INSPECT Wave, Storm Surge and Tsunami Models

Integrated Numerical research System
for Prevention and Estimation of Coastal disasTer

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INTRODUCTION

INSPECT Wave, Storm Surge and Tsunami models are for simulation of oceanographical disaster phenomena in coastal and estuarine areas.

With these models, coastal protection works consisted of hard and soft countermeasures can be designed with more reliable information. INSPECT models are continued to be upgraded for numerical studies of all coast and estuarine areas of Japan.

DEVELOPMENT PROCESS

INSPECT Wave and Storm Surge model has been developed for numerical studies on several coasts in bay areas (e.g. Tokyo , Ise, Osaka and Tosa bay) , where severe storm surges are generated by huge typhoons. Accuracy of simulation results has been verified with the data observed tide anomaly.

INSPECT Tsunami model has been developed to simulate propagation of solitary wave, which was generated by Nihonkai-Chubu earthquake tsunami. Accuracy of simulation results has been verified with the data of several laboratory experiments.

KEY POINTS

Key points of INSPECT Wave, Storm Surge and Tsunami models

●Wave model

INSPECT Wave model is a shallow-water wave hindcasting model which is based on spectrum method incorporating wave generation, wave decay and wave transformation. This model is able to simulate wave fields composed of wind waves and swells. Three components of radiation stress, which are generated by wave transformation, are estimated by this model.

●Storm Surge model

INSPECT Storm Surge model gives an accurate tide anomaly by incorporating several effects such as:

*Multi-level flows *Density stratification *Wave setup *River discharge *Inundation

●Tsunami model

INSPECT Tsunami model gives an accurate wave height and velocity by incorporating several effects such as:.

*Wave dispersion *Bottom friction estimated with land conditions

APPROVAL/CREDITABILITY

ECOH CORPORATION is continuing to verify the quality of INSPECT models.

Several papers have been published in Proceedings of Coastal Engineering, JSCE.

Graphic Outputs with INSPECT Wave, Storm Surge and Tsunami model

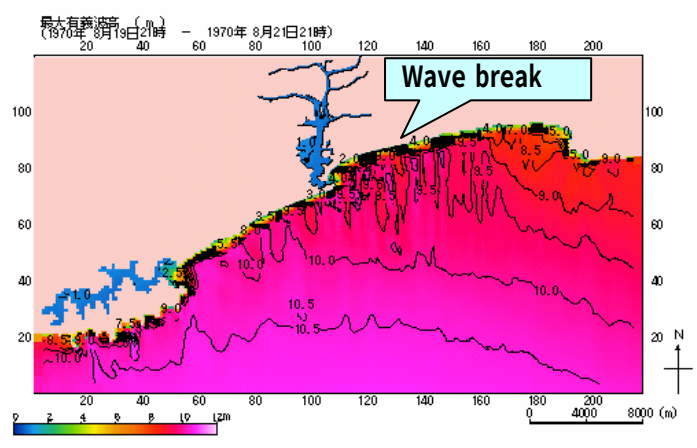

Fig.1 Wave height distribution on coast of Tosa bay
(Simulated by shallow-water wave hindcasting model)

