

Intermeshing: A New Concept For Rapid Steel Erection

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1 Abstract

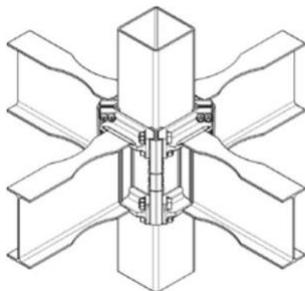
Three-dimensional intermeshing of steel enabled by advanced digital manufacturing holds the potential to radically change how steel bridges and buildings are connected. This paper presents the concept of the first universal structural steel connection in over 100 years. The proposed Intermeshed Steel Connection (ISC) exploits recent advances in steel cutting technologies and robotics to shape member ends precisely. This vastly reduces on-site bolting and welding. Forces are transferred through common bearing surfaces at multiple contact points. The new connection is designed to accelerate structural steel deployment and offer better disassembly options. This paper introduces the geometry, manufacturing, and initial analysis of the connection approach, which holds the potential to be robust, secure, scalable, and faster to erect.

Keywords: Structural Steel, Erection, Manufacturing, Connections, Disassembly

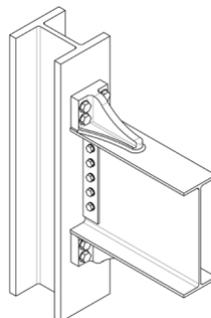
2 Introduction

Current structural steel connections include bolting and welding, and less commonly riveting. To date, this part of the construction industry has yet to exploit advances in digital cutting technologies to re-envision a work process that is over 100 years old. This paper introduces the Intermeshed Steel

Connection (ISC), which eliminates site welding and vastly reduces bolting. While the ISC is not the first proposed connection that attempts to minimize field welding and bolting to improve erection speeds (Figure 1) [1]–[3], it is the only one that can be applied beam-beam, column-column, and column-rafter.



a) ConXtech connection [1]



b) Kaiser connection [1]



c) ATLSS connection [4]

Figure 1. Patented connections aimed at rapid assembly.