

Leaks and Blockages in Pipelines

A new technique is developed utilizing the system pressure frequency response to locate and quantify leaks and blockages. The pressure frequency response is calculated at the downstream valve by the transfer matrix method. It is found that the presence of leaks and blockages alters the shape of the system pressure frequency response, the amplitude of pressure oscillations at even harmonics is increased and the amplitude at the odd harmonics is decreased. The increase in amplitude at the even harmonics is used to detect the location of leaks or blockages based on the leak and blockage frequency. For a simple pipeline, the technique successfully detected blockages up to 30% in size and leaks up to 2% of the mean discharge. Moreover, the computed results are verified by comparing with experimental measurements and those obtained by using the method of characteristics.