This thesis is submitted in partial fulfilment of the requirements for the award of the degree of Doctor of Philosophy of the University of Portsmouth

May 2011
ABSTRACT

The thesis aims to examine simulation exercises comparatively in Korea and the UK, and provide practical suggestions for the future of Korean simulation exercises, based on lessons from the UK experiences and practices, regarding effective planning and execution of simulation exercises. To achieve this aim, two research questions were formulated. Firstly, ‘How are simulation exercises in Korea and the UK organised and conducted, and how can this knowledge be used to respond to crises or disasters more effectively?’. Secondly, ‘Why are new methodological changes to organise and conduct simulation exercises needed in Korea?’. In order to practically assess whether or not simulation exercises in Korea are sufficient in dealing with the nature and characteristics of a large-scale disaster, this thesis carries out an in-depth investigation of two real-life underground fires: the King’s Cross Underground Fire in the UK and the Daegu Subway Fire in Korea. Simulation exercises are influenced by the social, political, and cultural contexts of emergency management arrangements, and hence, the study also conducts a comparative study of emergency management frameworks in Korea and the UK.

The current practices of simulation exercises in Korea can be categorised into the four main themes: ‘Top-level Commitment and Support’, ‘Repeating Training through Rehearsals’, ‘The Politics of Box Seats, Ill-structured Scenario-Scripts and a Lack of Adaptation’, and ‘The Politics of Podium and Speech-based Debriefs’. However, critical analysis of the empirical data in the study reveals that a complex and highly-coupled ‘socio-technical’ crisis does not respect such a conventional training and exercising methodology of Korean simulation exercises, and that a degree of ‘adaptation’ is indispensable to effective crisis response. Thus, it is proposed in the study that Korean simulation exercises need to allow adaptation and diversion to take place, encouraging communication and discussion between exercise players. Furthermore, ensuing after-action reviews in Korea should be transformed into a discussion-based debriefing style to maximise learning effectiveness. Finally, it is suggested that emergency management arrangements in Korea should also evolve into a more flexible, decentralised, bottom-up model in terms of effective response to ‘socio-technical’ crises or disasters along with changes in simulation exercises and subsequent after-action reviews.
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DECLARATION

Whilst registered as a candidate for the above degree, I have not been registered for any other research award. The results and conclusions embodied in this thesis are the work of the named candidate and have not been submitted for any other academic award.
<table>
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<tr>
<th>Abbreviation</th>
<th>Description</th>
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<td>Association of Chief Police Officers</td>
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<td>BCM</td>
<td>Business Continuity Management</td>
</tr>
<tr>
<td>BCP</td>
<td>Business Continuity Plan</td>
</tr>
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<td>BTP</td>
<td>British Transport Police</td>
</tr>
<tr>
<td>CBRN</td>
<td>Chemical, Biological, Radiological, and Nuclear</td>
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<td>Civil Contingencies Act 2004</td>
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<td>Government Office</td>
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<td>IEM</td>
<td>Integrated Emergency Management</td>
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<td>IFSMD</td>
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<td>KCG</td>
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<td>Special Weapons and Tactics</td>
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DISSEMINATION

Relevant Publications


Relevant Conference Papers


CHAPTER 1
INTRODUCTION

“No battle plan survives contact with the enemy.”
(Helmuth von Moltke the Elder, 1800-1891)

1.1 INTRODUCTION

Today, risk is becoming a pervasive phenomenon, and modern society can be characterised by a high-risk world. As we develop and change the life conditions or environment, the new types of risk, which range from climate change to BSE and nuclear energy to mobile phones, are continuously emerging in spite of human efforts to avoid them. Such public and academic concerns about risk have led to the publication of various books and discourses exploring the nature of risk. In particular, high-profile disasters in the UK, such as the Zeebrugge Ferry Disaster, the Clapham Junction Railway Accident, and the Buncefield Fire, empirically showed that large scale disasters cannot be controlled by scientific and technical strategies or countermeasures alone. Instead, social science approaches to risk have become increasingly prominent in understanding risk, drawing attention to the question of how complex organisations and disasters can be managed safely (Taylor-Gooby and Zinn, 2005).

Under these circumstances, simulation exercises are increasingly recognised as an effective learning tool to train emergency services to deal with major incidents throughout the world. This is mainly because they are the only viable way to vicariously test or train response organisations’ ability in mock crisis or disaster situations (Kleiboer, 1997) (For the difference between the concepts of emergency, crisis, and disaster, please refer to Section 3.2.6). The existence of written emergency plan documents is, of course, important, but the documents alone are not sufficient to guarantee preparedness (Quarantelli, 1981). The written emergency plans are likely to fail under the pressure of vast and complex crisis or disaster situations, and hence they might readily degenerate into little more than window-dressing, creating a false sense of preparedness, unless they are connected with regular training and exercise programs. In this context, emergency response organisations need to build up their experience and confidence with simulation exercises, and this is the reason why they are viewed as the most effective
and efficient way to validate emergency plans, test disaster capacity, and as a consequence, ensure an optima state of preparedness.

1.2 RESEARCH RATIONALE

1.2.1 Introduction

At disaster scenes, emergency response organisations are required to work together to minimise the threat to human life and wider consequences of the disaster. Typically, no single agency can possess all the skills and resources necessary to respond. In this regard, cooperation and coordination at the phases of preparedness (e.g. planning, training, and exercising) and response has been long practised by the emergency services in the UK. However, training and exercising for such cooperation and information-sharing on the scene is not easy, and can be very costly. Furthermore, failure in such training or exercising may result in poor disaster response, which consequently gives rise to mass casualties and expensive economic damage, together with the public’s denunciation of the emergency services (Borodzicz, 1997, 2005). On the other hand, the problem is that the benefit of such training and exercising might become apparent, only when a real disaster happens (Borodzicz, 1997, 2005).

In Korea, simulation exercises are, in practice, employed to prepare for and improve the response of the emergency services to major incidents. However, the field of simulation exercises is not well researched, and accordingly has failed to draw the attention of academics as well as practitioners in the Korean context, despite their great importance in assuring resilience (MOPAS, 2008). Furthermore, there is a lack of theoretical and practical frameworks on organising and validating simulation exercises and their subsequent debriefings. For this reason, there exists no official guidance on how to plan, organise, and conduct an exercise in Korea (NIDP, 2001), and a majority of exercise designers put too much emphasis on simply running simulations, regardless of their policy relevance. There also is a tendency for exercise designers to neglect the process of observation and evaluation in simulation exercises, without providing systematic feedback to exercise players (NIDP, 2001).

1.2.2 King’s Cross Underground Fire in the UK
On November 18, 1987, a fire started in an escalator at the King’ Cross underground station, which was one of the busiest among London’s underground network. In this fire, the police evacuated passengers upward, although the fire moved in the same direction (Borodzicz, 1997). The first fire-fighter on the scene noticed this, and tried to reverse passengers’ movement, which was in stark contrast to the police evacuation focused on moving people upwards. This attempt was too late, and the fire eventually developed into a dangerous flashover point, which claimed about thirty lives. The most intriguing aspect of this case is that the police effectively carried out their duties in the manner in which they were trained, although in reality, their actions inadvertently plunged passengers into the fire. The police might have realised the danger at that time, if they had consulted with specialists in underground fire behaviour, for example, the fire brigade. What if the police had tried to communicate with the fire brigade at the time of the evacuation?

1.2.3 Daegu Subway Fire in the Republic of Korea

In 2003, a major subway fire disaster, called the Daegu Subway Fire, occurred in Daegu, the third largest city in Korea. The fire left nearly two hundred people dead and one hundred and fifty injured. The lack of sufficient fire fighting equipment, a faulty ventilation system, failure of the backup power system, poor reaction by subway staff, and the negligence of traffic control officials compounded the casualties (Hong, 2004). Notably, the fatalities all occurred within 15 minutes or less from the onset of the fire. Fire fighters could not even enter the station, because of the heavy black smoke and toxic gases. Given that a fire develops fast and fire-fighters may arrive at the scene late in a crowded city like Daegu, it becomes apparent that the role of subway staff is also of great importance in extinguishing fire, or evacuating passengers as an initial response, before emergency services appear. However, when the fire started, subway staff did not take action because they had not been trained for that situation. What if the subway staff had tried to extinguish the fire first, while emergency services were on their way to the scene? On the other hand, if the police had come to the site before the fire brigade, could they have moved passengers downward, avoiding the mistakes by the British police in the King’s Cross Fire?

1.2.4 Conclusion

Reflecting on the two underground fires suggests that disaster response should deal with
situational uncertainties and complexity, and it is quite probable that unsuccessful management of even a small fire will cause tragic consequences. Nevertheless, most simulation exercises for Korean emergency services still seem to be focused on applying traditional mechanistic and simplistic responses to specific situations with the so-called ‘ill-structured’ scenario-scripts (MOPAS, 2008). The brief explanation of the two fire disasters also demonstrates that inter-agency coordination and cooperation can be instrumental in successfully managing situations of a degree of ambiguity and uncertainty. However, because of Korean cultural practices, which stress in-group solidarity and foster an inward orientation, both inter-organisational preparedness and response countermeasures generally tend to be underemphasised. Consequently, governmental and other disaster-relevant organisations in Korea may have been reasonably well-prepared internally for ‘well-defined’ disasters, but are not prepared to coordinate with other organisations and groups on key response tasks, when a large-scale disaster strikes.

The research originates from such ‘what if’ questions. At this time, emergency response organisations in Korea, including subway staff, are probably well prepared internally for a subway fire. For disasters including subway fires, the most common means of training or exercising in the Korean emergency services has been through simulation exercises. However, what if an ill-structured or unexpected accident - for instance, the Sarin Gas Attack in the Tokyo subway - occurred in the Daegu subway? Can the current simulation exercises enable them to deal with not only a fire, but also a sarin attack successfully, facilitating cooperation and information-sharing among emergency response agencies? If not, then is a new methodological framework to organise and conduct simulation exercises required? In this context, this thesis is to identify the general problems that Korean simulation exercises are facing, and then to make practical suggestions, based on lessons from the UK (England-focused) simulation exercise practices.

**1.3 RESEARCH AIM AND OBJECTIVES**

**1.3.1 Research Aim and Questions**

The main aim of the research is basically to make desirable recommendations for the future of Korean simulation exercises in order to promote multi-organisational
coordination and cooperation in disaster response. To this aim, this thesis will fundamentally compare and contrast current practices of simulation exercises in Korea and the UK, which are used jointly by emergency response agencies within a disaster response context. The lack of knowledge and expertise in the field of simulation exercises in Korea justifies this research, and further, the analysis of the research rationale finally allows the following two research questions to be formulated: First, how are simulation exercises in Korea and the UK (England-focused) organised and conducted, and how can this knowledge be used to respond to crises or disasters more effectively? Second, why are new methodological changes to organise and conduct simulation exercises needed in Korea?

1.3.2 Research Objectives

To meet the research aim, the research will have four objectives as follows: the first objective is to demonstrate the usefulness of simulation as training or exercise tools, on the assumption that a simulation is one of the best vehicles to facilitate individual and organisational learning. The second objective is to investigate and compare real underground fires: the Daegu Subway Fire in Korea and the King’s Cross Fire in the UK, in order to understand the nature and commensurate characteristics of large-scale disasters. The nature of a disaster is such that it would be both ethically and practically impossible to study human behaviour in actual disaster situations. In this context, simulation exercises offer an ethical insight into this fascinating world, although this is always one step away from the reality (Borodzicz, 1997). For this reason, not only simulation exercises but also real (past) incidents are to be explored. The third is to make a cross-cultural comparison between simulation exercises used by emergency response agencies in Korea and the UK.

The fourth objective is to examine and compare the current organisational and legislative mechanisms of emergency management in Korea and the UK. This is because the way simulation exercises are planned and implemented can be partially ascribed to the social, cultural, and political contexts of emergency management arrangements. In this sense, it is necessary to understand history, development and current legal framework of emergency management, and then contextualise simulation exercises. Therefore, the thesis also attempts to explore the social, cultural, and political contexts, where simulation exercises take place, and the roles played by response organisations. Finally, through the analysis of specific exercise simulation cases, the
study will pave the way for a new, efficient simulation exercise model to encourage multi-agency cooperation and information-sharing, based on lessons from the UK experiences and practices.

1.3.3 Aims of Comparison

The thesis takes the form of a cross-national comparative study, and one of the benefits of comparative research is to learn from the experience of others (Pakes, 2010). Simulation exercises around the world are likely to face similar challenges. It might be, therefore, informative to probe into how simulation exercises in other advanced countries deal with their problems. In this regard, the thesis is to learn from the way the UK simulation exercises are planned, organised and executed, and subsequently to look at Korean practices of simulation exercises from a new perspective, in order to provide practical suggestions. To acquire such insight, it is also vital to figure out the arrangements of emergency management, in which simulation exercises operate. This is because the way simulation exercises are planned and carried out is influenced by culture, history and society. However, ‘best practice’ requires many comparative studies of simulation exercises, and thus even if the thesis draws some lessons from the UK experiences and practices, regarding simulation exercises, they should not be treated as the ideal solutions, nor only the solutions, available.

1.4 STRUCTURE OF THE THESIS

The thesis consists of eight chapters. The second chapter deals with the theoretical literature on risk. The third chapter intends to explain and analyse the theoretical literature on purposes and types of simulation exercises, simulation and learning theories, reflections and debriefings, and validation issues, regarding evaluation of the learning effect. The fourth chapter is mainly associated with research methodology and the progress of the research, adopted by this thesis. As argued in Section 1.3.3, a comparative study on the different national frameworks of emergency management can contribute to a better and deeper understanding of the differences in the manner in which simulation exercises are planned, organised, and conducted. For this contextualised understanding, the fifth chapter will examine the organisational and legislative development of emergency management systems in Korea and the UK.
The sixth chapter has been sub-divided into two sections. The first section investigates the nature and properties of the aforementioned two underground fires, and the second section illustrates the processes and findings of ethnographic-natured case studies into a total of seven simulation exercises in Korea and the UK. In the seventh chapter, the main themes will be finally drawn, after categorising the research findings of Chapter 6. Combined with the literature review in Chapter 2 and 3, the seventh chapter will also conduct theoretical analysis and discussion of the empirical findings in a critical fashion. The thesis concludes with the eighth chapter, in which the research process and findings will be summarised. This final chapter will briefly include a major contribution of the thesis to the field of Korean simulation exercises, and a series of constructive recommendations, regarding directions for future research.

1.5 CONCLUSION

Simulation exercises are mainly used as a training tool for cooperation and information-sharing within the British emergency services (Home Office, 2003). One of the reasons is that knowledge, skills, and attitudes in responding to disasters can be improved by that simulation exercise, in which exercise players are encouraged to develop their strategies and their styles or to test their modus operandi for coping with emergencies. In Korea, exercises are also increasingly being employed to prepare for and improve the response of the emergency services to major incidents. However, each response agency in Korea separately runs simulation exercises primarily geared toward its own organisational objects, which are incongruent with other organisations’ objects. Accordingly, it can be presumed that this type of simulation might not be sufficient, when a large-scale disaster of a highly unforeseen nature, such as the King’s Cross Fire and the Daegu Subway Fire, takes place. In this context, the two research questions are developed: ‘How are simulation exercises in Korea and the UK organised and conducted, and how can this knowledge be used to respond to crises or disasters more effectively?’ and ‘Why are new methodological changes to organise and conduct simulation exercises needed in Korea?’. In the next chapter, the theoretical literature on risk will be presented, with the hope that through changes in current practices of Korea simulation exercises, much can be done to ameliorate risk by facilitating effective response to large-scale disasters.
CHAPTER 2
THEORIES OF RISK

2.1 INTRODUCTION

Today, ‘risk’ is omnipresent and most human activities give rise to risk. Beck (1992) argues that we live in a ‘Risk Society’, where uncertainty, complexity, and multiplicity of new technologies are increasing at an unprecedented rate, and it is impossible to predict their hazards and potential consequences precisely. In this context, risk becomes recognised as one of the most important organising principles and influential concepts in contemporary society. However, there is no clear and commonly agreed definition of what the term risk actually means, since the concepts of risk used in different fields are usually perceived against the background of their “epistemological foundation” (Zinn, 2008, p.4).

<table>
<thead>
<tr>
<th>Table 1: Some formal definition of risk</th>
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<tbody>
<tr>
<td>• Probability of undesired consequences.</td>
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<tr>
<td>• Seriousness of (maximum) possible undesired consequences.</td>
</tr>
<tr>
<td>• Multi-attribute weighted sum of components of possible undesired consequences.</td>
</tr>
<tr>
<td>• Probability x seriousness of undesired consequences (‘expected loss’).</td>
</tr>
<tr>
<td>• Probability weighted sum of all possible undesired consequences (average ‘expected loss’).</td>
</tr>
<tr>
<td>• Fitted function through graph of points relating probability to extent of undesired consequences.</td>
</tr>
<tr>
<td>• Semivariance of possible undesired consequences about their average.</td>
</tr>
<tr>
<td>• Variance of all possible consequences about mean expected consequences.</td>
</tr>
<tr>
<td>• Weighted combination of various parameters of the probability distribution of all possible consequences.</td>
</tr>
<tr>
<td>• Weight of possible undesired consequences (‘loss’) relative to comparable possible desired consequences (‘gain’).</td>
</tr>
</tbody>
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Source: Vlek and Keren (1991)

Contemporary academic studies of risk are conducted in both natural and social sciences, promoted by the practical needs of an industrialised society to regulate technology and
to protect their citizens from natural and technological hazards. Risk analysis in the natural sciences is mainly focused on ‘Quantitative Risk Assessment (QRA)’ in order to calculate or measure the frequency or likelihood of a certain physical danger, and its scale and intensity. In contrast, perceived risk or risk perception has been a focus of interest for policy-makers and academics in the realm of the social sciences. This risk perception is currently understood to involve not only people’s beliefs, attitudes, and emotions, but also their wider social and cultural contexts toward and of risk (Royal Society, 1992). The social science research of risk can be again divided into two broad approaches: psychological and sociological ones (Taylor-Gooby and Zinn, 2006).

Most of the earlier psychological approaches known as ‘Risk Perception’ concentrated on the identification and measurement of various features in the human decision-making process, where risk was considered as a real and objective entity (Borodzicz, 1997). However, since the beginning of 1980s, the social and cultural contexts of risk have become one of the key issues in risk studies. For example, the Royal Society (1992) noted that one of the major challenges to orthodox psychological approaches to risk perception had originated from the grid-group ‘Cultural Theory’ proposed by anthropologists such as Mary Douglas. They argued that risk perception needed to be viewed within the cultural context of the individuals’ relationship to social groups and their social structures.

Recent developments however show that those approaches have begun to converge, incorporating a wide range of theoretical perspectives with one another (Krimsky and Golding, 1992; Royal Society 1992; Taylor-Gooby and Zinn, 2006). For example, psychologists have begun to consider the influence of social and cultural factors on risk perception, and conversely sociologists have emphasised personal accounts of risk recognition and response, all of which will be discussed in the ensuing sections. This chapter will review the two main approaches of ‘psychology’ and ‘sociology’ to risk, from the perspective of the social sciences. First of all, it commences by introducing two influential psychological theories of ‘Risk Perception’: cognitive/decision-making and psychometric approaches.

2.2 PSYCHOLOGICAL APPROACHES: RISK PERCEPTION
2.2.1 Cognitive/ Decision Making Strategies

Serious academic interest in risk management among social scientists dates back to as far as the seventeenth century, when concepts of risk were being developed together with probability in mathematics (Borodzicz, 1997). Douglas (1985) argued that this could be linked with the notion of a capitalist philosophy, where the ownership and creation of great wealth could be justified by the risk-taking behaviour of the entrepreneur. Most of the earlier psychological approaches known as ‘Risk Perception’ have been influenced by the context of such risk-taking behaviour. Risk perception has concentrated on the identification and measurement of various features in the human decision-making process, where risk was considered as having an objective nature, and thus, most of their work has been of a highly quantified nature.

“… risks to which they are exposed can be treated as though they were concrete physical entities which can be precisely defined and unambiguously measured in objective terms. That is to say, they believe that risks and their assessment can be considered as value-free and neutral.”

(Toft, 2001, p.7)

For this reason, cognitive theorists in the field of risk perception attempted to understand the decision-making process under a simulated environment. Their studies have usually been carried out in a psychological laboratory, using artificial experimental paradigms, and college students as their subjects. Subsequently, these theoretical results are applied to real situations or different populations of other samples. For example, Kahneman and Tversky (1979) conducted a series of gambling experiments to see how people evaluated their chance of winning, and discovered that people had a statistical probability of making certain choices, which however were often far from rational decision-making. The advantage of this experiment is that researchers can apply various stimuli to their subjects and observe their responses (Borodzicz, 1997). The nature of this decision-making in risky situations was also made explicit by Lopes (1987), who used gambling analogies for her own research.

“Technically, the word risk refers to situations in which a decision is made whose consequences depend on the outcomes of future events having known probabilities. Choices among the different kinds of bets in games like roulette and craps are good examples of choice made under risk.”
However, the effectiveness of such quantified tools as a sole methodology for managing risk is not unproblematic. According to Starr (1969), risk perception could be influenced not only by quantitative assessments of risk, but also subjective or qualitative factors such as voluntariness. He discovered that there was a distinction between voluntary and involuntary risks. He argued that one’s risk perception could be influenced by the extent to which risk was considered to be self-imposed, in contrast to risks exerted by an external influence beyond personal control. Here, involuntary risks were defined as “imposed by the society in which the individual lives” (Starr, 1969, p.165). This finding is of importance because it revealed an aspect of the complexity of social features, which influences individual perceptions of risk. However, this aspect of risk is such that it can never be reproduced by the gambling experiment (Gigerenzer, 1996). The subjective nature of risk was more investigated by psychometric approaches to risk.

2.2.2 Psychometric Model

Psychometric studies are a systematic approach in which the psychological variables in relation to particular hazards are collected and measured from individuals in a sample population. In particular, psychometric approaches attempted to take account of the qualitative features of hazards, by measuring the extent to which people perceived particular risks with regard to fatalities. In 1978, a significant experiment was conducted, involving educated lay subjects (Lichtenstein et al., 1978). They were required to judge the fatality rates from various known hazards, which ranged from natural disasters to common fatal diseases. The first result was that the subjects had a propensity to overestimate the death rates for low-frequency hazards, such as floods, botulism, and smallpox vaccinations, whilst they underestimated the death rates for high-frequency hazards, such as heart diseases, diabetes, and homicide. The second was that whereas the subjects slightly overestimated deaths from vaccination but more heavily overestimated those from botulism, they slightly underestimated those from diabetes and moderately underestimated homicide deaths. Such work is of significance as it was the first attempt to measure the extent of human irrationality towards substantive risk issues, and consequently demonstrate the public’s confusion in rationalising risk (Royal Society, 1992).

However, perception of risk was to turn out more complex matters than simply
assessing death rates. Slovic et al. (1980) analysed the most feared types of hazards by using ‘3-way factor analysis techniques’. Their study used a large sample population for data collection, and investigated the perceptions of different hazards in relation to three factors: ‘Dread risk’, ‘Unknown risk’, and the ‘Number of people exposed’ (See Figure 1). ‘Dread risk’ primarily concerned judgements of scales, such as uncontrollability, dread (fear), involuntariness of exposure, and unequal distribution of risks. Hazards of nuclear power, nuclear weapons, nerve gas, and terrorism were rated high on this factor. ‘Unknown risk’ related to judgements of the familiarity of risks, and hazards of solar electric power, DNA research, and earth orbiting satellite were calculated to be high on this factor. The third dimension the ‘Number of people exposed’ was associated with literally, the number of people exposed to the hazard, and the degree of one’s personal exposure.

Figure 1: Perceptions of different hazards by 3-way factor analysis

In the above 3-way factor analysis, Slovic (1987) argued that the first dimension ‘Dread risk’ was most significant, since “the higher a hazard’s score on this factor, the higher its
perceived risks, the more people want to see its current risks reduced and the more they want to see strict regulation employed to achieve the desired reduction in risk” (Slovic, 1987, p.283). When it comes to the achievements of the psychometric model, the Royal Society acknowledges as follows:

“The psychometric tradition has undoubtedly generated an impressive body of empirical data on individual risk perceptions. The evidence shows that human judgments of hazards and their benefits involve multiple qualitative dimensions related in quite subtle and complex ways.”

(Royal Society, 1992, p.107)

Table 2: General (negative) attributes of hazards in the psychometric tradition

- Involuntary exposure to risk
- Lack of personal control over outcomes
- Uncertainty about probabilities or consequences of exposure
- Lack of personal experience with the risk (fear of unknown)
- Difficulty in imagining risk exposure
- Effects of exposure delayed in time
- Genetic effects of exposure (threatens future generations)
- Infrequent but catastrophic accidents (‘Kill Size’)
- Benefits not highly visible
- Benefits go to others (inequity)
- Accidents caused by human failure rather than natural causes.

Source: Otway and von Winterfeldt (1982)

All of these studies highlighted the complexity of risk perception, but there were still several criticisms of the psychometric model regarding its methodology. Although psychometric approaches attempted to take the qualitative dimensions of hazards into account, the perceived risk was still calibrated against actual risk within a certain population of individuals. In other words, the basic pattern, ‘Reductionism’ remained, and thus it was still assumed that aspects of risk could be considered as constants; and how people feel about hazards could be measured accurately and thus managed. Furthermore, the psychometric theories tended to neglect the social and cultural contexts in which beliefs about risks are formed and risk decisions are determined.
“The perception of risk is multidimensional with a particular hazard meaning different things to different people and different things in different contexts... risk perception cannot be reduced to a single subjective correlate of a particular mathematical aspect of risk, such as the product of probabilities and consequences, because this imposes unduly restrictive assumptions about what is an essentially human and social phenomenon.”

(Royal Society, 1992, p.89)

Anthropologists have criticised psychometric approaches for their failure to take account of the cultural dimensions of risk perception. For example, Douglas argued that “The profession of psychologists which has grown up to study risk perception takes the culturally innocent approach by treating political dissension as intellectual disagreement” (Douglas, 1990, p.9). Moreover, risk communication theorists have criticised them, questioning the social contexts where communication takes place between the general public and experts.

2.3 SOCIOLOGICAL APPROACHES

2.3.1 Cultural Theory

Cultural theorists argue that risk perception needs to be viewed within the cultural context of individuals’ relationship to social groups and their social structure, figuring that that risk is culturally constructed (Douglas, 1978). Its crux is that human attitudes toward risk and danger are not only heterogeneous, but also differ according to their cultural biases. Cultural bias means attitudes and beliefs shared by a group, and outlines the risks that the groups is to identify in ways that cannot be explained by quantitative analysis of ‘objective’ risks (Royal Society, 1992). An individual’s cultural bias is linked with the extent to which people are included in bounded groups – ‘group’ dimension, and with the extent to which an individual’s life is restricted by externally imposed prescriptions – ‘grid’ dimension (Thompson et al., 1990). Wildavsky and Dake (1990) argued that these cultural biases could predict the findings of risk perception, and that people selected what to fear and how to fear it in order to sustain their own way of life.

Putting the two dimensions together, four ways of life can be identified (Douglas, 1978;
Thompson et al., 1990): Fatalism (low group/high grid), Hierarchy (high group/high grid), Individualism (low group/low grid), and Egalitarianism (high group/low grid) (See Figure 2). In some variants, a fifth category, ‘hermits’ or ‘autonomists’ can be added (Royal Society, 1992, p.112). Fatalists regard risk as something capricious; there is nothing that they can do about it. Hierarchists consider risk as perverse/tolerant; everything will be okay if only they stay within known limits made by experts. Individualists regard risk and danger as something parallel; they intentionally ignore risk in pursuit of short-term profits, thinking that risk and profit go hand in hand. Egalitarians view risk as ephemeral. Risk and potential disasters are an ever-present threat from forces in ‘the system’ beyond the border. Hermits or autonomists avoid both the grid and group dimensions, refusing to engage in any relationship with others. Although there are only four (or five) viable ways of life, however central to cultural theory is the understanding that each way of life depends upon the survival of the other ways of life for its own ongoing existence (Thompson et al., 1990).

This grid–group cultural theory has been also criticised in three ways. The first one is that the four categories seem to be an over-simplification or reduction of the complexity found in the real world, given that there are a variety of races, theories and cultures in the world (Funtowicz and Ravetz, 1985; Johnson, 1987; Sjöberg, 1996).

“… there remains a basic problem in unambiguously classifying existing social units in terms of the grid and group dimensions, that the basic four or five cultural types may oversimplify more complex shades of social difference, and in particular that environmentalism may not be just an egalitarian movement because ‘different kinds of environmentalism can stem from all four posited social structures’.”

(Royal Society, 1992, p.113)

The second one is that the cultural theory tends to make static (not dynamic) comparisons among the four ways of life. According to Bellaby (1989), cultural theory cannot explain the reason why individuals might move from one risk culture to another, and how an organisation has changed from one risk culture to another. He argues that life course transitions can account for this personal movement between cultures, and that the struggle for power as well as the impact of managerial succession can expound the immanent dynamic, by which an organisation transfers from one culture to another.
The final one is that cultural theory seldom produces empirical results, which can help solving real-world problems. For example, Rayner (1992) argues that the practical application of cultural theory has been very limited, and thus cultural theorists have made few systematic empirical studies of risk perception and management. In a similar vein, Boholm (1996) argues that the cultural theory of risk has been highly praised in risk perception and management, but still lacks empirical substantiation.

Figure 2: Cultural theory - four ways of life.

<table>
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<tr>
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<tbody>
<tr>
<td>Fatalism: Isolated and subordinate</td>
<td>Hierarchy: bounded and graded</td>
</tr>
<tr>
<td>Individualism: competitive network</td>
<td>Egalitarianism: bounded but equal</td>
</tr>
</tbody>
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Source: Frosdick (1995)

2.3.2 Risk Communication

Risk communication evolved from earlier work in risk perception (Lofstedt, 2003). During the 1980s, interest in the topic of risk perception diminished whilst theories of risk communication started to emerge (Pidgeon, 1992). The purpose of risk communication is to consider various and different perceptions of risk in order to reduce social conflicts on the assumption that people look at the world differently. There are two major reasons for the emergence of risk communication (Plough and Krimsky, 1987). First, risk communication surfaced to pass quantitative information about risk from experts to the public. Secondly, it emerged to resolve the public policy dilemmas resulting from particular social conflicts over risks, for example, over the place where
the nuclear plant would be established. Hence, by considering respective social contexts of individuals (who have different expectations), the central characteristic in risk communication is to increase their dialogue and cooperation by establishing realistic common purposes between them. In a similar vein, the Royal Society (1992) argues that developing effective forms of communication between the groups might not only foster better mutual understanding, but also lead to a solution of such conflicts. In this context, risk communication can be defined as follows:

“Risk communication is an interactive process of exchange of information and opinion among individuals, groups, and institutions. It involves multiple messages about the nature of risk and other messages, not strictly about risk, that express concerns, opinions, or reactions to risk messages or to legal and institutional arrangements for risk management.”

(NRC, 1989, p.21)

However, risk communicators appear to frequently use the ‘deficit (or public ignorance) model’ (Wynne, 1991; Gross, 1994; Irwin, 1995). In the deficit model, risk communication is characterised as a ‘top-down’ or one-way transmission of messages about a hazard from experts to lay people. In this model, the general public are assumed to be ‘deficit’ whilst science is considered as ‘sufficient’, and thus usually isolated from contexts that give it public significance (Gross, 1994). In this sense, it is assumed that fears and objections of the general public about new risks such as Mad Cow Diseases, GMO, and nuclear power plants stem from ignorance of the science behind them. The model fails to consider the perspectives of lay people combined with their sociological and cultural values in the real world. However, risk communication is basically founded on an assumption that the general public has a generalised right to know about risks and their hazards (Reynolds and Seeger, 2005). In this way, the deficit model is rather viewed as ineffective for resolving social conflicts especially between experts and the general public. Noticeably, this model has ignored the social interactions and contexts which define authentic risk communication (Otway and Wynne, 1989).

“While [the]… top down approach has the apparent advantages of ‘keeping the message simple’, it does encounter major difficulties. These ‘difficulties’ essentially relate to the understanding of local people whose practical experience encourages scepticism towards this kind of official advice. The ‘public ignorance’ model thus fails because it builds ‘practical’ action on a
flawed conceptualisation of the citizen-science relationship... the assumption that local people are a mere *tabula rasa* is not only sociologically inaccurate but it also serves as an obstacle to social learning on all sides.”

(Irwin, 1995, p.92)

In contrast, the ‘sociological’ model (or sociological view of risk communication) equally takes account of the evidences and assumptions made by both experts and non-experts, and thus seems to be more appropriate in term of effective risk communication. The Royal Society (1992, p.120) divided this model into three sub-approaches. The first one emphasises the communication process, typically with a two-way exchange or dialogue. It entails multiple messages about the nature of risk and also other messages that show concerns, opinions, or reaction to risk. The second sub-approach stresses not just the exchange of information between actors, but the wider institutional and cultural contexts, within which risk messages are formulated and embedded. The final sub-approach regards risk communication as part of wider political processes that operate within democratic societies. Therefore, this type of risk communication encourages people to take part more actively and effectively in the process of decision-making about risks. Here, the most important point is that the findings from risk perception and cultural theory (e.g. subjective nature of risk) might be harmonised and reflected equally in this model (Royal Society, 1992).

2.3.3 Safety Culture

As a prerequisite, it should be noted that the definitions of ‘safety culture’ have been derived mainly from the more general notion of organisational culture, and thus, the idea of ‘safety culture’ is also one facet of the concept of ‘culture’, widely used in the social sciences. The beginning of safety culture can be traced back to the nuclear disaster at Chernobyl in 1986 (Pidgeon, 1998), where a poor safety culture was acknowledged as a contributing factor. Since then, safety culture begun to be discussed in public enquires and the analysis of system failures, such as the King’s Cross Underground fire and the Piper Alpha oil platform explosion. For example, in the report on the Piper Alpha disaster, Lord Cullen (1990) notes that it is absolutely necessary to establish a corporate culture, where safety is recognised as the number one priority. Also, Borodzicz in his PhD research on the King’s Cross Underground Fire (Borodzicz, 1997, p.117) observes, “…the problem appeared to be the defective safety culture within they were employed. …The safety culture of London Transport staff did not consider fire as
Definitions of ‘safety culture’ abound in safety literature, and there is no generally accepted terminology. One of the most widely used definitions of safety culture was suggested by the Health and Safety Commission (HSC). According to HSC (1993, p.23), safety culture is viewed as “the product of individual and group values, attitudes, perceptions, competencies, and pattern of behaviour that determine the commitment to, and the style and proficiency of, an organisation’s health and safety management”. Toft and Reynolds (1999, p.15) also define ‘safety culture’ as “those sets of norms, roles, beliefs, attitudes, and social and technical practices within an organisation which are concerned with minimising the exposure of individuals to conditions considered to be dangerous”. However, several commonalities among these many different definitions can be identified as follows (Wiegmann et al., 2002, p.5):

- Safety culture is a concept defined at the group level or higher, which refers to the shared values among all the group or organisation members.
- Safety culture is concerned with formal safety issues in an organisation, and closely related to, but not restricted to, the management and supervisory systems.
- Safety culture emphasises the contribution from everyone at every level of an organisation.
- The safety culture of an organisation has an impact on its members’ behaviour at work.
- Safety culture is usually reflected in the contingency between reward systems and safety performance.
- Safety culture is reflected in an organisation’s willingness to develop and learn from errors, incidents, and accidents.
- Safety culture is relatively enduring, stable and resistant to change.

In particular, Toft and Reynolds (1999) argue that the collapse of this ‘safety culture’ ultimately can cause large-scale disasters. In a similar vein, HSC (1993) argues that an organisation with a good safety culture will benefit from enhanced profit and safety in both the long and short term because risks can be recognised and avoided by creating and sustaining good safety culture. Here, noticeably, ‘organisational learning’ is considered as significant in improving safety culture, as it acknowledges that people in organisations learn new modus operandi or ways of thinking through diverse experiences over a long term period (Waring, 1996; Toft and Reynolds, 1999).
Organisational learning can be defined as follows:

“Organisational learning may be defined as a cumulative, reflective, saturating process through which all personnel within organisations learn to understand and continually reinterpret the world in which they work by means of the organisational experiences to which they are exposed.”

(Toft and Reynolds, 1999, p.18)

Toft and Reynolds takes this point further:

“Neither decree, nor prescription, nor technical approaches on their own are sufficient to effect permanent change in the safety culture of organisations. Given the difficulty of changing the culture quickly a sustained commitment must be made to change. Organisations are dynamic, complex human activity systems… if organisations are to be as safe as reasonably practicable, they need to learn from their own experiences and where appropriate, the experiences of others.”

(Toft and Reynolds 1999, p.18)

However, Reason (2000) suggests that four safety paradoxes or contradictions should be acknowledged in the process of improving a safety culture, arguing that if an organisation is convinced that it has a good safety culture, paradoxically it does not. He contends that understanding the safety paradoxes can also contribute to achieving a better safety culture.

- Safety is defined and measured more by its absence rather than by its presence.
- Safety measures designed to protect a system might cause its catastrophic breakdown.
- Many organisations seek to limit the variability of human action, primarily to minimise error, but it is this same variability of humans to maintain safety in a dynamic and changing environment by adjusting to unexpected situations timely.
- A blind acceptance that absolute safety can be attainable is likely to prevent the achievement of feasible safety goals, whilst a preoccupation with failure might lead to high reliability.
2.3.4 Systems Theory

2.3.4.1 Normal Accidents

The use of Systems Theory dates back to the work of the biologist von Bertalanffy (1968) in the 1920s (Borodzicz, 1997). He develops the notion that different systems might have underlying similarities and common characteristics. Beishon (1980) also maintains that a particular system, whether it is originally biological, sociological or mechanical, can display the same or essentially similar properties if it is the same basic kind of system. Since then, systems theory has been extensively developed for application in many fields, both in and out of the human sciences. For example, Perrow in his book *Normal Accidents* (1999) argues that a system accident or a normal accident originates from the complex and unexpected interaction of multiple technical failures. Perrow classifies ‘systems’ into four levels of increasing aggregation: unit, parts, subsystems, and system, and accidents are connected with damage to subsystems or the system as a whole, disrupting future output of the system. The causes of disasters are usually ascribed to operator errors or human error, but he argues that the operators of the system are rather scapegoats or victims, as their errors have been already ‘designed’ into the complex systems. He says that modern technologies are now so complex and tightly coupled that accidents are no longer unavoidable, irrespective of operators’ errors, and for this reason, he refers to accidents as ‘normal accidents’. According to Perrow (1999, p.78), complex interactions are viewed as “those of unfamiliar sequences, or unplanned and unexpected sequences, and either not visible or not immediately comprehensible”. Tight-coupling is described as a situation, where what happens in one directly influences what happens in the other.

“If interactive complexity and tight coupling - system characteristics - inevitably will produce an accident, I believe we are justified in calling it a normal accident, or a system accident. The odd term normal accident is meant to signal that, given the system characteristics, multiple and unexpected interactions of failures are inevitable.”

(Perrow, 1999, p.5)

Thus, it can be argued that there is a negative correlation between complexity and coupling, and safety; complex and tightly coupled systems are inherently and unavoidably prone to accidents. Recently, Perrow (2008) suggests that it might be
possible to decrease complexity and tight-coupling by modularising a system. He argues that modularisation or modularity can reduce the possibilities of the unexpected interactions and the degree of tight coupling alike, and for this reason, the potential for a catastrophe can be eliminated. Put simply, through modularity, it might become feasible to simply replace a module in question and re-operate the system. However, his argument can be shown to have some weaknesses as it is too focused on technical problems, not considering social and cultural factors, which can also contribute to bringing about a failure.

2.3.4.2 Man-Made Disasters

Whilst Perrow’s discourse concerns tight and loose coupling in complex systems, in *Man-Made Disasters* (1978), Turner emphasises the influence of an organisation culture on ignorance to hazards and danger signals. He further argues that accidents within organisations stem not only from technological factors, but also a combination of human, organisational, and cultural problems, contending that “… it is better to think of the problem of understanding disasters as a socio-technical problem with social organisation and technical processes interacting to produce the phenomena to be studied” (Turner, 1978, p.3).

Turner (1978) has also suggested a six-staged model of how disasters occur in an organisation, showing the mutual dependency of both social and technical aspects of a system. At the first stage, the system operates on an accepted set of norms, values, and beliefs (operating culture). During the second stage (the incubation period), the system functions with minor problems and events arising, but these are not treated seriously as they do not conform to the organisation’s world-view of a hazard. In the third stage, a precipitating event happens, which is serious enough to provoke the awareness of decision-makers involved in the second stage. They attempt to respond to problems on the basis of preconceived ideas about the system’s mode of operation. However, the system may fail to respond to these interventions, subsequently leading to stage four – system failure or breakdown. The fourth stage is the onset of disaster, which produces the fifth stage, rescue and salvage. In the sixth stage, those responsible for operating the system learn to accept what has happened. They normally carry out an ‘inquiry process’ with a view to establishing its causality, and subsequently, ‘cultural re-adjustment’ takes place in order to improve the safety of the system. It can be summarised here that socio-technical accidents often “stem from an incubation of latent errors and events which are
at odds with the culturally taken-for-granted, accompanied by a collective failure of organisational intelligence” (Pidgeon and O’Leary, 2000, p.15). Similar conclusions are also drawn by many other theorists, who argue that the cause of disasters typically consists of a complex combination of technical, human, organisational and social factors (Horlick-Jones, 1990; Cox and Tait, 1991; Blockley, 1996; Toft and Reynolds, 1999). For example, Cox and Tait argues that “the majority of accidents are, in some measurable, attributable to human as well as procedural and technological failures” (Cox and Tait, 1991, p.93).

2.3.4.3 Isomorphic Learning

Learning from disasters could enable an organisation to prevent its own disasters (Toft and Reynolds, 1994, 1999; Kletz, 2001; Crichton et al., 2009). Undoubtedly, disasters are such infrequent phenomena that an organisation cannot completely predict such disasters on the basis of tracking its own statistical history. However, different organisations may have common properties in the context of a whole industry using similar management practices, materials or production processes. As a result, similar disasters can be observed in different organisations (Turner, 1978). Lagadec (1982) also proposes that disasters should not be treated as the meteorite that falls out of the sky, and rather they can be anticipated on several occasions. In this context, Toft and Reynolds (1999) argue that socio-technical disasters, at first glance, seem to show a set of unique characteristics, but through analysing the factors or the circumstances surrounding them, it is discovered that similar patterns of behaviour do exist across a wide variety of such calamities. Further, they state as follows:

“If disasters do recur for the same or similar reasons then it may also be postulated that the organisational learning which takes place following such events could also have similar features. Consequently, if we better understand those processes of reporting back and learning it may eventually be possible to design procedures and structures that will assist organisational learning and reduce further losses.”

(Toft and Reynolds, 1999, p.54)

According to Toft and Reynolds (1999, p.54-55), the ‘organisational learning’ is considered as occurring on at least three different levels of analysis. The first level is that of ‘organisational specific’ learning, where individual organisations involved in a
specific event draw their own lessons from the event in question. The second level is that of ‘isomorphic learning’, where more universally applicable lessons are drawn after analysis of the factors surrounding a specific organisational failure of other organisations. The third level is that of ‘iconic learning’, whereby the publication of disastrous events or technical failures (e.g. by the mass media) creates a learning event in itself for those who are unaware of such events. In particular, they argue that the second level of analysis and learning, i.e. ‘isomorphic learning’, is the most valuable. This is because at this level of analysis, people can see more clearly the fundamental causes of complex socio-technical disasters. Further, the particular and individual circumstances having been removed, the core fragilities of an organisation in question can be examined, and subsequently compared with the activities of other organisations. Consequently if strong isomorphic similarities are found in other organisations, it is possible to make use of the lessons resulting from such similarities, in order to help prevent the recurrence of a similar incident. Particularly, Toft and Reynolds (1994, p.xi) have made an impassioned plea for the significance of ‘isomorphic learning’, saying that “we owe it to those who have lost their lives, been injured, or suffered loss to draw out the maximum amount of information from those lessons and to apply it to reduce future suffering”.

Within the field of isomorphic learning is the concept of organisational isomorphism. According to Toft and Reynolds (1999), there are at least four types of isomorphism in which organisations can be thought of as displaying generic characteristics. The first isomorphism is ‘event isomorphism’, where qualitatively different incidents lead to the same dangerous result. For example, the consequences of a train which goes through a signal set at danger (human error) will be exactly the same as those of a train which passes a malfunction signal (technical failure); if there is another train on the same track, there will be a collision. The second is ‘common-mode isomorphism’. This is a situation where organisations in the different industry use the same or similar raw materials, components, techniques or procedures, which can give rise to the same or similar disasters. For example, polyurethane foam has been used for the material for seats from furniture, cars, and airplanes, but it is vulnerable to fire, and emits heavy smoke and toxic gases. This polyurethane foam was one of the main factors responsible for many fires including the Coldharbour Hospital Fire in 1972 and the Lockheed Tristar Fire in 1980, UK. The third is ‘self-isomorphism’. This is a situation where an organisation is so large that it possesses many operational sub-systems, which produce or serve the same or similar goods or service. Multi-national corporations such as Coca-Cola and
IBM can be good examples. Their different divisions or sub-systems might experience similar internal or external failures. The final is ‘cross-organisational isomorphism’, where organisations that show different sets of ownership, management and staff are identical in the context of the same industry. The Korean National Police Force and the British Local Police Forces together provide a good example. They are quite separate from one another in term of locations, arrangements, organisations, hierarchy structures, etc., but essentially share many of the same features in identical ways because their basic roles of maintaining public order and protecting the life and properties of their nationals are the same.

In summary, according to Toft and Reynolds (1999), learning from past disasters of other organisations or countries, i.e. ‘isomorphic learning’ can be used as comparative examples, giving the benefit of hindsight proactively to prevent future analogous tragedies. Also, the isomorphic learning might contribute to helping change its own ‘safety culture’. In particular, HSL (2005) suggests that the practical key elements for an effective system for learning lessons from incidents are as follows:

- An incident/accident reporting system;
- A process for incident investigation that ensures that the underlying as well as immediate causes of accidents and incidents are understood, taking full account of human and organisational factors;
- A process for analysing cumulative information on accidents and incidents from both internal and external events;
- A process for ensuring that the findings of incident investigation and analysis of accident and incident data are acted upon in a timely fashion and suitable interventions put in place or modifications made to prevent a recurrent of the incident or similar incidents;
- A process for evaluating the success or otherwise of interventions and modifications;
- A process for disseminating information on accident and incident causation and suitable interventions/modifications to all relevant parties (both internal and external), as quickly as possible;
- A system to capture the information in a format that is readily searchable and retrievable to allow ease of access, so that any lessons learned stay learned (corporate memory).
However, the concept of ‘isomorphic learning’ also has its critics. For instance, Reason (1990) counter-argued that it is extremely unlikely to happen as a consequence of the same sequence of errors, and thus specific learning would simply have a limited influence on overall organisational system safety.

“Such events are usually caused by the unique conjunction of several necessary but singly insufficient factors. Since the same mixture of causes is unlikely to recur, efforts to prevent the repetition of specific active errors will have only a limited impact on the safety of the system as a whole. At worst, they merely find better ways of securing a particular stable door once its occupant has bolted.”

(Reason, 1990, p.174)

2.3.5 Postmodernism

Defining ‘postmodernism’ is complex and complicated, and thus there is hardly agreement on its nature and meaning (Tyler, 2005). For example, Lash (1990) in his book ‘Sociology of Postmodernism’ summarises the main elements of the work of an acclaimed French sociologist, Pierre Bourdieu in reference to the concepts of ‘tradition’, ‘modernism’, and ‘postmodernism’. He sets out with the concept of ‘traditional society’, where “power is exercised unmediatedly by one agent over another. Relationships of power are effectively ‘exchange relationships’, based on the indebtedness of subordinate agent to his/her superordinate” (Lash, 1990, p.261). In contrast, he describes ‘modernism’ as “the differentiation and autonomisation of the ‘de-limited fields’ – i.e. the legal, political, intellectual, artistic, academic, cultural and religious fields – from the more general ‘field of power’” (Lash, 1990, p.262). In particular, he argues that ‘modernism’ can be only attained through struggle. Finally, he depicts ‘postmodernism’ as ‘de-differentiation and a reverse of autonomisation. This includes a process of “de-differentiation of fields or structures, and de-differentiation of agency, or the habitus. The latter comprises a partial breakdown or de-centring of the grid of classificatory rules which structure the habitus” (Lash, 1990, p.263).

Similarly, Holtzhausen (2000, 2002) mentions that ‘modernism’ emphasises on single, dominant theoretical perspectives and ideologies referred to as ‘metanarratives (Lyotard, 1992)’, while ‘postmodernism’ focuses on multiplicity and diversity, accommodating eclectic ideas and theories including the modernist perspective itself. For this reason, he
argues that postmodernism tries to make use of all relevant theories, which are applied to the issue under scrutiny, and as a consequence, postmodernism becomes increasingly multifaceted. According to Dear (1998), postmodernism is also viewed as a rebellion against not only the rationality of modernism but also the too-rigid conventions of existing methods and languages. Postmodernism “holds out for a philosophic culture freed from the search for ultimate foundations or the final justification” (Dear, 1998, p.265), and especially, he stresses on the importance of a conversation, in which no one holds hegemony, denying the dominance of one discourse over another. Seeger et al. (1998, p.269) take the point further, arguing that “the metaphor of postmodernity, with its emphasis on situated meanings, multiple audiences, counterrationality, and competing narratives, may prove useful for our understanding of organisational crisis”.

As mentioned above, ‘Postmodernism’ is basically founded on multiplicity and diversity, assimilating various paradigms and ideologies equally (Holtzhausen, 2000, 2002). In this context, noticeably, Browning and Shelter (1992) suggest that the concept of postmodernism should be applied to crisis and disaster management by allowing different hazard constructions (different perceptions of risk and hazards) of various organisations and parties to be considered. Thus, they analysed the Exxon Valdez oil spill disaster by applying the four postmodern features, such as ‘simultaneity’, ‘chaos’, ‘unintended consequences’, and ‘multiple realities’ (Browning and Shelter, 1992).

- Simultaneity: Two contradictory things happening at once.
- Chaos: Single event metamorphosis; instability/order resonance.
- Unintended consequences: We did not expect this to produce that.
- Multiple realities: Qualitative layers and strata differences of cultural and interest disjunctions.

They argue that all the differing hazard constructs of responding organisations involved need to be aired together as much as possible in crisis and disaster planning, prevention, and response. Their point is that even conflict voices resulting from different hazard constructions, if appropriately managed and encompassed, may generate a more comprehensive, flexible, and holistic response to a disaster than a prescribed response formulated by the minority of official institutions and agencies.

“Having complementary and countering input from many views and voices as an integral part of planning, prevention, and response can productively exploit
the problematics of simultaneity, chaos, unintended consequences, and multiple realities in ways which would not be possible in a plan which attempted to reconcile them.”

(Browning and Shelter, 1992, p.489)

Further they argue,

“The apparent chaos of many viewpoints and many voices allows a larger view of order to emerge, one without the disqualifying filters of the self-delusional, intentional bias that allows systems to lurch unforeseen and unintended toward normal accidents.”

(Browning and Shelter, 1992, p.496)

In conclusion, postmodernism refers to a world of ever growing complexity, where a simple mechanistic model is no longer valid. In particular, when it comes to risk management, the concept of ‘postmodernism’ might be of relevance because it acknowledges and embraces all possible hazard constructions of relevant organisations, subsequently introducing more various voices to decision-making with regard to risks. In this respect, Tyler (2005) concluded that the concept of postmodernism can present a more humane, pragmatic, sensible way for organisations to respond to crises and disasters.

2.3.6 Risk Society

In Risk Society: Toward a New Modernity (1992), Beck argues that a major social and political transition has occurred from a class-based industrialised society to a risk society, in which social class has lost much of its previous significance, influenced by the context of postmodernism (Boholm, 1996; Borodzicz, 1997). The risk society is characterised by an increasing public awareness of the multiplying risks and hazards produced by society. In particular, the general public have their own opinions and ideas on the nature and management of technological risks and hazards produced by society, and as a consequence, they are increasingly sceptical of the accountability of formal science and their relationships with experts. Therefore, citizens of the risk society came to actively take part in the production of social and political discourses about them (Borodzicz, 1997). In a similar vein, Coote (1998, p.125) argues, “The implications of the risk society for the conduct of public policy-making is that we must grow up and
develop an adult-adult relationship with our politicians, as well as with scientists and all manners of so-called experts”. Talyor-Gooby and Zinn (2005) argue as follows:

“(In the risk society) Individuals are conscious of their social context and their own role as actors within it. Managing the risks of civilisation becomes both a pressing issue and one that is brought home to individuals. At the same time, however, confidence in experts and in accredited authorities tends to decline as people are more aware of the shortcomings of official decision-makers and of the range of alternative approaches to problems available elsewhere on the planet.

