Dam Breach Analysis for a Tailings Storage Facility

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Abstract. The purpose of this study was to assess the various mechanisms that could result in a dam breach of a Tailings Storage Facility (TSF) and the resultant downstream impacts.
The TSF, located in Central America where short duration high intensity precipitation events result in rapid and large changes in flow conditions, will impound approximately 12 million tonnes of tailings behind a phased earth and rockfill embankment. The main portion of the dam will have a crest length of about 400 meters with a maximum dam height of approximately 72 m.
The hypothetical breach of the TSF dam was evaluated under likely modes of embankment dam failure from published information as well as likely modes of failure applicable to the TSF dam. The BOSS DAMBRK model was selected for the analysis as it allows simulating tailings properties by using the non-Newtonian model capabilities. The routing was developed for two different model scenarios for inundation limits (1) assuming the tailings behave as water for the routing process, and (2) assuming liquefied tailings properties for the routing process. This paper presents the results of the estimation of the dam breach parameters and modeling of the dam breach analysis for the TSF dam. The dam breach analysis characterizes the height, velocity and time of arrival downstream for a flood wave which could occur as a consequence of a hypothetical dam failure. Prediction of the flood-wave routing is to be used to approximate the effect of the dam breach downstream of the facility and aid in the Emergency Action Plan (EAP) for the TSF.

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