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NR CIV/SD/1003 Rev B

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GENERAL NOTES

USE OF DRAWINGS

1 THE STANDARD DRAWING SERIES AVAILABLE TO THE DESIGNER ARE:

NR/CIV/SD/1000 – BOX GIRDER UNDERBRIDGES – SUPERSTRUCTURE DRAWINGS
NR/CIV/SD/1800 – UNDERBRIDGE ANCILLARY ITEMS
NR/CIV/SD/1900 – STANDARD WALKWAY DRAWINGS

2 REFER TO TECHNICAL USER MANUAL NR/CIV/SD/TUM/1000 FOR COMMENTARY ON THE DESIGN PARAMETERS.

3 THE STANDARD DRAWINGS, TOGETHER WITH DRAWINGS OF THE PARTICULAR PROJECT SHALL BE REFERRED TO BY THE CONTRACTOR WHEN PREPARING HIS WORKING DRAWINGS.

4 THESE DRAWINGS DO NOT REPLACE THE NEED FOR THE CONTRACTOR TO PREPARE WORKING DRAWINGS OR WRITTEN WELD PROCEDURES.

5 ALL DIMENSIONS ARE STATED IN MILLIMETRES.

6 DRAWINGS ARE FOR A PARTICULAR SKEW AS INDICATED. ARRANGEMENT OF DETAILS TO BE DETERMINED FOR THE PARTICULAR SPAN SKEW.

7 THE DECK SKEW AND THE SKEW OF THE MAIN GIRDERS BETWEEN BEARINGS MAY NOT EQUAL THE TRIMMER SKEW AS THE BEARING CENTRELINE IS IN–BOARD OF THE BOX INNER WEB TO WHICH THE TRIMMER IS ATTACHED.

MATERIALS AND WORKMANSHIP

8 STEELWORK SHALL COMPLY WITH BS EN 1090–2 FOR EXECUTION CLASS EXC3 AND TOLERANCE CLASS 2.

9 ALL STEEL SHALL BE TO BS EN10025–2:2004 AND BS EN10025–3:2004 UNLESS OTHERWISE STATED. STEEL GRADES ARE AS SHOWN ON THE DRAWINGS.

10 ALL WELDS SHALL BE CONTINUOUS ON BOTH SIDES OF ALL JOINTS UNLESS OTHERWISE STATED. WELD SIZES SHALL BE AS SHOWN ON THE DRAWINGS, BUT WHERE NOT STATED SHALL BE MINIMUM 6mm LEG FILLET WELDS.

11 ADDITIONAL WELDS TO MAKE UP SPECIFIED SIZES OR LENGTHS MAY ONLY BE USED WHERE ACCEPTED IN WRITING BY THE ENGINEER UNDER THE CONTRACT. WHERE BUTT WELDS ARE PERMITTED THEY SHALL BE FULL PENETRATION BUTT WELDS WITH QUALITY AT LEAST FAT90.

12 BOLTS SHALL BE CLASS HR 8.8 TO BS EN 14399–3 AND SHALL BE TIGHTENED USING ONE OF THE METHODS GIVEN IN THE SPECIFICATION. GRADE S10T TENSION CONTROLLED BOLTS MAY BE USED AS AN ALTERNATIVE.

13 ALL HOLES SHALL BE TO SIZE STATED WITH THE HOLE IN ONE PART OF ALL MATING CONNECTIONS TO BE DRILLED AT TRIAL ERECTION.

14 CONFORMANCE IS REQUIRED TO THE LIMITS ON DISCONTINUITES, LAMELLAR TEARS AND LAMINATIONS REQUIRED BY THE CONTRACT. PD 6695–1–10 CLAUSE 3 PROVIDES GUIDANCE ON PREVENTION OF LAMELLAR TEARING IN WELDED STRUCTURAL STEELWORK COMPRISING A LIST OF FABRICATION CONTROL MEASURES, WHICH INCLUDES PROCUREMENT OF MATERIAL WITH IMPROVED THROUGH THICKNESS PROPERTIES. THE FABRICATOR MAY, AT HIS OPTION, CHOOSE TO PROCURE MATERIAL WITH IMPROVED THROUGH THICKNESS PROPERTIES BY INVOKING BS EN 10164 AS A SUPPLEMENT TO THE PRODUCT STANDARD.

