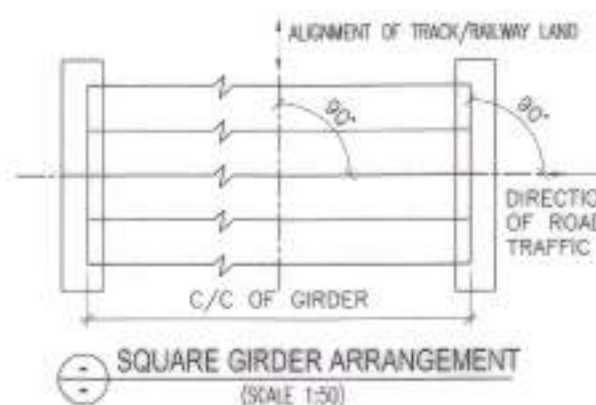
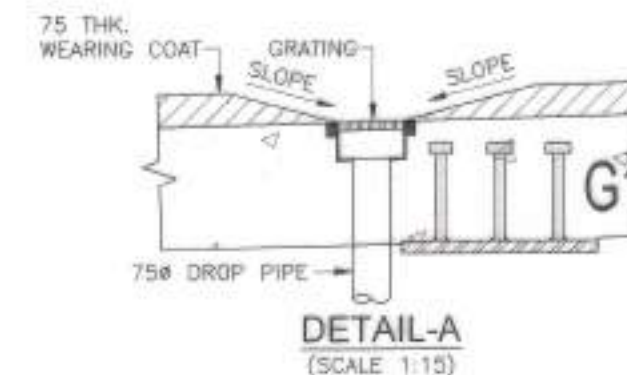
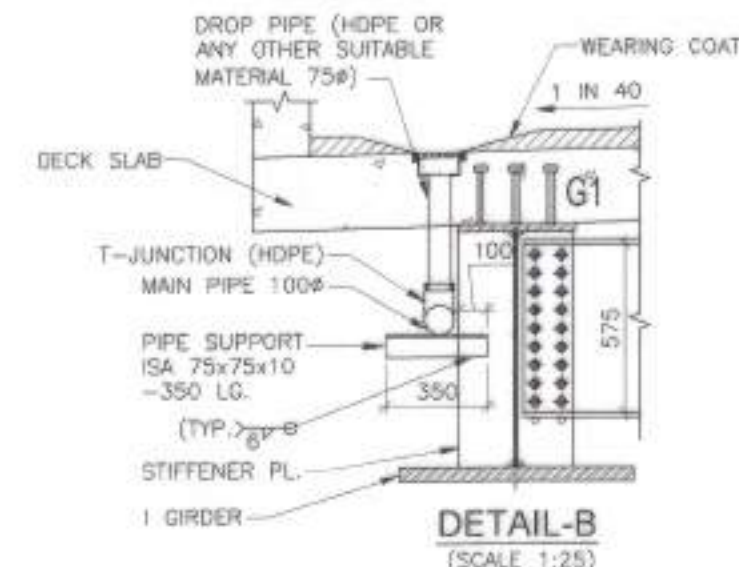


ELEVATION OF SQUARE ARRANGEMENT OVER 3 TRACKS (EXISTING/FUTURE)  
(SCALE 1:75)

### NOTES:

- ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED. NO DIMENSION SHOULD BE SCALED FROM THIS DRAWING.
- ALL STEEL FOR GIRDERS SHALL BE E350, GRADE B0 AS PER IS:2062-2011 WITH EXCEPTIONS PERMITTED AS PER CLAUSE 8 OF IRS B1.
- THE SLAB SHALL BE OF CONCRETE GRADE M-45. SLAB DETAILS ARE COMMON TO ALL SPANS AND DETAILS OF SLAB ARE AS PER DRAWINGS "DETAIL OF RCC DECK SLAB".
- THE DESIGN OF COMPOSITE I-GIRDER IS DONE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS AND CODE OF PRACTICE FOR ROAD BRIDGES: IRC:24-2010 (STEEL ROAD BRIDGES), IRC:112 - 2020 (CONCRETE ROAD BRIDGES), IRC:22-2015 (COMPOSITE CONSTRUCTION), IRC:83(I)-2018 NEOPRENE BEARINGS, IRC:83(II)-2018 METALLIC GUIDE BEARINGS, IS:3935-1966 (SHEAR CONNECTOR DESIGN CODE) & IS:4000-1982 (HSFG BOLTS).
- DESIGN LOADINGS, TEMPERATURE EFFECTS, WIND LOADS AND SEISMIC LOAD HAVE BEEN TAKEN FROM IRC:6-2017.
- THIS DRAWING IS SUITABLE FOR USE UPTO SEISMIC ZONE-V. THE SEISMIC FORCE HAS BEEN CALCULATED IN ACCORDANCE WITH IRC : 6-2017.
- CENTRIFUGAL FORCES FOR 10 DEGREE CURVE (AT 75 KM/H SPEED) HAS BEEN CONSIDERED IN THE DESIGN.
- THE DESIGNS HAVE BEEN DONE FOR 70R (WHEELED) AND A-CLASS LIVE LOADS WITH APPROPRIATE CONGESTION FACTOR AS PER IRC:6-2017 AND FOR SPECIAL 365T VEHICLE GIVEN IN IRC:6-2017.
- SNOW LOADING HAS NOT BEEN CATERED FOR IN THE DESIGN.
- GRADE OF CONCRETE FOR BED BLOCK/PIER CAP WHERE THE BEARING RESTS SHALL BE MINIMUM M-40.
- FABRICATION OF COMPONENTS OF ROB INCLUDING STUD SHEAR CONNECTOR TO BE DONE IN WORKSHOP.
- FEASIBILITY OF THIS STRUCTURE SHALL BE CHECKED AT SITE IN EVERY RESPECT BY ENGINEER IN-CHARGE BEFORE FABRICATION/ERECTION. IF THERE IS ANY CONFUSION/AMBIGUITY IN DIFFERENT DIMENSIONS PROVIDED IN THESE DRAWINGS, A FULL SCALE LAYOUT SHOULD BE PREPARED FOR THE VERIFICATIONS OF THE SAME BEFORE START OF EXECUTION OF THE WORK.
- BEFORE FABRICATION WORK IS TAKEN UP, GIRDER PIECES TO BE FABRICATED (ALONG WITH ITS EXACT DIMENSION) AND THEIR NUMBERS SHALL BE WORKED OUT. MOREOVER EXACT DIMENSIONS AND THEIR NUMBERS OF OTHER COMPONENTS SUCH AS BRACING, CROSS FRAMES, END DIAPHRAGM, BEARINGS, ETC. ALSO TO BE WORK OUT IN ORDER TO AVOID ANY PROBLEM AT LATER STAGE.
- FABRICATION OF STEEL WORKS SHALL BE DONE AS ACCORDANCE WITH IRS-B1 AND RELEVANT CODES REFERRED IN IT.
- ALL WELDS TO BE MADE BY USING APPROVED WELDING PROCEDURE AND BY QUALIFIED WELDERS AS PER PROVISIONS OF IRS WELDED BRIDGE CODE. WELDERS QUALIFIED FOR A PARTICULAR WELD POSITION, WELDING TECHNIQUE AND SIZE ONLY SHALL MAKE THE WELD.
- FOR GENERAL FEATURES OF DESIGN OF ROAD BRIDGES INCLUDING IMMEDIATE APPROACHES, THE RECOMMENDATIONS GIVEN IN IRC:5-2015 SHALL BE FOLLOWED.
- CRASH BARRIER SHALL BE PROVIDED AS PER CLAUSE NO. 109.6 OF IRC:5-2015.
- AUTOMATIC SUBMERGED ARC WELDING (SAW) SHOULD BE EMPLOYED FOR FILLET WELDS IN FLANGE TO WEB OF MAIN GIRDER. OTHER WELDS SHOULD ALSO BE DONE BY SUBMERGED ARC WELDING TO THE MAXIMUM EXTENT POSSIBLE. FCAW OR GMAW WELDING MAY BE DONE IN CASES WHERE SAW WELDING IS NOT POSSIBLE.
- METALLIC GUIDE BEARINGS ARE DESIGNED TO FUNCTION AS SEISMIC RESTRAINERS AND SHOULD BE PROVIDED ACCORDINGLY.
- WELDING MAY BE DONE IN ACCORDANCE WITH PROVISIONS OF IRS WELDED BRIDGE CODE OR THE SPECIFICATION/ CODES REFERRED IN THIS SPECIFICATION FOR THIS PURPOSE.
- RELEVANT PROVISIONS GIVEN IN LATEST REVISIONS OF RDSO REPORT NOS BS-102, BS-110, BS-111 AND BS-115 MAY BE REFERRED FOR GUIDANCE, IF REQUIRED.
- FASTENERS SUCH AS HSFG BOLTS, NUT AND WASHERS SHOULD BE IN ACCORDANCE WITH IRS B1 OR THE SPECIFICATION/CODES REFERRED IN THIS SPECIFICATION FOR THIS PURPOSE.
- THE METALLISING AND PAINTING SHALL BE DONE AS PER PARA 39.1 OF IRS B1.
- ALL HOLES ARE 23.5 DIA. FOR 22 DIA. HSFG BOLTS OF PROPERTY CLASS 8.8 EXCEPT WHERE OTHERWISE SHOWN.
- GUIDELINES REGARDING USE OF HIGH STRENGTH FRICTION GRIP(HSFG) BOLTING ASSEMBLIES ON BRIDGES ON INDIAN RAILWAYS VIDE REPORT NO. BS-111 (REVISION 7) ISSUED BY RESEARCH DESIGN & STANDARD ORGANIZATION(RDSO), LUCKNOW SHALL BE FOLLOWED.
- THE DRAINAGE ARRANGEMENT SHALL HAVE MINIMUM 1 IN 100 SLOPE AND SUITABLE GRATINGS TO PREVENT INGRESS IF DIRT/CARBAGE INTO THE PIPES.
- THE WATER COLLECTED IN DRAINAGE SYSTEM SHALL NOT BE LEAD TO TRACKS IN ANY CASE AND IT SHALL BE CONNECTED TO PROPER STORM WATER DRAINAGE OR PROPERLY GROUND WATER RECHARGE ARRANGEMENT.
- THIS DRAWING IS SUITABLE FOR STANDARD ROAD ARRANGEMENTS SHOWN IN THIS DRAWING ONLY.
- SUITABLE UTILITY DUCT MAY BE PROVIDED WITHIN THE CRASH BARRIER TO CATER THE UTILITY SERVICE AS PER CL. 109.1 OF IRC:5-2015.

