

# Sensitivity study of different parameters affecting design of the clay blanket in small earthen dams

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## Abstract

Dams are structures that retain water for human services. Dams may be earthen, concrete, timber, steel or masonry made. On the basis of size, they may be small, medium or large dams. The main purpose of a dam is to stop the flow of water for the intended use. Flow of water cannot be stopped permanently even by the best dam ever made. Water may seep from dam body, abutments or the foundation bed below the dam body. To control seepage from the foundation bed, certain available methods like cutoff trench, cutoff walls, diaphragms, grout curtains, sheet pile walls and upstream impervious blankets are used. Upstream impervious blankets are considered more economical comparing with the other methods mentioned above. The key parameters playing role in blanket efficiency are length of blanket, thickness of blanket, clay core width of the dam, foundation bed depth up to impervious zone, reservoir head, permeability of blanket material and permeability of bed material. This study is focused on the effect of these parameters on reduction of seepage quantity. Seep/W, a finite element method based software, is used to model all the mentioned parameters within practical ranges. The results show that when the length of blanket is gradually increased, the seepage quantity reduces gradually until a specific length where the effect of further increase in blanket length is less significant. Same is the case for thickness of blanket but in this case the effect is comparatively less. In case of dam's clay core width, before a certain value, it has almost no effect on seepage reduction. Beyond that value, the seepage starts reducing. When the permeable stratum below the dam body is of more depth, the net seepage is more. The permeability of blanket material and foundation material has same effect on the seepage. When both the materials are more pervious, more seepage will be expected from the dam.