15 WELD SYMBOLS ARE GENERALLY IN ACCORDANCE WITH BS EN553. FILLET WELD SIZE GIVEN IS LEG LENGTH, E.G. – z6

16 BUTT WELDS ARE FULL PENETRATION OF THE THICKNESS JOINED, UNLESS MINIMUM DEPTH OF PENETRATION IS STATED, E.G. – s4

17 ALL WELDS SHALL MEET THE REQUIREMENTS OF BS EN 1993–1–9 TABLES 8.2 TO 8.5 & 8.9 FOR THE MINIMUM DETAIL CATEGORY, AS AMENDED BY THE UK NATIONAL ANNEX NA BS EN 1993–1–9. WHERE A HIGHER DETAIL CATEGORY AND ADDITIONAL REQUIREMENTS ARE NECESSARY THE REQUIRED DETAIL CATEGORY IS DENOTED THUS F71 z6

BRIDGE INSTALLATION LEVELS

18 BEARINGS ARE TO BE INSTALLED AT LEVELS SUCH THAT A CONSTANT LEVEL DIFFERENCE BETWEEN EACH GIRDER IS MAINTAINED THROUGHOUT THE SPAN UNDER SELF–WEIGHT AND EACH GIRDER IS ON A COMMON CURVE RADIUS EQUAL TO THE GIRDER PRE–CAMBER LESS THE PERMANENT LOAD DEFLECTION. THE LEVEL DIFFERENCE BETWEEN THE DECK ENDS SHOULD NORMALLY REFLECT THE TRACK GRADIENT, SUBJECT TO A MINIMUM FALL FOR DRAINAGE PURPOSES. THE DESIGNER SHOULD REFER TO THE USERS MANUAL FOR COMMENTARY.

19 CAMBER TO THE MAIN BOX GIRDERS SHALL BE AS SHOWN ON THE BOX GIRDER DETAIL DRAWINGS.

TRIAL ERECTION REQUIREMENTS

20 THE DECK MUST BE FULLY TRIAL ERECTED ON ALL ITS BEARINGS AT THE SAME RELATIVE LEVELS AS INTENDED FOR THE PERMANENT INSTALLATION. THE TRIAL ERECTION SHALL INCLUDE, WHERE REQUIRED FOR THE PERMANENT WORKS, PRECAST CONCRETE CILLS AND BALLAST WALLS, WALKWAYS ETC, ALL SET TO THEIR CORRECT RELATIVE LEVEL AND ALIGNMENT.

21 ALL SHEAR PLATES TO FLOOR UNITS AND TRIMMERS SHALL BE ACCURATELY LOCATED AND TEMPORARILY BOLTED PRIOR TO FINAL WELDING OF THE SHEAR PLATES TO THE FLOOR UNITS AND TRIMMERS. A TIGHT FIT OVER THE FULL LENGTH OF SHEAR PLATE BEARING SURFACES SHALL BE ENSURED.

22 ALL LEVELS AND DIMENSIONS OF THE FULLY TRIAL ERECTED BRIDGE SHALL BE CHECKED AND RECORDED.

23 ALL STEELWORK SHALL BE MATCH–MARKED AT THE TRIAL ERECTION FOR SUBSEQUENT ERECTION AT SITE.

PERMANENT INSTALLATION REQUIREMENTS

24 THE STANDARD DESIGN PERMITS THE DECK TO BE INSTALLED AS A COMPLETE UNIT, OR INSTALLED AS MAIN GIRDERS FOLLOWED BY FLOOR UNITS.

25 LIFTING BRACKETS SHALL BE UNIQUELY MARKED, TESTED AND CERTIFIED. DETAILS OF TESTING AND CERTIFICATION SHALL BE SUPPLIED TO THE ENGINEER.

26 LIFTING BRACKETS SHALL BE USED STRICTLY AS SHOWN. ANY VARIED LIFTING ARRANGEMENT MUST BE DESIGNED BY THE CONTRACTOR AND BE SUBJECT TO THE ENGINEER'S WRITTEN ACCEPTANCE.

27 THE CONTRACTOR SHALL BE RESPONSIBLE FOR ENSURING STABILITY OF THE STEELWORK DURING CONSTRUCTION. DEPENDING ON THE INTENDED ERECTION SEQUENCE IT MAY BE NECESSARY TO INCORPORATE ADDITIONAL STABILITY MEASURES.

28 ALL FLOOR UNITS ARE TO BE ERECTED, FIT UP CHECKED AND BOLTS OR FASTENERS INSERTED IN THE JOINTS PRIOR TO COMMENCING BOLT TIGHTENING.