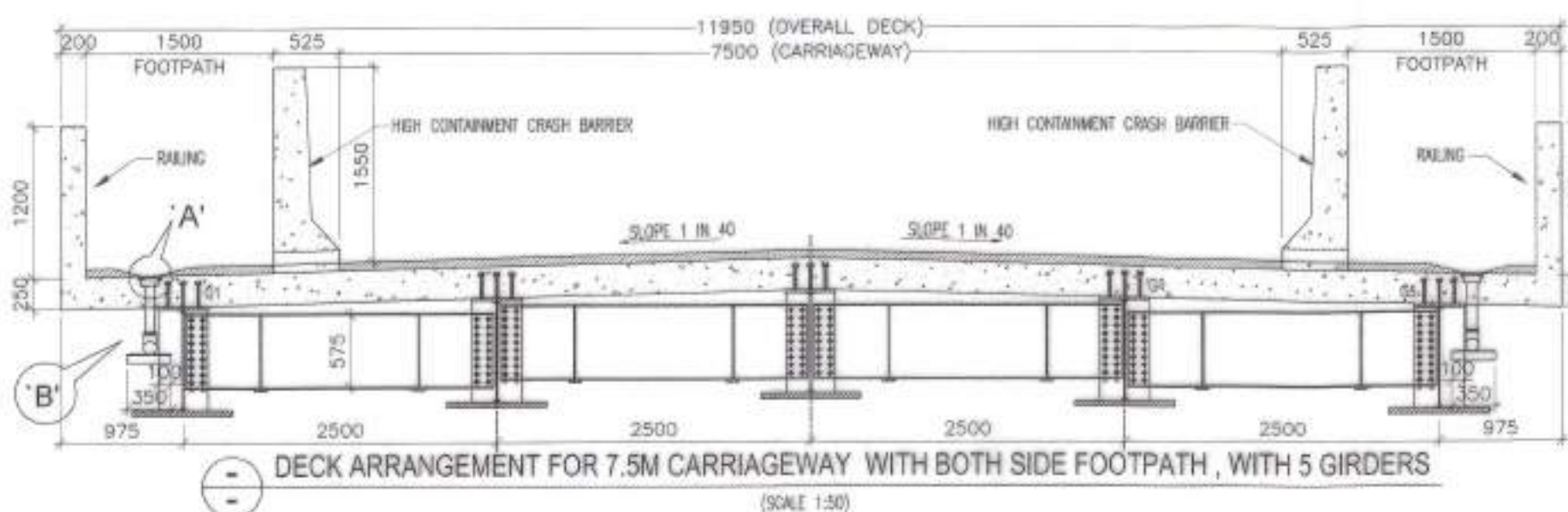


### UNFACTORED LOAD ON SPAN (FOR DESIGN OF SUBSTRUCTURE)

LOAD TYPE (IN T)	NON-SEISMIC CASE		SEISMIC CASE		SV
	DL	SIDL	LL	DL+SIDL	
VERTICAL	200.20	121.78	276.55	43.46	37.33
LATERAL	0	0	42.46*	86.93*	74.66*
LONGITUDINAL	0	0	22.65*	86.93*	74.66*

\* APPLIED AT 2395 MM ABOVE TOP OF BEARING.  
 ‡ APPLIED AT 709 MM ABOVE TOP OF BEARING.  
 @ LL INCLUDES IMPACT FACTOR AND CONGESTION FACTOR AS PER IRC:6-2017.

WEIGHT OF GIRDER (MT)	
DECK WIDTH	11950mm
STEEL	54.73
CONCRETE	144.65
SIDL (INCLUDING WEARING COAT MACADAM)	121.79
TOTAL	321.17



DESCRIPTION	SYMBOL
FILLET WELD (ONE SIDE)	—
FILLET WELD (BOTH SIDE)	—
HOLE FOR TURNED BOLT	○
HSFG BOLT	⊙
SHEAR STUD	●

DESIGN CONSULTANT :



**SPARSH ENGINEERING COMPANY PRIVATE LIMITED**  
H-55, Hamra Housing Colony, Near Nigam Park,  
Ranchi, Jharkhand - 834 002, PH- 0651-2340959

CLIENT :



**DEDICATED FREIGHT CORRIDOR CORPORATION OF INDIA LIMITED**  
(A Govt. of India Enterprise)  
Ministry of Railways.

THIS DRAWING IS THE PROPERTY OF RESEARCH DESIGNS & STANDARDS ORGANISATION (MINISTRY OF RAILWAYS) LUCKNOW - 226011 (INDIA) AND SHALL NOT BE USED, COPIED OR REPRODUCED IN PART OR WHOLE WITHOUT PRIOR CONSENT IN WRITING.

DESIGN CHECKED BY -

PRASHANT SRIVASTAVA (JE/D&S)

DRAWING CHECKED BY -

DURGESH KUMAR SHARMA (JE/D&S)

SCRUTINISED & CHECKED BY

SANDEEP AGARWAL (ADE/SB-IB&S)

SCRUTINISED & RECOMMENDED BY

MANISH KUMAR (DBS-VIB&S)

APPROVED BY

RAJESH KUMAR SRIVASTAVA (ED/IB&S)

