

Analysis of evacuation destination and in-vehicle choice factor in response to 2016 Kumamoto earthquake

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Abstract

During the Kumamoto earthquake that occurred in 2016, 183,882 persons were evacuated to 855 evacuation centers as of 17:00 on April 17, 2016. However, there were many people stay night in the car who were unable to evacuate to evacuation shelters. On the other hand, the evacuees who chose to stay in- vehicle cause to develop an economy class syndrome and shortage of cars parking spaces. It were recognized as a serious problem that cause to another man-made secondary disaster. In order to prevent such secondary disaster, it is necessary to find the whole scope of the stay in-vehicle problems and immediate solutions. Therefore, in this research, we analyze the choice factors of the evacuation destination and stay in-vehicle by using data from three questionnaires survey conducted after the Kumamoto earthquake in 2016. Data were collected from a total of 12493 respondents from the three surveys which include evacuee questionnaire survey on the Kumamoto earthquake, resident questionnaire survey on the Kumamoto earthquake, and municipal questionnaire survey on the Kumamoto earthquake. At first, we compiled and summarized data from the surveys and then analysis using a multinomial logit model was performed. From the results, we examined the factor of choosing the evacuee from both macro and micro viewpoint. About 78% of the respondents were evacuated during the Kumamoto earthquake. Among these evacuees, about 20% of the evacuees evacuated to the designated evacuation centers, while about 40% of the evacuees stay in-vehicle. The results showed that improvement of evacuation places is necessary. Furthermore, the results of the analysis were found that privacy and family structure were the major factor related to the decision of designated evacuation centers where as the infrastructure conditions of parking location such as water and electricity supply, toilet facilities and neighborhood relations were major factors of stay in-vehicle decision. In addition, it was found that the tendency of evacuation destination differs depending on the respondents living areas. Therefore, it is necessary to improve the evacuation policy from various factors such as personal attribute and surrounding environment.