

DYNAMIC ANALYSIS OF TWO ADHESIVELY BONDED RODS*

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Abstract

This work presents two models for the dynamic analysis of two rods that are adhesively bonded. The first model assumes that the adhesive is an elasto-plastic material and that complete debonding occurs when the stress reaches the yield limit. In the second model the degradation of the adhesive is described by the introduction of material damage. Failure occurs when the material is completely damaged, or the damage reaches a critical floor value. Both models are analyzed and the existence of a weak solution is established for the model with damage. In the quasistatic case, a new condition for adhesion is found as the limit of the adhesive thickness tends to zero.

keywords: Adhesion, elastic rod, dynamic contact, bonding function, existence and uniqueness

1 Introduction

We study two different models for the dynamic process of debonding of two slender rods that are adhesively bonded. In the first model, the adhesive

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