

EVACUATION-ROUTE-BASED REFUGE ANALYSIS: A CASE STUDY OF NAGATA WARD, KOBE CITY WITH THE HELP OF DIMSIS*

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1. Introduction

When a disaster occurs, the injured and refugees can be accepted and protected in a refuge with its advantaged condition, such as the aseismatic structure, fireproof walls and vantage ground. And how to select a safe refuge and reach there quickly and safety in a chaos disaster phase is one of the most important steps in a disaster evacuation or rescue process.

After the great Hanshi-Awaji earthquake disaster happened in Japan in 1995, Morita et al²⁾ studied the designated refuges, the reasons of selecting the practical refuges, evacuation directions, evacuation traffic tools, evacuation distance and time and so forth based on a questionnaire in the Nagata Ward in Kobe and Awaji Island. Based on graph theory, the step index was used to analyze the accessibility and route of each area to the refuges in Suita City, Ibaraki City, Takatsuki City and Settsu City in Osaka Prefecture¹⁾. These two papers mainly use the shortest-distanced-based approach for refuge selection. In this paper, we intend to develop an evacuation-route-based approach for refuge selection, and comparisons are made with the designated refuge and the shortest distance based refuge selection in Nagata Ward, Kobe City with the help of spatial-temporal GIS software-DiMSIS.

2. The evacuation-route-based refuge analysis compared with the shortest-distance-based refuge selection and designated refuge in Nagata Ward

Nagata Ward has a population of 103823³⁾, and there are 25 refuges and 403 Cho-Cho-Mokus, and the Ward Office designated the corresponding refuges of each Cho-Cho-Moku⁴⁾.

Fig.1 shows the basic principle of refuge analysis in the designated situation, the shortest way based approach and the evacuation route based approach.

In the-evacuation-route based approach, the availability of the evacuation route is mainly considered. Based on the available evacuation route, some scenarios are addressed, and the shortest distance and shortest time to the refuges, and

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population of taking refuge to each refuge will also be analyzed. We make full use of DiMSIS, a spatial-temporal GIS software, and demonstration is make to show the effectiveness and availability of the propound method as a participatory disaster communication method.

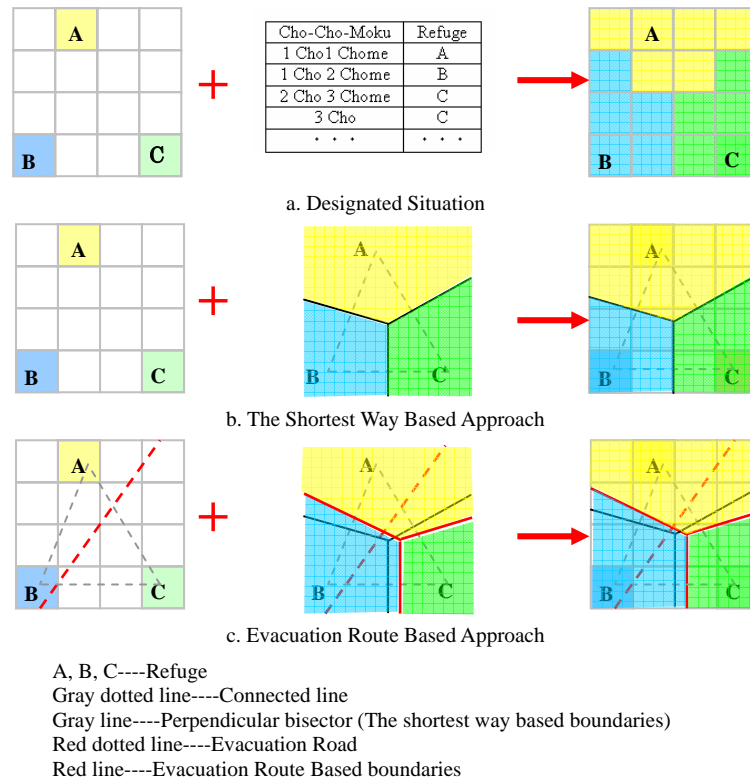


Fig.1 Basic principle of refuge analysis in the designated situation, the shortest-way-based approach and the evacuation-route-based approach

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