Abstract

**Purpose:** The purpose of the research in this paper is to derive the operating key of the manual that must be included in the preparation of the manual in order to prepare the field action manual that works at the disaster site. We want to contribute to preparing a manual of on-site action that can operate at disaster sites through critical reflection on the fact that many human casualties were caused by the failure of the prepared manual in each national disaster. The study will contribute to preparing manuals for disaster sites.

**Methods:** Research on the field action manual is insufficient. In particular, there has been no research on the key to the field action manual to operate at the disaster site. Nevertheless, the need for this research is due to the urgent need to make manuals that do not work at disaster sites into manuals that can be operated. To this end, in addition to theoretical research, we would like to study based on the insights gained from our experience in the disaster scene and military experience as a professional career soldier.

**Results:** Disaster relief agencies and various related agencies, including disaster relief agencies, will respond to disasters, and in order for them to properly respond to disasters, they must prepare manuals that can operate at disaster sites. In order for the manual to function properly at the disaster site, it must have a key to operate the manual. According to the research, the key to making the manual work at the disaster site is mission and golden time, decision making requirements, a resolution table, and various field information that affects decision making.

**Conclusion:** The reason why the manual did not work at the disaster site was that there was no key for the manual to work. It is expected that the manual will be operated on the spot if the key for operation of the manual derived from this study is prepared by including the on-site action manual during peacetime, and regular training is conducted with the decision maker taking the initiative. It will also give insight to officials preparing and training manuals. We look forward to expanding further research on the working keys of the manual.

**Keywords** Field Action Manual(FAM), Manual Operation Key, Mission, Decision, Disaster Site Information

1. **Introduction**

In accordance with Article 34-5 of the Framework Act on the Management of Disasters and Safety, the manual is prepared and trained during peacetime to respond based on the manual in case of a crisis. Nevertheless, in the event of a crisis in the real world, manuals would become nominal and disasters would develop into national disasters [1]. This paper began with a reflection on these problems and studied them to contribute to preparing manuals that operate in the disaster scene in crisis situations.

The scope of research for research on manuals that do not work at disaster sites was focused on the Field Action Manuals(FAM from next time on) used at actual disaster sites in the
manual (standard manual, working manual, and on-site action manual). In order to re-recognise
the problems of the manual that did not work, the preparation status of the on-site action man-
ual was analyzed and further the recent disaster cases were studied.

For manuals that operate at disaster sites, manuals should be prepared so that they can be
operated, and the so-called 'Manual Operation Key' was studied and presented in this paper so
that it can be used at disaster sites by identifying and presenting key elements to be included in
the preparation of manuals. Since there is no prior study that separately studied the "Manual
Operation Key," this study used my experience in disaster scene activities, experience in com-
mander and staff activities, and experience in auxiliary training when serving in the military.

2. The FAM Preparation Status

Everyone thinks of a manual that works at a disaster site, and hopes it will. Nevertheless, the
manual only works at disaster sites as long as it is honestly prepared. Taking this into account,
it is important to analyze and reflect on why the manual does not work at the disaster site, and
through this analysis and reflection, the manual that operates at the disaster site should be
prepared to prepare for a disaster.

2.1. The FAM preparation

The preparation and operation of the crisis management manual in the disaster area shall be
linked in the order of the crisis management standard manual, the disaster response working
manual, and the FAM[2].

The crisis management standard manual is a document that defines the duties and roles of
the disaster management system and related agencies at the national level and is prepared by
the head of the disaster management agency. The working manual for disaster response shall
be prepared by the head of the agency in charge of disaster management and the head of the
relevant agency and the head of the agency in charge of disaster management in accordance
with the functions and roles prescribed in the standard manual for crisis management.

Figure 1. Cover of the FAM(e.g. livestock disease).

The FAM is a document containing the action procedures of the agency that performs its du-
ties directly at the disaster site and is prepared by the head of the agency designated by the
head of the agency that has prepared the crisis response working manual. The Republic of Korea
has enacted the Framework Act on Disaster Management and pushed for disaster preparedness
under the manual amid heightened public interest since the Daegu subway fire in 2003[3], and
has completed the maintenance of the manual as of 2020. <Figure 1> is a manual cover for livestock diseases during the field action manual, and all on-site action manuals are red in consideration of their urgency[4].

2.2. The FAM preparation

Under the leadership of the Ministry of Public Administration and Security, the crisis management manual in the disaster sector has been well-organized and prepared, but in the process of organizing and preparing the manual, we would like to present problems such as <Figure 2> with some characteristics and limitations.

