

عنوان مقاله:

Assessment of Free Spanning Pipelines Frequency and Vortex Induced Stress Ranges

محل انتشار:

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خلاصه مقاله:

Offshore pipelines in their route pass through uneven sea beds. Free spans may be caused by seabed unevenness and changes of seabed topology such as scouring or sand waves. If dynamic forces be exerted on free spanning pipelines with frequency in the range of the free spanning pipe line frequency, free span will vibrate, and time varying stresses may cause fatigue. The main source of dynamic stresses for subsea pipelines is the vibrations caused by vortex shedding. Inherently these vortices are shed periodically, therefore, the forces exerted by them on free spanning pipelines are cyclic, which can cause fatigue damage. In recent years, many studies have been done on free spanning pipelines (eg, [1], [2], [3], [4], [5] & [6]). In this paper, pipeline free spanning and its interaction with surrounding soil and fluid have been modeled in ABAQUS; the main difficulty in the modeling process is the interaction of the free span with sea water flow. This interaction has been modeled by a distributed, harmonic, amplitude dependent load, and the influence of different parameters including soil stiffness, hydrotest and operation conditions on the free spanning pipeline frequency and stress ranges in cross-flow direction have been assessed.

کلمات کلیدی:

free spanning pipeline, stress ranges, flow velocity, ABAQUS, fatigue

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