(Talyor-Gooby and Zinn, 2005, p.6)

According to Beck (1992), the risk society has experienced a three-stage periodisation of social change: ‘first premodernity (feudal agrarian society)’, ‘first modernity (industrialised modernity or simple modernity)’, and ‘reflexive modernity’, derived from the immanent contradictions of modernisation and counter-modernisation. Especially, Lupton describes Beck’s notion of ‘reflexive modernity’ as follows:

“This concept incorporates the notion that late modernity is characterised by a critique of the processes of modernity, which are no longer unproblematically viewed as producing ‘goods’ (such as wealth and employment) but are now seen to produce many of the dangers or ‘bads’ from which we fell threatened (such as environmental pollution, unemployment and family breakdown).”

(Lupton, 1999, p.4)

In the risk society, major risks, such as nuclear power plants, global warming, and the hole in the ozone layer, affect both the rich and the poor indiscriminately, in Beck’s words (1992, p.36), “poverty is hierarchic, smog is democratic”. In this sense, the risk society becomes an option which could be not chosen or rejected in the course of political debate (Beck, 1999). Beck (1998) also argues that those risks are created paradoxically by the processes of modernisation, which try to control and contain them. In this respect, science is no longer simply regarded as a source of solutions but rather seen as part of the problem, and new technologies increasingly become the risks that nobody knows:

“Many of the newer risks (nuclear or chemical contaminations, pollutants in
foodstuffs, diseases of civilisation) completely escape human powers of direct perception. The focus is more and more on hazards which are neither visible nor perceptible to the victims; hazards that in some cases may not even take effect within the lifespan of those affected, but instead during those of their children…”

(Beck, 1992, p. 27)

Table 3: Class society versus risk society

<table>
<thead>
<tr>
<th>Basic social organising Principle</th>
<th>Class Society</th>
<th>Risk Society</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collectivisation (into families, classes, corporat -ions, status groups, etc.) plus tradition</td>
<td>Individualisation plus Reflexivity</td>
<td></td>
</tr>
<tr>
<td>Form of inequality</td>
<td>Social class position</td>
<td>Social risk position</td>
</tr>
<tr>
<td>Core contentious issues/ questions of justice and fairness focus on</td>
<td>Distribution of scarce goods (wealth)</td>
<td>Distribution of ‘bads’ (risks)</td>
</tr>
<tr>
<td>Experienced personally</td>
<td>Hunger</td>
<td>Fear</td>
</tr>
<tr>
<td>Experienced collectively potentially as</td>
<td>Class consciousness</td>
<td>Risk consciousness</td>
</tr>
<tr>
<td>Utopian projects aimed at</td>
<td>Elimination of scarcity</td>
<td>Elimination of risk</td>
</tr>
</tbody>
</table>

Source: Scott (2000)

Beck (1992) argues that modern technological developments are creating largely unknown risks, such as GMO (Genetically Modified Organism), BSE (Bovine Spongiform Encephalopathy), and antibiotics, which are far beyond society’s capability to recognise, let alone manage. As a result, the implications for failures in technological safety are becoming much greater. Given such complexity and uncertainty of new technologies, the point is that we can no longer depend on scientific experts only in relation to dealing with risk conflicts in the risk society.

In summary, the basic features of a risk society can be listed as follows (Beck, 1992, 1998, 1999); firstly, it is a society where the post-materialist public is becoming more and more aware of the risks and hazards of contemporary life. Secondly, it is a society where new scientific and technological hazards are both multiplying and spreading.
Thirdly, it is a society of ‘manufactured uncertainty’ (Beck, 1998, p.12), which means that risk has become an inescapable part of our lives, and everybody is facing more and more unknown and incalculable risks as technologies develop. Fourthly, there are always contentious claims and perspectives from various actors and interested groups who see risks very differently. So producing contentious knowledge on risk is no longer a matter of good or bad experts. Fifthly, experts can only supply more or less uncertainly factual information about probabilities, but never answer the question: which risk is acceptable and others are not. Finally, as long as politicians just implement scientific advice, they rather become caught in the errors and uncertainty of scientific knowledge.

2.4 CONCLUSION

This chapter has explored the key theories of risk, especially focusing on two main social science approaches to risk: psychological and sociological. Here, it is revealed that there are a number of ways in which risk can be perceived and managed differently in different contexts. To sum up, much of the risk perception theory highlights how people perceive risks, and the factors which can influence individual risk perception. Risks can be viewed as a physical entity and as a consequence, they can be measured and reduced to their simplest elements. In contrast, sociological approaches to risk have emphasised the social and cultural context where risk is defined and used as a phenomena. The theories of cultural theory and safety culture, for example, argue that culturally-oriented approaches can be of importance in terms of understanding risk because it can be interpreted differently in different cultures. On the other hand, system theory suggests that both hindsight and foresight can be facilitated by analysing the factors surrounding socio-technical disasters and discovering similar patterns of aetiology. Particularly, it is argued that isomorphic learning might help to change safety culture. Risk communication theorists think that effective risk communication can contribute to increasing the dialogue and coordination by establishing realistic aims for people who have different expectations in different contexts. Postmodernism emphasises the importance of multiplicity and diversity, which can consequently accommodate many various theories, ideas, values, etc. Risk society theorists argue that new technologies increasingly become the risks that nobody knows, and science itself might be rather part of the problem, not a source of solutions. In this
context, they emphasise the role of the public with regard to decision making in newly emerging risks.

The comprehensive concept of risk can be compared with a ‘risk archipelago’ (Jones and Hood, 1996), where each island shows its own particular characteristics. Just as it is impossible to show the characteristics of the archipelago by explaining the island in isolation, it is unfeasible to explain the comprehensive risk by simply one psychological or sociological approach to risk. All risk studies are inextricably interwoven, and thus they should be supported and complemented by one another, especially when it comes to risk (and crisis) management. Despite differences in the way in which the concept of risk is perceived and managed across different approaches, such interconnected theories can help to provide opportunities for cross-fertilisation and multi-dimensional perspectives from all of the disciplines in the development of risk research.
CHAPTER 3
SIMULATION EXERCISES & CRISIS MANAGEMENT

3.1 INTRODUCTION

What is the definition of simulation? The word ‘simulate’ originates from the Latin simulare, ‘to make life’ (Borodzicz, 1997, 2005). Accordingly, in simple terms, a simulation can be defined as a working representation of the central characteristics of reality (Guetzkow and Valadez, 1981). Guetzkow and Valadez (1981) argued that simulations permit simulation players to deal with problems of great complexity of reality vicariously, when the real situations are too expensive, complex, and dangerous to manage. Thatcher and Robinson (1985) identified two essential features of simulation: an on-going process (dynamic), and representations of reality (in a simplified form). However, simulations are often confused with games in that all games and simulations are a form of experiential learning, notwithstanding the difference of features. There is little consensus in simulation and gaming literature on how these terms are defined, and for this reason, theorists and practitioners often interchangeably use the terms. The distinction needs to be made for better understanding (Kleiboer, 1997).

A game can be defined as any contest among opponents playing under rules for a specific aim (Thatcher and Robinson, 1985). In this respect, they argued that a game is a contest, and so participants should play a game according to the rules. In a similar way, Gredler (1996) contended that a game includes rules and penalties. Further, Schlenker and Bonoma (1978) argued that simulations contain the dynamic real-world conditions; otherwise they become invalid, whereas games need not to have elements analogous to real-world events. On the other hand, Jaques and Salmon (2007) maintained that the existence of a scenario is a disparity between simulations and games, and that a game can be transformed into a simulation when a specific real-life context is provided by a scenario. In this sense, Kleiboer (1997, p.197) described a scenario as the “building blocks for simulations which script the simulated real world”.

These days, simulations and games are highly lauded as an effective experiential
exercise, in which participants can apply and develop their knowledge, skills, and attitudes in a safe environment. Simulations and games have their origin in military theory. For example, approximately 2500 years ago, Sun Tzu, Chinese writer of *The Art of the War*, emphasised the importance of gaming in preparing for war (Boer and Soeters, 1998). In a Western context, the early use of simulations and games can be traced back to war games in the 1600s. The aim was to improve military strategic planning for the purpose of winning wars (Gredler, 2003). Since then, simulations have been actively developed and employed in order to develop military and political capabilities, filling the gap between the conference room and the real world. Since the late 1950s, the use of simulations has also become popular in the fields of business, the medical profession, language education, etc.

Borodzicz (2005) divided training applications for simulations into five groupings: *Primitive/traditional usage, Role Play/educational, Martial arts and fighting, Business Applications, and Crisis simulations.* In particular, simulation exercises for emergency response organisations in the UK can be split into three types (Cabinet Office 2010): discussion-based, table-top, and live exercises. This chapter intends to theoretically explain and analyse current practices and types of UK simulation exercises, simulation and learning theories, reflections and debriefings, and some key validation issues in relation to evaluation of learning effectiveness.

### 3.2 SIMULATION EXERCISES IN THE UK CONTEXT

#### 3.2.1 Overview

The most common means of training or exercises for disasters in the UK emergency services has been through ‘crisis simulation’ (Borodzicz, 2005) (For the difference between the concepts of emergency, crisis, and disaster, refer to Section 3.2.6). This point seemed to be first emphasised by Superintendent Brian Fisher, Emergency Planning Officer for the City of the Police. Fischer (1978, p.196) argued that realistic simulations needed to be developed in order to help police officers to deal with major crisis situations, mentioning that “Wherever possible, there must be physical participation by the student and he must be given an opportunity to exercise this own thoughts and knowledge on the subject”. In particular, the 1980s is remembered as the decade of disaster in the UK. A spate of man-made disasters such as the Bradford City
Stadium Fire (1985), the Zeebrugge Ferry Disaster (1987), and the Clapham Junction Railway Accident (1988) compelled the UK emergency services to revisit their existing training methods, lending weight to the significance of crisis simulations to prepare and test their response plans (Moore, 1988).

Although crisis simulations are regularly held in the UK by governmental departments as well as private organisations, there is no single accepted definition of them (Upton, 2007). Generally speaking, ‘crisis simulations’ involve exposing one or more agencies to an imaginary scenario through their response, and are differently referred to as ‘exercises’, ‘drills’ or ‘simulations’ (Perry, 2004). In official UK documents such as ‘Dealing with Disaster (Home office, 2003)’ and ‘Emergency Preparedness (Cabinet Office, 2010)’, they are called ‘exercises’ or ‘emergency exercises’. In particular, Cabinet Office (2005a, p. 218), defines an ‘exercise’ as “a simulation to validate an emergency or business continuity plan, rehearse key staff or test systems and procedures”, which have three main purposes: validating plans (validation), developing staff competencies and giving them practice in carrying out their roles in the plans (training), and testing well-established procedures (testing).

There are several reasons why crisis simulations or emergency exercises have been a necessary training tool for the emergency services. Firstly, they provide a unique, vicarious experience of ‘sitting in the hot seat’ (Flin, 1996) - there are limited opportunities to actually experience the demands of disaster because of their low probability of occurring. Secondly, they afford the only ethical means with which emergency services can expose their personnel to imaginary crises or disasters in a realistic but risk-free environment (Van Haperen, 2001; Nemeth, 2010). Thirdly, simulation exercises are an effective vehicle of demonstrating both awareness and preparedness to manage major incidents (Borodzicz, 2005), bridging the gap between theory and practice. Finally, exercises are useful tools to detect weaknesses or difficulties in operational procedures (Perry, 2004). In other words, simulations can be used to evaluate emergency response arrangements, and subsequently to develop new policies and procedures. For these reasons, a crisis simulation becomes the realistic, safe, and effective alternative in the absence of actual experience in managing emergency operations (Mathis et al., 1982). However, it should be recognised that performance in crisis simulations may not be linked with real-world performance; i.e. they simply measure how players perform in simulations, and may not guarantee that they will show the same performance in a real crisis (Ford and Schmidt, 2000).
3.2.2 Emergency Planning & Simulation Exercises

UK emergency services and local authorities are obliged to co-operate and share information with other responders engaged under the Civil Contingencies Act 2004 (Walker and Broderick, 2006). However, the key to collaborative success in the response activity is in the preparation stage, but not in the response phase (Scholtens, 2008). Accordingly, effective preparedness for emergency needs to be supported by training exercises from all the organisations concerned, and in this context, crisis simulations are now considered as an integral part of the emergency plan. According to ‘Emergency Preparedness’, emergency planning is a systematic and ongoing process, and is divided into two stages (See Figure 3). At the first stage, ‘Consultation’, emergencies are identified by a quantitative risk assessment (the likelihood of an event). Here, it is necessary to consult with other organisations involved in response activity in order to choose scenarios. Those selected scenarios are then translated into a set of plans, and a set of responsibilities are respectively assigned to each relevant organisation based on those plans (Sommerville et al., 2007). Through this process, plans are finalised and established. During the second stage, ‘Embedding’, the plans are tested and validated by training or exercises, and then revised.

Figure 3: Cycle of Emergency Planning

Source: Cabinet Office (2005a, p.54)
Particularly, with regard to emergency planning, Perry and Lindell (2003, p.340-347) suggested ten guidelines as follows:

- Should be based on accurate knowledge of threats and likely human responses.
- Encourage appropriate action by emergency managers.
- Develop flexibility in disaster response.
- Facilitate inter-organisational coordination.
- Integrate into an all-hazard approach.
- Should have the training component of an emergency plan.
- Provide for testing through emergency exercises.
- Should be an ongoing and dynamic process, accommodating changes of the environment.
- Should consider conflict and resistance on the allocation of resources such as personnel and budget.
- Acknowledge the differences between emergency planning (part of preparedness) and emergency management (implementation and performance).

### 3.2.3 Multi-Agency Simulation Exercises

In major incidents, emergency services are required to work together to minimise the consequences of disasters as no single agency can possess all the skills and resources necessary. For this reason, ‘multi-agency’ simulations are increasingly acknowledged as a necessary and significant training tool for emergency response organisations. Perry and Lindell (2003) argued that coordination and cooperation which emergency services need in the event of a major incident can be developed by repeating ‘inter-agency’ simulation training. Cabinet Office (2010) also stresses that the combined response will be strengthened if responders are aware of each other’s exercises and are invited, where appropriate, to participate in them. It is because inter-agency training can enable emergency response agencies to not only understand each other’s methods, procedures, and modus operandi, but also identify potential communication and coordination problems (Flin, 1996). In this context, the Home Office (2006, p.20) emphasises the importance of ‘inter-agency simulation’ as follows: “Overall, the response to the bombings (7 July 2005 London) demonstrated the value of the extensive multi-agency planning, training and exercising”.

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“... the overall multi-agency responses to the 7 July Bombings had been very successful... Four years of planning and exercise had clearly paid great dividends. Co-operation and co-ordination between responders had been effective and there was a willingness to work through issues jointly to achieve a successful response. The events of 7 July did not exceed the capacity of the responding organisations to contain and deal with the situation.”

(London Resilience Team, 2006, p.3)

However, the UK official guidance ‘Emergency Preparedness’ requires these ‘inter-agency’ exercises to take place, yet does not suggest any standards or guidelines for conducting exercises, judging the results, and investigating problems discovered (Walker and Broderick, 2006). In the absence of formal standards, it is also difficult to evaluate or validate what has been achieved by inter-agency crisis simulations. Besides, in the UK, there is only one multi-agency training facility, the Emergency Planning College within the Civil Contingencies Secretariat. Each emergency service has also its own training centre, but each service is likely to run exercises which are primarily geared towards its own particular organisational goals, and these may not necessarily be congruent with other responders’ goals in terms of total incident management (Borodzicz, 2005). This phenomenon might give rise to a lack of coordination and collaboration between the various responding agencies, causing confusion and ineffective use of resources when responding to major incidents (New, 1992). This point was also stressed in the public inquiry reports (Fennell, 1988; Hidden, 1989).

“...there ought to be joint exercises between the emergency services, because...if such joint exercise had taken place, communications would have been better and some of the problems which presented themselves would not have proved as difficult as they did on the night.”

(Fennell, 1988, p.83)

3.2.4 Types of Simulation Exercises

The choice of an exercise depends on what exercise planners are to accomplish by conducting the exercise, namely the purposes of the exercise (Home Office, 1998; Cabinet Office, 2010). For this reason, the purpose or goals of the exercise should be clearly established and specified at the beginning. In a similar vein, Turner (1996) argued that it is of great importance to first clarify ‘goals’ when designing and selecting
simulations. According to Cabinet Office (2010), there are basically three types of simulation exercises: discussion-based, table-top, and live exercises. The three types of exercises can be employed for agency-specific or multi-agency plans and multi-level plans.

- Discussion-based: generally low-cost activities (cheap to run), and easy to prepare. They are usually designed to inform exercise players of the role of the responding organisations and procedures, which would be invoked during an actual emergency. In other words, they are used to develop awareness about organisations, plans or procedures through a ‘discussion’ activity. Discussion normally starts from a paper-based (imaginary but realistic) scenario, and representatives from different organisations discuss and debate their response activities and potential problems as the scenario unfolds. Discussion-based exercises are mainly focused on the identification of problems in their disaster response, and the search of concomitant solutions (Hill, 2005). Discussion-based exercises are a popular form of training for ‘Integrated Emergency Management’, in which responding organisations are required to work together in order to minimise the effects of disasters (Smith et al., 1999).

- Table-top: relatively cost-effective and easy to mount. Table-top exercises entail a specific realistic scenario and a time frame, which may occur in real time or may speed up. The participants usually include members from different emergency teams, who would be activated in the event of an emergency. They are required to know and understand the emergency plans and procedures beforehand, and then through a table-top exercise, they can test their procedures and plans by developing the scenario (Hill, 2005). The testing usually takes place through verbally responding to a scenario. This process also leads to the discovery of key weaknesses in their plans or procedures. Furthermore, it is anticipated here that those who have attended an exercise and subsequently come to be familiar with each other will work together more effectively than those who come together for the first time at the scene of disasters, thus providing a coordinated response (Home Office, 1998).

- Live: very costly and time-consuming to organise, requiring the most extensive and careful preparation in their design, planning and implementation. For example, Exercise Triton 04, the UK first national flooding exercise, was
conducted over a total of 3 days. The exercise also involved more than 60 organisations, and almost 1,000 players and directing staff at 35 different locations. Its direct costs were £1.5m (Environment Agency, 2005). They were a live rehearsal for implementing their emergency plans under high levels of stress. Live exercises can range from a small-scale agency-specific test of one component of its response to a full-scale multi-agency test of the whole organisation’s responses to a large-scale disaster (Hill, 2005). They provide the only practical means to test fully logistics, inter-agency communications and coordination, and physical capabilities. They might involve ‘casualties’ or a ‘simulated disaster scene’, involving real buildings in order to increase ‘physical fidelity’.

However, some variations can be formed through combining elements of the other three. For example, Home Office (1998) states that exercises can be divided into four types such as ‘Seminar’ (also known as workshops or discussion based exercises), ‘Table-top’ (also known as floor plan exercises), ‘Control Post’ (also known as training without troops) and ‘Live’ (also now known as practical, operational or field exercises) (See Table 4). Renner (2001), an Australian practitioner, also classified them into five types such as ‘Information session’, ‘Walkaround’, ‘Tabletop exercise’, ‘Centre simulation’, ‘Field exercise’ (See Table 5), slightly different from Table 4. Similarly, the US Department of Homeland Security currently divides an exercise into two types: discussion-based and operation-based exercises. The discussion-based exercises include seminar, workshop, table-top exercise (TTX), and game. The operation-based exercises can be split into three sub-types: drill, functional exercise (FE), and full-scale exercise (FSE) (DHS, 2007).

Table 4: Different types of exercise in a UK context

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<tr>
<td>● Discussion-based</td>
<td>● Seminar</td>
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<tr>
<td>● Table top</td>
<td>● Table top</td>
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<tr>
<td>● Live</td>
<td>● Control post</td>
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<td></td>
<td>● Live</td>
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Table 5: Five types of exercise in an Australian context

- Information session
- Walkaround
- Tabletop exercise
- Centre simulation
- Field exercise

Source: Renner (2001)

Table 6: Exercise Types in a US context

- Discussion-based exercises
  - Seminar
  - Workshop
  - Tabletop Exercise (TTX)
  - Game
- Operations-Based Exercises
  - Drill
  - Functional Exercise (FE)
  - Full-Scale Exercise (FSE)

Source: DHS (2007)

New plans or new players should go through seminar exercises or table-top exercises first before live exercises. In this sense, Overy (1993) argued that it is desirable to develop or build up the types of exercises progressively from table-top to live exercises. In other words, it would be helpful to proceed from the simplest type of exercise to more complicated ones gradually. In a similar vein, Home Office (1998) mentions that a live exercise should be conducted after the exercise planner gains confidence in the abilities of those involved through sufficient training in discussion-based or table-top exercises.
Recently, the use of computerised simulations has become popular and widespread for emergency response organisations including police, fire, and ambulance (Borodzicz, 2005). Crisis management managers and simulation designers have jumped on this bandwagon, and invested a lot of money in developing computer simulation models (t’ Hart, 1997). For example, recently developed computer simulations such as ‘Vector Command’ employ a combination of key state-of-the art technologies such as 3-D computer graphics or GPS mapping for the purpose of instilling realism. They are also designed for dealing with single and multi-agency major incidents, providing two-way communication between responding organisations (Emergency Command System, 2009). However, human interactions usually involve emotions, mistakes, errors, conflicts of views, and many subjective elements, and it is not feasible to programme such complex human interactions taking place in the real world into computer simulations. Therefore, computerised simulations should be regarded as a complementary method, not the driving force behind the exercise (t’ Hart 1997; Webb and Chevreau, 2006). Of course, advantages of computer-based simulations should not be simply underestimated. However, people do matter in simulations, and the fundamental focus of crisis simulations is on humans, not technologies (Herman, 1997).

“… if the limitations of computers and the importance of human relations and communication are recognised, then during simulation the roles of both participants and computer will be more realistic, and this in turn allows the learning potential of such simulations to be more fully realised.”

(Crookall and Martin, 1986, p.346)

### 3.2.5 Designing and Documenting Simulation Exercises
The design of simulation exercises is also driven by their aim and objectives (Cabinet Office, 2010). The aim and objectives should be agreed by the top-level officers of all participating agencies beforehand since the aim and objectives play a vital role in selecting an appropriate exercise design. In preparation for designing and further conducting simulations, the following points should be considered (Home Office, 1998).

- Agree on the scenario, extent and aim of the exercise with senior management.
- Assemble a multi-disciplinary exercise planning team and agree the objectives for each area to be exercised.
- Sketch out and then develop the main events of the exercise and associated timetables.
- Determine and confirm the availability of the outside agencies to be involved, such as the media or voluntary agencies.
- List the facilities required for the exercise and confirm their availability e.g. transport, buildings and equipment.
- Ensure that all communications to be used during the exercise have been tested at some stage prior to the exercise. If a control post or live exercise, test radios, mobile phones, etc., in the locations in which they will be used as near to the date of the exercise as possible. Check that cellular phones are registered under ACCOLC (Access Overload Control).
- Check that umpires for each stage of the exercise are clearly identified and properly briefed.
- Ensure that directing staff are clearly identified and properly briefed, and have good independent communications with 'exercise control' throughout the exercise.
- If the exercise links a number of activities or functions which are dependent on each other, confirm that each has been individually tested beforehand;
- Ensure that all participants have been briefed.
- Ensure that all players are aware of the procedures to be followed if a real emergency occurs during the exercise.
- If spectators are to be invited, including the media, ensure that they are clearly identified and properly marshalled, and arrange for them to be kept informed of the progress of the exercise. Ensure their safety.
- For the longer exercise, arrange catering and toilet facilities.
- Ensure that - where appropriate - outside agencies are indemnified in the event of an exercise accident.
• Warn the local media, emergency services switchboards/controls and any neighbours who might be worried or affected by the exercise. Position "Exercise in Progress" signs if appropriate.
• Ensure that senior management, directing staff, umpires and key players are aware of the time and location for the 'hot' debrief, and circulate a timetable for a full debrief.
• Agree and prepare a detailed set of recommendations, each one accompanied by an action addressee and timescale.
• Prepare a clear and concise summary report of the exercise to distribute to all organisations and groups which took part, together with major recommendations.
• Discuss with senior management the outcome of the exercise and agree the future exercise programme.
• Thank all personnel and outside agencies which took part.

Noticeably, crisis simulations need to balance failure and success experiences (‘t Hart, 1997; Herman, 1997). There is much to learn from not only success experiences but also failure experiences. This can also apply to a simulation context. One advantage of the crisis simulations is that they can create a ‘mistake-friendly’ learning environment, encouraging trial-error learning to take place (Kriz, 2003; Smith, 2004). In this context, Borodzicz (2005) argued that the effectiveness of learning might be maximised when crisis simulations begin to fail. It is because ‘crisis’ requires a rapid reaction, yet in contrast to an ‘emergency’, the risks for critical decision makers in crisis situations are difficult to measure owing to its ill-structure. Hence, simple attempts to tackle crises in a routine manner according to established procedures and practices are likely to founder. He suggested that crisis simulations should be designed to take account of the characteristics of a crisis, differentiated from an emergency (which will be discussed in more detail in Section 3.2.6). This might be done, for instance, by introducing variation and unpredictability of substance and timing (irregular hours) or providing incorrect or insufficient information. In this sense, members of the exercising planning group need to keep all information confidential. Similarly, the UK official guidance, ‘Emergency Preparedness’ stresses that most of the exercise documentation needs to be treated with privileged information to some degree, and not shared with exercise participants (Cabinet Office, 2010). Learning may well be diminished, if the participants are aware of the expected outcomes (Freimuth et al., 2008).

On the other hand, success experiences in simulations can contribute to bolstering their
confidence, especially when they have continuously received negative feedback (t’ Hart, 1997). If they have constant failures in simulations, they might ascribe the causes of their continuous failure to other factors, such as the poor design of simulations. Thus, crisis simulations must endeavour to provide the opportunities for learning from both success and failure experiences.

3.2.6 Understanding ‘Crisis’ for Simulation Exercises

In Section 3.2.5, it is maintained that crises cannot be managed by employing the identical organisational structures and standards to cope with an emergency. Borodzicz (1997, 2005) argues that there needs to be a clear distinction between the concepts of ‘emergency’, ‘crisis’, and ‘disaster’, and understanding this difference can contribute to improving the design and effectiveness of simulation exercises as learning tools. He defines an ‘emergency’ as a “situation requiring a rapid and highly structured response where the risks for critical decision makers can, to a relative degree, be defined” (Borodzicz, 1997, p.226). Therefore, emergency services are able to manage ‘emergencies’ by deploying their established and structured routines, skills and procedures (Turner, 1994) (For the term, ‘emergency’ of the UK emergency services, refer to Section 5.2.3.1). A ‘crisis’ is defined as a “situation requiring a rapid response (for this reason they are all too easily misconceived as emergencies), although in contrast, the risks for critical decision makers are difficult to define owing to ill-structure” (Borodzicz, 1997, p.226). In this context, a crisis can be characterised by three dimensions such as unexpected threats, uncertainty and a need for immediate decision-making (Rosenthal et al., 2001; Boin et al., 2005; McConell and Drennan, 2006). A crisis situation is likely to create great uncertainty, unfamiliarity and complexity, and consequently can be managed by adaptive or second order expertise and techniques, not routine or structured responses (Turner, 1994; Rosenthal, 1994).

However, despite such uncertainty and difficulty, most importantly, its successful management can transform a crisis situation into a better one, and conversely its mismanagement can easily lead to the next crisis (’t Hart and Boin, 2001). In other words, there is still an opportunity for good management or organisational change in crisis situations (Borodzicz and Van Haperen, 2002; Roux-Dufort, 2007). The interesting point here is that the English word, ‘crisis’ stems from the Greek ‘krisis’, which is synonymous with making a right judgment when it is timely to decide. So in this respect, a crisis can be translated as an opportunity (i.e. a right time) for decision
In a similar vein, Lalonde (2004) argues that a crisis is simultaneously menacing and opportunistic, and thus has negative effects as well as positive ones. Another well-known analogy here is that the Chinese word for crisis (危機, WEI JI) is comprised of two different characters: the first character (危) symbolises a ‘danger (risk or threat)’, and the second one (機) represents an ‘opportunity’ (Daring, 1994; Wrigely et al., 2003; Borodzicz, 2004). Likewise, the Korean word for crisis (위기, WI GI) consists of two different characters, which respectively stand for ‘danger or risk (WI)’ and ‘opportunity (GI)’ (Choi, 2004). Hence, in not only the Chinese context but also the Korean context, a crisis is seen as another opportunity. In other words, it is recognised from the oriental perspective that in every crisis, there is risk and there is opportunity. Also, the French word for crisis is defined (in medical terms) as a “sudden variation during a disease which determines the outcome for better or for worse” (Hansen and Drieu, 1994, p.491). Considering all of the definitions, it can be summarised that there is a point in time where the opportunity to regain control exists, or the worsening or deepening can be halted although there is uncertainty, which depends upon the course of action taken, and this point in time is referred to as a crisis.

In contrast, a ‘disaster’ is defined as a ‘cultural construction of reality’ (Dombrowsky, 1995). Put simply, a disaster means a stage where harm has been caused and there is an element of damage limitation because of a failure to deal with the aforementioned emergencies or crises. The central argument here about a disaster is that it also consists of ongoing emergencies and crises, and hence is often considered as the most difficult phenomenon to successfully manage. A crisis or disaster produces a different social order (non-routine events), and they cannot be handled by the same organisational structures and skills used to deal with emergencies (Dynes 1994; Horlick-Jones, 1994; Quarantelli, 1995a). However, it should also be borne in mind that ‘emergency’, ‘crisis’ and ‘disaster’ can be understood differently by different organisations involved. There are different organisational, social and cultural constructs of the definitions, and this subjective nature appears to cause the same event to be interpreted differently.

An interesting but rather surprising comparison with ‘crisis simulations’ is made for martial arts practice (Borodzicz, 2005). In martial arts, a beginner usually begins practising various techniques with an imaginary opponent. Individual training of this nature enables trainees to get accustomed to the body mechanics involved in the performance of techniques. Certain optimum patterns of movement and skills must be
set up, which can only be feasible if trainees repeat training drills with dedication. Then, to become proficient in martial arts, trainees must practice free style sparring with a partner, where merely doing the form in a pre-programmed manner does not work, and instead, they have to adapt and apply the skills and movement in an unprogrammed manner to attack partners or avoid their attacks. Noticeably, skilled masters are proficient in delivering their techniques and skills adaptively through a combination of almost simultaneous application of defence and attack. They occasionally show their combined techniques in creative and unprogrammed ways. In this sense, crisis simulations might be compared with freestyle sparring in martial arts.

In conclusion, the characteristics of a ‘crisis’ such as ill-structure, unexpectedness, uncertainty, and unfamiliarity, can create a different social order, and cannot be tackled by the identical organisational structures and standards to cope with an ‘emergency’. As a result, such differentiation between emergency, crisis and disaster should be considered in designing effective crisis simulations, particularly in order to cope with uncertainty and complexity of crises. However, if a majority of the current crisis simulations are designed and organised, without considering this distinction, it might be questionable whether (or how) this type of simulation can deal with such unanticipated crisis situations that are not part of emergency plans.

### 3.3 LEARNING, REFLECTING & EVALUATING

#### 3.3.1 Experiential-Learning Theory

Exploring the usefulness of crisis simulations as a learning tool inevitably requires some understanding of learning theory itself. Learning theory is theoretically based on ‘Operant Behaviourism’ suggested by B. F. Skinner (Read and Kleiner, 1996). Particularly, with regard to a relationship between training and effective learning, Read and Kleiner (1996) argued that for effective learning to take place, trainees must actively participate in training, the training should be followed by positive reinforcement, and trainees should return to their normal work and subsequently apply it to their own contexts. Interestingly, Read and Kleiner (1996) attempted to describe the essence of learning theory by citing one Chinese traditional saying: ‘I hear I forget, I see and I remember, I do and I understand’. Similarly, Rogers (1983) claimed that much significant learning can be acquired by ‘doing’. Therefore, it can be concluded here that
basic to all learning is some kind of active experience.

Noticeably, this ‘learning by doing’ was elaborated by Kolb’s model of ‘experiential learning theory’, which has its intellectual own origin in the works of John Dewey, Kurt Lewin, and Jean Piaget (Kolb, 1984; Kolb et al., 2001). Kolb (1984) defined ‘learning’ as the process of transforming experience into knowledge. Further, he argued that the learning process was composed of the following four phases: concrete experience, reflective observation, abstract conceptualisation, and active experimentation (See Figure 4). This suggests that experience is “not just an observation, a passive undergoing of something, but an active engagement with the environment, of which the learner is an important part” (Boud et al., 1993, p.6). This ‘experiential learning theory’ now provides a pedagogical ground for ‘crisis simulation’ (Thatcher, 1986; Petranek, 2000; Van Haperen, 2001; Borodicz, 2005). Similarly, Botkin et al. (1979, p.8) contended that “learning is the process of preparing to deal with new situations. It may occur consciously, or often unconsciously, usually from experiencing real-life situations, although simulated or imagined situations can also induce learning”. Also, Thatcher (1990) recognised that simulations are a key form of experiential learning.

**Figure 4: Experiential learning cycle**

Source: Kolb (1984)

### 3.3.2 Reflection in Experiential learning

‘Reflection’ lies at the crux of experiential learning because without reflection,
experience might quickly vanish or lose its learning potential easily (Jaques and Salmon, 2007). Reflection is the process of standing back from an experience in order to mull over its meaning to the self through the development of inferences (Daudelin, 1996). Also, it can be described as a generic term for those intellectual and affective activities in which individuals engage to explore their experiences in order to have new understandings and appreciations (Boud et al., 1985). The idea of reflection in learning can trace its history back to Aristotle’s discussions of practical judgement and moral action in his Ethics (Grundy, 1982). In the 1930s, John Dewey (1933) invented the term ‘reflective activity’, and he argued that the reflective activity can give rise to not only effective problem-solving but also improve efficacy of learning by interconnecting relationships between the parts of an experience.

Kolb (1984) developed the notion of reflection further in his model of experiential-learning. He argued that transformation of experience into knowledge should be supported by reflection or reflective observation on experience. It is because during the experience, the emphasis is on the doing, but through the process of reflection, the doing can be changed into a form of knowledge by creating a new perspective on the world (Lederman, 1984). For this reason, without reflection experience might remain as experience, and consequently the full potentiality for learning might not be realised (Pearson and Smith, 1985).

“The individual’s experience needs to be followed by some organised reflection. This reflection enables the individual to learn from the experience, but also helps identify any need for some specific learning before further experience is acquired.”

(FeU, 1981, p.21)

Boud et al. (1985, p.26-27) divided the process of reflection into three stages as follows:

- Returning to experience: remembering the experience, replaying it in their minds, and recounting its characteristics
- Dealing with feelings: taking advantage of the positive feelings, and eliminating obstructing feelings through expressing negative feelings
- Re-evaluating experience: re-exploring experience, linking new knowledge with people’s own perspectives, and integrating the new knowledge into their conceptual framework
Similarly, Briers and Barber (1997, p.5) argued that “when the learner is engaged in critical reflection, s/he works on the experience, links new knowledge with old, re-examines the initial experience in the light of his/her own goals, integrates learning into his/her existing framework, and rehearse it with a view to subsequent activity”. The reflection is regarded as critical to experiential learning. Particularly, Thiagarajan (1994) even went so far as to say that people do not learn from experience but they learn from reflection on their experience concerning its importance in learning. From a simulation perspective, reflection occurs in the form of ‘debriefing’, which will be discussed further in Section 3.3.4.

### 3.3.3 Writing & Reflection in Experiential Learning

Reflection usually takes place in the form of ‘oral discussion’ in the learning process, whereas from a reflection perspective, writing is often given much less attention than oral discussion, namely speech and speaking (Petranek et al., 1992; Petranek, 1994, 2000; t’ Hart 1997; Boin et al., 2004). However, there has been a growing academic interest in the relationship between ‘writing’ and ‘reflection’. Francis Bacon (1890) said that people who write can understand things better than thinking or talking about them. One of the reasons might be that writing can help learners to not only reflect and learn but also appreciate the actual process of reflection within learning (Walker, 1985). Furthermore, Walker (1985) contended that writing can elucidate the initial experience since it distances oneself from his/her experience, and then instil objectivity to the experience by removing subjective feelings. In addition, he emphasised that experience can be preserved through writing, and thus learners can return to it at any time when future knowledge is gained and he or she wants to compare it with previous experience.

“The use of writing can create in the person a dynamic in which the person’s existing knowledge is held in a more fluid state so that whatever new knowledge comes, it can be more easily integrated within it. The creative interaction between the person and the person’s self-development helps incorporate new realities into that self-development.”

(Walker, 1985, p.65)

Irmscher (1979) stressed that writing is a way of not only learning but also developing. According to Elbow (1978), ‘learning’ is regarded as obtaining new information, ideas,
skills or behaviour, whilst ‘developing’ is defined as moving on to a newer, more complex stage of organisation in the organism’s growth. Based on this distinction, Irmshcer (1979) argued that writing can serve as a way of learning and developing alike, given that education is associated with learning to know, finding meaning by association, organising knowledge, and finally developing an ability to apply knowledge to new situations. Likewise, Emig (1997) said that writing provides short-term as well as long-term feedback benefits, make close connections with other eclectic ideas, and finally make people more conscious of themselves. In particular, she argued that writing is a unique opportunity in the learning process as it integrates three attributes in one act, i.e. involving the works of hand, eye and brain simultaneously.

There are three main learning methods in which she believed, people can manage reality: ‘enactive’ - learning by doing, ‘iconic’ - learning by describing in an image, and ‘representational (symbolic)’ - learning by restating in words. The hand has a role in enactive learning, the eye in iconic learning, and the brain in symbolic learning, all of which can aid in reflection. The values of writing in contrast to speaking was also acknowledged by Wollman-Bonilla (1989, p.113), who stated that “Moreover, unlike speech, writing remains for us to rescan and reconsider; by putting our thoughts on paper, we are often better able to recognise and understand them”. In addition, recent empirical studies (Bain et al., 2002; Pedro, 2005; Greiman and Covington 2007) have demonstrated that writing has a positive influence on the development of reflection on practice. Therefore, it can be concluded that effectiveness of reflection might be maximised when supported by not only oral discussion but also writing.

3.3.4 Oral & Written Debriefing

The theoretical framework of simulation is ‘experiential learning’, in which reflection provides a vital link between experience and learning. Lederman (1984) defined debriefing as an oral discussion in which students and teachers engage in a question and answer session designed to guide students through a reflection of their learning. From a simulation perspective, debriefing can be defined as learning through reflection on a simulation experience (Rath, 1987). Debriefing has its origins in military campaigns and war games (Pearson and Smith, 1985). After a mission or an exercise, soldiers (participants) were brought together to describe what has happened and to account for the activity in order to improve their performance for next missions or exercises by a debriefing session. As a result, new strategies and tactics could be developed, based on
lessons and experience obtained from the debriefing. This function of debriefing in a military context still holds true, and thus can apply to the context of crisis simulation.

Debriefing is of paramount importance in that not all of the participants experience simulations in the same way, but debriefing can afford the opportunity for reflection whereby experience is transformed into knowledge. Simulations are not self-teaching, and thus require effective debriefing to reflect on behaviour and the purpose of the simulation (Gillespie, 1973). However, debriefing tends to be neglected in crisis simulations in practice (Borodzicz, 2005). Experience obtained from simulations can be examined, discussed, and subsequently transformed into learning by debriefing (Thatcher, 1986). In other word, debriefing can enable simulation players to reflect on their experience gained through simulations, and thus to hone transferable skills and concepts (Thiagarajan, 1994). Further, Crookall and Saunder (1989) argued that participants can compare and contrast their view of real world with the stimulated reality, and then they can make connections between them by debriefing.

"Debriefing allows parallels to be drawn between simulation realities and ‘real’ realities… In the debriefing, however, participants will consider the experience from both the representational and the reality perspectives, and thus attempt to tie the two together in a creative and insightful appraisal of both realities."

(Crookall and Saunder, 1989, p.18)

The debriefing process can be categorised into three stages (Lederman, 1984, 1992). The first stage is the systematic reflection and analysis, which consists of the recollection of what happened to participants, and the description of what they did in simulations in their own words. The second stage is the intensification and personalisation of the analysis of the experience, in which participants can explore and communicate their feelings gained during simulations. The final is the generalisation and application of the experience, in which they can make comparisons with real-world experiences.

Lederman (1984, 1992) also identified seven common structural elements involved in the debriefing process. The first two elements are the debriefer (also referred to a facilitator) and those to be debriefed. The role of the debriefer is of great importance in these two stages because he or she should create a supportive and amicable climate, in which all opinions and ideas are equally valued and respected, even if harsh emotions
are discussed occasionally. Also the debriefer should allow as many willing participants to speak, which consequently leads to ensuring the best possible learning experience. The third is experience, and the fourth is the impact of the experience. These two elements are closely related with a simulation scenario. The fifth element is the recollection of the experience, and the sixth involves reporting it. The seventh element is time. Debriefing seems to be influenced by how much time has passed since the simulation because experience might also be understood differently over time. Thus, it is recommended that debriefing should take place as soon as reasonably practicable after simulations.

Moreover, sufficient time for debriefing should be provided. Pearson and Smith (1985) suggested that the length of time for debriefing should not be less than the time taken for a simulation itself. Hofstede and Pedersen (1999) went so far as to suggest that it was better to simplify a simulation rather than to shorten debriefing, when encountered with time constraints. However, in reality, it is often cancelled or shortened by the extension of a simulation itself.

Petranek (1994) also developed the ‘Six Es’ model with regard to the reflection process, which is comprised of 6 stages: Events, Emotions, Empathy, Explanations, Everyday, and Employment. Participants are first asked to describe the events that occurred to them in simulations. Second, they are required to depict why, what, and how they feel during the simulation - i.e. their emotions. The third stage is to empathise with other participants by attempting to see things through the eyes of others, through which participants can concede that there can be several contrasting viewpoints to the simulation, and all of them might have validity in their own contexts. Gaining insight into different perspectives is of critical importance in the reflection process. The fourth E of the debriefing process is to explain the simulation. Participants are encouraged to account for their motives behind action, and the reasons for certain feelings. At this stage, similarities and differences can be drawn between simulation realities and real-world realities, and discussed. The fifth stage is to take account of everyday applicability. During this stage, participants are questioned as to how the simulation experience is different from their daily routine, and finally they are encouraged to employ (apply) insights, knowledge, and attitudes learned from simulation to their real-world work.

In a similar context, Thatcher and Robinson (1985) divided the debriefing process into five phases. The first phase is to identify the impact of the experience on each individual.
The second one is to examine the processes developed in the simulation. The third one is to clarify facts, concepts, and principles used in or related to the simulation. The fourth one is to look into the ways in which emotion is developed or understood in the simulation. The final one is to understand the different viewpoints which each of the trainees hold in relation to the nature of the processes and the experiences. They emphasised that each stage plays an important role in the reflection process whereby the real learning can occur for each person or the group as a whole.

Also, Thiagarajan (1995) suggested the six phases of debriefing. The first phase is to ask, ‘How do you feel?’, in which each participant is encouraged to share their emotion felt during simulations. Meanwhile, the others are also asked to listen actively in a non-judgemental manner. The second is to ask, ‘What happened?’, in which simulation players are asked to recall important things that took place during their role in simulations. This stage enables them to compare and contrast their recollections. The third is to ask, ‘What did you learn?’, in which they can draw some general conclusions, based on the comparison and contrast between their different recollections. The fourth is to ask, ‘How does this relate to the real world?’, in which they are stimulated to discuss how each conclusion relates and adapts to real world situations. The fifth is to ask, ‘What if…?’, in which they are asked to apply their insight to new different contexts. The final phase is to ask, ‘What next?’, in which they are asked to recognise how their actual behaviours can be changed as a result of their insights gained through these previous stages.

In most cases, debriefing means oral discussion after the simulation, and written debriefing is seldom recommended in the debriefing process (Lederman, 1984; Petranek, 1994). In the previous section, it is argued that not only oral discussion, but also writing, can contribute to maximising the quality of the reflection process, and from a simulation perspective, this ‘writing’ should take place in the form of written debriefing after oral debriefing. The assumption of oral debriefing is that all participants learn the same things simultaneously and in the same fashion. However, written debriefing can extend the analytical learning process further by encouraging each participant to reflect on experience on an individual basis, and complementing the oral debriefing (Petranek, 1989; Petranek et al., 1992). In this manner, Petranek et al. (1992) concluded that simulation provides three levels of learning: through participation, oral debriefing and finally written debriefing.
“It harnesses the raw energy of the simulation and the frenzy of ideas during the oral debriefing into a concrete, coherent essay. This writing activity broadens the basic principle of gaming - learn by doing. People learn by reinventing and reapplying ideas actively. Students often comment in their journals that they learn more about the simulation because they have to organise their thoughts.”
(Petranek et al., 1992, p. 180)

Table 8: Four Models of the Debriefing Process

Lederman (1984, 1992)

1. The introduction to the systematic reflection and analysis
2. The intensification and personalisation of the analysis of the experience
3. The generalisation and application of the experience

Petranek (1994) : the Six Es of Debriefing

1. Events
2. Emotions
3. Empathy
4. Explanations
5. Everyday
6. Employment

Thatcher and Robinson (1985)

1. Identifying the impact of the experience
2. Identifying and considering the processes which developed
3. Clarifying the facts, concepts, and principles
4. Identifying the ways in which emotion was involved
5. Identifying the different views which each of the participants formed

Thiagarajan (1995)

1. How do you feel?
2. What happened?
3. What did you learn?
4. How does this relate to the real world?
5. What if…?
6. What next…?

3.3.5 Validation of Crisis Simulations

One of the major problems in crisis simulations is how to measure their learning (training) effectiveness (Hay and Singer, 1989). The benefits of simulations have been highly praised, but these claims were not fully supported and corroborated by empirical studies. For example, Carvalho (1991) pointed out a lack of generally accepted theories or methodologies for validating simulations. Similarly, Wolfe and Crookall (1998, p.8) also mentioned that “the education simulation/gaming field has been unable to create a generally accepted typology, let alone taxonomy, of the nature of simulation/gaming”. After reviewing the literature on simulation evaluation in detail, Feinstein and Cannon (2002) however argued that ‘validation’ is the most important factor in assessing the effectiveness of simulations as a training tool. They defined ‘validation’ as the process of determining that conclusions drawn from simulations are isomorphic to those drawn from the real world system on which the simulations are founded. Equally, Kleijnen (1995) referred to validation as the process of identifying whether or not the conceptual simulation model is an accurate representation of the real-world system. Also, Law and Kelton (1991) viewed validation as the process of determining that the model on which a simulation is based is an acceptably accurate representation of the real world. In simple parlance, validation can be described as the process of determining the right model has been built (Balci, 1995).

First of all, the validation process can be divided into two basic dimensions of validity (Campbell and Stanley, 1963; Roelofs, 1998): internal validity and external validity. According to Campbell and Stanley (1963), internal validity is associated with the extent to which a simulation operates in the intended fashion - i.e. an effect produced in a simulation really resulted from the simulation itself? In contrast, external validity relates to the ability to generalise the findings obtained from a simulation to different situations and settings - i.e. the findings really accord with real world phenomena outside the simulation?
“Internal validity refers to the approximate validity with which we infer that a relationship between two variables is causal or that the absence of a relationship implies the absence of cause. External validity refers to the approximate validity with which we can infer that the presumed causal relationship can be generalised to and across alternate measures of the cause and effect and across different types of persons, settings, and times.”

(Cook and Campbell, 1979, p.37)

However, the distinction between internal validity and external validity is criticised for focusing mainly on the validity of experimental situations (Peters et al., 1998). In contrast, Raser (1969, p.144) suggested four types of validity: structure validity, psychological validity, process validity, and predictive validity. The first type of validity is psychological validity. The psychological validity is mainly associated with ‘providing an environment that seems realistic to the subjects (players)’. The second type is structure validity. He suggested that simulations or games are ‘valid to the degree that its structure (the theory and assumptions on which it is built) can be shown to be isomorphic to that of the reference system’. The third type is process validity, which is concerned with ‘the degree that the processes observed in the game are isomorphic to those observed in the reference system’. The final type is predictive validity, which implies that simulations or games are ‘valid to the degree that it can reproduce historical outcomes or predict the future.’ Peters et al. (1998) argued that these four types of validity could contribute to obtaining a better understanding of the general concept of validity in simulation and games. In particular, Roelofs (1998) claimed that psychological validity is the most important in accomplishing predictive validity, clarifying the relationship between four validity criteria.

Another approach to ‘validation’ might be one by the concept of ‘Fidelity’. Fidelity is the degree of realism to which a simulation represents to the participants, and can be broadly divided into two types: high-fidelity and low-fidelity. Borodzicz (2005) said that live exercises exemplify high-fidelity simulations, and table-top exercises can be viewed as low-fidelity simulations. Likewise, Hays and Singer (1989) argued that high-fidelity simulations are focused on the physical characteristics - i.e. a training context which physically reproduces the actual performance environment to the greatest possible extent (e.g. computer-controlled training facilities equipped with video). In contrast, low-fidelity simulations more concentrate on the functional characteristic, such as stimulus, tension, time pressure, and limited response options. Flin (1996) argued that
such low-fidelity simulation exercises can be a very economical means to test contingency plans, and to practice coordination between different emergency response organisations in the event of an emergency.

Particularly, with regard to the relationship between fidelity and learning effectiveness, some studies (Martin and Waag, 1978; Alessi, 1988) argued that high-fidelity simulations can rather prevent effective training and learning as they might galvanise novice trainees too much. In this context, Hays and Singer (1989) argued that low-fidelity simulations are more appropriate and economical at the first stage of training, especially for beginners. They argued that simulations do not always need to be an exact representation of the real, and departing from realism can rather ameliorate the effectiveness of training or learning. Lierman (1994) correspondingly emphasised that simulations do not have to achieve the same level of realism as the actual environments and costs might be cut by using different levels of physical fidelity for different parts of a simulation. Feinstein and Cannon (2002) went so far as to argue that the reckless pursuit of high-fidelity might bring about a devastating effect on the overall effectiveness of the learning process, although the importance of high-fidelity should not be underestimated.

The distinction between high-fidelity and low-fidelity can also be linked with one between physical-fidelity and psychological-fidelity (Kozlowski and DeShon, 2004). They asserted that simulations must have psychological-fidelity irrespective of the level of physical-fidelity. Borodzicz and Van Haperen (2002) argued that simulations need psychological fidelity as well as physical fidelity, but psychological fidelity is much more important in crisis situations. Gredler (1992) also argued that crisis simulations should produce similar emotions and feelings which can be obtained in the real world, such as tension, irritation, time pressure, uncertainty, etc. Similarly, Kibbee (1961) contended that ‘verisimilitude’ is much more important than realistic recreations of the actual situation. Noticeably, Loveluck (1994) also argued that verisimilitude is more highly valued than (physical) realism, suggesting eight factors as follows, which should be considered in validation of simulations:

- Simulation should display an external simplicity which masks internal complexity;
- Simulation should have some theoretical underpinning;
- Simulation should include an element of surprise;
• The social structure of a cluster of participants may conflict too strongly with the desired power structure in simulation;
• Verisimilitude is valued more highly than realism in management training;
• Running simulation is different from designing it;
• Simulation is culture sensitive;
• Simulation should make an emotional impact.

However, the two fidelity aspects are not competing requirements, and thus simulations need to strike the balance between physical and psychological fidelity (Feinstein and Cannon, 2002; Kozlowski and DeShon, 2004). Psychological fidelity must be prioritised in crisis simulations, but this does not mean that physical fidelity is not important. Rather, both of psychological-fidelity and physical-fidelity need to be successfully interwoven to evoke effective learning outcomes.

In principle, the evaluation of simulations rests on the model being developed. The bridge to the reality will collapse, if the models are not real. However, simulations can never be the exact representation of the real-world, and thus some aspects tend to be presented more conspicuously than others, especially depending on the aims or purposes of the simulations. Learning effectiveness in simulations is also contingent on a variety of factors such as the character of an individual, previous experience, existing knowledge and skills, etc. In this point, Borodicz (2005) argued that in reality, the debriefing session is fundamentally important in validating crisis simulations. Horner (1976, cited in Moore 1988, p.135) also argued that the debriefing process is at the core of validation of crisis simulations because:

• Identification of failings and short-comings allows individuals to learn from their mistakes, and thus extend their range of experience;
• Monitoring of the course of events allows modifications to be made to improve procedures; and may suggest new procedures and the appropriate form of contingency plans.