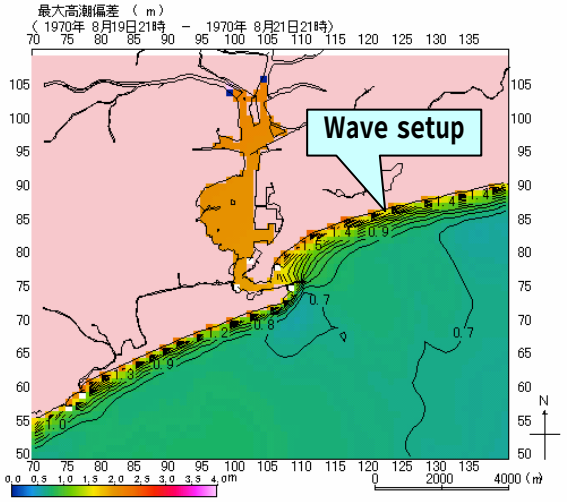

Fig.2 Maximum tide anomaly distribution
on coast of Tosa bay

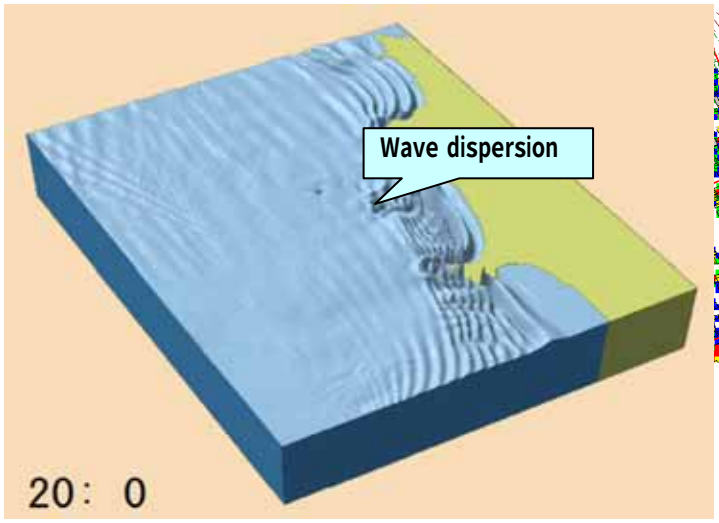

Fig.3 View of Tsunami propagation
by wave dispersion equation

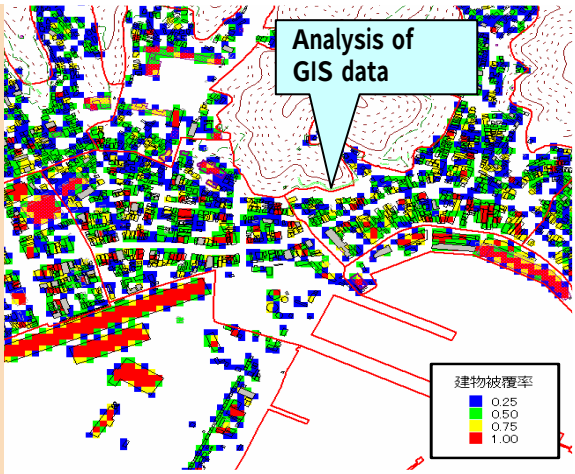

Fig.4 Distribution of Covered ratio
with land structures in city

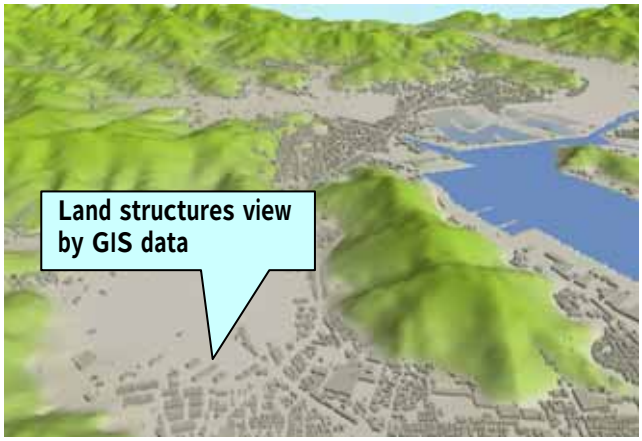

Fig.5 3-dimentional view of topography and
land structures (Input data)

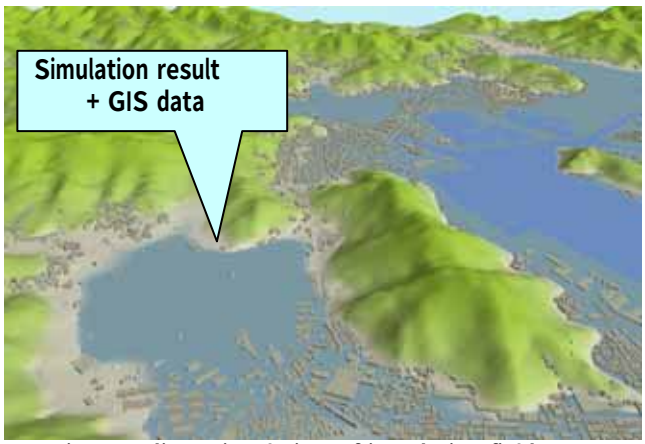

Fig.6 3-dimentional view of inundation field
(Tsunami simulation result)