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Passengers Evacuation Simulation in a Cruise Ship due to Tsunami Attack as Port Safety Management Consideration

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Summary: Tsunami is not only causing the raise of free sea surface but also strong horizontal water movement in a bay. Thus, an appropriate countermeasure is required for a passenger ship because the ship may be forced by tsunami to move unexpectedly. In this case, tsunami acts as a variable to limit evacuation time of passengers from a ship to shelter areas. For instance it is estimated that the time to tsunami arrival at Tempozan Passenger Terminal of Osaka Port, that is available time for passengers to evacuate is around 1 hours and 40 minutes (6000 sec). Passengers evacuation, which is caused by tsunami attacks has different problems since passengers not only have to evacuate from a ship, but also have to run to safe areas where they do not receive the impact of tsunami, such as in high land area. This paper describes the use of Discrete Event Simulation (DES) of passengers evacuation process due to tsunami attack considering several scenarios, such as in the morning, day and night scenario considering MSC.1/Circ.1033; therefore, it will be known that how many people are safe in the case of such incident. The outputs of analysis are prediction of time evacuation; as a result, they can be used as consideration of port safety management and evacuation procedure in case of tsunami disaster.

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