국외훈련 성과보고서

재난대응 역량강화를 위한 교육·훈련체계 연구

- 재난훈련 실행검토 및 재난원인의 접근 -

2018년 8월

서울소방재난본부 강남소방서

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5. 훈련 기간 : 2016. 7. 19. ~ 2018. 7. 18 (2년)

6. 훈련 과제 : 재난대응역량 강화를 위한
교육·훈련체계연구

훈련성과보고서 요약서

성 명	김 정 인	파견연도	2016
훈련분야	소 방 방 재		
훈련과제	재난대응역량 강화를 위한 교육·훈련체계 연구		
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내용요약

본 훈련성과보고서는 2015년 선정 서울특별시 장기국외훈련 학위과정 훈련과제인 『재난대응 역량강화를 위한 교육·훈련체계 연구』와 관련하여 수행된 연구로서 훈련과제와 관련된 주요내용과 배경은 다음과 같다. 2015년 훈련과제 제출 당시, 사전조사에 기초하여 대도시 서울에서 발생 가능한 재난관리 및 대응에 대한 역량강화 요구에 있어「선형적 재난관리의 기반확보와 복잡계 적응시스템으로 전환요구)」에 근거, 훈련과제 선정이 필요함을 기술함

· 선형적 재난관리 : 사고지휘체계 ICS(Incident Command System)와 같이 명령과 통제를 통한 재난관리조직 간의 협력달성을 통해 재난을 관리함 (Moynihan, 2008)
· 복잡계 적응시스템 (CAS : Complex Adaptive System) : 협업적 조정 및 결정중심으로 급격히 변화하는 재난상황 하에서 공동목표를 위한 집합·즉각적 의사결정재난관리 (Axelrod, 1997).

2015년은 재난대응 실행도구인 긴급구조통제단 도입 초기단계로, 용어정의 및 대응단계와 지휘권 통합 등내용이「화재대응 긴급구조통제단 운영지침」에 포함됨.

내용요약	재난에 대응하기 위하여 명령과 통제를 중심으로 하는 지휘체계를 갖추어 대응한다는 부분은 일면 Moynihan (2008)이 제시한 선형적 재난관리의 기반에 있어 기초적인 적용단계로 이해되어질 수 있다. 한국, 대도시 서울의 재난발생 시 대응에 관한 역량강화 요구에 대하여 현행 준용되는「긴급구조통제단」모듈은 시행 초기단계로 소방조직 중심 이며, 대도시 서울 발생가능 재난의 효율적 대응을 위한 서울시 모든 기관들의 공통적용 필요성이 있으며, 급격히 변화하는 재난상황 하 공동목표를 위한 민관의 집합·즉각적 의사결정 협업체계 모색 및 확보의 필요성이 있다. 반면 Axelrod (1997)가 제시한 바와 같이, 단일 기관이 재난과 같이 복잡하고 급격하게 변화하는 상황을 선형적인 형태로 포괄할 수는 없으며, 반드시 관련된 모든 기관들과 단체 그리고 구성원들이 협업 하에 급격히 변화하는 상황에 대처할 수 있도록 하는 비선형적인 재난관리에 대한 추가적인 접근과 연구가 또한 반드시 요구되는 것으로 확인되었다. 선형적인 그리고 동시에 비선형적인 접근을 필요로 하는 재난관리 (Axelrod 1997; Moynihan 2008)에 대한 문제를 어떻게 대도시 서울에 적용할 것인가? 라는 기초적인 질문에 대하여, 지정 훈련과제인『재난대응 역량강화를 위한 교육·훈련체계 연구』의 범주 내에서 기 제출 1차 연구과제보고서에서는 재난관리 기초문헌연구를, 2차 연구과제보고서는 선형적 재난관리 및 복잡계 적응에 있어 중심이 되는 사고지휘체계 ICS(Incident Command System)에 대한 분석을 제시한 바 있다.

내용요약	2차 연구보고서에서 제시한 바와 같이 재난(대응)관리에 있어, 선형적인 재난관리와 비선형적인 복잡계 적응시스템이라는 두 개의 대치되는 것처럼 보이는 당면요구에 있어 사고지휘체계 ICS (Incident Command System)의 분석을 통해, 선형적(기계적)인 명령과 통제의 성격으로 보이기 쉬운 재난(대응)관리 실행도구나 체계요소가 비선형적(유기적)인 특성을 또한 가져야 하는 재난(대응)관리의 대척점에 놓인 것처럼 보일 수 있다는 전제에 있어, 사고지휘체계의 효용성에 대한 비판과 지지로 나누어진 오랜 논쟁은 조직이론을 통해 설명될 수 있으며, 사고지휘체계는 비록 정도는 다르지만 기계적 그리고 유기적인 성격을 함께 가지고 있는 것으로 사고지휘체계 관련 문헌과 기존 연구를 통해 기술한 바 있다. 재난대응에 있어 교육·훈련의 필요성에 대한 부분을 추가로 살펴보면, 재난대응은 재난관리 4단계 중 하나로서 「재난 피해자에 대한 긴급지원 제공과 이차 피해의 가능성을 줄이기 위한 활동, 그리고 신속한 재난복구의 시작을 위해 계획된 활동들」이며 (National Governor's Report, 1979, pp. 13-14), 이러한 기조는 이후 911을 기점으로 전환된 미국 재난(대응)관리 체계의 기반이 되었다. · 하나의 주요계획문서를 사용한다, · 재난관리 4단계 개념을 활용한다, · 예외, 기타 중요사항은 부속서류 (Annex)로 명시한다, · 본 접근방법은 대비 및 계획단계에 보다 효과적이다.

내용요약	미국 내 지방정부를 포함한 모든 공공 및 민간기관의 구성원은 사고관리체계를 포함한 국가사고관리체계를 본인의 직무단계에서 학습하고 기관 단위에서 훈련할 의무가 있다. 2011년 미국 LA 시장지시사항 18번 사례를 보면, 국토안보부 대통령령 5번에 의거 모든 국내 사고 및 재난에 있어 단일화, 포괄적 사고(재난)관리를 위해, 2004년 발표된 국가사고(재난)관리체계(NIMS)를 준용함, 이에 따라 국가사고(재난)관리체계 준용을 위해 모든 LA 시 소속 민관군 기관은 국가사고(재난) 관리체계 내의 다수기관 간 협력을 위한 조정관을 두고 해당 기관 내 사고(재난)관리체계 준용을 위한 내부규정 등을 개정 및 교육훈련을 실시할 것 (연방정부 감사대상) LA 시의 사례는 재난발생 이전에 재난(대응)관리 실행도구 또는 체계요소를 사전에 참여하는 공 · 사 기관과 개인 그리고 시민들이 인지하고 익숙해질 수 있도록 하는 접근으로서, 이는 재난대비단계에 이루어져야 하는 것으로 재난대비와 대응역량 향상에 관한 정의는 다음과 같다. · 재난대비 정의 : 재난대응역량을 향상시키기 위한 재난발생 이전의 활동들 · 재난대응역량 향상 정의 : 향상된 대응역량은 해당사회가 Hazard(위해성)를 확인하고, 발생 가능한 문제들을 예측하고, 예방적 평가 (Precautionary measure)의 수행 Perry (2004)는 재난에 관한 훈련이 구성원들의 유대감을 향상시키며, 향후대응 등 공동 활동에 있어 신뢰감을 주는 것으로 기술하였으며,

내용요약	전문가 그룹과 자원 일반인들 간에는 훈련효과의 차이가 있었으며, 훈련설계 등에 이를 인지할 필요가 있다고 주장하였다. Peterson & Perry (1999)도 훈련을 통해 대응인력들이 자신의 역할을 수행하는 것을 실습하는 효과에 대해 기술하였으며, 현재 제시되고 있는 재난훈련의 3가지 유형은 다음과 같다. · 도상훈련 (TTX, Table top exercise) · 기능훈련 (Functional exercise) · 종합훈련 (Full scale exercise) 미국 사례에서 우리는 소방에서 시작된 사고관리체계를 국가 단위에서 단일화 국가사고(재난)관리체계의 핵심으로 채택, 신속성과 전문성 그리고 현장중심의 원칙이 준용되는 지휘체계 속에 자연스럽게 관련기관들이 사고관리체계 속에 융합될 수 있도록 함으로서 주요 재난 및 사고 시 다수기관 간의 협력과 조정이 가능한 체계를 운영하게 된 것을 볼 수 있다. 독일의 경우 소방기관이 운영해 온 사고관리체계를 국가내 대형사고 및 재난 관리체계로 준용토록 하여 초기 대응단계부터 소방지휘부를 중심으로 지휘 관리를 일원화하도록 관리체계를 통합하였다. 영국은 재난대응 전문성을 가진 소방기관장이 국가사고(재난)관리에 있어 자원조정 권한을 가지도록 명시하고 있으며, 일본은 지방 정부 단위 사고관리체계가 수립되고 있지 못함을 적시하고 최근 사고관리체계 가이드 북을 발간하는 등 주요한 흐름을 따라가고 있는 것으로 추정된다.

