Dynamic Compression Properties of Paper-Based Wet Friction Material

by

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Abstract

The objective of this study is to investigate the dynamic compression properties of paper-based wet friction material experimentally and theoretically. First, the frequency characteristics of storage and loss modulus were measured changing the material size and lubricant viscosity. It was found that under wet conditions the loss modulus increases with frequency compared to that under dry conditions and that the effect is greater for larger material size and for larger lubricant viscosity. Next, the dynamic response of a poroelastic block saturated by viscous fluid which was put between two impermeable rigid planes and subjected to compressive vibration was analyzed theoretically. The experimentally obtained results were accounted for qualitatively in the calculation and the mechanisms of dynamic compression properties were discussed.

Keywords: Dynamic response, Paper-based friction material, Poroelasticity, Compression, Wet clutch

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An Analysis of Postbuckling Behavior of Angle-Ply Laminated Curved Plates under Biaxial Compression

by

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Abstract

Because of their high specific strength and stiffness, fiber-reinforced plastics is used as structural members in various fields, and hence analysis of thin laminated structures is important. Postbuckling behaviors of laminated plates under axial compression have been discussed by many researchers. However, little research has been performed on the postbuckling behavior of laminated curved plates. In this paper, the stability condition of CFRP angle-ply laminated curved plates under biaxial compression and which are simply supported along four edges is determined using Galerkin’s method. The postbuckling behavior is proven analytically, and the effects of various factors, such as the dimensions of the curved plate, biaxial compressive ratio, deflection pattern and average axial shortening, are clarified.

Keywords: Structural analysis, Composite materials, Angle-ply laminated curved plates, Biaxial compressive load, Postbuckling behavior

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