NONLINEAR VARIATIONAL SOLUTIONS FOR BONDED RUBBER MOUNTS WITH THE MULLINS EFFECT

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Abstract

Bonded rubber mounts are used for bearings for bridges, earthquake isolation bearings for buildings and elements in vehicle suspensions. However, rubberlike materials are generally not purely elastic and when they are subjected to cyclic loading they exhibit stress-softening phenomenon widely known as the Mullins effect. Using a variational method, this paper develops novel explicit nonlinear forms of solution for axial deformation of bonded mounts that exhibit stress softening. The explicit formulae are simple to use for design purposes, and are consistent with expected behaviour.

Keywords and phrases: bonded-mounts, variational approach, stress-softening, explicit-formulae, Mullins, nonlinear.

Received December 5, 2011

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