

MODELING OF FUKUSHIMA NPP INDUSTRIAL SITE FLOODING BY TSUNAMI

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ABSTRACT

While the Fukushima-Daiichi was designed and constructed the maximal tsunami height estimate was about 3 m based on analysis of statistical data including Chile earthquake in 1960. The NPP project industrial site height was 10 m. The further deterministic estimates TPCO-JSCE confirmed the impossibility of the industrial site flooding by a tsunami and therefore confirmed ecological safety of the NPP. However, as a result of beyond design earthquake of 11 March 2011 the tsunami height at the shore near the Fukushima-Daiichi NPP reached 15 m. This led to flooding and severe emergencies having catastrophic environmental consequences.

This paper proposes hydrodynamic model of tsunami emerging and traveling based on conservative assumptions. The possibility of a tsunami wave reaching 15 m height at the Fukushima-Daiichi NPP shore was confirmed for deduced hydrodynamic resistance coefficient of 1.8. According to the model developed a possibility of flooding is determined not only by the industrial site height, magnitude and distance to the earthquake epicenter, but also by duration of seismic impacts, power dissipation conditions, epicenter size and other conditions.

Keywords: flooding, tsunami, earthquake, environmental safety, hydrodynamic model

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