A simulation of drainage of influent water caused by tsunami at Tokushima.

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It is said that great earthquake will occur in the near future at the Nankai subduction zone. The tsunami of this earthquake will damage Tokushima. The effect of this tsunami has been predicted by using numerical simulations, and measures are being taken. But there are few discussions about influent water. In Tokushima, there are some places that lands are low and are surrounded by levees, where the influent water should become obstacles to rehabilitation. So we attempted to simulate it in this study.
Simulation procedure is as follows. First, we simulated tsunami caused by an earthquake with the non-linear long wave theory to target areas. The tsunami can flow into the target areas by overflow formula (Honma, 1940) when the wave becomes bigger than the levee. Water movements inside the levee are simulated as 2D unsteady shallow water flow. It is also modeled open channels, sewer pipelines, drainage pumps to simulate drainability. We used AFREL (Application of Flood Risk EvaLuation) software to simulate inland flow.
In a simulation using case 3 of Cabinet Office earthquake source models as input, the first wave reached at Okinosu area, Tokushima, about 40 minutes after the earthquake. After about 42 hours, 90.6% of the maximum wetted surface area were drained, but the others were not drained because of sunken place. We can’t drain these water any more in this calculation. In the next calculation, we stopped 3 pumps which drainage capacity are better than the others (there are 12 pumps in this area). In this case, only 55.2% of the maximum wetted surface area are drained at 72 hours after the earthquake. Furthermore, these pumps are made to drain water caused by rain, so these may not work for seawater or during long-time blackouts. It may be needed to take some additional measures for the influent water caused by tsunami.

Keywords: drainage, tsunami