내용요약	재난관리단계 중 구조를 인명구조를 최상위 목적으로 하는 재난대응에 있어 사고관리체계를 채택 및 활용하는 것이 재난대응에 요구되는 신속성, 전문성, 현장중심의 원칙의 확보방법이며, 이러한 체계를 재난대응에 관련된 기관들의 구성원과 조직차원에서 학습하고 훈련함으로서 재난 및 사고 시에 작동할 수 있도록 하는 것이다. 지휘권한을 강화하는 것이 해결책이 아니라, 사고와 재난이 발생하는 현장에서 작동할 수 있는 기전 강화가 대안이 될 수 있는 것이다. 이에 대한 교육과 훈련을 미국의 사례와 같이 관련 유관 기관에 의무화하여 유사시 긴급구조통제단 내로 관련 기관 주무담당자들이 합류하는 동시에 기관장 등 결정권한을 가진 관리자들이 지원을 하는 통합된 체계에 대한 지향점을 제시할 필요가 있는 것으로 보인다. 현행 긴급구조통제단의 구조와 운영내용을 단순화하여, 적응성을 높이는 일도 병행되어야 할 것으로 사료된다. 재난훈련의 검토(원문)는 2017년 가을 수행된 연구로서 문헌조사 및 사례연구를 기반으로 현재 국내의 재난훈련에 대한 분석을 통해, 효과적인 재난훈련 실행의 기초적인 개념을 제시하는 것을 그 목적으로 하였다. 재난훈련은 효과적인 재난대응을 위한 재난대비 단계에서 수행되는 재난관련 계획과 교육 · 훈련프로그램에 피드백을 제공할 수 있는 핵심적인 도구이며, 도상·기능·종합훈련의 적절한 활용은 현장의 조정 및 협력을 증진하는데 도움이 될 수 있다.

내용요약	국내 재난훈련에 대해 중앙정부 단위와 지방정부 단위의 실행에 대해 비교하였으며, 중앙정부의 경우 재난훈련 자체가 관련 규정에서 기능훈련에 유사한 Drill 이라는 불명확한 용어를 사용하고 있으며, 재난계획과 교육프로그램 그리고 훈련이라는 3가지 중요한 요소 간에 약한 연관성을 보였다. 대중에 대한 정보제공 또는 홍보 중점으로 인한 훈련 자체목적의 달성은 이루어지지 않고 있었으며, 훈련자체가 종합이 아닌 기능적인 하위단계의 개념으로 제공되고 있었다. 가장 중요한 부분은 훈련을 통해 효과적인 재난대응을 위한 협력과 조정을 위한 역량을 배양하는 것에 취약하다는 것이었다. 지방정부 단위 재난훈련 실행에서는, 지역 소방기관이 실시하는 긴급구조통제단 설치와 운영 그리고 지휘권 이양과 같은 부분을 확인하였으나, 이러한 훈련도 중요한 유관기관 등의 협력과 조정을 위한 역량배양의 기회로서 작용하기 위한 실제적인 참여 없이 기능적인 훈련에 제한되어 있는 것으로 확인되었다. 소방공무원들을 대상으로 한 설문조사에서, 소방공무원들은 긴급구조통제단의 운영을 교대제 기반으로 하자는 의견이 확인되었으며 (현재 내근 근무직이 출동하여 현장에서 통제단을 구성하는 방식), 협력과 조정을 위한 부분이 부족하다는 사실이 간접적으로 확인되었다.

내용요약	결론에서 네 가지 개선사항이 제시되었으며 다음과 같다. 1. 재난훈련에 있어 관련규정에 불명확한 용어에 대한 정의가 선행되어야 한다. 이러한 불명확한 용어의 사용은 효과적인 재난훈련에 대한 이해와 기반을 제공할 수 없다. 재난대비단계에서 재난계획과, 교육, 그리고 재난훈련은 가장 중요한 3가지 요소로서 긴밀한 상호연관성을 가진다. 효과적인 재난대응을 위해서는 재난대비단계를 확인하는 것이 첫 번째 단계이며, 그러한 첫 번째 단계에서 재난계획과 교육 그리고 재난훈련의 연관성과 재난훈련을 통해 재난계획과 교육에 대한 피드백이 이루질 수 있도록 하여야 한다. 2. 홍보와 대중에 대한 정보제공의 중요성을 간과할 수는 없으나, 재난훈련의 본연의 취지와 목적을 달성할 수 없다면 이러한 부정적인 면에 대한 고려가 필요하다. 재난훈련은 재난계획과 교육프로그램을 검증할 수 있는 유일한 기회이기 때문이다. 재난훈련과 홍보나 대중에 대한 정보제공 또는 교육의 기회로 활용되는 이벤트 성 훈련은 명확히 구분되어야 하며, 재난대응에 요구되는 유관기관 및 자원봉사자 등의 실제 참여로서, 재난 시에 필요한 협의 역량을 배양할 수 있는 기회로서 활용되어야 할 것이다. 3. 지역단위의 긴급구조통제단 훈련의 경우 효과적인 재난대응을 위해 유관기과 그리고 자원봉사자 등을 참여시키는 도상훈련과 같은 비용대비효과가 높은 훈련방식을 도입할 수 있을 것으로 사료된다.

내용요약	4. 긴급구조통제단 활용은 내근 근무자 중심으로 구성하기보다는 현장 출동을 위한 교대제 근무자 위주로 편성하는 것을 고려할 수 있을 것으로 사료된다. 재난원인의 접근은 2018년 봄에 수행된 연구로서 요양병원 등의 화재로 인한 대형인명피해가 건축물에서 반복적으로 발생하는 흐름에 대해 압력 및 누출모델 (Pressure and Release Model)을 활용하여 분석하였다. 해당 모델은 원인으로부터 이루어지는 과정을 통해 최종결과가 발생한다는 개념으로서 예를 들어 성숙한 민주주의의 부재로 인한 도덕적인 기준의 상실 그리고 특정 위험에 대해 무관심하고 보호되지 않은 상태가 재난으로 이어지는 일련의 과정을 설명하는 모델이다. 한국의 경우, 성숙한 민주주의로 나아가지 못한 전 단계와 부패가 이러한 치명적인 인명피해를 발생시키는 주요한 근본원인으로 지목되었으며, 인구와 경제 분야에서의 고령화나 보건 분야 인력부족도 부가적으로 확인되었다. 특히 도덕적이고 상식적인 규제가 인명안전 등에 최우선적으로 적용되지 못하는 것(유예 등) 현상에는 근본원인으로서 성숙한 민주주의로 나아가지 못한 전 단계와 부패가 존재하는 것으로 이해할 수 있다. 근본원인 이후의 과정에서 보건부야 인력부족의 경우에는 한국에 금융위기 이후 신자유주의가 의료 공공성을 축소하고 의료분야 인력감축을 초래하게 된 것이 주지의 사실이다. 요양병원 등의 인력부족은 화재사례에서 볼 수 있듯이 초기 대응과 환자대피 등에 영향을 줄 수 밖에 없다.

내용요약	인구에 있어 고령화는 세계적인 흐름이며 한구에서만 발생하는 현상이 아니지만, 고령인구의 피난의 어려움과 요양병원 등 독자적인 대피가 어려운 경우 위험이 가중되는 것으로 사료된다. 불안전한 상태 즉 위에서 기술한 근본원인과 과정들이 만들어낸 보호되지 못한 요양병원 등의 건축물에서의 반복적인 대형인명피해는 기술적이거나 물리적 분야에 대한 접근만으로는 원인이 아닌 개별적인 문제를 보는 것에 국한될 수 있을 것이다. 근본적인 원인을 바라볼 수 있는 사회학적인 접근이 절실히 필요한 시점으로 사료된다. 재난대응 역량강화를 위한 교육·훈련체계 연구라는 훈련과제에 대해 1, 2차 연구보고서를 통해 재난문헌연구와 재난(대응)관리의 도구인 사고지휘체계(한국 긴급구조통제단)의 선형적 그리고 비선형적인 재난관리에 적용가능한 기계적 그리고 유기적인 측면이 동시에 존재한다는 사실에 기반 한 협력과 조정이 필요한 재난대응의 효과적인 적용이 가능하다는 전제와, 최종 훈련성과보고서를 통한 국내 재난훈련의 실행에 대한 분석과 개선방안의 제시, 마지막으로 국내에서 이슈가 되었던 반복적 인명피해가 발생한 화재사례들에 대한 모델을 적용한 원인의 접근을 추가적으로 제시하였다. 시민이 안전한 서울 재난(대응)관리 재난대응역량은 협력과 조정이 가능한, 선형적(기계적) 그리고 비선형적 (유기적)재난관리가 가능한 사고지휘체계(한국 긴급구조통제단)의 재난대비 단계에서의 재난훈련을 통한 강화와 재난의 근본원인을 볼 수 있는 접근의 변화에 있는 것으로 사료된다.

