

# Steel Quiz

*Steel Quiz*, a monthly feature in *Modern Steel Construction*, allows you to test your knowledge of steel design and construction. All references to LRFD specifications pertain to the 1999 *LRFD Specification for Structural Steel Buildings*, available as a free download at [www.aisc.org](http://www.aisc.org). ASD references pertain to the 1989 *ASD Specification for Structural Steel Buildings*. Where appropriate, other industry standards are also referenced.

If you or your firm are interested in submitting a *Steel Quiz* question or column, contact:



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The first five questions of this month's *Steel Quiz* were contributed by **Julie Kuenneke** of the Hughes Group in Missouri. The remaining questions were created by AISC's Steel Solutions Center. This month's *Steel Quiz* has a steel joist theme. Please note that questions on steel joists are best addressed by the **Steel Joist Institute**: 3127 10th Ave. North Ext., Myrtle Beach, SC 29577-6760, tel: 843.626.1995, fax: 843.626.5565, [www.steeljoist.com](http://www.steeljoist.com).

## Questions

1. What is joist camber?
2. Why are steel joists cambered?
3. As an erector, how do I safely place decking bundles on steel joists during the erection procedure?
4. Does the Steel Joist Institute require plant certification for its member plants?
5. Are steel joists designed to resist uplift forces?
6. Is AISC's *Code of Standard Practice* applicable to steel joists?
7. Are steel joists classified as "Structural Steel" in AISC's *Code of Standard Practice*?
8. Where can one find information on reducing joist costs?
9. Who is the Steel Joist Institute?

**Turn page for answers**

### September's *Steel Quiz* question #4

**was:** *Are hooked rods recommended for anchoring base plates that experience uplift?* **Our response was:** No. Hooked rods just don't have the pullout capacity that threaded rods with nuts have. It is believed by many that hooks are no better than having a straight rod. Thus, anchorage with a hooked rod would require development of bond between the rod and concrete. This is really not possible with smooth rods.

A reader writes: *"We have designed anchor bolts with tension...for over 30 years with no failures. Also there are many buildings built with smooth bars in the early 20th century that are still standing. Smooth bars can develop bond and you should retract your statement."* (The ACI 318-63 and PCI 4th Edition Section 6.10 were cited as references)

The reader makes a valid comment. There is some bond that takes place between a smooth rod and concrete, and there are well-established formulae that determine the required bond development length.

However, according to AISC's Steel Design Guide Series #7, *Industrial Buildings—Roofs to Column Anchorage*, a hook is generally not capable of developing the recommended tensile capacity of the bolt. Thus, it is recommended that anchor bolts which must develop a tensile capacity to resist moment or uplift should normally be a bolt or threaded rod with a nut provided for the anchorage. A similar recommendation is given in AISC's Steel Design Guide Series #1, *Column Base Plates*.

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## Answers

1. Joist camber is an upward (positive) curve built into the joist in the shop. The amount of camber is standardized and is a function of the joist span. Standardized camber amounts are listed in the Steel Joist Institute (SJI) Specifications.
2. Joists are cambered to aid in avoiding drainage problems that may occur at the center of the joist span. The specifying professional should be aware that the amount of standard camber listed in the SJI specifications is based on a fixed radius curve and bears no relationship to actual live or dead load deflections.
3. The proposed OSHA Steel Erection Standards (§1926.757(e)(4)) provides a very concise and safe method for placing steel deck bundles on steel joists during the erection process. If the reader does not have access to this section of the proposed OSHA standards a copy may be obtained by contacting the SJI office.
4. Yes. Applicants for SJI membership must undergo a rigorous plant inspection to verify that the applicant has the knowledge, equipment and personnel to fabricate steel joists in accordance with SJI standards. Each member company fabricating facility must also undergo periodic plant re-certification inspections.
5. Standard steel joists are designed to support uniform gravity loads only. However, steel joists may be designed for many special loading conditions including uplift. The specifying professional should select his or her joist requirements based on uniform gravity loading, designate the joist as special, i.e. 24K8SP, and provide net uplift requirements on the structural design drawings.
6. No. See the commentary of Section 1.1 of the *Code of Standard Practice*.
7. No, per Section 2.2 of the *Code of Standard Practice*, both steel (open-web) joists and steel joist girders are classified as "Other Steel, Iron or Metal Items." Even though the structural steel fabricator may provide open-web steel joists, they are not considered to be structural steel because they are neither manufactured nor fabricated by the structural steel fabricator.
8. SJI published some cost-reducing recommendations in an article called "Reducing Joist Costs" in *Modern Steel Construction* (April 2000). The article can be viewed at [www.modernsteel.com](http://www.modernsteel.com).
9. SJI is a not-for-profit organization. Besides setting standards for the steel joist industry, SJI works closely with major building code bodies throughout the country helping to develop code regulations regarding steel joists and joist girders. SJI also sponsors ongoing research related to steel joists and joist girders, and offers a complete library of publications and other training and research aids.