

Welding Steel Deck

Is it acceptable to make arc spot welds of metal deck to ASTM A992 steel beams using E60 electrodes? Are there conditions that require using higher-strength electrodes?

This topic was briefly discussed in the March 2010 SteelWise article "Attaching Metal Decking" (available via the "Back Issue Archives" at www.modernsteel.com).

It states: "The most common filler metal used for welding steel deck is an E60 electrode. The most common yield strengths. Accordingly, an E60XX electrode is the

Non-Fusible Weld Backing

Does the use of non-fusible weld backing require a welding procedure specification (WPS)? If so, is a procedure qualification record (PQR) also required?

Yes to both. Section 3.3.1 of AISC Steel Design Guide 21 states, "While AWS D1.1 specifically permits the use of copper backing, none of the prequalified joint details use it, so WPSs that call for copper backing must be qualified by test."

Section 7.5 of AISC Steel Design Guide 21 states, "To qualify a WPS, the contractor must first weld a test plate that will be subject to a variety of nondestructive and mechanical tests. The welding variables and parameters used during the test, as well as the results from the various tests, are recorded on a Procedure Qualification Record, or PQR. If the testing demonstrates that all the AWS D1.1 requirements and job specifications have been met, then the contractor can develop a specific WPS based on these results. At a minimum, the parameters used in making the test weld will constitute a valid WPS. The values recorded on the PQR are simply transcribed to a separate form, now known as a WPS rather than a PQR."

Larry S. Muir, P.E.

Historic Cast Iron

We would like to use some welded details for the renovation of an existing building but have concerns that some existing columns are cast iron and thus not weldable. What field tests would determine if they are cast iron or steel and what test can be performed to determine if the material is weldable?

Numerous sources indicate that wrought iron, cast iron and steel can be differentiated with spark tests, where a grinding wheel is applied to piece and differences in the type and color of spark indicate different compositions.

AISC Steel Design Guide 21 states, "...it may be desirable to repair broken cast iron parts or to weld cast iron members to structural steel. While cast iron can be welded, it is difficult to weld, and the results are inconsistent. Cast iron should not be welded if the weld is intended to serve a structural function. Of course, cast iron members were nearly always used to resist compression, and cosmetic cracks or portions that have broken off may be repaired by welding using the proper procedures and materials."

One approach might be to have a knowledgeable contractor conduct a spark test. If the results indicate cast iron, you should probably forego welding. If steel, Steel Design Guide 21 provides information concerning the welding of historical steels. It suggests testing to determine chemistry and also provides details about a bend tab test, which is typically done in the field.

Larry S. Muir, P.E.

Design of Cribbing Beams

Steel I-beams are commonly used for cribbing or shoring. In many of these applications they are not rotationally restrained

at their supports. I am concerned that this lack of rotational restraint precludes me from using AISC 360 Chapter F in their design. Is that correct? Are there any resources that discuss the design of steel I-beams uses as cribbing?

You are correct to be concerned. AISC 360 Section F1 requires that beams be rotationally restrained at their supports, so you are also correct that the AISC *Specification* cannot be directly applied to the flexural design of these members.

This topic was addressed at the 2012 NASCC: The Steel Conference. The presentation was "Erection Engineering: The Science Behind The Art," which can be viewed at:

www.aisc.org/uploadedcontent/2012NASCCSessions/N3/

The discussion of cribbing beams begins at about the 14:00 minute mark and describes an approach that uses an adjusted length for lateral-torsional buckling.

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AISC Search Utility

Has the AISC Search Utility been updated for the 14th Edition Manual?

No. The AISC Search Utility was written for us by a company that no longer exists, and it has not been updated. However, all subsequent versions of the shape data has been made available in simplified spreadsheet form and can be downloaded at:

www.aisc.org/shapesdatabase

Note that the shape data has been divided into two main files; the one named "Current" contains the data on current shapes, while "Historic" contains the data for older shapes (the version with "DLL" in the name is intended for use by software). Although the spreadsheets wn F19h t3s,d3 d3that beams be rouvailan/aila