



Fabrication of a device testing bonded joint strength under combined stress

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Abstract

Recently, growing demand for adhesive bonding to repair and strengthen corroded and fatigue-damaged steel structures requires research on the proper strength of the adhesive joints. However, no standard method to measure the static strength of the adhesive joints is established since the standard methods such as ISO, ASTM and JIS are not directly applicable to adhesive joints. In this study, a test device was designed to develop a simple and inexpensive test method for evaluation of the static strength of adhesive joints between butt-joined steel tube members under combined stress. The static loads were manually applied by using a center hole hydraulic jack and a power wrench. The result shows the value for the elastic modulus of the adhesive determined by the proposed method is slightly higher than the reference value, and the failure envelope between shear stress and normal stress is close to a straight line.

Keywords: adhesive bonding; combined stress; cohesive failure; steel member; repair and strengthening.

1 Introduction

Demand for adhesive bonding as a method to repair and strengthen corroded and fatigue-damaged steel structures is increasing. However,

no standard method to measure the static strength of the adhesive joints is established, since the standard test methods such as ISO, ASTM and JIS (Japanese Industrial Standards) are not directly applicable to adhesive joints. Previous studies [1-4] have proposed a test method in which the