

the box was in one position, ie with the web horizontal, thus saving a part turn.

Additionally, the edges of the bottom flanges were bevelled in line with the web to avoid a shadow line on the bridge.

Non-destructive testing

All plates were ultrasonically tested in the works and shop butt welds in both top and bottom flanges were subject to 100 per cent radiographic testing. In addition, coupon plates were provided for further testing of these butt welds, the tests being: one tensile, one normal bend, one reverse bend for each flange, with three charpy V-notch tests for the tension flange. The latter were carried out, with the notch in the weld metal vertical to the plate surface at -15°C and the requirements for NDII steel to BS.2762 in this respect, ie average value of 20 ft lb for three specimens with

no individual specimen breaking under less than 15 ft lb, were fully met. The other mechanical tests were conducted in accordance with BS.709.

All inside fillet welds on tension flanges were tested for cracks using K-07 Magnaflux simplified crack detector with Ardrex No 800-2 black magnetic particle inspection, kerosene based.

Tests for welding procedures

All welders were required to pass the appropriate tests specified in BS.2645 according to the degree of skill necessitated by the procedures, manual, semi-automatic, or automatic, on which they were to be employed.

The Irwell Valley Bridge was designed by Lancashire County Council and the contract was placed by the MoT North Western Road Construction Unit (Director, Mr James Drake, CBE).



AD 424: Shear stud length

SCI has been advised that shear studs which are shorter than usual have been placed on the market in the UK, and this AD warns against using them unless the length has been reflected in the design, and unless the studs meet the necessary material specification.

AD 380 indicates that a stud that starts with a manufactured length of 105 mm would typically have a length after welding (LAW) of 100 mm when welded directly to a beam flange and 95 mm when welded through decking. The studs are identified as nominally 100 mm

studs. AD 380 also indicates that studs of diameter $d = 19$ mm and a nominal length of 100 mm may be deemed to satisfy the requirement that a stud extends at least 2d above the height of the decking, when that height is 60 mm. UK practice in composite construction for buildings generally involves the use of through deck welded shear studs. Tests have shown that through deck welded studs of 100 mm nominal length, with 60 mm decking, perform satisfactorily.

A complication is that studs identified as nominally 100 mm

long have actual lengths "out of the box" which differ from manufacturer to manufacturer. It is understood that the shorter studs referred to in the opening paragraph are 90 mm before welding, so are likely to be less than 85 mm LAW when welded through decking. Clearly they should not simply be substituted for nominal 100 mm studs unless the design is verified with the shorter length.

All shear studs should conform to EN ISO 13918, as noted in the National Structural Steelwork Specification (NSSS). Composite

beam design generally assumes a certain level of slip between the steel and concrete so the studs must be ductile, regardless of the fact that failure is normally in the concrete (at least for the grades of materials typically found in buildings). Annex B of BS EN 1994-1 describes the stud test arrangement to demonstrate ductility.

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New and revised codes & standards

From BSI Updates October 2018

BS EN PUBLICATIONS

BS EN ISO 15626:2018

Non-destructive testing of welds. Time-of-flight diffraction technique (TOFD). Acceptance levels
Supersedes BS EN ISO 15626:2013

BS IMPLEMENTATIONS

BS ISO 1835:2018

Round steel short link chains for lifting purposes. Medium tolerance sling chains. Grade 4, stainless steel
No current standard is superseded

PUBLISHED DOCUMENTS

PD CEN ISO/TR 20173:2018

Welding. Grouping systems for materials. American materials.
Supersedes PD CEN ISO/TR 20173:2009

BRITISH STANDARDS REVIEWED AND CONFIRMED

BS EN ISO 19232-1:2013

Non-destructive testing. Image quality of radiographs. Determination of the image quality value using wire-type image quality indicators

BS ISO 14346:2013

Static design procedure for welded hollow-section joints. Recommendations

BRITISH STANDARDS WITHDRAWN

BS EN ISO 15626:2013

Non-destructive testing of welds. Time-of-flight diffraction technique (TOFD). Acceptance levels
Superseded by BS EN ISO 15626:2018

PD CEN ISO/TR 20173:2009

Welding. Grouping systems for materials. American materials
Superseded by PD CEN ISO/TR 20173:2018