Research Article

Efficient Operation Plan of 119 Comprehensive Situation Room According to the Nature of Disaster Response in Korea

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Abstract: This study presented efficient problems and improvement measures according to the nature of disaster response in the 119 General Situation Room, which handles most of the disaster response. The results of the study are as follows. First, it is necessary to distinguish emergency and non-emergency reports in order to enhance urgency and speed. It was also proposed to organize a fire, rescue, and emergency team as a firefighter with abundant working experience in emergency reports such as fire, rescue, and emergency reports, and to organize and operate a life safety team as a general firefighter. Second, it is necessary to operate an emergency rescue standard system by separating the reception desk, command, and control unit to enhance expertise. In addition, it is necessary to establish a situation management team within 119 comprehensive situation rooms across the country and transfer the information and communication team to 119 comprehensive situation rooms. Third, it is necessary to give clear responsibility and authority to field commanders in terms of decentralization so that dispatched firefighters can be properly deployed and coordinated. Finally, flexibility in organizational operations is needed in terms of appropriate decision making.

Kewords: Disaster response, characteristics, 119 comprehensive situation room, operation plan, Urgency and promptness

1. Introduction

119 General Situation Room is integrated and managed to improve the efficiency of human resource operation, information and control capabilities by unifying what had previously been operated by each fire department in each province according to the operation of the emergency rescue standard system. It aims to establish a unified wide-area dispatch system by integrating each fire station's regional water conservation system into a standard system to prevent overlapping investments.

As of January 1, 2020, 14 units of the Jeollabuk-do 119 General Situation Room and 51 personnel are operating in a 24-hour three-team, two-shift, 24-hour work system, and the average number of 119 reports in Jeollabuk-do in 2019 is 1,556 per day, almost all reports that threaten people's lives and property. Accordingly, the role of situation receptionists in the 119 General Situation Room, which is responsible for responding to various disasters and accidents, is important. A study on the improvement of work and training to improve the response ability of 119 situation receptionists.

The 119 General Situation Room orders 12 fire stations to be dispatched in accordance with the situation manual, such as saved fires, rescue, first aid, and other complaints. However, special environments such as sudden writing, uncertainty, and time pressure are created at disaster sites, and dispatch time can be delayed depending on the excitement, nature, reporting ability, situation handling of the reporter, and cognitive ability. In order to take this disaster response situation into account, it is important to analyze the nature of disaster response and seek efficient operation of the 119 General Situation Room. Song Yun-seok, Kim Jung-gu, Bang Kyu-myung, Lee Sang-mi, Jeong Ho-shin, Hyun Sung-ho, Firefighting Organization Theory, Literary Media, 55-60, (2011)
Ha Yeon-seop, Risk Society and National Policy, Park Young-sa, 45-70 (2015.7.6)
Derivation and verification of "principles for implementing disaster response" based on the reinterpretation of disaster and disaster management policies (2014.519. Byun Sang-ho, Kim Tae-yoon)
Are we responding to the Korean economy, corona disaster, and principles? (2020.9.10)

The existing study on the nature of disaster response was conducted by Kim Kyung-jin et al. (2019) on the analysis of the effects of fire organization effectiveness on the organizational effectiveness of disaster field commanders. Kim Kyung-jin, Analysis of Factors Influencing the Effectiveness of Firefighting Organization in Regularity, Yang Gi-geun, and Disaster Response, State Administration Research, Vol. 14, No. 3, 211-233, (2019)
In order to verify the feasibility of the "principle of disaster response" through a study on the effect of the class system (2014) on organizational performance, the causal relationship and influencing factors between the class system and organizational process were analyzed. A Study on the Effect of the Class System on Organizational Performance, Hanyang University Graduate School, 255-259, (2014)
A study on the derivation and verification of disaster response principles based on the reinterpretation of disaster and disaster management policies by Byun Sang-ho and Kim Tae-yoon (2014) suggested the theoretical development of disaster response principles. Byun Sang-ho, Kim Tae-yoon, Derivation and verification of principles for implementing disaster response based on reinterpretation of disaster and disaster management policies, the Korea Administration Report, Vol. 48 No. 109-136 (2014.2.11).

