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Influence of Various Disaster Scenarios Assumption to the Advance Creation of Wide-Area Evacuation Plan Confronting Natural Disasters

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Abstract : After occurring Great East Japan earthquake and as a consequence the invasion of an extremely large Tsunami to the city, obligated many local governments to take into account certainly these kinds of issues. Poor preparation of local governments to deal with such kinds of disasters at that time and consequently lack of assistance delivery for local residents caused thousands of civilian casualties as well as billion dollars of economic damages. Those local governments who are responsible for governing such coastal areas, have to consider some countermeasures to deal with these natural disasters, prepare a comprehensive evacuation plan and contrive some feasible emergency plans for the purpose of victims' reduction as much as possible. Under this evacuation plan, the local government should contemplate more about the traffic congestion during wide-area evacuation operation and estimate the minimum essential time to evacuate the whole city completely. This challenge will become more complicated for the government when the people who are affected by disasters are not only limited to the normal informed citizens but also some pregnant women, physically handicapped persons, old age citizens and foreigners or tourists who are not familiar with that conditions as well as local language are involved. The important issue to deal with this challenge is that how to inform these people to take a proper action right away noticing the Tsunami is coming. After overcoming this problem, next significant challenge is even more considerable. Next challenge is to evacuate the whole residents in a short period of time from the threated area to the safer shelters. In fact, most of the citizens will use their own vehicles to evacuate to the designed shelters and some of them will use the shuttle buses which are provided by local governments. The problem will arise when all residents want to escape from the threated area simultaneously and consequently creating a traffic jam on evacuation routes which will cause to prolong the evacuation time. Hence, this research mostly aims to calculate the minimum essential time to evacuate each region inside the threated area and find the evacuation start point for each region separately. This result will help the local government to visualize the situations and conditions during disasters and assist them to reduce the possible traffic jam on evacuation routes and consequently suggesting a comprehensive wide-area evacuation plan during natural disasters.

Keywords : BPR formula, disaster scenarios, evacuation completion time, wide-area evacuation
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