

The Effect of Stitch Bolts on Bolted Timber Connections

Joseph Scobey and Dr. Ray Witmer, Jr.

University of Tennessee at Martin

Background

This is a two year University Scholars undergraduate project at the University of Tennessee, Martin.

Purpose

The goal of this project is to determine the effects of stitch bolts on bolted timber tensile connections. Figure 1 shows a timber connection acted upon by a tensile force. The connection consists of steel side plates bolted to timber main members. The stitch bolts are bolts used to keep splits from developing in the timber main members and are placed perpendicular to the connection bolts. Very little research exists pertaining to bolted timber connections reinforced with stitch bolts. If the addition of one additional stitch bolt can significantly increase the strength of the connection, smaller and less expensive connections can be used to transmit tensile loads.

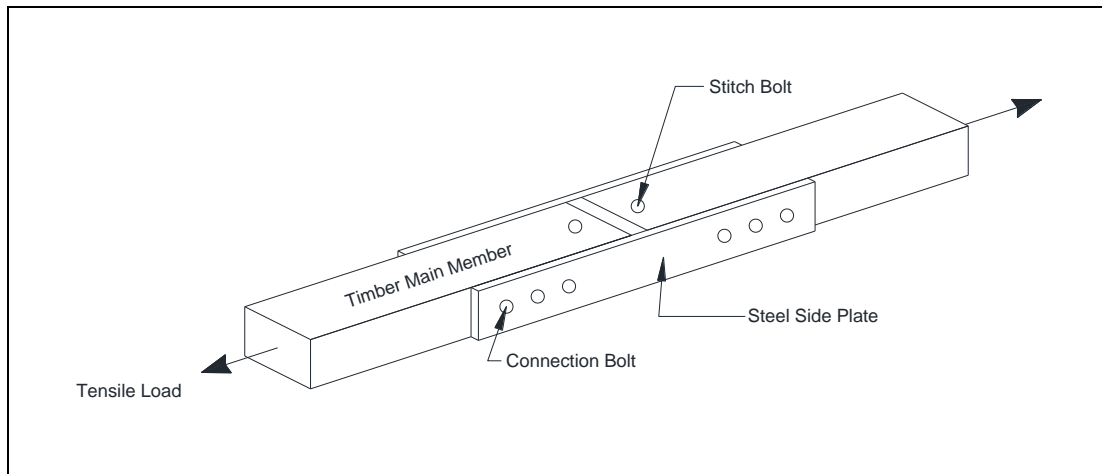


Figure 1 – Tensile timber main members connected by bolted steel side plates. Stitch bolts are placed perpendicular to the connection bolts.

Design/Method

The bolted timber connections were designed to fail in the main timber member. Connections were tested with and without stitch bolts to determine the effect of the stitch bolt on the connection strength. Basic material properties were also determined for use in the National Design Specification's (NDS) analytical connection strength model.

Results

Experimentally determined material values were slightly larger than the NDS published values. The coefficients of variation for timber and bolt material properties were approximately 9% and 2.5%, respectively.

Conclusions

The timber connection tests have not been completed at the time this abstract was submitted. Therefore, final conclusions cannot be determined.