29 SITE WATERPROOFING OF FLOOR JOINTS SHALL NOT COMMENCE UNTIL ALL FLOOR JOINTS HAVE BEEN COMPLETED.

PARTICULAR HEALTH & SAFETY ASPECTS

30 THE MAIN BOX GIRDERS ARE TO BE CONSIDERED AS "CONFINED SPACES" AND APPROPRIATE PROCEDURES FOR SAFE ENTRY AND EXIT ARE REQUIRED.

31 ALL MAIN AND FLOOR UNITS, AND OTHER INDIVIDUAL ITEMS REQUIRING LIFTING OR MOVING, SHALL BE CLEARLY MARKED WITH THEIR WEIGHT. THE MARKING SHALL BE CLEARLY VISIBLE IN POOR LIGHT.

32 ALL PROCESSES (INCLUDING, BUT LIMITED TO WELDING, PAINTING AND WATERPROOFING) SHALL BE CARRIED OUT IN A SAFE MANNER. ALL SUBSTANCES SHALL BE USED IN ACCORDANCE WITH THE COSHH REGULATIONS.

33 REFER TO THE TABLE FOR FURTHER SAFETY, HEALTH AND ENVIRONMENT RISK ASSESSMENT.

SAFETY, HEALTH & ENVIRONMENT RISK ASSESSMENT

RISK	STAGE	MITIGATING MEASURES
CONFINED SPACE NATURE OF BOX GIRDERS	C/O	CONFINED SPACE TRAINING FOR ALL PERSONS PERMITTED TO ENTER THE BOXES. IMPLEMENTATION OF CONFINED SPACE PRECAUTIONS SUCH AS (BUT NOT LIMITED TO): • ENSURING THROUGH VENTILATION • ATTENDANCE OF PERSONNEL OUTSIDE THE BOX • MEANS OF COMMUNICATION.
NOISE ASSOCIATED WITH BOLTED CONNECTIONS TO THE BOX	C	USE OF CLAMP CONNECTIONS SUCH AS TENSION CONTROLLED BOLTS SHOULD REDUCE THE NOISE ASSOCIATED WITH FORMING FRICTION TYPE CONNECTIONS.
INJURY LIFTING BRIDGE COMPONENTS	D*	SCHEME AND WORKING DRAWINGS TO INCLUDE COMPONENT CENTROIDS AND WEIGHTS
INJURY, DIRECTLY OR INDIRECTLY, DUE TO SITE WELDING.	C	COMPONENTS TO BE SHOP WELDED AND ONLY CONNECTIONS USING BOLTS ARE PERMITTED AT SITE.
INJURY DUE TO UNSUITABLE CONDITIONS FOR INSPECTION AND RELACEMENT OF BEARINGS.	D	SUFFICIENT SPACE MUST BE LEFT IN FRONT OF THE ABUTMENTS AND AROUND THE BEARINGS FOR ACCESS TO INSPECT, MAINTAIN AND REPLACE THE BEARINGS.
INJURY DUE TO UNSUITABLE CONDITIONS FOR INSPECTION AND RELACEMENT OF BEARINGS.	D	STANDARD DESIGNS PROVIDE DETAILS TO FACILITATE THE INSPECTION OF THE BEARINGS, AND DEFINED JACKING POINTS TO BOX GIRDERS PROVIDED.
DISEASE FROM VERMIN EXCREMENT	D/O	WHERE CONSIDERED TO BE A RISK, ANIMALS (INCLUDING PIGEONS AND OTHER ROOSTING BIRDS) ARE TO BE DISCOURAGED FROM ROOSTING ON THE STRUCTURE BY USE OF DETERRENTS SUCH AS PLASTIC ANTI–PERCH SPIKES.
COLLAPSE OF STRUCTURE/TRAIN, DERAILMENT DUE TO TRAIN STRIKING THE BRIDGE	D*	SELECTION OF DECK GEOMETRY TO ENSURE GAUGE AND ALLOWANCE FOR FUTURE TRACK RE–ALIGNMENT

NOTE: D = DESIGN, D* = SCHEME DESIGN, C = CONSTRUCTION, O = OPERATION

Rev	Date	Description of revision	Design'd	C'kd
B	Dec 10	EUROCODE ISSUE	CH	MM
A	Dec 09	ORIGINAL ISSUE	CH	MM

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Master copy with original signatures held by Network Rail HQ
CIVIL ENGINEERING STANDARD DESIGN

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STANDARD HALF THROUGH UNDERBRIDGES BOX GIRDERS & TRANSVERSE RIBBED FLOORS

GENERAL NOTES

Scale N/A

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