First, it is a matter of expertise. In preparing the manual, the Ministry of Public Administration and Security led by experts in related fields prepared and provided it to local governments, and the manual was prepared by a theory-based expert who had no field work experience. Theoretically, it is elaborately written, but the question remains whether it will work at the disaster site. In particular, the on-site action manual must be prepared by the relevant officials participating in the disaster response at the site to ensure its effectiveness, but the reality is that the manual produced by a third party expert has to have another limitation because the relevant officials have limitations in making manuals while performing their current duties.

Second, it is a matter of simplicity in the manual. A simplified manual was created so that it can be easily understood when looking at the manual[5]. Therefore, a manual with a well-established overall system is made, but if a person who lacks expertise in the manual structure reads the manual, it is difficult to understand, and furthermore, there are problems of storing the manual in a separate storage box but not using it.

Third, it is an organizational problem for the manual. The Ministry of Public Administration and Security tried to prepare for a crisis by appointing disaster prevention lines to improve the expertise of public officials in charge of disaster areas, but the organization of disaster management agencies, such as local governments, was in charge of disaster prevention.

Finally, it is a question of the usability of the manual. During disaster preparedness training, such as safety Korea training, the training is based on manuals, but the phenomenon of "manuals separately, years apart" has occurred, leaving questions about whether the manual will work properly in a crisis situation.

3. Recent Disaster Cases and Causes of Unoperating Manuals
Recently, the prepared FAM did not work properly at the disaster site, resulting in many casualties. There may be many causes and reasons, but I would like to analyze them at the manual level.

3.1. Recent disaster cases

On December 21, 2017, a fire broke out at the Jecheon Sports Center, killing 29 people and injuring 37 others. There are many causes and reasons for the occurrence of many victims, but in terms of preparation and response to the manual, the report of delays in the occurrence of fire, the spread of damage caused by the opening of fire doors in case of evacuation using emergency stairs, the failure to maintain the status of firemen, and the failure to share information on disaster sites remain regrettable.

On January 26, 2018, a fire broke out at Sejong Hospital in Miryang, killing 50 people and injuring 142 others. Most of the victims were elderly patients, but the evacuation plans for elderly patients who were unable to move were insufficient, and many mid-term disaster agency officials, including Cheong Wa Dae, showed interest in the site to the on-site commander, which also affected the on-site command.

On April 29, 2020, a fire broke out at the construction site of the Icheon Logistics Center, killing 38 people and injuring 10 others. The scene in which the CEO of the construction company fainted while coming out of the press conference due to the accident clearly showed that the priority task should be to prepare for the crisis.

What the above-mentioned accidents have in common is the accident that has developed into a major disaster because it did not work properly at the disaster site, although it had a manual on the crisis situation.

3.2. Why doesn’t the manual work at the disaster site?

Even if the manual is well prepared and well trained, the disaster site is initially confused by the limitations of human cognitive abilities. In particular, due to the uncertainty, friction, danger, dynamics, etc. of a disaster site, it takes time to be familiar with the situation in order to play a proper role in a disaster environment in which disaster officials are not familiar. There are various related agencies at the disaster site, so more time is needed for the entire organization to adapt to the disaster site.

The reasons why the manual did not work properly at the disaster site without considering the specificity of the disaster site are summarized in <Figure 3>.

Figure 3. Why isn’t the manual working?.

Why doesn’t the manual work?

1. **Expertise**: I don’t know because I didn’t write it!
   - Professional education completion, priority mission knowledge conditions must be guaranteed

2. **Complexity**: I don’t know what it is even if I read it!
   - A description of the simplified manual configuration is required.

3. **Organizationality**: Whatever we want to do, we can’t cooperate!
   - Skilled response system operation required

4. **Reaction**: I’ve never been trained properly
   - Training required considering worst-case scenario

The first reason why the manual does not work at the disaster site is because of the disaster officer’s expertise. It is not easy to respond to a disaster by using a manual created by a third
party expert, even if it is written by a disaster official himself. Considering his experience of consulting manuals at multi-use facilities after being commissioned by the Ministry of Public Administration and Security, the safety officer at the branch of 00 companies at large companies did not read the manual for a year while on duty, even though he had a certificate of industrial safety engineer. Disaster officials should first ensure that they have professional training related to manuals and conditions for familiarization[12].

Second, it is a matter of complexity due to the simplification of the manual. It was simplified and written to enhance awareness of the manual, but in the view of disaster officials who did not write it themselves, the simplicity rather comes as an incomprehensible complexity. Only when a simplified manual has a specific description of its composition and composition, will the practitioner be able to read and understand it.