The existing research on 119 situation rooms was conducted to improve the responsiveness of 119 situation receptionists, suggesting problems and improvement of the work and training methods for 119 situation receptionists in Korea. Lee Jung-il, A Study on the Improvement of Work and Training to Improve the Response Capacity of 119 Situation Correspondent, Vol. 13, Vol. 4 No. 550-561, 2017.
In order for integrated situation management to be successful in the field response stage, Lee Jung-il (2010) argued that it is necessary to establish a computer and communication system suitable for the new IT technology environment. Lee Jung-il, the development of the comprehensive situation management system for disaster reporting. Korea Institute of Safety and Management Science, 559-580. 2010

Disaster has its own characteristics, and disaster response requires customized response, but little research has been conducted so far on the efficient operation of the 119 situation room based on the nature of the disaster, so we will seek efficient operation of the 119 situation room.

Previous studies have been conducted by Lee Kang-young et al (2007) [3], Han Un-hee (2018)[4], Ahn Eun-hee (2005)[5], Kim Won-guk et al (2018)[6], and Kim Hye-jin et al (2013)[7]. There were only simulations about buildings without connected passageways, while this study aims at evaluating efficient method of evacuation and safety by analyzing RSET for the two buildings with a connected passageway.

2. Properties of Disaster Response

Existing conditions for the nature of disaster response include urgency and speed, accuracy, expertise, integration of field emergencies and organizational establishment, decentralization of appropriate work, concentration of disaster response elements, efficient mobilization of manpower, information flow, comprehensive coordination, and contextual importance (Quarjin 9); Quarantelli (1998) introduced the convergence of field emergency and organizational establishment, appropriate task makeup, concentration of disaster response elements, essential function performance, efficient mobilization of human resources, proper flow of information, appropriate decision making, establishing total coordination, media use, and contextual significance. Arjen Boin (2013) introduced the nature of disaster response in three ways: urgency, speed, accuracy, and expertise. Haesung et al. (2010) divided the nature of disaster response into six categories. In contrast, Kang Sung-wan (2005) defined four main attributes for responding to disasters. Therefore, this study focuses on urgency and speed, professionalism, decentralization, and appropriate decision-making, which are the main pillars of the existing research. A summary of this is presented in comparison with existing studies as shown in Table 1.

<Table 1> attribute category of disaster response by researchers

Researcher / Properties	Quarantelli (1998)	Arjen Boin and others (2013)	HaSung Kong and others(2010)	Kang Sung-wan (2005)	Application
urgency and speed	×	○	○	○	○
Accuracy	×	×	○	×	×
professionalism	×	○	○	○	○
Integrality (fusion of on-site emergency and established organization)	○	×	×	×	×
Decentralization (Appropriate business makeup)	○	○	○	×	○
Focus on disaster response requirements	○	×	×	×	×
Perform essential functions	○	×	×	×	×
Efficient mobilization of manpower resources	○	×	×	×	×
the proper flow of information	○	×	×	×	×
Appropriate Decision Making	○	×	○	○	○
Establishing overall coordination	○	×	×	×	×
Use of the media	○	×	×	×	×
The importance of the situation room	○	×	×	×	×

2.1 Urgency and Agility
Most 119 reports require life-saving and emergency services, so it is urgent to minimize damage as soon as it is reported, and to do so, it is given the status of a specific civil servant and has a command order system. Since the golden time for most of the disasters and fire accidents is determined within 10 minutes, it is necessary to arrive at the site quickly and take measures such as rescue and first aid to save lives.