The Review of Disaster Exercise Practices

POLS 5903

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Fall 2017

EXECUTIVE SUMMARY

The Seoul Metropolitan Fire and Disaster Management Headquarters represent the Seoul Fire and Emergency Service under the direction of the Seoul Metropolitan Government. The Seoul Fire and Emergency Service have been providing the fire and emergency services such as structural firefighting, emergency rescues, and emergency medical service before the hospital care. The organization of the Seoul Metropolitan Fire and Emergency Headquarters has six divisions; fire administration, disaster response, fire prevention, safety assistant, fire service audit, special rescue. Twenty-five dire departments have a similar organization structure like headquarters and one emergency operation center belongs directly to the headquarters. The Seoul Fire Academy has own authority under the direction of the Seoul Metropolitan Government. The first organization establishment of the Fire Headquarters was in the 1972 year and reorganized with the merge of former civil defense division in the 1998 year, and now they are providing the disaster management function since the 2008 year.

The continuing problem addressed in the Seoul Fire and Emergency Service is that how can make sure the effective disaster response. The Seoul Metropolitan City was not only in the center of the man-made disasters like the Sam-poong department store collapse but also the major actors in cooperating disaster responses under the unified national disaster policy. The one of reasonable approach is that examine the literature what solution should be selected for the effective disaster response as well as a review of the current practice of the disaster response before disasters break out. In preparedness, the exercise can be a powerful step to

prepare an effective disaster response and reviewed both national and regional disaster response exercise practices include a major focus of the exercise, type, and firefighter's survey.

This practicum will be reported directly to the Seoul Metropolitan City for the re-consideration of reform of current disaster response exercise followed the order of the Seoul City Major. It is not easy to mention the assessment of this solution success at this time, but it can be a valuable chance to look back what was accomplished and missed during the practice of disaster response exercises for the effective disaster response in the Seoul Fire and Emergency Service.

ACKNOWLEDGEMENTS

I would like to thank

Dr. Martin Brienen
Dr. Alex Greer
Dr. Hsien-Ho (Ray) Chang
Dr. H. Tristan Wu
Dr. Dave Neal

Seoul City Major. Park Won Soon

CHAPTER 1

Reason for the Practicum

The Seoul Metropolitan City is a national capital of South Korea. The history of the Seoul City originated from the remains of the castle of three kingdoms' stage at the second century AD and Jo-Seon Dynasty relocated the capital to the Han-Yang (the old name of the Seoul) at the 1394 year.

The city population is over ten million and shows higher density. In every square kilometer of the Seoul Metropolitan City, around sixteen-thousands, people are living in there (Seoul Metropolitan Government, 2018).

Comfort argued that the city risk is combined interaction after breaking hazard event with city characteristics such as socio-economic status, infrastructures, and physical environment (2006). The Seoul Metropolitan City is not a New Orleans but never free from this kind of threat as a homely word 'disaster' because of their high population density, city own characteristics.

The quick fact of the monthly emergency response data can provide the estimation of the potential threat. The Seoul Fire and Disaster Management responded to 649 fire incidents, 2399 rescue incidents, and 35,024 emergency medical incidents in a just one month of January 2018 (Seoul Emergency Operation Center, 2018). Disaster management and the question about effective response in the Seoul Metropolitan Government has been a continuous concern

with background above mentioned.

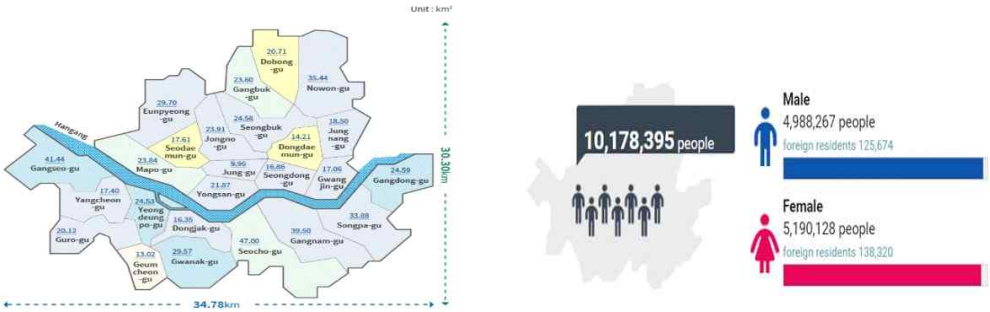

Figure 1. The location and population of the Seoul Metropolitan City.

<Image courtesy of the Seoul Metropolitan Government>

In addition, the Seoul Metropolitan City and the Seoul Fire and Disaster Management have been in the center of the issue of disaster management since 1990s man-made and technological disasters in South Korea. Those sequential three disasters impacted heavily the nation and raised the change of disaster management policy (Kim & Lee, 1998; Kong, 1996; Yoon, 2014). Two of them happened in Seoul Metropolitan City. From left to right order in figure 1: The Sung-Su bridge collapse in Seoul (October 21, 1994), Gas Explosion in Dae-Gu (April 28, 1995), and the Sam-Poong department store collapse in Seoul (June 29, 1995).

Figure 2. National impacted man-made and technological disasters in the 1990s.

<Image courtesy of the Seoul Fire and Disaster Management Headquarter>

In the 2015 year, The Seoul Metropolitan Government admitted the author of this practicum as a one of a beneficiary under the official two years' overseas training program. The overseas training program purpose was 'The review on the status of disaster exercise for the effective disaster response' (Seoul City Mayor, 2015; Appendix 1; Appendix 2). That was a policy-oriented decision based on both city committee's examination result and the former researches that commonly addressed the needs of study for the effective disaster response (Yang 2008; Yoon 2014; Yoo 2015).

Yang pointed out the lack of cooperation experience within various organizations during the disaster response stage (2008) and Yoon (2014) introduced that the fire service organizations under each major municipal authority changed as more aggressive attitude to the effective disaster response with the adoption of 'disaster' on their official organization name. Yoo (2015) indicated that the examination requirement of the current exercise for the effective disaster response.

Why is the exercise important for the effective disaster response?

The aftermath of certain disaster response activities can be a chance to learn how could improve the disaster response, but the problem of that examination is that only available after the break of the event. Phillips, Neal, & Webb (2016) introduced that the improvement of the disaster response capability should be considerate at the preparedness stage before disaster happen.

Perry (2004) defined that three major parts of the preparedness stage can be suggested as plan, training, and exercise. The consideration of the importance of exercise in the literature will be narrated at the below in text citation.

Peterson and Perry (1999) study introduced following:

> Preparedness represents actions that are undertaken to reduce the negative consequences of events where there is insufficient human control to institute mitigation measures (p. 242).
>
> Exercises represent constructed opportunities to test the protocols and equipment specified under a plan and taught in the training phase (p. 243).

Peterson and Lindell (2003) also emphasized following:

> The operational problem would have been discovered in an exercise (p. 344)

Perry (2004) article clarified following:

> Since an exercise is an operational test, operational failures or weaknesses are identified (p. 65).

Definition of the problem

The problem related with the disaster exercise practice

As one of ways to improve or make effective, the disaster response suggested the ideal practice of the disaster exercise should be answered with various approaches. But there has been a lack of this kind of approaches to the right practice of the disaster exercise (Kim, 2013).

First, this practicum did the literature review about the disaster exercise generals include the importance of exercise for the effective disaster response before disaster break out.

Second, this practicum investigated central or national level practice of disaster response exercise based on the South Korea regulation

or act (Status of the Republic of Korea, 2017). That aimed to figure out of actual practices and most focused side of the disaster exercise in South Korea (Kim, 2013).

Third, this practicum explored the regional level of disaster response exercise in the Seoul Metropolitan City and found that remained on the drill level like certain practices' repetition (The Seoul Fire and Disaster Management, 2016).

Fourth, this practicum cited the simple review of firefighter's survey in other municipal government in South Korea that is similar with the Seoul Metropolitan City for the idea about how firefighters think about the current disaster response through the regional exercise practice (Newsis, 2016).

This practicum tried to provide; literature review-based disaster exercises practical points; Status of the disaster exercise practice at the central and regional level for improvement; firefighters' opinions to the disaster response and exercise.

Importance of the problem

Why solving the problem of disaster exercise practice is important?

Phillips, Neal, & Webb emphasized, for the effective disaster response can be prepared at the stage of preparedness during the disaster management cycle (2016). The disaster exercise can provide feedback chances to the disaster management officials, stakeholder organizations and participants whether the planned disaster response on the exercise can be creating the desired outcomes or not (Peterson and Lindell, 2003).

