# Hydraulic Characteristics of In-ground Stilling Basin for In-stream Flood Mitigation Dams

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Flood mitigation dam (FMD) is defined as a dam committed only to flood retention and retardation, which has attracted much attention over past decades. In practice, FMDs are still facing to several challenges. For example, presence of continuous end-sill at downstream end of stilling basin (SB), on the one hand can positively confine hydraulic jump within a limited area which finally lead to an economical design. While, on the other hand, is an obstacle against the fish migration and sediment transport. In order to reach a solution for this problematic, a new concept of both SB and end-sill were introduced in this paper; named In-ground SB and slit-type (non-continuous) end-sill respectively. The schematic side view of In-ground SB is shown in **Fig. 1**. In case of slit-type end-sill two slits (free space) were considered at lateral side of end-sill, which create two passages to ease fish migration and sediment transport. In-ground SB is combination of sudden drop and cross section enlargement below the FMD's outlet which is accessorized by a positive step at the downstream end with an exact height equal to abrupt drop; how the shape of structure is homogenous with a pool below the FMD. The present experimental study, conducted to evaluate the effects of In-ground SB length, end-sill type and end-sill dimensions on hydraulics characteristics of forced jump within SB without considering tail water depth which totally controlled by downstream river conditions. For this purpose, different In-ground SB length, end-sill with different heights and widths were examined experimentally. The results showed that, when drops is combined with an enlargement the typical hydraulic phenomena of each measure reciprocally influencing each other whose overall characteristics are very complicated. **Fig. 2** shows the velocity reduction of main stream flow at the centreline of In-ground SB for different end-sill heights. As can be seen in this figure, higher end-sill can effectively reduce the magnitude of velocity within the SB. Moreover, considering two free spaces at the lateral side of end-sill shows almost equal function for velocity reduction and providing additional effects for fish and sediment passing.

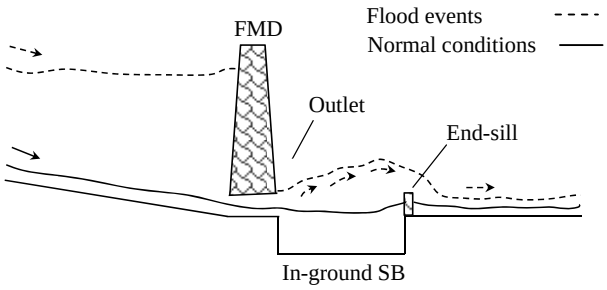


**Fig. 1**: schematic side view of In-ground SB.

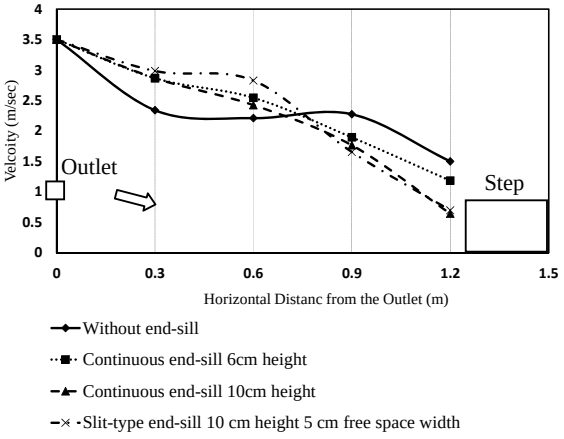


**Fig. 2**: The variation of Velcoity within centr line of In-ground SB for different end-sill dimensions.