2.2 Professionalism
The studies required for firefighting work span a wide range of firework, machinery, architecture, administrative and civil engineering, and the knowledge of overall fields such as firefighting tactics, rescue, and first aid activities, and fire investigation can be solved, investigated, and saved lives efficiently. In particular, the cause of a disaster has a very complex process. Especially in responding to human disasters, advanced knowledge and skills must be applied rather than simply instructed or directed by superiors [13]. Therefore, the technical expertise that disaster response organizations should have in preparation for field activities is important.

2.3 Decentralization
At the site of a disaster, the field command system consists of one large framework, but due to the nature of the disaster, actual field activities are carried out by teams or families. Each group has one leader. Delegating authority on a team basis at the site of a disaster is a reasonable way to increase flexibility and effectiveness in initial response or changes in field conditions, while preventing safety accidents by members. This is because team members have a shared purpose, leverage complementary expertise, and have a responsibility to cooperate in a mutually reliable and open relationship [14].

2.4 Making the right decision
Bureaucracy or complex systems and rules are powerful forms of governing people. However, in times of crisis at a disaster site, the confusion surrounding how to apply regulations and procedures can be found. This is because many rules hinder an effective approach as a mechanical organization crisis in disaster management. Therefore, in order to manage the increased complexity in urgent situations, there should be a norm that can give very high levels of flexibility to regulations, such as the regulations and procedures that organizations have.

3. The efficient operation of the 119 General Situation Room

3.1 Urgency and expediency

3.1.1. Separate operation of emergency and non-emergency reports

The fire organization receives not only emergency reports among 119 reports, but also non-emergency reports that can be handled with time, simple complaints against fire organizations that do not require firefighters to be dispatched because they are not related to the lives and property of the people. However, the number of 119 reports of non-emergency reports continues to increase year by year, and the proportion of living complaints among the reports is rapidly increasing. Receiving and responding to all 119 reports without distinguishing between emergency and non-emergency reports can be an overload considering limited firepower. Compared to the number of 119 reports and the number of police organization reports over the past three years, more than 154 percent of reports have been processed.

Unlike advanced countries such as the U.S., Canada, and Japan, fire organizations are handling 119 reports mixed with simple civil service calls and emergency reports. In the case of the police organization, it operates a call center for civil service counseling by separating it from simple civil service calls and emergency reports 112. This is interpreted as a decision made by the police organization to effectively replace the number of civil complaints. In addition, the fire organization is going against the times by integrating 25 types of civil service calls into 119 reporting calls, an emergency reporter, as shown below. Integrating civil service calls such as inconvenience in living and emergency calls into 119 for simple benefits can lead to the depletion of 119 comprehensive situation rooms and dispatched firefighting forces, including manpower and costs. As a way to effectively cope with daily complaints while remaining faithful to one's duties through selection and concentration, it is proposed to increase the urgency and speed of emergency reports by separating emergency and non-emergency reports, such as police organizations.

3.1.2. Separate operation of fire, rescue, and emergency teams and life safety teams

In general, fire organizations are dispatched to the scene in the order they received the call without distinguishing between emergency and non-emergency reports. As such an emergency report and civil complaints are handled together, they can be neglected in their original work, fire, rescue, and emergency. According to the analysis of emergency reports and civil complaints such as fire, rescue, and emergency in Table 2 over the past three years, 74.2% of civil complaints were reported on average compared to emergency fires and various accidents. Firemen are being deployed to most of the non-emergency tasks rather than to emergency tasks.

<Table 2> Status of emergency reports and civil complaints

Sortation		Sum	Emergency report on fire, rescue, emergency, etc.;	Report on civil complaints
2019	Number of cases	427,735	104,197	323,538
	Ratio (%)	100	24,4	75.6
2018	Number of cases	316,776	84,872	231,904
	Ratio (%)	100	26.9	73.1
2017	Number of cases	281,743	75,450	206,293
	Ratio (%)	100	27.44	72.56
Average (%)		100	25.8	74.2

Therefore, it is necessary to organize a fire, rescue, and emergency team with abundant working experience in emergency reporting, and to organize a life safety team as a general firefighter to separate the two organizations and faithfully carry out fire, rescue, and emergency services faithfully.