The desirable notion of the right practice of the disaster exercise can be starting not only from the literature review of the disaster exercise but also contributed from the review of the current practice

of the disaster exercise at the central and regional level in South Korea. In addition, firefighters' opinion is worth to considerate to support this idea as one of the major participants in the disaster response and exercise.

Objectives of the practicum

The general approaches used in this practicum

The author used general approaches like next sentences for access the issues mentioned in this practicum. First, the literature review included: the journal articles, text books, government documents, media, and internet. Second, observation for the central and regional level practice of the disaster exercise in South Korea was done by the literature review included the disaster exercise reported articles and official documents. The author is 25 years experienced firefighter in the Seoul Metropolitan City and tried to do critical thinking and observational analysis in this approaching process.

The major outcomes in the practicum

This practicum provided literature review results about the foundational concept of the disaster exercise through the search of journal articles. The importance of the disaster exercise at the preparedness stage for the effective disaster response tried to explain with the literature review and critical thinking. The clear definition of why the disaster exercise is critical for the effective disaster response and the desirable practical features include exercise type also introduced.

These findings applied to doing an analysis of the disaster exercise observation at both levels of central and regional level in South Korea. The observational results of the central level operated

disaster exercise showed the lack of the real exercise practice such as ambiguity about disaster exercise practice in the legal document, the weak connection between components of the preparedness include exercise and the certain type of exercises does not adequately practiced, and additionally media focused side was over emphasized.

These weak points also generated to miss the core practice part of the disaster exercise for the future effective disaster response, that was lack of practices of the disaster response coordination tools and activities as a homely word ‘Incident Command System (ICS)’. The observational results of the regional levels’ disaster exercise revealed as remained a drill concept like repetition. The focus of the regional disaster exercise is not aimed to build up experiences of the disaster response coordination, but only focused the launching the post of incident command at the disaster situation.

The survey of firefighters showed their thinking about the current practice of the regional level disaster exercise and related activities. The half of survey answers said the lack of knowhow for disaster response coordination capability. In addition, firefighters provided opinions such as improvement of deploying way of disaster response coordination. More details will be descripted in chapter 3 of this practicum.

CHAPTER 2

Organizational setting and staffing

The Seoul Fire and Disaster Management of the Seoul Metropolitan City in South Korea

The Seoul Fire Disaster Management is the department organization under the Seoul Metropolitan Government. The Seoul Fire and Disaster Management not only respond to fire, rescue, and emergency medical calls but also operated fire administration included fire prevention and safety support for the protection of city population and properties.

The significant change of organizational point of view happened at 2008 year as adoption ‘disaster’ in their current official name (Yoon, 2014). The Seoul Fire and Disaster Management have four fire districts with 23 fire departments, special rescue service, and the emergency operation center under the headquarter in the Seoul Metropolitan Government. The Seoul Fire and Disaster Management Headquarter have six division included fire administration, disaster response in organizational structure.

The Seoul Fire Academy also placed under the headquarters’ structure but operated as an independent organization for the training and research.

The South Korea was under the military style government until the first civilian government started at the 1993 year and the first regional vote for local officials’ election for the foundation of the glass-roots democracy started at the 1995 year (Kong, 1996). For the understanding of the South Korean disaster management, it is important to consider their on-going status of the decentralization and democracy (Bae, Joo & Won, 2015).

This point leads the position to observe both the central and regional government practices in case of investigation of certain practices of their society. The local authorities closely affected by the central regulation or practice.

The structure of the organization and where within that structure the practicum was conducted

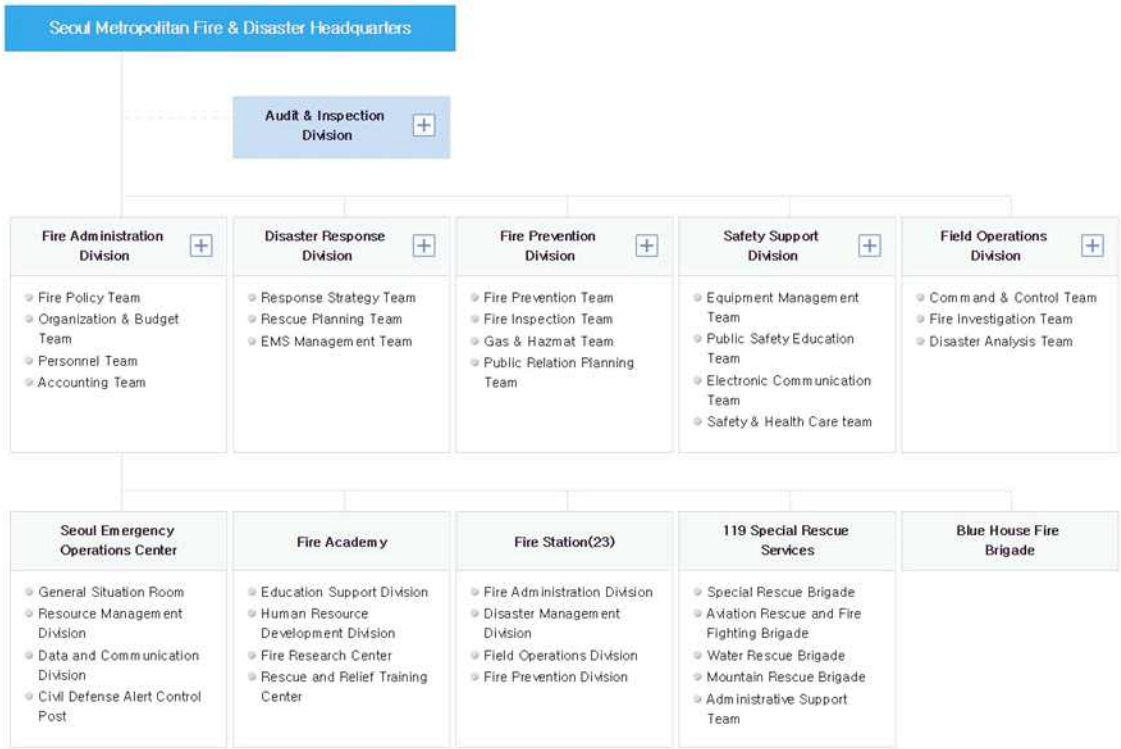

Figure 3. The organizational charts of the Seoul Fire and Disaster Management.

<Image courtesy of the Seoul Fire and Disaster Management Headquarter>

The Seoul Fire and Disaster Management headquarters' structure introduced at the figure 3. Twenty-three fire department have similar structure like headquarter but audit and safety division emerged into administration and response division.

The author is 25 years experienced fire officer and elected as a beneficiary of the overseas training program by the Seoul Metropolitan Government. This annual program operated as a competitive process, beneficiaries should do a subject study what they applied this competition during their training time.

Study results directly report to the major of the Seoul Metropolitan City for the improvement application to various areas of the city administration. During the practicum, disaster response division of the Seoul Fire and Disaster Headquarter worked with author for sharing disaster exercise reports for observation at the regional level practice of disaster exercise.

Analytic methodologies

Basically, the author used related literature review first and applied findings from the literature review to the observational analysis in this practicum and identifying potential solutions and suggested the best solution. The literature review in this practicum operated as two separated parts: first part was for the disaster exercise and second part were for the observation of the disaster exercise practices in both level of central and regional in the South Korea.

The first literature review included: the journal articles, text books, government documents, media, and internet. Second, observation for the central and regional level practice of the disaster exercise in South Korea required data analysis such as the disaster exercise reported articles and official documents as well as articles in disaster act.

In this practicum, the author tried to do critical thinking and observational analysis based on both learning in the Fire and Emergency Management Program (FEMP) and experience in the Fire and Disaster Management Practice.

Description of tasks and schedules

In this practicum, the tasks performed required six-months and will be described at the next. Literature review of disaster exercise related academic journals and others was performed at the first two months. Observation data collection for the disaster exercise practice in the South Korea was performed at the next two months. Critical thinking of literature and observational data analysis were performed at the last two months. Practicum writing with results was co-performed at the last two months.

CHAPTER 3

Results

The literature review on disaster exercise for the effective disaster response

Phillips, Neal, & Webb introduced that the improvement of the disaster response capability should be considerate at the preparedness stage before disaster happen (2016). As other word, the key actions for the effective disaster response should be done at the preparedness stage.

The exercise can be contributing to test the weakness of both plan and training because the exercise is an operational activity (Peterson and Perry, 1999; Peterson and Lindell, 2003; Perry, 2004). The critical point is that the disaster exercise is a powerful tool for the ensuring of disaster plan and training at the preparedness stage. Therefore, the exercise can be the one of the ways to enhance the disaster response capacity.

The three components of disaster preparedness

The three important activities in disaster preparedness, the disaster exercise type, and the exercise benefit were reviewed in this practicum. The three important activities of the preparedness suggested as plan, training, and exercise (Perry, 2004). Quarantelli (1998) defined that the disaster plan is a set of required actions during disaster response following the disaster break. The disaster plan must have goals and objectives to evaluate the disaster response capacity (Lindell and Perry, 1992).