3.4 CONCLUSION

This chapter has theoretically discussed and analysed current practices and types of UK simulation exercises, simulation and learning theory, and finally validation issues.
Simulation exercises for UK emergency services are fundamentally conducted in three forms: discussion-based, table-top, and live exercises, and the choice of which type of exercise to employ is mainly decided by their aim and objectives. For this reason, clear aim and objectives need to be first and foremost established by all participating organisations. The design of simulation exercises is also driven by the simulations’ aim and objectives. Particularly, with regard to its design, the definitions of ‘emergency’, ‘crisis’, and ‘disaster’ also need to be distinguished. Response organisations can deal with ‘emergencies’ by merely following established procedures or routines, but crises, characterised by uncertainty and complexity, might be tackled by adaptive or second-order expertise and techniques in contrast to routine or structured response. In this regard, it is argued that a collective understanding of the difference will contribute to the improvement of designing and implementing crisis simulations.

A simulation exercises is theoretically based on ‘experiential learning’ by Kolb (1984), in which learning is defined as the process of transforming experience into concrete knowledge. However, the transformation process should be supported by reflection or reflective observation on experience, and in this sense, reflection is argued to be the essence of experiential learning. From a simulation perspective, reflection can take place in two forms: oral and written debriefing. Written debriefing sessions tend to be overlooked, but learning effectiveness will be developed to the full extent when reflection is also conducted by written debriefing. Validation - i.e. how to measure the learning effectiveness - is another major issue. There is a vast amount of literature about the concept of validation or validity. In principle, crisis simulations need to reproduce reality as closely as possible.

However, psychological validity, verisimilitude, low fidelity, or psychological fidelity must be prearranged in crisis simulations. The reckless pursuit of high or physical fidelity can be counterproductive and have a devastating effect on the learning effectiveness in crisis simulations, especially in the case of neophytes. It is also emphasised that the two different properties are not incompatible and need to harmonise with each other in crisis simulations. In practice, validation or validity of simulations will be judged in the oral and written debriefing sessions, where people can reflect on their experience obtained by simulations and compare it with reality. Finally, this chapter ends with an introduction of one popular saying by Confucius (552-478 B.C.); By three methods we may learn wisdom, first by reflection, which is noblest; second by imitation, which is easiest; and third by (first-hand) experience, which is the most bitter.
CHAPTER 4
RESEARCH METHODOLOGY

4.1 INTRODUCTION

This chapter will discuss the research methodology germane to this research, and outline the research progress adopted by this thesis. Research methodology in social science research is inextricably interwoven with data collection techniques as well as epistemological perspectives, both of which will decide how data is collected and analysed with regard to research questions. Also, it can determine the nature of the research findings to a certain extent. Therefore, the selection of appropriate research methodology is of critical importance to the research. For this, researchers are required to choose the methods that are the most suitable to the data collection in relation to the topics on the research agenda. Furthermore, they need to justify why the chosen methods are the most appropriate to the research questions under investigation.

Research questions should be, first of all, clearly formulated to guide the research progress as it can provide a focus for the research as a whole. However, they might not be evident at the initial stages of the research. It has been spotlighted earlier in the thesis that multi-agency simulation exercises are not well researched, especially in a Korean context, in spite of this being identified as one of the most crucial elements affecting effective crisis or disaster responses. Given this research problem, an increased familiarity with the literature review finally enabled the researcher to raise two main research questions: ‘How are simulation exercises in Korea and the UK organised and conducted, and how can this knowledge be used to respond to crises or disasters more effectively?’ and ‘Why are new methodological changes to organise and conduct simulation exercises needed in Korea?’. The first research question regarding ‘how’, relates to exploring the practices, procedures, and activities, whereby multi-agency crisis simulations are conducted in Korea and the UK. The second research question, ‘why’, is concerned with the theoretical and practical limitations, and further making resultant suggestions and recommendations, based on the empirical findings from a cross-national (cultural) comparison study of simulation exercises.

In order to address the research questions, the following sections will examine research
strategies available to the researcher, their epistemological perspectives, research methods and associated strengths and weaknesses, data collection procedures (progress), research ethics, etc. in detail. Additionally, they will address general research considerations, such as validity and reliability of a research design. With this process in mind, the chapter will commence by examining two main research paradigms (epistemological paradigms): ‘positivism’ and ‘interpretivism’, before justifying the research strategy and data gathering methods adopted by this research.

4.2 RESEARCH PARADIGMS AND STRATEGY

4.2.1 Epistemological Paradigms

A research paradigm means a philosophical framework which guides how research is conducted, and is mainly associated with investigators’ philosophical positions and assumptions regarding the nature of knowledge (Collis and Hussey, 2009). Particularly when it comes to ‘epistemology’ (the study of how we know things), there are two main research paradigms: ‘positivism’ and ‘interpretivism’. According to Bryman (2004), the term, ‘positivism’ is defined as an epistemological position that advocates the application of the methods of the natural sciences into the study of social phenomena. One of its basic beliefs is that the social and natural worlds conform to certain fixed and unalterable laws in an endless chain of causation (Malhorta and Birks, 2003).

Assumptions of ‘Positivism’ can be depicted as follows (Robson, 2002, p.20):

- Objective knowledge (facts) can be gained from direct experience or observation, and is the only knowledge available to science. Invisible or theoretical entities are rejected.
- Science separated facts from values; it is ‘value-free’.
- Science is largely based on quantitative data, derived from the use of strict rules and procedures, fundamentally different from common sense.
- All scientific propositions are founded on facts. Hypotheses are tested against these facts.
- The purpose of science is to develop universal causal laws. The search for scientific laws involves finding empirical regularities where two or more things
appear together or in some kind of sequence (sometimes called a constant conjunction of events).

- Cause is established through demonstrating such empirical regularities or constant conjunctions – in fact, this is all that causal relations are.
- Explaining an event is simply relating it to a general law.
- It is possible to transfer the assumptions and methods of natural science from natural to social science.

On the contrary, the central belief of ‘interpretivism’ is that truth is not absolute, and can be influenced by human judgement. This perspective emphasises the dynamic, participant-constructed and evolving nature of reality, recognising that the truth may be a wide array of interpretations of realities (Malhorta and Birks, 2003). The viewpoints of interpretivism can be described as follows (Robson, 2002, p.23):

- Social phenomena exist not ‘out there’ but in the minds of people and their interpretations.
- Reality cannot be defined objectively but only subjectively: reality is interpreted social action.
- The overemphasis positivists place on quantitative measurement is wrong and unjustifiable, for it cannot capture the real meaning of social behaviour.
- Quantitative research takes natural sciences as model. However, the methods of natural sciences are not suitable for social research. People are not just natural elements but social persons, acting individuals with their own wishes, perceptions and interests.
- Because quantitative research works on the principles of natural sciences (objectivity, neutrality), research objects are seen as scientific objects and are treated as such. Respondents are therefore treated as objects and as informants or producers of data. But social sciences are not natural sciences, and respondents are not objects but partners and experts whose views are sought.
- Standardisation and distance from the research object do not guarantee objectivity because the perceptions and meanings of the researcher penetrate the research process in many ways. Standardisation results in converting the social world under study into an artificial world which has nothing in common with the real world. Objectivity is not necessary. The personal involvement of the research is required in order to help to take the position of the respondent and see human life as seen by people themselves.
4.2.2 Qualitative Research

After the end of World War II, there had been an atmosphere of remarkable optimism about science and technology. In particular, the period from 1945 to 1965 was the climax of deference to the scientific experts. They invented new devices like jet-powered aircraft, nuclear energy, genetic engineering, and so on, all of which were seen as making the world a better place to live in. Jumping on such a scientific bandwagon, most of all fields including even the area of international politics tried to employ methodologies of science and technology (Durant, 1998). In particular, after large-scale disasters, such as Three Mile Island, Bhopal, Chernobyl and the space shuttle Challenger, occurred, society began to depend on engineers and technological experts to understand why the aforementioned disasters occurred, and how they could be prevented (Toft, 1996). The government also encouraged them to develop such methodologies which could quantitatively show how safe new technologies, installations, and processes were. On the grounds of ‘objectivity’ expressed by the quantitative methodologies, technical experts exclusively made decisions about what technologies were developed and how they were used. In this context, technical experts like statisticians, engineers, and natural scientists enjoyed a privilege to prove ‘scientific rationality’, which conferred a greater authority on their perspectives and statements than those of ordinary people in society (Waring, 2002).

However, as is already discussed in Chapter 2, risk is neither value-free nor objective, and it can be interpreted differently in different contexts by different people. It is also argued in Chapter 3 that ‘emergency’, ‘crisis’ and ‘disaster’ can be understood differently by the different organisations involved. There are different organisational, social and cultural constructs of emergency, crisis and disaster, and this subjective nature seems to cause the same event to be interpreted differently. Now, the focus of risk studies has significantly shifted away from quantitative-based studies toward more qualitative-based ones, incorporating a variety of perspectives from anthropology, sociology, and economics (Royal Society, 1992). Arguably, science or technology is no longer simply regarded as a source of solutions but rather seen as part of the problem, and new technologies increasingly become unforeseen risks, particularly in a risk society (Beck, 1992). Therefore, this study is mainly associated with interpretivism rather than with the positivistic approach to social sciences, and consequently adopts qualitative research methodology (See Table 9).
Table 9: Features of positivism and interpretivism

<table>
<thead>
<tr>
<th>Positivism</th>
<th>Interpretivism</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantitative</td>
<td>Qualitative</td>
</tr>
<tr>
<td>Objective</td>
<td>Subjective</td>
</tr>
<tr>
<td>Scientific</td>
<td>Humanist</td>
</tr>
<tr>
<td>Traditionalist</td>
<td>Phenomological</td>
</tr>
</tbody>
</table>

Source: Collis and Hussey (2009, p.58)

However, the choice between ‘quantitative’ and ‘qualitative’ methodologies should be based on not only the aforementioned two epistemological paradigms, but also the nature of data which will be collected (Yin, 2003). Some academics still claim that these research paradigms are incompatible with each other, whereas some disagreements are also presented. For example, Guba and Lincoln (2008) assert that there is no single conventional paradigm, and thus the paradigm differences are increasingly blurring - although the distinctions between research paradigms have had significant impact on such demarcation between quantitative and qualitative methodologies. In a similar manner, Bryman and Bell (2007, p.29) contend that there seem to exist some essential interconnections between quantitative and qualitative methodologies, regardless of the epistemological paradigms, stating “the distinction is not a hard-and-fast one: studies that have the broad characteristics of one research strategy may have a characteristic of the other. Not only this, but many writers argue that the two can be combined within an overall research project…”

As stated earlier, this study takes the form of addressing two research questions: ‘How are simulation exercises in Korea and the UK organised and conducted, and how can this knowledge be used to respond to crises or disasters more effectively?’ and ‘Why are new methodological changes to organise and conduct simulation exercises needed in Korea?’. Case study approach becomes increasingly popular, not only in sociology, but also in many other fields of social inquiry (Hammersley and Gomm, 2000). Particularly, using a case study strategy to examine the social phenomena is seen to be ideal to answer those how and why questions (Yin, 2003). In addition, the study will include a detailed account of two underground fires: the King’s Cross Fire in the UK and the Daegu Subway Fire in Korea. Yin (2003) also argues that the case study is preferred for
examining modern events, but when the relevant behaviours cannot be manipulated. For these reasons, a case study is likely to be best suited for the nature of this research. In brief, the research is basically in favour of the epistemological bases and assumptions of qualitative research, and a case study strategy in qualitative research is considered as the most suitable method for addressing the research questions (See Table 10).

“determination of problems, concepts, research techniques, and theoretical schemes should be done by the direct examination of the actual empirical social world… the nature of the empirical social world is to be discovered, to be dug out by a direct, careful and probing examination of that world.”

(Blumer, 1969, p.48)

<table>
<thead>
<tr>
<th>Qualitative</th>
<th>Quantitative</th>
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</thead>
<tbody>
<tr>
<td>Soft</td>
<td>Hard</td>
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<tr>
<td>Flexible</td>
<td>Fixed</td>
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<tr>
<td>Subjective</td>
<td>Objective</td>
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<tr>
<td>Inductive</td>
<td>Deductive</td>
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<tr>
<td>Speculative/illustrative</td>
<td>Hypothesis testing</td>
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<tr>
<td>Political</td>
<td>Value-free</td>
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<tr>
<td>Relativistic</td>
<td>Universalistic</td>
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<tr>
<td><strong>Case Study</strong></td>
<td>Survey</td>
</tr>
<tr>
<td>Grounded</td>
<td>Hypothesis testing</td>
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</tbody>
</table>

Source: Halfpenny (1979, p.799)

4.3 CASE STUDY STRATEGY

“Case study is the way of the artist, who achieves greatness when, through the portrayal of a single instance locked in time and circumstance, he communicates ensuring truths about the human condition.”

(MacDonald and Walker, 1975, p.3)

A case study is described as “an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident” (Yin, 2003, p.13). Equally, Robson
(2002, p.78) suggests that a case study is “a strategy for doing research which involves an empirical investigation of a given contemporary phenomenon within its real life context using multiple sources of evidence”. A case study must be constructed to be sensitive to the context, in which a case takes place (Eisenhardt, 1989), and the case can be the situation, individual, group, tribe, organisation, region or whatever it is that researchers are interested in. In this sense, Stake (2000, p.435) contends that a “case study is not a methodological choice but a choice of what is to be studied”. Similarly, Yin (2003) argues that case studies are neither a data collection method nor a design characteristic, but a comprehensive and flexible research strategy. The case study was once underestimated as having insufficient quantification, objectivity, and neutrality, but nowadays it is extensively employed in the social sciences such as psychology, criminology, sociology, anthropology, public administration, and business studies. Arguably, case studies have become one of the most popular research tools to do qualitative inquiry.

According to Scapens (1990), case studies can be categorised into four types: descriptive, illustrative, experimental and explanatory case studies. Additionally, Yin (2002, 2003) added two other types: exploratory and meta-evaluative (a meta-evaluation). However, some variations might be formed through combing one type with another. First, descriptive case studies are primarily concerned with describing current practice. Second, illustrative ones are associated with illustrating new and innovated practices adopted by specific countries, organisations, groups, etc. Third, experimental case studies usually look into difficulties in carrying out new procedures and techniques, and evaluating their consequences. Fourth, explanatory ones usually aim to discover causal relationships in real-life interventions, which are too complicated for the survey or experimental researches. Fifth, exploratory case studies attempt to find out theory by observing a social phenomenon directly in its raw form. Finally, a meta-evaluation case study simply means a study of an evaluation study.

There are several advantages in conducting case studies. The first main strength is that a case study allows for an in-depth treatment or a ‘thick’ description (Geertz, 1973) of the subject, where a large amount of detail about the practices and processes under scrutiny can be understood with reference to a given social context (Innes, 2001). The second is that a case study enables researchers to identify unique characteristics of organisations or individuals and the various interactive processes at work, and further to explore how they influence not only the implementation of systems, but also the way an organisation
operates. In contrast, a large scale survey tends to fail to discover these processes, although they are very critical to the success of systems or organisations (Bell, 2005). The final advantage of case studies is that they enable researchers to have greater ‘flexibility’ in their selection of research methods when conducting their studies (Stark and Torrance, 2005). This is mainly because the sources of evidence, which can be used in conducting a case study, are quite extensive, for example: documentation, archival records, interviews, direct observations, participant observation, physical artefacts, films, photographs, videotapes, etc. (Yin, 2003).

“By whatever methods, we choose to study the case. We could study it analytically or holistically, entirely by repeated measures or hermeneutically, organically or culturally, and by mixed methods - but we concentrate, at least for the time being, on the case.”

(Stake, 2000, p. 435)

However, disadvantages can also be identified in doing case studies. First of all, it is not feasible to generalise statistically from one or several cases to the total population, although case studies aim to expand and generalise their findings (Yin, 2003; Stark and Torrance, 2005). Second, it is often criticised that case studies fail to create a sufficiently operational set of measures, and thus data collection might be influenced by researcher biases and subjective judgements (Yin, 2003). Third, case studies are criticised for lack of procedural rigor, which can give rise to the problem of ‘reliability’. In other words, when a researcher repeats the same procedures as followed by an earlier researcher, if the procedures are not well documented, he or she might not reach the same findings and conclusion. The final disadvantage is that they can be relatively time-consuming and expensive, and might produce a considerable accumulation of incomprehensible and inexplicable papers and documents (Stoecker, 1991). Despite these drawbacks, it should be acknowledged that a case study is not a flawed experimental design in itself, but rather should be viewed as a different research strategy with its own designs (Cook and Campbell, 1979). Also, some tactics will be employed in order to attempt to offset the disadvantages, which will be discussed in Section 4.4.

The research basically adopts a ‘socio-technical’ approach to understanding crises and disasters, and borrows ideas from the social and management sciences in attempting to understand the practical workings of simulation exercises and their relevance to real crises or disasters. In the researcher’s field, crises and disasters have been increasingly
considered as consisting of a complex combination of technical, human, organisational and social factors. These ‘socio-technical’ disasters, at first glance, seem to show a set of unique characteristics, but through analysing the factors or the circumstances surrounding them, it is discovered that similar patterns of behaviour do exist across a wide range of such calamities (Toft and Reynolds, 1999). In this context, case study approach usually lends itself to the exploration of the etiology, process, and background of those ‘socio-technical’ disasters. Moreover, simulation exercises are strongly influenced by interaction between humans and the environment. Their success is contingent on not only the expertise of skilled responders, but also the conditions under which emergency or disaster situations are literally impossible to control or manipulate (Crichton et al., 2008).

“To try to understand the experience of another, it is necessary to dismantle the world as seen from one’s own place within it, and to-reassemble it as seen from his. For example, to understand a given choice another makes, one must face in imagination the lack of choices which may confront and deny him…”

(Berger and Mohr, 1975, p.92)

The quotation above depicts the raison d’etre of the case study approach very well, and considering all of the surrounding factors, it is finally decided that case study strategy is most suitable for the purpose of this research. Furthermore, given the two research questions, this study will take both descriptive and exploratory forms, in terms of basically depicting current practices of simulation exercises in Korea and the UK

4.4 DESIGNING CASE STUDIES

‘Research design’ is associated with developing research questions into projects. It deals with all of the issues involved in planning and conducting a research project from identifying the research problem through to publishing the results (Punch, 2009). Therefore, research design primarily concerns how the data selection and analysis can be set up, and how the selection of empirical material, such as situations and cases, is to be made in order to answer the research questions within the time frame available (Flick, 2004). In simple terms, Yin (2003) suggests that research design is a guide for the investigator to the process of collecting, analysing and interpreting observations. Frankfort-Nachmias and Nachmias (1996, p.99) also describe research design as “the
blueprint that enables the investigator to come up with solutions to these problems and
guides him or her in the various stages of the research”. Further, Ragin (1994) depicts
research design as follows:

“Research design is a plan for collecting and analysing evidence that will make
it possible for the investigator to answer whatever questions he or she has posed.
The design of an investigation touches almost all aspects of the research, from
the minute details of data collection to the selection of the techniques of data
analysis.”

(Ragin, 1994, p.191)

Yin (2003) argues that the development of case study designs should have the following
five elements:

- Research questions;
- Research propositions if any;
- Unit of analysis;
- The logic link between the data and the propositions;
- The criteria for interpreting the findings.

Further, Yin (2003) argues that a good research design of case studies also needs to pass
four design tests (validity and reliability criteria) in order to establish their quality (See
Table 11): **construct validity, internal validity** (for explanatory or causal case studies
only), **external validity**, and **reliability**, which originally stem from quantitative research
(Winter, 2000). In a similar fashion, Patton (2002) avers that both validity and reliability
are crucial elements of any qualitative research, when designing research, analysing the
findings, and judging the quality of the study. Interestingly when it comes to the
relationship between validity and reliability, Patton (2002) argues that reliability is a
consequence of the validity. Also, Lincoln and Guba (1985, p.316) mention, “since there
can be no validity without reliability, a demonstration of the former is sufficient to
establish the latter”.

- **Construct validity**: ‘Construct validity’ refers to whether theoretical concepts
  or social phenomena being studied are adequately reflected by the correct
  operational measures (Modell, 2005). As already mentioned in Section 4.3, data
  collection in a case study can be affected by the investigator’s biases or
subjective judgements. To overcome this limitation, Yin (2003) proposes three tactics. The first tactic is to employ multiple sources of evidence. The second tactic is to set up a chain of evidence. The final one is to have the draft case study report reviewed by key informants. The first tactic, multiple sources of evidence can be justified by ‘triangulation’, which will also be discussed in detail in Section 4.6.1.

- **Internal validity:** Internal validity means the credibility of the causal links between independent and dependent variables inferred from data (Modell, 2005). Internal validity is mainly associated with establishing a causal relationship, whereby the investigator can conclude that certain conditions instigate other conditions. However, internal validity is concerned with explanatory case studies only, and thus it does not apply to this thesis with descriptive and exploratory natures.

- **External validity:** The issue of external validity refers to the extent to which the findings of a specific study can be generalised across populations, settings, and times beyond the immediate case study (Birnberg et al., 1990). External validity is also synonymous with ‘generalisability’, which can be split into internal and external generalisability (Maxwell, 1992). Internal generalisability indicates generalisability within the situations and contexts under study, whereas external generalisability represents generalisability beyond those situations and contexts (Maxwell, 1996). Noticeably, internal generalisability is a key issue for case studies, and for this reason, investigators tend to select a representative case or representative set of cases. Nonetheless, multiple cases, no matter how many, cannot address perfectly the issue of internal generalisability. Instead, the investigator should try to generalise findings from case studies and transform them into a broad theory. It is because survey depends on statistical generalisation but case study relies on analytical generalisation (Yin, 2003). In addition, if a theory is tested by replicating the findings in a second and even a third case study, then it can be argued that the theory has specified that the same results are most likely to take place. Hence, the results can be acknowledged as upholding the theory, which is termed as ‘replication logic’ (Yin, 2003).

- **Reliability:** Reliability refers to the degree to which results are consistent over time, and an accurate representation of the population as a whole being studied
In other words, if the results and conclusion of a case study can be replicated by the same data collection and research progress, then it might be accepted as reliable. Reliability aims to minimise the errors and biases, and to obtain this, Yin (2003) argues that case study research procedures must be documented in concrete terms and in detail, suggesting that the general way of addressing the issue of reliability is to carry out research as if someone were always looking over the investigator’s shoulder. With regard to such documentation, Yin (2003) proposes two tactics such as the use of a case study protocol and the development of a case study database.

Table 11: Case Study Tactics for Four Design Tests

<table>
<thead>
<tr>
<th>Tests</th>
<th>Case Study Tactic</th>
<th>Phase of research in which tactic occurs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Construct validity</strong></td>
<td>* Use multiple sources of evidence</td>
<td>* Data collection</td>
</tr>
<tr>
<td></td>
<td>* Establish chain of evidence</td>
<td>* Data collection</td>
</tr>
<tr>
<td></td>
<td>* Have key informants review draft case study report</td>
<td>* Composition</td>
</tr>
<tr>
<td><strong>Internal validity</strong></td>
<td>* Do pattern-matching</td>
<td>* Data analysis</td>
</tr>
<tr>
<td></td>
<td>* Do explanation-building</td>
<td>* Data analysis</td>
</tr>
<tr>
<td></td>
<td>* Address rival explanations</td>
<td>* Data analysis</td>
</tr>
<tr>
<td></td>
<td>* Use logic models</td>
<td>* Data analysis</td>
</tr>
<tr>
<td><strong>External validity</strong></td>
<td>* Use theory in single-case studies</td>
<td>* Research Design</td>
</tr>
<tr>
<td></td>
<td>* Use replication logic in multiple-case studies</td>
<td>* Research Design</td>
</tr>
<tr>
<td><strong>Reliability</strong></td>
<td>* Use case study protocol</td>
<td>* Data collection</td>
</tr>
<tr>
<td></td>
<td>* Develop case study database</td>
<td>* Data collection</td>
</tr>
</tbody>
</table>

Source: COSMOS Corporation (Cited in Yin 2003, p.34)

4.5 CONDUCTING CASE STUDIES

4.5.1 Data Collection Methods

Case studies emphasise the holistic investigation of social and cultural phenomena under the microscope, and thus attempt to describe them comprehensively and thoroughly from the wider contexts to which those phenomena may be related.
(Jorgensen, 1989). Deciding upon a case study as a research strategy further involves decision-making into the selection of research methods (data collection methods). Particularly, with regard to research methods, Yin (2003) suggests that there are six main sources of evidence in conducting case studies: documentation, archival records, interviews, direct observations, participant-observation, and physical artefacts (See Table 12). However, no single research method (or source of evidence) is best in all situations, and each has advantages and disadvantages. Therefore, it is vital that a good case study should use as many different methods or source of evidence as possible.

Case studies can be based on any mix of quantitative and qualitative methods (Yin, 2003). However, the most commonly used methods are ‘interviews’, ‘documentary research’, and ‘observation’, with the balance between them being largely decided by the resources available, and the disciplinary and professional tradition in the field (Patton, 2002; Stark and Torrance, 2005). Also, Stake (1995) argues that participant observation, interview, and document review are traditionally considered as vital research methods in doing case studies. In this context, many of the case studies in the researcher’s field, on the whole, followed this tradition (Borodzicz, 1997; Jones, 2003; Chen, 2007; Devitt, 2009), and the research methods employed for this study are also firmly embedded within the tradition. Hence, participant observation, qualitative interviews, and documentary research are to be used for this research, which will be respectively justified in the following sections (The ways the researcher conducted his case studies are documented in great detail in Chapter 6).

Table 12: Six Sources of Evidence: Strengths and Weaknesses

<table>
<thead>
<tr>
<th>Source of Evidence</th>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Documentation</td>
<td>* stable - can be reviewed repeatedly</td>
<td>* retrievability - can be low</td>
</tr>
<tr>
<td></td>
<td>* unobtrusive - not created as a result of the case study</td>
<td>* biased selectivity, if collection is incomplete</td>
</tr>
<tr>
<td></td>
<td>* exact - contains exact names, references, and details of an event</td>
<td>* reporting bias – reflects (unknown) bias of author</td>
</tr>
<tr>
<td></td>
<td>* broad coverage - long span of time, many events, and many settings</td>
<td>* access - may be deliberately blocked.</td>
</tr>
</tbody>
</table>
| Archival Records | * (Same as above for documentation)  
* precise and quantitative | * (Same as above for documentation)  
* accessibility due to privacy reasons |
|---|---|---|
| Interviews | * targeted - focuses directly on case study topic  
* insightful - provides perceived casual inferences | * bias due to poorly constructed questions  
* response bias  
* inaccuracies due to poor recall  
* reflexivity - interviewees give what interviewer wants to hear |
| Direct Observation | * reality - covers events in real time  
* contextual - covers context of event | * time-consuming  
* selectivity - unless broad coverage  
* reflexivity - event may proceed differently because it is being observed  
* cost - hours needed by human observers |
| Participant Observation | * (Same as above for direct observations)  
* insightful into interpersonal behaviour and motives | * (Same as above for direct observations)  
* bias due to investigator’s manipulation of events |
| Physical Artefacts | * insightful into cultural features  
* insightful into technical operations | * selectivity  
* availability |
4.5.1.1 Participant Observation

“All social research is a form of participant observation because we cannot study the social world without being part of it.”

(Atkinson and Hammersley, 1994, p.249)

The research is to explore the social and cultural contexts, where simulation exercises take place, and to this end, the researcher needs to observe or take part in simulation exercises in both Korea and the UK. Jorgensen (1989, p.13) argued that participant observation is most appropriate when the following conditions are present:

- the research problem is concerned with human meanings and interactions viewed from the insider’s perspective;
- the phenomenon of investigation is observable within an everyday situation or setting;
- the researcher is able to gain access to an appropriate setting;
- the phenomenon is sufficiently limited in size and location to be studied as a case;
- study questions are appropriate for case study; and
- the research problem can be addressed by qualitative data gathered by direct observation and other means pertinent to the field setting.

All of the conditions had also been met for this research, and participant observation was finally employed. Participant observation can be defined as “a method in which a researcher takes part in the daily activities, rituals, interactions, and events of a group of people as one of the means of learning the explicit and tacit aspects of their life routines and their culture” (DeWalt and DeWalt, 2002, p.1). Arguably, participant observation should be understood as a method for finding out the real processes of interaction in their real settings. It aims to comprehend behaviour within the context of an observed setting because people act and understand the world by taking meanings and symbols from their surroundings (Borodzicz, 1997). As a result, the investigator can watch what people actually do, and listen to what people actually say, not what people say what they have done or will do by virtue of participant observation (Robson, 2002). Therefore, participant observation is likely to be one of the most ideal means for investigating the
social and cultural contexts of the people, groups, organisations, and settings under scrutiny.

Jorgensen (1989, p.13-14) proposes seven basic characteristics of participant observation as follows:

- a special interest in human meaning and interaction as viewed from the perspective of people who are insiders or members of particular situations and settings;
- location in the here and now of everyday life situations and settings as the foundation of inquiry and method;
- a form of theory and theorising stressing interpretation and understanding of human existence;
- a logic and process of inquiry that is open-ended, flexible, opportunistic, and requires constant redefinition of what is problematic, based on facts gathered in concrete settings of human existence;
- an in-depth, qualitative, case study approach and design;
- the performance of a participant role or roles that involves establishing and maintaining relationships with natives in the field; and
- the use of direct observation along with other methods of gathering information.

Robson (2002) suggests that for convenience, participant observation should commence with the form of descriptive observation that aims to describe the setting, the people, and the events. Further, Spradley (1980) argues that the following nine dimensions should be considered respectively, when starting the descriptive observation.

- **Space**: lay out of the physical settings; rooms, outdoor spaces, etc.
- **Actors**: the names and relevant details of the people involved
- **Activities**: the various activities of the actors
- **Objects**: physical elements: furniture, etc.
- **Acts**: specific individual actions
- **Events**: particular occurrences, e.g. meetings
- **Time**: the sequence of events
- **Goals**: what actors are attempting to accomplish.
- **Feelings**: emotions in particular contexts
Participant observation is rooted in ethnography (For this, refer to Section 4.5.2), in which the observer needs to become a member of the observed group. In other words, the researcher is required to understand the environment by being a part of it, and as a result, this involves not only a physical presence and a sharing of life activities, but also being immersed in their social, cultural and symbolic worlds (Robson, 2002). It is this naturalistic familiarity that is essential for understanding how and why people do what they do. In contrast, Bruyn (1966) warns that the role of the participant observers also requires detachment as well as personal involvement. This means that the researcher needs to carry out their observation as a neutral and distanced observer simultaneously. The issue automatically raises a general question specifically about the role of the researcher in participant observation as to what extent the researcher should be involved in the settings and people under examination. For example, Gold (1958) described four membership roles for the participant-observer such as complete participant, participant-as-observer (participant-oriented), observer-as-participant (observer-oriented), and complete observer. Similarly, Adler and Adler (1987) developed a typology consisting of three memberships such as the complete-member-researcher, the active-member-researcher, and the peripheral-member-researcher. Whichever typology is used, it should be noted that the role of the researcher might affect the level of reactivity in participant observation data.

Keeping all of the points in mind, a total of seven major ‘multi-agency’ crisis simulations were observed; ‘Hitachi 395 Evacuation Workshop’ (30 March 2009, London), ‘Exercise Twin Bore’ (Overnight on 24/25 April 2009, London), ‘Exercise Saxon Shore’ (26 June 2009, Kent), and ‘Exercise Operation Safe Return’ (16 and 17 March 2010, London) in England, and ‘Keungogae Subway Counter Terrorism Exercise 2009’ (14 October 2009, Daegu), ‘SKX 2010 Earthquake Exercise’ (13 May 2010), and ‘SKX 2010 Subway Fire Exercise’ (14 May 2010) in Korea, all of which will be explored in great detail in Chapter 6. The researcher partook in all of the simulation exercises as an observer-as-participant, except Exercise Saxon Shore, in which the researcher attended as a participant-as-observer (volunteering as a mock casualty). To keep a record of simulation exercises, they were recorded by using camera or video equipment, if appropriate. However, when individual filming and photography was not allowed (e.g. Exercise Saxon Shore), the researcher tried to make a note of activities, unique experiences and other matters of possible interest in detail by using ‘Case Study Notes’ (Yin, 2003).
4.5.1.2 Qualitative interviews

“The interview is the main road to multiple realities.”

(Stake, 1995, p.64)

One of the most important sources of information in the case study is the qualitative interviews. Given the research problem and questions of the research, it was indispensable to interview participants (exercise players) of simulation exercises such as police officers, fire fighters, ambulance staff, etc. Qualitative interviews are viewed as a vital first-hand source of information about a given area, and in particular, they are considered as appropriate for researching the attitudes and beliefs of social groups (Fielding and Thomas, 2001). In this context, qualitative interviewing aims to derive interpretations from respondent talk, and further understand the meanings of their experiences and life worlds (Warren, 2002), especially through “listening, hearing, and sharing social experiences” (Rubin and Rubin, 2005, p.1). Qualitative interviews are not neutral tools of collecting primary data, and rather should be viewed as active interaction between the interviewer and interviewee(s) leading to negotiated, contextually based results (Fontana and Frey, 2000) (For strengths and weaknesses of qualitative interviews, see Table 12). In this way, qualitative interviews have long been involved in ethnographic fieldwork, together with participant observation, which will be further explained in Section 4.5.2

“…interviews are particularly suited for studying people’s understanding of the meanings in their lived world, describing their experience and self-understanding, and clarifying and elaborating their own perspective on their lived world.”

(Kvale, 1996, p.105)

There are three main varieties of qualitative research interview, which are determined by the extent of structure imposed on each format: the structured interview, the semi-structured interview, and the unstructured interview (Fielding and Thomas, 2001). In the structured interview, the interviewer asks all respondents the same set of questions in the same order with a limited set of response categories. There is very little flexibility in the way questions are asked in the structured interview settings (Fontana and Frey, 2000), and for this reason, interviewers need to be trained to handle all interview situations in the same manner. The structured interview is usually adopted when they
have some ideas of what is happening with their sample in relation to the research topic, and where there is no risk of losing their meanings as a result of imposing a standardised and straightforward manner of asking questions.

In the semi-structured interview, the interviewer is afforded his or her discretion to change their sequence and to probe for more information. Proportionately, respondents are granted their liberty in expressing their ideas and feelings. Moreover, he or she can adapt his or her interview techniques to the level of respondents’ understanding and articulation, and can manage the fact that in responding to a question, responders often give answers to questions that the interviewer is going to ask later. The semi-instructed can also contribute to improving the relationship between the interviewer and respondents.

The unstructured interview is centred on a ‘list of topics’ which interviewers want the interviewees to talk about. Interviewers can take the liberty of phrasing the wording of questions and asking them in any order as they wish with their interview guide. They can also take part in the conversation, if appropriate, by discussing what they think of the topic. The unstructured interview is far more flexible, and its objective is especially to “find out what kinds of things are happening rather than to determine the frequency of predetermined kinds of things that the researcher already believes can happen” (Loftland, 1971, p.76). Furthermore, it enables the interviewer to obtain voluntary and unexpected information about attitudes, beliefs, values and actions about interviewees rather than a rehearsed position. Besides, it is preferred by inexperienced interviewers on account of not only its simple design, but also similarity to routine procedures in their social life.

It was for those characteristics that the unstructured interview was finally selected for the research method. Loftland (1971) also support this selection by pointing out that both of participant observation and unstructured interviewing go hand in hand. Nonetheless, the choice of the unstructured interview is not without disadvantages. Its main downside is that it lacks the reliability and uniformity because each respondent is asked a different series of questions. Also, this type of interview might produce unwieldy and unnecessary amounts of data, requiring a great deal of time to analyse and to code. To offset these weaknesses, a list of topics (not questions) was formulated in more detail, and thus the interview style adopted for the research seemed to be somewhere in between the semi-structured and the unstructured interviews, still having
enough flexibility to allow different responses to the topics. The list of topics has been finally constructed from a comprehensive consideration of the literature review and document research, which is presented in Appendix 1. The interviews were primarily conducted around this list of topics, but it should be noted again that if appropriate, questions were improvised, according to the responses of interviewees, without strictly adhering to the list.

Each interview was recorded for both the natural flow of the conversation and the safekeeping of interview data by a digital voice recorder, and all of the interviews were finished within 30 to 60 minutes (key results from qualitative interviews are included in Chapter 6). Recording might give rise to anxiety and distraction of interviewees. Thus, it was very crucial to create amicable ambience for the interview conversation, and the voice recorder needed to be positioned inconspicuously. In Korea, all of the interviews were conducted and were, subsequently, fully transcribed in Korean, and the researcher tried to translate (summarise) them into English, without impairing the original meaning of each interviewee. However, the issue of the transcription and translation of dialogue was considered as one of the main research difficulties, particularly when it comes to the researcher being a non-native speaker. In the case of this research, the problem was dealt with by employing a ‘reviewer’ to check the accuracy of these transcriptions and translations. The reviewer hired was Mr. Wayne Letcher, a professional Canadian English teacher, who was conducting his (distance-learning) master degree from a Canadian university. Having lived in Korea for more than seven years, and working as an English lecturer with the Korean National Police University (KNPU), Mr. Letcher was familiar with various aspects of Korean society and culture, and for this reason, he was finally selected as a reviewer. Although it took a significant amount of time to transcribe and further translate the research audio-tapes that amassed, as the interviews were recorded, the help by a professional contributed to ensuring the accuracy and efficiency of transcription and translation.

4.5.1.3 Documentary Research

“Documents are literally all around us, they are inescapable, they are an integral part of our daily lives and our public concerns.”

(McCulloch, 2004, p.1)

The research involves exploring two different underground fires and current practices of
simulation exercises. It is unavoidable to examine actual disasters since they form the social and cultural contexts, within which crisis simulations will be conceived, implemented and analysed. However, because of their tragic nature and infrequency, it is quite impossible to study a disaster as anything other than a reconstruction of a historical event (Borodzicz, 1997). In addition, the researcher is not a member of the British emergency services, and would hence be unlikely to gain access to the management of a real disaster. Meanwhile, documents, both historical and contemporary, can be a rich source of data for social research. Of great importance is the fact that they record the details of events beyond our understanding because we do not have firsthand experience of what they are in detail (Macdonald, 2001). In this respect, documentary research was basically employed in order to arrive deep inside the truth of the aforementioned two fire disasters. In other words, the researcher was able to get a comprehensive view of the process of the underground fires vicariously by adopting documentary research.

Documentary research still remains as a significant research tool in its own right as well as an invaluable part of most schemes of triangulation (Denzin 1970). Moreover, documentary research almost always provides a point of departure for primary research (Stewart and Kamins, 1993). In addition, it is also relatively a time and cost effective method of collecting data (For further advantages and disadvantages, see Table 12). The range of documents which social scientists usually utilise includes ‘life histories’, the ‘diary’, ‘newspapers and magazines’, ‘letters’, ‘stories, essays and other writings’, ‘official documents and records’, and ‘research reports’ (Jupp, 2006). These documents are not only an important means for improving our understanding of the social world, but also frequently used in order to uphold other research methods such as interviews and surveys as secondary data. Particularly, documents are unobtrusive and non-reactive (stable), compared to other sources of evidence.

For credibility and representativeness, official or government documents and records, such as public inquiry reports, exercise (implementation & evaluation) plans and scenario-scripts, post-exercise reports, police investigation reports, and radio communication logs, were mainly used and examined in this research. In particular, the researcher could obtain circulars, information sheets, joining instructions, and PPT files with regard to simulation exercises while taking part in them. These internal documents were of great importance in the sense that they provided an accurate account of scenarios, purposes, processes, instructions, etc. Research reports, such as journal
articles and PhD theses written by academics, and news papers were also explored. However, those official or academic documents and reports should not always be treated as objective, accurate statement of facts because they were published for their own purposes, and might be understood differently in different contexts. Accordingly, nothing can be taken for granted in documentary research, and every document needs to be checked from more than one angle (Macdonald, 2001). For this, Finnegan (2006, p.146-149) suggested eight ‘questions to ask’, which need to be considered by the investigator, when searching for documentary resources.

- Has the researcher made use of the existing sources, relevant and appropriate, for his or her research topic?
- To what degree has the researcher taken account of any personal interpretations or selection of the facts in the sources used?
- What kind of selection has the researcher made in her or his use of the sources and on what principles?
- How far does a source, which describes a particular incident or case, reflect the general situation?
- Is the source concerned with recommendations, ideals or what ought to be done?
- How relevant is the context of the source?
- With statistical sources: what were the assumptions according to which the statistics were collected and presented?
- And, finally having taken all the previous factors into account: can we safely conclude that the researcher has reached a reasonable interpretation of the meaning of the sources?

In Korea, government documents or circulars are seldom publicised, and so if the researcher were not a Korean police officer, it might be more difficult to gain access to such internal data. It seems that the researcher’s status as a police inspector of the Korean National Police Agency (also as a senior lecturer with KNPU) contributed to obtaining those documents and data. Through looking into them, the researcher was able to get the whole picture of the backgrounds, progress, and underlying causes of the two underground crises, and attain a better understanding of simulation exercise practices in both countries. All of the documents obtained also contributed to supplementing a comprehensive literature review in Chapter 2 and Chapter 3.
4.5.2 Ethnographic Nature

The thesis fundamentally adopts a case study strategy, using ‘participant observation’ and ‘qualitative interviews’ as research methods, in order to understand ways of thinking (world views) and behaviours of actual people in the contexts of not only simulation exercises but also their everyday emergency response. As mentioned in Section 4.3, the case study is able to create an in-depth description of the case (subject) under study vis-à-vis its particular social and cultural contexts. Not surprisingly, the case study strategy employed in the study is very closely associated with an ethnographic approach because the main purpose of ethnography is also to produce an in-depth description - i.e. a focus on the description and interpretation of the culture and social structure of a social group (Robson, 2002). Likewise, Hammersley (1990, p.1) states, “the meaning of ethnography overlaps with that of several others - such as qualitative method, interpretative research, case study…. (emphasis added)”. Ethnography can be linked with the case study, and conversely a case study can be approached ethnographically, and for this reason, data collection methods of ethnography often become congruent with those of a case study strategy, generally involving ‘interviewing’ and ‘participant observation’ (Crang and Cook, 2007; Fielding, 2008).

The founding father of ethnography is seen to be Bronislaw Malinowski, whose seminal work “Argonauts of the Western Pacific”, published in 1922, was based on his immersion with Trobriand islanders (Devitt, 2009). However, ethnography is not easy “to define because it is used in different ways in different disciplines with different traditions” (O’Reilly, 2005, p.1). Ethnography has its roots in anthropology, and is mainly associated with understanding the meaning of actions and events to the people under study, particularly, involving an immersion in the particular culture of the group, typically, for a period of years. That is, traditional ethnography usually requires long periods of time in the field. However, this was almost unrealistic and also physically impossible for this PhD research. Robson (2002) argues that employing an ethnographic approach is very much a question of general style rather than of following specific rules about procedures. Hence, such unfeasibility finally persuaded the researcher to allow a shorter period of immersion in crisis simulations under study, not requiring the same period of time as does classical ethnography. Despite a reduction in time immersed than might normally be expected, the case study employed in the thesis is still inherently ethnographical in nature. Consequently, the case study was conducted in a manner
reflected in a quote by Spradley: “I want to know what you know in the way that you know it…. Will you become my teacher and help me understand?” (Spradley, 1979, p.34, cited in Heyl, 2001, p.369).

4.5.3 Research Relationship

Before collecting primary data, the researcher had to seek formal permission from those responsible, usually called gatekeepers. Gatekeepers have positions of authority within an organisation, and can give or refuse permission to conduct research regarding the activities of an organisation or its members (Fosters, 2006). In this sense, they might exercise considerable influence over the whole process of data collection. Therefore, gaining access via gatekeepers was the first stage of field relations in this study. Fetterman (1998b, p.33) emphasised the importance of gatekeepers, arguing that “An introduction by a member (a gatekeeper) is the ethnographer’s best ticket into community (emphasis added)”. However, the process of gaining access is not a single event, and rather involves the continual negotiation of access with a number of different gatekeepers. Moreover, identifying the relevant gatekeeper is not always clear and straightforward.

At the onset of this PhD study, the researcher did not have direct access to organisational gatekeepers with regard to multi-agency simulations in the UK. The researcher’s Director of Studies (DOS), Professor Edward Borodzicz made some arrangements for the researcher to contact a relevant gatekeeper, and finally introduced Inspector Julian Dixon of British Transport Police (BTP). Interestingly, Inspector Julian Dixon worked for St. Pancras International Railway Station in London, served by King’s Cross underground station (where the King’s Cross Fire occurred). Mr. Dixon has a good relationship with the researcher’s DOS, and for this reason, Mr. Dixon was instrumental in providing the researcher with access to events, relevant individuals and information. First of all, the researcher was invited to ‘Hitachi 395 evacuation workshop’ on 30 March 2009, which took place in London. Similar to the ‘snowball effect’, this first attendance broadened contacts with the emergency response agencies, which subsequently gave rise to invitations to other simulation exercises. The researcher was invited to a live exercise, ‘Exercise Twin Bore’ (in the continuum of the above workshop) overnight between 24 and 25 April 2009 at St. Pancras Railway Station, London. There, the researcher gained other useful contacts, and also obtained relevant information regarding another upcoming live exercise, ‘Exercise Saxon Shore’. The
The researcher emailed Liz Turner in charge of ‘Exercise Saxon Shore’, and finally was able to partake in the simulation exercise as a causality volunteer. The ‘Exercise Saxon Shore’ took place on 26 June 2009 in Kent, England. Moreover, the researcher was invited to ‘Exercise Operation Safe Return’, a five-day CT live exercise, by virtue of Mr. Dixon’s introduction, which occurred between 15 and 19 March 2010, in London.

The importance of establishing trust and friendship during participant observations and qualitative interviews should also be emphasised, since those relations can lead to a better understanding of the settings or people being studied. Participant observations and qualitative interviews have long been linked to ethnographical fieldwork, and the relationship is often described as ‘going native’ or ‘complete membership’ in the field of ethnography, which means being fully immersed in their cultures and lives (Alder and Alder, 1987). Nevertheless, the main downside of ‘going native’ is that the objectivity of the researcher might decrease in proportion to the degree of active involvement with or firm commitment to the observed and interviewees (Borodzicz, 1997). Therefore, researchers need to adopt a balanced stance between ‘going native’ and behaving as perfect strangers, also referred to as a ‘marginal native’ (Freilich, 1970) or a ‘professional stranger’ (Agar, 1980). This position also seems to be in tune with Fetterman’s stance that “the ethnographer enters the field with an open mind, not an empty head” (Fetterman, 1998a, p.473). Notably, Tedlock (2000, p.457) suggests that field workers should be expected to maintain a respectful distance from those studied, and to develop “rapport, not friendship; compassion, not sympathy; respect not belief; understanding, not identification; admiration, not love”. All in all, the field relations seem to be a complex and changing entity, and thus can facilitate or hinder the data collection process in terms of impartiality. Therefore, the researcher tried to strike the balance between the extremes in conducting participant observations and qualitative interviews.

4.5.4 Research Ethics

Research ethics are associated with the protection of participants and interviewees, and the morality of research conduct. Each stage of the research from design to dissemination should be guided by ethical considerations. In this research, participation was completely voluntary, and each interviewee was well informed of the process and purpose of the research. To ensure complete communication of information, a participation information sheet, containing all of the relevant information regarding the
research process and methods, was provided to each interviewee. Subsequently, he or she was politely asked to sign the research consent form, when applicable. For those interviewees who desired anonymity, a code was used in place of names to designate the interview recordings, ensuring complete confidentiality. Furthermore, it was promised that personal details would be not released or published without their direct consent to the disclosure. In addition, the researcher tried to ensure that all data collected were accurate, and that intentional fabrication and omissions did not take place. Arguably, in qualitative research, organisational, cultural, and political values cannot be eliminated, and for this case study to be accurate and rational, it must serve ‘value-relevance’ rather than ‘value freedom’ (Weber, 1949). Finally, the researcher was given ethical approval by the Ethics Committee of Portsmouth Business School.

4.6 DATA ANALYSIS

4.6.1 Triangulation

In social science research, the term, ‘triangulation’ is used to refer to the use of multiple sources to improve the validity of interpretations, and consequently to enhance the rigour of the research. This is most often realised by means of applying different research methods to the research problem. Yin (2003) also emphasises the significance of using evidence from two or more sources, which converge on the same set of facts or finding. All research methods have their own disadvantages, and so triangulation can neutralise the disadvantages by double-checking the phenomena under observation with different research methods. In simple terms, Saunders et al. (2007) explain that triangulation refers to the use of different data collection methods within one study in order to ensure that data are telling you what you think they are telling you. Notably, Denzin (1998, cited in Robson 2002, p.174) has classified ‘triangulation’ into four types as follows:

- Data triangulation: the use of more than one method of data collection;
- Observer triangulation: using more than one observer in the study;
- Methodological triangulation: combining quantitative and qualitative approaches;
- Theory triangulation: using multiple theories or perspectives.

This research employed three different research methods to validate the research
findings, comprised of participant observation, qualitative unstructured interviews, and documentary research. Particularly, this selection can be explained in terms of ‘data triangulation’, which means using more than one method to gather data. Through this data triangulation, the researcher could balance the advantages and disadvantages of each research method, and further reduce many of the threats to validity (Macdonald, 2001; Robson, 2002). In a similar vein, Stake (1995) argues that with multiple approaches within a single study, researchers are likely to nullify some extraneous influences. As explained in Table 11, data triangulation can address the potential problems of construct validity because the multiple sources of evidence can provide multiple measures of the same phenomenon. It had been acknowledged that triangulation was fundamental to validity, but in recent years, it has been perceived less as a validation strategy on the grounds that “what goes on in one setting is not a simple corrective to what happens elsewhere – each must be understood in its own terms” (Silverman, 1985, p.21). Triangulation is increasingly viewed as a strategy for justifying and underpinning knowledge by gaining additional knowledge, and less toward validity and objectivity of interpretation (Flick, 1992). Finally, the findings of a case study become not only convincing and accurate, but also holistic and rich through this data triangulation process, specifically acknowledging the following point:

“Accounts collected from different perspectives may not match tidily at all. There may be mismatch and even conflict between them. A mismatch does not necessarily mean that the data collection process is flawed – it could be that people just have very different accounts of similar phenomena. You need to critically examine the meaning of any mismatches to make sense of them.”

(Law et al., 2003, p.281)

4.6.2 Data Analysis Process

The analysis of qualitative data obtained from case study is one of the least developed and most difficult dimensions of conducting case studies (Yin, 2003). According to Maxwell (1996), the process of qualitative data analysis consists of two stages. The first stage is to read the (case study) field notes consisting of interview transcripts, observational notes, literature review, and other relevant documents which are to be analysed (Tesch, 1990; Dey, 1993). Listening to interview tapes for transcription, transcribing interviews, and rewriting and reorganising field notes are all regarded as a good opportunity for qualitative data analysis. At the second stage, three main analytic
options can be presented: *memos, categorising strategies*, and *contextualising strategies*, which can, or generally should, be combined (Maxwell, 1996). First of all, a researcher is required to write *memos* on a regular basis while doing data analysis. Memos are an essential technique for qualitative data analysis, and notably can contribute to developing analytic thinking and insights, concerning quantitative data collected.

Secondly, the main *categorising strategy* in qualitative research is coding. Coding in qualitative research focuses on deconstructing data and re-sorting them in categories, and encourages comparison of data within and between categories. At the beginning, qualitative data analysis software such as NVivo was considered for the coding in this thesis, because such computer-assisted methods can help to code and categorise a large amount of data collected from participant observations, qualitative interviews and documentary review. However, data finally collected and sifted were not that large, and also not complex, and for this reason, it became feasible to adopt manual techniques without employing computer-assisted qualitative data analysis software (CAQDAS). Computer-assisted methods are merely a ‘tool’ which can ‘assist’ in qualitative data analysis, but which will not do the analysis for the researcher. Of great significance are the researcher’s inputs, efforts, and creativity on his part (Punch, 2009; Yin 2009).