3.2 Professionalism

3.2.1. Separate operation of reception desk and command and control unit

Despite the importance of the first recipient's ability or expertise in the process of receiving 119 reports, it tends to belittle important reporting systems in a series of processes from receiving 119 reports to dispatching, controlling, processing, and returning home. Despite numerous variables depending on the recipient's behavior, one recipient is required to handle the report receipt case entirely from receipt to order, control, and closure. In the U.S., the recipient continues to talk to the reporter, broadcast the contents of the call to fire organizations, police organizations, and hospitals simultaneously, and each vehicle is organized and dispatched. Therefore, it is necessary to operate the emergency rescue standard system by separating the reception desk, command, and control unit. For example, in the case of a recipient, it is desirable to be a simple telephone respondent, not a firefighter, to receive the location and contents of the reporter, and to conduct order and situation control through a multi-party call.

3.2.2 Expansion of the establishment of a situation management team in the 119 General Situation Room across the country

Most disaster reports are made to 119 and the 119 General Situation Room is handling a large number of 119 reports. This vast amount of information can be stored within the emergency rescue standard system, and this stored data can be used as important data for disaster prevention. In addition, data analysis can be used to reduce casualties and property damage in the event of a disaster, and it can also help disaster response activities. The 119 General Situation Room, which handles such a large amount of information, will also be important for system management. The establishment of a situation management team in the 119 General Situation Room is necessary to analyze such data and manage the system. Support organizations such as administration are essential to prevent disasters, provide accurate information, predictable information, and manage a vast amount of data, as well as simply accepting 119 reports and organizing dispatches. 119 The vast amount of big data in the comprehensive situation room shall be utilized well. However, in the case of the 119 General Situation Room in Jeollabuk-do Province, it only operates three teams of three shifts of the security team that receive 119 reports, and one administrative agent supports the security guard. This is also too much for administrative personnel to handle administrative support, requests for information disclosure, and general administrative affairs. In other words, the number of people cannot be done except for simple administrative support. Therefore, they cannot analyze and utilize the vast amount of information they have in the 119 General Situation Room.

In the case of 119 general situation rooms in 18 cities and provinces, 8 cities and provincial fire departments, including Seoul, operate administrative support departments in the form of situation analysis and situation management in 119 general situation rooms.

3.2.3 Information and Communication Team Transferred to 119 General Situation Room

119 General Situation Room includes Emergency Rescue Standard System, Location Information Inquiry System, Firefighting Vehicle Choldong Control System, AVL, Communication and computer systems are especially important because geographic information systems, chemical inquiry systems, aviation control systems, wireless communication systems, wired communication and computer and information systems are operated organically. Moreover, despite the need for the most recent management of 24-hour computer communication equipment, the 119 General Situation Room and the communication system may not be organically established because the information and communication team is affiliated with the structural emergency department. Therefore, it is necessary to transfer the information and communication team to the 119 General Situation Room and the communication system so that they can operate organically with each other in the overall framework.

3.3 Decentralization: Granting clear responsibility and authority to field commanders

At the site of a disaster, the field command system consists of one large framework, but due to the nature of the disaster, actual field activities are carried out by teams or families.

Each group has one leader. Delegating authority on a team basis at the site of a disaster is a reasonable way to increase flexibility and effectiveness in initial response or changes in the field situation, while preventing safety accidents by firefighters. This is because team members have a shared purpose, leverage complementary expertise, and have a responsibility to cooperate in a mutually reliable and open relationship [14].