The training needs created by the disaster plan and exercise can be a chance to test plan and peoples participated (Rosenthal and Pijnenburg, 1991; Perry, 2004). Hermann (1997) reported that the

creation of exercise must start with the exercise objectives to test plan and training. It can be summarized that the plan, training, and exercise have a close connection, and exercise can test the plan and training program.

The disaster exercise type

Daines (1991) have reported three traditional types of disaster exercise: Tabletop exercise, functional exercise, and full-scale exercises reported as three types of traditional disaster exercise (Daines, 1991). Drills, training, multisite and workshop with orientation added in more expanded notion by Phelps and this concept extended former education and training parts to the disaster exercise (2011). The traditional three disaster exercise type will be discussed in this practicum.

First, a tabletop exercise is cost-effective and generally practiced in a room setting. Designated tabletop exercise controller provide exercise and evaluate the exercise outcomes. The participants usually ordered to verbal respond to the situations followed narrative introduction. This can invite key persons of various organizations for the previous coordination experiences.

Second, a functional exercise is that certain selected response functions practiced at the field setting. The exercise aimed to test disaster plans and training status. Simulated disaster victims, disaster response personnel, and exercise support staffs participated at the scenario simulated field. To make real activities is the purpose of the functional exercise and staffs should be including controller, observers, and designer.

Third, a full-scale exercise is possible to chance to examine whole functions and requirements of the disaster plan and training program. In a full-scale exercise, actual resources and responders participate

and mobilized. The time and cost management are critical to operate this exercise, but this exercise can provide chances to examine the preparedness level which directly related disaster response capacity. The combination practices and right choices of exercise type followed the exercise purpose recommended (Phelps, 2011).

Disaster exercise benefits

Disaster exercise can provide benefits for the effective disaster response in the preparedness stage of disaster management cycle. First, the disaster plan operation difficulties can be found through the exercise. Second, the disaster exercise can be informing public in the exercising. Third, the exercise can examine training programs' adequacy through hands on practice of responders and participants (Perry, 2004). Fourth, the teamwork can be building up through the exercise (Shapiro, 1995; Peterson and Perry, 1999). In summary, disaster exercise has benefits to provide feedbacks to the disaster plan, training program, and disaster response cooperation experience.

The literature review and analysis on disaster exercise in the South Korea

Disaster policy and organizational change in South Korea

For the good understanding about the disaster exercise practice in the South Korea, the review of the disaster policy, organizational change explored. Figure 4 display the disaster policy change in South Korea. The 1995-year emergency management act at the 1995 year changed to the Frame Act on the Management of the Disaster and Safety at the 2004 year. At the same year, for national disaster management, the National Emergency Management Agency (NEMA) was established with merge of former civil defense

organizations under the Ministry of Public Administration and Security (MOPAS) (Yoon, 2014). The NEMA designed to manage disaster with comprehensive emergency management concept (Bae, Joo & Won, 2015) but criticized the lack of comprehensive emergency management practices (Yoo, 2015).

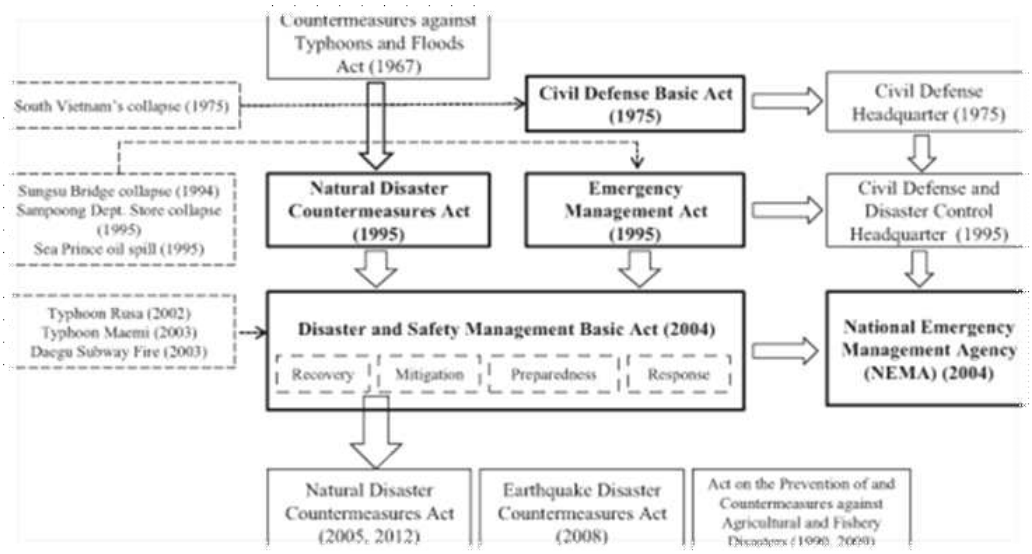

Figure 4. Disaster policy change in South Korea

<Image courtesy of the Yoon, 2014, p. 155>

The Ministry of Public Safety and Security (MPSS) was created in the 2014 Year after the Sewol Ferry disaster and abolished at the 2017 year. Now, the Ministry of Home Affairs (MHA) oversees the emergency management and the National Fire Agency operate the disaster response as an independent organization.

Disaster Exercise regulation in South Korea

In this part, the regulation of disaster exercise in South Korea reviewed. The author reviewed and analyzed the disaster exercise related act articles in Frame Act on the Management of the Disaster

and Safety. First, the use of term in Act can be reflecting the understanding level of the disaster exercise. In act articles, there still use the ‘drill’ instead of exercise. For better understanding, the use of term ‘exercise’ is more adaptable choice to enhance the consensus.

Second, the author applied first literature review results ‘three important activities of the disaster preparedness and relationship’ to the disaster related act articles in South Korea.

The Frame Act on the Management of the Disaster and Safety act article 34-6 (Appendix 3) described Manuals in crisis and ordered to utilize that manuals to drills. The manual cannot be an exercise plan, even that can be working as a subpart of the exercise plan.

The Frame Act on the Management of the Disaster and Safety act article 29-2 (Appendix 3) described the educational requirement of disaster management related persons, but this content is not related with training program or disaster exercise. In the Frame Act on the Management of the Disaster and Safety, there is lack of clear training requirement.

The Frame Act on the Management of the Disaster and Safety act article 35 (Appendix 3) described the drills of the disaster preparedness stage and this context based on the study of the National Institute for Disaster Prevention (NIDP, 2001). As mentioned above, that drills’ concept can be understand as a full-scale exercise. Finally, the feedback function from disaster exercise to both plan and training program do not exist within the content analysis of the exercise related articles in the Frame Act on the Management of the Disaster and Safety.

In summarization, the three important activities of the disaster preparedness from the first literature review applied to the analysis of the disaster exercise regulation in South Korea, but there was no

clear relationship between the activities as well as no clear defined as expected operation.

The observation of the disaster exercise practice at the central level in the South Korea

Disaster Safety Korea Exercise

The Frame Act on the Management of the Disaster and Safety act article 35 (Appendix 3) ordered the annual exercise 'Disaster Safety Korea Exercise' to both the central and regional level government. That article defined to set up plan for the exercise and distribute stakeholder organizations as well as every level of reginal government to operate disaster exercise, but this is exercise order document and not a disaster exercise plan. As pointed above, the term 'drills' still used for display the exercise concept on the act articles. On the other hand, the term 'exercise' used on official reports.

In the observational study of the actual status of the disaster exercise, the Korea National Emergency Management Agency (NEMA, 2009) designed 'Disaster Safety Korea Exercise' observed (Kim, 2013).

Figure 5. Disaster Safety Korea Exercise

<Image courtesy of the Seoul Fire and Disaster Management Headquarter>

Kim (2013) criticized that the ‘Disaster Safety Korea Exercise’ was no real exercise even though that purposed full-scale exercise. The exercise prepared through several rehearsals with pre-informed scenario for the public information providing to medias as well as important people invited event concept.

In the scenario, any complex situation disappeared for the prevention of mistakes (Smith, 2004), and the lack of adaption for the desired purpose also appeared (Kendra and Wachtendorf, 2003). The evaluation and discussion were not practiced properly for the organizational learning because podium debriefing provided (Borodzicz, 2005).

From a point of view of author of this practicum as 25 years experienced fire officer, the central level disaster exercise put much attention to the public informing side and other regional level exercise shows same situations. That exercise cannot provide feedbacks to the plan and training programs. The actual exercise type remained as functional exercise (Figure 5) rather than originally stated full-scale exercise. the adaptable discussion or evaluation should be providing for the compensation of the lack of organization learning to exercise.

The benefits of disaster exercise such as the teamwork building, response cooperation, and coordination experiences is not acquired from the current disaster exercise.

