Seminario de Matemática Aplicada

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"Modelling the blowdown of biphase hydrocarbons pressure vessels"

We propose a model for the simulation of the blowdown of vessels containing two-phase(gas-liquid) hydrocarbon fluids, considering non equilibrium between phases. Two phases may be present either already at the beginning of the blowdown process (for instance in gas-liquid separators) or as the liquid is formed from flashing of the vapor due to the cooling induced by pressure decrease. There is experimental evidence that the assumption of thermodynamic equilibrium is not appropriate, since the two phases show an independent temperature evolution. Thus, due to the greater heat transfer between the liquid phase with the wall, the wall in contact with the liquid experiences a stronger cooling than the wall in contact with the gas, during the blowdown. As a consequence, the vessel should be designed for a lower temperature than if it was supposed to contain vapor only.

Our model is based on a compositional approach, and it takes into account internal heat and mass transfer processes, as well as heat transfer with the vessel wall and the external environment.

In the first part of the talk, we will present the mathematical model and some numerical simulations, showign a good agreement with experimental evidence. In the second part of the talk, we will concentrate on the thermodynamics aspects of the problem, involving liquid-gas phase equilibrium, and our choice of equation of state.

Organizado por el Departamento de Matemática Aplicada de la UCM, el Grupo MOMAT y el IMI.

Fecha: Martes 30 de junio, a las 12.00 horas
**Seminario Alberto Dou (aula 209)
Facultad de CC Matemáticas, UCM.**