TITLE :-

GENERAL LAYOUT

**R. D. S. O.**

NAME OF WORK :-

"IRC-6 LOADING - 2017"  
18 M SPAN COMPOSITE WELDED  
ROB GIRDERS

DRAWING NO. :-

RDSO/B-11781

SHEET NO. :- 1 OF 14

SCALE :- AS SHOWN

ORIGINAL SIZE :- A1

DATE :-

MAIN DRAWING NO. :- RDSO/B-11781

PROVISIONAL

SR. NO.	DESCRIPTION OF WORK	AGE/BS	DR./BS	ED/BS
REVISION/ALTERATIONS				

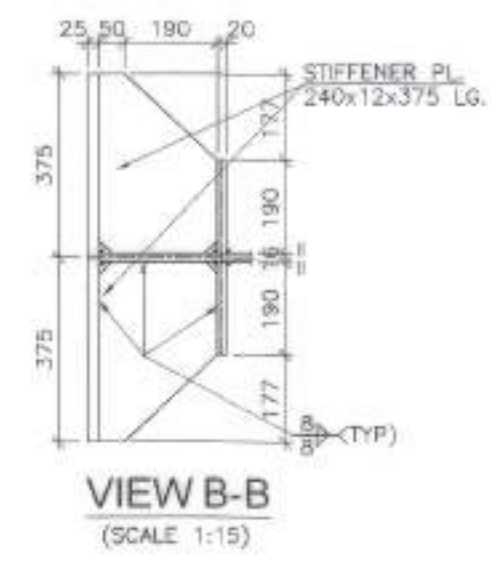
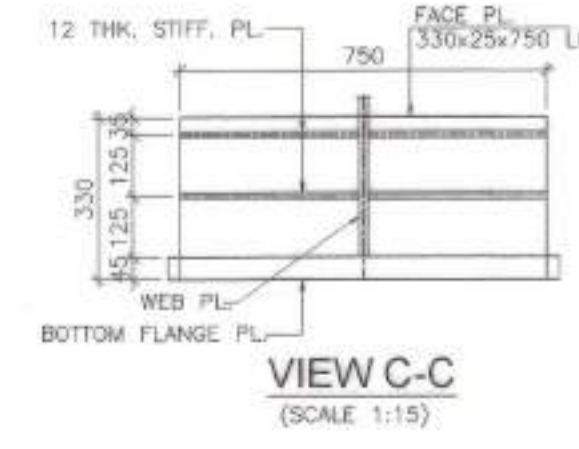
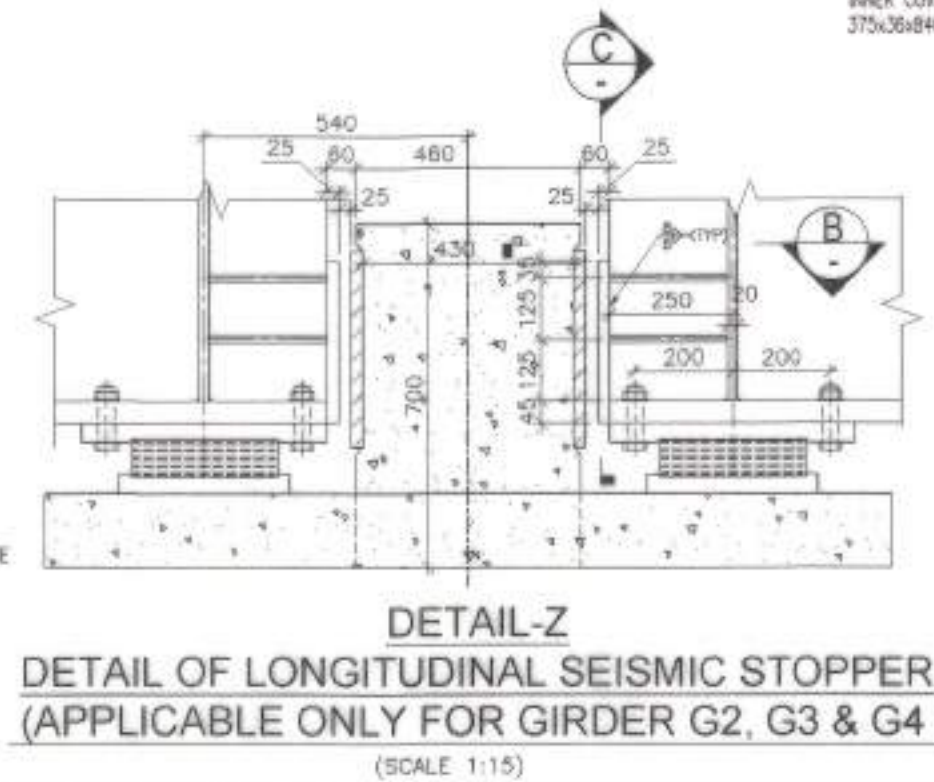
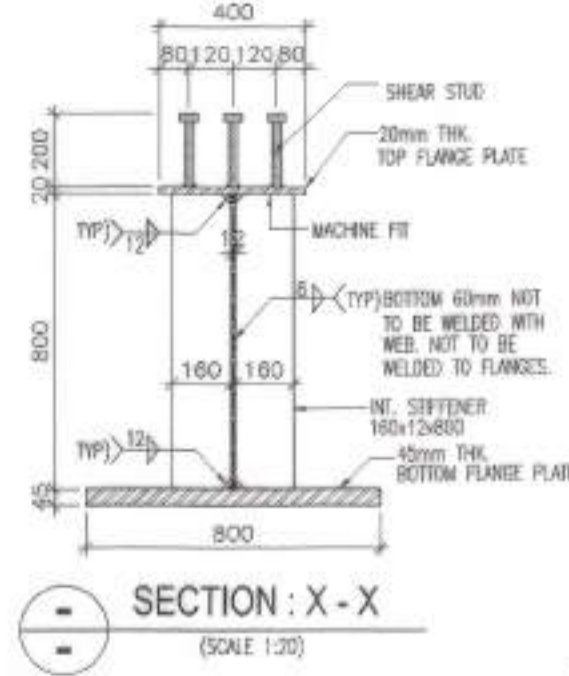
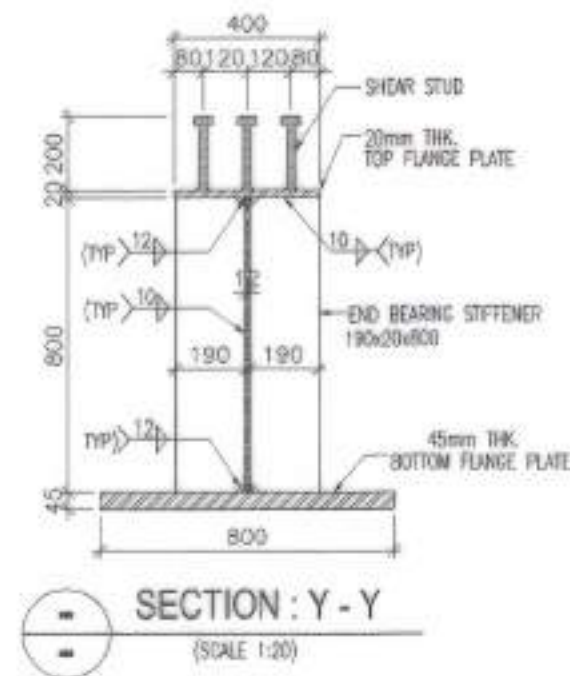
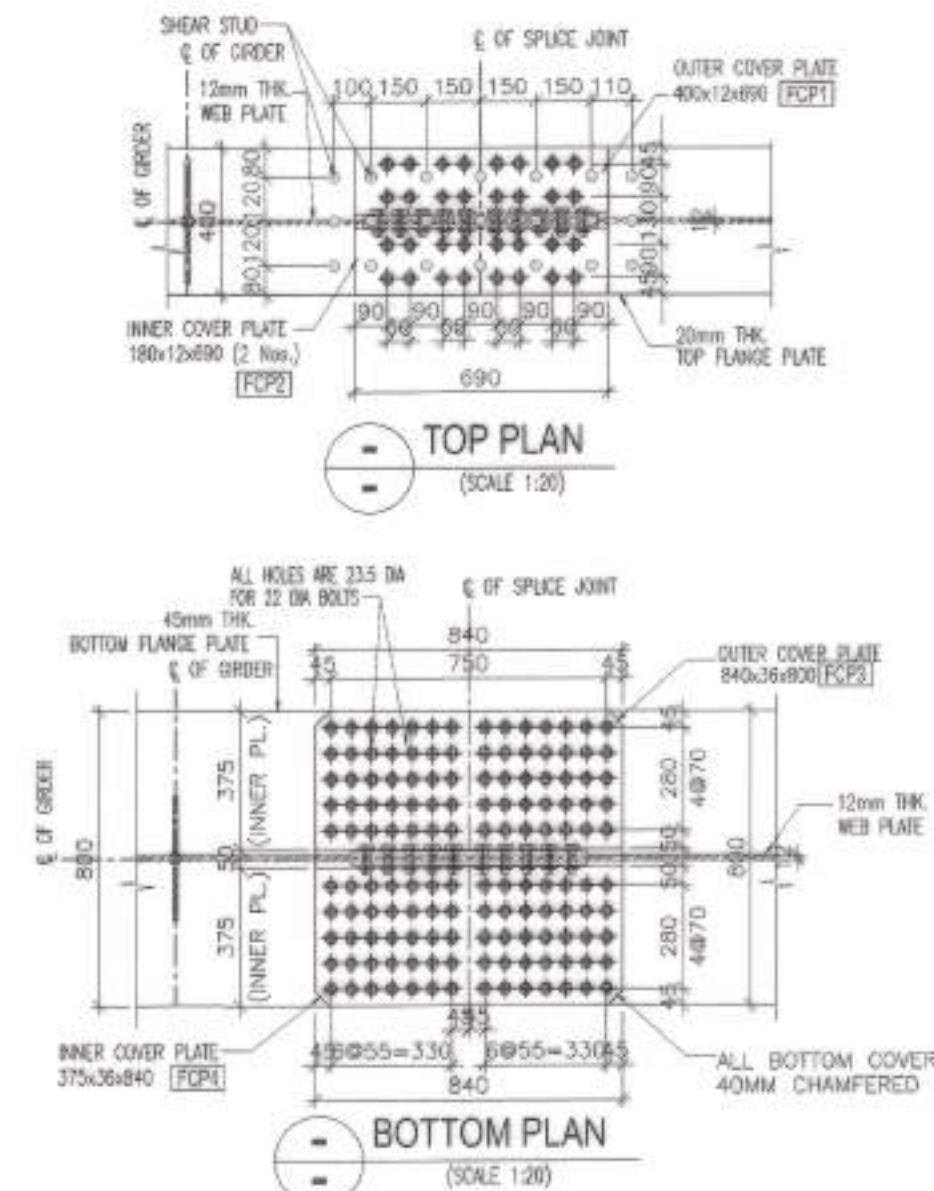
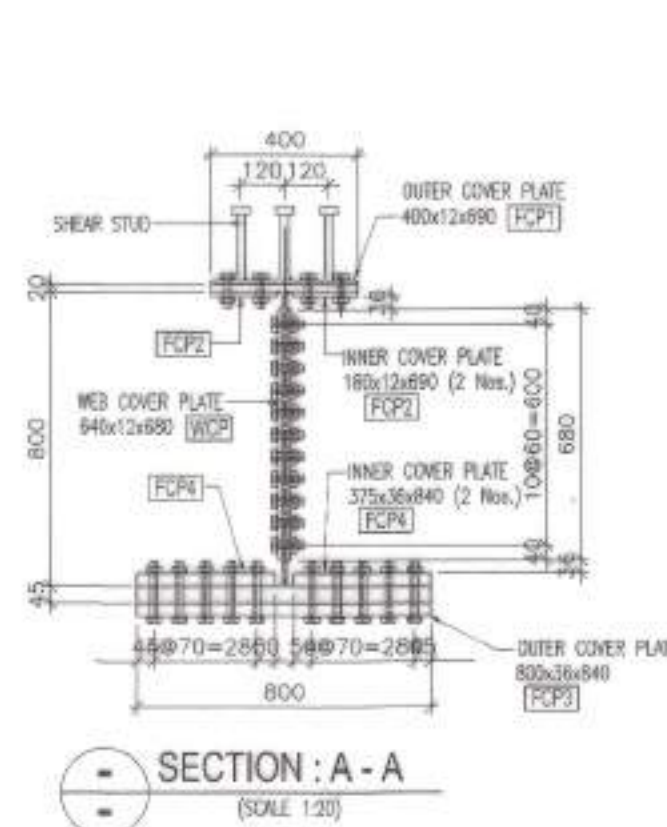
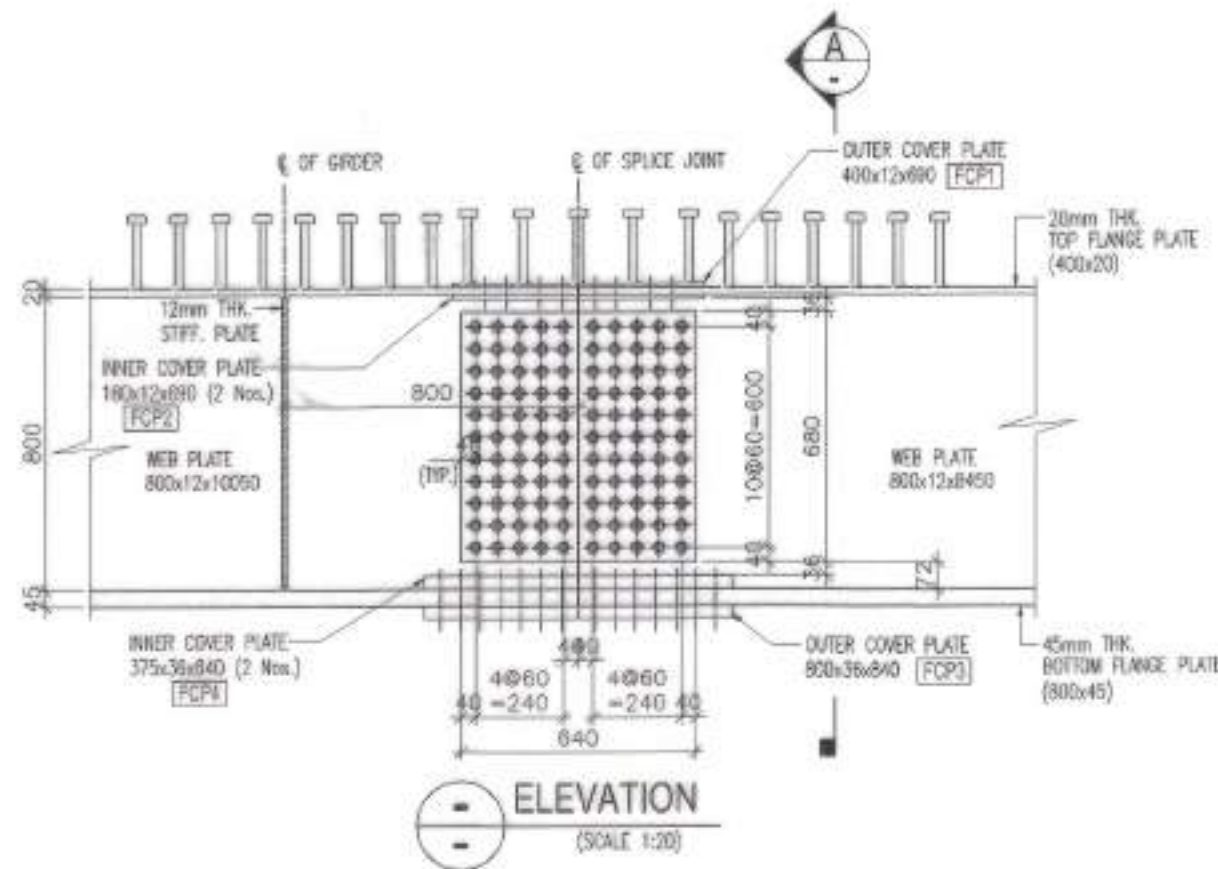
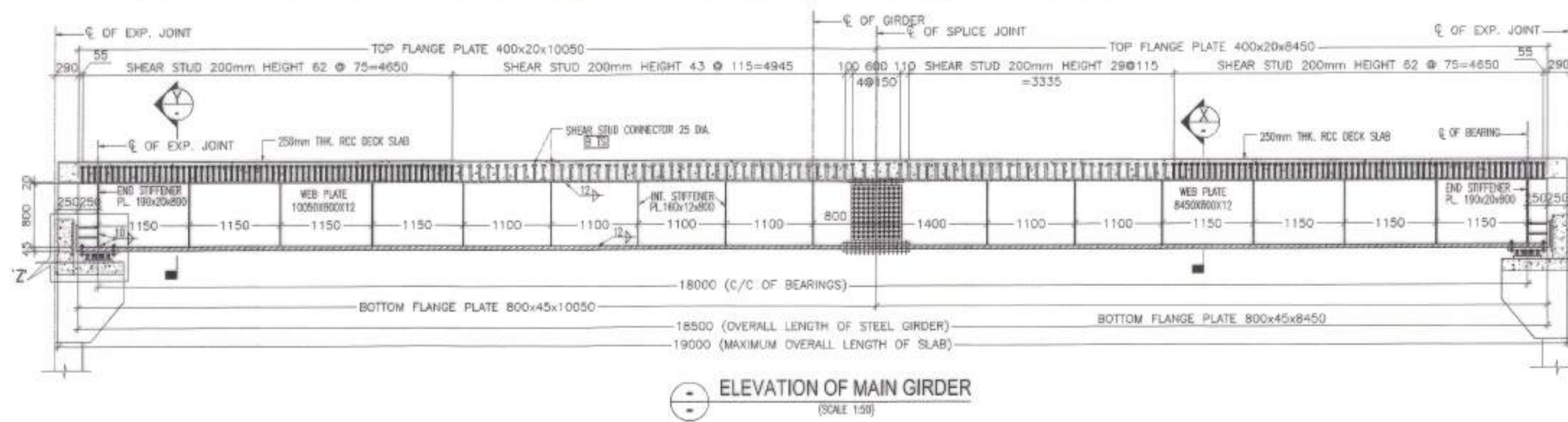
DRAWN BY -	DESIGNED BY -	CHECKED BY -
SANJOY BERA	RAVI PRASAD	SUDHIR KUMAR

APPROVED BY -	APPROVED BY -	APPROVED BY -
KHAWANISH BISWAS DY.CPM/KKK	SOUVIK SENGUPTA GM/CIVIL/KKK	AJAY KUMAR GM/CIVIL/KKK



