

Rescue Network Design with Respect to Earthquake

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Earthquake has special affections to network design. Rescue units, i.e. fire stations and hospitals, provide essential rescue function through network. However, uncertainty comes with earthquake. Conditions may be changed because of the possibly failed rescue unit due to direct ruins by earthquake, or high dense demands exceeding its tight supply capability. This research simultaneously takes rescue units and network into consideration, proposing important concepts, such as Responsible Territory and Mutual Aid, trying to control the uncertainty.

This research applies Multiple Rooted Shortest Path Tree (MRSPT) algorithm as methodology in the local network design process. This algorithm is developed not only in the base of Shortest Path Tree algorithm but contains Responsible Territory concept. According to lemmas of Responsible Territory, the design of local networks resulted from MRSPT algorithm can provide connections between local rescue units and demand ones that guarantee minimum time consuming connections between any pair of them. Meanwhile, principles and skills of Mutual Aid, including contraction/de-contraction of local network and dummy links, also assure the regional network design of minimum time consuming among local areas. Under its design, the integral network in addition provides tolerance of any failed rescue unit. This research shows the insights of rescue network through rescue and demand units among different area scopes.

Estimating Disaster Impacts of Typhoon Rusa and Other Natural Disasters of Korea in 2002

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This research is to develop an efficient disaster-impact evaluation (DIE) procedure for estimating direct, indirect, and induced system-wide impacts of natural and human-caused disasters. This research provides the DIE procedure and the multi-regional input-output (MRIO) model to estimate economic impacts of business interruptions by disasters. The applicability of the model is evaluated in the empirical cases of typhoons and other natural disasters including Typhoon Rusa in year 2002 and 2001. The analysis results show that the total indirect and induced losses are 14.8 trillion Won from the direct losses of 6 trillion Won. In addition, the employment losses of 256.6 thousand persons are estimated. The direct damage of 1.3 trillion Won generates the indirect losses of 3.4 trillion Won and employment loss of 60.3 thousand persons in the case of year 2001. In both years, the local economy of non-Seoul metro regions is the major victim with over 50 percent of total losses.

ANALYSIS OF LAND USE MANAGEMENT POLICIES FOR EARTHQUAKE DISASTER REDUCTION THROUGH MARIKINA CASE STUDY

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Land use management is one of the alternative countermeasures initiated and implemented by local governments to reduce earthquake disaster as not engineering method. Land use is heavily tied to the economic development plan, and the consideration of earthquake disaster elements into land use management is critical for sustainability of the city. However, it is not a common approach in Asia Pacific countries due to the barriers including socio-economic or institutional issues. Thus, it is necessary to develop the system and procedure to develop policies and implementation

strategies to facilitate the application of land use management for earthquake disaster reduction. In this study, land use management processes is developed incorporating important factors, such as spatial identification of risk elements, analysis of institutional issues or land use management methods assessment. These factors are analyzed along with the land use management planning processes to understand barriers and find out solutions to facilitate the implementation of land use management in Asia Pacific countries. These processes are divided into three phases: 1) planning background analysis, 2) planning strategy development, and 3) implementation strategies development. In this paper, the first and the second phases are studied, which leads to the final phase of implementation. Marikina City (Metropolitan Manila, Philippines) was selected as an empirical study site, where land use management policies for earthquake disaster reduction were developed through workshops.

Demand Modeling of Temporary Housing Support after an Earthquake Disaster

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The Great Hanshin-Awaji earthquake disaster clarified an importance of the demand estimation of temporary housing support such as prefabricated temporary houses, vacancies in public housing, and rent subsidies. If required amounts of temporary housing support can be clarified, advance preparations will become possible, and countermeasures will be able to be performed more smoothly than in the Great Hanshin-Awaji earthquake disaster. This is a basic study on an estimation of demand for temporary housing support. The purpose of this study is to analyze relations between household attributes and demand for temporary housing support after an earthquake disaster from a questionnaire survey and structural equation modeling. Results are as follows; 1) we indicated that appropriate variables to explain demand for temporary housing could be extracted from many variables of household attributes by structural equation modeling. From data of this study, "site area" was extracted as an appropriate variable to explain the demand. 2) We clarified that it is not enough to estimate the demand for temporary housing only from variables of household attributes because the rate of contribution to demand for temporary housing support by household attributes was low in the structural equation modeling. Reliable estimation methods will have to be built through this analysis.

Development of Integrated Strategic Planning for Earthquake Disaster Reduction -Participatory planning process and plan contents in Marikina City, Philippines-

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As a collaborative effort, earthquake disaster experts from Japan joined with a local stakeholder team made up mainly of Marikina City administrators to develop a comprehensive and integrated disaster management plan titled Marikina Comprehensive Earthquake Disaster Reduction Program (CEDR). This paper describes the participatory planning process, contents and characteristics of the CEDR. The CEDR was developed by using strategic planning methodology, which is distinguished by its emphasis on implementation which links key objectives with the human and financial resources necessary for maximizing plan fulfillment. It features a systematic structure in which a single goal is elaborated into ten objectives, Critical Facilities, Existing Building, New Building, Education, Research & Technology, Public Information, Land Use Planning, Institutional Initiatives, Economic Development, Source of Finance, along with 54 policies/strategies and 216 programs/projects. CEDR comprises of ten objectives which can be categorized into three general policies summarizing physical, informational and strategic countermeasures. In addition to planning methodology, participatory planning process is one of the important characteristics of CEDR formulation. We held five workshops in 2003; (1) Problem Identification Workshop, (2) Risk Assessment and Goal Setting Workshop, (3) Planning Workshop, (4) Implementation Workshop, (5) Stakeholder Resource Assessment and Priority Evaluation Workshop. There are two main characteristics of CEDR, the comprehensiveness of the program and the concept of

disaster management cycle. After developing CEDR, we prepare 10 year Action Plan which prioritizes Programs/Projects by year to be completed, projecting the use of internal or external resources as well as identifying the department to take the lead. Through developing CEDR and Action Plan, we emphasized capacity building for local stakeholders in order to create a sense of ownership so that they will take active roles in implementing the comprehensive countermeasures to reduce earthquake risk.