The final analytical option is *contextualising strategy*. This contextualising analysis attempts to understand data in context (also retaining the context of qualitative data), in order to identify relationships between categories and themes within a context into a coherent whole. The most important factor at this stage is to hear what the data have to say in their contexts, rather than simply uniting them into arbitrary units (Welsh, 2002). To this end, the researcher tried to read and re-read field notes, reflect on what was read, and make comparisons based on logic and judgement as is argued by Neuman (2006). Particularly, with regard to understating and interpreting data in context, Erickson and Nosanchuck (1983, p.5) averred that “…there are always lots of interpretations and lots of approaches depending on what you are interested in. There are many good answers to different questions, not just one right answer as in the detective story”. All attempts were made during the analysis of qualitative data to make it possible for the data analysis process to be sound. A further consideration behind this data analysis process was the researcher’s firm belief that policy should be formulated out of practice, and that policy and practice should be inextricably linked with one another in the real world.
4.7 CONCLUSION

This chapter has illustrated the research methodology and progress. Notably, it examined not only the pros and cons of the research methods, but also data gathering procedures adopted by the thesis. The research basically includes the investigation of two different underground fires, and simulation exercises conducted by emergency response organisations. In relation to this exploration, two key research questions were presented: ‘How are simulation exercises in Korea and the UK organised and conducted, and how can this knowledge be used to respond to crises or disasters more effectively?’ and ‘Why are new methodological changes to organise and conduct simulation exercises needed in Korea?’. The first step in addressing these research questions, is to select an appropriate case study strategy: First, case studies are extensively employed in the sphere of investigating the etiology, process, and background of ‘socio-technical’ disasters. Secondly, they are most appropriate for addressing the ‘how’ and ‘why’ research questions. Thirdly, case studies are suitable for exploring the social and cultural contexts, where simulation exercises take place. Finally, they are also ideal for exploring the reconstruction of real events, when the relevant behaviours cannot be controlled.

To get a clearer view of the research questions, a researcher should employ as many different research methods as possible. Particularly, participant observation, qualitative interviews, and documentary review are perceived as traditional research methods in case study strategy. The research methods employed for this study are also firmly embedded within this tradition. The drawbacks of each research method were also fully recognised, because they could potentially impair the validity and reliability of the study. To counterbalance these, data triangulation was finally employed. On the other hand, participant observations and qualitative interviews are connected with the nature of ethnography. In order to understand the world of the settings and people under study, ‘going native’ is a course of action, but the objectivity and impartiality of the research might inversely decrease. Therefore, it is vital to strike the balance between ‘going native’ and ‘detachment’ in conducting case studies of ethnographic-nature.

Lastly, for the nature of this research, flexible and rounded design and attitudes are essential elements in order to overcome the practical difficulties. When circumstances begin to change, maintaining a predetermined route is likely to be naïve, and hence, flexibility is a crucial ingredient to this qualitative case study research. At all stages of
the case studies, it was kept in mind that disasters and simulation exercises did not take place within a vacuum, but occurred in historical, cultural, and social contexts, which formed a framework, whereby the minds and lives of those being studied could be understood. The frameworks of emergency management in Korea and the UK, in which simulation exercises are planned and undertaken, will be explored in great detail in the next chapter.
CHAPTER 5
COMPARATIVE EMERGENCY MANAGEMENT:
DISASTER POLICY IN KOREA AND THE UK

5.1 INTRODUCTION

The main purpose of this chapter is to illustrate the organisational and legislative arrangements of current emergency management in Republic of Korea and the UK (focused on England & Wales). Understanding the history and development of emergency management is of great significance because the concepts of emergency management or civil protection have been applied differently at different times. On the other hand, given that different legislation and accompanying systems and practices may affect the ways simulation exercises are designed, implemented and evaluated, it is also necessary to examine and subsequently compare some of the significant changes, which have formed the evolution of civil protection over the years, in those two countries. One of the remarkable distinctions between Korea and the UK is that Korean emergency management is centralised whilst the English system is relatively decentralised, which will be shown in the following sections.

Generally, it has been the case that crises and disasters are understood in different ways by different people, and a similar argument can be applied to a study on simulation exercises. Simulation exercises mirror, in some degree, historic, cultural, and social expectations and circumstances. In this respect, like ‘risk perception’ (See Section 2.2), simulation exercises also need to be considered within social, political and cultural contexts, within which they are planned, conducted, and evaluated. Hence, it can reasonably be assumed that the political, cultural, and institutional dimensions to responsibility and authority in Korean society exert considerable influence on existing practices of simulation exercises. With this in mind, this chapter is primarily aimed at identifying similarities and differences in national priorities and approaches for disaster management between Korea and the UK. All in all, the research on emergency management in a comparative context can also contribute to a better and deeper
understanding of how simulation exercises are organised under their corresponding social, cultural and political contexts.

5.2 EMERGENCY MANAGEMENT IN THE UK

5.2.1 Background

In the UK, major incidents are managed by the emergency services and other responders such as local authorities, and the utility and transport sectors at the local level without direct involvement from central government (Cabinet Office, 2010). Central government intervention is implemented, only when the scale or complexity of an emergency requires some degree of central government coordination and support, resting on the severity and impact of the event. Notably, the local police traditionally coordinate all of the response activities at the scene of a disaster. The coordination role seems to stem from the role of the police in law enforcement, public order & safety, the relatively extensive personnel and resources, and day-to-day accident response. However, their duties and plans are required to be discharged in liaison with other agencies after being prearranged and pre-agreed through the mechanism of the Local Resilience Forum (LRF) (Cabinet Office, 2010).

The section is largely geared toward civil protection arrangements in the UK (concentrating on England & Wales). The Civil Contingencies Act 2004 (CCA), which currently underpins UK emergency (disaster) management, establishes a consistent level of civil protection across the UK, based on Integrated Emergency Management (IEM). Therefore, it is recognised that emergency preparedness and response arrangements become integrated both within and between responding organisations including emergency services. In this context, the ensuing section aims to describe the UK approaches to crisis and disaster management, presenting an overview of UK emergency management development. It also explores mechanisms of local responders in cooperating and sharing information under existing legislation, the CCA.

5.2.2 Civil Contingencies Secretariat

In England & Wales, the Home Office was the principal central government department of emergency planning and management activities before 2001. However, in July 2001,
the lead responsibility has been transferred from the Home Office to the newly established Civil Contingencies Secretariat (CCS) within the Cabinet Office. The main purpose of the CCS (still in existence under the current Civil Contingencies Act 2004) is to ‘ensure that the UK and its communities remain a safe and secure place to live and work, by effectively identifying and managing the risk of emergencies, and maintaining world-class capabilities to respond to and recover from emergencies’ (UK Resilience, 2008a), through combining responsibilities diffused over different government departments. The CCS, staffed by approximately 123 members (House of Commons, 19 April 2002), supports the Prime Minister and the Cabinet Office with regard to civil protection issues. At present, the CCS consists of 8 teams listed below, under oversight of the Director of Civil Contingencies (UK Resilience, 2008b).

- Horizon Scanning and Response Team: evaluating circumstances, which may cause an emergency, communicating its evaluation to the key decision-makers and other parts of the CCS, and assisting in developing an integrated response.
- Capabilities Team: providing programme management for the cross-Government Capabilities Programme associated with ensuring a rapid, effective, and flexible response to the consequences of emergencies, and giving secretariat support to the cabinet committees in charge of driving the programme forward.
- Strategy and Communications Team: helping the Director to keep consistency and communication inside the CCS.
- Civil Contingencies Act and Local Response Capability Team: ensuring that the Civil Contingencies Act 2004 (CCA) and its regulations are successfully conducted at a national, regional, and local level.
- International Team: managing liaison with EU and NATO partners on international civil protection issues.
- Exercises and Operations Team: coordinating government-wide exercise programmes, and leading exercise strategy.
- Corporate Services Team: maintaining the whole Secretariat (mainly the Secretariat's external relationships), and also supervising all Secretariat staffing, resourcing and facilities maintenance.
- Emergency Planning College (EPC): the leading centre in the UK for emergency management and civil protection training with a multi-agency focus (EPC, 2007).

The Director is responsible for the day-to-day management of the organisation, and reports directly to the Permanent Secretary, Intelligence, Security and Resilience within
the Cabinet Office, which was also newly created in June 2002. As its title suggests, the role of this office is to advise the Prime Minister as the Security Adviser on security, intelligence and emergency related matters, and secure effective coordination between government departments and with other international and domestic partners.

5.2.3 Civil Contingencies Act (CCA) 2004

5.2.3.1 Overview


The CCA consists of three parts. Part I of the CCA covers ‘local arrangements for civil protection against emergency’, and defines ‘emergency’ as follows:

- An event or situation which threatens serious damage to human welfare in a place in the United Kingdom, which involves, causes or may cause: a) loss of human life, b) human illness or injury, c) homelessness, d) damage to property, e) disruption of a supply of money, food, water, emergency or fuel, f) disruption of a system of communication, g) disruption of facilities for transport, or h) disruption of services relating to health.
- An event or situation which threatens serious damage to the environment of a place in the United Kingdom, which involves, causes or may cause: a) contamination of land, water or air with biological, chemical or radioactive matter, or b) disruption of destruction of plant life or animal life.
- War, or terrorism, which threatens serious damage to the security of the UK.
Part I establishes a clear set of roles and responsibilities for those involved (local responders) in emergency preparation and response at the local level. The CCA categorises local responders into two types: Category 1 and 2 Responders, imposing a different set of direct duties on each. Here, there are the two root and branch reforms (Walker and Broderick, 2006); the British government firstly recognises the involvement of the general public as essential to the validity and reliability of the civil protection process from the perspective of two-way risk communication. Secondly, the duty of promoting business continuity management (BCM) for not only Category 1 responders but also local businesses is also acknowledged and enacted.

Category 1 responders are listed in Schedule 1 to the CCA, and usually those local organisations at the core of emergency response such as ‘Local authorities’, ‘Police forces’, ‘British Transport Police’, ‘Fire and rescue authorities’, ‘Ambulance services (a part of the National Health Service)’, ‘National Health Service’, ‘Health Protection Agency’, ‘Port health authorities’, ‘Environment Agencies’, and ‘Maritime and Coastguard Agency’ (Cabinet Office 2005a, p.19-20). Under the CCA, those Category 1 responders are required to carry out exercises, and provide training for staff or other relevant people in order to ensure that their emergency and business continuity planning are effective in the event of an emergency. Their common duties are as follows (Cabinet Office, 2005b, p.82):

- To assess the risk of emergencies occurring and use this to inform emergency planning and business continuity planning;
- To put in place emergency plans;
- To put in place business continuity plans;
- To put in place arrangements to make information available to the public about civil protection matters and maintain arrangements to warn, inform and advise the public in the event of an emergency;
- To share information with other local responders to enhance co-ordination;
- To cooperate with other local responders to enhance coordination and efficiency; and
- To provide advice and assistance to businesses and voluntary organisations about business continuity management (local authorities only, but they are also required to work with other Category 1 and 2 responders in discharging this duty).
Category 2 responders are also listed in Schedule 1. They are coordinating organisations such as ‘Electricity distributors and transmitters’, ‘Gas distributors’, ‘Water and sewerage undertakers’, ‘Telephone service providers, fixed and mobile’, ‘Railway operators’, ‘Airport operators’, ‘Ports’, ‘Highways Agency’, ‘Health and Safety Executive’, and ‘Strategic Health Authorities’. Their duties are to cooperate and share pertinent information with other Category 1 and 2 responders, and for this reason, Category 2 responders must take part in exercises conducted by other Category 1 and 2 responders under the CCA on request, if that request is reasonable.

Part II of the CCA is associated with the emergency powers to make regulations in order to help to deal with serious emergencies, replacing the Emergency Power Act 1920. It sets down the ‘conditions for making emergency regulations’, ‘scope and limitations of emergency regulations’, ‘establishment of tribunal’, ‘duration period’, ‘parliamentary scrutiny’, and the ‘consultation with devolved administrations’. Part III concerns ‘minor and consequential amendments and repeals’, and ‘commencement of provisions of the CCA’. For example, most of Part I came into force on 14 November 2005, but Part II came into effect on 10 December 2004. The duty of local authorities to provide advice and assistance to businesses and voluntary organisations about continuity management imposed by Section 4 of the CCA, started on 15 May 2006.

5.2.3.2 History and Development

Before the Civil Contingencies Act 2004 (CCA), the legislative arrangements were divided into ‘civil defence’ (or wartime) and ‘peacetime’ emergency planning (Parker, 1992). The former concerned the protection of the civil population in the event of a wartime attack, whereas the latter was associated with the response to civilian disasters such as underground fire, explosion, train crash, and building collapse. In the UK, contemporary emergency management received official recognition in the Civil Defence Act 1948. This legislation focused on civil defence activity, preparing for hostile (nuclear) attacks from an enemy. However, with an increasing number of civilian disasters such as the Bradford City Stadium Fire (1985) and the King’s Cross Fire (1987), and the demise of the Cold War in the late 1980s and early 1990s, civil defence activity radically started to evolve into peacetime emergency planning (Handmer and Parker, 1992).

Before the CCA, there was a statutory duty on local authorities for civil defence activity
only, not peacetime emergency planning. It is because the general and moral responsibility of care that local authorities owed to their residents was still regarded as an adequate legislative framework for peacetime emergency planning. For this reason, the consequences of legislative changes were limited, and always fell short of creating a statutory duty for peacetime emergency planning in spite of considerable pressure in favour of it. The Civil Defence Act 1984 had been the only source of peacetime emergency planning funding granted by central government, providing the statutory basis for emergency planning in the UK until 2004. In the meanwhile, the concept of Integrated Emergency Management was instead promulgated, emphasising a closer relationship between contingency arrangements for civil defence and peacetime emergencies in 1991 (Civil Protection, 1991). The driving force behind the change was to secure best value for money through integrating contingency plans for civil defence and peacetime emergencies into all-hazard approach regardless of the cause (Coles, 1998).

Following the Millennium bug problem (simply referred to as Y2K), the severe flood events, the fuel crisis, and the Foot and Mouth disease outbreak in the early 2000s, however UK central government officially acknowledged that the Civil Defence Act 1948 was not adequate to deal with newly-emerging threats including Chemical, Biological Radiological and Nuclear hostile attacks (O’Brien, 2006). Noticeably, the 9/11 terrorist attack in the USA added strong impetus to change of legislation. As a consequence, the then Blair government introduced the new Civil Contingencies Bill, repealing the outdated pieces of legislation including the Civil Defence Act 1948. The Bill finally received Royal Assent on 18 November 2004, and became known as the Civil Contingencies Act 2004 (CCA).

5.2.3.3 Emergency Preparedness Arrangements under the CCA

Local Level

Category 1 and 2 responders are required to cooperate and share information with other responders and relevant organisations under the CCA. The principal mechanism for this multi-agency cooperation and information-sharing at the stage of preparedness is the Local Resilience Forum (LRF). LRF is not a statutory body, but a process by which responders with duties under the Act cooperate with one another. Therefore, LRF does not have any powers to direct its members. Each LRF (with the exception of London) is
formed on a police area basis, and thus, there are 42 LRFs across England and Wales except London. The involvement of Category 2 responders is more limited than that of Category 1 responders. They can simply participate in the LRF process on a ‘right to attend, right to invite’ basis. The main forum should be convened at least once every six months. Its principal goal is to ensure effective implementation of category 1 and 2 responders’ legal duties, through a combined and coordinated multi-agency approach. Also, Community Risk Register (CRR) in a local resilience area needs to be published by each LRF as a requirement of the CCA and its associated regulations. LRFs are traditionally chaired by the local police force, and the task of providing secretariat to the LRF is decided locally by its members.

**Regional Level**

Another major change under the CCA is that a new regional tier, an aspect of central movement, has been introduced with a focus on a regional role in terms of both planning and response with regard to civil protection. The key role of the regional tier is to provide a single line of coordination and communication between a local area and central government, or with other regions when an emergency could overwhelm any local level in the region. The principal mechanism for this multi-agency cooperation and information-sharing at the regional level is the Regional Resilience Forum (RRF). Likewise, an RRF is not a statutory body, and it does not own any powers to direct its members. Membership of RRFs is drawn from representatives of category 1 and 2 responders at each local area in a region. They may also include representatives of central government departments including the Civil Contingencies Secretariat (CCS). However, the Local Resilience Form (LRF) is not subordinate to the RRF, which in turn is not commanded or controlled by central government. The task of chairing the RRFs in England falls to the Regional Director of the Government Office (GO). Currently, the secretariat to RRFs is provided by the Regional Resilience Team (RRT), located within each GO in the nine English regions: North East, North West, Yorkshire and Humberside, East, East Midlands, West Midlands, Southeast, Southwest, and London.

**Central Government Level**

At a central government level, a Minster of the Crown is granted a range of powers under Part 1 of the CCA, which are classified into three types (Cabinet Office, 2005a, p.163): ‘Legislative powers’, ‘Urgent direction powers’, and ‘Monitoring powers’. In
most cases, those powers will be exercised by a Minister with lead responsibility for civil protection at the local level, namely a Minister of the Lead Government Department (LGD) (For the role details of a designated LGD, refer to Cabinet Office (2004) in the bibliography).

- Legislative powers: amending the Regulations which manage the main duties, requiring a Category 1 or 2 responder to perform a specific function in an emergency, and amending the list of Category 1 and 2 responders (subject to the approval of the both Houses of Parliament);

- Urgent direction powers: issuing urgent directions to require action to be taken at the local level in case of urgency, where there is not sufficient time to make legislation;

- Monitoring powers: requesting information about actions taken by Category 1 and 2 responders with regard to the implementation of their statutory duties, also demanding an explanation as to why local responders have not taken action to comply with their duties.

**Figure 5: Co-ordination Arrangements of Emergency Preparedness in England**

![Diagram of co-ordination arrangements](image)

Source: Kim (2009a, p. 177)

**London**

London is unique and different from elsewhere. London has a ‘regional’ police force,
the Metropolitan Police Service (MPS) and hence, it is not appropriate to base LRFs on a police area. Nonetheless, London has also the same need as other local areas for multi-agency cooperation and information-sharing at a local level, and to that end, the London boroughs are grouped into six LRFs: Central London, North Central London, North East London, South East London, South West London, and West London. The Local Resilience Forums (LRF) in London are chaired by local authority chief executives, and membership also involves representatives from category 1 and 2 responders, and other organisations involved (LFB, 2009a). London’s local authorities are supported and complemented by the London Fire and Emergency Planning Authority (LFEPA), which runs the London Fire Brigade (LFB, 2009b). The LFEPA presently carries out the task of the secretariat for the six LRFs in London, and assumes responsibility to ensure that Community Risk Register (CRR) is produced and maintained in each LRF. When discharging its duties at the local level, the LFEPA are required to work in conjunction with the London Emergency Services Liaison Panel (LESLP), chaired by the MPS (LESLP, 2007). The LESLP comprises all of the emergency services and local authorities to help plan for major incidents in London. At a region level, London also has a London Regional Resilience Forum (LRRF). The LRRF is chaired by a Government Minister, and the London Mayor takes on the role of deputy chair (London Resilience, 2009). The London Resilience Team (LRT), based within the Government Office for London, is expected to give the secretariat support to LRRF. The relationship between the LRRF and the six LRFs operates in a more hierarchical way in order to ensure that all of the LRFs operate consistently across London as a whole, unlike the model elsewhere. For this reason, members of LRT are also ones of all London LRFs.

5.2.3.4 Emergency Response & Recovery Arrangements under the CCA

Local Level

A majority of emergencies in the UK are managed by local responders at a local level without interference by central government (Cabinet Office, 2009). Especially, the phases of emergency response and recovery at the local level are dealt with by the common protocol for all responding organisations, namely the Gold, Silver and Bronze model. The framework was first forged by the Metropolitan Police Service (MPS) in the aftermath of the Brixton riots in the mid-1980s (Arbuthnot, 2008), and subsequently accepted by all the response agencies including the fire and ambulance services. The Gold, Silver and Bronze command and control model can be summarised as follows
(Cabinet Office, 2010):

- **Bronze (operational):** At this level, command and control of task-level work is undertaken at the scene of an incident. The bronze arrangement will be usually enough to tackle most of the emergencies at the local level. In most cases at the bronze level, the police will assume the responsibility of coordinating the entire response operation. If an incident requires greater coordination and resources, the silver level of management can be established, relying on advice of Bronze commanders. In this case, they become responsible for conducting the silver commander’ tactical plan at the site.

- **Silver (tactical):** At this level, there is a need to ensure that the Bronze arrangements will be co-ordinated and supported to maximize their effectiveness. Similarly, silver commanders need to consider whether circumstances require the establishment of a Gold level. Each Silver commander has agency-specific responsibilities, and also must establish the overall multi-agency management of the incident in liaison with silver commanders from other agencies. Silver commanders might become involved in the detailed operational tasks delivered by a Bronze commander, only when there is an urgent need.

- **Gold (strategic):** At this level, a wide-area, high impact emergency is imminent, or happens. The Gold level will be implemented, in most cases, through the multi-agency ‘Strategic Co-ordinating Group’ (SCG), usually referred to as ‘Gold command’ or ‘Gold’. The SCG, chaired by the police, should be stationed at a suitable location from the scene (e.g. in police headquarters.). However, in the recovery phase, its leadership may pass to another agency, depending on the nature of situation. The SCG does not have the power to command or control its members. Each member agency retains its own responsibility and takes control of its own operations. The role of the SGG is to ensure that the agreed strategic aims and objectives are effectively implemented at the Silver and Bronze levels. The SCG is distinct from the Local Resilience Forum (LFR) since the LFR has no role in the emergency response despite having a strikingly similar membership.

*Regional Level*
At a regional level, Regional Civil Contingencies Committee (RCCC) might be convened to promote and deliver multi-agency coordination in emergency response and recovery, when an emergency cannot be contained with a single locality (e.g. when several local SCGs are set up within a region) (Cabinet Office, 2009). Although RCCC has nearly an identical membership with Regional Resilience Forums (RRF), RCCC is differentiated from RRFs in that they have no role in emergency response and recovery. RCCCs will observe the principle of ‘subsidiarity’, which means that a decision should be made first at the local level. Consequently RCCCs will not interfere with local command and control arrangements, unless specifically authorised to do so by emergency regulations. RCCCs are also chaired by the Regional Director of the Government Office (GO). As with RRFs, the secretariat support will be given to RCCCs by the Regional Resilience Teams (RRT). The RCCC meeting takes place at one of the following three levels (Cabinet Office 2010):

- Level one: a level-one meeting will be called the stage when an emergency is pending.
- Level two: a level-two meeting will lead the co-ordination of the multi-agency responses to an emergency affecting the region or overpowering a given locality.
- Level three: a level-three meeting can only be convoked when emergency powers are invoked under Part 2 of the CCA. In this case, the RCCC would be chaired by a Regional Nominated Co-ordinator (RNC).

**Central Government Level**

At a central government level, where the dimensions of an emergency are so vast and complex that central government’s coordination and support are crucial, a pre-designated Lead Government Department (LGD) will become responsible for the overall management and coordination of the central government response (Cabinet Office, 2004, 2009). A pre-designated list of LGDs and their responsibilities is maintained and updated by the Civil Contingencies Secretariat (CCS). The CCS will designate one department as the LGD where the emergency is too far-reaching to be managed by a single department, or the LGD is unclear from the list. Again, the basic principle is that most of the emergencies in the UK are dealt with by local responders, and hence, central government does not replicate the role of Category 1 and 2 responders.
Three levels of LGD response requiring the involvement of the UK central government are identified as follows (Cabinet Office, 2004, 2005c):

- Level 1 (significant): The LGD remains responsible for leading the central government coordination.
- Level 2 (serious): The central government coordination will be led from the Cabinet Office Briefing Rooms (COBR) under the leadership of the LGD.
- Level 3 (catastrophic): The central government coordination will be led from the COBR under the leadership of the Prime Minister.

The central government’s crisis management machinery takes place in COBR. The Prime Minister, Home Secretary or another senior Minister will normally chair the COBR meetings involving other Ministers and senior officials from relevant government departments. When a SCG has been set up and a UK central government response is critical, a Government Liaison Team (GLT) from the GO or the LGD will be placed within the SGG. For terrorist events, a Home Office-led GLT will be dispatched. The GLT will be the main communication channel between COBR and the scene.

**Figure 6: Coordination Arrangements of Emergency Response & Recovery in England**

Source: Kim (2009a, p.180)

*London*

In London, the SCG is nearly the same as the RCCC. In a major incident, the LRT will
give the secretariat support to the SCG or the RCCC. In practice, in emergencies with a police-lead (e.g. terrorist attacks), the group is usually called the SCG, whilst in non police-led events (e.g. outbreak of foot and mouth disease) or in the recovery phase, the group will be referred to as the RCCC.

5.3 EMERGENCY MANAGEMENT IN KOREA

5.3.1 Background

In the Republic of Korea society, civil protection has not been a very well-known or respected discipline. Many in the profession were holdovers from the days of civil defence, and most of the elected officials did not see the value of emergency management until they had a major disaster in their communities. To make matters worse, the field of emergency management in Korea seems to be dominated by two categories of emergency personnel - fire fighters and civil engineers - without active involvement of other responders or professionals (Ha, 2009). For example, the roles of the Korean police at disaster scenes tend to be viewed in isolation from the context of the whole disaster management (Kim, 2009b). Under these circumstances, the Korean national police force has dedicated little of its resources and efforts to emergency planning and response. Also, the Korean National Police Agency (NPA), which has legislative power to direct all police organisations across Korea, seldom makes emergency or disaster plans, but if it does, it is without consultation with other emergency response agencies (KNPU, 2008).

The following section is mainly focused on emergency management arrangements in South Korea, officially referred to as the Republic of Korea. The Framework Act on the Management of Disasters and Safety 2004 (FAMDS) currently upholds the basic legislative structure of Korean emergency management. Before the FAMDS, the basic legislation had adopted a tripartite system consisting of ‘civil defence’, ‘natural disasters’, and ‘man-made disasters’. Those three types of disasters had been managed by the three corresponding acts: the Framework Act on Civil Defence (FACD), the Countermeasures against Natural Disasters Act (CNDA), and the Disaster Management Act (DMA). In the previous section, UK civil protection arrangements were briefly presented, and thus the section is to describe South Korean approaches to crisis and disaster management for a cross-cultural comparison, presenting a general overview of
Korean emergency management.

5.3.2 The Republic of Korea

The Korean peninsula, currently occupied by two different countries: the Republic of Korea (South Korea) and the Democratic People’s Republic of Korea (North Korea), covers a total area of 222,514 square kilometres; roughly the same size as Britain. In contrast, the Republic of Korea, which the paper is associated with, encompasses a total of 100,032 square kilometres, with a population of approximately 50 million as of April 2010 (KOSIS, 2010). It extends southwards for about 684 miles from continental Asia into the Pacific Ocean in East Asia. South Korea is surrounded by the East Sea on the east, the East China Sea to the south, the Yellow Sea to the west, while the Korea Strait connects the first two bodies of water. South Korea has a continental climate with four distinctive seasons, especially characterised by drought in spring, heavy rainfall and typhoons in summer, and heavy snowfall in winter. These geographical and climate conditions and characteristics have caused a great number of natural disasters in South Korea (Kim and Lee, 1998).

Korea had been a single political entity whose territory approximately coincided with the Korean peninsula until Korea was annexed by Japan in 1910. The Korean peninsula had been ruled by Japan from 1910 to 1945. However, in August 1945, Japan was defeated by the Allies, and consequently Korea was emancipated from the Japanese colonial rule. However, it was not considered as a complete independence for Korea, in that the Korean peninsula was soon divided into two countries along the 38th parallel, with the United States’ Army occupying South Korea and the communist Soviet Union’s Army occupying North Korea (Pyo, 2000). The 38th parallel increasingly became a hot spot between the two Koreas as their conflict was expanded by the United States and the Soviet Union’s involvement as part of the larger Cold War. Finally, the Korean War began as North Korean troops invaded South Korea on 25 June 1950. In the beginning, the Korean War was viewed as a civil war between the two rival Koreas, but soon developed into a political clash between the communist and the capitalist worlds, or an armed conflict of two superpowers by proxy (Moon and Lee, 1995). Military confrontation with North Korea has remained acute and protracted since the Korean War in 1950, and the two Koreas still remain divided until now. Under these circumstances, higher priority seems to have been assigned to civil defence than any other activities (Kim, 1998; Ha, 2009).
5.3.3 Constitutional Perspective of Emergency Management

Article 34, Section 6 of the Constitution of the Republic of Korea tasks the State with responsibility for the management of disasters by stipulating that the State shall endeavour to preclude disasters and to protect citizens from harm therefrom. In other words, the central government is primarily responsible for the management of all kinds of disasters in Korea. On the other hand, Article 117, Section 1 of the Constitution also articulates that local governments shall handle administrative matters pertaining to the welfare of local residents, manage properties, and may enact provisions relating to local autonomy, within the limits of acts and regulations. Therefore, it is recognised that not only the central government but also local governments have the basic responsibility for providing for the safety of their citizens in South Korea. In practice, a majority of disasters are managed by local responders at the local level with the central government in a secondary role. However, the relationship between the central government and local governments, generally speaking, seems to be founded on the concept of command and control, rather than that of coordination and cooperation, contrary to the UK system (Kim, 2009b). Notably, political leadership at the central government level has a very strong influence on how local governments handle their responsibilities, when it comes to disaster management (Choi and Ryu, 2006).

5.3.4 The Framework Act on the Management of Disasters and Safety 2004

5.3.4.1 General Overview

The Framework Act on the Management of Disasters and Safety 2004 (FAMDS) is currently the legislative framework of the Republic of Korea disaster management. According to Article 1 of the FAMDS, its major objective is to set up the disaster and safety management systems of the State (i.e. central government) and local governments in order to preserve territory and to protect the lives, bodies, and property of citizens from disasters. Furthermore, the FAMDS aims to prescribe the necessary details regarding the management of disasters and safety, such as disaster prevention, preparedness, response and recovery. Noticeably, Article 3 of the FAMDS mentions that a disaster causes, or is likely to cause, serious damage to not only peoples’ lives, bodies and property but also the State itself, thus providing the definition of ‘disaster’ as follows:
Natural disasters caused by typhoons, floods, heavy rainfall, gales, wind waves, tidal waves, heavy snowfall, droughts, earthquakes, yellow dust, red tide and any other equivalent natural phenomena.

Damage beyond a scale determined by the Presidential Decree, caused by fires, collapses, explosions, transportation accidents, CBR (Chemical, Biological and Radiological) accidents, environmental pollution, and any other similar accidents.

Damage caused by the disruption of national key infrastructure, such as a supply of energy and water, telecommunication, transport, finance, health service, and the spread of a pandemic.

The FAMDS 2004 enumerates three different kinds of disaster authorities: ‘Responsible Authorities for Disaster Management (RADM)’, ‘Emergency Rescue Authorities (ERA)’, and ‘Emergency Rescue Assistance Authorities (ERAA)’. The Responsible Authorities for Disaster Management (RADM) consist of central government departments, local governments, and public institutions and organisations which are designated by the Presidential Decree. Constitution of the Emergency Rescue Authorities (ERA) incorporates three key governmental institutions such as the National Emergency Management Agency (NEMA), fire headquarters, and fire stations, prescribed by the FAMDS 2004. NEMA plays a highly pivotal role in providing national coverage of disaster management in terms of fire-fighting, emergency medical service, and rescue (NEMA, 2009a). Finally, The Emergency Rescue Assistance Authorities (ERAA) consist of support organisations such as the Korean National Police Agency (NPA), the Korea Coast Guard (KCG), the Korean Meteorological Administration (KMA), the Korean Forest Service (KFS), etc, all of which are prescribed in the Presidential Degree.

When it comes to training and exercises for disaster preparedness, Article 73 of the FAMDS 2004 states that the Minister of the Ministry of Public Administration and Security (MOPAS), the Heads of the Emergency Rescue Authorities, metropolitan city mayors or provincial (“Do”) governors, and the heads of “Si/Gun/Gu”s (which will be explained in detail in the following sections) have a statutory responsibility to conduct (multi-agency) emergency preparedness ‘training’ on a regular basis in conjunction with
partner agencies. Unfortunately, there are no regulations regarding the holding of ‘exercises’. The partner agencies must participate in the aforementioned training on request, unless there are special reasons for not attending. The FAMDS 2004 introduced the concept of Integrated Emergency Management (IEM), which is, however, comprised of four activities: ‘prevention and mitigation’, ‘preparedness’, ‘response’, and ‘recovery’ (Ha, 2009); slightly different from that of the UK.

5.3.4.2 History and Development

As previously mentioned, before the FAMDS 2004, South Korean civil protection arrangements were fragmented into natural, man-made, and civil defence disasters, predicated on the Framework Act on Civil Defence (FACD), the Countermeasures against Natural Disasters Act (CNDA), and the Disaster Management Act (DMA) (See Table 13). Modern emergency management in Korea received official recognition in the Framework Act on Civil Defence (FACD) 1975, preparing for military attacks from North Korea (Lee, 2006). According to Article 2 of the FACD, ‘civil defence’ was defined as any measures of the public for protecting their lives and property from an attack by an enemy or a disaster under the direction of the government, which may jeopardise public peace and order in a place of the Republic of Korea. However, with an increasing number of natural disasters such as floods and typhoons in the 1980s, Korean emergency management commenced to radically evolve into natural disaster planning. For this purpose, the CNDA was passed in December 1995, primarily to manage all sorts of natural disasters happening in South Korea. In the meantime, as an unprecedented series of man-made disasters have occurred in the 1990s, the then Korean government enacted the DMA in June 1995 in order to cope with man-made disasters more comprehensively. Particularly, the Sampoong department store collapse in 1995, where 502 people were killed and 938 people injured, facilitated the enactment of the DMA decisively.

In passing the FACD, the CNDA and the DMA, the Korean emergency management system commenced to assume the form of a tripartite system, grounded on three kinds of disasters: civil defence, natural disasters, and man-made (especially technological) disasters. However, the then Korean emergency management was defined by “types of a disaster, rather than by the responding functions” (Kim and Lee, 1998, p. 199). For this reason, it was criticised that the then Korean government had accepted a hazard-specific approach - managing each disaster through enacting individual acts and resultant
presidential decrees - not an ‘all-hazards’ strategy (Ha and Ahn, 2009). As a result, it was strongly recommended that emergency planning should be built around not the cause of a disaster but the response to the disaster, by integrating operations under exceptional circumstances with day-to-day activities.

### Table 13: Selected Key Legislation

- The Framework Act on Civil Defence 1975
- The Countermeasures against Natural Disasters Act 1995
- The Disaster Management Act 1995
- The Framework Act on the Management of Disasters and Safety 2004

In 2004, the government finally started to manage all types of disasters comprehensively, based on an all-hazards approach (or a multi-hazards approach) by enacting the Framework Act on the Management of Disasters and Safety 2004 (FAMDS). In other words, the FAMDS 2004 has accommodated an integrated approach to emergency management, and this was made explicit by employing the integrative term, ‘disaster’ (See Section 5.3.4.1). Furthermore, the FAMDS 2004 repealed outdated legislation such as the DMA 1995. The Framework Act on Civil Defence 1975 (FACD) and the Countermeasures against Natural Disasters Act 1995 (CNDA) are still in existence, but both of them have been revised into simple administrative procedure acts with regard to functions, organisations, and formation. In this regard, the FAMDS 2004 is currently recognised as a virtual core legislative framework in Korean emergency management. Noticeably, the Daegu subway fire disaster in 2003 added a strong impetus to the re-establishment process of the Korean emergency management, promoting the enactment of the FAMDS 2004 (Ha, 2009; Kim 2009b); an in-depth case study of the Daegu Subway Fire 2003 will be conducted in the next chapter.

When it comes to organisational change, in June 2004, the National Emergency Management Agency (NEMA) was established by emulating the Federal Emergency Management Agency (FEMA) of the United States, which was triggered, in part, by the Daegu subway fire disaster (Jeong, 2006). Similar to FEMA, NEMA is not an independent agency but a subordinate organisation within the Ministry of Public Administration and Security (MOPAS). The NEMA serves as an official government agency charged with the management and coordination of natural and man-made
disasters at the central government level in accordance with the FAMDS 2004. The NEMA is acknowledged as the first specialised national emergency management organisation in Korean history (Jeong, 2006). However, the NEMA does not have a role in maintaining law and order, and this role is conducted National Police Agency (NPA), the centralised police force, which is also under the supervision of the MOPAS.

5.3.4.3 Disaster Preparedness, Response, and Recovery Arrangements

**Central Government Level**

Under the FAMDS 2004, Korea establishes a three-tiered governmental structure for emergency (disaster) management: central government, provincial & metropolitan government, and local government tiers (See Table 14). This structure can be compared to the UK system of central government, regional, and local level. At a central government level, there exists the Central Safety Management Committee (CSMC), chaired by the Prime Minister. The CSMC is intended to review, control, and coordinate the overall national safety management policy, and further to coordinate the disaster and safety management activities between relevant government departments at different levels in terms of emergency preparedness. Membership of the CSMC consists of ministers of central government departments, such as the Ministry of Public Administration and Security (MOPAS), the Ministry of Strategy and Finance (MSF), the Ministry of National Defence (MND), the Ministry of Education, Science and Technology (MEST), etc. The Korean National Emergency Management Agency (NEMA) currently conducts the task of the secretariat for the CSMC.

However, in the event of a large-scale (usually national) disaster, the Central Disaster and Safety Countermeasures Headquarters (CDSCH) can be established under the leadership of the Minister of the Ministry of MOPAS, in order to provide follow-up countermeasures, such as operational assistance. The main purpose of the CDSCH is to ensure a fast, efficient and combined response and recovery, when the dimensions of a disaster are so vast and complicated that central government’s command and control is vital. CDSCH has nearly an identical membership with CMSC, but CDSCH’s membership additionally contains governmental agencies and offices such as the National Police Agency (NPA), the Korea Coast Guard (KCG), the Korean Meteorological Administration (KMA), the Korea Forest Service (KFS), and the Public Procurement Service (PPS). When it comes to search and rescue, there exists the
Central Emergency Rescue Control Group (CERCG), and its role is to coordinate, and further command and control all of the national rescue activities under the leadership of NEMA Administrator.

Table 14: Three-tiered Structure for Disaster Management in Korea

<table>
<thead>
<tr>
<th>Structure</th>
<th>Disaster Management Organisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central Government Level</td>
<td>Central Safety Management Committee (CSMC),</td>
</tr>
<tr>
<td>(Large-scale)</td>
<td>Central Disaster and Safety Countermeasures Headquarters (CDSCH)</td>
</tr>
<tr>
<td></td>
<td>Central Emergency Rescue Control Group (CERCG)</td>
</tr>
<tr>
<td>Regional Level</td>
<td>“City/Do” Safety Management Committee (CDSMC)</td>
</tr>
<tr>
<td>(Middle-scale)</td>
<td>“City/Do” Disaster and Safety Countermeasures Headquarters (CDDSCH)</td>
</tr>
<tr>
<td></td>
<td>“City/Do” Emergency Rescue Control Group (CDERCG)</td>
</tr>
<tr>
<td>Local Level</td>
<td>“Si/Gun/Gu” Safety Management Committee (SGGSMC)</td>
</tr>
<tr>
<td>(Small-scale)</td>
<td>“Si/Gun/Gu” Disaster and Safety Countermeasures Headquarters (SGGDSCH)</td>
</tr>
<tr>
<td></td>
<td>“Si/Gun/Gu” Emergency Rescue Control Group (SGGERCG)</td>
</tr>
</tbody>
</table>

*Provincial & Metropolitan (Regional) Level*

The present administrative divisions of South Korea can be divided into seven metropolitan cities (“City”) including one special metropolitan city (Seoul, capital of South Korea), and nine provinces (“Do”) including one special autonomous province, Jeju. These are further subdivided into 75 cities (“Si”), 86 counties (“Gun”), and 69 autonomous wards (“Gu”). A “Gu” is strikingly similar to a borough in London. Figure 7 illustrates the current arrangements of administrative districts in South Korea. At a provincial & metropolitan level, the “City/Do” Safety Management Committee (CDSMC), whose main duties are basically the same as the Central Safety Management Committee (CSMC), can be convened when a middle-scale (regional) disaster occurred in their areas. The CDSMCs are set up under the leadership of each metropolitan city mayor or provincial (“Do”) governor. Similar to the Central Disaster and Safety Countermeasures Headquarters (CDSCH), there exists “City/Do” Disaster and Safety Countermeasures Headquarters (CDDSCH) under the chairmanship of metropolitan city mayors or provincial governors. The CDDSCH is the equivalent of the CDSCH of a central government level. Membership of CDSMC and CDDSCH is decided by their regional ordinances. Similar to the Central Emergency Rescue Control Group (CERCG),
there exists the “City/Do” Emergency Rescue Control Group (CDERCG) at a regional level. The CDERCG is operated under the leadership of the Commissioner of each fire department, who is accountable to metropolitan city mayors or provincial governors for his or her search and rescue activity.

*Local level*

At a local level, there exist the “Si/Gun/Gu” Safety Management Committee (SGGSMC) and the “Si/Gun/Gu” Disaster and Safety Countermeasures Headquarters (SGGDSCH). Both of them are established under the responsibility of the head of “Si/Gun/Gu”s, when a small-scale (local) disaster occurs in each locality. Each head of the “Si/Gun/Gu” mirrors the responsibilities and authorities of mayors of the metropolitan city, or provincial governors. The SGGSMCs and the SGGDSCHs are the equivalent of the CSMC and the CDSCH of a national government level, respectively. Autonomous wards (“Gu”) are part of metropolitan cities (“City”), and cities (“Si”) and counties (“Gun”) are part of provinces (“DO”). Thereupon, the relationship between the provincial & metropolitan level and local level seems to be operated on a command-and-control basis (Kim, 2009b). Membership of SCGSMC and SCGDSCH is decided by their local ordinances.

With respect to emergency search and rescue, the local level has “Si/Gun/Gu” Emergency Rescue Control Group (SGGERCG) under the control of the Chief of a fire station. According to Article 52, Section 1 of the Framework Act on the Management of Disasters and Safety (FAMDS), the Chief of a fire station - also leader of the SGGERCG - is empowered to command the whole of search and rescue activities at disaster scenes, and reports directly to the heads of “Si/Gun/Gu”s. However, according to Article 52, Section 3 & 5 of the FAMDS, the Commissioner of a fire department and NEMA Administrator have legal powers to command and control the entire search and rescue activities instead of the Chief, even in a locality, when there is an urgent need or a large-scale disaster happens. When it comes to the role of the police at disaster scenes, police work at a disaster scene seems to be neglected in Korea (KNPU, 2008). In contrast, the police service in the UK has a role in coordinating all of the disaster responses. The role of the Korean police tends to be confined to cordonning, managing traffic, and conducting criminal investigations, separately from the wider context of disaster management, although this aspect of policing is also its inextricable part (Kim, 2009b).
5.4. CONCLUSION

As with contemporary UK emergency management, Korean emergency management has evolved from a civil defence activity to peacetime emergency planning. However, an outstanding difference between Korea and the UK, with respect to the emergency management system, is that the Korean emergency management system can be characterised as a top-down system; there is a high level of central government decision-making remote from the local area. Particularly, the relationship between central government and regional & local tiers appears to be operated on a command-and-control basis, whilst most of the emergencies in the UK are first managed by local responders without direct interference from central government. All of the Korean committees and headquarters mentioned in the FAMDS 2004 are statutory bodies, and
they have legal powers to direct and command its members, contrary to the UK system. Notably, the FAMDS 2004 seems to stress the role of central government in emergency management without presenting equal emphasis on the roles of regional and local governments (Ha and Ahn, 2009). For this reason, the CSMC and the CDSCH are easily able to interfere with regional or local command and control arrangements.

In the milieu of Integrated Emergency Management (IEM), it is imperative that local responders should cooperate and share information to respond to disasters effectively. This is because a disaster usually spans boundaries of one agency’s jurisdiction, and no single agency can have all the skills and resources necessary to respond at disaster scenes (Petak, 1985). For this reason, in the UK, responding organisations are required to work together by law in the event of an emergency. It is maintained that Korean emergency management has also adopted IEM, but still seems to lack key factors of IEM such as coordination and cooperation between responding organisations (SERI, 2005). First of all, Korean emergency management was historically considered as a unique function of fire departments or stations, aloof from police work (KNPU, 2008). In this context, the role of the police at disaster scenes is diminished to simply maintaining or restoring public order and peace in a disaster situation (Kim and Lee, 1998), or responding to terrorist attacks. Secondly, the structure of NEMA is built around two main activities - fire fighting and civil engineering - without active involvement of other responders. Finally, the emergency numbers are still not integrated; the 112 emergency telephone number is for police and the 119 number for medical and fire emergencies.

With all this in mind, some practical suggestions for the future of the Korean emergency management will be made in Chapter 7, based on lessons learned from UK civil protection. ‘Best practice’ might differ from nation to nation, and hence, UK emergency management should not be taken as the most ideal framework. Nevertheless, it cannot be denied that much can be learned from other nations’ emergency management systems. Additionally, another intriguing issue in this matter is to look into how emergency management structure and practice affects a modus operandi of Korean simulation exercises, a detailed account of which will be discussed in Chapter 7, coupled with empirical findings in Chapter 6.
CHAPTER 6
CASE STUDIES

6.1 INTRODUCTION

This paper is primarily aimed at looking into crisis simulation exercises in Korea and England to train emergency services for and in crisis situations through a case study of two underground fires. For this purpose, the sixth chapter is focused on presenting empirical data collected from observing seven crisis simulations in both Korea and England. Further, the empirical data obtained is used to compare and contrast some of the theoretical and empirical ideas and perspectives on simulation exercises with the two underground fire disasters, which are investigated in Section 6.2. One of the main reasons for selecting these two fire disasters as case studies is that they seemed to have the characteristics of socio-technical crises, such as uncertainty, complexity, and unfamiliarity, and so, seemed to look ‘ill-structured’ (See Section 3.2.6). In other words, disasters were managed by response staff in a routine and prearranged way, culminating in mass casualties, even though there appeared to be the potential for their successful management.

With this in mind, this chapter firstly explores two different underground fire disasters: the King’s Cross Fire 1987 (in the UK) and the Daegu Subway Fire 2003 (in Korea), which suggest that crises can escalate into large-scale disasters by reason of the unpredictable interplay between technical, organisational and cultural systems as was argued by Turner (1978) and Perrow (1999) (See Section 2.3.4). Secondly, current UK practices in simulation training and exercises are critically examined. Finally, Korean simulation exercises are investigated for social and cultural comparison. In Section 6.3, each simulation exercise observed is reported in chronological order. In particular, this chapter of the ethnographic case study on the exercises uses the third person: ‘the researcher’ for the purpose of conducting participant observation and qualitative interviews in order to demonstrate a neutral stance, namely a ‘marginal native’ (See Section 4.5.3). For the case studies, newspapers, photographs, videos are all used as supporting data in addition to official documents. Notably, key results from qualitative interviews are also stated in the ensuing sections.
6.2 LARGE-SCALE DIASTER CASE STUDIES

6.2.1 King’s Cross Underground Fire in England

The London underground was the world’s first underground system when it started to operate in 1863. Today, the Underground has 270 stations and about 402 km (249 miles) of railway (Transport for London, 2008). The number of individual passengers carried on the tube each year amounts to approximately 28 million. The King’s Cross tube station is infamous for its “labyrinth of passages, shafts and tunnels” (Fennell, 1988, p.37) because it is served by 6 lines: Circle, Metropolitan, Northern, Piccadilly, Victoria, and Hammersmith & City. Therefore, it is seen as the busiest station among the entire 270 stations on the London Underground network. Currently, approximately 55,000 passengers use the King’s Cross tube station in the morning rush hour, and the number is expected to increase to about 82,000 passengers by 2011 (Transport for London, 2008). In 1987 when the fire occurred at the King’s Cross station, over 250,000 passengers were using the station. For an average weekday, approximately 100,000 people would have passed through in each peak period between 07:30 and 10:00, and 16:00 and 18:30. Within these peak periods, the maximum throughput was 2,000 per minute (Crossland, 1992).

On the evening of 19 November 1987 at around 19:30, a passenger reported a small fire on a Piccadilly Line wooden escalator at the King’s Cross underground station (Fennell, 1988). The fire seemed to be first caused by carelessly discarded smoker’s material (Moodie, 1991). One of the staff on duty went to examine the small fire. However, he had not received any fire training, and as a consequence, he did not notify either the station manager or the line controller of the fire. At that time, there were two police officers on patrol in the station, but as their radios did not work below ground, one officer ran to the surface to alert the London Fire Brigade at 19:34. Shortly before 19:40, the police decided to evacuate the station, and requested the London Underground line controllers pass trains without calling at the King’s Cross station. Passengers were then evacuated upward from the lower levels of the station via the Victoria line escalators and through the tube lines ticket hall. With the benefit of hindsight, it is argued that it would have been better if they had moved passengers on the platforms by underground train to adjacent stations (Crossland, 1992). It is also pertinent that virtually all of the passengers killed in the King’s Cross Fire had been travelling to other stations and were ironically being evacuated for their safety. Despite this, the police appeared to take
correct and proper action in accordance with their existing protocol, a protocol which designed surface geographical contexts, but not in the surroundings below ground (Borodzicz, 1997, 2005).

The first fire fighters reached the tube lines ticket hall of King’s Cross station about 19:43, yet this was too late. Between 19:30 and 19:45, no one tried to extinguish the fire (Fennell, 1988), and it quickly spread into a flashover, engulfing the whole ticket hall with flame and smoke. The flashover was later identified as an unexpected phenomenon exacerbated by the ‘Trench Effect’, which was brought about by combining three factors: ‘the slope of the escalator’, ‘the trench profile which affected the later movement of air and hot combustion products’, and “the presence of flammable materials on the floor and sides of the trench” (Moodie, 1991, p.61). The fire was finally taken under control at 21:48, but 31 people had been killed by this point. Afterwards, Mr. Desmond Fennel was appointed as the Inspector to conduct a formal investigation into the surroundings of the fire by the Secretary of State for Transport. On 21 October, 1988, he submitted a report on the investigation into the King’s Cross underground fire to the Secretary for Transport.

The King’s Cross underground fire represented an already well-researched case study of events. The public inquiry produced a published and hence publicly available report (Fennell, 1988). This public inquiry determined a number of problems concerning London Underground, London Fire Brigade, Metropolitan Police, Ambulance Service, and coordination between the response agencies. Ultimately, the report drew a total of 157 recommendations from the problems in relation to escalators on the underground, the response of underground staff and its training, liaison between the emergency services, and the management of safety (Flin, 1996). Some of the key problems and recommendations made in the Fennell report focused on the physical characteristics of escalators on the underground and the failure of safety equipment (Fennell, 1988, p.44). The report went on to discuss a phenomenon known as the ‘trench effect’ enabling the escalators to act as a chimney (Fennell, 1988, p.111). The lack of heat/smoke detectors and wooden construction were also commented on (Fennell, 1988, p.163). However, the majority of the Fennell’s recommendations related to the organisational response, training and exercises.

*The Response of Underground Staff, and Training:*
“Since no one had been killed in the earlier fires, they genuinely believed that with passengers and staff acting as fire detectors, there would be sufficient time to evacuate passengers safely. But they had no system to train staff in fire drill or evacuation and their attitudes towards fire gave the staff a false sense of security.”

(Fennell, 1988, p.18)

“The response of the staff was uncoordinated, haphazard and untrained. London Underground now recognises the need for better training of staff. Similarly, a cultural change in the management is required.”

(Fennell, 1988, p.19)

“Every six months fire and safety training must be provided for non-supervisory staff and booking clerks… There shall be a joint exercise with the emergency services at least twice each year. London underground must involve as many different fire stations, staff and members of the public as possible.”

(Fennell, 1988, p.171)

The Response of the Emergency Services:

“In the absence of help from London Underground, it had proved very difficult to understand the geography of the Underground station”

(Fennell, 1988, p.81)

“…there had been a breakdown of communications at command level between the emergency services. Each diligently pursued its own duty but there was a lack of liaison between them.”

(Fennell, 1988, p.83)

“The emergency services shall review the exchange of information between themselves and London Underground during an incident, both at their controls and at the site.”

(Fennell, 1988, p.165)

“…there ought to be joint exercises between the emergency services, because…if such joint exercise had taken place, communications would have
been better and some of the problems which presented themselves would not have proved as difficult as they did on the night.”

(Fennell, 1988, p.83)

6.2.2 Daegu Subway Fire in the Republic of Korea

Daegu Metropolitan City (also known as Taegu) is the fourth largest city in Korea with a population of approximately 2.5 million as of 31 December 2009 (DMC, 2010). The Daegu Metropolitan Subway has two subway lines: Daegu Subway Line 1 and Daegu Subway Line 2 (DMTC, 2008). Line 1 opened in 1998, and has an operational distance of 25.9 km between Daegok and Ansim with 30 stations. Line 2 was completed in 2005, and has 26 stations with about 28.0 km of railway between Munyang and Sawol. In December 2007, the Daegu Metropolitan Subway served 648,625 passengers per day. Jungangno station in Line 1, where the tragic fire happened, is located in the city centre of Daegu, and consists of three basements (three levels of stairs between the platform and the surface). Jungangno station currently serves approximately 47,121 passengers per day, and in 2003 when the fire happened, the station was serving some 150,000 passengers a day (Chung et al., 2005).