# NOTES:

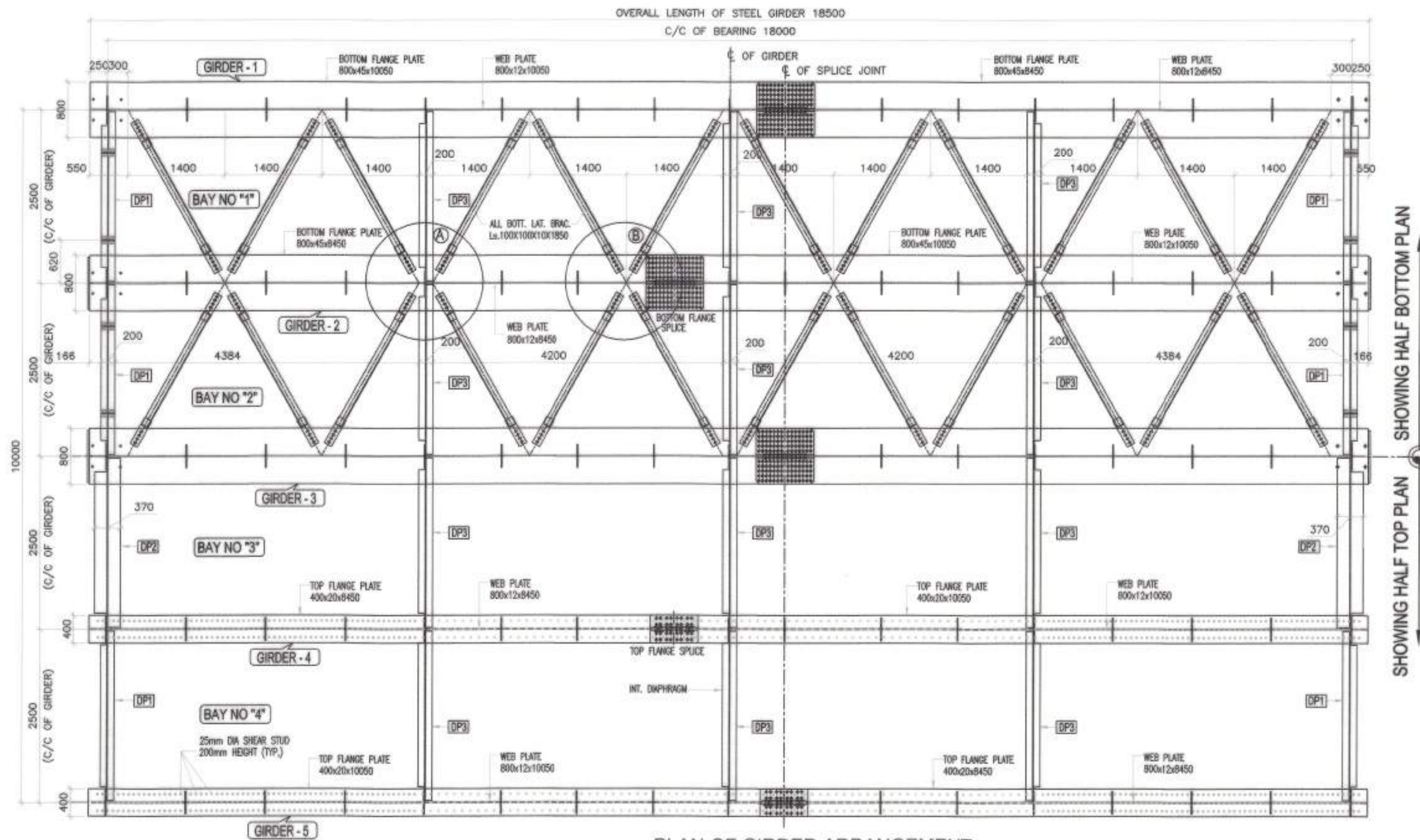
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED. NO DIMENSION SHOULD BE SCALED FROM THIS DRAWING.
2. FABRICATION OF STEEL WORK SHALL BE DONE AS PER IS 8-1 AND IS 9595 WELDED BRIDGE CODE.
3. AUTOMATIC SUBMERGED ARC WELDING SHOULD BE EMPLOYED FOR FILLET WELDS IN FLANGES TO WEB. OTHER WELDS SHOULD ALSO BE DONE BY SUBMERGED ARC WELDING TO THE MAXIMUM EXTENT POSSIBLE. CO<sub>2</sub> WELDING SHALL BE PREFERRED OVER MANUAL METAL ARC WELDING.
4. ALL WELDS TO BE MADE BY USING APPROVED WELDING PROCEDURES AND BY QUALIFIED WELDERS ONLY AS PER PROVISIONS OF IS:9595.
5. ALL HOLES ARE 23.5 DIA. FOR 22 DIA. HSFG BOLTS OF PROPERTY CLASS 8.8 EXCEPT WHERE OTHERWISE SHOWN.
6. END STIFFENERS SHALL BE CONNECTED TO WEB AND FLANGES BY 10MM FILLET WELD ALL AROUND.
7. INTERMEDIATE STIFFENERS SHALL BE WELDED BY 8 MM SIZE WELDS ONLY TO THE WEB AND NOT TO THE FLANGES (THESE SHALL BE TIGHT FIT WITH FLANGES). THE BOTTOM BOMM OF STIFFENERS SHALL NOT BE WELDED TO WEB.
8. END STEEL PLATES ATTACHED TO THE GIRDER FOR SEISMIC STOPPER ALONG WITH ITS STIFFENER SHALL BE WELDED AT THE TIME OF GIRDER FABRICATION.
9. FOLLOWING PROPERTIES HAVE BEEN ASSUMED FOR STRUCTURAL STEEL IN DESIGN: (YOUNG'S MODULUS = 2.00 EDS MPA, POISSON'S RATIO = 0.30 & COEFF. OF THERMAL EXPANSION = 0.0000117/°C/UNIT LENGTH).
10. PART LIST NOS INDICATED THUS: □ AND SHIPPING LIST NOS INDICATED THUS ○.
11. ALL EDGES SHALL BE MACHINE FINISHED IN SPLICES.



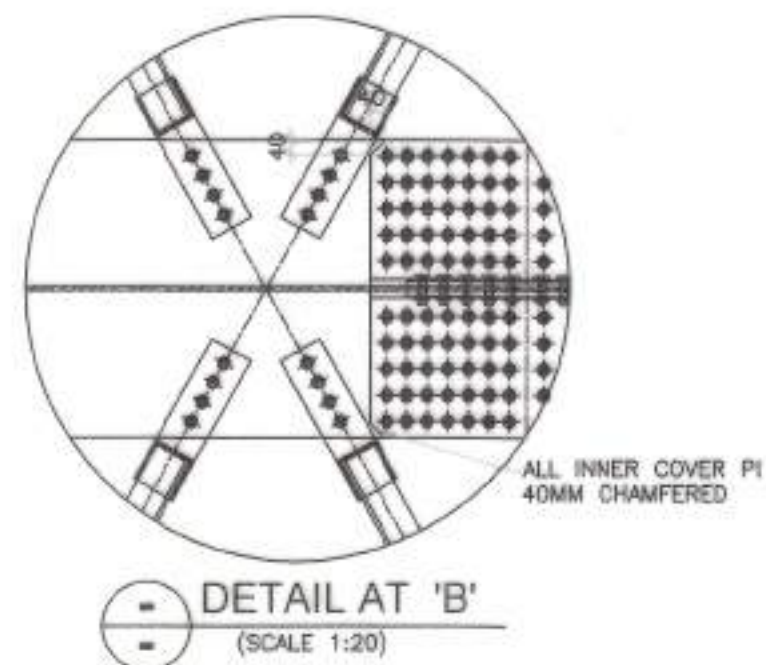
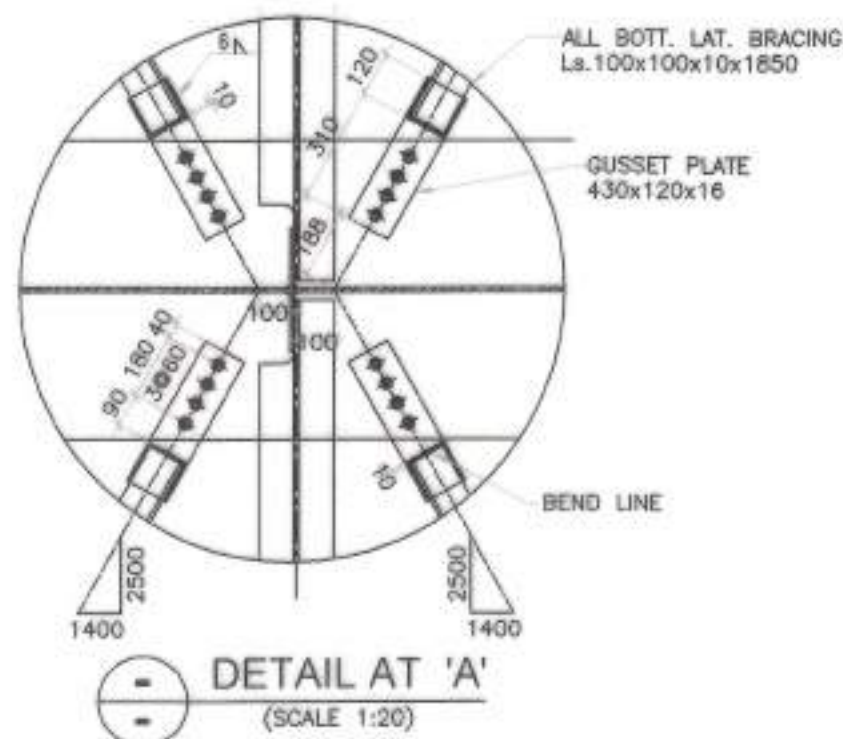
DESCRIPTION	SYMBOL
FILLET WELD (ONE SIDE)	—
FILLET WELD (BOTH SIDE)	—
HOLE FOR TURNED BOLT	○
HSFG BOLT	⊙
SHEAR STUD	●

<b>DESIGN CONSULTANT</b> <b>SPARSH ENGINEERING COMPANY PRIVATE LIMITED</b> H-55, Harmu Housing Colony, Near Nigam Park, Ranchi, Jharkhand - 834 002, PH- 0651-2340659				<b>CLIENT</b> <b>DEDICATED FREIGHT CORRIDOR CORPORATION OF INDIA LIMITED</b> (A Govt. of India Enterprise) Ministry of Railway.				<b>THIS DRAWING IS THE PROPERTY OF RESEARCH DESIGNS &amp; STANDARDS ORGANISATION (MINISTRY OF RAILWAYS) LUCKNOW - 226011 (INDIA) AND SHALL NOT BE USED, COPIED OR REPRODUCED IN PART OR WHOLE WITHOUT PRIOR CONSENT IN WRITING.</b>				<b>R. D. S. O.</b>		SHEET NO.: 2 OF 14
<b>DRAWN BY:</b> BANUJI BERA <b>DESIGNED BY:</b> RAVI PRASAD <b>CHECKED BY:</b> SUCHIR KUMAR				<b>DESIGN CHECKED BY:</b> PRASHANT SRIVASTAVA (JED/BS) <b>DRAWING CHECKED BY:</b> DURGESH KUMAR SHARMA (JED/BS)				<b>SCRUTINISED &amp; CHECKED BY:</b> SANDEEP AGARWAL (AO/BS-IBSS) <b>SCRUTINISED &amp; RECOMMENDED BY:</b> MANISH KUMAR (DBS-VIIS&S)				<b>NAME OF WORK:</b> "IRC-6 LOADING - 2017" 18 M SPAN COMPOSITE WELDED ROB GIRDERS		SCALE: AS SHOWN ORIGINAL SIZE: A1 DATE:
<b>REVISIONAL ALTERATIONS</b>				<b>TITLE:</b> DETAILS OF MAIN GIRDER, SPLICE JOINT & LONGITUDINAL SEISMIC STOPPER				<b>DRAWING NO.:</b> RDSO/B-11781/1				<b>MAIN DRAWING NO:</b> RDSO/B-11781		PROVISIONAL





PLAN OF GIRDER ARRANGEMENT  
(SCALE 1:50)



