BU 07-03 Update 2
DSA raised a concern with welding defects in tube steel last year. The concern resulted from observed gaps in the factory welding of the seam in tube steel. After much discussion with DSA staff and leading structural engineers, ACCM has collected the consensus best practices on tube steel welding quality.

Have tube steel in the shop visually inspected by the special inspector observing fabrication. If welds are visually questionable, involve the structural engineer of record to decide on rejecting pieces or calling for supplemental welding or repair.

Have fabricated tube steel on the jobsite visually inspected by the project inspector. If welds are visually questionable, involve the structural engineer of record to decide on rejecting pieces or calling for supplemental welding or repair.

Be sure that project files of heat numbers and in-plant and jobsite steel testing and inspection are fully up to snuff.

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DSA BULLETIN 07-03 – UPDATE #2

Update #2: March 7, 2008
Update #1: October 29, 2007
Issued: September 26, 2007
To: DSA Staff and
Interested Parties
From: Division of the State Architect
Department of General Services
State of California
SUBJECT: Update to
Defective Product Alert: Structural Tube Steel

Introduction: The Division of the State Architect (DSA) continues to monitor seam weld quality of hollow structural sections (HSS) used in California school construction projects.

Findings: To date, DSA has received reports of HSS with defective seam welds found in seventeen separate school projects. We have been assured that appropriate measures have been taken to mitigate the impact of these defects on these projects. Information received thus far indicates that the defective material came from seven different mills.

Defects reported appear to be limited to seam weld discontinuities, as illustrated in
photographs of defects posted on the DSA web site, Testing Labs page. However,
DSA is also aware of concerns raised in regard to the mechanical properties of HSS.
More information and recommendations on this issue can be found on the America
Institute of Steel Construction (AISC) web site, at
http://www.modernsteel.com/SteelInTheNews/?p=105

Conclusions: As a result of its investigations so far, DSA has reached the following conclusions:

1) - Many visible seam weld discontinuities in HSS were not detected by fabricator quality control and special welding inspectors.

2) - In some cases, special welding inspectors and project inspectors, failed to perform the proper material identification, traceability and record keeping procedures, as required by the 2007 California Building Code (CBC), Sections 2203A.1 and 2212A.1 (Sections 2203A.1 and 2231A.1 in the 2001 CBC).

Recommendations: For current or pending construction projects, DSA continues
to recommend that responsible parties, as a minimum, conduct:

• A thorough material ID and mill certification review for all steel products. The project inspector is responsible for verifying that proper material identification is conducted either at the fabrication shop, by the shop welding inspector, or by other appropriate means.

• A thorough visual examination of the seam weld area for visible discontinuities. Visual examination should include, as a minimum, the exterior of the seam weld and the interior at each end.

Inspectors are cautioned that defects can be narrow in width, sometimes covered in grease and possibly difficult to detect using only visual examination methods. Other methods of flaw detection should be considered, such as non-destructive testing (NDT), when defects are suspected. The structural engineer of record should determine if NDT is warranted.

DSA strongly recommends that these measures be taken for ALL tube steel, including round HSS sections and pipe used for structural elements, regardless of
origin. See DSA IR 17-3 for a complete list of structural welding inspection duties.

Summary: This is a very serious, and potentially a dangerous matter. DSA is
aware of a structural collapse of a 100’ tall, 760’ long, industrial building in Wisconsin that has been attributed, in part, to defective seam welds in HSS. The
collapse resulted in the death of one person.

DSA will continue to investigate this issue, collect data, and assess the magnitude
of the problem. In addition to the standard California Building Code (CBC) reporting requirements, it is imperative that all relevant investigations be reported
to DSA Headquarters at eric.france@dgs.ca.gov so that data can be compiled and
disseminated. Please direct any questions regarding this Bulletin to Eric France
(916) 445-2193.
DSA appreciates your cooperation.
Check the DSA web site for future developments at
http://www.dsa.dgs.ca.gov/Labs