Study of the Assessment of the Priority of Removing Rubble from Roads during a Disaster

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1. Introduction

To rescue and assist the victims of an earthquake, a variety of activities including first aid and rescue, fire-fighting, medical treatment, and supplying water, food, and medical supplies etc. (disaster response activities) are done by many organizations. The first 72 hours after the disaster has a particularly great impact on the survival rate of the victims, so it is necessary to quickly ensure a road network by removing rubble from roads (cutting the way) to the disaster area.

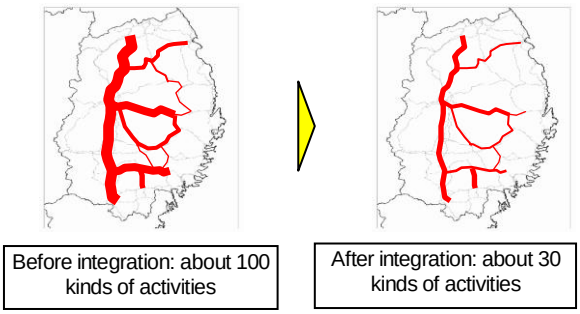
This research assessed the priority of cutting the way to the disaster area through the fastest routes for disaster response activities during the first 72 hours after the disaster happened. This research was based on research conducted last year[1)] (below, "Document 1") to study a method of identifying the route which is given priority.

2. Assessing road networks focusing on disaster response activities

Document 1 describes the trial of a method of using GIS software on the market to superimpose and display the fastest routes to carry out part of disaster response activities to assess these routes as the road required for the disaster response activities according to the thickness of the lines on the display.

Cutting the way to the disaster area is an activity that places top priority on ensuring rescue routes to save human lives immediately after a disaster, so this research focused on important kinds of disaster response activities that must be carried out by 72 hours after a disaster and superimposed the shortest routes on a map of Iwate Prefecture as the model in the same way as previous research. And because a vast number of routes equaling the number of departure and destination points are displayed for even one type of disaster response activity, in order to simplify the work, an effort was made to integrate disaster response activities within a range where the overlapping of shortest routes remained largely unchanged.

Figure 1 Integration image

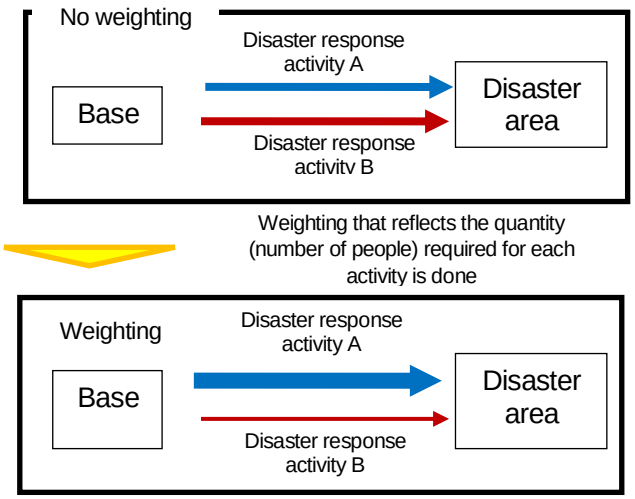


3. Weighting disaster response activities

In the previous section, all types of disaster response activities were represented by lines of the same thickness, and the road network was assessed based on the thickness of the superimposed lines (in other words, number of types of disaster response activities).

So a weighted assessment was done by reflecting the "quantity" necessary for disaster response activities. As typical representations of "quantity", there are many such as "number of injured persons" that are related to people, so an attempt to assess the road network was made by weighting according to the disaster response activities integrated in the previous section based on the population of the disaster area.

Figure 2 Image of road network assessment in a case with weighting of disaster response activities



4. Summing up

This research was a trial of a method of visualizing an assessment as a method of identifying the route on which cutting the way to the disaster area should be prioritized.

This research approached an assessment of priority of cutting the way to the disaster area according to the need for disaster response activities.

On the other hand, there are many problems in each process of removing rubble from roads. For example, it is necessary to clarify damage to roads (they are different

from assumptions), and to manage work teams efficiently.

So, it is necessary to conduct future research that deals with these problems.

[Sources]
1) NILIM Report 2014, pp. 41.
http://www.nilim.go.jp/lab/bcg/siryou/2014report/2014nilim022.pdf