In the morning of the 18th of February 2003 at 09:52:55, a passenger with mental and physical illness threw a plastic bottle full of gasoline, which ignited inside a car of the 1079 subway train, which had stopped at the Jungangno subway station in Daegu (NEMA, 2004). At 09:53:12, the arsonist managed to escape from the 1079 train just as the train burst into flames. Afterwards, it transpired that he intended to commit suicide due to his mental and physical diseases and finally set fire to the train under the delusion that it would have been better if many people had died together than if he died alone. Within 2 minutes owing to the highly flammable furnishings within the train, the fire had to spread to all of the six carriages in the 1079 train. Simultaneously, the fire alarm went off at the control centre at 09:53:12, but the subway staff on duty at the control centre ignored initial fire alarms on account of its frequent malfunctions. Meanwhile, the 1079 train driver first attempted to extinguish fire, but failed. He subsequently escaped from the train at 09:54:40, without informing the control centre of the fire (Lee, 2007), consequently delaying the emergency response by the control centre. At 09:54:40, the first call to the Daegu fire department came from a male passenger inside the 1079 train via his mobile phone, but there was no communication between the fire department and the control centre. At 09:55:30, a member of the staff
within the station alerted the control centre to the fire, yet the centre still did not report
the fire to the Daegu fire department (Lee, 2007). Meanwhile, the 1080 train was
approaching the Jungangno station in the opposite direction. At 09:55:40, the 1080 train
driver was notified of a fire at the Jungangno station by the control centre, but he
received no instructions, except a warning that he should be careful in operating the
train since there was a fire (Kim, 2005).

At 09:56:40, the 1080 train finally entered the station, and stopped alongside the blazing
1079 train. The operator of the 1080 train then opened its doors, but soon closed them
because of the heavy smoke and toxic gases. At 09:56:50, the fire wall, originally
designed to protect the underground shopping malls from a fire, was automatically
operated. However this made it difficult for the 1079 passengers to take a break let
alone escape from the station (Kim, 2005). For this reason, many fatalities occurred on
the subway stairs, where they were presumed to be suffocated to death as they tried to
escape. At 09:57:07 shortly after the 1080 train arrived, its automatic fire detector,
initially intended to cut off electricity in the event of an electric short-circuit, also shut
down the power supply to the 1080 train unexpectedly, preventing it from departing. At
09:57:32, the 1080 train driver communicated with the control centre about evacuation
alternatives, saying “It’s a mess. It’s stifling. Please, take some measures. Do I have to
evacuate passengers? What should I do?” (TRB, 2006). However, control centre staff
could not decide on the appropriate plans, and the driver simply waited for re-supply of
electricity without taking action. The reason for this is that train operators were not
permitted to exercise discretion and take action in case of a fire but were obliged to wait
for instructions or orders from the control centre (Kim, 2005). Here, it can be argued
that with the benefit of hindsight, if the control center had ordered the 1080 train to stop
outside of the station or pass through or if the 1080 driver had actively evacuated
passengers without waiting for the control centre’s instructions or orders, causalities
could have been reduced or alleviated.

In the meantime, the 1080 train driver made three announcements between 09:57:32 and
09:58:28, asking passengers to remain seated inside a subway car although it was on fire.
However, it appeared that he took right and proper action paradoxically, given the then
emergency guide, “It is safer to stay on the train than attempt to get off in an emergency”
(TRB, 2006). The fire subsequently engulfed all six coaches of the 1079 train, and at
09:58:28 spread to the adjacent 1080 train. At 09:59:00, the communication between the
1080 train driver and the control centre was cut off. Through a mobile phone, he was
finally advised to kill the engine and flee from the scene by the control centre. At 10:02:00, he removed the master control key and escaped from the train, shutting down the onboard batteries that powered the train doors. This action had serious ramifications, and led to passengers being trapped within the car. The fire was finally extinguished around 13:38:00, and killed 192 people and injured 148 in total. Of 192 people, at least 142 people were killed in the 1080 train. Noticeably, the fatalities all occurred within 15 minutes or less from the onset of the fire. At 09:57:32, the fire brigade arrived at the scene, but they could not go into the station because of the heavy black smoke and toxic gases (Hong, 2004). The arsonist named Daehan Kim was arrested about two hours after the fire was taken under control. He was convicted of arson and murder, and sentenced to life imprisonment. Nine subway officials including the two train drivers were also arrested and convicted of manslaughter, and the 1080 train driver was sentenced to 5 years of imprisonment and the 1079 driver to 4 years of imprisonment (Chung et al., 2005). Table 15 summarises the chronological development of the fire at Jungangno station.

Unlike in the UK, no public inquiry system exists in Korea in order to examine the causes of crises or disasters, except the form of a police investigation. The transcripts of the police investigation are not be publicised due to confidentiality and privacy by laws. The police investigation is however focused on applying criminal law to cases in order to charge and prosecute people, and thus, does not provide a comprehensive approach to the underlying causes of disasters including organisational management failures. Crucial problems are identified from government and police reports and academic papers as follows:

**Safety Facilities on the Subway:**

The lack of sufficient fire fighting equipment, faulty ventilation system, failure of the backup power, and flammable and toxic furnishings of trains were all responsible for aggravating the fire. Most of the interior furnishings of the cars were vulnerable to fire, and thus emitted heavy smoke and toxic gases, preventing fire-fighters from entering the station for several hours. Fire extinguishers were also put inside a cabinet in the end of the car, which made them invisible to passengers (NAK, 2006). Computerised control systems, such as automatic fire detectors and fire wall, contributed to increasing the death toll.
Table 15: Development of Fire at Jungangno Station in Daegu

<table>
<thead>
<tr>
<th>Time</th>
<th>Situation Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>09:52:43</td>
<td>The 1079 subway train arrived at Jungangno station in Daegu.</td>
</tr>
<tr>
<td>09:52:55</td>
<td>An arsonist threw a bottle full of gasoline inside a car of the 1079 train.</td>
</tr>
<tr>
<td>09:53:12</td>
<td>The arsonist escaped from the 1079 train. The alarm bell rang in the control centre, but ignored.</td>
</tr>
<tr>
<td>09:54:00</td>
<td>The 1079 train driver escaped from the train after failing to extinguish fire, without reporting the fire to the control centre.</td>
</tr>
<tr>
<td>09:54:40</td>
<td>The first call to the fire department was made from a man inside the 1079 train.</td>
</tr>
<tr>
<td>09:55:30</td>
<td>A member of the subway staff at Jungangno station alerted the control centre to the fire.</td>
</tr>
<tr>
<td>09:55:40</td>
<td>The 1080 train was heading for Jungangno station in the opposite direction, and the driver was warned of the fire by the control centre.</td>
</tr>
<tr>
<td>09:56:40</td>
<td>The 1080 train entered the station, stopping alongside the blazing 1079 train.</td>
</tr>
<tr>
<td>09:56:50</td>
<td>The fire wall was automatically operated.</td>
</tr>
<tr>
<td>09:57:07</td>
<td>The fire detection system shut down the power supply to the train.</td>
</tr>
<tr>
<td>09:57:32</td>
<td>The 1080 train driver was waiting for instructions and order from the control centre, not letting passengers evacuate. The first fire brigade arrived at the scene.</td>
</tr>
<tr>
<td>09:58:28</td>
<td>The fire engulfed all six coaches of the 1079 train, and soon spread into the 1080 train.</td>
</tr>
<tr>
<td>09:59:00</td>
<td>The communication between the 1080 train driver and the control centre broke down.</td>
</tr>
<tr>
<td>10:02:00</td>
<td>The 1080 driver fled from the train after removing the master control key, which consequently caused passengers to be trapped inside the burning train.</td>
</tr>
<tr>
<td>13:38:00</td>
<td>The fire was finally declared extinguished.</td>
</tr>
</tbody>
</table>

The Response of Subway Staff and its Training:

Although the fire alarms were activated shortly after the fire started, subway officials at the control centre overlooked the warning on account of frequent failures in the past, believing that it was a malfunction. The 1079 train driver escaped from the train, failing to report the outbreak of the fire in a responsible time frame. The control centre did not report the fire to the fire department although they were notified of the fire from one subway official at the Jungangno station. They also permitted the second train (1080) to enter the station despite knowing that a fire already happened at the station. The 1080
train driver simply waited for orders or instructions from the control centre without taking action, and additionally the control centre failed to give any proper orders. The driver eventually escaped from the train without evacuating the passengers, with the master control key, leaving passengers trapped inside the car. Their responses were evaluated to be impeded by the inadequacy of emergency plans and exercises (TRB, 2006).

The Response of the Emergency Services:

The fire brigade did not warn the control centre when they received an emergency fire call, and apparently, there had been no communication between them (Lee, 2007). Because of toxic smoke and gases, fire-fighters could not commence their actual rescue activities for several hours, and in addition, they were not familiar with the station layout (NEMA, 2004). Post disaster investigations also revealed a lack of adequate joint crisis training or exercises between emergency services.

6.3 MULTI-AGENCY SIMULATION EXERCISES IN ENGLAND AND KOREA

6.3.1 Simulation Exercises observed in England

6.3.1.1 Hitachi 395 Evacuation Workshop & Exercise Twin Bore

Participation Background & Exercise Overview

In January 2009, as a second-year doctoral student, the researcher became aware that it was high time to observe some of the UK (England & Wales) crisis simulations. This was perceived as greatly important because observing exercises could enable the researcher to empirically compare and contrast the real-workings of simulation exercises with his completed literature review. Also, it was considered as a window of opportunity to be progressively invited to other upcoming simulations by not only broadening his contacts but also acquainting them with his academic interest in crisis simulations. However, as an international student, the researcher had difficulty finding correct gatekeepers who could link him with people in charge of managing crisis simulations in England. Fortunately, the researcher came to know Inspector Julian
Dixon of the British Transport Police (BTP) by introduction of his Director of Studies, Edward Borodzicz. As mentioned in Section 4.5.3, through Mr. Julian Dixon, the researcher was invited to ‘Hitachi 395 evacuation workshop’ on 30 March 2009 by David Woodhouse, Safety Manager of Southeastern. As the title ‘workshop’ implied, the workshop was basically a discussion-based exercise, and it was going to be the first (discussion-based) exercise for the researcher to attend as an observer for the purpose of collecting his primary data.

From 2007, the Hitachi 395, utilising technology from Hitachi’s bullet trains in Japan, had been built in order to run on the new High Speed 1 (HS1) line as well as the existing district network between Ashford International, Kent and St. Pancras International, London (D. Woodhouse, personal communication, 16 March 2009). For this, the Hitachi 395 trains should pass through the newly-built tunnels: London Tunnel between London East and London West, and Thames Tunnel between Essex and Kent. HS1, officially known as the Channel Tunnel Rail Link (CTRL) was the United Kingdom’s first high-speed railway line, and the Hitachi 395 trains were to speed at 140 mph (225km/h) on HS1 faster than any other domestic train operating in the UK. Technically, this meant that the Hitachi 395 could connect London and Ashford in just 37 minutes, down from the original 80 minute duration (BBC NEWS, 18 June 2009). Regular passenger service was expected to be inaugurated in December 2009.

In this context, Hitachi 395 Evacuation Workshop was organised to ensure that evacuations in the tunnels could be effectively managed, and that effective coordination arrangements were in place between the organisations concerned before the full passenger service started in December 2009. All in all, a workshop was needed to consider evacuation issues in both the London and Thames tunnels, as part of the preparations for the introduction of the Hitachi 395 trains. Following the Hitachi 395 evacuation workshop, ‘Exercise Twin Bore’ was to take place in order to fully test train evacuations in a real-life environment on 24 Friday/25 Saturday (overnight) April 2009. The researcher was also cordially invited to participate in Exercise Twin Bore as a passenger volunteer. Exercise Twin Bore was going to be the first live exercise for the researcher to attend as a volunteer. Instructions regarding the volunteer exercise were as follows: “This exercise is an important step towards Southeastern achieving safety accreditation to operate the high speed Class 395 trains on the HS1 route, so your assistance on the night is appreciated.” The instructions further added the following points:
- Make sure you have your boarding pass for this exercise
- Wear warm, comfortable clothing and robust flat shoes
- It's helpful if you travel as you normally would: carrying briefcases, coats, etc. This will add to the authenticity
- You may also wish to bring a book, crossword, etc. as there will be periods of time when you will be sitting, travelling and waiting
- Electronic plug sockets are available for use onboard the train so you are welcome to bring electronic devices, such as DVD players, laptops, etc.
- We will provide light refreshments but you may also want to bring along some snacks

**Hitachi 395 Evacuation Workshop - Monday 30 March 2009**

The Hitachi 395 Evacuation Workshop was scheduled to be staged on the 30\(^{th}\) of March, 2009 in the Olympic Delivery Authority Executive Room, which was located adjacent to Stratford Regional station and Olympic Park in London. The evacuation workshop had been planned by Southeastern in partnership with emergency services in London, Essex, and Kent. As the geography of London was not familiar to the researcher at that time, Mr. Julian Dixon thankfully promised to attend the workshop together with the researcher. The workshop was to start at 13:00, and we agreed to meet at 12:00 on the day in front of London St. Pancras International Train Station, where Julian Dixon was working. The researcher took the train from Portsmouth to London Waterloo, and arrived at 11:13. Taking the Victoria Line, north to St. Pancras International, the researcher met Julian Dixon around 12:10 at the station, and travelled together to the workshop venue - the Olympic Delivery Authority Executive Room. Upon arriving at the workshop venue, Julian Dixon kindly introduced the author to all of the workshop participants including the facilitator, explaining the purpose of the visit. Mr. Dixon’s introduction made the researcher feel like he gained ‘complete membership’ of the exercise (For this, see Section 4.5.3).

Participants consisted of 28 members from different organisations: BTP (British Transport Police), MPS (Metropolitan Police Service), LFB (London Fire Brigade), Eurostar, Southeastern, etc. (See an attendance list in Appendix 2). At 13:00, the facilitator began to deliver his PowerPoint presentations on the Hitachi 395 evacuation workshop. According to the facilitator, the aim of the workshop was to consider
management of evacuations, the interface arrangements between the Train Operating Companies and the Infrastructure Controller, and the interface with Emergency responders and command and control arrangements. For this aim, the workshop had two main objectives. The first objective was to ensure that tunnel evacuations could be effectively managed, and that effective coordination arrangements were working in a proper fashion between the relevant key responders. The second one was to confirm that the Thames Tunnel MOU (Memorandum of Understanding) between Essex and Kent was fit for purpose. The workshop was divided into two parts as below. In particular, Part two involved representatives of emergency services from not only Essex but Kent because the Thames Tunnel was under the border of the two counties (See a map in Appendix 3).

Table 16: Hitachi 395 Evacuation Workshop Timetable

<table>
<thead>
<tr>
<th>Part one: London Tunnel Evacuations (10:30 – 13:00)</th>
<th>Part two: Thames Tunnel Evacuations (13:00 – 16:00)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Southeasten &amp; Eurostar</td>
<td>Southeastern &amp; Eurostar</td>
</tr>
<tr>
<td>Network Rail Channel Tunnel Rail Link</td>
<td>Network Rail Channel Tunnel Rail Link</td>
</tr>
<tr>
<td>London Fire Service</td>
<td>Essex Fire &amp; Rescue Service</td>
</tr>
<tr>
<td>London Ambulance Service</td>
<td>Essex Police, Kent Fire &amp; Rescue</td>
</tr>
<tr>
<td>Metropolitan Police Service</td>
<td>Kent Police</td>
</tr>
<tr>
<td>British Transport Police</td>
<td>South East Coast Ambulance</td>
</tr>
<tr>
<td></td>
<td>East of England Ambulance Service</td>
</tr>
<tr>
<td></td>
<td>British Transport Police</td>
</tr>
</tbody>
</table>

Discussion of the workshop centered on four scenarios, and the participants explored each scenario, developing circumstances and ramifications under the leadership of the facilitator. The researcher was told that the emphasis of the workshop was on discovering problems and hammering out solutions rather than decision-making in relation to each scenario. The following four scenarios were fully investigated during both of the parts.

- Non-emergency passenger transfer
- Emergency passenger evacuation, with evacuation trains
- Emergency passenger evacuation, with no immediate evacuation trains
- Serious incident, with passenger self evacuation
As the Hitachi 395 evacuation workshop was the initial exercise for the researcher to observe, he decided to focus attention on savoring the overall ambience of the workshop rather than directly participating in the discussion. For this reason, the researcher wrote his (case study) field notes with an open mind, based on participant observation without conducting interviews. The workshop tested new ideas, processes, and procedures derived from each scenario, producing active participant interactions. Leading discussions, the facilitator tried to keep the participant discussions on the right track with the exercise aim and objectives, and made sure all issues and points regarding each scenario, for example door alignment, gaps, the disabled, and signage, were raised and discussed in a proper manner. The entire workshop finished at around four o’clock, and before leaving, the researcher once more asked all the participants to invite him if they had upcoming simulation exercises.

*Exercise Twin Bore - Friday 24/Saturday 25 April 2009*

The main purpose of Exercise Twin Bore was to test train evacuations between two class 395 High Speed trains in London Tunnel 2 and Thames Tunnel. Exercise Twin Bore was planned and orchestrated by Southeastern in conjunction with local emergency services. The exercise was scheduled to start at St. Pancras at 22:15 on Friday 24th, April 2009, and to end around 02:30 in the morning of the next day in St. Pancras. All of the passenger volunteers were required to arrive at St. Pancras Station Platforms 11-13 by 22:00 on 24 April 2009, which made the researcher leave Portsmouth for London by vehicle around 19:00. On that day, Mr. Julian Dixon was, however, off-duty, and instead, he introduced his colleague, Sergeant Richard Llett to the researcher, who was working the night shift. Thankfully, Julian Dixon had already emailed him to treat the researcher like a VIP, and also to answer the researcher’s questions concerning every aspect of a simulation exercise. Richard Llett was with the researcher throughout the exercise.

At 21:30, the researcher reached the station, and met Richard Llett. Shortly afterwards, we moved to the platform together to take the class 395 High Speed trains to participate in the exercise. There, the researcher was able to see dozens of representatives from BTP, LFB, MPS, Essex police, and Kent police, etc., and also citizen volunteers waiting on the platforms (See the upper photograph in Appendix 4). By 22:10, one safety manager of Southeastern appeared, and began to provide a short briefing presentation on the evacuation exercise. During the presentation, the safety manager briefly
explained the purpose and procedure of the exercise. Additionally, it was said that Exercise Twin Bore was organised to validate (inter-agency & inter-jurisdictional) agreements, consensus, and procedures in a real-life setting, which had been concreted in the Hitachi 395 Evacuation Workshop. It became apparent that two exercises were part of the same continuum, designed to solidify emergency evacuation plans for Hitachi’s Class 395 high-speed trains. This continuum reminded the researcher of Overy’s progressive build-up in Section 3.2.4 - i.e. progressing from the simplest type to more complex ones, although the choice of which exercise to employ was mainly determined by the purpose of the exercise (Cabinet Office, 2010). The following points were underlined for the purpose of safety. It was felt that top priority was given to safety in conducting this exercise.

- Please listen for announcements and follow instructions given to you.
- You will be evacuated into tunnels which may have dirty walls, so try to avoid leaning against them as they may soil your clothes.
- Please do not take photographs during the evacuations as flash photography is not permitted in the tunnels.
- If you are unsure of anything or notice something you consider to be unsafe, point it out to one of the marshals wearing orange high visibility vests.

At 22:30, the safety manager thanked all of the people on the spot for their time and significant participation in the exercise after the briefing. In the meanwhile, the class 395 High Speed trains approached the station in the distance (See the middle picture in Appendix 4). When the exercise trains called at the platforms, exercise players and volunteers stepped into cars of the trains as instructed by members of the Southeastern exercise staff. Like in the Hitachi 395 Evacuation Workshop, the researcher focused on understanding the entire process and general mood of Exercise Twin Bore, rather than embarking on full-scale case studies, to get the whole picture of a live simulation exercise.

Exercise Twin Bore was relatively a static simulation because the only thing for passenger volunteers to do was to simply follow instructions given by the exercise staff. When the researcher’s exercise train halted in each tunnel, the exercise staff started to evacuate all the cars to get passenger volunteers off. Subsequently, all of the volunteers in the trains transferred to the exercise evacuation train on the opposite side through an emergency exit. This was the end of Exercise Twin Bore, and unfortunately the
researcher was notified that a debrief would not be staged right away because the exercise was due to finish in the early hours of the morning. At a time when the exercise was complete, the researcher became very curious about debriefings, and asked Mr. Richard Llett to account for a debriefing process. He simply answered,

“Yes, we always have debriefs after exercises. Debrief is not a lecture on what we did right and what we did wrong. It’s like a more structured conversation. It is about learning from experience. It provides deeper learning and better understanding about our work. In debriefs, the facilitator tries to create a friendly atmosphere where all opinions and emotions are equally respected. This is not easy, but this is very important….”

(Richard Llett, BTP)

The following day, at 02:30, the trains returned to St. Pancras, and the exercise was officially declared to have ended. Through attending Exercise Twin Bore, the researcher could obtain useful contacts (e.g. Marten Anderson, Watch Manager of LFB, David Bulbrook, Station Manager of LFB, Dave Madden, Resilience Manager of London Underground (LU), Liz Turner, Project Manager of Health Protection Agency (HPA), etc.) and information on two simulation exercises coming up in 2009. The first exercise was a joint table-top exercise between LFB and LU, which was due to take place on the 26th of May 2009 at Ashfield House, West Kensington, London. The researcher was politely requested to attend the table-top exercise as an observer, but unfortunately, the researcher was later informed on 20 May 2009 that the table-top exercise was cancelled for some unspecified reason. The second exercise was Exercise Saxon Shore, a multi-agency live exercise, organised by South East Coast emergency services. The researcher was able to attend Exercise Saxon Shore as a casualty volunteer, a detailed account of which was presented in the following section.

6.3.1.2 Exercise Saxon Shore

Participation Background

As mentioned in Section 4.5.3 and Section 6.3.1.1, the researcher received a flyer saying that casualty volunteers, plus a few extra volunteers to act as concerned relatives or uninjured people, were needed for a training exercise on 26 June 2009, at a time when he took part in Exercise Twin Bore as a passenger volunteer on 25 April 2010.
Getting back to Portsmouth, the researcher emailed Liz Turner, Project Manager of the Health Protection Agency (HPA), expressing an interest in volunteering as a casualty volunteer at the training exercise for his own doctoral research. She soon replied back to the email, saying that the researcher was welcome to volunteer and attend the exercise for his own research, but no individual filming and photography would be allowed at the exercise. For this reason, the researcher decided to write his field notes as detailed as possible in order to not only reconstruct the events of the exercise but also record the interviews. In other words, the researcher should simply depend on his pen and notes for the record. The sections below are constructed mostly from the researcher’s field notes.

The researcher was provided information sheets containing three forms: volunteer pro forma, medical questionnaire, photographing and filming consent form (For the information sheets, see a picture in Appendix 5). The researcher filled in the forms, and returned them by using the enclosed envelope, wishing to be a (walking) casualty volunteer. After two weeks, the researcher finally received ‘Joining Instructions for Shorncliffe Barracks Volunteers’ from the Emergency Response Department, the Health Protection Agency (HPA) in Salisbury. The instructions for volunteers emphasised that the exercise would present a useful and realistic opportunity for emergency response agencies (including the emergency services) to practise their emergency response plans with help from lay volunteers. The instructions added, “it will be an interesting day for those taking part and provide an excellent opportunity to see some of the work of the emergency services and hospitals first hand” (HPA, 2009). The researcher became convinced that participating in the exercise as a causality volunteer would provide a window of (ethnographic) opportunity to watch modus operandi of the emergency services in response to a major incident.

Joining Instructions

According to the joining instructions, ‘Exercise Saxon Shore’ was a joint training exercise involving South East Coast local emergency services (Police, Fire and Ambulance), health care organisations and other supporting agencies. For the exercise, all of the volunteers were kindly asked to arrive between 08:00 and 09:00 on Friday 26 June 2009 at Shorncliffe, Barracks, Folkestone, Kent. The instructions stated that volunteers should wear swimming costumes under their ‘disposable’ dresses and also be prepared to be wet, because fire and ambulance services were due to practise the
decontamination process for affected causalities with the mobile showering (decontaminating) facilities. It was added that volunteers’ clothes and footwear would be removed as part of the exercise and not returned, and that they had to bring a full second-set of clothes and footwear to go home in. After the exercise, a 40 pound gift voucher, for a wide range of High Street Stores, would be provided to offset volunteers’ expenses incurred. It was also suggested that volunteers could bring some books or magazines to read because there would be some waiting about on the day. Most importantly, the researcher was notified that precise details of the incident would not be disclosed until the day so that the exercise could be as realistic as possible for the exercise players taking part. Accordingly, the researcher fully understood that the details in the joining instructions should also be kept secret for better fidelity in the exercise.

The researcher found not only the information sheets but also the joining instructions very interesting. First, relatively detailed information about the exercise was provided in terms of ‘informed consent’. Volunteers were able to fully understand the exercise purposes and process, and then they were able to decide whether or not they would take part in the training exercise as causality volunteers. Secondly, as the exercise involved some walking and standing around for long periods, even volunteers with a basic level of fitness were permitted to participate in the exercise. For this reason, volunteers who already decided to attend the exercise were kindly asked to complete and submit a brief medical questionnaire before participation. Furthermore, the joining instructions stressed that when volunteers felt unwell, cold, or the treatment they received caused discomfort, they were able to use the words, ‘No duff’ during the exercise. Every member of the staff soon recognised this, and would provide proper treatment according to symptoms and conditions. Through such processes, the researcher was left with the impressions that health and safety issues were regarded as one of the top priorities. Finally, they were willing to reimburse for some travel costs that volunteers had incurred. The 40 pounds voucher was not a large amount of money, but it appeared to play a small incentive role in encouraging members of the public to volunteer to participate in training exercises.

**Exercise Overview**

Exercise Saxon Shore was a multi-agency counter terrorist live exercise, and took place on Friday 26 June 2009 in Dover, Kent, forming part of the Home Office National Counter Terrorist Exercise Programme (HPA, 2009). The exercise was led by Kent
County Constabulary in conjunction with the Health Protection Agency (HPA), and was funded and coordinated by the Home Office and the Department of Health at a central government level. During the exercise, the Strategic Coordination Centre was established at the Kent Police College, located to the rear of the Kent Constabulary headquarters site. In preparation, there had been a structured training programme building up to the exercise for the exercise players, such as forensic awareness, HART (Hazardous Area Response Team) training, command training days, and table-top exercises. For Exercise Saxon Shore 2009, the specific scenario was based on a terrorist attack, in which terrorists (suicide bombers) detonated a radioactive dirty bomb inside a minibus at a college car park in Dover, England, resulting in 300 contaminated casualties requiring rapid decontamination and treatment (MTW, 2009). The then timetable for the exercise is presented in Table 17 below.

Table 17: Exercise Saxon Shore Timetable

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:00 - 09:00</td>
<td>Registration</td>
</tr>
<tr>
<td>09:15</td>
<td>Volunteers to canteen for hot meal</td>
</tr>
<tr>
<td>10:15</td>
<td>Volunteers transfer to the incident site</td>
</tr>
<tr>
<td>11:30</td>
<td>Exercise Briefing</td>
</tr>
<tr>
<td>12:00</td>
<td>Volunteers rehearse positions on the incident site</td>
</tr>
<tr>
<td>12:30</td>
<td>Make up and lunch</td>
</tr>
<tr>
<td>13:30</td>
<td>Volunteers take up positions</td>
</tr>
<tr>
<td>14:00</td>
<td>Exercise starts</td>
</tr>
<tr>
<td>18:00 - 21:00</td>
<td>Exercise ends (not fixed)</td>
</tr>
</tbody>
</table>

Exercise Saxon Shore 2009 was designed to test the emergency responses to and management of a terrorist attack by South Coast East emergency services, governmental departments, hospitals and local health care organisations in partnership. Put simply, the exercise aimed at practising their multi-agency counter-terrorism contingency plans, when a dirty bomb terrorist attack occurred in their locality. With regard to implications of a dirty bomb attack, “the biggest threat caused by a dirty bomb may be not the destruction or damage to life but its power to create blind panic among thousands of members of the public”, commented one Kent police officer. It came to the researcher’s mind that through conducting an exercise, showing ‘confidence’ by successfully tackling terror attacks might be one of the key factors to determine if the exercise was a success. Exercise Shore 2009 involved contingencies of all of Kent’s emergency services up to 1000 people (police, paramedics, and fire service) and approximately 150
volunteers. Therefore, the exercise demanded meticulously detailed preparation, and took over nearly 12 months to plan.

*Exercise Day - Friday 26 June 2009*

On Friday, 26 June 2009, the researcher woke up at around 05:00 and left for the registration venue, Shorncliffe Barracks, Folkestone, Kent by car. At 08:20, the researcher arrived at the main entrance of Shorncliffe Barracks, and was directed to the designated parking area by a member of the exercise staff. As directed, the researcher left his digital camera, mobile phone, and digital recorder in his vehicle. From there, the author was re-directed to the registration desk in the place named ‘Old Gym’. By 08:40, he went through the registration process, and asked a member of the registration staff how many volunteers they would have today. The staff member kindly replied that a few hundred volunteers were expected to join the training exercises. We talked about the involvement of volunteers with simulation exercises, and she stressed the importance of volunteer participation in an exercise, “a few hundred members of the public volunteered to act as casualties for us today, and we recognise their participation is very important to create validity in our exercise.”

After finishing the registration, the researcher took some rest at Registered Volunteer Waiting area, waiting for the next procedure. Nearly all of the volunteers were British people, and among them, the researcher seemed to be the only international (foreign) volunteer. The exercise staff began to issue a wrist band indicating volunteers’ identification number, and a card detailing volunteers’ roles and symptoms. Interestingly, the card had readings taken at 0 minutes, 30 minutes, 60 minutes and 120 minutes intervals. The 0 minutes sheet indicated the moment when casualty volunteers were first assessed, or treated by an ambulance service health care crew. At those approximate time intervals, after the inception of the exercise, volunteers had to turn the card over to identify their expected roles. The researcher’s details were as follows:

<table>
<thead>
<tr>
<th>Table 18: ID Details and Symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Causality No.</strong></td>
</tr>
<tr>
<td><strong>Name</strong></td>
</tr>
<tr>
<td><strong>Age</strong></td>
</tr>
<tr>
<td><strong>Nationality</strong></td>
</tr>
<tr>
<td><strong>Medical History</strong></td>
</tr>
</tbody>
</table>
Medication Use | Citalopram
---|---
Address | 88842 Doral Drive, Duluth, Georgia, USA 30097
Major Symptoms | Principal Injuries, Able to walk, Laceration to forehead
 | Anxious to where my wife is, thinks she was taken to hospital
Location | Within 50 meters of the explosion
Radiation Level | Background levels only

By 09:10, all of the volunteers including the researcher were taken to the Barrack canteen for breakfast and final comfort break, before travelling to the exercise venue (the incident site). At the canteen, the researcher had a chance to chat with a female causality volunteer. Her name was ‘Donna’, and she was from Eastbourne, East Sussex with two of her friends. She had taken part in this kind of exercise several times before by using her day-offs. She said, “I enjoy attending this sort of exercise. It is sometimes very interesting to see their jobs in person. I feel like I am making some contributions to community safety as well.” The actual exercise was supposed to take place inside the Connaught Barracks near Dover Castle, approximately 20 minutes-drive away. The exact exercise venue was not revealed to the staff taking part, until the exercises was officially declared to start.

At 10:15, the volunteers were called forward, and they boarded a coach to move to the ‘incident site’, the Connaught Barracks. On the coach, the researcher met one police officer from Scotland, and spent some time having a conversation. Regarding the reason for participating, “I am here to watch and learn from their exercise. We have a plan to carry out a counter-terrorism exercise, strikingly similar to this exercise. I reckon this will be a good example for us,” answered the Scottish police officer. We also talked about the role of a (hot) debrief, and concerning its atmosphere, he underlined, “During debriefs, we shared emotion and ideas, and discuss what happened, how we responded, and how we can do better next time. That provides better understanding about our job. We are learning from it.” The researcher became very eager to know about the ambience and practical procedure of debriefs held after an exercise.

By 11:20, we arrived at a waiting area next to the exercise venue, and received a full briefing presentation of the exercise. Distributing briefing notes for casualty volunteers, the briefer illustrated the purpose, scenario, overall procedure, game rules, health and safety issues, cautions, etc. of the exercise to volunteers. When it came to health and safety, four points were underlined. The first point was that safety officers with high-
visibility tabards would be on-site during the entire exercise, and so when volunteers felt unwell or distressed during the exercise and would like to withdraw, they were asked to simply put their hands up, and say the words, “No duff”. Every member of the exercise staff would recognise this, and were willing to help them. The second one was that suntan lotion, hats and rain ponchos would be provided at the incident site if necessary, for the protection of volunteers from the weather. The third one was that volunteers were kindly required to report any accident or incident to the exercise staff, when they were involved in or simply saw the accidents. The final point was that volunteers had to follow directions from exercise staff and then move quickly to the designated assembly point when required.

The researcher felt that the exercise staff seemed to have proper consideration for the welfare of not only their own personnel but also volunteers in their training exercise. Furthermore, the briefer instructed, “when you were entered into the exercise, you would be treated as realistically as possible by the exercise players. Some of the health care people seem to be unaccustomed to the cards you have, and also how they changed as the scenario unfolded, and in this case, you have to help the health care people understand the cards.” The presentation was finally finished, highlighting, “the exercise should be realistic, but it is not a real incident, and so safety should be the priority. Also, please do not overreact!” Subsequently, a Q & A session was conducted for 10 minutes. At 12:10, after the briefing presentation, all of the volunteers moved to the incident site to rehearse his or her positions and roles briefly.

The exercise venue was a large-car park area, previously used as playfields, parade ground, helipad and military vehicle compound, which was located in the north-east of the Connaught Barracks area. One completely-burned minibus (the minibus was completely destructed by fire) and one half-burned coach were located side by side in the exercise venue. Nearby, mock medial film crews and reporters wearing purple tabards were present to simulate media attention. Volunteers were allowed to interact with them in their role as causalities. The researcher double-checked his position and role with help of the exercise staff. By 12:30, we returned to the waiting area, and then realistic make-up was provided to each volunteer, depending on his or her symptoms. Some of the female volunteers were provided plastic dolls to represent their babies. The researcher was required to act as a mock causality with deep cuts on his forehead, and hence fake blood make-up was applied to his forehead in order to improve realism with help of professional casualty actors from Casualty Union and ACHES (Association of
Casualty and Health Emergency Simulators). After putting on make-up, all of the volunteers had lunch.

At 14:00, the exercise started with a simulated explosion inside the minibus by the work of suicide bombers. The explosion generated a heavy smoke with a deafening roar, which seemed to be activated by remote control. Then, casualty volunteers, some of whom collapsed, began to scream, and shout things like “I am dying, help me please!”, “Can somebody help me?”, “Help me, Help me!” as instructed. According to the scenario, the simulated blast itself immediately killed about 10 people nearby, and it occurred to the researcher that as the emergency services arrived at the scene of the incident, they would realise this was no ordinary blast. Approximately 5 minutes after the simulated explosion, one fire truck with a couple of fire fighters, its siren blaring, arrived at the scene, and subsequently a police vehicle joined them. However, they did not approach the explosion site in order to rescue victims immediately. Rather, they kept their distance from the site, and observed the situation through their binoculars. In spite of mock casualties’ screaming and shouting, “please come to help me, please help me!”, police officers and fire fighters did not budge, and simply continued to examine the explosion site from a distance.

By 14:30, one fire fighter in a protective gear appeared in the distance, and asked the volunteers by way of an electric loudhailer, “if you can walk, please leave the scene immediately, and move to that designated area right now.” Walking casualties including the researcher moved to the designated collection point under the fireman’s directions, about 50 meters away from the scene, and were again asked to wait there. However, the first responders were continuously making observations of signs and symptoms regarding the incident site, including the surrounding environment, exchanging their opinions with each other. They did not even attempt to approach the scene in order to take care of the injured people. In the meanwhile, an ambulance car showed up, and directly headed for the explosion site, but they soon came back, joining the police officers and fire fighters. The researcher became very curious about this, and asked one exercise umpire nearby why they changed their direction suddenly en route to the site. He informed, “I don’t know the details of what happened to them, but I am afraid they seem to have made a mistake, I guess. They haven’t a clue what type of explosion they are going to deal with. There may be more danger yet to come. Care should be taken.”

It was only after around 15:00 that volunteers began to complain bitterly that the first
responders did not provide any explanation to what had happened, and were puzzled as to why they did not even try to provide medical treatment. They did not even approach casualties in order to find relevant information. Some of the wounded volunteers at the collection point, appeared to get frustrated about the inaction of the emergency services, and attempted to approach them, shouting, “You have to take action right now to save people over there. They are dying.” Others also resented the emergency service crews for not rescuing the remaining casualties, yelling things like “Hey look, my wife is dying there. Go there and save her right now!” However, the emergency service staff ordered the man to return to the collection point over the megaphone. About 10 minutes later, one fire fighter for the first time came to the collection point, where casualties stood by, and he tried to account for the current situation, pointing out:

“We don’t have any information regarding the source of the explosion yet. We are gathering information and carrying out risk assessment. There is an indication this might be a CBRN incident, and also there might be a second device. We can’t risk endangering the lives of our members, can we? Also there is a very high probability of more victims of fatalities without a proper risk assessment.”

(Anonymous Player: Kent Fire Service)

Meanwhile, one male casualty volunteer, impersonating a French tourist, intervened, and asked the fire fighter, “I just wondering if you help me? I don’t know what is happening. Explain me!”, affecting his broken English with a thick French accent. He intentionally continued to ask some questions in broken English as required. Then, the fireman replied slowly and clearly, “I will get you a translator, but you have to wait first.” By 15:30, the fire fighter started to ask the casualties questions like, “What was the colour of the smoke?”, “Do you have any symptoms after the explosion?”, and ‘Any sickness?”. It appeared that he tried to gather information directly from casualties to identify the source of the explosion. Shortly afterwards, one middle-aged lady reported that she was pregnant, and another lady said that she had a high blood pressure. Leaving for the observation post, the fire fighter made a request to casualties that they should not leave the collection point until further notice, and also to follow their instructions to stay as safe as possible. The umpire kindly remarked, “if this were a real attack, we would probably have had thousands of scared (terrified) members of the public to take care of. And that would be a very different story.” Further he commented:
“Terrorist attacks might take place in crowded places, such as pubs, nightclubs, restaurants, and shopping centres. Club managers and private security guards such as door bouncers are in the front line of fighting against terrorism, and their roles are very important. For this reason, we have spoken to the workers and owners of every establishment and offered them advice on how to deal with, I mean, plan for the potential for terrorist attacks.”

(Police Service Umpire)

At this point, the exercise was suspended for almost one hour with a period of waiting, and causality volunteers were asked to move to a decontamination area, 300 hundred meters away from the incident site. In the area, a couple of decontamination tents had been already established for patients (casualties) from the terrorist attack site. Around at 17:00, volunteers were instructed to undress into swimming costumes, and walk through a tent, in which decontamination showers were operating, and wash themselves there. Beside the tent, monitoring of radiation levels was being conducted by medical staff. Using the cards given to them, every volunteer let the medical staff know what readings their monitors were expected to show. When the volunteers were finished with the decontamination, the time was nearly 18:00.

After the decontamination, those with black-backed cards were called forward to proceed to a ‘Survivor Reception Centre’. The researcher had also been given a black-backed card, and therefore, about 20 casualties including the researcher were taken to the Centre by a coach. When coming back on the coach from the incident site, volunteers were required to complete their feedback forms. By the time we arrived there, police and health teams were standing by to identify causalities’ ID details as well as information or evidence in relation the terrorist attack. We were instructed to use the character on the cards to give our identification, and the cards also included specific comments on their characters. The researcher was interviewed by one male public servant. He asked things like, “Where are you from?”, “What is the purpose of your visit”, “Have you seen any suspects?”, and “Where were you and what were you doing, when the bomb exploded?” The researcher tried to answer all of his questions, sometimes improvising answers with flexibility; for example, “I am here for sightseeing from the USA with my wife. I don’t know where she is now. She seemed to be taken to hospital. I want to know if she is okay. Could you please find her location for me?” He recorded what the researcher replied, and then tried to reassure the researcher, “the police will contact you immediately if they find your wife”. It was around 19:00, seven
hours into the exercise, that the whole procedure of the exercise was officially declared finished. The researcher formally signed out with the registration team, receiving a 40 pound voucher in return for voluntary participation.

Outcomes of Exercise Debriefs

The researcher was told on the day that each service had its own hot-debriefs after the exercise, and in addition, there would take place a couple of multi-agency debriefs sometime in the near future. However, all of the debriefing sessions were scheduled to be held away from volunteers. The researcher did ask the Exercise Coordinator, Virginal Cox if he could attend and watch debriefs, explaining the goals and objectives of his doctoral research minutely. However, the researcher was politely informed that it would not be appropriate for volunteers to attend the players’ debrief on the grounds of confidentiality. She highlighted that this was because that emergency services’ response plans for terrorist attacks and their weaknesses must not be revealed to anyone outside key responding organisations. The researcher fully understood the confidentiality of a counter-terrorism exercise, but as the member of the registration staff commented, volunteer participation was nothing short of an essential part of exercises, and further their suggestions or recommendations were also of great significance for the validation of exercises. In this context, it came to the researcher that even if the feedback form for volunteers to complete seemed to play a role as a written debrief (listening to the voices of volunteers about their exercise experiences), it was not sufficient, and volunteers should have been given a chance to orally debrief as were the exercise players.

Instead of attending formal debriefs, the researcher was able to receive some copies of the Exercise Saxon Shore 09 planning documents, briefly explaining the aims and objectives, planning process, exercise conducting procedure and process, etc. Also, it was several months later that the author was able to obtain debriefing reports of Exercise Saxon Shore. In particular, the report on the results of debriefings detailed the most successful and least successful aspects, together, with important learning points. The report also recommended that the lessons learned from the exercise, as well as the debriefing, should be fully assimilated into participating organisations respectively. Some of the key aspects and points from the debriefs were identified as follows (EKHUFT, 2009, p.1-3):

Least Successful Aspects:
• Not enough space within the Silver control room to accommodate all
• No Police presence; delay in police arrival at hospital site caused issues with ‘crowd control’
• Patient and press control
• Procedure for staff while in lockdown
• Communication with other agencies
• Privacy and dignity outside Decontamination; facilities requirement
• Lines of approval too far away
• Length of time in role
• Access to information; everyone too busy

Most Successful Aspects:

• Radio communications
• Good communications at Bronze with Silver (Hospital Control Centre)
• Police approach very structured and organised
• Good communication/updates between hospital and police/ambulance at Bronze level
• Well resourced command posts
• Lockdown process
• Participation of control room
• Working as a team
• Road control and CCTV
• Good decontamination and nuclear advice from Trust

Significant Learning Points:

• Working as a Team
• Planning and training enables individuals and organisations to respond successfully
• To brief the whole Trust about the exercise and level of play
• Realising what each person’s role is and for it to be consistent despite whoever does it
• Working as a Team in the event of a CRBN event
• Communication with Silver
In order to improve the major incident plan or response, it was stated that the following points should be realised vis-à-vis the above learning points.

- Training not just paper exercises
- More robust action cards
- Continually update the Major Incident Plan
- Meet with external support services to understand their plans
- Regular updates; exercises and/or table tops
- Use the information gained from Saxon Shore to make amendments to the Plan
- Re-look at the levels and location of internal HQ hierarchy
- Better and speedier access to information
- Re-write the Major Incident Plan so that it reflects the systems in place to deal with a crisis and the results of the Exercise
- Standardise the flow of information, both within any Control Room and between different control rooms - Command Chain

According to the report, the exercise was acknowledged as not simply a great success, but also an excellent learning opportunity for all parties concerned to recognise the multiple realities of managing a dirty-bomb attack. The researcher was notified that lessons from Exercise Saxon Shore would be published locally and nationally in the form of a post-exercise report. The post exercise report is currently at the stage of a final draft (as of October 2010), waiting for approval from all relevant parties, prior to publication (NHS South Coast East, 2010). When it came to the evaluation of exercises, various methods - for example, the observation and assessment of evaluators - were deployed. However, debriefs might be the most efficient method to enable individuals and attending agencies to identify not only strengths, but also the weaknesses of their emergency response plans. This process consequently caused individual and organisational learning to take place, as the Scottish police officer remarked, “we are learning from it (a debrief).”

Furthermore, it can be maintained that if all of the people involved, such as players, observers, umpires and even volunteers, are fully engaged in the debriefing sessions, it can be easily accepted that modifications to plans or actual responses are required for better emergency planning. The researcher finally came to accept that through the
debriefing process, emergency plans and accompanying practical performance in emergency response could be more elaborate and improved. To describe the entire learning process more easily, the researcher himself formulated a process, as seen in the figure below (See Figure 8). All in all, it became obvious that simulation exercises, particularly coupled with debriefings, were the crux of the emergency preparedness.

**Figure 8: Role of a Debrief in an Exercise**

![Figure 8: Role of a Debrief in an Exercise](image)

### 6.3.1.3 Exercise Operation Safe Return

**Participation Background**

On 20 July 2009, the author returned to Korea in order to collect his primary data, and further write up his doctoral thesis. The decision had been formally approved by his Director of Studies, Edward Borodzicz. At the same time, the author was able to secure a full-time senior lecturer post at the Korean National Police University (KNPU), while still working on his PhD research project. From September 2009, the researcher started to deliver lectures on the field of policing, public order and crisis management at KNPU. Although the researcher had observed a total of three exercises (one discussion-based and two live exercises) in England, he still felt somewhat frustrated that he seemed to have spent more time on participant observation. The researcher was increasingly inspired by academic curiosity to look into diverse actualities in the British context, which existed around simulation exercises - i.e. each player’s experiences, perspectives, and self-understanding with regard to simulation exercises. All of these can also be obtained through interviews, as Stake argued, “the interview is the main road to
multiple realities” (Stake, 1995, p.64). For this reason, the researcher decided to put more emphasis on qualitative interviews (focused on the list of topics), when attending next simulation exercises.

In the meantime, on 27 January 2010, the author was cordially invited to observe ‘Exercise Operation Safe Return’ by Mr. Julian Dixon. The event was planned to be held at Kentish Town West station, in North London, England from 15 to 19 March 2010. Mr. Dixon again proved to be a valuable gatekeeper for the researcher’s collection of empirical data, and he always provided the researcher with a ‘best ticket (Fetterman, 1998b, p.33)’ to enter his profession (Also, see Section 4.5.3). The author requested permission from the KNPU president to participate in the exercise, and finally, the president allowed the researcher to fly to London for his PhD research. Meanwhile, a formal invitation was issued, and sent to the researcher by Mr. Julian Dixon. However, Mr. Dixon was not directly involved in running the exercise, and for this reason, he introduced the writer to Edward Purchase, BTP police inspector. Mr. Purchase was working as POLSA (Police Search Advisor) in charge of conducting some sessions of Exercise Operation Safe Return. The researcher contacted him by email, and was informed that there would be two exercise sessions per day: 09:00 hrs and 13:00 hrs with varying scenarios, although all sessions would be basically the same. Different search teams would be led by different POLSAs from all over the country. The researcher notified him that it was the researcher’s wish to observe a total of three exercise sessions on 16 and 17 March, due to his tight schedule. We finally agreed to meet at 12:00 on Tuesday, 16 March 2010 in front of Kentish West Town station, London.

**Exercise Overview**

Exercise Operation Safe Return was a five-day counter terrorism live exercise, which was planned and led by the British Transport Police (BTP), England. Its main purpose was to test BTP counter terrorism contingency plans. The exercise was part of a continuing programme of training, skill development and familiarisation, when bomb threats occurred on the railway. The exercise took place on the London Overground route between Camden Road and Kentish West railway stations in northwest London between Monday, 15 March and Friday, 19 March, 2010. During the period, the Overground route between the two stations was supposed to be closed for major signalling and track renewal work, platform lengthening, and station refurbishment, and
thus there would be no service. Taking advantage of the line blocks for exercise purposes, BTP specialist search officers undertook a counter terrorism search operation along the track leading into Kentish Town West Station with explosive detection dogs. The exercise was based on the scenario of a category 1 bomb threat, assessed as urgently demanding a line closure and police response at Kentish Town West Station. For this, dummy explosive devices were placed along the line of route, and the search teams with sniffer dogs had to conduct the re-occupation search to discover the dummy explosives.

Noticeably, Exercise Operation Safe Return was regarded as a great opportunity for search officers to not only put into practice what they had learned in the BTP counter-terrorist search course, but also renew their skills in a real-life setting (in a safe learning environment). The BTP search was divided into three levels: ‘Basic Search’, ‘Intermediate Search’, and ‘Advanced Search’ (PNSC, 2009, p.7), and the exercise was directly related with the intermediate search (The course timetable for intermediate search is enclosed in Appendix 6). The researcher was informed that each element of search, which was needed for the exercise, had been already taught as per the manual.

- **Basic Search**: (CTSA: Counter Terrorism Search Awareness) Personnel are trained to be aware of the indicators of terrorist activity through knowledge of the threat, becoming aware of the different methods of terrorist attack. Such training is available within forces from their POLS As. CTSA staff can be utilised where advised by the POLSA in pre-planned defensive operations and this is inherent to event protection.

- **Intermediate Search**: Police search teams are trained and licensed in systematic search procedures to conduct both offensive and defensive counter terrorism search operations in a low risk environment, where there are manageable hazards and a significant level of assurance is required. This is the first level at which teams are formed to conduct search operations.

- **Advanced Search**: This level of search requires teams with particular skills to work in generically high risk environments (e.g., working at height, confined spaces, underwater, waterborne environments, and CBRN environments). It also includes the use of military assets under Military Aid to Civil Power (MACP), where a higher level of assurance is required or when there is either known to be, or special reason to believe that a bomb or booby trap (explosive or otherwise) is present.
Exercise Operation Safe Return was primarily geared toward refreshing as well as practising BTP’s counter-terrorism procedures and techniques in the event of a category 1 (severe) bomb threat. For such an agency-specific goal, the exercise fundamentally assumed the form of a single-agency exercise, and more than one hundred police officers from BTP Counter Terrorism Special Units, including explosive search dog handlers, participated in the exercise. However, several members of staff from London Overground, London Underground, and London Fire Brigade (LFB) also attended and observed the exercise. In particular, they were provided staff training on the management of counter-terrorism incidents, and also took part in simultaneous HOT protocol-related exercises on the spot at the station. In particular, the HOT principle-related exercises presented all of the attendees taking part (outside BTP) with a good opportunity to learn about dealing with suspect packages, methods employed by terrorists, and what they should do if they discovered suspicious items. Several police officers from other local police forces, such as West Yorkshire Police, attended and observed the exercise as well. A hot-debrief was held after every session, and a full debrief was scheduled to occur in April, 2010.

Exercise Day - Tuesday 16 March 2010

The researcher left South Korea for London, England on 14 March 2010 to observe Exercise Operation Safe Return, and arrived at Heathrow in the afternoon on the same day. The researcher spent one and a half days in Portsmouth to reduce jet lag, and took a coach to go to London Waterloo to observe the 13:00 exercise session. The exercise venue, Kentish Town West station, was located in London transport zone 2, and the researcher took the Northern line, north to Kentish Town, and walked to Kentish Town West railway station from there. Arriving at the station around 12:00, he phoned Police Inspector Edward Purchase on his mobile as mutually agreed. We met around 12:30, and moved to a park near the station in order to have lunch. There, we met Mr. Purchase’s BTP colleagues, and Mr. Purchased kindly introduced the researcher to them. There, Edward Purchase gave a brief explanation on the purpose, procedure, principles, etc., with regard to the day’s search exercises. Regarding the exercise purpose, he commented:

“The intention of the exercise is to refresh and practise re-occupation search following a category 1 bomb threat to the railways, line of route and station.
The last category 1 that we had was in 2000, and with the forthcoming Olympics, it would be prudent for us to ensure that we are fully up to speed, as it will result in major delays and disruption to the mass transit system.”

(Edward Purchase: BTP)

In addition to practicing what had been learned in the search course, it was highlighted that some adaptation in the event of real incidents or even in exercises were particularly necessary in order to deal with situational uncertainties. Similarly, Edward Purchase emphasised that a situational change was the key to keeping risks to a minimum, during operational incidents.

