●研究論文

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接着接合板における特異応力の強さを用いた接着強度の簡便な評価法について

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Convenient Debonding Strength Evaluation Based on the Intensity of Singular Stress for Adhesive Joints

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概要　本論文では，接着接合板が破壊に至る際の特異応力場の強さに注目し，接着接合板の強度が特異応力場の強さ一定として整理できることをまず確認した。次に，種々の接合界面の強度を統一的に評価するため，接合界面に仮想的な微小き裂を考えて，その界面き裂の応力拡大係数が一定条件で接着強度が整理できることを示した。さらに種々の応用を考えてどのような寸法の仮想き裂を考えればよいかを接着接合板の実験結果を基に考察した。その結果，仮想き裂の寸法に依存せず接着接合板の接着強度が簡便に評価できることが明らかとなった。

Abstract

In this study the debonding strength of an adhesively bonded joint is investigated in terms of the intensities of the singular stress fields. Two types of models are used to evaluate the tensile adhesive strength σ_c; one is the perfectly bonded model, and the other is a fictitious crack model assuming different fictitious crack lengths. Previous experimental data, which were obtained for S35C JIS medium carbon steel plates bonded with epoxy resin, are then examined. From the comparison between the results, it is found that the critical values of the stress intensity factors are almost constant. In other words, the adhesive strength can be estimated from the intensities of the singular stress, usually with less than 17% error for both the perfectly bonded model and fictitious crack models. The usefulness of assuming the fictitious crack is put at the singular point is also discussed on the basis of the analysis for stress intensity factor.

***Key Words*:** *Adhesion, Fracture Mechanics, Stress Intensity Factor, Interface, Crack, Elasticity, Finite Element Method*