The observation of the disaster exercise practice at the regional level in the South Korea

Regional disaster exercise practice for common tools in disaster cooperation and coordination

As described above, the practice of the disaster exercise in regional

level also impacted by the practice of the central level. The practice of the 'Disaster Safety Korea Exercise' in regional level like the Seoul Metropolitan City also shows same issues discussed. In this part, the widely practiced disaster exercise in regional level will be discussed.

Figure 6. Disaster Exercise in Seoul Metropolitan City

<Image courtesy of the Seoul Fire and Disaster Management Headquarter>

The Frame Act on the Management of the Disaster and Safety act described the mandatory requirements for all central and local government should deploy safety committee, incident planning headquarter, and Emergency Rescue Control Unit System (ERCUS) based on the fire service. That system inspired from the notion of the Incident Command System in the U.S.

The ERCUS is officially adopted at the 2004 year and has been operated by the fire service after exercise practice added at the 2012 year. Command post with the chief of staffs, response planning, resource management, operation, recovery was major five section of the ERCUS.

Even though the critics and appraisal opinions exist about certain type of common tool, but there is a consensus for the requirement of some common tool for the effective disaster response coordination (Bigley & Robert, 2001; Cole, 2000; Neal and Webb, 2006). In the

background of the adoption and followed exercise requirement of the ERCUS, there was a claim about the effectiveness of the ERCUS as well as the lack of the coordination and cooperation based on common process (Yang, 2008).

In figure 6, the disaster exercise at the regional level tried to build up capacity for disaster response coordination and cooperation. The Seoul Fire and Disaster Management deployed untimely the disaster exercise ‘ERCUS’ from February to April in the 2015 year (2016).

Twenty-three fire department under the Seoul Fire and Disaster Management Headquarter participated and evaluated their ERCUS operation capacity. The details in evaluation area divided such as command post set up, command authority take over from battalion chief to the chief of department, and designated person’s hands on practice in each ERCUS section.

The exercise results showed the increase of the capacities like command post set up and command authority transfer, but the level of adaption of the individual tasks in each ERCUS section still need improvement.

The disaster exercise ‘ERCUS’ in the regional level have a clear purpose and available to provide some feedbacks. In the applying the literature review of disaster exercise, that exercise remained the level of the functional exercise and the lack of the real disaster response capacities like cooperation and coordination experience build up.

In this exercise, important stakeholder organizations have not been invited, and the results of the exercise limited in the fire and disaster management. In case of consideration about time and cost, tabletop exercise type can be an alternative way to promote participation.

Firefighters' survey

As a support of firefighters thinking about current practice of the disaster exercise, this practicum cited firefighters' survey from one regional fire service (Newsis, 2016).

The survey participants were total 886 firefighters (Male 822, Female 64) who were currently have been worked in the Gyeong-Gi Fire & Disaster Safety management. The National Fire Academy operated the survey at the 2016 year.

Total 53% of the participants answered the lack of the ERCUS operation knowhow for cooperation and coordination in crisis management. The one of the reasons was that firefighters who participated to the ERCUS usually worked for the fire department administration as a daily base.

The main opinion for the improvement was that the ERCUS operation staffs should be placed as permanent position as shift work base. Under the current Frame Act on the Management of the Disaster and Safety act requires every fire department operate the ERCUS, but firefighters answered that one ERCUS for each fire district in regional level can be an option rather than all fire department.

Findings and Conclusions

problems found in this practicum

This practicum utilized literature review results for the foundational

concept how observe and analyze the current practice of disaster exercise. The disaster exercise is critical method that can be providing feedback to the disaster plan and training program at the preparedness stage for the effective disaster response. Different type of disaster exercise also introduced for utilization as well as the disaster exercise benefits such as build up cooperation and coordination capacities.

The disaster exercise observation at both central and regional level in South Korea were analyzed with findings from literature review and collected data.

In the central level, the disaster exercise practice was not supported well with unclear term ‘drills’ use as well as weak connection between three important activities such as plan, training program, and exercise. Public informing dependent tendency created the lack of real exercise practice and caused that exercise as functional exercise instead full-scale exercise. More important point was to miss to practice the capacity for the disaster response cooperation and coordination in their disaster exercise practice.

In the regional level of disaster exercise practice, the regional fire service learned how they operate the ERCUS set up and command authority transfer, but that exercise also remained as functional exercise without participation of important stakeholder organizations.

In firefighters’ survey, firefighters expressed their opinion to modify the deployment of the ERCUS as shift work base work as well as agreed the lack of the ERCUS operation capacities such as cooperation and coordination in disaster response.

Conclusion and suggestion for solving problems

In conclusion, the author suggests ways for the solving issues found in this practicum. First, the clear term use ‘exercise’ instead ‘drills’ in the regulation. It causes misunderstanding and not avail to

provide good foundation for best practice.

It should be work together for creating the close connection between the disaster plan, training program, and disaster exercise for the feedback from exercise results to plan and training program. It can be the first step for the ensuring the effective preparedness stage and extend to the effective disaster response.

Second, the central level of disaster exercise should be care about the negative effects from the media focused situation. The disaster exercise not only for the public informing but also for the chance to test the plan, and training program which directly related the effective preparedness stage.

Divide the event and real exercise must be practiced. The lack of learning from the exercise should be covered by evaluation and discussion session as an official part of the disaster exercise. As a most important content of the disaster exercise, some common tool for the disaster response cooperation and coordination should be adopted.

Third, the regional level of disaster exercise now adopted the ERCUS for enhancing common tool use in the disaster response. For the effective disaster response, inviting important stakeholder organizations recommended and tabletop exercise type can be working the barriers such as time and cost.

Fourth, the utilization of the ERCUS should be considering the operation format from temporal participation of fire administration worker to the shift working format with designated personnel.

CHAPTER 4

Practicum preparation

FEMP class participation for prepare practicum

For preparing this practicum work, the class participation of the Fire

and Emergency Management Administration program (FEMP) was great help to doing the part of literature review and followed analysis to my own practicum subjects.

Dr. Alex Greer provided a chance to the author to start this preparation work through the FEMP introduction class with exercise related subjects. Dr. Hsien-Ho (Ray) Chang gave an insight why common tool required for the effective disaster response in his ICS class. Dr. H. Tristan Wu and Dave Neal also provided understanding about the stage of disasters and their relationship. Dr. Martin Brienen support this practicum work with patience and careful consideration. I deeply appreciate to all of them in here.

Benefits obtained

Academic journals can provide more power to explain some status. To learn how to find articles and data help myself to build up basic skills include analysis practice for certain issue. During the practicum work, I practiced how explain issues with reference-based analysis. I expect that I can be advancing in a fire and emergency career with this valuable experience instead my former policy oriented approaching way to issues.

Recommendations for changes

This practicum has a process like next; literature review, findings summarize from literature review and analysis observation with findings from literature review. In every classes of the FEMP, I was available to get a practicum related pieces through the course progress. I want to recommend to the future ones who takes the FEMP program. In every class can providing what you are looking for. The more communication and close relationship between

professors and student should be working on the successful completion of given practicum and other academic achievement.

Other comments

I want to give thanks to all ones gave me helps to do this practicum works. Thanks so much.

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Fatal Structural Fire phenomenon in South Korea

Applying the Pressure and Release Model (PAR)

and Root Causes Analysis

Abstract

This paper focused on fatal structural fire phenomenon in South Korea. The vulnerable people's urgent need for their life safety still was not a priority in fatal structural fires include the recent mil-yang nursing hospital (MYNH) fire caused 50 people deaths and 142 people injuries in 2018 year, the Jang-Seong Nursing Hospital (JSNH) fire reported 21 people deaths and 8 injuries in 2014, the Pohang Nursing Home (PHNH) fire reported 10 people deaths and 17 injuries in 2010.

The PAR model applied to these fatal structural fire Phenomenon in South Korea as well as Root causes and Dynamic pressures of fatal structural fire phenomenon also discussed.

In conclusion, the lack of matured liberal-democracy and corruption as main root causes of the fatal structural fire in South Korea can be suggested beside the older population and the lack of staff issue based on demographic and economic process.

The lack of status of mature liberal-democracy and corruption issue seems to make continued effects to the failure of function of the state for good governance as well as the rule of law to measure the fatal structural fire. Unprotected buildings created by root causes described in front and provided the causes of this fatal structural fires as phenomenon in South Korea.

Fatal structural fires as a phenomenon in South Korea

The purpose of this essay to applying the Pressure and Release

model (PAR) to the recent mass emergency in writer's choice. Fatal structural fires in South Korea was selected because Mass casualties in structural fires showed repeated pattern and can be characterized for a series of fatal structural fires as a phenomenon in South Korea. The three-fatal structural fire case introduction will be started from most recent one.

