

# **Analysis of fluid-structure interaction in piping systems excited by seismic actions**

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## **ABSTRACT**

This paper is about the behaviour of a liquid-filled pipe system excited by seismic actions. A coupled model with strong interaction, which includes hydraulic interface coupling, Poisson coupling and junction coupling, was developed.

Hydrodynamic behaviour of a liquid filled pipe was studied in experimental installation. Through the application and exploration of computational model it is possible to obtain some general indications for conception and design of piping systems, such as water supply systems, in order to reduce seismic vulnerability. It is also possible to present some recommendations about water supply system operation.

## **1 INTRODUCTION**

City life is extremely dependent on public utility networks such as water supply systems. In the past, the management office of Municipal Utilities wanted to guarantee the water supply to a maximum number of citizens. Nowadays the quality of the service provided is as important as the number of citizens served.

The functionality of the water supply system during and after the seismic event is very important to mitigating the recovery. When an earthquake occurs, fire flow capability and people supply (drink and sanitary needs) must be maintained.

Economically it isn't feasible to design a full seismic-resistance water supply system, but sustainable seismic-resistance water supply systems must be designed to allow the repair works on the system due to seismic destruction to be implemented immediately, after the earthquake and during the reconstruction period in order to obtain total operation of the system.