

Edge Distance for Mechanical Fastening of Steel Fatigue Cracks

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Abstract

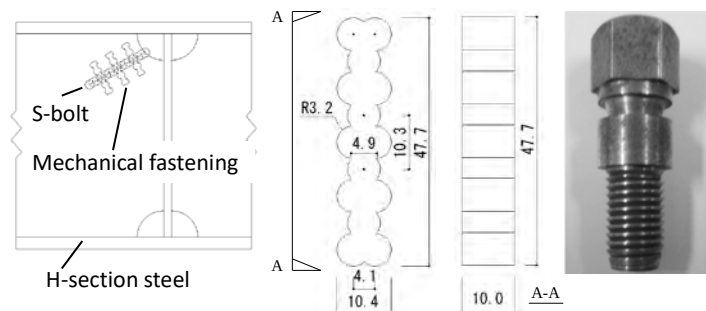
Fatigue cracks of steel structural members applied by overload, repeated load occur. As a countermeasure, there are some repair methods of steel fatigue cracks such as a stiffening plate method, a weld repair method, a stop-hole method, and a mechanical fastening method, and they are used corresponding to the characteristics. Among them, a mechanical fastening method repairs steel fatigue cracks without welding. Crack progress after this construction is less and the thermal strains by welding do not occur.

In this paper, tensile test and FEM analysis of steel structural members using the mechanical fastening system are conducted. Fracture behavior affected by the edge distance of the mechanical fastening components is simulated using FEM analysis and the effective edge distance of the mechanical fastening is discussed.

Keywords: Steel structural member; Mechanical fastening; Steel fatigue crack; Tensile test, FEM analysis, Edge distance.

1 Introduction

Fatigue cracks of the steel structural member occasionally occur due to aging, cyclic load, and overload which is not assumed in the design, there is adequately required to take responses to the extent of the size of cracks [1]. In a relatively large building of civil engineering structures and building structures, longevity of the steel structural member due to repair and reinforcement have been taken mainly for



(a) Construction (b) Mechanical fastening (c) S-bolt
Unit:mm

Figure 1. The mechanical fastening system