First Case **: the mil-yang nursing hospital (MYNH) fire**

First fatal structural fire case is .Total 50 people died, and 142 people injured from one fatal structural fire in South Korea recently. Followed the Korea times (2018), the fire happened on January 28th, 2018 year. The fire started at 07:30am, 911 calls taken at 07:32 am and extinguished fire at 10:26 am. Themil-yang nursing hospital (MYNH) located at the Mil-Yang city in Gyeong-Sang-Nam-Do (South Eastern Provincial area in South Korea).

Figure 1. The mil-yang nursing hospital (MYNH) fire scene.

<Image courtesy of the Gyeong-Sang-Nam-Do Fire Service Headquarter>

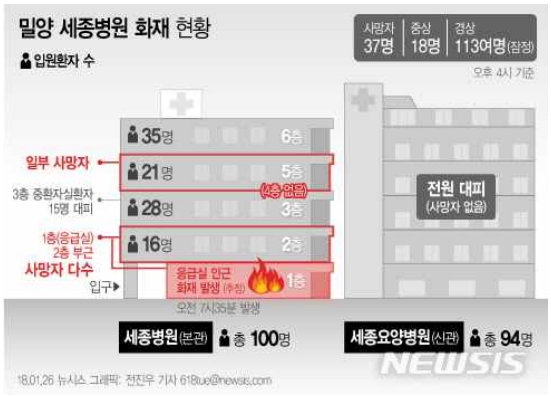

Figure 2. The mil-yang nursing hospital (MYNH) fire deaths in 1st, 2nd, and 5th floor

<Image courtesy of the Newsis graphic>

Total 194 patients stayed for their treatments include nursing care patients in the MYNH. The fire cause still under investigation, but media announced fire on the ceiling witnessed by nurses in the emergency room. Fire engines arrived at the fire scene from 07:33 am and fire alarm activated for evacuation alerts. Fire generated toxic smoke propagated to all areas in 6thfloor main building and most victims happened on each1st, 2nd and 5th floor in the main building with smoke inhalation. There were no sprinklers and most of the victims were not able to evacuate by themselves. In fire victims, one medical doctor and two nurses included.

Second case : the Jang-Seong Nursing Hospital (JSNH) fire

Second fatal structural fire case is the Jang-Seong Nursing Hospital (JSNH) fire. Total 21 people died, and 8 people injured from this fatal structural fire. Followed the Korea times (2014), the fire

happened on May 28th, 2014 year.

Figure 3. ***the Jang-Seong Nursing Hospital (JSNH) fire.***

<Image courtesy of the Jeol-La-Nam-Do Fire Service Headquarter>

The fire started at 00:24 am, 911 calls taken right after the fire witnessed at 00:27 am and extinguished fire at 00:55 am. The Jang-Seong Nursing Hospital (JSNH) located at the Jang-Seoung Gun (County) in Jeol-La-Nam-Do (South Western Provincial area in South Korea).

Figure 4. the Jang-Seong Nursing Hospital (JSNH) fire in 2nd floor.

<Image courtesy of the Joseon times graphic>

Total 333 patients stayed for their treatments include 79 nursing care patients in the JSNH. The fire cause announced as arson fire

by 80 years old nursing care patient and started in the 2nd nursing care building's utility room. One fire engine arrived at the fire scene from 00:31 am, but only 3 firefighters were available from under staffing.

Fire generated toxic smoke rapidly propagated to all areas in 2nd nursingcarebuildingandmostvictimshappenedoneach1st,2ndfloorwith smokeinhalation.Theonly28minutesfromthecalltakingandputoutremaine d21patients'death.

There were no sprinklers and most of the victims were not able to evacuate by themselves. In fire victims, one female nursing care person included.

Third case : the Pohang Nursing Home (PHNH) fire

Third fatal structural fire case is the Pohang Nursing Home (PHNH) fire. Total 10 people died, and 17 people injured from this fatal structural fire. Followed the Korea times (2010), the fire happened on Jan 12nd, 2010 year. The fire started at 04:24 am, 911 call report delayed before the nearby security person witnessed. Fire extinguished at 05:34 am. The Pohang Nursing Home (PHNH) located at the Pohang city in Gyeong-Sang-Buk-Do (South Eastern Provincial area in South Korea).

Total 26 old people stayed for their nursing care in the JSNH. The fire cause announced as electric spark and started in the 1st floor located building office room. Fire engines spend 1 hour and half for put out fire. Fire generated toxic smoke propagated to all areas

in 2nd story building and most victims happened on each 1st floor nursing care rooms with smoke inhalation.

Figure 5. ***the Pohang Nursing Home (PHNH) fire.***

<Image courtesy of the Pohang city Fire Service Headquarter>

The only 28 minutes from the call taking and put out remained 21 patients' death. There were no sprinklers, no fire alarm system, and no fire extinguishers. Most of the victims were not able to evacuate by themselves and there was no care person. The distance from each nursing care rooms' door to exit door was only 5 meters.

Pressure and Release Model

Before applying the PAR model to fatal structural fire in South Korea, brief description of the PAR model should be introduced. Blaikie, Cannon, Davis & Wisner (2014) developed their conceptual framework for vulnerability analysis with three sets of connected links. Root causes, dynamic pressures, and unsafe conditions connected and generated pressures in vulnerable people and resources.

The root causes like a limitation of access to power and social systems expand the propagation of vulnerability following dynamic

pressures such as process like a lack of ethical standards in public life.

Rapid urbanization can be one of the dynamic pressures. And these pressures finally create unsafe conditions in both physical and social manners. To release vulnerability, three sets of links should be approached for decreasing in the PAR model.

Figure 6. PAR model to fatal structural fire in South Korea.

<Image created by writer>

Rauken & Kelman (2010) took a step of identifying from root causes included dynamic pressures before describing unsafe conditions for applying the PAR model to the river flood vulnerability in Norway. In this paper, firstly root causes will be discussed, and dynamic pressures and unsafe conditions' description will be followed in applying the PAR model to fatal structural fires in South Korea.

Table 6 shows the PAR model to fatal structural fire in South

Korea. The lack of matured liberal-democracy & corruption was suggested as main root causes, Lack of (Staff) training and Ethical Standard (Life Safety Priority) and Macro Forces Population Change were suggested as dynamic pressures, and Unprotected Building, as well as the lack of Preparedness to fatal structural fire, were suggested as unsafe conditions. In addition, the function of state was not included this model figure with editing issue.

Unsafe conditions

Unprotected buildings created by root causes in physical environment belongs to the unsafe condition and the lack of preparedness in public actions to unprotected buildings also belongs to the unsafe conditions. For more understanding about the lack of preparedness, brief introduction of disaster management include short history in South Korea will be discussed.

In South Korea, natural hazards like floods, the typhoons had been major concerns before the 1990s (Kim & Lee, 1998; Yoon, 2014). The society of South Korea was under the armies generated three presidents until 1993 (Kong, 1996). The civil defense and military focused policy against North Korea was a strong propaganda until 1993 and impacted the disaster management at that period like the early stage of disaster management history in the United States (Kong, 1996; Yoon, 2014).

There was no policy consideration of human created and technological disasters in South Korea until 1995, while the former

wind & water hazards act only covered the natural hazards since 1967 (Kim & Lee, 1998).

South Korean society had a first civilian government in 1993 and first local election voted in 1995 (Kong, 1996). The decentralization and grass-root democracy still on the way of the disaster management in the South Korean Society and the emergency management act in South Korea was not fully stated the four phases of the disaster management and the comprehensive emergency management concept (Bae, Joo & Won, 2015). Disaster management policy in South Korea showed tendency like changed after national impacted disasters in South Korea (Kim & Lee, 1998; Yoon, 2014).

Root causes and Dynamic pressures of fatal structural fire in South Korea

Blaikie et al (2014, p. 47) introduced that most vulnerability came from economic, demographic, and political process as root causes.

In the mil-yang nursing hospital (MYNH) fire), the Jang-Seong Nursing Hospital (JSNH) and the Pohang Nursing Home (PHNH) most victims were older patients. In disaster response, the population segments should be applied rather than just undifferentiated public (Lindell, Prater & Perry, 2006).

The victimized population in this mass emergency showed two characteristics in their combined name as older patients. In South

Korea, the old population means over 65years old by the law and each one of five peoples are old population.

Firstly, this vulnerable population segment requested more immediate help from their care facilities in case of emergency because they cannot move by themselves. The Korean hospital association (2005) has been indicated that Neo-liberalism has been destroyed the publicity in the medical sector in South Korea. It caused the layoff medical care personnel and lack of training in nursing care organizations after the economic crisis of the international monetary fund on the 1997 year in South Korea.

In the mil-yang nursing hospital (MYNH), there were 35 medical steps has been working, but fire happened in the early morning without a minimum level of human resources available for evacuation activities. It caused delays of patient's evacuation at the initial stage of fatal fires.

