Supplementary Information

The following information is associated with Network Rail Standard:
NR CIV/SD/1013 Rev B

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CAD Drawing

- CIV/SD/1013

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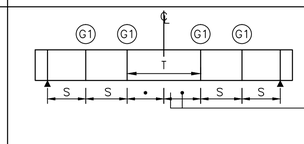
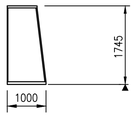
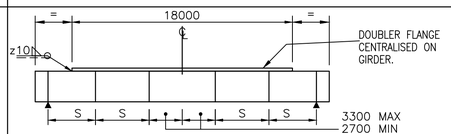
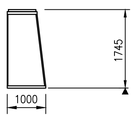
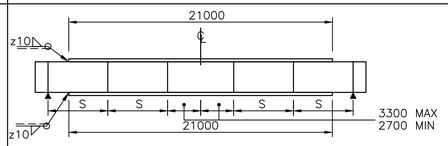
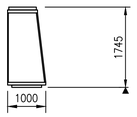
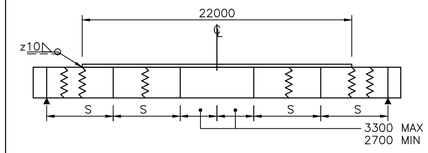
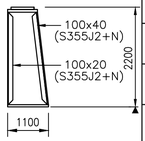
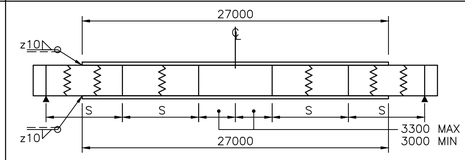
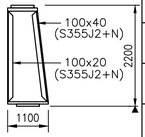
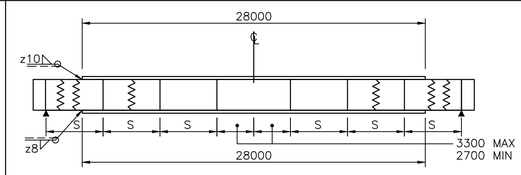
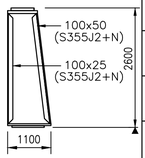
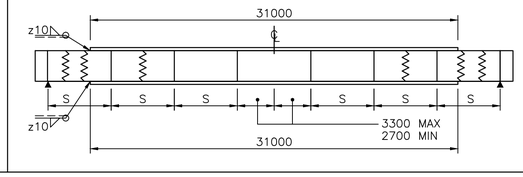
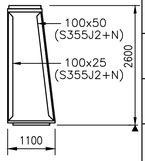
TABLE OF MAIN GIRDER SIZES

HEAVY GIRDERS (1)

SPAN LIMIT (M)	ELEVATION	MID–SPAN SECTION	FLANGES TOP/BOTTOM	FLANGES GRADE	WEBS OUTER/INNER	WEBS GRADE	CAMBER (2) / SELF WEIGHT (3)	WEIGHT T
21			–	–	15	S355J2+N	27 / 2	32.5
			805 x 65	S355J2+N				
			1000 x 50	S355J2+N	25	S355J2+N		
			–	–				
24			600 x 40	S355J2+N	15	S355J2+N	38 / 4	41.0
			810 x 50	S355J2+N				
			1000 x 65	S355K2+N	25	S355J2+N		
			–	–				
27			750 x 40	S355J2+N	15	S355J2+N	53 / 5	57.5
			814 x 60	S355J2+N				
			1000 x 50	S355J2+N	25	S355J2+N		
			800 x 40	S355J2+N				
30			700 x 40	S355J2+N	15 (20) NOTE 5	S355J2+N	54 / 6	58.0
			853 x 40	S355J2+N				
			1100 x 60	S355K2+N	25	S355J2+N		
			–	–				
33			800 x 55	S355J2+N	15	S355J2+N	65 / 8	73.5
			861 x 55	S355J2+N				
			1100 x 50	S355J2+N	25	S355J2+N		
			700 x 50	S355J2+N				
36			750 x 50	S355J2+N	15	S355J2+N	65 / 8	79.0
			810 x 50	S355J2+N				
			1100 x 50	S355J2+N	25	S355J2+N		
			700 x 40	S355J2+N				
39			750 x 60	S355J2+N	15	S355J2+N	78 / 10	95.0
			815 x 60	S355J2+N				
			1100 x 50	S355J2+N	25	S355J2+N		
			900 x 50	S355J2+N				

