

# Experimental Database on Resistance of Hybrid Joints with High-strength Bolts and Epoxy Adhesive

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## Abstract

High-strength frictional bolted joints is a usual connecting method of steel members at a construction site. Epoxy putty is also used to adjust the unevenness of corroded member's surface in a repair with bolted connections. Thus, the repair is often conducted by hybrid joint with epoxy adhesives and high-strength bolts. The conversion to hybrid joints is also effective in terms of the performance enhancement. Therefore, this paper surveys experimental data of the hybrid joints in Japan to summarize essential pieces of information. Surveyed results show that the relationships between the average shear strength of hybrid joints and average contact pressure on the faying surface indicates a strong correlation. Therefore, hybrid joints have the strength characteristic of adhesive joints rather than frictional bolted joints. Moreover, approximate equations which can evaluate the peeling resistance of the joint composed of several bolts was proposed.

**Keywords:** Hybrid joints, Bolted joints, Shear strength, Epoxy adhesives

## 1 Introduction

High-strength frictional bolted joints is a usual connecting method of steel members at a construction site. Recently, there is also an increase in the opportunity to strengthen in-service structural members with high-strength bolted connections in repair or aseismic performance. For example, when corroded members are repaired with bolted doubler plates, the rust layer is removed by a blast or power tool cleaning. And then, epoxy putty is used to adjust and absorb the unevenness of the surface. Therefore, the repair with frictional bolted connections is often conducted by hybrid connections with epoxy adhesives and high-strength bolts. The conversion



*Figure 1. A repair work with epoxy putty and high-strength bolts in Japan*

of frictional bolted joints to hybrid joints is effective in terms of the performance enhancement of frictional bolted joints.

In this study, a survey on experimental data of the hybrid joints in Japan was conducted to summarize and publicize essential pieces of information in every paper such as structural configurations, the