Analysis of Problems on Wide-Area Evacuation in Case of Urban Fires following Major Earthquake
-A case study for Shinagawa ward of Tokyo-
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Keywords: wide area evacuation, district-based vulnerability, earthquake fire

The possibility is the pointed out that any fires occur due to the huge earthquake and develop into large-scale urban fires because there are dense wooden areas in Tokyo. According to the report on the earthquake damage estimation in the Tokyo Metropolitan Area by cabinet office, the number of buildings completely destroyed by earthquake fires is more than two hundred thousand ridges, the number of deaths is more than four thousand people and the number of injuries is more than seventeen thousand people. On the other hand, the Tokyo metropolitan government has implemented the countermeasures to minimize the damage, such as the promotion of urban fire proof acceleration project, the publication of the District-based Assessment of Vulnerability to Earthquake Disaster to enhance the citizen recognition of disaster prevention, and the improvement of refuge areas against urban fires where the local residents can reach at the walking distance within 3km. However, there are some problems on the wide-area evacuation. For instance, it is hard for most seniors to walk long distance in excess of 2km, and the residents might not be able to reach the refuge area by being surrounded by multiple fire. So, It's necessary to recognize the problems on wide area evacuation by considering the fire risk and the location of refuge area in each area and to examine solutions to improve them.

The purpose of this research is to propose the concept of wide-area evacuation in seismic fire, therefore the effectivity and the safety have been evaluated through the case study for Shinagawa ward as the main investigation region. First, the issues on the location of refuge site were clarified from analyzing the District-based Vulnerability Map, and then, the field investigation was conducted on the condition of refuge sites, escape roads to there and blocks of each district to clarify the problems furthermore. Also, the interview was conducted to the district officials and the members of neighborhood association, the web-based questionnaire surveys were carried out about the residents’ recognition of wide-area evacuation in seismic fire, and then the risk on interruption of evacuees by urban spread fire on the assumed escape roads from the temporary designated places to the refuge sites was evaluated by the original way.

Through their investigations and analysis, the following results were produced. There were many issues of wide-area evacuation in seismic fire such that the fire hazard rating of some of the districts far away from the refuge site was higher, the residents living in the areas far away from there tended to utilize not the designated refuge site but the near site etc. In addition, it was clarified that the risk of interruption of evacuees living in the areas far away from there by urban spread fires was high by evaluating the expectation of fire ignitions in the region near the escape roads. As a conclusion of this study, the above results suggested that the supply of a new refuge area for wide-area evacuation was required to the high-risk region (such as Nakanobu and Yutaka-cho) for interrupting the evacuees by the urban spread fire, or that the urban fire proof acceleration project for high-risk districts needed to be promoted by further residents’ and political efforts.