

Implementation of workflow for systematic understanding of disaster waste management

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INTRODUCTION

The large amount of waste of various compositions generated in times of disaster not only worsens the living environment and public health of the affected areas, but also has the potential to significantly slow down recovery and restoration. Therefore, it is necessary to dispose of disaster waste properly and promptly. One challenge is that the management tasks are cross-departmental and wide-ranging, and it is not easy for the municipal officers in charge to grasp them. In this study, we focused on introduced flow charts that illustrate the flows of tasks of disaster waste management, and attempted to develop a method for understanding and learning tasks using flow charts, and to examine the practicality and usefulness of the method.

MATERIALS AND METHODS

In this study, a disaster waste flow chart is defined as a chart that depicts the flow of disaster waste management tasks on a single sheet of paper along a time line from left to right. We asked 28 municipal officers in A Prefecture who participated in the training to make a flow chart before and after the training. In addition, we asked 6 people who have experiences in supporting disaster waste management in multiple disaster areas to make a flow chart, and conducted a semi-structured interview.

RESULTS AND DISCUSSION

From the analysis of the flow charts of the 28 officers, it was confirmed that the number of tasks (Fig.1), the degree of systematization of tasks, and the comprehensiveness of tasks had improved. The degree of tasks systematization was analyzed according to the items in Fig.2. In the analysis of the comprehensiveness of each task, which looked at the percentage of officers who listed on their flow charts, "requesting cooperation and support from other municipalities" had the largest increase, from 21% to 57% before and after the training.

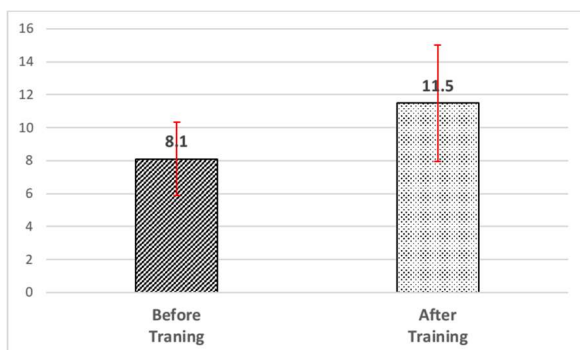


Fig.1 Change in the average number of tasks (n=28)

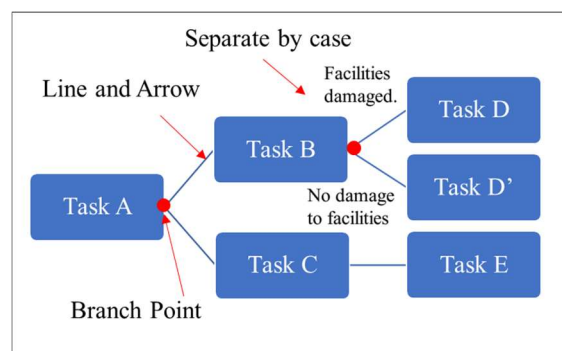


Fig.2 Evaluation items for the degree of systematization

The flow charts of experienced supporters showed that the ratio of tasks related to “Information collection/analysis” and “command and coordination” was 60%, which is 10% higher than that of municipal officers. On the other hand, the flow chart of Municipal officers showed that the ratio of tasks related to “Resource management” and “Field work” and “public relations” was about twice as high as that for those with Experienced supporters. (Fig.3, Fig.4)

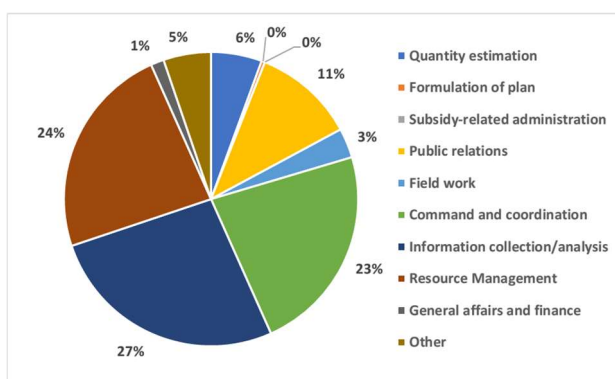
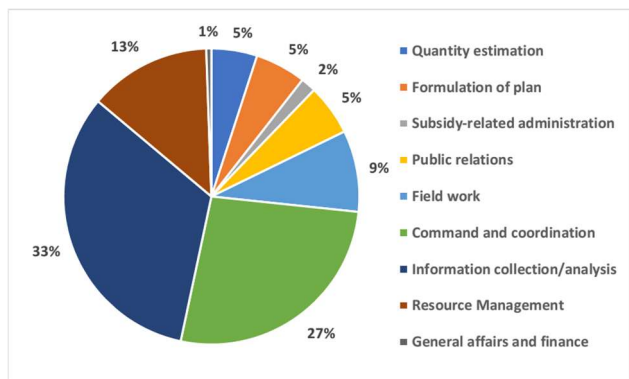


Fig.3 Experienced Supporters (Total of 6 supporters) n=180 Fig.4 Municipal Officers (Total of 28 officers) n=554

The tasks in the flow charts of those with experience supporters were organized into four stages of tasks in the initial stage of disaster management. In addition, among the tasks listed by several experienced supporters, we checked them against the flow charts in the disaster waste management guidelines and extracted tasks that were not listed in the guidelines. From this work, we have derived elements that can be used to improve the guidelines. (Table.1)

Tasks not mentioned in the flowcharts of the disaster waste management guidelines (Table.1)

	Stage 1	Stage 2	Stage 3	Stage 4
Contents of the stage	Stage to grasp the damage situation and improve the organizational system	Waste begins to be discharged from the affected area	Temporary storage site is opened and waste is brought in	Waste is stored and begins to be shipped to a processing facilities
Tasks	<ul style="list-style-type: none"> press relations 	<ul style="list-style-type: none"> Advance publicity of the opening Secure personnel Consideration of the necessity of outsourcing office work Establishment of support system Confirmation and activation of disaster agreements 	<ul style="list-style-type: none"> Expansion of temporary storage space Determine the amount of waste delivered to temporary storage areas Determine the status of roadside discharge Identify and deal with mixed waste 	<ul style="list-style-type: none"> Apply for subsidies Secure civil engineering staff Consider and secure disposal sites

CONCLUSION

The flowchart-focused approach to understanding disaster waste management tasks developed in this study can be implemented for municipal officers with the proper preparation. The usefulness of this method is that it allows users to recognize the level of understanding and proficiency of tasks, and to visualize the effects of training. In addition, this method enables the knowledge of experienced people to be organized and share information, from which points for improving tasks may be obtained.

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