

Development of Design Flood Waves for Unsteady Seepage Analysis through Levees in Korea

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In recent years, Korea has experienced damages due to the great floods such as Typhoon 'Rusa' and 'Maemi'. Especially, levee failure caused the loss of lives and poverty around riverine area.

It has known that there are several causes in levee failure in flood time. The foundation underseepage and seepage through embankment is assumed to be one of reasons of the levee collapses.

There are two ways to estimate seepage flow. One is an analysis on steady state condition, another is on unsteady state condition. Up to now, the former has been used by engineers widely in Korea. This method has, however, a weakness not to consider the duration time and recession slope of flood hydrograph. It may bring about over- or under-estimation in design of levee section.

In this study, the method to determine the design flood waves was developed using hydrological data from 55 flood events in period of 1976-2003 and the original project flood hydrographs, collected from thirty water level stations in five major basins of Korea.

Keywords: design flood wave, original project flood wave, duration time, recession slope.

Table 1. The relationships between design flood wave and original project flood wave

Basins	Duration time(T)	Recession slope(S _R)
The Han River	$T_D \leq 2.61 T_p$ (T_p under 50 hour) $T_D = 0.78 T_p + 88.24$ (T_p over 50 hour)	$S_{RD} \leq 1.57 S_{Rp}$
The Nakdong River	$T_D \leq 3.28 T_p$	$S_{RD} \leq 1.51 S_{Rp}$
The Geum, Youngsan and Seomyin River	$T_D \leq 3.58 T_p$ (T_p under 41 hour) $T_D = 1.14 T_p + 100.31$ (T_p over 41 hour)	$S_{RD} \leq 1.01 S_{Rp} + 0.14$

* T_D : duration time of design flood wave, T_p : duration time of original project flood wave

* S_{RD} : recession slope of design flood wave, S_{Rp} : recession slope of original project flood wave

References

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