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## 3D simulation of Levee breach

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Levee breaching is the process of erosion of the levee material resulting in its failure and causing the water to flood. A levee may breach due to overtopping, piping, foundation defects, and lack of maintenance. The complex process of levee breaching involves hydrodynamics, sediment transport, and soil water interaction. This paper presents the 3D simulation of levee breach due to overtopping using CFD software, FLOW-3D. The numerical model uses Reynolds-averaged Navier–Stokes equations (RANS) for fluid flow, along with the volume of fluid (VOF) equation for surface tracking, as the governing equations. In addition, several turbulence models and different equations for bedload transport in scour model are available in FLOW-3D for simulation. A grid convergence test is used to decide the mesh size. The turbulence model and the parameters used in sediment scour model are calibrated using the experimental results for breach profiles available in literature. Results for evolution of breach and water surface profiles are presented. Additionally, velocity vectors in breach section, turbulence characteristics along the longitudinal and transverse direction and the breach discharge are also presented. The study suggests that the Renormalized group (RNG) turbulence model along with Meyer-Peter Müller equation for bedload transport optimally simulate the breach process for the considered case.