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A Finite Elements Model for the Study of Buried Pipelines Affected by Strike-Slip Fault

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Abstract : Pipeline systems, play an important role as a vital element in reducing or increasing the risk of earthquake damage and vulnerability. Pipelines are suitable, cheap, fast, and safe routes for transporting oil, gas, water, sewage, etc. The sepipelines must pass from a wide geographical area; hence they will structurally face different environmental and underground factors of earthquake forces' effect. Therefore, structural engineering analysis and design for this type of lines requires the understanding of relevant parameters behavior and lack of familiarity with them can cause irreparable damages and risks to design and execution, especially in the face of earthquakes. Today, buried pipelines play an important role in human life cycle, thus, studying the vulnerability of pipeline systems is of particular importance. This study examines the behavior of buried pipelines affected by strike-slip fault. Studied fault is perpendicular to the tube axis and causes stress and deformation in the tube by sliding horizontally. In this study, the pipe-soil interaction is accurately simulated, so that one can examine the large displacements and strains, nonlinear material behavior and contact and friction conditions of soil and pipe. The results can be used for designing buried pipes and determining the amount of fault displacement that causes the failure of the buried pipes.

Keywords : pipe lines , earthquake , fault , soil-fault interaction
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