Cooperative Study on Countermeasures against the Tsunami for Sewerage in Kochi Prefecture

Year of Research | 2012 | Promotion of earthquake disaster prevention

(Purpose)
According to the outcome of the revised-study on the prediction of the inundation hazard by Tsunami in east Japan (hereinafter referred to as National Prediction of the Tsunami Hazard (NPTH)) which was revised after the disaster caused by the great earthquake in the east Japan 2011, approximately 70% of the sewage treatment facilities in Kochi Prefecture was practically put to use, was established to realize effective countermeasures against the damage by Tsunami.

(Results)
Outline of the study and the results is shown with the description of the subject facilities in the Table -1.

(1) Subject Facilities for Confirmation of Reproducibility
Simulation model was established by provision of the Tsunami data which was analysed by mesh method (10m) from the authority. Reproducibility was verified in the result of the model and actual record.
Verification was made for the inundation depth, the area range of inundation, and arrival time of the Tsunami attack.

(2) Organization of the basic data and implementation of the simulation
After the provision of the data of the land area and topographic configuration from Geographical Survey Institute of Japan, structuring the basic data (2m mesh) for the analysis was conducted.
Using the data, simulations were conducted as follows:
Case 1: With the structures and buildings in the area for study of the highest depth of the inundation, the time of the fastest arrival, the flow direction in the area and standard water level)
Case 2:without any structure and building(⇒for research of the Froude number)
From the results of these studies, investigation of physical/hydraulic parameters for the target area and buildings was conducted.
Setting of the parameters used for wave force and hazard prediction for each facility was made to predict the damage from these outcomes.

(3) Master Plan of the countermeasures against Tsunami
Master Plan for the countermeasures against Tsunami was formulated based on the result of the article (2).
Examination was made for installation of dikes at the boundary of the facilities, waterproofing buildings, watertight bulkhead for rooms and immersion proofing of equipment.

(Future subject)
Implementation of the effective measures according to the measures for Tsunami established in this Study will be expected.
Further, it is necessary to continue the case studies for accumulation of the knowledge.

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Table-1: Subject Sewage Treatment Plant

<table>
<thead>
<tr>
<th>Municipality and Sewage Treatment Plant</th>
<th>Current Capacity for Sewage Treatment (㎥/day)</th>
<th>Sewered Population (person)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Takasu Sewage Treatment Plant in Kochi city</td>
<td>27,910</td>
<td>52,278</td>
</tr>
<tr>
<td>Shimoni Sewage Treatment Plant in Kochi city</td>
<td>66,600</td>
<td>88,971</td>
</tr>
<tr>
<td>Shioe Sewage Treatment Plant in Kochi city</td>
<td>30,180</td>
<td>22,280</td>
</tr>
<tr>
<td>Seto Sewage Treatment Plant in Kochi city</td>
<td>8,025 Flow rate in Daily Maximum</td>
<td>14,711</td>
</tr>
<tr>
<td>Notsu Sewage Treatment Plant in Konan city</td>
<td>3,500</td>
<td>2,711</td>
</tr>
<tr>
<td>Yachi Sewage Treatment Plant in Konan city</td>
<td>2,555</td>
<td>1,784</td>
</tr>
<tr>
<td>Kishimoto Sewage Treatment Plant in Konan city</td>
<td>500</td>
<td>995</td>
</tr>
<tr>
<td>Toochi Sewage Treatment Plant in Nankoku City</td>
<td>2,680</td>
<td>3,594</td>
</tr>
<tr>
<td>Hamakaida Sewage Treatment Plant in Nankoku City</td>
<td>486 Flow rate in Daily Average</td>
<td>932</td>
</tr>
</tbody>
</table>

Figure -1: Confirmation of the consistency with the National Prediction of the Tsunami Hazard (NPTH)

Figure -2: Simulation of the Tsunami Attack

Key words
Tsunami measures, Simulation, Numerical analysis, Crisis control, Disaster prevention measures, Mitigation