Third, it is a disaster preparedness problem at an organizational level. Disaster preparedness by disaster prevention series is expected to guarantee expertise, but local governments, in contrast, are operated mainly on civil service welfare, so even if disaster prevention officials want to do anything to prepare for disasters, cooperation from neighboring departments is often poor. The government should be prepared to ensure that the system for responding to disasters is in operation throughout local disasters can be put into operation.

Finally, training considering the worst scenario is required to increase responsiveness to disaster situations[13]. Without manual training, the manual will not work properly in a disaster situation.

4. What are the Keys for Manuals that Operate in Disaster Situations?

What is the key to make the manual work properly in a disaster situation? Since there is no existing research on the key that allows the manual to function properly in a disaster situation, I studied the key of the working manual that can be used at a disaster site using my military and disaster experience.

4.1. The FAM operation key

In order for the on-site action manual to work, a key must be prepared to operate the manual from peacetime, taking into account the characteristics of the disaster site, such as uncertainty, friction, danger and dynamism. It was named “Manual Operation Key” in the sense that the manual should be prepared in advance to operate automatically in case of a crisis.

The keys for the manual to work at the disaster site can be aggregated into tasks, golden times, decision demands, resolution tables, and peacetime training, as in <Figure 4>

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**Figure 4.** For the FAM that works on the disaster site.

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**For the FAM that works on the Disaster Site!**

1. **The duties and golden time** shall be determined in case of a disaster
   - Deriving and confirming the responsibility of the head of the Disaster Countermeasures Headquarters

2. **Draw up decision needs** in the event of a disaster
   - Categorization by decision maker: Controller (Director of Supervision Division), Deputy Mayor, Mayor, etc.

3. **Use of The Conditions Table of the Decision Make**
   - The staff concerned reported the field information of the resolution table to the director of the headquarters.

4. **Training** is usually carried out using the final condition table. And as we trained, at the disaster site To make a decision
   - Implementation through a situational judgment meeting or a disaster response headquarters meeting.
First of all, "Mission and Golden Time" sets missions and golden times in the preparation manual in case of a disaster. Since the mission and golden time play a central role in which all disaster response efforts at the disaster response headquarters can be concentrated and integrated, they should be derived, finalized and reflected in the manual under the responsibility of the head of the disaster response headquarters. Since it is to determine what(mission) should be carried out at the disaster site(including the disaster situation room and disaster response headquarters) until when(golden time), it is necessary to carefully select all of its capabilities with the head of the disaster response headquarters in order to take the first step toward proper operation of the manual.

Second, the manual should reflect the decision requirements necessary to carry out the mission within Golden Time at the disaster site. Of course, experienced officials at the disaster headquarters may be able to respond to the disaster by drawing up decision-making requirements in real-time at the disaster site. However, in order to properly respond to disaster sites that act on uncertainty, risk, friction and dynamics, it is necessary to draw up and prepare decision-making requirements in the manual during peacetime.

Third, it is preparation of the final condition table. If the decision conditions are met by the decision requirements, timely disaster response will be possible by making a decision quickly and implementing it. The decision criteria table will be judged effectively by utilizing the factors that Kim Sung-geun and Lee Young-jae(2017) consider for assessing the situation of the disaster site.

Finally, training is based on the prepared manual. The manual will work properly at the disaster site if it is used to make decisions and implement them at the disaster site as it is usually trained and trained using the manual will work properly at the disaster site.

4.2. Manual operation key preparation example

I would like to present an example of preparing a manual key for livestock disease. Livestock diseases are a type of livestock infectious disease, and the most important task is to take measures to prevent the spread of infectious diseases. The sooner, the better, the sooner, the better, but within three hours of the shutdown and within five hours of the killing. The reason why the golden time is set is because equipment and supplies from related agencies can be the standard for dispatch to the disaster scene from the resolution of the local government's disaster response headquarters. <Figure 5 > uses examples of livestock diseases to show missions, golden times, and decision making.

**Figure 5. Manual operation key example of livestock disease.**

<table>
<thead>
<tr>
<th>Manual operation key (e.g. livestock disease)</th>
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<tbody>
<tr>
<td><strong>1. Mission and Golden Time</strong></td>
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<tr>
<td>☐ AI mobile blockage (within 3 hours) by a control post</td>
</tr>
<tr>
<td>☐ Execution of slaughter (within 5 hours)</td>
</tr>
<tr>
<td><strong>2. Decide at Decision Point (Consider Golden Time)</strong></td>
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</table>

In the case of livestock disease, the mission and golden time were determined to be AI(bird flu) mobile block(within three hours) and killing within five hours by operating a mobile control...
post. In order to block the movement within three hours, the decision maker must make a decision at Point 1 of the resolution, one hour after the incident, in order for the equipment and materials of the relevant authorities and related agencies to be operated on the site. It also shows that in order to perform the killing within five hours, the decision on the killing must be made two hours after the occurrence of the event.

