

# Breaching of fluvial dykes: influence of the dyke geometry

Vincent Schmitz, Sébastien Erpicum, Ismail Rifai, Kamal El kadi Abderrezzak,  
Pierre Archambeau, Michel Pirotton & Benjamin Dewals  
*University of Liège*

Failure of fluvial dykes often leads to devastating consequences in the protected areas. Various factors can trigger breaching; but overtopping flow is, by far, the most frequent cause of failure of fluvial dykes. Nevertheless, the breaching mechanisms are still not well understood, and their prediction remains challenging.

Most experimental studies so far focused on overtopping of dykes perpendicular to the main flow, while few analyzed fluvial dykes, i.e., dykes parallel to the main flow. Recently, Rifai et al. (2017, 2018) performed 54 laboratory tests of fluvial dyke failure to assess the influence of the channel inflow discharge, the downstream boundary condition, the floodplain tailwater, the channel size as well as the bottom and dyke material. In contrast, the influence of the dyke geometry was never investigated systematically for the case of fluvial dykes.

Here, we present 40 new laboratory tests carried out to highlight the influence of the dyke upstream and downstream slopes as well as the crest width on the breaching process of fluvial dykes. Results show that the combined effect of these three geometrical parameters can be lumped into a single non-dimensional parameter, as introduced by Müller et al. (2016) for the frontal configuration. Also, the influence of the dyke geometry remains limited compared to that of the other governing parameters, such as the inflow discharge in the main channel. These findings make a valuable step towards a better understanding of the breaching dynamics of fluvial dykes.