Research Articles

Analysis of hydraulic transients during pipeline filling processes with air valves in large-scale installations

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ABSTRACT

During the filling process in pressurized hydraulic systems, sudden pressure changes generated inside the pipes can cause significant damage. To avoid these excessive overpressures, air valves should be installed to allow air exchange between the inside and outside during the filling process. This study presents a mathematical model to analyse the hydraulic transients during filling processes. This model, which has already been validated in small laboratories, is now applied to real large-scale systems that consist of DN400 and DN600 pipelines from Empresa Mixta Metropolitana S.A (EMIMET – Group Global Omnium), which is the company that manages the water supply of the metropolitan area of Valencia (from the Drinking Water Treatment Station to the municipalities). The mathematical model for large pipes is validated by comparing the experimental measurements and the results of model.