In order for the head of the disaster response headquarters to decide to block the movement within an hour and decide to kill within two hours, the manual needs to prepare a final condition table. <Figure 6> shows the use of a resolution table for the decision to block movement and kill livestock.

In order to decide on the "decision to set up a mobile control center within one hour of Al outbreak" in the final condition table of livestock disease, conditions 1 to 4 must be met, and conditions 2 to 4 must be met before the director can make a decision, and conditions 2 to 4 can be confirmed within golden time, but related information must be verified for Decision 1 to be implemented. The head of the headquarters will decide after receiving a report from the relevant section chief that the conditions of the resolution figure are met, and the director of the department in charge will execute it and the manual will work. If Resolution 2 is reflected in the peacetime manual in the same way, the mission will be carried out based on the manual without panic even if a real crisis occurs[16].

Figure 6. Decision making using the resolution criteria figure (e.g. livestock disease).

5. A Policy Suggestion

Based on the results obtained from this study, I would like to make some policy suggestions to supplement the actual on-site action manual and to ensure that the manual works in the event of a crisis. First, the manual should be supplemented considering the operating keys of the manual presented in this study. The task, golden time, and decision requirements shall be derived for each type of on-site action manual, and a resolution condition table for each decision need shall be prepared so that the head of the Disaster Prevention Headquarters can make a decision in the event of a crisis, and the manual shall be updated from peacetime to quickly identify and report relevant on-site information[17].

Second, regular training shall be conducted based on the on-site action manual created. The Disaster Countermeasures Headquarters training is to collect and analyze disaster site information necessary for the resolution, report it to the head of the headquarters, and train the decision maker to implement it when the decision maker makes a decision.
Third, disaster officials who are members of the Disaster Prevention Headquarters should be trained[18] field action manuals. It should be thought that once a manual is made, disaster preparedness will begin from then on, not the end of disaster preparedness. The prepared manual must be familiar to all members of the disaster response headquarters so that they can respond organically in case of a crisis.

Finally, a person responsible for each disaster management agency and type of disaster shall be designated to update the manual continuously. Once created, the manual is only the beginning. After the new information is updated or trained, the supplementary information, etc. should be reflected in the manual. For this purpose, a manual officer should be designated and operated.

6. Conclusion

In the above, we looked into why the on-site action manual could not work in a disaster situation and why the manual did not work in the latest disaster cases. He also presented a so-called 'Manual Operation Key' for manuals that can work in times of crisis. The 'Manual Operation Key' provides examples of identifying tasks and golden times for disaster response, deriving decision needs to perform the mission within Golden Time, then incorporating a table of decision conditions into the manual for each decision need and updating the disaster site information needed for determination. Manuals that reflect the operating keys of the manual should be thoroughly familiar with and mastered by the relevant officials so that they can operate in any disaster situation by periodically training the prepared manuals, not by the end of preparation. To this end, four policy proposals were made. In any case, we hope that this research will be actively used to prepare for the on-site action manual, and we hope that it will be used to provide insight into disaster preparedness and response to officials who overcome all kinds of risks at difficult disaster sites.

Since there was no theoretical prior study on the "Manual Operation Key," the theoretical study was not conducted in depth, and based on my military experience and disaster site experience, I presented the "Manual Operation Key" based on this study, I hope that the theoretical study will be further expanded.

7. References

7.1. Journal articles


7.2. Books


7.3. Additional references

[7] Commander of the North Chungcheong Fire Department, It was not a Situation Where the Windows on the Second Floor could be Broken at the Time of Dispatch. Hankook Ilbo, December 22 (2017).

8. Appendix

8.1. Authors contribution

<table>
<thead>
<tr>
<th>Initial name</th>
<th>Contribution</th>
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<tbody>
<tr>
<td>Lead Author</td>
<td>SGK</td>
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<td>-Set of concepts ✔</td>
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<td>-Play a decisive role in modification ✔</td>
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<td>-Significant contributions to concepts, designs, practices, analysis and interpretation of data ✔</td>
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<td>-Participants in Drafting and Revising Papers ✔</td>
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<td></td>
<td>-Someone who can explain all aspects of the paper ✔</td>
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<td>Corresponding Author*</td>
<td>CSC</td>
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8.2. Funding agency

This paper was carried out in 2019 by the Ministry of Education of the Republic of Korea and the Korea Research Foundation(NRF-2019 S15B5A01045246).