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TAILINGS DAMS: INITIAL CONSIDERATIONS FOR A NON NEWTONIAN FLUID DAM BREAK

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ABSTRACT: Tailings dams are spread all over the Brazilian territory due to Brazil's strong mining business and recently there were two major failures with catastrophic consequences. In dams that is applied the law number 12.334/2010 must have studies that verifies the inundation zone for the Emergency Action Plan (Plano de Ações Emergenciais – PAE). The material release by tailings dams doesn't have the same properties as water, they have different density and viscosity, resembling a non-newtonian fluid. Because of this, this research investigated these properties through rheology tests on a fluid with water and fine soil, in which it was possible to imply that with less water, it is harder for the mixture to flow. A slight difference in the water volume applied to the mixture demands a greater stress for the fluid to flow. Therefore, it is expected to the inundation zone to reach closer distances than compare to a material with a smaller viscosity in a hypothetical dam break scenario in Mariana/MG region. To know how much material will be release in this failure a 3D slope stability model will used. It will be applied a seismic load and post liquefaction material properties.

Keywords: Tailings dams. Non newtonian fluid. Inundation zone. Liquefaction. Dam failure.

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