Steel Quiz

Steel Quiz, a monthly feature in Modern Steel Construction, allows you to test your knowledge of steel design and construction. Answers can generally be found in the LRFD *Manual of Steel Construction*, 2nd edition, but other industry standards are often referenced.

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

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The tower cranes and steel frames sprouting in Chicago inspired MSC's staff to develop this quiz on steel erection.

Questions

1. True or False: The AISC Steel Erector Certification Program deals with
   a. quality (like the shop program)
   b. Safety
   c. Both quality and safety
2. What is a *spud wrench*?
3. What is a *jumping derrick* and when would it be used?
4. Why are columns in tall buildings most often two stories per tier?
5. What does the acronym *SENRAC* stand for?
6. What is a *double connection*?
7. True or False: Untrimmed metal deck that extends several feet over a spandrel beam makes a safe work platform.
8. What does the term *Christmas Treeing* mean?
   a. Putting a Christmas tree on the topping-out piece
   b. Lifting more than one piece on a load line at one time
   c. Erecting the structure in a stepped back fashion
9. True or false: Fall arrest systems and fall restraint systems are the same.
10. Do field welders use a different welding process than shop welders?

See next page for answers

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Answers

1. c. Engineers and builders have a limited number of tools they can use to communicate the importance of safety and quality to their subcontractors and their customers. Erector Certification is a new tool AISC offers for that purpose. It also helps an erector emphasize the importance of safety and quality to their staff.

2. A *spud wrench* is a heavy hand tool with an open ended wrench for fastener heads on one end and a taper on the other end used to align bolt holes. Since the tool is relatively heavy and only works with one size of fastener, mixing bolt sizes in a connection adds difficulty and slows erection.

3. A *jumping derrick* (also known by other names) is a crane on a tower that is jacked up onto successive floors of the project as the structure is erected. It is used on structures too tall to conveniently erect with a crane supported on the ground. The structure has to be designed or redesigned to resist loads from the crane.

4. While there are many reasons including weight, mill lengths, shipping and field accessibility, the most frequently cited reason for 2-story columns is to permit erection of a working platform within the limit that OSHA permits an ironworker to work without tying off. (Note some builders require tie-off at lower heights, which can be accommodated, but at a cost.)

5. Steel Erection Negotiated Rule-making Advisory Committee. This committee was created in 1994 to negotiate issues involved in revising OSHA's steel erection standard.information is available from your erector trade association. SENRAC has proposed a significant revision to OSHA 1926 Subpart R that will effect erectors, fabricators, and builders. The latest estimate for publication of the new rule is November.

6. In the draft revision to the steel erection OSHA safety standard, a *double connection* is defined as "an attachment method where the connection point is intended for two pieces of steel which share common bolts on either side of a central piece." The SENRAC proposal demands in connections at the web of columns or to the web of beams above columns, that the first piece be attached by at least one bolt/nut assembly even while subsequent pieces are erected. This can be done with a seat, an extra hole, or with other connection configurations.

7. False. Extended decking can buckle, causing worker injuries.

8. b. Erectors lift more than one piece at a time to avoid having to return to the main steel storage place, often on another floor, for every piece. The SENRAC proposal will permit this practice under limited conditions.

9. False. A *fall arrest* system, usually worn by ironworkers, stops a fall in a limited distance and consists of a belt or harness, a lanyard, an anchorage, and frequently a shock absorbing device. A *fall restraint* system or positioning device prevents a fall of more than 24 in. and permits self rescue. It is used by specialty contractors when people are working at one point in a structure.

10. The most common processes in shops and the field today are SMAW and FCAW. In the field, self shielded FCAW is used because the consumable provides its own shielding, while in the shop a separate gas shielding can be provided easily which promotes better productivity in many conditions. But both types of FCAW and SMAW can and are used in both the field and the shop.