

Comprehensive Critical Review for Static and Dynamic Soil-Structure Interaction Between Winkler, Pasternak and Three-Dimensional Method of Buried Pipelines

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Abstract : Pipeline infrastructure are a valuable asset to the country that help in transporting fluid and gas from one place to another and contribute in keeping the country functioning both physically and economically. During seismic activity, additional loads are acted on the buried pipelines becoming a salient parameter to be studied in soil pipe interaction. Winkler Beam Theory is a commonly used approach for design of underground buried structures however this theory does not take into account shear and dynamic loading parameters in consideration. Shear can be addressed in Pasternak Theory - an improved model of Winkler Theory. However dynamic loading condition and horizontal displacement is not considered in either method. A comprehensive critical review between Winkler Beam Method, Pasternak Method and Three-Dimensional Method in finite element analysis is to be done in this paper for seismic forces. Study of the influence of depth and displacement of soil in correspondence to stiffness value and influence of horizontal displacement for design of underground structures is considered.

Keywords : finite element, pasternak theory, seismic, soil-structure interaction, three-dimensional theory, winkler theory

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