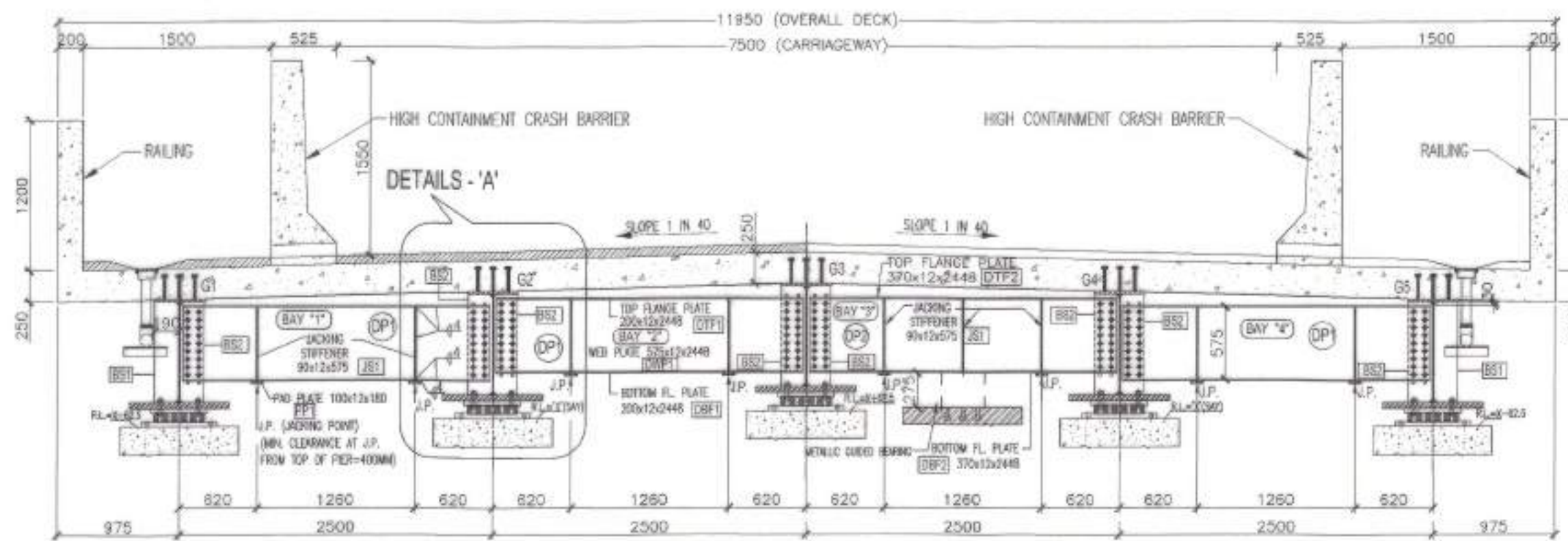
### NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED. NO DIMENSION SHOULD BE SCALED FROM THIS DRAWING.
2. FABRICATION OF STEEL WORK SHALL BE DONE AS PER IRS: 8-1 AND IRS WELDED BRIDGE CODE.
3. FOR LATERAL BRACING ALL HOLES ARE 21.5 DIA. FOR 20 DIA. HSFG BOLTS OF PROPERTY CLASS 8.8 EXCEPT OTHERWISE SHOWN.
4. THIS DRAWING GIVES DETAILS OF SQUARE ARRANGEMENT ONLY.
5. THE END DIAPHRAGM DP2 IS TO BE PROVIDED ONLY IN SEISMIC ZONE IV AND V. FOR SEISMIC ZONES II AND III, THE DIAPHRAGM DP1 SHALL BE PROVIDED INSTEAD.
6. THE GIRDER/BAY NUMBERING IS FOR ILLUSTRATION PURPOSE ONLY. NO OTHER INFERENCE MAY BE DRAWN FROM THESE.
7. PART LIST NOS INDICATED THUS:  $\square$  AND SHIPPING LIST NOS INDICATED THUS:  $\bigcirc$

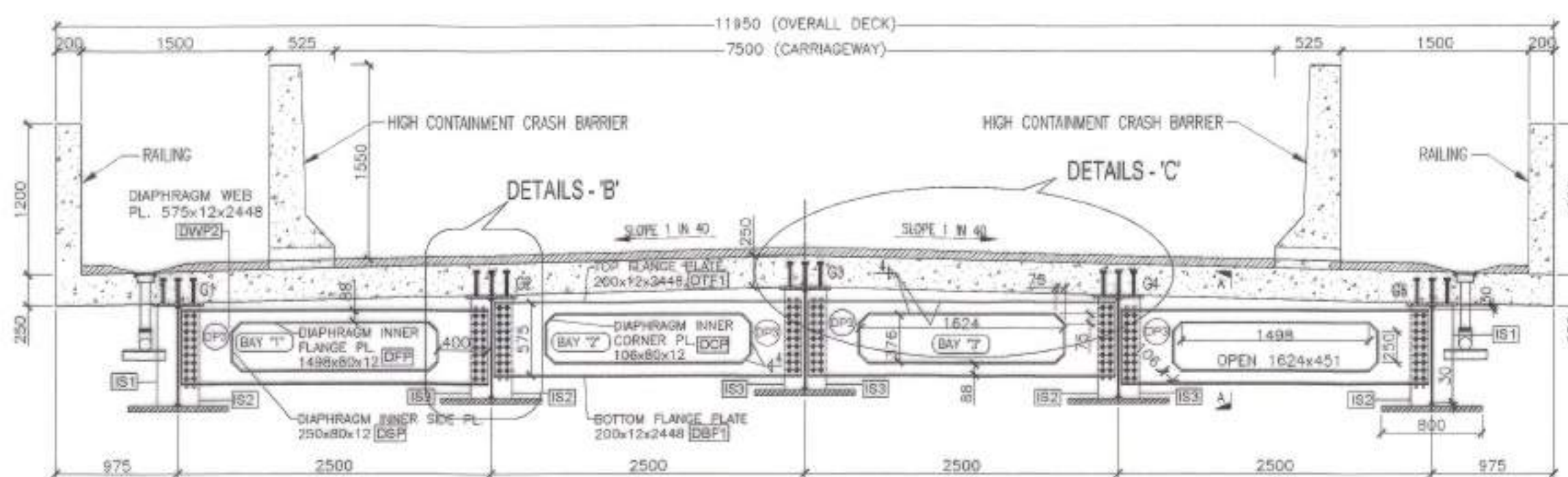
DESCRIPTION	SYMBOL
FILLET WELD (ONE SIDE)	$\sim$
FILLET WELD (BOTH SIDE)	$\sim\sim$
HOLE FOR TURNED BOLT	$\bigcirc$
HSFG BOLT	$\bullet$
SHEAR STUD	$\ast$

<b>DESIGN CONSULTANT:</b>  SPARSH ENGINEERING COMPANY PRIVATE LIMITED H-55, Hamu Housing Colony, Near Nigam Park, Ranchi, Jharkhand - 834 002, PH: 0651-2340659				<b>CLIENT:</b>  DEDICATED FREIGHT CORRIDOR CORPORATION OF INDIA LIMITED (A Govt. of India Enterprise) Ministry of Railway.				<b>THIS DRAWING IS THE PROPERTY OF RESEARCH DESIGNS &amp; STANDARDS ORGANISATION (MINISTRY OF RAILWAYS) LUCKNOW - 226011 (INDIA) AND SHALL NOT BE USED, COPIED OR REPRODUCED IN PART OR WHOLE WITHOUT PRIOR CONSENT IN WRITING.</b>				<b>R. D. S. O.</b>		SHEET NO.: 3 OF 14
<b>DESIGN CHECKED BY:</b> PRASHANT SRIVASTAVA (JED/B&S)				<b>SCRUTINISED &amp; CHECKED BY:</b> SANDEEP AGARWAL (ADE/S&B&S)				<b>SCRUTINISED &amp; RECOMMENDED BY:</b> MANISH KUMAR (DSB-VIB&S)				<b>APPROVED BY:</b> RAJESH KUMAR SRIVASTAVA (ED/B&S)		NAME OF WORK: "IRC-6 LOADING - 2017" 18 M SPAN COMPOSITE WELDED ROB GIRDERS
<b>DRAWING CHECKED BY:</b> DURGESH KUMAR SHARMA (JED/B&S)				<b>DESIGNED BY:</b> SANJOY BERA				<b>CHECKED BY:</b> RAVI PRASAD				<b>TITLE:</b> PLAN FOR 5-GIRDER ARRANGEMENT		DATE:
<b>REVISION/ALTERATIONS</b>				<b>DESIGN CONSULTANT:</b> SPARSH ENGINEERING COMPANY PRIVATE LIMITED H-55, Hamu Housing Colony, Near Nigam Park, Ranchi, Jharkhand - 834 002, PH: 0651-2340659				<b>CLIENT:</b> DEDICATED FREIGHT CORRIDOR CORPORATION OF INDIA LIMITED (A Govt. of India Enterprise) Ministry of Railway.				<b>DRAWING NO.:</b> RDSO/B-11781/2		<b>MAIN DRAWING NO.:</b> RDSO/B-11781
<b>REVISION/ALTERATIONS</b>				<b>DESIGN CONSULTANT:</b> SPARSH ENGINEERING COMPANY PRIVATE LIMITED H-55, Hamu Housing Colony, Near Nigam Park, Ranchi, Jharkhand - 834 002, PH: 0651-2340659				<b>CLIENT:</b> DEDICATED FREIGHT CORRIDOR CORPORATION OF INDIA LIMITED (A Govt. of India Enterprise) Ministry of Railway.				<b>DRAWING NO.:</b> RDSO/B-11781/2		<b>PROVISIONAL</b>

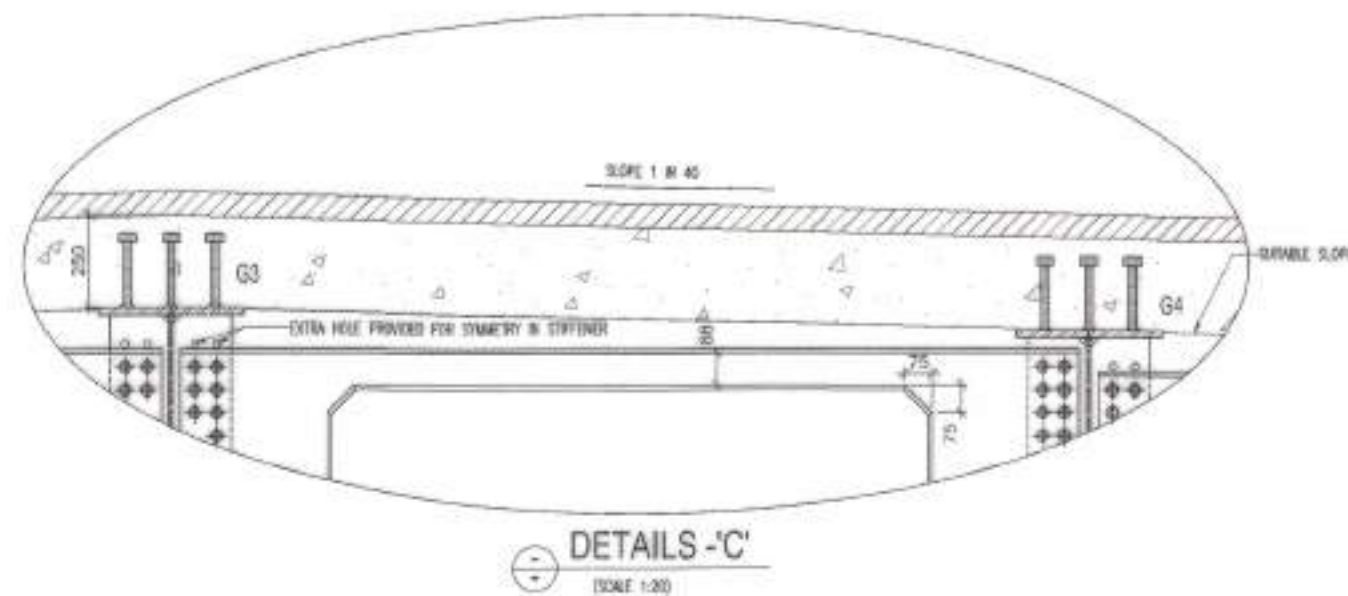




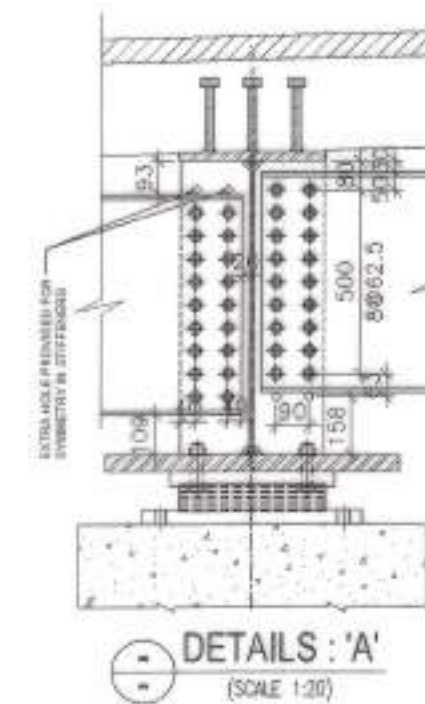
DETAILS OF END DIAPHRAGM  
(SCALE 1:40)



