

Exploration of novel faying surface treatment for high-strength frictional bolted joints to enhance its after-slip performance

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Abstract

Welded joints is adopted rather than bolted joints for megastructure's connections because the former can carry large force. However, the former has several problems, such as quality control of welding in situ, which the latter can solve. By contrast, as the load transfer ratio of each bolt becomes uneven proportionally to the number of bolts, local slip around extreme bolts occurs before the whole slip. Extreme bolts to which a large shear force is applied will break before other bolts. For utilizing the strength of all bolts, the problem is solved by improving shear deformation capacity in faying surface with novel surface treatment. Here, the treatment concepts were explored, and the coating's effectiveness was evaluated through friction tests. The deformation capacity can be twice or more than that of conventional treatment, and the slip coefficient doesn't depend on contact pressure. These features have the advantage to give stable slip behaviour.

Keywords: Bolted Connection; Ultimate Limit State; Faying Surface Treatment, Polyurea Resin

1 Introduction

Megastructures have prominent size members so that the welded joints is adopted rather than the bolted joints because the former joints can carry large cross-sectional force even if the joints is compact. Moreover, the weld joints provides

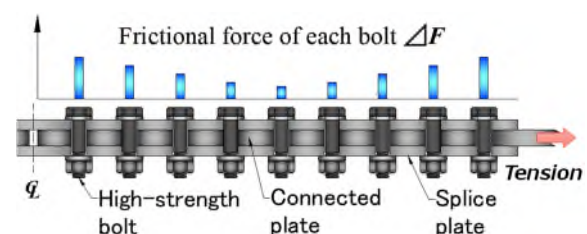


Figure 1. Load transfer behavior of frictional type joints with multiple bolts