Inner flow-induced buckling of offshore pipelines

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The interaction of inner flow with flexural motion is a predominant parameter in the dynamic response of offshore pipelines. The existing tools consider the external flow-induced dynamic loads but ignore the inner flow-induced instability. In the present work the motion equations for a long pipeline are formulated, and a numerical method for inner flow-induced buckling and modal analysis is proposed. With the aid of transfer matrices and finite elements the modes and the natural frequencies are determined. The effect on the dynamic stability of the balance of the elastic flexural restoring force, the centrifugal force of the fluid flow in the curved portions, the Coriolis force of the fluid, the inertial force of the fluid and pipe mass, and the damping because of the surrounding water is examined. Implementation of the solution and numerical results are provided and discussed.

**REFERENCES**

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