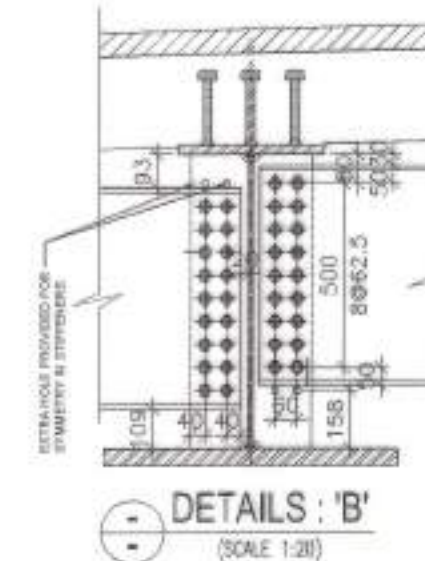
DETAILS OF INTERMEDIATE DIAPHRAGM  
(SCALE 1:40)



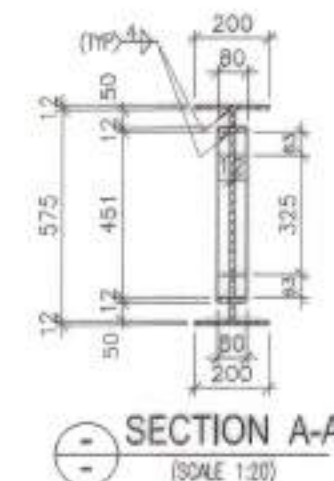
DETAILS - 'C'  
(SCALE 1:20)



DETAILS : 'A'  
(SCALE 1:20)



DETAILS : 'B'  
(SCALE 1:20)



SECTION A-A  
(SCALE 1:20)

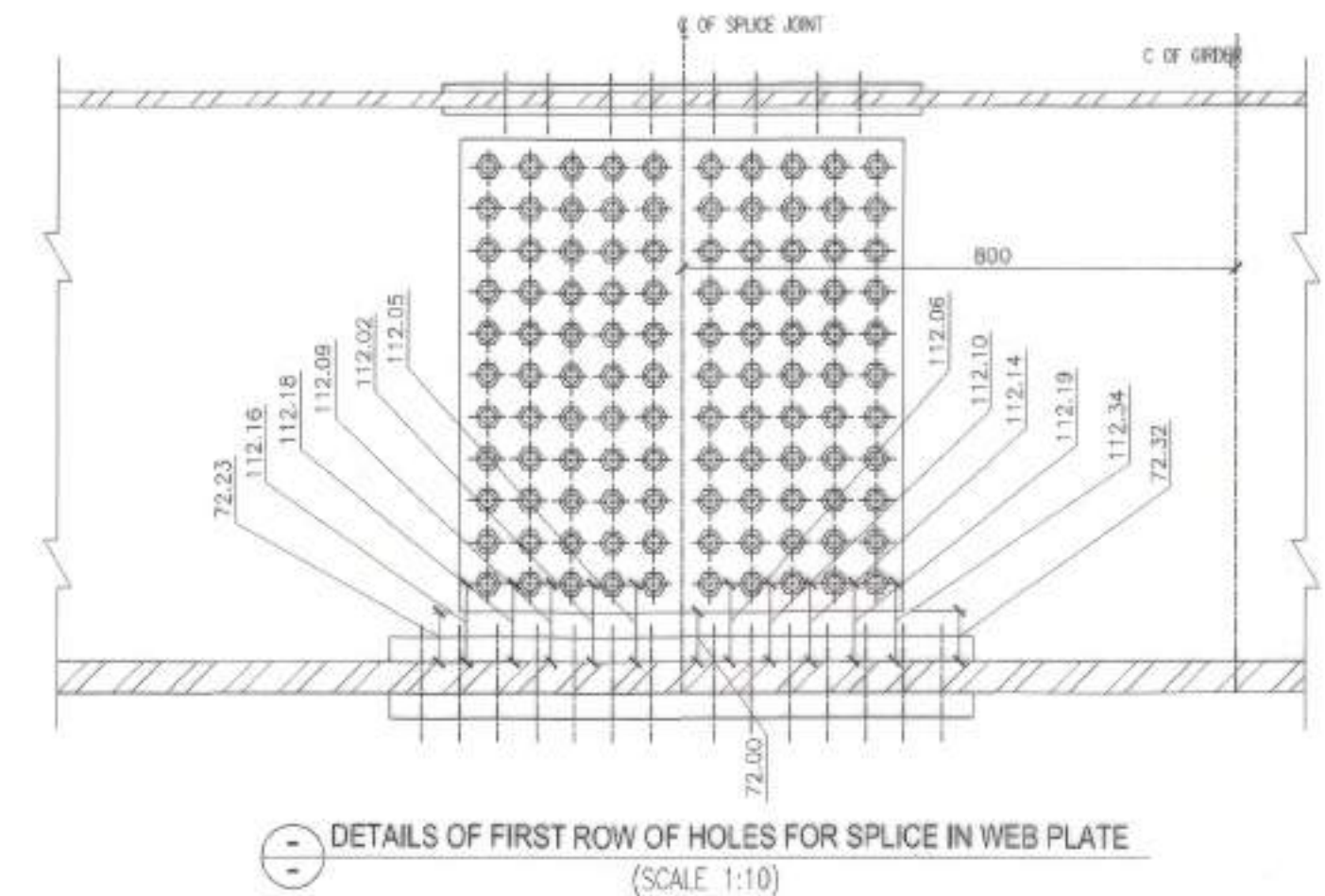
## NOTES:

- ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED. NO DIMENSION SHOULD BE SCALED FROM THIS DRAWING.
- THIS DRAWING IS SUITABLE FOR USE UPTO SEISMIC ZONE-V.
- THE GRADE OF REINFORCEMENT PROVIDED IN DECK SLAB SHALL BE OF Fe 500D.
- ALL HOLES ARE 23.5 DIA. FOR 22 DIA. HSFG BOLTS.
- AUTOMATIC SUBMERGED ARC WELDING SHOULD BE EMPLOYED FOR FILLET WELDS IN FLANGES TO WEB OTHER WELDS SHOULD ALSO BE DONE BY SUBMERGED ARC WELDING TO THE MAXIMUM EXTENT POSSIBLE CO2 WELDING SHALL BE PREFERRED OVER MANUAL METAL ARC WELDING.
- ALL WELDS TO BE MADE BY USING APPROVED WELDING PROCEDURES AND BY QUALIFIED WELDERS ONLY AS PER PROVISIONS OF IS:9585.
- CO2 WELDING SHALL BE PREFERRED OVER MANUAL METAL ARC WELDING FOR DIAPHRAGM FABRICATION.
- THE GIRDERS SHALL BE PLACED ON PEDESTALS PROPERLY FINISHED TO PROPER ALIGNMENT, LEVEL AND CROSS SLOPE ETC AS PER CLAUSE 930 OF IRC:83 PART III. CENTER LINE OF THE FINAL BEARING LOCATION SHALL BE PAINT MARKED IN LONGITUDINAL AS WELL AS TRANSVERSE DIRECTION WHILE PLACING THE GIRDER, THE CENTER LINE OF THE BEARING LOCATION SHALL BE MATCHED WITH THE MARKING ON THE PEDESTALS.
- THE PEDESTAL ARE AT DIFFERENT LEVEL TO PROVIDED CROSS SLOPE OF 1:40 IN THE DECK SLAB/ROAD. THIS ASPECT MUST BE KEPT INTO MIND WHILE PLANNING THE PIERS.
- THE REDUCE LEVEL (R.L) OF THE TOP OF THE PEDESTAL FOR GIRDER G2 HAS BEEN TAKEN REFERENCE (X). THE LEVELS OF OTHER PEDESTAL HAS BEEN INDICATED IN REFERENCE TO THIS.
- THE GIRDERS G3 ARE AT HIGHEST LEVEL DIFFERENCE OF LEVEL BETWEEN SUBSEQUENT GIRDERS IS 62.5 MM.
- THE EXTRA HOLES IN THE STIFFENERS OF GIRDER ARE GIVEN SUCH THAT ANY CROSS FRAME/ANY END DIAPHRAGM CAN BE PROVIDED IN ANY BAY.
- THE BEARINGS AND PEDESTAL SHOWN IN THIS DRAWING ARE INDICATIVE ONLY. ACTUAL BEARINGS SHALL BE PROVIDED AS PER DRAWING "DETAILS OF METALLIC GUIDED BEARING". THE DIMENSIONS SHALL BE AS GIVEN BY THE DESIGNER FOR SUB STRUCTURE. THE DIMENSIONS OF THE PEDESTAL SHALL NOT BE SCALED/MEASURED FROM THIS DRAWINGS.
- MINIMUM CLEARANCE AT JACKING POINT FROM TOP OF PIER SHALL BE 400 MM.
- PART LIST NOS. SHOWN THUS ○ SHIPPING LIST NOS. SHOWN THUS □
- THE PEDESTALS FOR THE SLIDE GUIDE BEARING SHALL BE PROVIDED ONLY IN SEISMIC ZONE IV AND V. THERE IS NO CROSS SLOPE IN ANY OF THE PEDESTALS IN STRAIGHT ALIGNMENT.
- THIS DRAWING GIVES DETAILS OF ONLY SQUARE ARRANGEMENT.

