

Stability of vertically bent pipelines buried in sand

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Abstract: This paper discusses the stability of underground pipelines with preformed vertical bends buried in sandy soil. More specifically, the minimum cover height required to prevent the pipe from bowing under the action of forces due to temperature change and internal pressure is estimated. The variables considered include the pipe and soil materials, diameter, thickness, overburden height, bend radius, bend angle, internal pressure, fluid specific weight, and temperature variation. A comprehensive three-dimensional finite element analysis is carried out. The results are extracted from the output obtained. These results are put in a database which is used to develop general regression models to determine the relationships among the different variables. Different buckling modes are also considered. All of these results and models are entered into a computer software program for ready access.