As seen in large-scale disasters such as the Jecheon complex fire, we can see how important the leadership and disaster response strategies of field commanders are. As a result of the analysis of the importance of disaster site transformative leadership for effective and efficient disaster response, the highest level of importance was the

charisma level, and the analysis of the importance of subcomponents at each stage was the highest. In order to have authority over commanders' orders at each stage, such as charisma level and firepower deployment and coordination capability, it is necessary to give clear responsibility and authority to field commanders so that dispatched firefighters can deploy and coordinate firepower.[6]

3.4 Appropriate decision making: flexibility in organizational operations

The fire organization consists of 11 classes of state officials in a series, and the bureaucratic mechanism of this hierarchical structure has the advantage of ensuring unity of the organization by graduating it into a vertical top-down hierarchy to work well in dangerous situations. As disaster response requires speed and is exceptional due to its nature, it is inevitable to take power to some extent, and it is also known to be beneficial to achieving efficiency [4]. However, due to the nature of the uncertainty and urgency of the disaster, it is difficult to fully comply with the prescribed regulations and requires flexibility in the operation of the organization, but the class status leads to rigidity, making the organization inefficient.

The class system in Korea is operated according to seniority, which is feared to hinder the productivity improvement of officialdom through motivation of public officials [18]. Moreover, it is not easy for low-ranking employees to present their opinions to high-ranking officials and reflect them because it is a hierarchical structure. Disaster response work is a crisis response to be taken in an urgent situation of disaster, but class systems, bureaucratic structures and procedures, and personnel composition and organizational structure are not designed to successfully cope with complex disaster situations. Therefore, in urgent situations, it is necessary to exercise the flexibility of the organization's operations and choose an effective method suitable for field conditions.

It is a matter of Korean disaster response organizations, as there is a bureaucratic malady to maintain a pre-crisis normative model even in urgent situations. Bureaucratic prescriptions are to clarify the boundaries of authority and ensure communication according to the 'approved' channel in times of crisis.

This universal line of thought leads to the ability of organizational functions to maintain more robust and accurate organizational structures. The bureaucratic organizational structure of the hierarchy maintains a practical aspect of emergency management that streamlines disaster response organizations. However, in order to increase the effectiveness of the field organization considering the nature of the disaster,

In the urgent situation of disaster, the re-conceptualization of the organization is necessary, but in Korea, the bureaucratic ills of the hierarchical structure are entrenched, making it difficult to re-conceptualize the organization. Therefore, it is necessary to give appropriate authority and responsibility to beginner commanders and to apply standards such as on-site rule procedures to prevent them from taking appropriate measures while waiting for orders from superiors.

4. Conclusion

This study aimed to prepare efficient problems and improvement measures according to the nature of disaster response in the 119 General Situation Room, which handles most of the disaster response. The results of the study are as follows.

First, there are many non-emergency reports of 119 due to the deterioration of urgency and speed, so it is necessary to increase the urgency and speed of emergency reports by separating emergency reports and non-emergency reports. In addition, it is necessary to organize fire, rescue, and emergency teams with working-level firefighters for emergency reporting, and to organize and operate life safety teams as ordinary firefighters for non-emergency reporting, faithfully perform fire, rescue, and emergency services.

Second, it is necessary to operate an emergency rescue standard system by separating the reception desk, command, and control unit to enhance expertise. In addition, it is necessary to expand the establishment of a situation management team to cities and provinces nationwide within 119 comprehensive situation rooms, and transfer the information and communication team from the rescue and emergency department through organizational maintenance of 119 comprehensive situation rooms.

Third, in terms of decentralization, the on-site command system is composed of a large framework, but it is necessary to assign clear responsibility and authority to field commanders in consideration of the nature of disaster so that dispatched firefighters can be properly deployed and adjusted.[6]

Finally, flexibility in organizational operations is needed in terms of appropriate decision making. Although there is an advantage of securing organizational unity by graduating the bureaucratic mechanism of hierarchy into a vertical top-down hierarchy so that it works well in dangerous situations of disasters, it is necessary to choose an effective method suitable for field conditions.

As a future research project, the first firefighters to deal with 119 civil affairs, such as situation security

education, situation management education, and reception tips, are the factors to receive 119 situation rooms, so research on education curriculum development is needed.

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