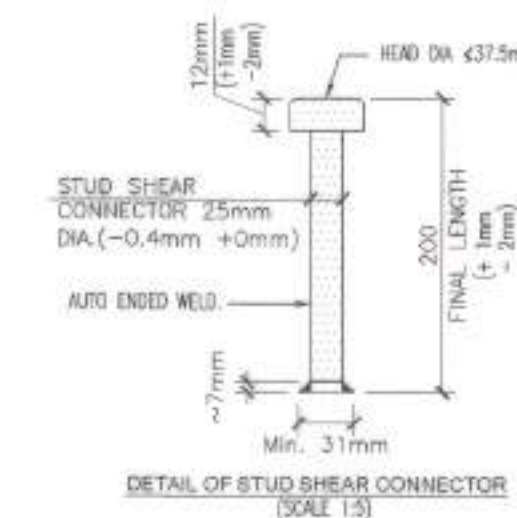
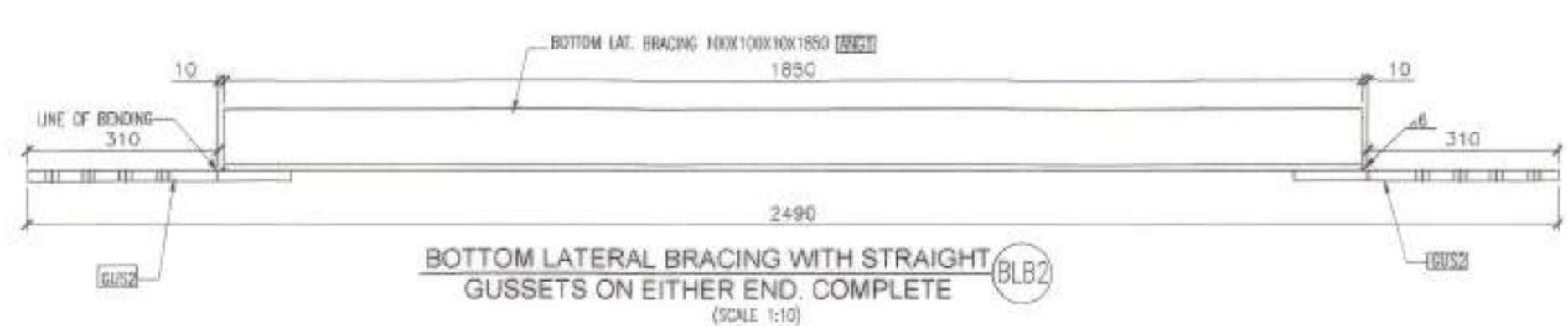
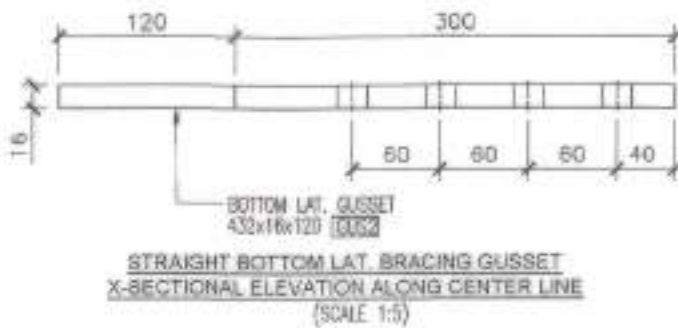
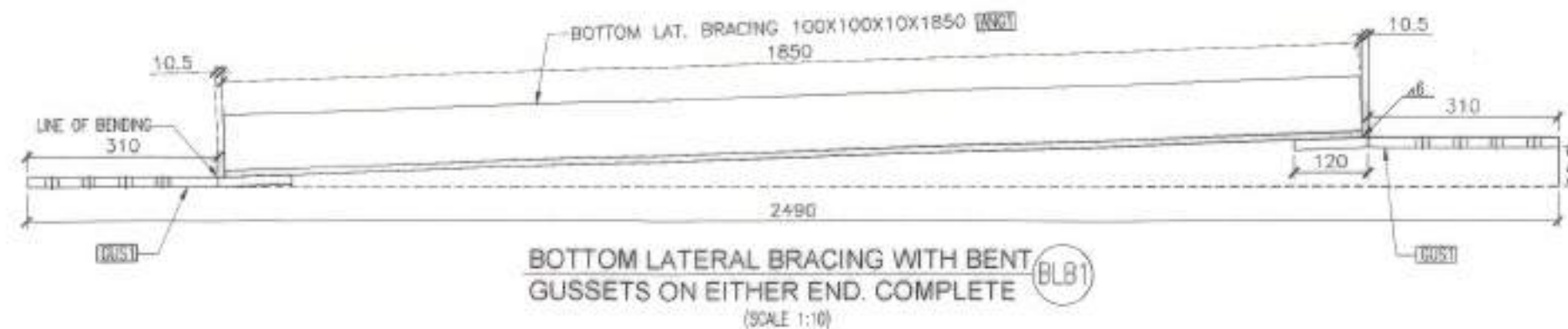
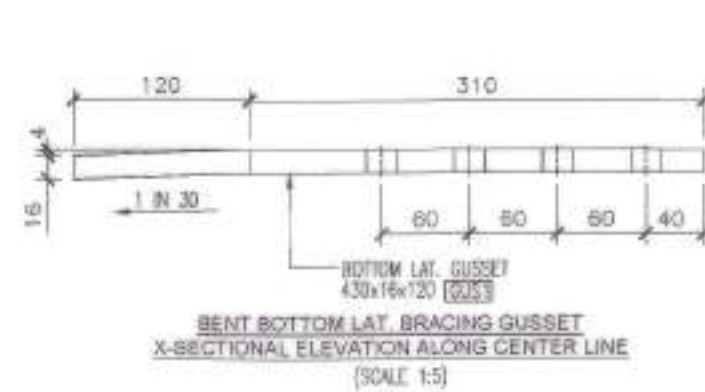
DESCRIPTION	SYMBOL
FILLET WELD (ONE SIDE)	—
FILLET WELD (BOTH SIDE)	—
HOLE FOR TURNED BOLT	○
HSFG BOLT	⊙
SHEAR STUD	●

DESIGN CONSULTANT				CLIENT				THIS DRAWING IS THE PROPERTY OF RESEARCH DESIGNS & STANDARDS ORGANISATION (MINISTRY OF RAILWAYS) LUCKNOW - 226011 (INDIA) AND SHALL NOT BE USED, COPIED OR REPRODUCED IN PART OR WHOLE WITHOUT PRIOR CONSENT IN WRITING.				R. D. S. O.		SHEET NO.- 4 OF 14	
SPARSH ENGINEERING COMPANY PRIVATE LIMITED H-55, Harmu Housing Colony, Near Nigam Park, Ranchi, Jharkhand - 834 002, PH- 0651-2342659				DEDICATED FREIGHT CORRIDOR CORPORATION OF INDIA LIMITED (A Govt. of India Enterprise) Ministry of Railway.				DESIGN CHECKED BY:- PRASHANT SRIVASTAVA (JED/B&S)				NAME OF WORK:- "IRC-8 LOADING - 2017" 18 M SPAN COMPOSITE WELDED ROB GIRDERS		SCALE:- AS SHOWN	
DRAWN BY:- SANJOY BERA				DESIGNED BY:- RAVI PRASAD				SCRUTINISED & CHECKED BY:- SANDEEP AGARWAL (ADESB-H&B&S)				TITLE:- X-SECTIONAL DETAILS FOR 5-GIRDER LEAVES		ORIGINAL SIZE:- A1	
CHECKED BY:- SUDHIR KUMAR				APPROVED BY:- RAJESH KUMAR SRIVASTAVA (ED&B&S)				DRAWING CHECKED BY:- DURGESH KUMAR SHARMA (JED/B&S)				DATE:-		MAIN DRAWING NO: RDSO/B-11781	
REVISION/ALTERATIONS				KHOVISH BISWAS DY OF MKKK				SOURIK SENGUPTA GM CIVIL/KKK				DRAWING NO:- RDSO/B-11781/3		PROVISIONAL	
				AJAY KUMAR GM CIVIL/KKK											



**NOTES:**

1. ALL DIMENSIONS ARE IN MILLIMETERS. LEVELS ARE IN METERS. ONLY WRITTEN DIMENSIONS SHALL BE FOLLOWED.
2. THIS DRAWING IS SUITABLE FOR USE UPTO SEISMIC ZONE-V.
3. CAMBER IS TO BE PROVIDED BY CUTTING WEB PLATE IN PROFILE AS PER DIMENSIONS INDICATED ABOVE.
4. FLANGE SPLICE PLATES ARE TO BE BENT TO SUIT THE CAMBER PROFILE OF GIRDER. IT IS EXPECTED THAT THE PLATE WILL BEND DURING BOLT TIGHTENING. HOWEVER IF ANY PROBLEM EXPERIENCED, THE FLANGE SPLICE PLATES MAY BE PRE-BENT HYDRAULICALLY.
5. THE DISTANCE OF FIRST ROW OF HOLES IN WEB SPLICE FROM BOTTOM OF WEB ARE VARYING AS PER DETAILS GIVEN IN THIS DRAWING. THIS HAS BEEN DONE TO ENSURE THAT HOLES ARE IN HORIZONTAL LINE WHEREAS WEB IS CUT TO CAMBER PROFILE. WEB SPLICE PLATE AND THEIR HOLES ARE ALSO HORIZONTAL.

**TESTING OF STUD SHEAR CONNECTOR****(A) APPEARANCE TEST:**

1. THE WELD TO A STUD SHEAR CONNECTOR SHOULD FORM A COMPLETE COLLAR AROUND THE SHANK AND FREE FROM CRACKS, EXCESSIVE SPLASHES OF WELD MATERIAL, FREE FORM INJURIOUS LAPS, FINS, SEAMS, TWIST, BENDS OR OTHER INJURIOUS DEFECTS.
2. WELD MATERIALS SHOULD HAVE A "STEEL BLUE" APPEARANCE.

**(B) TEST TO CHECK THE FIXING OF SHEAR STUDS:**

1. RING TEST: INVOLVES STRIKING THE SIDE OF THE HEAD OF THE STUD WITH A 2Kg. HAMMER. A RINGING TONE ACHIEVED AFTER STRIKING INDICATES GOOD FUSION WHEREAS DULL TONE INDICATES A LACK OF FUSION (BS 5400-6).
2. BEND TEST: TEST REQUIRES THE HEAD OF A STUD TO BE DISPLACED LATERALLY BY APPROXIMATE 25% OF ITS HIGH USING 6kg HAMMER.
  - \* THE WELD SHOULD THEN BE CHECKED FOR SIGNS OF CRACKING OR LACK OF FUSION.
  - \* STUD SHOULD NOT BE BENT BACK AS THIS IS LIKELY TO DAMAGE THE WELD.
  - \* THE RATE SHOULD BE 1 IN 50 (BS 5400-6).

**NOTES:**

1. ALL DIMENSIONS ARE IN MILLIMETERS. DIMENSIONS AS WRITTEN SHALL BE FOLLOWED. SCALING OR MEASUREMENT OF DIMENSIONS IS NOT ALLOWED.
2. THE STUD SHEAR CONNECTOR DESIGN IS BASED ON IRC:22-2015.
3. THE WELDING OF STUD SHEAR CONNECTORS SHALL BE DONE BY "DRAWN ARC STUD WELDING WITH CERAMIC FERRULE" TECHNIQUE.
4. THE STUD SHEAR CONNECTOR AND CERAMIC FERRULES SHALL CONFORM TO TYPE SD1/UF AS PER BS EN ISO 13918-2008.
5. MECHANICAL PROPERTIES OF STUD SHEAR CONNECTORS SHALL BE AS PER ISO 6892/BS EN ISO 13918-2008.
6. SHAPE OF TIP OF STUD SHEAR CONNECTORS MAY BE CHOSEN BY MANUFACTURER. THE STUD TIP SHALL BE SUPPLIED WITH FLUX IN THE FORM OF PRESS FITTED ALUMINUM BALL OR ALUMINUM SPRAY COATING.
7. THE DIAMETER OF CERAMIC FERRULE D7 AS PER FIGURE 1.3/TABLE 18 OF BS EN ISO 13918 SHALL BE 26 MM +0.5MM -0.0MM.
8. IN BAYS WHERE GIRDERS ARE HAVING 62.5 MM LEVEL DIFFERENCE, BOTTOM LATERAL BRACING WITH BENT GUSSETS SHALL BE PROVIDED. BOTTOM LATERAL BRACING WITH STRAIGHT GUSSETS SHALL BE PROVIDED IN BAYS HAVING GIRDER AT SAME LEVEL.
9. FOR BENDING THE GUSSET, A TEMPLATE SHALL BE PREPARED WITH DIMENSIONS AS SHOWN ABOVE. BENDING OF GUSSETS SHALL BE DONE BY COLD PRESSING ON THIS TEMPLATE. HEATING/HAMMERING OF GUSSET TO BEND THE SAME IS NOT PERMITTED. HOLES SHALL BE DRILLED ONLY AFTER THE GUSSET HAS BEEN BENT.