MATRIX OF SPANS AND DECK SKEWS
SHOWING SELECTION OF BOX SECTION & FLOOR TYPE

SPAN (m)	SKEW RANGE (degrees) / FLOOR WIDTH TYPE	0–30	30–40	40–55	COMMENTS
21	NARROW	21+N	24+N (or 21+W)	24+N (or 21+W)	Where adequate construction depths exist use the Wide (W) type floor.
21	WIDE	21+W	21+W	21+W	
24	NARROW	24+N	24+W	24+W	Note – for skews >30° the 27m box and the Narrow floor (N) is NOT adequate.
24	WIDE	27+W	27+W	30+W	
27	NARROW	27+N	27+W	#	# – For skews >40° a deeper floor AND deeper/stiffer box (within the structure gauge) is necessary.
27	WIDE	30+W	30+W	33+W (or 30+D)	D = Deep wide floor, i.e. as Wide type floor but with 460mm deep ribs.
30	WIDE	30+W	33+W	36+W	
33	WIDE	33+W	36+W	39+D	D = Deep wide floor, i.e. as Wide type floor but with 460mm deep ribs.
36	WIDE	36+W	39+W	36(3000)+D	36(3000) denotes a 3000mm deep version of the 36m span box with having a 764 x 55 top flange and a 700 x 55 top doubler. D= Deep wide floor, i.e. as a Wide type floor but with 460mm deep ribs.
39	WIDE	39+W	39(3000)+W	39(3200)+W	39(3000) and 39(3200) denotes a 3000mm/3200mm deep version of the 39m span box. For the 3000mm version the top flange and doubler are 767 x 65 and 700 x 65. For the 3200mm deep version top flange and doubler are 744 x 65 and 700 x 65.

KEY

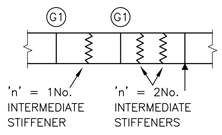
(1) SEE TABLE ON DRAWING NR/CIV/SD/1002 FOR FATIGUE CAPABILITY OF BOX GIRDERS

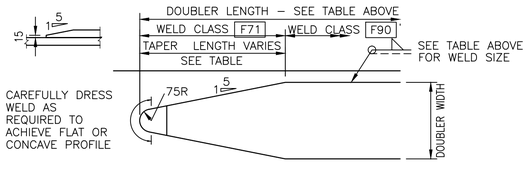
(2) MAIN GIRDER CAMBER IS BASED ON DEAD LOAD DEFLECTION PLUS HALF OF LIVE LOAD DEFLECTION. NO ALLOWANCE IS INCLUDED FOR ANY FABRICATION EFFECTS. GIRDER SELF WEIGHT DEFLECTION AS SHOWN.

(3) WEIGHT IS AS FABRICATED UNIT FOR SQUARE SPAN WITH GIRDER EXTENDING 345 BEYOND CENTRE OF BEARINGS. ASSUMED 2% ALLOWANCE FOR WELDS ETC. INCLUDING: BEARING PLATES. EXCLUDING: INSPECTION UNITS.

