عنوان مقاله:

Analytical Hertz Model of Indentation on Pipes by Rigid Spherical Indenters

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خلاصه مقاله:

This paper presents a work on three dimensional analytical modeling of elastic indentation on a pipe by a rigid spherical indenter using Hertz theory of elliptical contact and Flugge's thin cylindrical shell theory. Navier's type equations are developed in terms of components of displacement function in the contact zone. Governing equations of the cylindrical shell are solved using double Fourier series expansion technique, yielding to components of displacement in terms of their corresponding Fourier coefficients of the load. The value and distribution of contact pressure between the pipe and the indenter obtained from the Hertz theory is used to model the lateral load acting on the outer surface of the pipe. Results obtained by the analytical model for different cases of indenter diameter are presented and compared with the finite element results. It is observedthat analytical results are in good agreement with finite element results.

کلمات کلیدی:

Elastic deformation, Hertz contact theory,Thin cylindrical shell, Rigid spherical indenter