

# Cooperative Research on Basic Countermeasure Plan for Earthquake and Tsunami at Sewerage Treatment Plants in Yokosuka City

Year of Research

2011 • 2012

Promotion of earthquake disaster prevention

**(Purposes)**

Establishment of countermeasures for tsunami in Sewerage system in Yokosuka city is urgently required, since most of sewerage facilities are located in bayside area and tsunami damage is supposed in case of a large scale earthquake. This 2-years (2011-2012) collaborative research aims to estimate the damage of tsunami and establish an effective countermeasure by using numerical Tsunami simulation.

**(Results)**

Study details and results are as follows:

(1) Build a tsunami simulation model

First, tsunami simulation model of this research is based on “TUNAMI” developed by Tohoku University, the validity of this simulation was confirmed by inspection of consistency of the simulation results and the actual damage in Minami Gamou Sewerage Treatment Plant in Sendai City. Second, tsunami simulation model of Nishi Sewerage Treatment Plant in Yokosuka City was built up by confirming to the estimated flood and damage of tsunami published by Government of Kanagawa prefecture.

(2) Estimation of tsunami damage

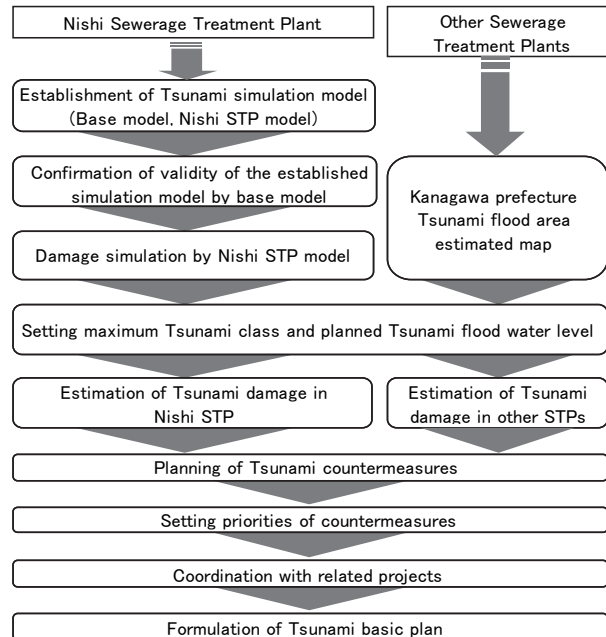
More detail, flood depth and wave power and damage by drifting objects were considered in damage estimation for Nishi STP in addition to the tsunami simulation. For other STPs, damages were estimated by simplified method based on this damage estimation of Nishi STP using “Kanagawa prefecture tsunami flood area estimated map”.

(3) Plan for countermeasures of tsunami

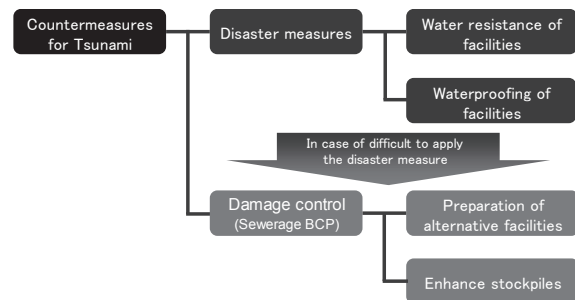
In keeping with the estimation of tsunami damage in each facility, firstly disaster measures were reviewed for countermeasure of tsunami to keep the required functions under tsunami attack. Next, in case disaster measures could not be applied, damage controls were investigated. Then countermeasures of tsunami were proposed. **(Figure 2)**

This countermeasure of tsunami was consisted by optimal combination of some levels as below; **(Figure 3)**

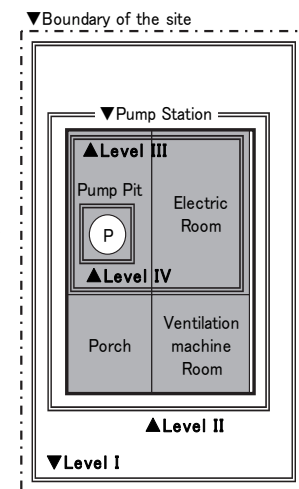
- Level I: Risk aversion by building breakwater to enclose the whole site
- Level II: Risk reduction by waterproofing of openings of buildings
- Level III: Risk reduction by waterproofing of inside buildings
- Level IV: Risk reduction by waterproofing of only major facilities



**Figure 1: Flow of corporative research**



**Figure 2: Process of applying tsunami Countermeasures**



**Figure 3: Levels of countermeasures for Tsunami**

(4) Setting priorities of the countermeasures, and formulation of basic plan for tsunami

Priorities of countermeasures of tsunami in each facilities were set as keep required functions (life saving, pump up and disinfection, sedimentation and dewatering, and so on) effectively. Phased approach of tsunami countermeasures were planned based on the priority, then basic plan for tsunami were made up inclusive of coordination with countermeasures of earthquake and reconstruction & renewal project.

※ Yokosuka City, Japan Institute of Wastewater Engineering and Technology  
Inquiries ; Shigeharu Inoue, Yasumasa Sakabe, Nobuto Moriya ;1st Research Department [03-5228-6597]

Key words

Tsunami Simulation, Damage Estimate of Tsunami, Tsunami Prevention Measurements