An Influence of Tide Level on High Water Level at the Han River Estuary

Hyo Seon Park* 1, Seong Joon Byeon2, Woo Jin Kim1, Gye Woon Choi1 and Jin Young Lee1

1Department of Civil and Environmental Engineering, South Korea
2International Center for Urban Water Hydroinformatics Research & Innovation, South Korea

Han River estuary stretches from the land to marine wetlands, and is the only one among the four river estuaries in the country where no tidal barrage is being built. Its brackish water provides a good conservation zone for the natural landscapes and ecosystems.

Recently, there have been discussions on the conservation of the Han River Basin. In recent years, the increasing heavy rainfall in the summer, causing more sediment transport and flooding, had make a huge influence on the direction of the development in the Han River Basin. In addition, it has a great influence on the ecosystem of on the Han River estuary, and thus it is vital that research should be actively carried out.

However, there lies a problem in the area of data collection. As the Han River estuary is located in the trans-boundary of North and South Korea, it is often difficult to have a collection of good observation data of the physical characteristics and tidal data under the influences like hurricanes and winter ice.

In order to solve this problem, a two-dimensional flow analysis model is developed to investigate the hydraulic and sediment transport behaviors with variation of river bed, in the effort to analyze and predict the tidal levels.

To determine the accuracy of the model, a direct integration and direct step calculation of the hydrograph will be computed and compared against the numerical simulation results where the acceptable error rate is within 1%.

Lastly, discharge data from both events of dry season and heavy rainfall in 2002, was applied to a developed model and executed numerically. Result shows that, all the areas of target region were affected by tidal level and the dominant factor for affecting the water level is the low tides.

Keyword: Han River, estuary, 2-dimensional model, shallow water equation