

عنوان مقاله:

Multi layered finite element analysis of graded coatings in frictional rolling contact

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خلاصه مقاله:

A plain strain analysis of frictional rolling contact on an elastic graded coating is presented in this paper. Finite element method is applied to gain an understanding of the stresses and contact zone properties caused during rolling contact. The effects of friction, material stiffness ratio and coating thickness on stresses in contact zone and coating/substrate interface are studied. Shear modulus of softening and stiffening graded coatings change with exponential, power law and linear functions. The substrate is homogenous and the rigid cylindrical roller moves in a steady state condition with constant velocity. The coating is modeled in multi layers and a 2-D hard contact of rolling surfaces is considered. The analytical results verify the present method and show a good agreement. It is shown that thinner thicknesses have more effects on stresses and energy density, but these effects are not seen for thicknesses larger than a specific limit.

کلمات کلیدی:

Frictional Rolling Contact, Finite Element Method, Graded Coating, Geometrical Effects

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