“I think we follow the routines, but not rigidly. If the geography is dictated otherwise, we have to develop, you know, change the way you search…. The overall learning key factor is that we don’t missing anything. We do as safely as possible. There will be a risk, but we have to keep the risk as low as we can.”

(Edward Purchase: BTP)

This view was echoed by a BTP search team leader, who joined the conversation unexpectedly. His name was Paul, and he went so far as to say:

“Definitely, definitely, we have to adapt. A manual doesn’t say what to do for every situation. A manual is just guidance. Sometimes, we have to stay outside the routine rules, regardless of manuals... Terrorists are very smart, you know, they can understand our plans, rules and manuals. So, for example, we get hoax bomb call-outs. And they watch how the staff react, what the response time from the police will be, where passengers gather. So we change bomb assembly points.”

(Police Search Advisor Paul: BTP)

One search dog handler from BTP nearby joined the interview, and he was not also isolated in this view.

“Yes, we change the rules. In theory, you will drill at a 90 degree angle but sometimes you can’t do it. You have to adapt. The manual says our dog indicates a device in a certain way. But as we know, they all react and communicate in different ways... We all get together and say this works, that
doesn’t work, and let’s carry this forward. May not be in the manual, but it works.”

(Anonymous Search Dog Handler: BTP)

At 12:50, the researcher moved to the platform of Kentish Town West station. The researcher met two observers from the London Fire Brigade (LFB), and was able to get a chance to interview one of them through an introduction from Edward Purchase. The researcher introduced himself, subsequently explaining the research aims and interview purposes. The researcher started to interview the LFB observer, following the list of topics, but the atmosphere of the interview was very akin to that of a casual conversation, which was conducted in an amicable environment. His name was Patrick Tawney, and he worked for the London Fire Brigade Headquarters as Station Manager. With regard to the reason for observing the exercise, he replied, “It’s about how we can support the police in this kind of incident. Sometimes they ask us for equipment or personnel. In some situations, we will say yes. In some situations, we will say no... We are here to help them in this incident”. From the perspective of working with other responders, he commented:

“We do our own risk assessment for our own staff. But we still talk to them, liaise with them, and help them to perform a risk assessment for everybody who is here. We work together. So, we run multi-agency exercises quite often, I mean, as often as we can. We also invite the military and the security services, depending on the situation. This is how different agencies are involved with training or exercises.”

(Patrick Tawney: LFB)

However, it was further suggested by Patrick Tawney that there had not been really sufficient multi-agency working in the past,

“Things have changed a lot here. Ten years ago, it would be... the police were over there, the fire brigade was over there, and the ambulance service was over there. They didn’t talk to each other. And it caused a lot of problems. Now we are able to understand what other people want, and what other people want to do. We also understand what individuals need to assist them. That makes things a lot easier. People with information now share this with each other, whereas in the past they wouldn’t tell anybody. Now we can work a lot more efficiently.
Police will tell the fire brigade key information.”

(Patrick Tawney: LFB)

Search Team Leader Paul supported his comment, “Yes, we are part of a team. We can’t do the job without them, and they cannot do the job without us. We are working together.” Further, he said:

“(Because of multi-agency exercises) we can have mutual understanding, and so we can trust each other. In some situation, where some changes are needed, we write it down, get everybody to look at it, and get everybody to sign it. That’s the plan. It does work. It protects you. The decision made at that time might be not right, but at least you considered it. In the future, people might say that it was a wrong decision, but it was a right decision at that time.”

(Search Team Leader Paul: BTP)

Edward Purchase endorsed their comments by praising the advantages of multi-agency exercises, especially from the perspective of building personal relations, “Every time we do these exercises, we start to get to know the people. When a real incident happens, we turn up, oh! Hello, John! Informal relationships…We do know the people, and things become much easier because of this.” The search dog handler chimed in with them, pointing out:

“It (knowing the people) is quite comforting as well. You recognised the people’s faces, and you don’t have to go through the whole explanation of who you are, and what you are doing because everybody knows you. Also, you know who to trust, when something serious happens. It is so beneficial to do things with other agencies.”

(Anonymous Search Dog Handler: BTP)

By 13:30, police officers wearing hardhats and florescent coats, started to assemble on the platform. Two dog handlers in protective gear were also present with two sniffer dogs, and the role of the dogs was to search the train tracks in order to find suspect explosives heading the search team. The search team was comprised of 12 police officers and 1 member of staff from Network Rail. Before the exercise commenced, a safety inspector from Network Rail checked if the search officers possessed a valid track safety certificate for safety purpose, otherwise they were not allowed to go on the
tracks, even if it was for training or exercise (See a picture in Appendix 7). The researcher felt that the inspection process illustrated the BTP’s safety concerns very well. At 13:30, when the search exercise started, two explosive search dogs first commenced to search the tracks lines down (from Camden Road) to Kentish Town West for suspect explosives, and the rest of the search team followed the dogs by hand-searching the tracks (See pictures in Appendix 8). In a waiting room on the platform, two observers from LFB, four members of staff from London Overground and London Underground, and the researcher were simultaneously given briefings and explanations on dealing with unattended bags and suspect package, methods used by those wishing to cause harm, and what to do if something suspicious was spotted.

In the briefings, the instructor attached great importance to evaluating the risks associated with the discovery of an unattended item, saying “If we always stop services and cordon off stations, when we have bomb threats or reports of unattended or suspicious bags, we can’t call it the decision. That’s not the decision”. He introduced the researcher to BTP’s HOT principle, the concept of which was completely new to the researcher. According to the instructor, whether an unattended bag incident escalated into a station evacuation would depend upon “risk judgements by people on the spot”. In 1992, the Appleton Inquiry Report into health and safety aspects of stoppages caused by fire and bomb alerts on London Underground, British Rail and other mass transit systems spotlighted staff and police training as lacking ‘coordination’ (between police and railway or underground staff). The coordination issue, deemed absolutely essential, was handled as soon as the report’s findings and recommendations were publicised. Consequently, in order to provide the frontline staff with credible and pragmatic advice, BTP eventually devised the (common) operational protocol known as HOT by analysing unattended bag incidents, and then contrasting pertinent factors with the characteristics associated with real attacks. The HOT principle enabled the finder of an unattended bag to consider three key characteristics, before it was declared ‘suspicious’. If they were not satisfied, they escalated the incident to BTP.

- Is the item Hidden?
- Is it Obvously suspicious?
- Is it Typical of the environment?

The instructor highlighted that the HOT protocol was commonly accepted throughout the UK railway industry, and increasingly by police forces in other parts of the world.
With regard to the effectiveness of the HOT principle approach to unattended items, he talked about it very proudly, “In the past, about 20 percent of cases reported as unattended or suspicious resulted in a full evacuation, but nowadays, the figure is less than 1 percent.” After the one-hour briefing, all of the participants took part in a series of HOT protocol-related exercises at the station in order to practice what we had learned about the HOT principle. One of the exercise scenarios involved a situation that an unattended briefcase was found in a waiting room on the platform, but it was inserted into the corner of the wall, partially hidden (See a picture in Appendix 9). Each participant was required to evaluate the situation by applying the HOT principle. It came to the researcher’s mind that knowing the principle was simply a starting point for the solution, and it was also vital to have hands-on experience about the HOT protocol through participating in those exercises.

The 13:00 search exercise concluded with a hot debrief, where all those who took part in the exercise had a chance to reflect on their actions taken. As with the previous exercises observed in England, the researcher had not been able to attend debriefs because of confidentiality, and the researcher asked Edward Purchase to make some arrangements to attend the exercise players’ hot debriefs. Edward Purchase was supposed to lead the hot-debriefs as a facilitator, and so he promised to arrange for the researcher not only to observe the hot debrief but also interview some of the exercise players. In the end, the author was kindly invited to watch the hot debrief, which lasted for about 30 minutes. The points, such as ‘what happened’, ‘how prepared we were’, ‘what went well’, ‘what did not go well’, and ‘what can be done better in the future’ were discussed during the hot debrief. In the discussion, the players actively expressed their feelings and emotions, and the facilitator tried to provide effective feedback, sometimes by pinpointing their errors and mistakes, but in a cordial (no blame) fashion. The exercise seemed to be considered as a success with the search team performing under pressure. All those taking part not only identified their strengths but also the areas where improvements could be made. Particularly, identifying areas for improvements was so crucial that the BTP search officers had to continually upgrade and refine their search skills and operating procedures with the results from debriefs. The researcher interviewed the facilitator, Edward Purchase at the end of the hot debrief, and he began to account for its atmosphere.

“Largely people will admit if they do something wrong in the exercise. But we are not here to say, oh you made a mistake, criticise or blame someone.
Different teams search differently. Just work progressively to improve the way things are done. Could we have done it better? Could we have done it safer? Just improve the way in which we do things... A further debrief with the dog instructors would be also arranged after this, and from there, we are looking at how to implement the learning points into the manuals and exercises.”

(Edward Purchase: BTP)

Mr. Purchase’s remark evoked the cycle of a hot-debrief’s role (See Figure 8 in Section 6.3.1.2), and his point was further reinforced by Search Team Leader Paul, notably with regard to the purpose of a debrief.

“It is about constant learning. If someone makes a mistake, we don’t say it is rubbish. We ask, why did you miss it? How did you miss it? What were you thinking then? We talk about something to improve .... I like debriefs. When I conduct search exercise, I use the incidents, where we went wrong. And I replicate it in training or exercises. I replicate it somehow to see what can be done better next time. I like debriefs. That’s my personal favourite way of doing things.”

(Search Team Leader Paul: BTP)

After the 13:00 session was finished, the researcher was informed that a full-debrief would be held sometime in April, 2010. The researcher was delivering lectures at KNPU at that time, and thus it was not feasible to visit London again merely in order to observe the full-debrief. Fortunately, Edward Purchase promised, “Every input is logged by me, and I will let you obtain the results by email.” The researcher finally took the tube to return to his accommodation in London. Since the researcher was supposed to attend both of the 09:00 and 13:00 sessions of Exercise Operation Safe Return the following day, he made a hotel reservation to stay one night in central London, not coming back to Portsmouth.

On board the underground train back, the researcher found a very intriguing safety information notice. It read, “In the unlikely event of an emergency, stay on the train and follow instructions given by train staff” (See a picture in Appendix 10). The safety information reminded the researcher of the disputed Daegu Metropolitan Subway’s emergency guide in the Daegu Subway Fire 2003, “It is safer to stay on the train than attempt to get off in an emergency” (See Section 6.2.2). The safety information rather
raised the questions as to whether passengers should stay on the train regardless of the nature of an emergency, such as “What if it is not safe to remain on board because of an internal fire? Is it more appropriate to exit through the coach doors or windows in that situation?” The question might be equivocal, since it is an oversimplification of reality. However, given that many passengers in the l080 train remained seated, following instructions given by the 1080 train operator in the Daegu Subway Fire disaster, there still existed a possibility that the question in point may again be realised, given the case in the Daegu Subway Fire. All of sudden, it occurred to the researcher that one of the solutions might be ‘adaptation’ as one of the interviewees emphasised, “We have to adapt. A manual doesn’t say what to do for every situation. A manual is just guidance. Sometimes, we have to stay outside the routine rules regardless of manuals.”

Exercise Day - Wednesday 17 March 2010

The following day, the author again visited Kentish Town West station to watch the 09:00 and 13:00 search exercise sessions. Edward Purchase was off duty that day, and Search Team Leader Paul took care of the author instead. Paul arranged some interviews during the two sessions for the researcher. All sessions on that day, including hot-debriefs, were basically the same as yesterday’s session, but with different search teams led by different police search advisors. Also, a series of HOT principle-related exercises were simultaneously held at the same place by the same instructor. During the 13:00 exercise, the researcher met Sergeant Gary Fretwell, Search & CBRN Advisor, Operational Support Unit, West Yorkshire Police, who was there to observe the search exercise. The researcher got a chance to interview him, watching the exercises together. During the interview, the researcher tried to share with Gary Fretwell what the researcher felt and perceived by watching yesterday’s exercise and interviewing participants. Sympathising with the researcher, Mr. Fretwell commented, “Learning from mistakes is the debriefing part. That’s most important”. Subsequently, he began to speak about rules, flexibility, and debriefing, and additionally he explained a debriefing model to the researcher, which West Yorkshire Police utilised within their police force area.

“Even ourselves need to focus on the debrief as much as the initial briefing. Generally, (a debrief) it’s about not partially going to individuals but identifying areas for development or improvement. We don’t like to use terms like weak… Not about criticising, and not about focusing on negatives, which may damage
morale. It’s about giving constructive feedback to people. Depersonalised... It’s not always easy. It is definitely important because I haven’t been to many incidents, where everything’s gone very well. Generally, there’s always something to improve, always…. If we didn’t do this, how would anything get better? Everybody’s got good ideas. It’s about getting the best of everybody…It’s just because… you are top officers doesn’t mean that you are the best at any or every given task.”

(Gary Fretwell: West Yorkshire Police)

Gary Fretwell continued the conversation, “We also need to adapt to rapidly changing circumstances. We call it dynamic risk assessment. Anything we do now is supposed to be risk-assessed to minimise risk or injury to ourselves.” He proceeded to tell the researcher that rules sometimes became a hindrance to effective emergency response:

“Sometimes, rules can get in the way. I am sure you know about it. There needs to be a degree of flexibility. Things are rarely black and white. There is room for a grey area. Sometimes, we are allowed a degree of flexibility. Apply just some common sense. Better commanders, they stick to the rules whenever possible but when needed, they allow flexibility to do their job effectively… You’ve got to have some flexibility. Without flexibility, especially if you follow the rules every time, terrorists are not stupid, and they know exactly what we are going to do. You need to start ahead of them. We don’t want them to second guess what we are going to do. We want them to not know what we are going to do because otherwise they can modify what they do. They watch us, and if they know we search in a certain pattern, that gives them a massive advantage. We won’t let this happen.”

(Gary Fretwell: West Yorkshire Police)

In the meanwhile, the researcher saw one BTP police officer nearby paying attention to the interviews. The researcher felt that the officer was interested in the interviews, and politely asked him to join the interviews. His name was Neil Favager, and he was working as Force Counter Terrorist Contingency Planner for BTP’s Counter Terrorism Support Unit. Neil Fretwell started to talk about debriefs, “We are very keen on a debriefing part. We can measure our own progress after debriefs. We are not too critical now, and we are a lot more open. Sometimes, getting things wrong can be a good thing to learn from.” With regard to the role of flexibility in emergency response, Mr. Favager
upheld Gary Fretwell’s perspective, using the term, ‘adaptation’.

“Sometimes, we won’t go A, B, C, D. We could go A, D, H, okay? That’s what suits that situation at a particular time. This station is very very very different from London underground stations. Procedures can change as stations are different. Depending on the layout, capacity and size, adaptation is the key…. If a commander decides something needs to be changed, they will discuss it more instead of making orders. After the discussion, the commander will make the final call.”

(Neil Favager: BTP)

After the interviews, Mr. Purchase introduced the researcher to his boss, Superintendent Phil Trendall, Head of BTP’s Counter Terrorism Support Unit. Mr. Trendall was present for interviews with the media at that time. The researcher expressed his gratitude to him for allowing the researcher to observe the exercises for doctoral research, and we talked about 20 minutes. During the conversation, he valued participation of rail staff with regard to counter-terrorism activity. He commented, “Rail staff are the first line of assessment, and they play a critical role in defeating terrorism. We always ask them to remain vigilant, and report any suspicious activity or items to us according to the HOT principle.” What was of particular interest here in the interviews was that almost every interviewee agreed that reality was sometimes different what was written in the book, plans or manuals. In this context, they concurred that some adaptation or flexibility could be allowed when necessary, depending on the situation. According to Section 3.2.6, crisis situations involve uncertainty, unfamiliarity and complexity, and in this context, it is argued that crises cannot be dealt with by routine responses – i.e. by always ‘going by the book’. This argument seemed to resonate with the interviewees’ viewpoints, for instance, “You follow the routines, but not rigidly.”, “May not be in the manual, but it works.”, “There needs to be a degree of flexibility.”, and “adaptation is the key.”

Outcomes of Exercise Debriefs

During each hot debrief, a lot of points were raised, and subsequently logged by Edward Purchase on a daily basis. Exercise Operation Safe Return was perceived as a success because all the inputs were properly used, there was good feedback from all involved, and finally, areas for improvement, including learning points, were identified. Various
actions and recommendations came out from the hot debriefs, and the author was informed that these were being implemented for the dogs and search officers (E. Purchase, personal communication, 21 August 2010). The main points raised during hot debriefs were presented below.

- Communication was a big issue between handlers and Search Team Leaders, due to distance, environmental noise and reduced hearing as handlers were wearing their bomb suit helmets. No radios or mobiles were worn as it was a Category 1 threat.
- Search Team Leaders, when they needed to discuss searching the station, would often walk up to the dogs due to communication issues and discuss in an area that was not cleared or sterile.
- Explosive Search Dogs were not given interim boundaries by the Search Team Leaders which would have helped get over the communication problems.
- The general advice given by Explosive Search Dogs as to how best to search the track was varied. Although all ways were safe (which must be the overriding factor), some were very slow and unnecessary.
- Police search advisors did not understand Explosive Search Dog terminology, such as burn, phase 1 and phase 2. This reduced their options.
- How best to utilise the Explosive Search Dog, e.g. Pairs or 1 dog working/1 dog resting.
- Explosive Search Dogs worked side by side (the search team for safety work in a 10m stagger) if a device was found both handlers would be within the immediate area of the Improvised Explosive Device. Speaking to handlers this is because they are trained on route search roads, etc., but this is obviously not a cat 1 scenario.
- Explosive Search Dogs work on defensive searches with search teams etc., on a regular basis, but there is little training on re-occupation searches.
- There are obviously training issues between Explosive Search Dogs and search teams, this could be resolved by Police Search Advisor’s incorporating re-occupation searches into their search refresher training and requesting Explosive Search Dogs. Perhaps an Explosive Search Dog training manual for Category 1 searches could be developed, all the rational/formation is recorded in the BTP search précis, and this could be expanded in some form to include Explosive Search Dog.
- Dogs train from a national manual which BTP do not own and getting changes
made in it are much more difficult.

6.3.2 Simulation Exercises observed in Korea

6.3.2.1 Keungogae Subway Counter Terrorism Exercise 2009

*Participation Background*

Since the researcher returned to Korea in July 2009, he has been looking for a chance to observe simulation exercises in Korea with an aim to compare and contrast with Exercise Twin Bore and Exercise Saxon Shore, which the researcher had attended in England. Particularly, the author hoped to take part in simulation exercises in Daegu, if possible, as the Daegu Subway Fire occurred in the city of Daegu (See Section 6.2.2). For this, the researcher was advised to contact the Daegu Metropolitan Transit Corporation (DMTC) to learn if they had any upcoming simulation exercises. The researcher’s first contact with Mr. Jungyong Yun, the emergency planning officer of DMTC was by telephone in September 2009. The researcher informed him that it was the researcher’s desire to understand the contexts of Korean crisis simulations by performing a participant observation on them. Shortly afterwards, the researcher was kindly notified that a counter-terrorism exercise, code-named ‘Keungogae Subway Counter Terrorism Exercise 2009’, was scheduled to take place at Keungogae station in Daegu, Subway Line 1, on the 14th of October 2009, and that the researcher was more than welcome to observe the exercise. Keungogae station is only five stops away from Jungangno station on Line 1, where the Daegu Subway Fire 2003 occurred. This was going to be the first exercise to observe in Korea, and the researcher decided to focus on grasping the exercise’s general atmosphere, rather than embarking on a full-fledged ethnographic case study in Korea.

*Exercise Overview*

The Keungogae Subway Counter Terrorism Exercise 2009 was a multi-agency counter-terrorism live exercise, which took place at Keungogae station in Daegu, Subway Line 1 on the 14th of October 2009. The anti-terror exercise was carried out as part of ‘Chungmu exercise’, and lasted for no more than 40 minutes. The Keungogae exercise was planned and led by the Daegu Dongbu Fire Station and Daegu Subway Metropolitan Subway together, involving more than 50 participants from other key...
responders, such as the emergency services, Daegu Dong-Gu Office, and the 501st Sustainment Brigade. Primarily geared toward testing and validating the Chungmu plan, the Chungmu exercise was an annual joint exercise scheme for preparing for both wartime emergencies and civilian disasters. The Chungmu plan was basically aimed at confirming if personnel and material could be mobilised smoothly so that government officials were able to support military operations in case of hostile attacks from an enemy. The Chungmu exercise was concerned with the non-military function of government at the time of war, but it also involved several civilian disaster-response exercises to prepare for peacetime emergencies, such as fire and water contamination. The Chungmu Exercise 2009 was a four-day national exercise from 12 to 15 October 2009, and was comprised of a total of 32 exercise sessions. One of the exercise sessions was the Keungogae Subway Counter Terrorism Exercise (MOPAS, 2009). For the exercise, all of the subway trains on Line 1 were to stop for 3 minutes during the exercise. However, the area was not cordoned off, and so passengers were allowed to come in and out for the purpose of creating a degree of realism. The exercise was to be evaluated by a team, consisting of public officials from the office of Disaster and Safety of MOPAS, and a couple of military officers from the Ministry of National Defence (MND).

Exercise Day - 14 October 2009

On Wednesday, 14 October 2009, the researcher took the train from Seoul to Daegu at around 10:00, and arrived at Dong Daegu Train Station (just one stop away from Keungogae subway station) at around 13:00. This was because the exercise was scheduled to start at 14:00 on the day. The researcher again took the subway to travel to the exercise venue, Keungogae subway station. When the researcher arrived at the station, it was already busy with rehearsals in progress. The exercise involved more than 15 volunteers to act as passengers, but the volunteers consisted of public servants only, without any lay people. For exercise players and volunteers, briefings were held in between the rehearsals. It appeared that all of the exercise players were seen in animated conversation with one another during the rehearsals. At 13:20, all of the players and causality volunteers were put on standby very near the station; some were rehearsing their positions again, while others were examining their equipment. At 13:30, the researcher met Mr. Jungyong Yun, and moved to his office at the station together to have a chat with some tea. There, Mr. Yun briefly explained the whole process of the exercise to the researcher, providing a three-page scenario script of the exercise.
According to the script, the purpose of the exercise was to reinforce cooperative ties among the related agencies, and improve their capacities to deal with terrorist attacks. For this, the exercise simulated a coordinated gun and bomb attack by a group of rebels, and a resulting fire on the station, which finally claimed several passengers. A police SWAT team was also invited to the exercise. When browsing through the scenario script, the researcher was able to identify certain inconsistencies; for example, when gunshots were fired, and a bomb explosion occurred, it was not the emergency services who first rushed to the scene to save people and extinguish the fire, but it rather the members of the station staff on duty. According to the script, they understood it was an ongoing terrorist attack, and that terrorists might be still there. Under these circumstances, it would be asking for trouble if the members dashed to the scene alone without any help from the emergency services. With regard to this point, Mr. Yun replied,

“This scenario script was just provided from senior management. I knew that this scenario had some inconsistencies. And we should have tried to correct them… Senior management, they said just let it go…. To be honest with you, we had the first planning meeting just yesterday… So we decided to stick to the scenario even if it had some snags. But nobody can notice these problems actually, during the exercise.”

(Jungyong Yun: Daegu Metropolitan Subway Corporation)

At 13:45, when a group of examiners from MOPAS with the CEO of DMTC arrived at Keungogae subway station, they were greeted by one representative from the subway staff; he bowed to them as a gesture of respect. They moved to pre-arranged deck chairs at the station, and after the director of the Office and the CEO were seated, all of the people including examiners and observers finally sat down. Seconds later, a senior official of DMTC began to report on station facilities, organisational charts, and the whole procedure of the exercise on the podium. The reporting lasted for approximately 10 minutes. By 14:00, the exercise started and soon, four terrorists with red shirts approached subway turnstiles upward from platforms. As they came out through the turnstiles, they started shooting at passengers, mimicking gunshots. They also threw smoke bombs to the waiting room, and finally fled up the stairs somewhere outside the station. Simultaneously, all the lights went off, and a heavy smoke was generated from a fog machine, sirens blaring.
At 14:10, the announcement for emergency evacuation was declared, “Ladies and gentlemen, your attention please! Due to a reported emergency, all of the passengers must leave the station immediately!” but the researcher could not hear the announcement completely, deafened by the siren noises. Right after the announcement, two members of the subway staff, wearing respiratory protective equipment, approached, and started tackling images of a simulated fire created on the display screen, while passengers were evacuated from the station by its fire marshals. At 14:10, fire-fighters and ambulance crew rushed to the station at the same time (See pictures in Appendix 11). At 14:13, when the police arrived at the station, the lights were on once again. The police officers, however, did not wear any personal protective equipment, such as gas, to combat the heavy smoke (See pictures in Appendix 11). They started to cordon off the area for booby traps, and soon one EOD (Explosive Ordnance Disposal) expert from the police SWAT (Special Weapons and Tactics) team approached and dismantled a booby trap. This operation was very swiftly completed within a mere 2 minutes. In the end, a military unit and a SWAT team joined the police in order to arrest the terror suspects.

The exercise seemed to finish successfully because the fire was declared completely extinguished, passengers were evacuated very quickly, and the four terror suspects were killed on the run from the station. However, it could be maintained that the exercise was not only highly unrealistic, but also contradictory in some respects. Particularly, the researcher became very concerned about the serious mistakes made. For instance, the subway staff and fire marshals rushed to the scene too hastily, before the threat had been properly assessed by the emergency service. In addition, police and military did not wear personal protective equipment, whilst fire-fighters attempted to control the fire, fully equipped with appropriate protective gear. The researcher hoped that these flaws would be pointed out, for sake of improvement, in a friendly and constructive manner during a planned hot debriefing session.

At 14:35, a public announcement was made, “And now on, we’ll have a debriefing session for the Keungogae Subway Counter Terrorism Exercise 2009.” Then, all of the exercise players and volunteers started to gather in formation just in front of the podium, and the debriefing session first commenced with a greeting address by the CEO of DMTC. Subsequently, a speech of encouragement was delivered by the director of the Office of Disaster and Safety (See pictures in Appendix 12), and the speech lasted for nearly 8 minutes. Each speech ended with a big round of applause from the exercise
players and volunteers. The hot debriefing session consisted of simply the two top-down speeches from senior management, not involving any discussions or conversations between players about their experiences and mistakes made. After the debrief session, a gift of cash was granted to the exercise players in recognition of their outstanding efforts (See the lower picture in Appendix 12). At 15:00, the exercise finally came to an end. The whole procedure of the exercise including the hot debrief was like a live performance. The researcher felt that the Keungogae Subway Counter Terrorism Exercise and the two aforementioned UK exercises appeared to be diametrically opposed.

6.3.2.2 Safe Korea Exercise (SKX) 2010

*Participation Background*

As mentioned in Section 6.3.2.1, the Keungogae Subway Counter Terrorism Exercise 2009 came as a cultural shock to the researcher. Its entire process and procedure seemed to be in contrast to those of the UK simulation exercises. However, it must be noted that up until this point, the researcher had taken part in only one singe exercise in Korea as an observer, and if the conclusion was drawn from a single case study, that is to say, the Keungogae Subway Counter Terrorism Exercise 2009, it could be criticised for not addressing the issue of external validity (internal generalisability) - i.e. a hasty judgment based on a single case study (For external validity, see Section 4.4). For this reason, the researcher needed to select more representative cases for his ethnographic case study. In the meanwhile, the researcher was informed that a countrywide exercise, dubbed ‘Safe Korea Exercise’ (SKX), was conducted every spring (usually April or May) under the responsibility of the National Emergency Management Agency (NEMA), which was also answerable to the Central Safety Management Committee (CSMC) in Korea. In January 2010, the researcher was able to secure the ‘Basic Plan on Safe Korea Exercise 2010’, a fourteen-page internal government document, produced in December 2009 by NMEA, and consequently, could get the whole picture of SKX 2010.

According to the press release (NEMA, 2010b), Safe Korea Exercise (SKX) 2010 consisted of a total of 30 training sessions as part of a series of exercises across the country. For example, an anti-terrorism exercise was staged with an aim to prepare for potential terrorist & CBRN attacks at Korea’s largest convention halls, COEX, in southern Seoul, where leaders of the G20 member nations were supposed to assemble to
discuss global issues in November 2010. The anti-terror exercise involved more than 750 people from emergency services, such as police, fire and rescue service, and emergency medical service, central, regional, & local governments, and private sectors. During the exercise, hypothetical situations: barricaded hostage situations, chemical attacks, and fire & explosions were expected to be simulated in front of the Prime Minister, NEMA Administrator, senior public officials, and journalists, who were special guests of the occasion.

Among the thirty exercise sessions, the researcher decided to take part in two major exercise sessions in Incheon Metropolitan City, the third largest city in Korea with a population of approximately 2.7 million (IMC, 2010). The first exercise was a simulated earthquake disaster, which was planned and led by the Disaster Management Division of Incheon Nam-Gu Office in partnership with the Incheon Nambu Fire Station. The earthquake exercise was expected to take place at Incheon Munhak World Cup Stadium, simulating a major earthquake hitting the Incheon area and resulting in the stadium collapse and a fire. The second exercise session was a subway-fire disaster scenario at Central Park Station of the Incheon Metropolitan Subway, located in Songdo City (southern Incheon). Noticeably, the exercise against an underground fire was constructed, organised, and modelled after the Daegu Subway Fire 2003 (See Section 6.2.2) - i.e. based on the scenario of a subway arson attack.

The reason why such a choice was made was that the researcher’s two colleagues (alumni of the Korean National Police University) were already involved in the two exercise sessions: the earthquake disaster and subway fire exercises. Their names and ranks were as follows: Senior Inspector Eunsok Jang and Superintendent Minyoung Park. Mr. Eunsuk Jang was working as Vice Director of Public Security Division, Incheon Yeonsu Police Station, whose jurisdiction included Central Park Subway Station. Mr. Minyoung Park was in charge of the Public Security Division of Incheon Nambu Police Station as Director, which had jurisdiction over Incheon Munhak World Cup Stadium. They had formal connections with the exercise-directing teams, and readily acted as gatekeepers for the researcher to gain permission to participate. They made all the necessary arrangements for a formal invitation to the exercises, and the researcher was finally able to gain access as an observer by virtue of their introductions. Furthermore, the researcher was thankfully appointed as Panel Chairman of the Incheon Metropolitan City’s ‘Citizen Review Panel’ (CRP), and thus was able to officially take part in the evaluation process of the two exercises as an external examiner. The CRP
was first introduced for Safe Korea Exercise 2010, and is illustrated in detail later in this section.

Exercise Overview

Safe Korea Exercise (SKX), launched in 2005, is a full-scale live disaster response exercise at the national level, organised by the National Emergency Management Agency (NEMA) under the leadership of the Central Safety Management Committee (CSMC). The SKX is an annual three-day exercise, the name of which used to be ‘National Disaster Response Total Training’, but the formal title was officially changed into Safe Korea Exercise in 2007. Including the armed forces, SKX 2010 involved a total of 398 emergency services, central, regional & metropolitan, and local governments, and also related civilian groups (NEMA, 2009b). Hundreds of volunteers from the Red Cross, the Volunteer Fire Brigades, the Korea Disaster Safety Network, the Citizen Corps, etc., also participated in the SKX 2010. The SKX is grounded on Article 73, the Framework Act on the Management of Disasters and Safety 2004 (FAMDS). According to Article 73 of the FAMDS 2004, not only the central government but also local governments are mandated to regularly carry out emergency preparedness training in liaison with other key response organisations (For more details, see Section 5.3.4.1). Through developing comprehensive competence in disaster response, the SKX is ultimately aimed at realising ‘Safe Korea’ by building up the national civil protection mechanism of cooperation and collaboration between ‘Responsible Authorities for Disaster Management (RADM)’ (MOPAS, 2008). However, its aim and objectives are slightly varied on a yearly-basis.

According to the official website of Safe Korea Exercise (SKX, 2010), Safe Korea Exercise 2010 basically aimed to develop disaster response capabilities, and thus lay the foundations for Seoul’s successful hosting of the G20 (Group of Twenty) Seoul Summit in November, 2010. The two-day 2010 G20 Seoul Summit was the fifth summit of the G20 heads of government in discussion of financial markets and the world economy, which was held in Seoul between 11 and 12 November 2010. Arguably, the Korean government wanted to use Safe Korea Exercise 2010 as a window of opportunity to thoroughly test not only the effectiveness of emergency plans (manuals) but also collaboration and cooperation systems among response organisations in preparation for the G20 Summit conference (SKX, 2010). The SKX 2010 had three objectives: the first objective was to test the disaster management system, including the command and
control system in the event of a large-scale disaster. The second one was to strengthen the country’s abilities to cope with disasters through citizen participation and public-private sector cooperation. The final one was to reduce disaster response time by ten percent through establishing the system of rapid initial response, when a disaster occurred.

Compared to previous Safe Korea Exercises, the SKX 2010 had two distinguishing characteristics (NEMA, 2010b); the first feature was a change from a demonstration-oriented exercise (over-reliant on a prearranged scenario) into a practical one. For this, disaster-related resources, such as personnel, facilities, and heavy equipment (fire trucks, ambulance vehicles, rescue helicopters, and so forth), were actually mobilised in a bid to fully check logistics, communications and physical capabilities. The second was that the Citizen Review Panel (CRP)s, comprised of 12 experts and selected citizens, were newly created at the central, regional, and local levels respectively for the purpose of objective and neutral evaluations. In 2010, the involvement of the general public was, for the first time, recognised as vital to the validity and reliability of the exercise review and evaluation process. In this context, the Citizen Review Panels were created to not only assess the performance of responders, but also to make recommendations to NEMA especially from the citizens’ perspectives.

As mentioned above, the SKX 2010 was basically a three-day comprehensive nationwide disaster exercise; on the first day of SKX 2010 (12 May 2010), field training exercises against large-scale storms and flood-related disasters were staged in the fifteen local areas. On the second day, SKX 2010 focused on earthquake and tsunami-related or combined disasters in the ten local areas. Notably, for the purpose of increasing verisimilitude of the exercise, approximately 19,000 nurseries, and elementary, middle, and high schools across the nation were mobilised to participate in the evacuation exercises. The final day of the SKX 2010 saw exercises against large-scale complex (man-made) disasters take place throughout the country, involving simulated subway fires. In summary, SKX 2010 was comprised of a total of 30 training sessions, and among them, the two simulation exercises in Incheon: an earthquake-related disaster response exercise and a subway fire response exercise were selected and observed for this doctoral study.

Safe Korea Exercise 2010 had been originally scheduled to take place from 28 April to 30 April 2010, but was postponed until 12 May 2010 due to the sinking of the Cheonan.
warship, which occurred near the disputed Northern Limit Line in the Yellow Sea on 26 March 2010, killing 46 naval sailors (ET News, 27 April 2010). An international investigation conducted by a team of experts from South Korea, the USA, the UK, Canada, and Australia finally concluded on the 20th of May 2010 that the Cheonan warship had been sunk by a North Korean torpedo (BBC News, 21 May 2010). Meanwhile, on 25 April 2010, at a time when the investigation was being conducted to uncover the causes of the Cheonan’s sinking, the Korean Government declared a five-day national mourning period in memory of the 46 sailors killed in the sinking. In particular, April 20, the first day of SKX 2010 was designated as a joint funeral for the 46 seamen and also a national day for mourning by the Prime Minister. Consequently, all central, provincial & metropolitan, and local governments were officially asked to refrain from sports and festive events during the five-day mourning period. The mourning period clashed with that of the SKX 2010, and thus the National Emergency Management Agency (NEMA) finally decided to delay the SKX 2010 for two weeks into May 2010.

**After Action Review (AAR) – debriefing in Korea**

In Korea, the term, an After-Action Review (AAR) is preferred over the term, debrief or debriefing. The term, the AAR was originally developed by the US Army, and is being used by British Petrol (Schindler and Eppler, 2003). Instead of a debrief or debriefing, an AAR is currently adopted by Korean emergency services as the primary method for delivering feedback after exercises (Choi, 2003; Jeong, 2008; Kim, 2008). However, the concept of the AAR (also debriefings) was not familiar to the Korean exercise players, and even worse, none of the participants that the researcher interviewed had any idea about the role of the AAR or debrief in a simulation exercise. They simply replied that the AAR was synonymous with one of the top-down evaluation processes by their senior management. It should be acknowledged that the AAR is also a form of debrief method with an educational purpose: through active discussions, identifying challenges by finding mistakes and improvements (DHS, 2007). In other words, an AAR has essentially the same purpose and functions as a debrief or debriefing.

**Final Planning Meeting for the SKX 2010 Subway Fire Exercise - 16 April 2010**

With regard to the subway fire exercise at Central Park Station in Incheon, a total of three planning meetings were held in the Disaster Situation Room of Yeonsu-Gu Office
on 11 March, 30 March, and 16 April 2010 respectively. The meetings were chaired by Director of Disaster Management Division, Yeonsu-Gu Office, involving Gongdan Fire Station, Yeonsu Police Station, Incheon Metro, Red Cross Incheon, Yeonsu-Gu Health Centre, Korea Gas Safety Corporation (KGS), Incheon Naval Sector Defence Command, and a professional event management company (Incheon Yeonsu-Gu Office, 2010a). At that time, the researcher was delivering lectures at the Korean National Police University as a full-time lecturer, and thus it was not possible to attend all of the planning meetings. Because of the tight teaching schedule, the researcher decided to attend the final planning meeting on 20 April 2010 only. For this, the researcher contacted Senior Inspector Eunsok Jang to get permission to attend the final meeting, and Mr. Jang’s recommendation played a vital role in the researcher’s gaining access to the meeting, as Mr. Jang was also part of the exercise planning group. The final meeting was scheduled to take place from 14:00 to 16:00 on 16 April 2010, and Mr. Jang and the researcher agreed to meet in front of Yeonsu Police Station at 13:00, and then travel to Yeonsu-Gu Office together. The Yeonsu-Gu Office is located just across Yeonsu Police Station.

At 13:10 (on 16 April 2010), we arrived at the Disaster Situation Room, located on the sixth floor of the Yeonsu-Gu Office. There were 16 members from the emergency response organisations concerned. Interestingly, a couple of naval officers from Incheon Naval Sector Defence Command were attending the planning meeting as a member of the exercise planning group. As with the Keungogae Subway Counter Terrorism Exercise 2009, the researcher was told that they would also participate in the exercise as players. Although local responders need to establish close links with the armed services, it is widely accepted that the armed services basically do not have a permanent role in civil emergency management. In other words, the military forces are expected to provide capabilities to support civil authorities, primarily under exceptional circumstances. In this context, the UK official guidance, Emergency Preparedness (Cabinet Office, 2005a, p.161) argues, “… Assistance is provided on an availability basis and the armed forces cannot make a commitment that guarantees assistance to meet specific emergencies. It is therefore essential that Category 1 and 2 responders do not base plans and organise exercises on the assumption of military assistance.” Unlike the UK-based exercises, active military participation, even under civil emergencies, was taken for granted in the contexts of Korean disaster-response exercises. It occurred to the researcher that this phenomenon might reflect the continuous military tension between North Korea and South Korea, since the Korean War (For this, see Section...
The researcher exchanged greetings with the members, briefly explaining the reasons for participation in the final meeting, that is, the purposes of his doctoral thesis. Thankfully, Mr. Jungho Park, Disaster Planning Officer of Yeonsu-Gu Office, who was in charge of planning the subway fire disaster exercise, promised to provide all of the necessary arrangements for the researcher to conduct participant observation and qualitative interviews. All of these seemed to contribute to obtaining ‘complete membership’ of the exercise planning group. By 14:00, the planning meeting started, chaired by Mr. Heunggi Min, Director of the Disaster Management Division, Yeonsu-Gu Office. Just before Mr. Min delivered a presentation on the exercise purposes, scenarios, response plans, and expected roles of each agency, all of the participant members had been given a copy of ‘Yeonsu-Gu Office’s Basic Plan on Safe Korea Exercise 2010’. During the presentation, he stressed, “As you know, the CRP system is newly launched this year, and they burden me with performance evaluations. We need to perform our exercise very naturally, strikingly similar to the actual response. For this, we plan to carry out a full-scale rehearsal two times on 27 and 29 April. I strongly believe your active participation and involvement will help us to work hand in glove with one another.” (See a picture in Appendix 13)

At around 14:40, Director Min concluded his presentation by saying “Please feel free to make comments regarding the scenario, exercise plans, and so on. Any comment is welcome.” Moments later, a participant from the Korean Gas Safety Corporation (KGS) raised a question, “There are no gas-related facilities in the subway station. So we have nothing to do, if a fire happened in the subway car or the subway station. What is our role then?” The director replied, “I understand, but visual effects are very significant for drawing people’s attention to this exercise. People have no idea about the details actually. Could you just take action as if a gas leak has existed?” Further, he asked the military members, “According to our scenario, this subway fire disaster is not associated with a CBRN attack. But I expect you to bring your mass decontamination trucks or trailers to the exercise venue on the day. Otherwise, you have nothing to do, and then, there is nothing that you can contribute to this subway fire exercise as well.” Further, the director emphasised the importance of rehearsals, mentioning, “We are going to orchestrate two live rehearsals before the actual exercise. Despite these rehearsals, if we still identify some deficiencies, I want to do another final run-through in the very morning of the exercise day.” With regard to preparation time for the
exercise, a fireman from the Gongdan Fire Station suggested, “I see that we are pushed for time. In this case, we need to run table-top exercises several times rather than simply repeating rehearsals. Then, the exercise preparation process will be much easier.” Adhering to the idea that a rehearsal is more effective than table-top exercises, the director however refused his suggestion politely, “I get your point. But I believe that repeating live rehearsals as the scenario unfolds is much more effective in terms of making no mistakes in the exercise.”

After a one-hour discussion on necessary preparations and arrangements, the director wrapped up the final planning meeting, stressing, “It is crucial not to make mistakes. For this reason, we formulate a very detailed scenario script, as you can see this in the distributed basic plan. I expect you guys to read and memorise all of the script completely so that we can do the job very well.” The researcher browsed through the scenario script, which consisted of twenty-pages. Every move that exercise players were expected to make was meticulously written in a scenario script on a nearly per-minute basis. In this case, exercise players could not avoid depending heavily on their detailed roles in the scenario script, when considering their actions. It appeared that the only thing for players to do was simply to memorise the script, and then execute the instructions within the scenario script. The researcher asked Mr. Jungho Park as to why they had drawn up this very detailed scenario script, to which he replied,

“I know that NEMA put a great emphasis on a change from a demonstration-orientated exercise into a practical and realistic one. But you know, the reality is totally different. One of the exercise purposes is to reduce response time by ten percent. Without this kind of very detailed scenario script, mistakes will undoubtedly occur in the exercise. As a consequence, the response time will be decreased, and we will lose some points. I want to achieve high scores from the Citizen Review Panel. I know that this is somewhat contradictory, but I have no options. You are a police officer, aren’t you? I think you fully understand this situation.”

(Jungho Park: Incheon Yeonsu-Gu Office)

Again, it came to the researcher, “What are they hoping to accomplish in this exercise?” It appeared that their primary concern was to achieve high scores, not only from the Citizen Review Panel, but also from their senior management, regardless of whether the exercise aims and objectives were achieved. In Korea, it appeared that crisis simulations
were viewed in isolation rather than as part of individual and organisational learning. Ironically, the researcher thought that one of the advantages of simulations in a Korean context might be the support and commitment of senior management, which was also critical to the success of the exercises. One fire fighter nearby commented,

“Safe Korea Exercise is coordinated by NEMA under the leadership of the Prime Minister at a national level. In other words, the Prime Minister himself is very interested in this exercise, and for this reason, nearly all of the ministers, agency heads, governors, and mayors… they cannot help giving full support, and make a commitment to the exercises. But again…as Mr. Park mentioned, this strong commitment sometimes causes rigidity or inflexibility in the exercise….”

(Anonymous participant: Gongdan Fire Station)

Another interesting point of the exercise was that a (paid) professional event management company was hired. The role of the company was to broadcast the exercise in real time on a big screen for the viewing of special guests and CRP members. Then, the exercise was expected to progress, under the narration of an announcer from the professional event management company. The researcher asked the question as to the reason why they had hired a private event management agency, to which the director answered:

“To receive high scores on our performance, we need to direct this exercise very naturally, I mean, like a live show performance. The exercise will be conducted underground, I mean, in a subway station, but you know, the subway station is not appropriate for accommodating distinguished guests, observers, and the CRP members. So, we will make some arrangements for them to watch the exercise in real time on a large outdoor screen installed on the ground. That’s why we hired a professional event management company. The company will provide all of the necessary facilities for us.”

(Heunggi Min: Director of Disaster Management Division).

The researcher finally asked the director if he planned to conduct debriefs or after-action reviews. He answered, “We don’t have any plans for AARs yet. I need to check again…but definitely we will have a cold AAR some time after the exercise. Anyway, I will let you know details about the AARs. (As mentioned above, the term, an after-
action review (AAR) is preferred over a debrief or debriefing in a Korean context). At 16:00, the final planning meeting was all over. The researcher was cordially invited to the upcoming full-scale rehearsals, and the researcher expressed his appreciation for providing the opportunity to observe the planning meeting, which was highly useful and informative.

Rehearsal for the SKX 2010 Earthquake Exercise - 20 April 2010

The researcher’s lectures at KNPU clashed with the planning meetings for the earthquake exercise, and so he was not able to attend all of them. However, the researcher was finally able to observe one of the rehearsals for the main earthquake exercise on 20 April 2010. The full-scale rehearsal (before the main exercise on 29 April 2010) was supposed to occur at Incheon Munhak World Cup Stadium, involving all of the participating agencies. Superintendent Minyoung Park was very busy dealing with other police work issues, and therefore introduced Assistant Inspector Woosun Sohn, to the researcher. Mr. Sohn was working closely with the Incheon Nambu Fire Station on the exercise project plan. The rehearsal was scheduled to commence at 14:00, and so we agreed to meet at 13:30 in front of the main gate of the Incheon Munhak World Cup Stadium. The Stadium is served by the Munhak Sports Complex Station on Incheon Subway Line 1, which connects to the Seoul Metropolitan Subway system at Bupyeong station. For this reason, the researcher decided to take the subway train. At 12:00 on 20 April 2010, the researcher took the subway from Suwon station, and arrived at Munhak Sports Complex Station at approximately 13:30. As agreed, the researcher met Mr. Sohn in front of the stadium’s main gate, and travelled together to the rehearsal venue.

Upon arrival at the venue, the box seats for senior public officials and observers were already established, and the researcher was ushered into one of the seats. A female announcer was practising reading her narration script using a microphone. The researcher looked round the venue, and saw all of the rehearsal participants put on standby. In the meantime, several exercise-related documents including the ‘Incheon Nam-Gu’s Basic Plan on Safe Korea Exercise 2010’ were given to the researcher for reference, and he was surprised to find that the scenario script was a forty-nine page document. More surprisingly, the researcher witnessed some arguments between fire-fighters, including the fire chief from the Nambu Fire Station, and public officials from the Nam-Gu Office, just before the rehearsal started. The fire chief appeared to look upset, and disapprove of the way the rehearsal was organised and conducted. Then, the
fire chief ordered all of his subordinate fire-fighters to boycott the rehearsal, and return to the fire station. This situation came as a complete surprise. Mr. Sohn tried to find out what was happening between them for the researcher, and after about 20 minutes, he returned to the box seats, and started telling the story of what happened among them.

“The Incheon Nam-Gu Office is basically in charge of planning and conducting the exercise by law. Fire-fighters from Nambu Fire Station, they are simply here to help public officials from the Nam-Gu Office in organising today’s rehearsal, literally as assistants. However, they are passing the buck to the fire fighters as if the responsibility is on the fire-fighters. The public officials, they step back and expect the fire-fighters to lead the rehearsal for them. That’s why the fire chief withdrew his teams from the rehearsal venue. He is very upset about the reversed relations, complaining bitterly that Nam-Gu’s officials are putting the cart before the horse.”

(Woosun Sohn: Incheon Nambu Police)

Mr. Sohn had almost 15 years of hands-on experience in security and public order, and he had attended many different simulation exercises until then. Based on his previous experience, he began to complain firmly, but politely, regarding the way the rehearsal as well as the exercise was to be executed.

“I’ve attended all of the planning meetings for this earthquake exercise. They told me that they’ve designed a totally different type of simulation exercise, compared to the previous ones, boasting that this year’s Safe Korea Exercise is based on the practicalities of actual disaster response. But nothing has changed, and they are still depending on the pre-determined scenario script too much. Does the reality respect the scenario script? They just try to conduct the rehearsal by following all the steps of the procedure, based on the script…. In practice, sometimes they have to skip some unnecessary procedures….And look at the decontamination trucks over there. This is an earthquake disaster, and the scenario doesn’t involve any CBRN attacks. They don’t need any decontamination equipment, but they still deploy the trucks. You know the reason? Cause it looks cool….“

(Woosun Sohn: Incheon Nambu Police)

Shortly following the departure of the fire fighters, the planned rehearsal was put off
because of dissension among rehearsal participants, and the researcher made his way to
the Nambu Police Station in order to meet and interview Superintendent Minyoung Park.
He also had 15 years of hands-on experience in community safety and public order.
During the interview, he also expressed concern over a detailed scenario script,

“They’ve attached too much credence to a pre-arranged scenario. The scenario
is simply a means to establish situations, which test not only emergency plans
but also exercise objectives. But they are simply testing the scenario, not the
plans, not the exercise objectives…. The biggest problem of this kind of
scenario is that they only deal with situations, which have been planned and
written in the scenario beforehand. They just memorised scripts word for word,
and merely do as they are told by the scenario script. The detailed scenario
doesn’t develop any decision points. People don’t have to use their brains with
this scenario. But in reality, you know, they need to address even unforeseen
issues by ad-libbing. They need their ad-lib….”

(Minyoung Park: Incheon Nambu Police Station)

Increasingly, it became more obvious that Mr. Park had a negative attitude about the
way the exercise was planned and conducted. He even went so far as to say,

“Such exercises or training… you know… It is just like a TV show. It is
completely useless. I believe everybody agrees with my opinion. I’ve
conducted simulation exercises for a long time, but I don’t produce too detailed
scenario scripts… I just try to use a realistic but rather simple scenario,
providing some injects to the exercise. So, I can test my men’s response
abilities under pressure…. And the biggest problem, I think, is that there is no
official guidance on how to plan, organise, and conduct an exercise… We have
after-action reviews (AAR) right after finishing an exercise, but it doesn’t
involve any discussion as you know. This is because, again there is no guidance
and so we don’t know how to conduct after-action reviews properly. It (AAR)
consists of simply expressing encouragement and appreciation to those who
participated in the exercise.”

(Minyoung Park: Incheon Nambu Police Station)

After interviewing for nearly an hour, the researcher came back home. The day was very
informative, although utterly unexpected. The planned rehearsal was cancelled, because
of discord between Nam-Gu Office officials and fire-fighters. It appeared that the interviewees had a relatively negative attitude about the current practices of simulation exercises or training. Instead, the researcher was able to identify three key areas for improvement from the day’s field research: coordination and cooperation between different agencies (For more discussion, see Section 7.2.3.1), the problem of using a very detailed scenario script (See Section 7.2.3.2), and finally no methodology or guidance of planning and carrying out simulation exercise and their AARs or debriefs (See Section 7.2.3.2).

Safe Korea Exercise 2010 Postponed - 28 April 2010

The researcher was informed on the 28th of April 2010 that the SKX 2010 was adjourned until May 2010. Through conducting real-life simulations, one of the purposes of the SKX 2010 was to enhance disaster response capabilities through raising the social awareness of crises or disasters. Given this purpose, the researcher thought that the SKX 2010 should have rather occurred as originally planned without being put off. The sinking of the Cheonan warship was a matter of national security, and on the other hand, it could be defined as a ‘disaster’, since harm had been already caused, and there was an element of damage limitation because of a failure to deal with a crisis (For this, see Section 3.2.6). Warnings had already been given that a North Korean submarine and support ships had been out to sea for unknown operations, but unfortunately the military did not take appropriate measures (JoongAng Daily, 11 June 2010; JoongAng Daily, 6 October 2010). Therefore, the situation before the Cheonan’s sinking might be defined as a ‘crisis’ with the benefit of hindsight. Again, the researcher felt concerned to think that it would be unwise to delay the SKX 2010 on account of the national mourning period, and thought that if they had held the exercise as planned, it could have been more effective from the perspective of raising public awareness about disaster preparedness. Safe Korea Exercise should be regarded as a simulation exercise of emergency preparedness, but a public performance event. Therefore, the researcher strongly believed that Safe Korea Exercise 2010 should not have been adjourned.