In the Jang-Seong Nursing Hospital (JSNH) fire, there was one female nursing care person, but failed to put our fire with fire extinguisher and died. In the Pohang Nursing Home (PHNH) fire, there was no person to help older patients' evacuation.

Secondly, this kind of facilities should be designed for the safety of this vulnerable population and protected by the function of the state(Blaikie et al,2014,p.48).

The mil-yang nursing hospital (MYNH), the Jang-Seong Nursing Hospital (JSNH) and the Pohang Nursing Home (PHNH) had no fire sprinkler system which provides initial fire exhaustion to prevent fire

propagation before the arrival of fire department human resources.

The rule of law was not applied for this fatal structural fire and repeated mass emergency like the former fatal structural fire reported 21 died at a nursing care facility in 2014.

The fire sprinkler system waived reason was that certain building exempted from the mandatory fire sprinkler system under 11 floors by the building law in South Korea.

After the 2015-year nursing care facility's mass emergency in South Korea, the government revised the fire sprinkler system installation as mandatory for any size of nursing care hospital, but this vital application was also waived for the June of 2018. The operating permit of this kind of facilities also divided. The nursing care hospital directly requires permission from the ministry of health in South Korea, but nursing care facilities just reported to their jurisdictional area administration for their operation.

The building laws required minimum fire safety measures, but almost nursing care facilities can open their business in current existed buildings.

On the other hand, one fire case shows different result from three fatal structural fires happened in nursing care facilities. This structural fire case is the Na-ju nursing hospital (NJNH) fire. Total 0 people died, and 0 people injured from this structural fire. Followed the Nam-Do times (2015), the fire happened on 11:49 pm in April 12nd, 2015 year.

The the Na-ju nursing hospital (NJNH) located at the Na-ju city

in the Jeol-La-Nam-Do (South Western Provincial area in South Korea). Total 217 patients stayed for their nursing care in the NJNH. The NJNH operated 22 night working staffs at that night and immediately provided evacuation efforts when the fire alarm activated.

The owner of the NJNH installed fire sprinkler system voluntarily. The fire started in lounge room by electric overload and exhausted by the sprinkler system in a few minutes.

Dynes (1997) described the Lisbon Earthquake in November 1st, 1755, can be evaluated as the first modern disaster in history because the State 'Portugal' showed the emergency response as well as reconstruction based on acceptance of the responsibility.

Unfortunately, the responsibility for this fatal structural fire in South Korea is not clearly stated and showed fatal structural fire as a repeated pattern in their society. The lack of ethical standards in public life and priority of life safety in PAR model appeared as dynamic pressure in fatal structural fires in South Korea.

In addition, rather than demographic process and function of state mentioned above, the root causes of fatal structural fires in South Korea can be explained by their ongoing status of the mature liberal-democracy since the authoritarian industrialization period under military government.

Kong (1996, p. 54) reported: "officials sacrifice the interests of ordinary citizens for the sake of achieving faster growth and personal gain" in South Korea. Followed the PAR model,

unprotected building can be the one as unsafe condition in a fatal structural fire in South Korea as well as the lack of disaster preparedness.

Suggested Root Causes

The most vulnerabilities came from economic, demographic, and political process as root causes in the PAR model (Blaikie et al, 2014, p. 47). Through the connected links, the root causes move to the process like a lack of ethical standards in public life and created the unsafe condition that is vulnerable for both physically and social manner.

The unsafe condition of the mil-yang nursing hospital (MYNH), the Jang-Seong Nursing Hospital (JSNH) and the Pohang Nursing Home (PHNH) reflect the fact that three suggested root causes such as demographic causes by the older population (Sara, Stan, Yvonne, 2004, p. 25), economic causes like the lack of staffs both of building facility and fire service after the Neo-liberalism (The Korean hospital association, 2005) as well as political process by the lack of matured liberal-democracy and corruption issue in South Korea (Han,1974;Kang,2002;Kong,1996).

Before approaching to political process, the older population and the lack of staffs will be discussed first. Every each one of five people are old population in South Korea.

The ageing issue include older population is a trend not only in South Korea but also in most developed countries faced nowadays.

The fact that the evacuation difficulties of the older population can make worse situation requires urgent emergency evacuation, but the population sensitive policy can be working as decreasing vulnerability.

The population segments (Lindell, Prater & Perry, 2006) can be one of those policies. The lack of hospital staffs issue can be explained as an effect of Neo-liberalism. The layoff and followed the lack of training has been making more vulnerable publicity of various filed as well as the medical service in South Korea. The understaffing of both the fire and emergency service and hospital can be issue because the third fatal structural fire case showed the understaffing issue of first due engine company, but political process by the lack of matured liberal-democracy and corruption issue political will be more discussed for explaining of the unsafe condition in this essay.

The fatal structure fire happened hospital can be an unprotected building in the unsafe condition of PAR model. This hospital was not designed or admitted for guarantee of evacuation of older and sick patient evacuation. Design and building permit of new and modified facilities must consider life safety like NFPA life safety code requirement (NFPA, 2018). For example, the means of egress include enough space for patients' bed moving from each room to evacuation elevator has not been measured with reasonable level.

In addition, the absence of the fire sprinkler system resulted in failure of initial fire exhaustion to prevent fire propagation before

the fire department arrival. That system was waived for the consideration of building owners' practical situation. The common rule of law and regulation enforcement to the life safety were not effectively practiced.

The inadequate building for life safety still allowed for their business continue and commonly admitted fire sprinkler system can be waived for only business gain. The critics of public exploded to these repeated tragedies, but the measures of government limited to punish few peoples. The reasonable measures in other word 'acceptance of responsibility' was introduced by Dynes cannot find in here (1997).

In South Korea, the lack of status of mature liberal-democracy and corruption issue seems to make continued effects to the function of the state for good governance and the rule of law (Blaikie et al, 2014, p. 48). Han (1974) reported the failure of democracy in South Korea. The Korea got an independence from Japanese rule between 1910 and 1945.

The country divided as South and North after Korean war. The dictatorship of Rhee Syngman was terminated at 1960 by the April uprising of people. Followed coup occurred at 1961 and two military coups happened at 1981. The military dictatorship had been continued until 1990s.

The corruption and authoritarian industrialization period during 1961 and 1987, minimal regulation for safety and neglecting safety for cut corner, and corruption highlighted for advantages of rulers

and their customers (Kong, 1996). Jaeyeol reported commonalities of disasters in South Korea can be thinking points: risk-taking culture followed the fast-growing economy, social groups and institutions are not connected based on coordination, unorganized rescue efforts from different organizational culture, corruption and privatized bureaucracy resulted in system failure (1998). The economic growth coincided in South Korea with general improvement of living through industrialization (Kang, 2002).

After 1987, democratization and economic liberalization period started, but the actual democratization started from the dismiss of military ruling party in 1993.

The national impacted disasters in early 1990s was criticized by Kong "officials sacrifice the interests of ordinary citizens for the sake of achieving faster growth and personal gain" (1996, p. 54).

Kong (1996) also insisted that corruption persist because decades will take to reform former established corruption and malpractice. The tolerance of corruption also has been existed as certain level of cultural norms. "In Korea, there is a set of practices called Chonji which literally means money as a token of appreciation" (Sohail & Cavill, 2008).

In 2015, government employee's construction corruption identified and 35 of them were arrested (Seoul times, 2015). Meanwhile, the clean government system to fight against corruption was set up in 2004 (Cho & Choi, 2004).

Conclusion

In conclusion, the lack of matured liberal-democracy and corruption as main root causes of the fatal structural fire in South Korea can be suggested beside the older population and the lack of staff issue based on demographic and economic process.

The lack of status of mature liberal-democracy and corruption issue seems to make continued effects to the failure of function of the state for good governance as well as the rule of law to measure the fatal structural fire.

In South Korea, the lack of status of mature liberal-democracy and corruption issue seems to make continued effects to the function of the state for good governance and the rule of law. The lack of ethical standard also has been expressed as non-prioritization of life safety.

In dynamic pressures as lack of staff issue, Neo-liberalism has been destroyed the publicity and caused the layoff medical care personnel and lack of training in nursing care organizations in South Korea. The nursing care facilities should be designed for the safety of this vulnerable population and protected by the function of the state, but the rule of law was not applied for the prevention of this fatal structural fire and repeated as phenomenon.

In dynamic pressures as a macro forces, the ageing issue include older population is a trend not only in South Korea but also in most developed countries faced nowadays. the fact that the evacuation difficulties of the older population can make worse

situation requires urgent emergency evacuation, but the population sensitive policy can be working as decreasing vulnerability

Unprotected buildings as well as the lack of preparedness created by root causes described in front and provided the causes of this fatal structural fires as phenomenon in South Korea. For effective mitigation for this fatal structural fire phenomenon in certain type of public facilities, careful consideration of current lack of matured liberal democracy and corruption issue should be focused.

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