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Earthquake risk assessment of artificial fill slope in urban residential region

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Recent destructive earthquakes in urban regions have triggered landslides in many gentle slopes of residential areas in Japan. The earthquake-induced slope instability that has occurred is closely related to these artificial landforms, especially valley fills (embankments). Investigation of past artificial landform changes show that differences in the shape of fills, such as depth, width, inclination angle of the base, and cross-sectional form, may be the key discriminating factors of slope instability. Triggering mechanisms (e.g. earthquakes) need to be considered in the analysis for accurate estimation, however, it is difficult to include earthquake parameters in convwenient linear multi-variate analysis. Neural network analysis is applied to assess large fill slope instability in urban residential areas. The developed neural network model including both causative factors (shape of fills, groundwater condition, age of construction) and the triggering factors (distance from the fault, moment magnitude, direction to fault) was independently checked against another data set and sensitivity analysis was conducted. It should be possible to conduct landslide hazard mapping in urban residential areas by using the newly proposed neural network model.