The SKX 2010 Earthquake Exercise Day - 13 May 2010

For the exercise, as Panel Chairman of the Incheon Metropolitan City’s Citizen Review Panel (CRP), the researcher was politely asked to come to the board room of Incheon Fire & Safety Management Department (IFSMD) by 09:00 on 13 May 2010, by Fire
Captain Sungho Kim. He was working as Disaster Prevention Team Leader for IFSMD, and was also working closely with Incheon Nam-Gu Office on the earthquake exercise. The exercise was scheduled to start at 10:00 on 13 May 2010, and was to last for approximately 50 minutes. The researcher was told that a couple of high-ranking officials, such as Minister of MOPAS, a Member of the National Assembly, Incheon’s Vice Mayor, NEMA Vice Administrator, and Commissioner of Incheon Metropolitan Police Agency, would also attend and observe the exercise. The author arrived at IFSMD at 08:50, and called Fire Captain Sungho Kim on his mobile as promised, and was guided to the boardroom, where some of the panel members had already assembled for the 10:00 exercise session. The fire captain introduced the researcher to the other members, exchanged greetings and sat down to some coffee. The Incheon’s CRP, comprised of 12 experts, public officials and citizens, were required to assess the entire process and provide objective evaluations directly at the site. The list of members is presented in Table 19:

Table 19: List of Incheon’s CRP Members

<table>
<thead>
<tr>
<th>Name</th>
<th>Organisation</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hakkyong Kim</td>
<td>Korean National Police University</td>
<td>Expert</td>
</tr>
<tr>
<td>Taesik Lee</td>
<td>Yonsei University</td>
<td>Expert</td>
</tr>
<tr>
<td>Ockjoo Kim</td>
<td>Incheon’s Volunteer Fire Brigade</td>
<td>Citizen</td>
</tr>
<tr>
<td>Keunsoo Ji</td>
<td>Shinhung-Dong’s Volunteer Fire Brigade</td>
<td>Citizen</td>
</tr>
<tr>
<td>Jeo Suk Ha</td>
<td>Shinhung-Dong’s Volunteer Fire Brigade</td>
<td>Citizen</td>
</tr>
<tr>
<td>Chonggun Yim</td>
<td>Gyeyang-Gu’s Citizen Corps</td>
<td>Citizen</td>
</tr>
<tr>
<td>Hyungi Cho</td>
<td>Seo-Gu’s Citizen Corps</td>
<td>Citizen</td>
</tr>
<tr>
<td>Chongwon Lee</td>
<td>National Emergency Management Agency</td>
<td>Public Official</td>
</tr>
<tr>
<td>Woojin Choi</td>
<td>Gyeonggi Provincial Government</td>
<td>Public Official</td>
</tr>
<tr>
<td>Sungho Kim</td>
<td>IFSMD</td>
<td>Public Official</td>
</tr>
<tr>
<td>Hongdae Kim</td>
<td>IFSMD</td>
<td>Public Official</td>
</tr>
<tr>
<td>Kibyung Chae</td>
<td>IFSMD</td>
<td>Public Official</td>
</tr>
</tbody>
</table>

At 08:40, all of the CRP members got on a coach, which was waiting to take them to the exercise site, Incheon Munhak World Cup Stadium. At 09:10, upon arriving at the stadium, the researcher was able to see the box seats already installed, and the group was finally seated. There, a couple of documents, such as the “Incheon Nam-Gu’s Implementation Plan on Safe Korea Exercise 2010” and “Evaluation Plan on Safe Korea Exercise 2010”, were provided to all of the panel members. In particular, the
evaluation plan detailed evaluation guidelines, criteria, and credits. The evaluation process adopted a points-based system with a perfect score of 100 points (IMCG 2010). For example, if they held debriefs, they could receive a maximum of 18 points, and if they set up a command & control centre during the exercise, they could earn a maximum of 3 points.

What most surprised the researcher was that 3 fire-fighters from IFSMD including Fire Captain Sungho Kim were included in the list, although they were fully engaged in planning and conducting the exercise. Noticeably, Fire Captain Sungho Kim was a core member of the exercise planning group, and in this case, the researcher felt that the evaluation process might be compromised in terms of objectivity and impartiality. Also all of the citizen members, excluding the researcher, had been closely working with IFSMD for a long time, and for this reason they already knew each other very well. It appeared that they were all handpicked for a favourable evaluation. The researcher politely raised this issue, from which Mr. Ockjoo Kim commented, “That doesn’t surprise me! Yes, we have been closely working with fire-fighters of IFSMD, and it is true that we have a close relationship. Nonetheless, that doesn’t influence our evaluations because… it is very simple… If the evaluation criteria say that they should have four desktops here, then, I will check if they have four desks or not. If they have four desks, then I will provide perfect scores, and if they don’t, they will most certainly lose points.”

According to the ‘Incheon Nam-Gu Office’s Implementation Plan on Safe Korea Exercise 2010’ (Incheon Nam-Gu Office, 2010b), the specific aim and objectives of the earthquake exercise were exactly the same as those of the entire SKX 2010. The earthquake exercise involved more than 839 personnel from 36 related organisations including police, military and fire departments. Also, 56 kinds of special equipment, such as smoke bombs, firefighting helicopters, fire and ambulance engines, decontamination vehicles, etc. were mobilised for the exercise. For this earthquake exercise, the scenario envisaged was that of a simulated earthquake registering 6.5 points on the Richter scale, which hit the city of Daejeon in the centre of South Korea, approximately 160 km away from Incheon. The Incheon Munhak World Cup Stadium suffered a partial collapse from seismic waves as a result of the earthquake, causing 22 casualties. Moreover, the collapse immediately caused fires and gas leaks by damaging electoral power and gas lines, leading to the entrapment of dozens of spectators within the stadium. For this reason, a large amount of volunteers, to act as causalities, were
required throughout the entire exercise. According to the eight-page proposed timetable, the exercise consisted of nine-stages, as seen in the brief timetable, presented in Table 20, below:

### Table 20: The SKX 2010 Earthquake Exercise Timetable

<table>
<thead>
<tr>
<th>Stage</th>
<th>Time</th>
<th>Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preparation stage</td>
<td>09:30-10:02</td>
<td>(Nam-Gu Office) Introduction of special guests and the CRP; brief explanation of the exercise; promotion of earthquake countermeasures and evacuations</td>
</tr>
<tr>
<td>First Stage: Exercise</td>
<td>10:02</td>
<td>(Nam-Gu Office) Issuing a mock exercise message: partial collapse of the Stadium as a result of a 6.5 magnitude earthquake; initial disaster responses by its fire marshals</td>
</tr>
<tr>
<td>First Stage: Exercise</td>
<td>10:22</td>
<td>Disaster response activities (fire fighting &amp; search and rescue) by first responders</td>
</tr>
<tr>
<td>Third Stage</td>
<td>10:30</td>
<td>Search and rescue operations by Emergency Rescue Assistance Authorities (ERAA), due to building collapse</td>
</tr>
<tr>
<td>Fourth Stage</td>
<td>10:40</td>
<td>Establishing the mechanism for multi-agency cooperation between all the emergency response agencies involved</td>
</tr>
<tr>
<td>Fifth Stage</td>
<td>10:45</td>
<td>Three-dimensional rescue operations</td>
</tr>
<tr>
<td>Sixth Stage</td>
<td>10:50</td>
<td>Emergency escapes of rescuers and response workers, due to a serious risk of building collapse.</td>
</tr>
<tr>
<td>Seventh Stage</td>
<td>10:53</td>
<td>Recovery activities at the disaster scene</td>
</tr>
<tr>
<td>Eighth Stage</td>
<td>10:55</td>
<td>Comprehensive fire-fighting to ensure complete combustion</td>
</tr>
<tr>
<td>Ninth Stage</td>
<td>10:57-11:10</td>
<td>The exercise ends, and after-action reviews</td>
</tr>
<tr>
<td></td>
<td>11:13</td>
<td>Seeing off MOPAS Minister</td>
</tr>
</tbody>
</table>

The researcher observed the earthquake exercise as Panel Chairman of the Incheon Metropolitan City’s CRP, and for this reason, was requested to deliver an AAR speech, right after the exercises was finished. I politely asked Mr. Sungho Kim, “What do you mean with the AAR speech? Does the AAR involve any discussion with the exercise players? Do I have to act as a facilitator?” Mr. Kim paused for a moment, and said, “No,
you don’t have to hold a discussion. When the exercise is ended, by the directing staff, all of the exercise players will be required to assemble in front of the box seats for the after-action review. Then, you can simply read this debriefing material. We’ve already prepared some debriefing material for your convenience.” Then, a two-page handout containing debriefing material was given to the researcher (For the original debriefing material, please see Appendix 14). He continued, “You don’t have to worry about the AAR. Please, just refer to this handout for your AAR speech.” The handout has been translated into English, as can be seen in Table 21. The researcher truly wanted to accept the task, but could not help relinquishing the opportunity to participate in the AAR speech to Mr. Taesik Lee. This was because ‘age seniority’ is of great importance in Korean society on account of deeply-rooted Confucianism, with Mr. Lee being about 10 years older than the researcher.

Table 21: Debriefing Material of the SKX 2010 Earthquake Exercise

<table>
<thead>
<tr>
<th>After-Action Review</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hello! My name is Hakkyong Kim. I am a professor at the Korean National Police University, and also a panel chairman of the Incheon Metropolitan City’s Citizen Review Panel.</td>
</tr>
<tr>
<td>Today is the second day of SKX 2010, and I’d like to mention my impressions of the earthquake exercise that I observed today.</td>
</tr>
<tr>
<td>This year’s SKX has different evaluation standards compared to previous years. First of all, an evaluation of simulation exercises was conducted by one or two public officials last year, but this year, we launched the CRPs across the country, which consist of 12 members including 2 experts and 5 civilians.</td>
</tr>
<tr>
<td>Secondly, it has been criticised that the previous SKXs were little more than window dressing. However this year, we try to change the SKX 2010 into a practical exercise, analogous of actual disaster situations.</td>
</tr>
<tr>
<td>Today’s exercise comprehensively produces good impressions, largely because it is apparent that a lot of hard work has gone into the preparations for this exercise by the exercise players.</td>
</tr>
<tr>
<td>As we are pressed for time, I would like to provide a brief evaluation.</td>
</tr>
<tr>
<td>Using wooden structures with an aim to inform the seriousness of earthquake damage in the exercise was very impressive.</td>
</tr>
<tr>
<td>Roads suffer serious damage in the event of an earthquake, and in this case, helicopters play a pivotal role in the response &amp; relief operations.</td>
</tr>
</tbody>
</table>
You used fire rescue helicopters to save people, which I believe, was noticeably effective.

- I think that rapid recovery activities by fire, gas distributors, electricity distributors, telecommunications companies, water companies, the armed forces, and their toxic elimination trucks in this exercise set a good example of what are effective recovery activities.
- Finally, I’d like to finish my AAR speech, expressing my heartfelt gratitude for all of the exercise players for active participation.
- Thank you.

13 May 2010
Incheon Metropolitan City’s Citizen Review Panel Chairman Hakkyong Kim

By 09:35, Hyungkyu Maeng, the Minister of MOPAS, arrived at the box seats, and other distinguished guests, such as Byungsil Jeong, Incheon’s Vice Mayor, Yunhwan Kim, Police Commissioner, Jinhyung Cho, Member of the National Assembly, Gihwan Lee, NEMA Vice Administrator, and Youngsu Lee, Head of Nam-Gu Office, followed the minister. They shook hands with all of the panel members, and then seated themselves in the box seats. Seconds later, a public announcement was made. “Today, we have very distinguished guests for Incheon’s SKX. We sincerely appreciate all of the guests who came and observed the event today. First, I’d like introduce Hyungkyu Maeng, the Minister of MOPAS. Please give him a big round of applause!” Whenever special guests were introduced, he or she stood up and nodded a greeting, and a big clap was given from participants. At 09:50, dozens of volunteers were put on standby to take part in the exercise, and media film crews were also present to film the scene with their video cameras. However, volunteers were not allowed to interact with the press in their role as causalities. Several explanations on the process were provided, and also promotional video clips were released through a truck-led display screen with some narration. Similar to the subway fire exercise, the exercise was also supposed to progress, narrated by a professional announcer.

At 10:02, a mock warning was issued, saying that the Stadium suffered from partial damage caused by a 6.8 magnitude quake, which hit the Daejeon area, and fire and gas leaks were subsequently caused. Seconds later, the exercise started with a simulated explosion, generating loud bangs with heavy smoke. A large wooden structure was established with an aim to simulate partial collapse, and the structure collapsed with the explosion as planned. The public announcement was continued, “May I have your
attention please? Because of the earthquake, the Stadium has begun to crumble, and hence, dozens of people in the audience have become buried in the debris or are trapped in the collapsed structure. Emergency services are on their way to this disaster scene.” Three minutes after the announcement, a team of the Stadium’s fire marshals rushed to the collapsed structure to save people, and the other team attempted to put out the fire. However, the fire marshals didn’t wear any protective clothing, even though falling bricks were simulated in the partial building collapse. This was pointed out later by Mr. Taesik Lee during his AAR (debriefing) speech, “During the exercise, not only fire marshals, but also volunteers, who assisted emergence services with their life-saving activities at the scene... They did not wear protective gear, including protective helmets. Their lives would be endangered if this exercise were real.”

At 10:22, firefighters, paramedics and police scrambled to the pre-arranged rescue exercise site, which was located 50 meters away from the box seats. A team of firefighters attempted to spray a fire with water, while another team of firefighters evacuated injured people in liaison with ambulance staff (See pictures in Appendix 15). The police began cordoning off the area just in front of the box seats. Subsequently, decontamination vehicles of the 10th Chemical Company approached the exercise site from a distance, for the purpose of tackling simulated ammonia leaks. However, no communication between the responders occurred, and hence risk assessment did not take place. With regard to this, one observer near the researcher in the box seats commented as follows:

“The problem is this. They usually don’t talk to each other during the exercise. They don’t have to do that actually... Cause they are simply required to follow the scenario, but the scenario doesn’t involve any communications between participants. They try to look good in front of VIPs without making any mistakes. This is of the essence. Communication is not that critical during the exercise. This is not a problem actually because failure to communicate during the exercise has nothing do with the evaluation criteria. They don’t lose their scores.”

(Anonymous Firefighter)

Everything went well in accordance with not only the scenario but also the proposed timetable. At 10:24, the researcher heard a really loud helicopter in the distance, and it soon hovered above the stadium (See the middle picture in Appendix 15). Seconds later,
special rescue unit officers started abseiling down from not only from a helicopter hovering over the stadium, but also from the stadium roof, in order to rescue people who were trapped by fire and debris. Simultaneously, a safety air mat was placed on the ground to prepare for possible falls of trapped people during rescue operations. “The problem is this.” Mr. Woojin Choi, a member of the Citizen Review Panel, paused for a moment, and then said:

“I’ve engaged in emergency management for more than 30 years. This is a common problem with nearly all of the Korean simulation exercises. How can firemen rappel down from a chopper or the roof, when fire and smoke are moving upward? The stadium also suffers from collapse, but how can they do that without any proper risk assessment? Many of the firemen are the former soldiers of Republic of Korea Army Special Warfare Command, and they have brought this method of operation (rope-rappelling) with them as cultural baggage from their military origins. When they attend simulation exercises, they always hold this rope-rappelling demonstration from a roof or a chopper whatever the situation is.”

(Woojin Choi: Gyeonggi Provincial Government)

The researcher also felt that this rappelling demonstration could, in reality, lead to disastrous consequences; the lives of special rescuers could have been jeopardised if the exercise had been real. However, this point was not mentioned at all during the after-action review. The researcher became very concerned about the extent to which the exercise was able to help emergency response organisations to handle the problems in the real world. A similar mistake led to the deaths of the passengers in the two underground fires; in the King’s Cross Fire, two police officers evacuated passengers upward, although the fire moved in the same direction, and in Daegu Subway Fire, public announcements were made, asking passengers to remain seated inside a subway car, although it was on fire. Also, according to the aforementioned basic plan, this earthquake exercise also came in a bid to raise public awareness of how tragic and deadly the aftermaths of an earthquake might be. In this context, it was the researcher’s understanding that members of the public needed to know how easy it was for the emergency services and other related response organisations to become overwhelmed by the sheer scale of the situation they encountered.

However, all went smoothly as expected, without any noticeable mistakes, and all of the
trapped people were safely saved by the rescue teams. The exercise was likely to be described as a successful event. Nonetheless, Mr. Choi continued to criticise this, “Exercises are always hailed as a success. But you know what? Everybody says it is unsuccessful, and it is unsuccessful. Everybody says it is successful, and it is not successful as well.” The exercise was conducted under very controlled conditions, partly because of the very detailed scenario. This scenario had been disclosed in advance, which means that all of the exercise players had been fully briefed about what would happen and what they should do in the exercise beforehand. Their attention to detail in a scenario script might be one of the most powerful advantages, but it might be claimed that it rather manufactured unrealistic responses to a mock disaster, not taking account of variables in a situation.

At 10:50, the exercise reached the climax, when all of the fire trucks assembled at the centre of the exercise venue, and began to douse the fire with water, all at the same time (See the lower picture in Appendix 15). Simultaneously, aerial fighting was performed, using fire-fighting helicopters, and the helicopters started dropping water from the air. A public announcement was made, “At the moment, we are mobilising helicopters as well as fire engines for three-dimensional compressive fire-fighting, and as a result, now we succeed in suppressing the fire. All of the observers! Please give them a big round of applause.” A closing mark continued, “By virtue of SKX 2010, we believe that Incheon becomes much more prepared for an earthquake, and also gains resilience to the aftermath of an earthquake. Lastly, I declare that SKX 2010 is over. We will have an after-action review, shortly”. Following the simulation exercise, all the participants were asked to assemble in front of the box seats to take part in an AAR (debriefing). While the participants, including volunteers, assembled themselves in formation, a podium was installed in front of the box seats, where special guests and the researcher were sitting. A representative of the exercises brought the assembly to attention, as the head of Nam-Gu Office took the podium (See pictures in Appendix 16). Then the representative turned to face the podium, raised his hand and saluted the speaker. The speaker acknowledged the salute by raising his hand, and then signalled the assembly to be at ease. This procedure seemed highly comparable to a formal military inspection.

Shortly thereafter, the speaker spoke to the assembly through a prearranged manuscript. The speech - approximately five minutes in length - praised the efforts of the exercise planners and attendees, without seeking any form of constructive feedback from the participants. After the AAR speech concluded, the participants soon began to applaud
obediently. After that, Mr. Taesik Lee stood up on the podium for his AAR speech. Also, the representative turned to face the podium, raised his hand, and saluted Mr. Lee (See pictures in Appendix 16). The procedure was exactly the same, but unlike the Head of Nam-Gu Office, Mr. Taesik Lee pointed out that the fire marshals and volunteers went out to the exercise scene without wearing protective equipment, which could be very dangerous in the real world. Throughout the whole of the AARs, participants and volunteers alike conducted themselves in a fashion that emulated a military-like organisation, guided under the direct supervision of the representative. At 11:05, the SKX 2010 earthquake exercise was finally declared over.

Unfortunately, the AAR was not what the researcher had expected. AARs (debriefings) should be open about exercise players’ mistakes and errors, consequently encouraging them to provide feedback through constructive discussions. However, this was not the case with the AAR held after the earthquake fire exercise. The entire procedure and process were in stark contrast to those of the UK simulation exercises which the researcher had observed. The researcher was disappointed to discover that the assembly (exercise players) were not given an opportunity to ask questions, make comments or suggestions at some point, as part of the after-action review session. Personal or organisational reflections should have occurred, based on reflective discussion about their experiences. Here, it was vital that the assembly should be given a chance to reflect on the events of the past, at some point; either prior to the debriefing or during the debriefing. The researcher asked Fire Captain Sungho Kim again, “Do you usually conduct AAR sessions in this fashion?” Then, he answered, “I think it is quite difficult actually. Let me answer in this way. They learn all of the scenario script by rote, and then repeat rehearsals. No noticeable errors or mistakes are made in exercises. They are usually evaluated as a success. So even if we have AARs or debriefings whatever the title is, it is very natural that we have little to discuss.” Finally, the researcher asked the CRP’s civilians, “What do you think is the best in the exercise?” and then, they replied with one voice, “The best is that the MOPAS minister attended and observed the exercise. This is very important actually.”

The SKX 2010 Subway Fire Disaster Exercise Day - 14 May 2010

The following day, the researcher travelled to Central Park Station in Songdo, Incheon to observe the 10:00 SKX 2010 subway fire exercise. At around 09:30, the researcher arrived at Central Park Station, and met Mr. Jungho Park as promised. He seemed to
have serious concerns about mistakes made during previous rehearsals, “Yesterday, we had a couple of rehearsals, but mistakes still were repeated.” Mr. Park’s colleague aligned himself with Mr. Park, “Our exercise will be conducted in the surroundings below ground, and we have nothing to show in the exercise. Incheon Nam-Gu Office mobilised choppers, and showed rappelling demonstrations in yesterday’s earthquake exercise. But we cannot do the same at the subway station. The problem is that we’ve practised and practised and practised for four days, but mistakes are still made.” Then, Mr. HeungGi Min, Director of Disaster Management Division, Yeonsu-Gu Office, began to sympathise with their feelings, “Don’t worry about this! Mistakes are natural in real situations. People will understand this.” Then, as usual, the researcher moved to the box seats, which were set up near Central Park Station. Some of the panel members were already there. The researcher exchanged greetings with them again, and finally seated himself in the box seats.

By 09:45, several documents including ‘Incheon Yeonsu-Gu’s Implementation Plan on Safe Korea Exercise 2010’ were provided to the researcher for reference. According to the implementation plan (Incheon Yeonsu-Gu Office, 2010b), the specific aim and objectives of the subway disaster were exactly the same as those of the earthquake exercise. More than 262 participants from 15 related organisations including police, military, fire, and ambulance service were supposed to participate in the exercise, and 33 kinds of special equipment, such as smoke bombs, fire and ambulance engines, and decontamination vehicles were also mobilised for the exercise. For the subway fire exercise, the scenario was a simulated arson attack against subway trains, based on the Daegu subway fire disaster in 2003.

The exercise scenario also contained every single action that exercise players should take, on a per-minute basis, similar to that of the earthquake exercise. Although their attention to detail in the scenario might be lauded as a power asset, the scenario did not involve any element of surprise, and for this reason, the researcher thought that verisimilitude was likely to disappear. This reminded the researcher of the argument of Kibbee (1961) and Loveluck (1994) that verisimilitude was a more significant factor than physical realism in terms of validating simulations. The exercise was scheduled to take place underground at Central Park Station, but the box seats for distinguished guests and observers were installed on the ground. For this reason, a total of 5 ENG video cameras were hired, and the images were instantly to be sent to a big TV screen for viewing, which was installed on the ground, just in front of the box seats (See
pictures in Appendix 17). The timetable for the exercise is presented in Table 22 below.

**Table 22: The SKX 2010 Subway Fire Disaster Exercise Timetable**

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:00</td>
<td>Exercise starts; issuing a mock warning, an arson attack inside a subway</td>
</tr>
<tr>
<td>10:00-10:01</td>
<td>Alerting emergency services and the Incheon Metro’s control centre</td>
</tr>
<tr>
<td>10:01-10:03</td>
<td>Alerting other related responders, such as utility companies and military</td>
</tr>
<tr>
<td>10:01-10:06</td>
<td>Sending their fire marshals, and evacuating passengers</td>
</tr>
<tr>
<td>10:03-10:10</td>
<td>Opening train doors and platform screen doors; evacuating passengers;</td>
</tr>
<tr>
<td>10:03-10:15</td>
<td>Cordoning; arresting an arsonist; maintaining public order</td>
</tr>
<tr>
<td>10:05-10:10</td>
<td>Launching a rescue operation; extinguishing the fire</td>
</tr>
<tr>
<td>10:05-10:20</td>
<td>Launching a rescue operation; extinguishing the fire inside the subway</td>
</tr>
<tr>
<td>10:05-10:30</td>
<td>Launching a rescue operation; assisting Gongdan Fire Station in putting</td>
</tr>
<tr>
<td>10:05-10:25</td>
<td>Commanding all recovery activities</td>
</tr>
<tr>
<td>10:05-10:25</td>
<td>Setting up a casualty clearing station; providing first aid treatment;</td>
</tr>
<tr>
<td>10:20-10:30</td>
<td>Water works restoration</td>
</tr>
<tr>
<td>10:20-10:30</td>
<td>Electricity restoration</td>
</tr>
<tr>
<td>10:20-10:30</td>
<td>Telecommunications restoration</td>
</tr>
<tr>
<td>10:20-10:40</td>
<td>Cordoning; recovery assistance</td>
</tr>
<tr>
<td>10:20-10:30</td>
<td>Evacuating casualties for hospital treatment</td>
</tr>
<tr>
<td>10:20-10:35</td>
<td>Establishing a survivor reception centre and a rest centre</td>
</tr>
<tr>
<td>10:20-10:40</td>
<td>Assisting Incheon Red Cross; recovery assistance</td>
</tr>
<tr>
<td>10:20-10:40</td>
<td>Focused on search and rescue</td>
</tr>
<tr>
<td>10:40-10:45</td>
<td>Focused on putting out the fire</td>
</tr>
<tr>
<td>10:45-10:50</td>
<td>Focused on recovery activities</td>
</tr>
<tr>
<td>10:50</td>
<td>Exercise Ends</td>
</tr>
</tbody>
</table>
At around 10:00, the exercise officially started soon after a mock warning was issued, “At 10:00 in the morning, of 30 April 2010, an unidentified arsonist threw flammable liquids inside a car of the 2010 subway train, when the train was entering Central Park Station. Now, the train is set on fire, and the fire begins to spread into the entire station, and cause many casualties by heavy smoke and toxic gases. The current situation urgently requires rapid rescue operations and fire fighting.” Shortly afterwards, fire fighters and rescue teams rushed to the subway station, cordoning off the area. (See pictures in Appendix 17). However, dialogue such as communication or discussion for risk assessment also did not occur, and every player simply conducted his or her job as the scenario instructed. The exercise did not involve any CRBR attacks, but Incheon Naval Sector Defence Command brought their decontamination equipment as required, and demonstrated decontaminating the area, just in front of the box seats.

In summary, it appeared that everything went well in accordance with the pre-arranged scenario, and no careless mistakes were made like the Keungogae Subway Counter Terrorism Exercise 2009 and the SKX 2010 earthquake exercise. The exercise was a very controlled exercise, simply following a pre-determined script with no digression. Definitely, one of the exercise objectives was to improve the country’s abilities to manage underground crises, but if something unanticipated happened, would this type of exercise be helpful to tackle the situation? The researcher had to admit that the exercise seemed to more wishful thinking than serious exercising, when judging from the way that the exercise was planned and staged. In a similar vein, Mr. Woojin Choi commented,

“This exercise is just so much make-believe. Needless to say this exercise, the problem is nationally common to all of the exercises here in Korea. Problems are repeating across the country. When it comes to communication between responders, they must exchange their ideas or opinions even in the exercises. There is no right or wrong answer here. I’d like to tell you about the case of the half-rotten apple. There is an apple, which is clearly rotten on one side, but not on the other. If you see the rotten side of the apple, you will complain of being given an apple which is inedible. However, if someone else sees the other side of the apple, he or she will say that it is edible. We need to talk to each other in order to look at the broader picture. That requires consideration from various angles, especially to gain a comprehensive overview of situations.
Communication between exercise players is also important in exercises.”
(Woojin Choi: Gyeonggi Provincial Government)

Within 50 minutes after the exercise commenced, it was declared that the fire was completely extinguished, injured passengers were evacuated in a safe way, and the arsonist was arrested by the police. A public announcement again came and said, “Now, we will have a brief after-action review shortly for today’s simulation exercise. All of the participants! Please, assemble in front of the box seats.” All of those involved in the exercise, including the volunteers, started to assemble in front of the box seats (See pictures in Appendix 18). While this was happening, a podium was installed in front of the box seats, where the researcher and the special guests were sitting. The procedure was strikingly similar to that in the earthquake exercise.

The speaker was the head of Yeonsu-Gu Office, and he stood on the podium for his AAR speech. Seconds later, one representative for the fire-fighters stood up in front of the speaker, and brought the assembly to attention. The representative stood to attention, and saluted the speaker by raising his right hand, simultaneously ordering, “Safety!” This procedure seemed to be equivalent to a formal military inspection. The speaker finally took the salute by raising his hand, and asked the assembly to be at ease. He then started to deliver his AAR speech by reading his prearranged manuscript (See pictures in Appendix 18). The speech lasted for about five minutes, praising the efforts made by the exercise planners and attendees without constructive feedback. After the speech, all of the participants applauded his speech, and the after-action review was finally over. All of the participants then formed a military-like line under the supervision of the head of Yeonsu-Gu Office. After this, the exercise was officially over, with additional announcement, “We will be making adjustments after taking into account the evaluation of today’s practice, for perfect preparation for large-scale natural and man-made disasters. Thank you.”

Arguably, the exercises the researcher watched here in Korea had several advantages; one of them was to generate feelings of reassurance for members of the public by giving an impression that the government was fully prepared, and that everything would be under control in the event of actual disasters. Another was strong support and commitment of senior management to exercises. Nevertheless, there were some questions that were likely to remain unanswered with the current practices of training or exercising. In particular, after-action reviews should have educational purposes; one of
them was to identify the areas for improvement through personal or organisational reflections on the experiences made. Through this process, specific weaknesses were remedied and systems would improve. However, the modus operandi of planning and conducting exercises in Korea was rather dictating outcome in the mock exercises. Even in the exercise, communication was also of great importance, as was the case with the UK simulation exercises that the researcher had attended. In particular, the podium symbolises the deficit model of communication: a ‘top-down’ or ‘one-way’ communication from high-ranking officials to rank and file exercise players. The podium should not be utilised. They need a round table, not a podium in ‘real’ debriefing sessions or after-action reviews whatever the name is. There still remains a question unanswered for the researcher though, “What are they hoping to achieve in this the exercise as a whole?”

6.4 CONCLUSION

This chapter consists of two major parts; the first part examined two underground fires in order to understand the nature of large-scale disasters. In particular, reflecting on the two fire disasters suggests that attempts to cope with crises in a prearranged manner, according to set procedures and practices, might have the potential for failure. For instance, evacuating passengers upward in the underground while the fire also moves upward, requiring passengers to stay on a burning train, or just waiting for the control centre’s instructions, led to disastrous results. It also reveals that cooperation and information-sharing with other response agencies would be of significance at disaster scenes. The second part is concerned with empirical comparison of records on simulation exercises, and also their social, cultural and political contexts between Korea and the UK. Noticeably, this comparative study comes from the idea that ‘best practice’ requires the cross-cultural synthesis of many approaches to crisis simulations, although it should be recognised that the UK exercise model cannot be lifted and directly apply to a Korean context.

In a Korean exercise context, in spite of a lot of efforts put into exercise validation, there are still several major concerns, all of which seem to contribute to generating a ‘lack of adaptation’ in disaster response. The first concern is too much dependence on a pre-arranged, very detailed scenario script with no digression, especially in order to eradicating mistakes in exercises. The second concern is that no dialogue, such as
discussion or communication between different responders, takes place at all in the exercises, even though dialogue is the key to cooperation and information-sharing between responders at a disaster scene. The final concern is about the way that AARs (debriefs) are planned and conducted. Unfortunately, AARs or debriefs in a Korean context tend to be recognised as an opportunity for senior officials to deliver his or her evaluation (a one-way or top-down) speech, unlike the UK debriefing practices; it might be maintained that individual and organisational learning does not take place in the Korean exercises. With these in mind, the next chapter will critically analyse and discuss the empirical findings, especially connecting the case studies with the theories mentioned in Chapter 2 and 3.
CHAPTER 7

ANALYSIS & DISCUSSION OF FINDINGS

7.1 INTRODUCTION

Chapter 6 reported on documentary research into two different underground fire disasters: the King’s Cross Fire (in the UK) and the Daegu Subway Fire (in Korea), which suggest that crises can escalate through unforeseeable interplay between technical, organisational, and cultural systems. Furthermore, Chapter 6 explored the current practices of simulation exercises in the two countries, primarily to address the research question: ‘How are simulation exercises in Korea and the UK organised and conducted, and how can this knowledge be used to respond to crises or disasters more effectively?’.

It was discovered that the focus of the repetitive rehearsals observed in Korea was merely to minimise mistakes made by training exercise players in predefined scenario scripts. The manner in which a Korean after-action review is conducted is in stark contrast to debriefing sessions in the UK simulation exercises. The Korean after-action reviews simply consisted of introductions, encouragement, or ‘thank-you’ speeches from senior management, without entailing an element of reflection on the experience of the training exercise. These points, as will be suggested in the ensuing sections, are in need of re-evaluation. In particular, this re-evaluation process mainly concerns addressing the second research question: ‘Why are new methodological changes to organise and conduct simulation exercises needed in Korea?’.

In this chapter, the main themes are to be drawn after categorising and then contextualising observation and interview findings of Chapter 6, coupled with the literature review in Chapter 2 and 3. Subsequently, the documentary findings from the two underground fires will also be critically compared and contrasted with the main themes in order to draw empirically-based conclusions. In Chapter 5, it is argued that the manner in which simulation exercises are planned, organised and staged is partly attributable to their own emergency management arrangements, which correspondingly, can affect a modus operandi of the emergency services in response to a major event. This point will also be discussed, using the empirical findings of Chapter 6. Additionally, for a cross-cultural comparison, some of the research findings from Yung-Fang Chen’s doctoral thesis, *Using Simulation to Train for Flood Hazards: a comparison between*
flood exercises in Taiwan and England (2007), will be cited in the sections below, in light of the main themes. This reference can be justified, when demonstrating cross-cultural generalisability of this thesis’s empirical findings.

### 7.2 RESEARCH FINDINGS FROM CASE STUDIES

#### 7.2.1 Lessons from the Underground Fires: complex and tightly-coupled ‘socio-technical’ disasters

Synthesising the *Normal Accidents* and *Man-Made Disasters* theories of Chapter 2, a majority of disasters seem to be associated with not only the evolution of socio-technical systems, but also the complex and tightly-coupled interaction of those systems. Organisations are often confronted with failure of socio-technical systems, where decision makers are required to cope with a degree of technological risk as well as more basic types of uncertainty, produced by a lack of knowledge and information, or ignorance to risk (Pidgeon, 1998). Under these circumstances, ‘normal accidents’ originate from an unexpected combination of these socio-technical system failures, which often makes them unavoidable. This concern also takes them beyond mathematical or probabilistic uncertainty, where the problems are well defined and failure modes are limited, to a deeper ‘Situational Uncertainty’ (Ravetz and Hasstrup, 1992; cited in Turner, 1994, p.87).

From a technical perspective, all fires are caused by a combination of heat, fuel and oxygen, and the fire at King’s Cross was no exception. However, it was the social, cultural and psychological aspects of this system that allowed the fire to turn into a disaster in the King’s Cross Fire (See Section 6.2.1). Hence, it is argued here that the fire at the King’s Cross underground was caused by an unexpected combination of technical, human, organisational, and cultural systems. Prior to the King’s Cross Fire, there had been two previous fires on wooden escalators at the Green Park underground station. However, London Underground failed to learn the lessons from their isomorphic qualities (Toft and Reynolds, 1999). This indicates that the safety culture of London Transport staff did not view fire as a legitimate hazard but rather a nuisance (Borodzicz, 1997). Another interesting point is that there had been at least 360 notifications of fire or fire hazards connected with this tragic escalator, and Fennell himself acknowledged that at least 63 of these could be substantiated (Fennell, 1998). This point also complies
with Turner’s second stage, the incubation period. Additionally, it appears that the newly discovered phenomenon ‘Trench Effect’ was a by-product of interactive complexity and tight-coupling (Perrow, 1999) - i.e. an unexpected mechanism of three major elements: the slope of the escalator, the trench profile, and flammable materials. Each, by itself, would not have caused the trench effect, but together they created it.

It can be argued here that the Daegu subway fire crisis was also caused by a complex and tightly coupled combination of technical, human, organisational and cultural factors (See Section 6.2.2), similar to the King’s Cross fire disaster. Such functioning of computerised control systems seems to bolster Perrow’s argument that interactive complexity and tight coupling inevitably will produce a normal accident. Given that train drivers were not permitted to exercise discretion and take action in the event of a fire and had to follow the orders of the control centre, the 1080 train driver appeared to be victimised or scapgoated, as his errors had been already ‘designed’ into the complex computerised systems. In addition, the safety culture of the control centre seemed to play a vital role in ignoring fire alarms, on account of previous malfunctions. Prior to the Daegu subway fire in 2003 - where a total of 198 people had been killed – there had been four major incidents during the construction (TRB, 2006). Therefore, it can be concluded that the seed of the Daegu subway fire crisis may have been sown or incubated several years even before its onset, although it was triggered by the arson attack.

All in all, the King’s Cross Fire and the Daegu Subway Fire clearly have proved that a crisis can develop into a disaster on account of a complex and tightly-coupled combination of technical, human, organisational, and social systems. The two underground fire disasters have further demonstrated that attempts to manage ‘socio-technical’ disasters or crises in a prescribed manner, according to set procedures and practices, have the potential for failure. For instance, evacuating passengers upward in the underground while the fire also moves upward, requiring passengers to stay on a burning train, or just waiting for the control centre’s instructions, gave rise to a large number of fatalities. These findings are congruent with Turner’s argument (Turner, 1978, p.52): “Disasters may be regarded as arising from attempts to handle ill-structured problems, the full implications of which were not realised before the event.” A crisis or disaster produces a different social order (non-routine events), and they cannot be handled by the same organisational structures and skills used to deal with emergencies (See Section 3.2.6).
In this context, the safety information notice of the London Tube, reading, “In the unlikely event of an emergency, stay on the train and follow instructions given by train staff”, (See Section 6.3.1.3; also see the picture in Appendix 10) needs to be revised in a more flexible manner - as in the New York City Subway’s safety emergency evacuation information, which the researcher came across during his research trip to New York in October 2010. It reads, “Subway evacuations don’t happen often, but when they do, we want our riders to be prepared” (See the picture in Appendix 19). Given the nature and meaning of a crisis and disaster, the ensuing sections will categorise the research findings of emergency management system and simulation exercise practices in Korea and the UK into the main themes, and investigate if such current practices of Korean simulations are good enough for complex and highly-coupled ‘socio-technical’ crisis situations.

Table 23: Comparison of the King’s Cross Fire and the Daegu Subway Fire

<table>
<thead>
<tr>
<th>Factor</th>
<th>King’s Cross Fire</th>
<th>Daegu Subway Fire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical</td>
<td>Trench Effect, Wooden Escalator, etc.</td>
<td>Highly flammable furnishings, faulty ventilation system, malfunctioned fire detectors, etc.</td>
</tr>
<tr>
<td>Human</td>
<td>The fire was started by a passenger’s discarded cigarette</td>
<td>The fire was started by a mentally-ill arsonist</td>
</tr>
<tr>
<td>Organisational</td>
<td>The police evacuated passengers upwards, although the fire moved in the same direction, lack of joint exercises, etc.</td>
<td>The train driver made three announcements, asking passengers to be seated in the burning subway car, lack of joint exercises, etc.</td>
</tr>
<tr>
<td>Cultural (Safety Culture)</td>
<td>Previous fires on wooden escalators, previous notifications of fire hazards about the wooden escalators</td>
<td>Fire alarms ignored by the control centre, because of their frequent malfunctions</td>
</tr>
</tbody>
</table>

7.2.2 Emergency Management System and Simulation Exercises in the UK

7.2.2.1 UK Emergency Management Structure: Decentralisation
Modern UK emergency management evolved from civil defence activity to peacetime emergency planning. The Civil Contingencies Act 2004 (CCA), which underpins the present UK emergency management, set up a consistent level of civil protection across the UK, based on Integrated Emergency Management (IEM). Therefore, emergency preparedness and response arrangements have become integrated both within and between responding organisations, including emergency services such as the police, the fire brigade, and the ambulance service. In particular, local responders are required to work together at all of stages of emergency preparedness and response (multi-agency planning, training, and exercising, and joint press briefings, etc.) at the local area. However, the mechanism between the response agencies is based on cooperation and coordination, not command and control. For this reason, each emergency response organisation’s duties are harmonised and discharged in liaison with other responders at a disaster scene, for example, through adopting the common protocol, the Gold, Silver and Bronze model (See Section 5.2.3.4).

The CCA can be divided into two parts: emergency preparedness, and emergency response & recovery. Each structure consists of three levels, such as local, regional, and central government levels. In the UK, major incidents are managed by emergency services and other responders, such as local authorities, and the utility and transport sectors, at the local level without direct involvement from central government. For instance, the Local Resilience Forum (LRF) is not controlled or commanded by the Regional Resilience Forum (RRF). In turn, the RRF is not controlled or commanded by the Lead Government Department (LGD) at the central government level. Their relationships are, on the whole, based on coordination and cooperation, not command and control. As a rule, the principle of subsidiarity is observed, and a decision is usually made by local responders first. Accordingly, central government level is implemented, only when the dimension of an emergency is so vast and complex that central government coordination and support is so needed.

In conclusion, UK emergency management adopts a decentralised system and structure. Most of the emergencies are managed by local responders at a local level, without direct involvement of central government. Only when the scale of an emergency's consequences overwhelms the local level, are aids from regional tier or central government provided. The following section will summarise the research findings of the UK simulation exercise practices observed, and again, it should be noted that practices
of simulation exercises might be influenced by the social, political and cultural contexts of their own emergency management arrangements.

7.2.2.2 Current Practices of Simulation Exercises in the UK

**Testing, Training & Validation**

The document findings of the UK simulation exercises revealed that the existent practices of simulation exercises in the UK focused on revising (making changes to) existing response plans with a focus on testing and validating the plans. Indeed, all purposes of the simulations observed were primarily associated with testing and validating plans or operations. For example, the purpose of Exercise Twin Bore was to test train evacuations, and further validate the agreements and procedures between responders. Exercise Saxon Shore aimed to test the emergency responses to a terrorist attack, and Exercise Operation Safe Return was also to test the BTP’s counter terrorism contingency plans. Regarding Exercise Operation Safe Return, the interview with Edward Purchase was in accordance with these document findings, “The intention of the exercise is to refresh and practise re-occupation search following a category 1 bomb threat to the railways.” This also resonates with the UK official guidance, Emergency Preparedness, which mentions that exercises have three main purposes, such as testing, training, and validating (See Section 3.2.1).

**Building-Block Approach**

In the UK, exercises are usually undertaken in three types: discussion-based, table-top, and live exercises (See Section 3.2.4). However, careful observations of the UK exercises, such as Hitachi 395 Evacuation Workshop, Exercise Twin Bore, Exercise Saxon Shore, and Exercise Operation Safe Return, reveal that simple types of exercises, such as discussion-based or table-top exercises are, as a rule, employed, prior to a large-scale live exercise. In other words, the relatively simple exercises are treated as a cornerstone in the so-called building-block approach to the escalation of exercise complexity. In a similar vein, Overy (1993) proposed the model of a progressive build-up in selecting which type of exercise, arguing that it is effective to readily progress from the simplest type of exercise to more complicated ones (See Table 7 in Section 3.2.4). In this sense, Perry (2004) argued that a discussion-based exercise, the least complex type, is noticeably beneficial, when a brand-new protocol is first introduced.
into existing response systems. In 2009, the Hitachi 395 trains were newly introduced to run on the new High Speed 1 (HS1) line in England. The Hitachi 395 Evacuation Workshop, a discussion-based exercise, had been organised to address evacuation issues by way of verbally responding to the four scenarios. Then, following the workshop, Exercise Twin Bore took place to fully test train evacuations in a real-life environment, and to validate the agreements, consensus, and procedures, which had been solidified during the Hitachi 395 Evacuation Workshop. Both of the two exercises were part of the same continuum, and such progression from a workshop to a live exercise exactly conformed to the arguments made by Overy (1993) and Perry (2004).

Document and observational findings of the other two simulation exercises also substantiated the arguments. For instance, Exercise Saxon Shore was part of the Home Office National CT (Counter Terrorism) Exercise Programme. Analogous to Exercise Twin Bore, the Home Office CT Exercise Programme was comprised of combined table-top and live exercises - for example, “One of the 2008 live exercises comprised of a strategic tabletop exercise in COBR linked to a tactical live play exercise” (Home Office, 2010, p.131). Likewise, Exercise Operation Safe Return formed part of an ongoing EOD (Explosive Ordinance Disposal) search programme of training, skill development and familiarisation, and its purpose was to practise what had already lectured in the classroom, regarding CT search, in simulated situations. In the UK, it is typically the case that simple types of exercises usually precede complex (live) exercises. The selection of which type of exercise to use is basically concerned with the exercise aims and objectives, but it is normally efficacious to develop the types of exercises progressively from discussion-based (or workshop) to live exercises. This is because exercise players can cumulatively gain confidence in the disaster response abilities by this progressive methodology, and on top of this, starting from simple exercises is one of the most cost-effective ways to accomplish the given aims and objectives.

Disaster Response and Adaptability

In Section 3.2.6, it is maintained that a ‘crisis’ possesses the characteristics of unexpectedness, uncertainty, and unfamiliarity, and hence, cannot be managed by the organisational countermeasure to deal with an ‘emergency’, which requires a rapid and highly structured response. In this context, it is argued that a simulation exercise, which does not take into account the distinction between emergency, crisis, and disaster, might
not deal with complicated and unanticipated crisis situations. Therefore, disaster response organisations sometimes step outside their emergency manuals or procedures, as suggested by the interviews in Chapter 6. In particular, conversations with the exercise players in this research underlined that when a large-scale disaster occurs, a degree of ‘adaptation’ is the key to effective disaster response, rather than simply following conventionality. The interviewees replied categorically that responders need to work outside the rules, regardless of standard operating procedures, in certain situations.

To cite a few examples from the interviews in Exercise Operation Safe Return, “we follow the routines, but not rigidly... we have to develop, you know, change the way you search,” (Edward Purchase), “we have to adapt. A manual doesn’t say what to do for every situation. A manual is just guidance,” (Police Search Advisor Paul), “Yes, we change the rules. In theory, you will drill at a 90 degree angle but sometimes you can’t do it. You have to adapt….May not be in the manual, but it works,” (Anonymous Search Dog Hander), “We also need to adapt to rapidly changing circumstances….Sometimes, rules can get in the way... There needs to be a degree of flexibility. Things are rarely black and white. There is room for a grey area,” (Gary Fretwell), and “Sometimes, we won’t go A, B, C, D. We could go A, D, H, okay? That’s what suits that situation at a particular time….Depending on the layout, capacity and size, adaptation is the key,” (Neil Favager).

The necessity of adaptation in disaster response can also be explained by Turner’s six-staged organisational disaster development model (Turner, 1978; also see Section 2.3.4.2). According to Turner (1978), the fourth stage is the onset of a disaster, and consists of ill-structured scenarios, which do not respect the organisation’s existing assumption and perspectives as to what constitutes risks or hazards. The fifth stage is the rescue and salvage operation, but normal or conventional modes of rescue and salvage operations can rather aggravate the situation, notably because of the ill-structured scenarios. In this regard, Turner argued that ‘flexibility (adaptability)’ should be allowed during the rescue and salvage operation; Turner (1994) argues that ‘flexibility’ is the capability to be sensitive to the changing meaning and consequences of an incident, and in this sense, adaptation or adaptability is synonymous with flexibility. To conclude, it becomes increasingly apparent that adaption or adaptability is recognised as essential to deal with a wide range of crisis situations in the UK context.
Citizen Participation

Citizen participation through volunteers is an integral part of simulation exercises because the involvement of the general public is very crucial to the validity and reliability of simulation exercises. Volunteers can be sourced from local communities, universities, related companies, volunteer organisation, etc. These volunteers are required for most of the live exercises to play victims, their families, passengers, the media, and so on, especially for the purpose of creating a degree of verisimilitude. In tune with this trend, the simulation exercises, which the researcher observed in England, actively encouraged involvement of volunteers from members of the public. For instance, Exercise Twin Bore involved citizen volunteers to act as mock passengers, and the researcher was also able to participate in the exercise as a passenger volunteer. When it came to Exercise Saxon Shore, hundreds of volunteers took part in the exercise as injured people or concerned relatives. Professional casualty actors from Casualty Union and Association of Casualty and Health Simulators were also invited to Exercise Saxon Shore. Despite being an international student, the researcher was kindly invited to the exercise as a casualty volunteer as well. In particular, participating in Exercise Saxon Shore proved to be a good opportunity to understand the working practices of the UK emergency response organisations, but also to gain an insight into the casualties’ experience – i.e. see things through the eyes of victims. Exercise Operation Safety Return also benefited from active participation of railway staff in terms of combating terrorism on the railway.

The interview findings of Chapter 6 strongly support the importance of public participation in simulation exercises. For example, a member of the registration staff remarked in Exercise Saxon Shore, “...we recognise their participation is very important to create validity in our exercise”. This active involvement of members of the public as volunteers can be understood from the perspective of the ‘sociological’ risk communication model (See Section 2.3.2), which tries to accommodate harmoniously the perspectives of not only professional responders, but also members of the public. When it came to Exercise Saxon Shore, the emergency services normally tried to communicate with members of the public, such as owners and security managers of pubs, nightclubs, and shopping centres, by providing proper advice on how to handle potential terrorist attacks, prior to the exercise: “Club managers and private security guards such as door bouncers are in the front line of fighting against terrorism, and their roles are very important. For this reason, we have spoken to the workers and
owners of every establishment and offered them advice on how to deal with, I mean, plan for the potential for terrorist attacks,” (Police Service Umpire in Exercise Saxon Shore). Likewise, the active involvement of railway staff in combating terrorism on the UK rail network was highly valued in Exercise Operation Safe Return: “Rail staff are the first line of assessment, and they play a critical role in defeating terrorism. We always ask them to remain vigilant, and report any suspicious activity or items to us according to the HOT principle” (Superintendent Phil Trendall in Exercise Operation Safe Return).

At disaster scenes, it is imperative that emergency response organisations work together with the general public for effective disaster response. To do this, it is vital to understand and accommodate the sociological and cultural values of members of the public first. Such involvement of civilian volunteers can also be justified in terms of Postmodernism (See Section 2.3.5). Postmodernism possesses four characteristics, such as simultaneity, chaos, unintended consequences, and multiple realities (Browning and Shelter, 1992). In this context, the concept of postmodernism has a meaningful resemblance to the characteristics of a crisis, such as unexpectedness, uncertainty, and complexity. Just as the concept of postmodernism can present a more humane, pragmatic, and sensible way for organisations to handle crises, by allowing more voices to the decision-making process (Tyler, 2005), so are simulation exercises able to deal with the features of a crisis successfully, by introducing multiple voices of the public to their planning, exercising and debriefing processes: “Having complementary and countering input from many views and voices as an integral part of planning, prevention, and response can productively exploit the problematics of simultaneity, chaos, unintended consequences, and multiple realities.” (Browning and Shelter, 1992, p.489).

In conclusion, emergency response organisations can benefit greatly from increasing public participation in crisis simulations, especially by making sense of the public’s multiple, alternative viewpoints.

**Discussion-based Debriefs**

In Chapter 3, it transpires that debriefing is also an essential part of simulation exercises. Through developing insights, interpretations, and conclusions, debriefs create opportunities for meaningful learning by reflecting on experience, obtained from attending simulation exercises. In the same way that an *experience* remains nothing more than an *experience*, without the aid of *reflection*, individual and organisational
learning cannot take place without the aid of debriefing. More importantly, debriefing can play a crucial role in validating simulation exercises through the following process: firstly, identifying weaknesses and mistakes; secondly, learning from them, and thus amplifying the range of experience; and finally, making modifications to emergency plans or suggesting new procedures (See Section 3.3.5). This process also complies with the proposed figure, regarding the role of a debrief in simulation exercises (See Figure 8 in Section 6.3.1.2). In this regard, the UK official guidance, Emergency Preparedness, argues that exercising is all about learning lessons, and that a wide range of (oral) debriefs should take place after each exercise in order for all of the participants to cogitate on the experience (Cabinet Office 2010). The UK guidance, further emphasises that the experience data of participation should be logged, and considered as part of the post-exercise analysis, and that such recording can play a role as a written debrief (See Section 3.3.4).

All of the exercises observed in England involved (hot) debriefing sessions. Notably, the researcher was able to observe three of the hot debriefing sessions of Exercise Operation Safe Return. During those debriefs, discussion on ‘what happened’, ‘how prepared we were’, ‘what went well’, ‘what did not go well’, and ‘what can be done better in the future’ took place on the platform of London Kentish West Town Station, right after each exercise session. In particular, the atmosphere, which was not only serious, but also supportive, (excluding blame or tension) encouraged brisk dialogue between exercise participants to take place, in order to identify key areas for improvement. The issues addressed were recorded by the facilitator (Edward Purchase), and subsequently documented under the rubric of a debriefing report. The report identified least successful points, most successful points, and significant learning points respectively, as already shown in the form of ‘Outcomes of Exercise Debriefs’ in Section 6.3.1.2.

