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Design of Panel-Point Bridge (Angles & Clamps)

Summary

The bridge angles (part of the bridging clamp system) utilize a back-to-back configuration. They are parallel to a joist and span between panel points of a joist's bottom chord. The angles are spaced apart horizontally by the combination of the joist web and the thicknesses of the vertical legs of the joist's bottom chord.

The allowable concentrated load, based on stiffness, is 1,000 lbs for a pair of angles. This is the load which results in about 0.04" deflection for a 48" span, if the 3" x 2" x ¼" bridge angles alone resist the load applied at midspan. Testing confirmed that the deflection at 1,000 lbs was in reasonably close agreement with the predicted deflection. An allowable load based on strength alone would be greater. Testing also confirmed that the clamps adequately stabilize the angles.

In a typical application, there will be some load-sharing between the bridge angles and the joist chord angles. Assuming that the bridge angles are initially in contact with the chord angles, the percentage of load carried by each pair will be in proportion to their relative bending stiffnesses, considering the cross-sections together with a simple or continuous span, as applicable. It is the responsibility of the structural engineer for the project to consider the design adequacy of the joist chord for the combined effects of axial force (truss behavior of joist) and bending stresses (beam behavior of chord due to load between panel points).

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