(4) SPACING & NUMBER OF DIAPHRAGMS (G1) MAY BE ADJUSTED TO SUIT DETAILS. THE SPACING 'S' SHALL NOT EXCEED THE MAXIMUM SHOWN AT MID SPAN 'T'.
INTERMEDIATE STIFFENERS SHOWN SHOULD BE EQUALLY SPACED AS FAR AS POSSIBLE. MAXIMUM SPACING $\left[\frac{T}{n+1}\right]$+300mm WHEN 'n' IS THE NUMBER OF STIFFENERS WITHIN A LENGTH 'S'. (SEE BELOW)

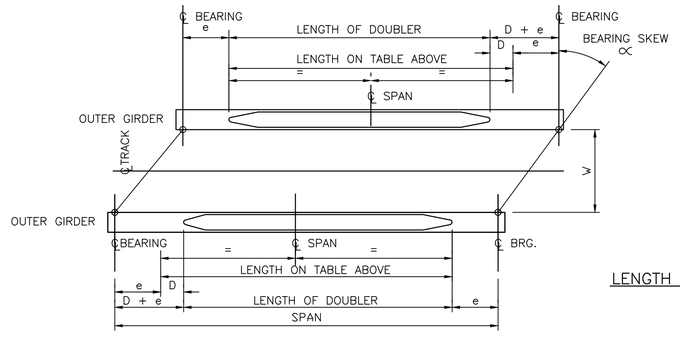
DIAPHRAGM (G1) — INTERMEDIATE STIFFENER





DOUBLER FLANGE

DOUBLER WIDTH	LENGTH OF TAPER
500	950
600	1200
700	1450
750	1575
800	1700
900	1950



LENGTH AND LOCATION OF DOUBLER FLANGES

BRIDGE SKEW ∝	DIMENSION D (mm)
0° – 20°	0
> 20° – 30°	250
> 30° – 40°	500
> 40° – 50°	600
> 50° – 55°	900

EXAMPLE: 25m SPAN. = ∝ 55°

FROM TABLE: D=900
FOR 27m SPAN.
TOP FLANGE: LENGTH OF DOUBLER = 21000 FOR 0° SKEW.
DOUBLER LENGTH = (21000–900) = 20100 } FOR 55° SKEW
DIMENSION e = $\frac{(27000-21000)}{2}$ = 3000
DIMENSION D + e = 900 + 3000 = 3900

1. FOR SPANS INTERMEDIATE TO THOSE SHOWN, SIZES & DIMENSIONS FOR THE NEXT GREATER SPAN SHALL BE USED.
2. GIRDERS SUITABLE FOR WIDE (8600) OR NARROW (6750) FLOORS, TRACK ECCENTRICITY 150 , AND BALLAST DEPTH UP TO 400 (BELOW SLEEPER).
3. ANY ADDITIONAL WELDS NECESSARY TO MAKE UP LENGTH SHALL BE SUBJECT TO ENGINEERS WRITTEN APPROVAL UNDER THE CONTRACT. BUTT WELDS ARE TO BE FULL PENETRATION, WITH EDGES GROUND FLUSH. NO BUTT WELDS SHALL BE COINCIDENT OR WITHIN 75mm OF DIAPHRAGM POSITIONS OR DOUBLER ENDS.
4. NO FLANGE OR WEB BUTT WELDS SHALL OCCUR BETWEEN THE CENTRAL TWO DIAPHRAGMS.
5. WEB THICKNESS SHOWN THUS (25) TO BE USED FOR FLOOR WIDTHS GREATER THAN 6750mm.
6. MATERIAL FOR WEBS, TOP FLANGE, INTERMEDIATE DIAPHRAGMS AND INTERMEDIATE STIFFENERS MAY BE SUBSTITUTED FOR STEEL WITH IMPROVED ATMOSPHERIC CORROSION RESISTANCE IF TOP WELDS ARE LAST TO BE MADE WHEN BOX IS ASSEMBLED.

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

Network Rail
Network Rail Infrastructure Ltd
Registered Office:
Kings Place
90 York Way
London
N1 9AG

	Name	Position	Signature	Date
Approved	P Clark	Senior Programme Engineering Manager (Building & Civils)	P.C.	Dec–10

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

DOUBLE TRACK – 2 GIRDER
MAIN GIRDER SIZES

Scale N.T.S.

Drawing Number NR/CIV/SD/1013 B

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