Empirical evidence from the interview findings also unequivocally demonstrated the significance of debriefs. With regard to the function of debriefs, the following are excerpts taken from the interviews in Chapter 6: “It is about learning from experience. It provides deeper learning and better understanding about our work,” (Richard Llett in Exercise Twin Bore), “During debriefs, we shared emotion and ideas, and discuss what happened, how we responded, and how we can do better next time. That provides better understanding about our job. We are learning from it,” (The Scottish police officer in Exercise Saxon Shore), “…we are looking at how to implement the learning points into
the manuals and exercises,” (Edward Purchase in Exercise Operation Safe Return), “It is about constant learning. If someone makes a mistake, we don’t say it is rubbish. We ask, why did you miss it? How did you miss it? What were you thinking then? We talk about something to improve….I like debriefs,” (Search Team Leader Paul in Exercise Operation Safe Return), and “Generally, a debrief is about not partially going to individuals but identifying areas for development or improvement…Not about criticising, and not about focusing on negatives, which may damage morale. It’s about giving constructive feedback to people. Depersonalised,” (Gary Fretwell in Exercise Operation Safe Return). It turns out that debriefs are recognised as an important learning tool to improve plans, manuals, or procedures in the UK context.

Nevertheless, in both Exercise Twin Bore and Exercise Saxon Shore, volunteers were not given a chance to orally debrief themselves, on account of confidentiality, even though their involvement was considered significant in terms of validating exercises. Arguably, the confidentiality of a counter-terrorism exercise should be respected. Given that an important source of recommendations can come from volunteers, they need to be orally debriefed to some extent, as are the emergency services. During Exercise Saxon Shore, the researcher was, instead, asked to fill in feedback questionnaires, which the researcher believed, played a role as a limited written debrief. However, the survey questionnaire has one major limitation; it does not properly take account of qualitative data, such as volunteers’ feelings and emotions. In Exercise Saxon Shore, most of the volunteers acted as mock victims, and the victims or casualties are also major stakeholders in the event of a large-scale disaster. So, it becomes clear that simulation exercises benefit from not only volunteer participation, but also oral debriefs with the volunteers, to make sense of their feeling, emotions, and ideas about disaster responses by the emergency services. Additionally, the post-exercise analysis needs to include their (qualitative) comments and recommendations, in order to ensure that the learning taking place is made more comprehensive and explicit.

7.2.3 Emergency Management System and Simulation Exercises in Korea

7.2.3.1 Korean Emergency Management Structure: Centralisation

Similar to the UK, Korean emergency management has also evolved from civil defence activity to peacetime emergency planning. In Korea, the Framework Act on the Management of Disasters and Safety 2004 (FAMDS) upholds the current legislative
framework of emergency management arrangements. Before the FAMDS, the basic legislation adopted the tripartite system, fragmented into three activities: ‘civil defence disasters’, ‘natural disasters’, and ‘man-made disasters’. Preparedness and response arrangements of the three types of disasters were separately grounded on the Framework Act on Civil Defence (FACD), the Countermeasures against Natural Disasters Act (CNDA), and the Disaster Management Act (DMA). In this context, it can be argued that Korean emergency management had been defined by types of disaster, rather than by the responding functions, before the FAMDS was legislated.

In 2004, the FAMDS introduced the concept of Integrated Emergency Management (IEM), for example, by using the integrative term, ‘disaster’ (like the concept of ‘emergency’ in the CCA). However, emergency preparedness and response arrangements do not seem to be integrated within and between emergency responding organisations, yet. This is because Korean emergency management is still dominated by two categories of emergency personnel - fire fighters and civil engineers - without active involvement of other responders or professionals. A situation of disintegration between key responders was witnessed by the researcher in the rehearsal for the SKX 2010 earthquake exercise on 20 April 2010. As mentioned in Section 6.3.2.2, the rehearsal was cancelled, due to a lack of mutual understanding between fire-fighters from the Nambu Police Station and public officials from the Nam-Gu Office. This example seems to clearly demonstrate the problem of disintegration, specifically, coordination and cooperation between different agencies in Korea. For this reason, the roles of the police at a disaster scene tend to be confined to cordonning, managing traffic and criminal investigation, in isolation from the wider context of disaster management, and they do not also share a protocol with other emergency services, such as fire and ambulance services.

Similar to the UK, the Korean emergency management structure is also divided into three levels: ‘Central government level’, ‘Regional level (City/Do)’, and ‘Local level (Si/Gun/Gu)’. In Korea, major incidents are, in principle, managed by local responders at the local level, but central government is easily able to interfere with regional or local command and control arrangements – i.e. the principle of subsidiarity is seldom respected. All of the Korean committees and headquarters, mentioned in Section 5.3.4.3, have legal powers to direct and command its members. Further, the relationship between central, regional and local levels is basically operated on the concept of the command and control, not coordination and cooperation. In other words, Korean
emergency management adopts the centralised system and structure, and can be defined as a top-down system from central government level to local government level, contrary to the UK arrangements.

In Section 5.1, it is argued that different legislation and resultant systems and practices might impinge on differences in the ways that simulation exercises are designed, implemented and evaluated. For this reason, a detailed comparison of emergency management systems between Korea and England was made in Chapter 5. Of another special interest here is that Dr. Chen (2007) discovered that Taiwan has also centralised its emergency management system, orientated toward the command and control model, after investigating the history and development of Taiwan emergency management. In this sense, this research will additionally cite some of the relevant empirical findings from Chen’s PhD research in the sections below, regarding Taiwan’s practices of simulation exercises. It would be very interesting to explore whether the current practices within Korean simulation exercises are similar to those of the centralised emergency management system in Taiwan.

7.2.3.2 Current Practices of Simulation Exercises in the Republic of Korea

*Top-level Commitment and Support*

One of the advantages of Korean simulation exercises is the strong commitment and support of senior management. The Keungogae subway counter terrorism exercise was planned and led by the Daegu Fire Station and the Daegu Metropolitan Subway in partnership with other emergency response organisations, such as police and military. However, the Keungogae exercise, part of the Chungmu exercise, was assessed by an evaluation team from the central government level: the Office of Disaster and Safety of Ministry of Public Administration and Security (MOPAS) in partnership with the Ministry of National Defence (MND). The director of the Office and the CEO of Daegu Metropolitan Subway attended, and observed the exercises in person, showing a deep interest. The director even delivered an after-action review (AAR) speech right after the exercise was over. When it came to the SKX 2010 Earthquake Exercise, the distinguished guests - such as the Minister of MOPAS, a Member of the National Assembly, Incheon’s Vice Mayor, the NEMA Vice Administrator, the Commissioner of Incheon Metropolitan Police Agency, and the Head of Nam-Gu Office - observed the exercise in person as well. The head of Nam-Gu Office made an AAR speech,
representing the other guests. With regard to the SKX 2010 Subway Fire Exercise, the head of Yeonsu-Gu Office and the director of Incheon Fire & Safety Management Department (IFSMD) attended and observed the exercise. As in the earthquake exercise, the head of Yeonsu-Gu Office made a debriefing AAR speech after the exercise was finished.

This top-level commitment of support to simulation exercises was also noticed by a comment from one Gongdan Fire Station’s participant in the SKX 2010 Subway Fire Disaster Exercise, “…the Prime Minister himself is very interested in this exercise, and for this reason, nearly all of the ministers, agency heads, governors, and mayors... they cannot help giving full support, and make a commitment to the exercises...”. The participation of high ranking public officials can contribute to creating the impression that they are fully aware of the importance of emergency preparedness through simulation exercises, and thus, can offer public reassurance to local communities that everything would be under their control, when a major incident happens. However, it appears that such strong commitment by senior management to the exercises might produce three (interwoven) side effects; firstly repeating rehearsals before a ‘real’ exercise for the purpose of making no mistakes in front of distinguished guests and observers, secondly too much dependence on the so-called ‘ill-structured’ scenario scripts, and finally ‘deficit’ debriefing (after-action review) practices. Those side effects and their interactive link will be explained in the ensuing sections.

Repeating ‘Training’ through Rehearsals

In the UK context, a rehearsal is recognised as synonymous with an exercise to implement emergency plans (Cabinet Office 2005a, p.70). Put simply, exercising is a rehearsal for using the plans in real situations. In this context, exercises can be seen as a form of training in that exercise players can rehearse their response knowledge, skills, and techniques (Perry, 2004). Also, Devitt (2009) identified rehearsals with exercises, arguing that regular exercising of plans is unlikely to take place in organisations, which do not take note of the significance of rehearsals. Similar to the UK exercises, all of the exercises observed in Korea were geared toward testing or validating emergency plans and procedures. For these training or validating purposes, the two SKX 2010 exercises had undertaken a couple of rehearsals beforehand, in order to pursue perfection in a real exercise. However, the perfection in the Korean context of exercising means that exercise players must be fully accustomed to every single line and movement of the
scenario-scripts so that no mistakes would occur during a real exercise, especially in front of the guests and observers who were invited to the occasions. Put another way, their primary concern was to eliminate mistakes in the real exercise by rehearsing repeatedly. Recognised as merely a warm-up to prepare for a ‘real’ exercise, a rehearsal is used as a kind of preliminary test to ensure that the real exercise will be virtually mistake-free. In Korea, exercise players need to appear highly competent, and must be successful in their enactment of real exercises, when performing in front of guests and observers.

Interestingly, Chen (2007) identified the same phenomenon as found in Korean exercises, with regard to the roles of rehearsals in Taiwan. Chen (2007) argues that conducting rehearsals before executing a real exercise, is not valid in the sense that rehearsals rather prevent organisational learning from occurring (in a Taiwan context). Regarding rehearsals, observational findings from this thesis have a lot in common with those of Dr. Chen’s PhD research. For instance, one of the citations from Dr. Chen’s PhD thesis is as follows: “...the purpose of the rehearsals was to ensure that players were familiar with the script and procedure of the exercise, and did not make mistakes in the actual exercise. However, rehearsing an exercise invalidates the exercise as an exercise...Rehearsals prevent players from learning to respond to disasters,” (Chen, 2007, p.131-132).

To sum up, the exercise planning groups in Korea (also in Taiwan) conducted the same rehearsal several times, for the purpose of eliminating mistakes from real exercises, namely by rote-repetition. This point was supported by the following interview excerpts from Chapter 6, such as “I believe that repeating live rehearsals as the scenario unfolds is much more effective in terms of making no mistakes in the exercise,” (Heunggi Min in the subway exercise), “Yesterday, we had a couple of rehearsals, but mistakes still were repeated,” (Jungho Park in the subway exercise), and “They learn all of the scenario script by rote, and then repeat rehearsals. No noticeable errors or mistakes are made in exercises,” (Sungho Kim in the earthquake exercise). Current practices of rehearsals (before a real exercise takes place) can nullify the advantages of simulation exercises, such as a ‘mistake-friendly’ learning environment. In this context, it can be argued that the effectiveness of learning can be maximised, when simulation exercises balance failure and success experiences together (See Section 3.2.5). Serious concerns about mistakes occurring during performance further give rise to the issue of ‘ill-structured’ scenario-scripts in Korea, which will be discussed in more detail in the next part.
As stated above, all of the exercises observed in Korea accommodated special guests and observers from central & regional government levels and their senior management. All of the guests were seated in the box seats, which were located just in front of the exercise venues. The special guests and observers were treated like VIPs, with the directing staff of the exercise displaying a high degree of hospitality. Much of the focus of the exercise arrangements was spent on ensuring that the guests had as much comfort and convenience as could be afforded to them. For example, the venue for the SKX 2010 subway fire exercise was a subway station, below ground, and thus, the place was viewed as inappropriate for accommodating the special guests, observers, and members of an evaluation group (Citizen Review Panel). Therefore, the box seats were instead arranged at ground level, where the special guests, observers and the CRP members were able to watch the exercise conveniently, on an outdoor TV screen, broadcast from the internals of the subway station. The SKX 2010 earthquake exercise was also relayed by an electronic visual display for the viewing of distinguished guests, observers, and CRP members. Under these circumstances, it is natural that the exercise players try to appear competent in front of dignitaries, without making mistakes; after all, who would want to display weaknesses in front of MOPAS minister or NEMA Vice Administrator? The box seats, in the context of Korean simulation exercises, seem to be one of the exercise aims or objectives, which all of the exercise players must satisfy.

In particular, the Citizen Review Panel (CRP) was, for the first time, introduced to the SKX 2010 in order to provide objective and neutral evaluations from the citizen’s perspective. Members of the exercise planning groups were very anxious to attain high scores from them; again, who wants to lose scores by making mistakes in front of an evaluation team? The exercises were constrained by fears of making blunders and hence losing scores, and it can be argued that under these circumstances, the so-called ‘ill-structured’ scenario scripts were created as a necessary alternative. This argument was also supported by some of the interview findings as follows: “It is crucial not to make mistakes. For this reason, we formulate a very detailed scenario script… I expect you guys to read and memorise all of the script completely so that we can do the job very well,” (Heunggi Min in the SKX subway exercise), and “…Without this kind of very detailed scenario script, mistakes will undoubtedly occur in the exercise. As a consequence, the response time will be decreased, and we will lose some points. I want
to achieve high scores from the Citizen Review Panel.” (Jungho Park in the SKX 2010 subway exercise).

As mentioned above, the scenario scripts used in the context of Korean simulation exercises can be described as ‘ill-structured’, because, frankly speaking, they have been constructed with some serious inherent flaws, typically misleading as to what an effective disaster response should be, when a real disaster strikes. The exercises employed a very detailed scenario script, in which every move that exercise players were expected to make was thoroughly written on nearly a per-minute basis. That’s why a three-page scenario script (the Keungogae exercise), a twenty-page scenario script (the SKX 2010 subway fire exercise), and a forty-nine page scenario script (the SKX 2010 earthquake exercise) were respectively produced. Korean simulations resorted to a scenario script at the expense of the actual purposes for using a simulation, which means that a scenario itself is used as merely a target, not an instrument. In the UK context, scenarios are, however, regarded as situations, through which the exercise aims and objectives can be tested – i.e. a scenario is an instrument, not a target (Cabinet Office, 2005a, p.70). For example, when the researcher attended the Hitachi 395 Evacuation Workshop (See Section 6.3.1.1), in which four possible scenarios were presented, each scenario’s (developing) circumstances and ramifications were fully investigated by exercise players using their agency’s emergency plans and procedures.

Coupled with fears of making mistakes in real exercises, these very detailed scenario scripts gave rise to very controlled and rigid exercises, void of any flexibility or deviation. In this case, the only thing for players to do was simply to memorise all of the scripts, and then replicate them mechanically in real exercises. As clearly shown in Section 6.3.2.1, this closed model of scenarios inevitably created lack of communication (during real exercises), and more importantly, adaptation, which was recognised as constituting effective disaster response in the UK (See Section 7.2.2.2). Exercise players in Korea were not used to interacting with the other groups, let alone other members of the same group. Exercise players representing different response organisations were not even encouraged to talk to each other because they were busy memorising, and simply following the scenario scripts given. This lack of communication and adaptation was acknowledged by Korean exercise players as follows:

“They usually don’t talk to each other during the exercise. They don’t have to do that actually… Cause they are simply required to follow the scenario, but
the scenario doesn’t involve any communications between participants.”

(Anonymous Firefighter in the SKX 2010 earthquake exercise)

“They must exchange their ideas or opinions even in the exercises…We need to talk to each other in order to look at the broader picture. That requires consideration from various angles, especially to get a comprehensive overview of situations. Communication between exercise players is also important in exercises.”

(Woojin Choi in the SKX 2010 subway exercise)

“… The biggest problem of this kind of scenario is that they only deal with situations, which have been planned and written in the scenario beforehand. They just memorised scripts word for word, and merely do as they are told by the scenario script. The detailed scenario doesn’t develop any decision points. People don’t have to use their brains with this scenario. But in reality, you know, they need to address even unforeseen issues by ad-libbing. They need their ad-lib …(emphasis added)”

(Minyoung Park in the SKX 2010 earthquake exercise)

“… they are still depending on the pre-determined scenario script too much. Does the reality respect the scenario script? They just try to conduct the rehearsal by following all the steps of the procedure, based on the script…. In practice, sometimes they have to skip some unnecessary procedures….”

(Woosun Sohn in the SKX 2010 earthquake exercise)

Congruent with these findings, the Taipei Flood Exercise 2001 also utilised a very detailed scenario-script, which consequently prevent exercise players from understanding the dynamics of actual disaster response, “…however, they followed a script which indicated all their actions and dialogues. Hence, those players only needed to know which role s/he was going to play and be able to follow the script in order to perform well in the exercise. Therefore, this prevented players from understanding the overall picture of the event, and learning the complexities involved in real-time situations,” (Chen, 2007, p.130).

In conclusion, as long as Korean simulation exercises resort to a fixed protocol too much, namely, a pre-arranged scenario, learning from mistakes cannot occur, and hence
individual and organisational learning will not take place. Put another way, valid learning cannot take place in the context of rigid scenario scripts. Without the learning effects, it is indeed questionable if the Korean exercises with detailed scenario-scripts can deal with the heterogeneity and unpredictability of a crisis, especially in the era of Risk Society and Postmodernism.

The Politics of Podium and Speech-based Debriefs

In Chapter 3, it is emphasised that debriefs or debriefings are considered to be one of the most important organisational learning methods from the perspective of transforming experience into concrete knowledge. Debriefs lie at the centre of individual and organisational learning, because without a debrief process, experience, obtained through participating in simulations, simply loses its learning potential very easily. Similar to the UK exercises, debriefing sessions, named an after-action review (AAR), were also staged in the Korean context, following each simulation exercise. However, organisational efforts to graft the debriefing method (AAR) on to Korean simulation exercises seem to have failed, because the dynamic and learning-orientated practice of debriefs has been reduced to a simple one-way and top-down speech in the Korean context. To cite one of the interview findings from Chapter 6,

“No, you don’t have to hold a discussion. When the exercise is ended by the directing staff, all of the exercise players will be required to assemble in front of the box seats for the after-action review. Then, you can simply read this debriefing material. We’ve already prepared some debriefing material for your convenience”

(Fire Captain Sungho Kim in the SKX 2010 earthquake exercise)

During the Korean AARs, active discussion on what happened, what the participants learned, what can be done better in the future, and how this can relate to the real word, did not take place at all. Instead, a podium was installed in front of the box seats, where distinguished guests and observers were seated. One of the distinguished guests took the podium for his or her AAR, and delivered a speech by reading a prearranged manuscript. The speech was all about praising the efforts made by exercise planners, without giving any constructive feedback. Unfortunately, this is a common problem with Taiwan exercise’s debriefings: “A one-hour debriefing sessions was held after the exercise was completed. Players reported to the director and audience what they had achieved
during the exercise. Following that, the audience and the director made speeches praising the players' completion of their missions. Usually it was about praising the hard work of agencies taking part,” (Chen, 2007, p.129), and “Although there was a debriefing session at the end of the exercise, players were provided with a script to recite. In addition, the director's speech at the end did not relate to the objectives or evaluation of the exercise," (Chen, 2007, p.131). As each ‘so-called’ AAR speech concluded, a big round of applause was given to the speaker in an automated fashion. In the context of Korean exercises, a podium appeared to be a symbol of absolute authority. All of the exercise players including volunteers were required to assemble in formation, in front of the podium. The entire procedure was the equivalent of a formal military inspection: saluting the speaker, acknowledging the salute, and signalling the assembly to be ease. All of the AARs were conducted mechanistically in a rote fashion, without facilitating any dialogue between exercise players.

Nevertheless, this practice of Korean AARs can make sense, when it is viewed in the wider context of Korean centralised emergency management system with other elements together. Combined with the centralised model of command and control in the Korean emergency management, strong commitment and support of senior management appeared to produce a fear of making mistakes, losing scores, and further compromising their reputation in front of other special guests and observers. These fears again produced rigidity and inflexibility in exercises, as suggested by one respondent in the SKX 2010 subway exercise, “…this strong commitment sometimes causes rigidity or inflexibility in the exercise…..” (Anonymous participant from Gongdan Fire Station), notably, too much dependence on a very detailed scenario script. Unrealistic rehearsals were repeatedly conducted in order to train exercise players to script-based perfection, until the rehearsals were error-free. By virtue of the scenario-script, everything went well in accordance with their exercising plans, but, without allowing any degree of digression, and void of any communication between exercise players. Hence, no noticeable blunders occurred, as indicated by Fire Captain Sungho Kim, “…They learn all of the scenario script by rote, and then repeat rehearsals. No noticeable errors or mistakes are made in exercises. They are usually evaluated as a success. So even if we have AARs or debriefings whatever the title is, it is very natural that we have little to discuss.”. This practice of AARs deprived exercise players of a window of opportunity to identify areas for improvements - for instance, it is highly likely that rescue officers continue to hold a rope-rappelling demonstration from a roof or a chopper, even when fire and smoke are moving upwards, in future simulation exercises. Table 24
comparatively summarised the relative characteristics of simulation exercises in the UK and Korea.

<table>
<thead>
<tr>
<th>Republic of Korea</th>
<th>UK (England)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Centralised</td>
<td>Decentralised</td>
</tr>
<tr>
<td>Command &amp; control</td>
<td>Coordination &amp; cooperation</td>
</tr>
<tr>
<td>One-way (top-down)</td>
<td>Two-way (Bottom-up)</td>
</tr>
<tr>
<td>Evaluation-focused exercises</td>
<td>Learning-focused exercises</td>
</tr>
<tr>
<td>Geared toward making no mistakes</td>
<td>Geared toward testing, training, and validation</td>
</tr>
<tr>
<td>Speech-based debriefs</td>
<td>Discussion-based debriefs</td>
</tr>
<tr>
<td>Unrealistic scenario scripts involving no communication between responders</td>
<td>Realistic scenarios involving active communication between responders</td>
</tr>
<tr>
<td>No digression allowed</td>
<td>Adaptation (adaptability) allowed</td>
</tr>
</tbody>
</table>

### 7.3 Analysis and Discussion of the Findings

#### 7.3.1 Paradoxes of Korean Simulation Exercises

Crisis simulation exercises are now considered as an integral part of the emergency planning process, not only in the UK, but also in Korea. However, the current practices of Korean simulation exercises are still restricted to training people to become familiar with necessary skills and locations, mechanistically in a rote fashion, namely, by adhering to a pre-arranged scenario through repeating rehearsals. In other words, most of the Korean crisis simulations are very controlled with no allowance for digression, applying a very detailed scenario script, for the purpose of an error-free exercise. Moreover, the exercise scenario scripts had been distributed to exercise players in advance so that they could become fully briefed about what would happen and what they were expected to do in exercises. Conversely, in Exercise Saxon Shore, it was emphasised that the precise details of the incident should not be disclosed until the exercise day so that the exercise could be as realistic as possible for the exercise players taking part (See Section 6.3.1.2). Scenarios should not be exact predictions of what will take place in an exercise, but rather create space for adaptation within a semblance of reality, and depending on their decisions made, it should be within this space that
potential outcomes are likely to unfold along with the scenario. Otherwise, learning may well be inhibited, because the participants are already aware of the expected outcomes (Freimuth et al., 2008). In this regard, it is doubtful whether, or as to how, the current practices of Korean simulations can deal with such unanticipated situations, which are not part of exercise scenario scripts.

In a ‘crisis’, where decision-makers are thrown into a concrete reality of physical danger by such ill-structure, the current practice of simulation exercises in Korea might not be sufficient to deal with dangers and opportunities posed by a crisis. In this context, several questions can be raised as to why current Korean simulations might be inadequate to manage crises; firstly, a crisis by definition creates uncertainty, and ambiguity, and as a result, the ‘planning paradox’ might happen whereby the more elaborate a crisis scenario script is, the less it will be used in a crisis as it necessarily must focus on a narrow range of potential threats (McConell and Drennan, 2006). Furthermore, it is not possible to predict and stipulate every possible emergency scenario and script every response to radically changing situations (Webb and Chevreau, 2006). Emergency services appear to successfully deal with emergency situations, similar to scenarios for which they are trained, but how can they deal with unexpected crisis situations, which they are not prepared or trained for? Besides, uncertainties about crisis responses themselves can be created by disagreements or different hazard constructions between responding organisations such as emergency services and local authorities. For example, regarding evacuation of passengers in the King’s Cross Fire, the hazard construct of police officers was significantly different from that of fire fighters. Nevertheless, unlike the UK simulation exercises (in particular, Exercise Saxon Shore), all of the Korean simulation exercises observed did not require risk assessment based on discussion between responders, as was shown in Chapter 6.

Secondly, prearranged scenario scripts in the Korean context require that every move that exercise players were expected to make should be ordered and coherent based on known hazards. Crises, in contrast, are the unanticipated consequences of complex systemic failures often combining technical, social, cultural and psychological factors so that they are not subject to a priori predictable deconstruction. In other words, the characteristics of crises might confound any necessary attempts to organise the actions, which exercise players are required to take, in neat, workable scenario-scripts. These attempts can produce ‘open systems paradox’ (Toft, 1996, p.105). A crisis is an ‘open system’, where there are numerous equally but different possible trajectories by which a
crisis can develop into a disaster. In contrast, a pre-arranged scenario script is a closed system, where every move and action is prescribed and fixed, without allowing any flexibility. Accordingly, ‘worst case’ scenarios are seldom taken into account, although a valuable exercise in preparing for a crisis need to work on them (Punch and Markham, 2000). For example, simulation exercises with a very detailed, predetermined scenario script cannot cope with possible variables, such as traffic congestion or adverse weather which might influence the late arrival of emergency services, and nor can they consider human variables, such as mistakes, errors, and conflicting views about disaster response.

Thirdly, Korean simulation exercises, serving as a training tool to eliminate mistakes, might often create the institutional blind spots around the processes of crisis response. One advantage of the simulations is that they can create a ‘mistake-friendly’ learning environment, encouraging trial-error learning to take place (Kriz, 2003; Smith, 2004). However, who wants to make mistakes in crisis simulations if they are watched by high-ranking public officials, observers and evaluation teams? Mistakes would be synonymous with failure, and participants may be under pressure to demonstrate their competency in the form of success - a phenomenon which would contradict the purpose of trial and error learning. Exercises are settings where failure should be allowed and even encouraged to a certain extent. Furthermore, these mistakes and errors should be fully debriefed and discussed during the AARs, involving active dialogue between players, not speeches from senior management. Otherwise, emergency services might lose the opportunity to learn the limits of their own, and their organisations’ abilities.

Finally, any difference in behaviour is judged to be a violation of rules, and can be sanctioned in the case of simulations as a training tool for eliminating mistakes, whereas people often adapt their response to cope with real situations in progress as demonstrated by the interview findings. Exercise players are usually assessed for their strict application of scenarios vis-à-vis the standard procedures, and as a result, deviations from predetermined scenarios and procedures are usually evaluated negatively in current simulations (Jacques and Specht, 2006). However, in reality, when confronted with unanticipated accidents, people usually find innovation and adaptations of plans or skills to cope with them (Wybo, 2008). Wybo (2008) further argues that simulation as a testing tool appears naive since it doesn’t cover the uncertainty and complexity that will arise during a crisis. Therefore, just repeating rehearsals mechanistically in a rote fashion, using preset scenario scripts, can never permit the exploration of alternatives, which may be needed when faced with a crisis or a disaster.
In Section 3.2.6 it is argued that the characteristics of a ‘crisis’, such as ill-structure, unexpectedness, uncertainty, and unfamiliarity, can create a different social order, and that they cannot be handled by using the identical organisational structures and standards to cope with an ‘emergency’. Moreover, as training or exercises for a crisis can itself present the responding organisations with another crisis, it is crucial that trainers understand the concept of ‘crisis’ as distinct from ‘emergency’ or ‘disaster’, particularly when designing and undertaking simulation exercises. In crisis situations, responding organisations, including emergency services, might face a series of unpredictable and uncertain events. Under these circumstances, ‘adaptive expertise’ (Ford and Schmidt, 2000) or ‘second order techniques’ (Rosenthal, 1994) might be needed to deal with a crisis successfully. However, the current practices of Korean simulation exercise prefer to employ fixed and militaristic simulation models, based on detailed, and error-free, scenario-scripts. These types of simulations can be valid in an ‘emergency’, but are no longer applicable in a ‘crisis’. Therefore, future Korean simulation exercises are required to transcend beyond the script-based scenarios towards scenarios and exercises that allow for natural deviations - for example, by encouraging some adaptive responses to occur, as suggested by the research findings of this study. Put simply, crisis simulations should be viewed as the freestyle sparring in martial arts, and not individual repetitive training (See Section 3.2.6).

7.3.2 Implications for Future Korean Simulation Exercises

The King’s Cross Underground Fire and the Daegu Subway Fire reflect the attempts to cope with crises in a routine and outdated manner, according to set procedures and scenarios which have the potential for failure. For instance, evacuating passengers upward in the underground while the fire also moves upward, requiring passengers to stay on a burning train, or just waiting for the control centre’s instructions, caused disastrous results. Similarly, during a real disaster, what if rescue officers rappel down from a helicopter, when fire and smoke are moving upward? What if police and military do not wear personal protective equipment, whilst fire-fighters, fully equipped with appropriate protective gear, are putting out a fire? Or what if volunteers do not wear protective gear, including protective helmets, during disaster response operations? Under these circumstances, it is likely to be a fallacy that current simulation exercises, focused on repeating rehearsals through prefixed scenario scripts, can give rise to successful responses to crises and disasters.
It might be alleged that a traditional mechanistic response, depending on a pre-arranged and fixed plan or protocol, might be needed in the very first stage of a crisis or a disaster. Nevertheless, too much dependence on predetermined scenarios and procedures might cause crisis simulation paradoxes. It is not feasible to predict every single worst case scenario, stipulate its response in a scenario script, and test it through simulations. Therefore, crisis and disaster responses need to be flexible and adapted to some extent over time, based on circumstances, time constraint, and resources available, case by case. Likewise, training or exercising for a crisis also requires a level of adaptation or adaptability, which consequently, can contribute to filling the gap between a scenario script and the reality of crisis. The importance of adaptation in simulation exercises for effective crisis response was also supported by the interview findings in this chapter.

The current practices of Korean after-action reviews (AAR) also need to be changed into discussion-based debriefing processes in order to promote individual and organisational learning. However, Korean simulation exercises seem to fail to implant the true meaning of AARs in their exercising practices, as was clearly shown in Chapter 6. One of the main purposes of simulation exercises is to identify challenges, and for this, exercise players should be provided a chance to reflect on their experience, feelings and emotions by way of the AARs. The Korean emergency services currently adopt hierarchical and bureaucratic structures, and particularly in this case, an AAR can present a chance for organisations to become more horizontal in structure, by involving all of the participants, from rank-and-file officers to high-ranking public officials, to interested outsiders and observers. In this light, everyone should be equal, irrespective of rank and position, and everyone feels free to comment on exercise player’s performance in a friendly and nontreating manner during AARs. So, what is needed for this two-way or bottom-up communication is a round table, not a podium (the podium signifies absolute authority in Korea). Only when Korean AARs involve active discussion on experience, mistakes, feelings, emotions, etc., can individual and organisational learning finally take place, as in the UK debriefing sessions. It should also be noted that the organisational learning is one of the means in which to create a positive safety culture (Toft and Reynolds, 1999; also see Section 2.3.3).

In Chapter 5, it is argued that simulation exercises need to be considered within social, political and cultural contexts, within which they are planned, conducted, and evaluated. This is because simulation exercises are also under the influence of political, cultural,
and institutional dimensions to the central, regional, and local authority’s arrangements for conducting their own responsibilities. An intriguing extension to this is to ask whether the centralised emergency management arrangements within the command and control model is appropriate in ‘Risk Society’, where uncertainty, complexity, and multiplicity of new technologies are unprecedentedly augmenting these variables, or in ‘Postmodern society’, where complexity is also increasingly growing. Therefore, a simple mechanistic model is rather counter-productive. As already seen in Chapter 5, the Korean emergency management system is based on a command-and-control model, requiring rigidity and centralisation. However, crises, by definition, demand adaptation, and thus emphasise coordination and cooperation, not the model of centralised command-and-control (Dynes, 1994; Helsloot, 2008). Also, the application of Risk Society and Postmodernism theories to crisis management requires that Korean central government should release the tight command and control, which their current legal authority gives them.

In this regard, Korean emergency management needs to move towards the model of coordination and cooperation, loosening the command structure, as with the UK emergency management system (Please, note that the 1080 train driver was not permitted to exercise discretion, and thus made three public announcements for the passengers to remain seated inside a burning subway car, simply waiting for orders from the control centre in the Daegu Subway Fire). The research implies that the simulation exercises within Korea and Taiwan are greatly influenced by the de facto emergency management system. In conclusion, emergency response organisations are required to work together at all of stages of emergency preparedness and response (planning, training, exercising, and responding), but the mechanism should be based on cooperation and coordination, not command and control.

“A lack of understanding of emergency management is likely one reason why officials have suggested that the nation’s response to catastrophic disasters needs a stronger command-and-control system that might be best handled by the military.”

(Waugh and Sterib, 2006, p.131)

7.4 CONCLUSION
In this chapter, the main themes are finally identified in order to answer the research questions, based on the research findings from participant observation, qualitative interviews, and documentary research. The two underground fires can be defined as ‘socio-technical’ disasters, caused by a complex and tightly-coupled combination of technical, human, organisational, and social factors. It was further demonstrated that attempts to deal with such socio-technical disasters by a fixed protocol is likely to end in failure. UK emergency management system has adopted a relatively decentralised structure, based on coordination and cooperation between responders, and the current practices of the UK simulation exercises are characterised as ‘Testing, Training & Validation’, ‘Building Block Approach’, ‘Disaster Response and Adaptability’, ‘Citizen Participation’, and ‘Discussion-based Debriefs’. In contrast, the Korean emergency management system has adopted a centralised structure, based on the command and control system. The current practices of the Korean simulation exercises are defined as ‘Top-level Commitment and Support’, ‘Repeating Training through Rehearsals’, ‘The Politics of Box Seats, Ill-structured Scenarios and a Lack of Adaptation’, and ‘The Politics of Podium and Speech-based Debriefs’.

In particular, the investigation into the two underground fire crises demonstrated that a crisis does not respect the conventional training and exercising methodology - i.e. the present (closed) practices of crisis simulations in Korea. Under these circumstances, Korean simulation practices appear to be deficient in dealing with crises, given that socio-technical crises call for responding organisations to react to unexpected accidents (crisis) in an adaptive manner. This raises the necessity of adaptation, with regard to conducting crisis simulations as well as actual disaster response. To fill the gap between the rigidity of scenario-scripts and the actuality of a crisis, simulation exercises should permit this ‘adaptation’ to occur. In addition to being adaptive, Korean AARs should also be organised and conducted in a manner which promotes organisational learning through dynamic discussion, rather than speeches from senior management.

A lack of coordination and cooperation between emergency responders suggests a potentially dangerous flaw in the way emergency management actions are carried out. The potential for failure in emergency situations is exasperated when simulation exercises and the corresponding AARs inherit the rigidity that is characteristic within command-and-control style organisations. The Korean simulation exercises and accompanying after-action reviews observed were all conducted in a very controlled fashion, under the influence of a centralised command and control model, discouraging
any deviation or discussion. This type of exercising and debriefing method might not be enough to deal with the characteristics of Risk Society and Postmodernism, consequently creating the aforementioned crisis simulation paradoxes. Finally, it should be noted that all of the themes are inextricably linked and interact with one another, and that fixing just one facet of each problem is not sufficient to change the existing practices of Korean simulation exercises. They all go hand in hand.
CHAPTER 8

CONCLUSION

“Problems cannot be solved by thinking within the framework in which they were created.”

(Albert Einstein, 1879-1955)

The principal aim of this thesis is to propose practical recommendations and suggestions for the current practices of Korean simulation exercises, based on lessons learnt from the UK experiences and practices, regarding the way simulation exercises are organised and conducted. To accomplish the research aim, the thesis has several key objectives. The first objective is to demonstrate the usefulness of simulation as training or exercise tools, from the perspective of effective disaster response. The second objective is to investigate the Daegu Subway Fire of 2003 in Korea and the King’s Cross Fire of 1987 in the UK, in order to understand the nature and features of a large-scale disaster. The third objective is to conduct a cross-cultural comparative study on simulation exercises in Korea and the UK. The fourth objective is to look into the history, development and current frameworks of emergency management in Korea and the UK in order to understand simulation exercises in context. Finally, this research suggests desirable models (directions) of Korean simulation exercises, which can fully deal with the dimensions of uncertainty and ambiguity, which ‘socio-technical’ crises or disasters possesses.

Chapter 2 undertakes a review of the current literature on risk. It was revealed that over the last thirty years, the focus of risk studies has significantly shifted away from quantitative-based studies toward more qualitative-based ones, incorporating a variety of perspectives from anthropology, sociology, and economics. Sociological approaches to risk - such as cultural theory, safety culture, systems theory, risk communication, risk society theory and postmodernism theory - have stressed the social and cultural contexts, in which risk (and crisis) are defined and viewed. In particular, postmodernism values the concepts of multiplicity and diversity, calling for a comprehensive, flexible and holistic response to a crisis or disaster. In a similar vein, risk society theorists argue that uncertainty, complexity and ambiguity are radically increasing in post-modern society, emphasising technological citizenship in the process of decision-making.
Chapter 3 reports the analysis of the theoretical literature on the general issues of simulation exercises in the UK context, including simulation design and types, learning effects and debriefings, and validation issues. In this chapter, it is emphasised that the choice of which type of exercise to employ should, first, be decided by the aim and objectives. However, in cases when objectives are unclear, it may be necessary to develop the types of exercises progressively from the simplest types of exercises to the more complex ones. The chapter also argues that a collective understanding of the difference between emergency, crisis and disasters contributes to the improvement of designing and performing simulations, since a crisis is characterised by uncertainty, unfamiliarity, and complexity, requiring a relatively adaptive, unstructured or unprogrammed response. Notably, the significance of debriefing is underlined because learning effectiveness can be maximised, only when reflection on experience is conducted by the debriefing sessions, after an exercise has concluded. It is, further, argued that the issue of simulation validation might be solved in the debriefing sessions, where exercise players are able to reflect on their experience and compare it with reality.

Chapter 4 reviews the methodology used in this research - including the choice of research design and methods, employed to obtain information during this research project - as well as discussion of the progress that has been made, to date. The nature of the two research questions leads to the adoption of a qualitative case study strategy. In particular, because of its ethnographic nature, three research methods, such as documentary research, qualitative (unstructured) interviewing and participant observation, are utilised. The advantages and disadvantages of each research method are fully recognised, and to offset the disadvantages, data triangulation technique is finally employed. In carrying out an in-depth case study, the researcher needs to be fully engrossed in the cases under study, and for this purpose, ‘going native’ is considered of the essence. However, the aspects of objectivity and impartiality should also be respected, and in this context, the researcher tries to adopt a balanced position between them - i.e. being a ‘professional stranger’.

Chapter 5 conducts a comparative study on the organisational and legislative frameworks of emergency management in Korea and the UK. In the UK, the arrangements for dealing with civil emergencies are, on the whole, decentralised to the local level, without direct involvement from central government. The UK emergency management system can be characterised as a bottom-up system, and thus more
coordination and cooperation between various response agencies are encouraged and required. In contrast, the Korean emergency management system adopts a top-down model, and the relationship between response organisations is based on the concept of command and control. Considering the top-down system of the Korean emergency management, it is assumed that a modus operandi of Korean simulation exercises also operates on the notion of a top-down or command-and-control model.

Chapter 6 details the empirical findings of this research project, which consists of two main parts. The first part contains a secondary analysis of the two underground fire case studies: the King Cross Fire in the UK and the Daegu Subway Fire in Korea. An investigation into the underground fires suggests that attempts to deal with complex and highly-coupled ‘socio-technical’ crises or large-scale disasters in a rigid and mechanistic fashion could backfire, when the attempts confront the heterogeneity and unpredictability of a crisis in the ages of Risk Society and Postmodernism. Coordination and information-sharing with other key responders is also recognised as essential for effective crisis response. The second part is associated with the descriptions of simulation exercises, which the researcher has attended and observed in Korea and the UK, and their social, cultural and political contexts. Particularly, with regard to the current practices of Korean simulation exercises, three areas for improvement are identified as follows: first, too much credence to a pre.arranged, very detailed scenario script, second, an absence of dialogue between players, and finally ineffective AARs (debriefings).

In Chapter 7, the main themes are finally drawn from a contextualised analysis and discussion of the empirical findings of Chapter 6, combined with not only the theoretical literature of Chapter 2 and 3, but also the secondary analysis of the fire cases. The two underground fires can be defined as ‘socio-technical’ disasters, triggered by a complex and tightly-coupled combination of technical, human, organisational, and social factors. As a result, the implications for failures in attempting to manage these social technical crises or disasters in a prearranged manner are becoming much greater. The current practices of the UK simulation exercises are characterised as ‘Testing, Training & Validation’, ‘Building Block Approach’, ‘Disaster Response and Adaptability’, ‘Citizen Participation’, and ‘Discussion-based Debriefs’. The current practices of the Korean simulation exercises are, by contrast, defined as ‘Top-level Commitment and Support’, ‘Repeating Training through Rehearsals’, ‘The Politics of Box Seats, Ill-structured Scenario-Scripts and a Lack of Adaptation’, ‘The Politics of
Podium and Speech-based Debriefs’.

However, the Korean simulation exercises and after-action reviews (AARs) observed were all conducted in an overly rigid fashion, discouraging deviation and dialogue, which seems to be partly affected by a centralised command and control model of the Korean emergency management. To be specific, mechanistic rehearsals, the box seats, and ill-structured scenario-scripts together have imposed rigidity and inelasticity on Korean simulation exercises, eliminating the chance of transformative, naturally-occurring deviations. Ultimately, not only simulation exercises, but also emergency management needs to transform into a more flexible, decentralised, bottom-up model in terms of effective response to ‘socio-technical’ crises or disasters. Importantly, in order to maximise learning effectiveness of simulation exercises, there is an urgent need for the current modus operandi of AARs (debriefs) in Korea to be revised and re-structured modelling the UK discussion-focused debriefings.

The thesis explored an under-researched area of simulation exercises and debriefing sessions in Korea, and provided some practical suggestions for the future of Korean simulation exercises. The main contribution of the research to knowledge is that the evidence within this study clearly demonstrates that the current practices of Korean simulation exercises, characterised as ‘Top-level Commitment and Support’, ‘Repeating Training through Rehearsals’, ‘The Politics of Box Seats, Ill-structured Scenario-Scripts and a Lack of Adaptation’, ‘The Politics of Podium and Speech-based Debriefs’, are not evidence-based practices. Additionally, the research shows that the current Korean simulation exercise methodology fails to conform with the theoretical literature and is conspicuously devoid of the lessons learnt from the UK experiences and practices - i.e. creating a false security of preparedness. As a consequence, cultural adjustment is urgently needed, and the implications for future Korean simulation Exercises in Section 7.3.2 should be translated into changed practices very soon.

The research emphasises that for demonstrating cross-cultural generalisability of the findings to a wider context, further research requires more comparative studies of simulation exercises. Particularly, it was assumed in the thesis that the aforementioned implications could be generalised to a wider international context, when combined with the findings from Dr. Chen’s PhD thesis. In this context, it would be very intriguing to learn through further research whether or not other countries, which have adopted centralised command-and-control arrangements of emergency management, display
situations or practices of simulation exercises and debriefing sessions that are similar to those in Korea and Taiwan. Future research also needs to explore the manner in which responders include flexibility in their crisis and disaster management plans, procedures and manuals. In addition, all of the categorisations need to be empirically re-tested in future comparative case studies into the practices of simulation exercises in Korea and the UK, in order to have perfect replication logic.

Last but not least, it should be noted that hindsight is always twenty-twenty. In this sense, it is important to recognise that the difficulties, which can be encountered when organising and implementing simulation exercises in politically and culturally pressured situations, should not be underestimated. In conclusion, the thesis finishes by paraphrasing Toft and Reynolds (1994) (See Section 2.3.4.3):

We owe it to those who have lost their lives, been injured or suffered loss in both the King’s Cross Fire and the Daegu Subway disaster to learn the lessons and apply them to prevent similar failures in crisis response…
APPENDIX 1: List of Topics

A. Selection of simulation exercises and scenarios

B. Goals and objectives of exercises

C. Organising and conducting simulation exercises

D. How to deal with uncertainties of real situations by simulation exercises

E. Resemblance to actual disaster response, or simulating actual disaster responses

F. Advantages and disadvantages of current simulation exercises

G. Debriefing sessions

H. Changes to ‘after-action’ practices

I. Criteria for success and failure of exercises

J. Feeling, emotions, and ideas for future suggestions
APPENDIX 2: Attendance List for Hitachi 395 Evacuation Workshop

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<td>Ian Milligan</td>
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<td>Chris Keylock</td>
<td>LAS</td>
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<td>P Ellis</td>
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<td>C Ellis</td>
<td>NR</td>
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</tbody>
</table>
APPENDIX 3: Map of Thames Tunnel between Essex and Kent
APPENDIX 4: Photographs of Exercise Twin Bore
Dear Potential Volunteer

Thank you very much for expressing an interest in taking part as a casualty volunteer in the exercise on 26 June 2009.

I have enclosed three forms for completion as follows:

- Volunteer pro forma – kindly indicate which role you might like to play
- Medical Questionnaire
- Photographing and film consent form

Once they are completed kindly place them in the enclosed envelope and return them as soon as possible.

If you have any friends or family who would like to take part, please contact us and we will send them an information pack.

Please do not hesitate to contact us on the numbers provided in the information sheets if you have any queries.

Liz Turner
Liz Turner
Project Manager
Health Protection Agency
### APPENDIX 6: Timetable of Intermediate Search Course

<table>
<thead>
<tr>
<th>DAY</th>
<th>TIME</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>MONDAY</td>
<td>13.00</td>
<td>Course Introduction</td>
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<tr>
<td></td>
<td>13.15</td>
<td>Terrorist Threat Presentation</td>
</tr>
<tr>
<td></td>
<td>15.15</td>
<td>Coffee</td>
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<td></td>
<td>15.30</td>
<td>Syndicate A – Vehicle Search</td>
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<tr>
<td></td>
<td></td>
<td>Syndicate B – Area Search, Winthrop principles.</td>
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<tr>
<td></td>
<td>16.30</td>
<td>Syndicate B – Vehicle Search</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Syndicate A – Area Search, Winthrop principles.</td>
</tr>
<tr>
<td></td>
<td>17.30</td>
<td>Evening Meal</td>
</tr>
<tr>
<td></td>
<td>18.00</td>
<td>Route Search – Classroom Theory</td>
</tr>
<tr>
<td>TUESDAY</td>
<td>07.30</td>
<td>Travel to Exercise Venue</td>
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<tr>
<td></td>
<td>09.15</td>
<td>Route Search – Practical Exercise</td>
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<tr>
<td></td>
<td>11.00</td>
<td>Debrief and return travel to Tadworth</td>
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<tr>
<td></td>
<td>12.30</td>
<td>Lunch</td>
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<td></td>
<td>13.30</td>
<td>Actions on a find</td>
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<tr>
<td></td>
<td>14.15</td>
<td>Waltham Cross presentation, Winthrop principles</td>
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<td>15.00</td>
<td>Coffee</td>
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<td>15.30</td>
<td>Area Search – Winthrop Practical</td>
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<td>17.30</td>
<td>Evening Meal</td>
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<td>Evening Work - Read precis: Building Search</td>
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<tr>
<td>WEDNESDAY</td>
<td>09.00</td>
<td>Building Search – pre brief</td>
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<td>Coffee</td>
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<td>Practical – Building Search – Philips Building, Redhill</td>
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<td>Syndicate A – Defensive Venue Search</td>
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<td></td>
<td></td>
<td>Syndicate B – Offensive Building Search</td>
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<td>12.30</td>
<td>Packed Lunch</td>
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<td>13.00</td>
<td>Practical – Building Search – Philips Building, Redhill</td>
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<td>Syndicate B – Defensive Venue Search</td>
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<tr>
<td></td>
<td>15.00</td>
<td>Search Documentation and preparation for final exercise</td>
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<td>17.30</td>
<td>Evening Meal</td>
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<td>Evening Work – Read precis: Body Search / CBR(N)</td>
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<tr>
<td>THURSDAY</td>
<td>09.00</td>
<td>Final Exercise- Syndicate presentation and briefing</td>
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<td>10.00</td>
<td>Search Exercise – Tadworth Grounds</td>
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<td>12.30</td>
<td>Lunch</td>
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<td>Search Exercise debrief</td>
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<td>14.00</td>
<td>Body Search</td>
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<td>15.30</td>
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<td>15.45</td>
<td>Twyford Avenue – presentation and lessons learnt</td>
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<td>16.45</td>
<td>Free session – CONTEST Strategy</td>
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<td>17.30</td>
<td>Evening Meal</td>
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<td></td>
<td>Evening Work – Read precis: preparation for written test</td>
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<tr>
<td>FRIDAY</td>
<td>09.00</td>
<td>Written Test</td>
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<td>11.00</td>
<td>Debrief</td>
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<td>Course disperses</td>
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APPENDIX 7: Track Safety Certificate
APPENDIX 8: Photographs of Exercise Operation Safe Return
APPENDIX 9: Photograph of the Unattended Briefcase
APPENDIX 10: Safety Information on London Underground Trains

Safety Information
In the unlikely event of an emergency stay on the train and follow instructions given by train staff.

Please make yourself aware of the following equipment in the event of an emergency.

Emergency equipment is available on board the train.

1 Passenger alarms
Stay on train - listen for instructions.
If you need to make immediate contact with an emergency, pull the RED Alarm handle located door or push the Alarm button at the wheelset.
Wait for a reply before talking into the speaker.
APPENDIX 11: Photographs of the Keungogae Subway Exercise
APPENDIX 12: Photographs of the Keungogae Subway Exercise’s After-Action Review
APPENDIX 13: Photograph of the SKX 2010 Subway Fire Exercise's Final Planning Meeting
APPENDIX 14: Debriefing Material of the SKX 2010 Earthquake Exercise

훈련 강령

안녕하세요!

인천시 국민경기단장 경찰대학교 교수로 제작 중인

감사드립니다.

오늘, 훈련 끝내 남을 맡아
최근 발생 민도가 높아지고 있는 지진 발생에 대비
통합군단훈련 모습을 본 소감을 말씀드리겠습니다.

이번 훈련은 여러가 다른 평가 기준이 있습니다.
먼저, 작년까지 해도 훈련 평가를 공무원 1.2명이
담당을 했는데,
금년에는 인원수도 대폭 늘리 시도평가단의 경우
12명으로 대폭 늘리고,
구성인원도 전문가 등 일반인 7명이 포함되었습니다.

다른 하나는 작년까지는 보여 주기적 훈련이었다면
금년에는 이를 단의 실제 현장 위주로 바뀌었습니다.

오늘 훈련은 전반적으로 관계기관 단체가 열심히
준비하여 좋은 모습을 보여 주었습니다.

시간관계상 구체적으로 설명 드리기는 어렵고 몇
가지 간단하게 훈련 평은 말씀드리면.

지진 피해의 심각성을 알려주기 위해 가실 목표
구조물을 만들어 연출을 했던 점은 인정적이었고

지진이 발생하면 도로 등이 마비되어 병기로 후송을
해야하는데 인천시 소방헬기와 중앙119구조대헬기가
보여준 구조 모습은 주효 했다고 볼 수 있다.

그리고 소방서와 가스, 전기, 통신, 성수도, 군부대
계측기판, 침묵비를 동한 선속한 행동으로 보살핌을
앞으로 제한 발생시 이렇게 해야 한다. 이런 귀중한
일견은 주는 좋은 훈련이었고 생각하며

오늘 훈련에 참여하신 모든 분들 수고 하셨다는
말씀을 드리면서 간단히 감정을 바치겠습니다.

감사합니다.

2010년 5월 13일

인천광역시 국민경기 단장 감 창경

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APPENDIX 15: Photographs of the SKX 2010 Earthquake Exercise
APPENDIX 16: Photographs of the SKX 2010 Earthquake Exercise’s AAR
APPENDIX 17: Photographs of the SKX 2010 Subway Fire Exercise
APPENDIX 18: Photographs of the SKX 2010 Subway Fire Exercise’s AAR
APPENDIX 19: Photograph of Safety Emergency Evacuation Information on New York City Subway Trains


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