**Title:** Mathematical modeling of pressurized system behaviour with entrapped air

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**Editor(s):** LopezJimenez PA; FuertesMiquel VS; IglesiasRey PL; LopezPatino G; MartinezSolano FJ; PalauSalvador G

**Source:** Environmental Hydraulics: Theoretical, Experimental and Computational Solutions

**Pages:** 61-64  **Published:** 2010

**Abstract:** The presence of entrapped air in pressurized hydraulic systems is considered a critical condition for the infrastructure security, due to the transient pressure enhancement related with its dynamic behaviour, similar to non-linear spring action. A mathematical model for the assessment of hydraulic transients resulting from rapid pressurizations, under referred condition is presented. Water movement was modeled through the elastic column theory considering a moving liquid boundary and the entrapped air pocket as lumped gas mass, where the acoustic effects are negligible. The method of characteristics was used to obtain the numerical solution of the liquid flow. The resulting model is applied to an experimental set-up having entrapped air in the top of a vertical pipe section and the numerical results are analyzed.