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Parametric study of adhesive joints with non-flat sinusoid interfaces

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Abstract

The role of sinusoid interface shape on the stress distribution and load bearing capacity of the adhesively bonded single lap joints has been investigated numerically and experimentally. The experimental results showed that the interface non-flatness can considerably influence the adhesive joint strength and this was in correlation with the numerical results obtained from finite element analysis. Parametric studies were conducted using finite element method to investigate the role of various wave heights, wave lengths, adhesive thicknesses and also mechanical properties of adhesives and adherends on the stress distributions of the bonded joints. Lower wave lengths and higher wave height resulted in decreased peak stresses in the mid-line of the adhesive layer and consequently increase the strength of the joint. Besides, the lower adhesive thickness and lower stiffness ratio of adherends and adhesive caused an increase in the efficiency of the non-flat single lap joints.

Keywords: adhesively bonded joint; interface profile; stress analysis; failure; single lap joint

1- Introduction

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