Challenges in Tsunami Evacuation

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Abstracts:
In many tsunami events, the high numbers of death toll in high-populated cities were due to the lack of several critical factors, which includes the existence of tsunami warning, the readiness and preparedness of the city toward tsunami events. The readiness and preparedness of tsunami high-risk cities are characterized by not only the existence of sufficient supporting infrastructure for emergency response and evacuation, but also how the whole people from tsunami prone area could evacuate safely after tsunami warning issued. Everybody in this tsunami prone area should have the same right and opportunity to evacuate safely. However in many tsunami prone cities, beside the level of awareness and preparedness of the people, the high number of population, population density, building density and vulnerable group of people such as elderly, women and children coupled with insufficient tsunami evacuation infrastructure such as evacuation routes has prolonged the estimated time for evacuation. There are many cases that the estimated time for evacuation is much longer than the estimated tsunami arrival time minus time needed for warning dissemination. Thus, increasing the capacity of horizontal evacuation infrastructures should be increased. Otherwise the existence of vertical evacuation infrastructure such as shelter in that area is necessary, using the existing tall structure or building the new one in the form of building structures or artificial hill. Vertical evacuation infrastructure is very complex and costly to build compare to horizontal evacuation, however for the aforementioned condition the existence of vertical evacuation shelter is a must. Many issues associated with the design criteria and planning should reviewed and solved, from physical to socio economic factors. In this paper the challenges and critical issues of tsunami evacuation for high-populated cities will be addressed and discussed.

Keywords: tsunami vertical evacuation infrastructure, estimated time for evacuation