

## Strength of Concrete-Encased Columns

**Can concrete encasing an existing steel wide-flange column be assumed to brace the steel section, even when no shear studs are present? In other words, can we assume the steel column is fully or partially braced by the concrete to reduce its effective length?**

It appears that you are planning to analyze the column while ignoring the direct contribution of the concrete strength due to the absence of shear studs.

I suppose if you had a significant reinforced concrete encasement, you might be able to show that the concrete section can provide sufficient strength and stiffness to brace the column per AISC 360 Appendix 6 provisions. Usual encasement may not be sufficient, however, so I'll suggest an alternative approach.

You can consider the composite strength of an encased column even without the presence of shear studs. Chapter I of the 2010 AISC *Specification for Structural Steel Buildings* (a free download at [www.aisc.org/2010spec](http://www.aisc.org/2010spec)

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## Maximum Spacing and Edge Distance Requirements

**What are the origins and purpose of the maximum spacing and edge distance requirements in Section J3.5 of the AISC Specification?**

I recently researched this myself and found that all of the published requirements stem from a paper by R.L. Brockenbrough. The information below summarizes the various recommendations and requirements. Some limited information on field observations, which verify the Brockenbrough recommendations, is also documented by P. Albrecht and A.H. Naeemi.

For sealing against the penetration of moisture in joints, the geometry of bolted joints must provide tight contact between faying surfaces. This is accomplished by limiting the fastener spacing and edge distance. Maximum bolt spacing and edge distance requirements are provided in the 2010 AISC Specification, the AASHTO