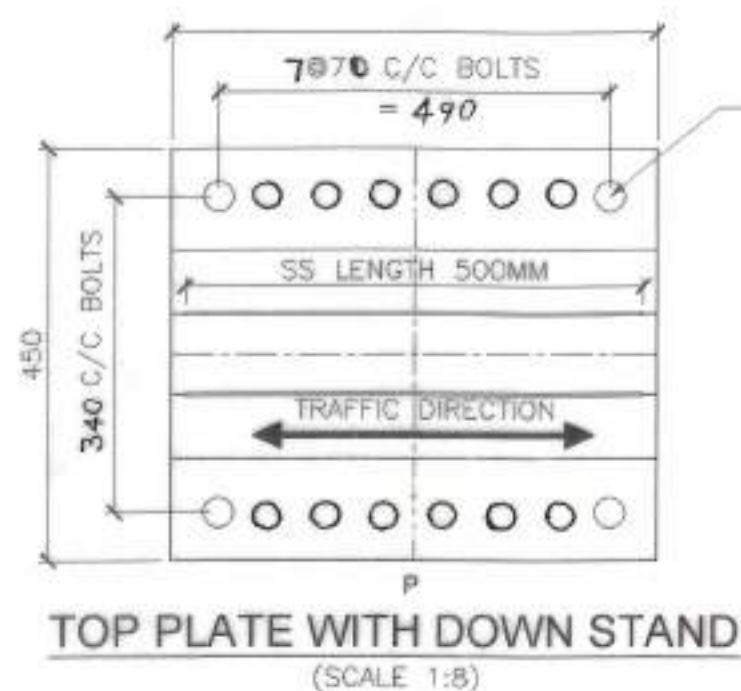
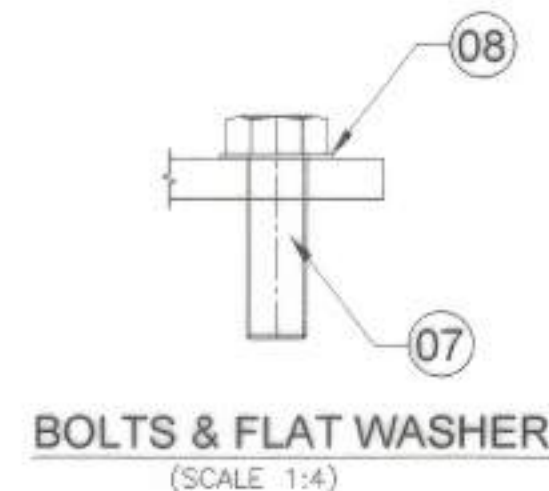
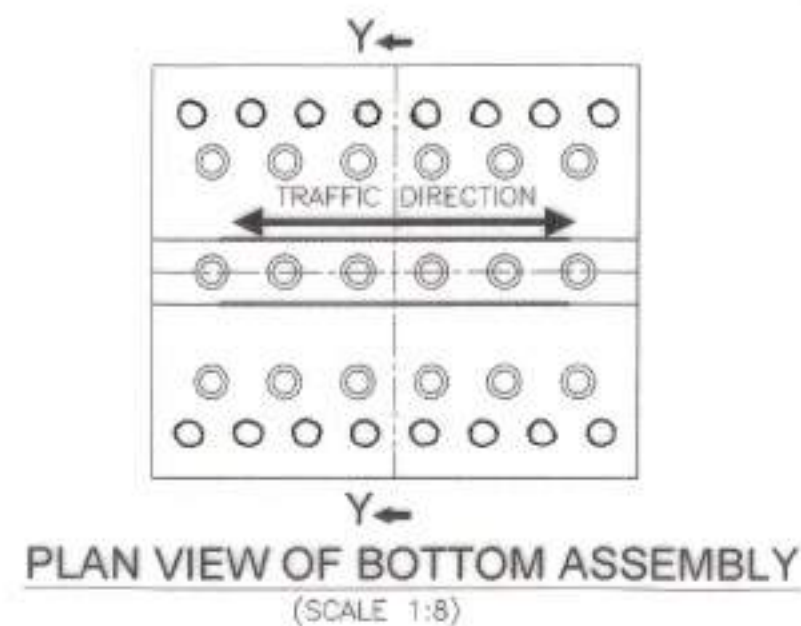
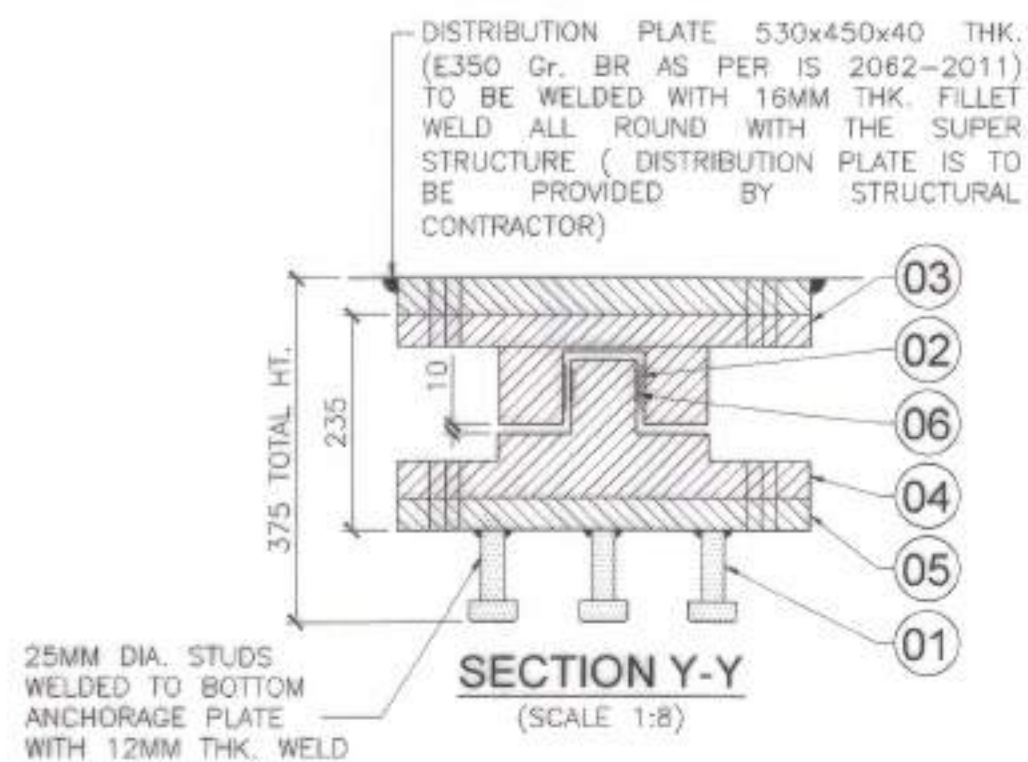
DESCRIPTION	SYMBOL
FILLET WELD (ONE SIDE)	—
FILLET WELD (BOTH SIDE)	—
HOLE FOR TURNED BOLT	○
HSFG BOLT	⊙
SHEAR STUD	●

				DESIGN CONSULTANT:		CLIENT:		THIS DRAWING IS THE PROPERTY OF RESEARCH DESIGNS & STANDARDS ORGANISATION (MINISTRY OF RAILWAYS) LUCKNOW - 226011 (INDIA) AND SHALL NOT BE USED, COPIED OR REPRODUCED IN PART OR WHOLE WITHOUT PRIOR CONSENT IN WRITING.				R. D. S. O.		SHEET NO.- 5 OF 14							
				 SPARSH ENGINEERING COMPANY PRIVATE LIMITED H-55, Harmu Housing Colony, Near Nigam Park, Ranchi, Jharkhand - 834 002, PH- 0651-2340659		 DEDICATED FREIGHT CORRIDOR CORPORATION OF INDIA LIMITED (A Govt. of India Enterprise) Ministry of Railway.						NAME OF WORK:- "IRC-6 LOADING - 2017" 18 M SPAN COMPOSITE WELDED ROB GIRDERS		SCALE:- AS SHOWN ORIGINAL SIZE:- A1 DATE:-							
				DRAWN BY:- 		DESIGNED BY:- 		CHECKED BY:- 		DESIGN CHECKED BY:-  PRASHANT BRIVASTAVA (JC/CBS)		SCRUTINISED & CHECKED BY:  SANDEEP AGARWAL (ADE/BS-IBBS)		SCRUTINISED & RECOMMENDED BY:  MANISH KUMAR (CBS-VI/BS)		APPROVED BY:  RAJESH KUMAR BRIVASTAVA (ED/BS)		TITLE:- DETAILS OF BENT GUSSETS, STUD SHEAR CONNECTOR AND CAMBER DIAGRAM DRAWING NO:- RDSO/B-11781/4		MAIN DRAWING NO: RDSO/B-11781 PROVISIONAL	
				KHOWNISH BISWAS DY. CPWKK		SOUVIK SINGUPTA GM/CIVIL/KKK		AJAY KUMAR GM/CIVIL/KKK		DURGESH KUMAR SHARMA (JC/BS)											
				REVISION/ALTERATIONS																	
				SANJOY BERA		RAVI PRASAD		SUCHIR KUMAR													

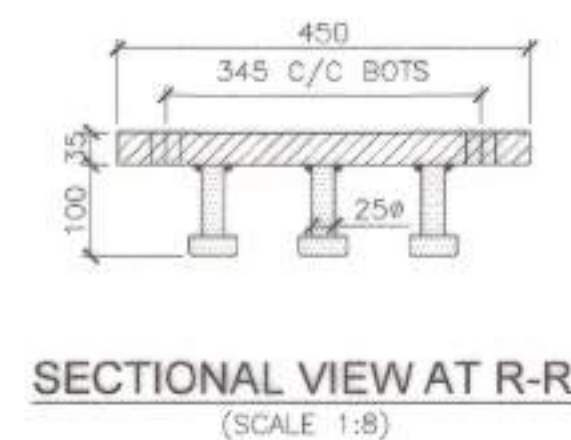
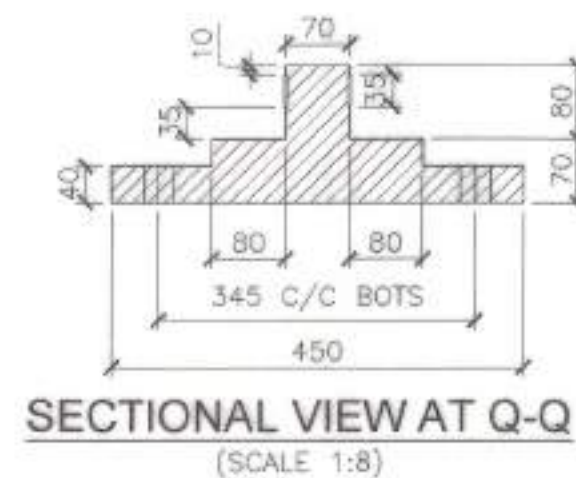
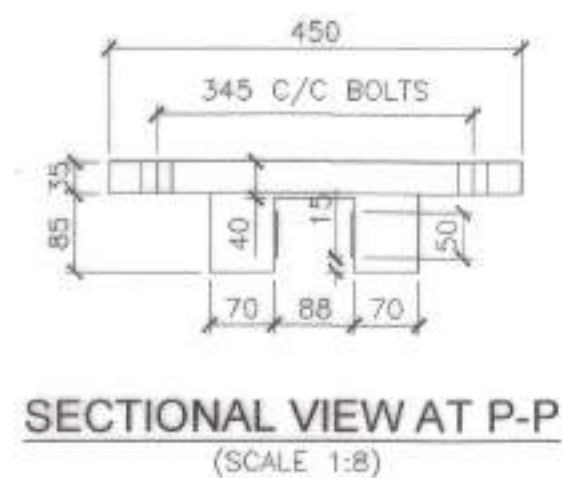
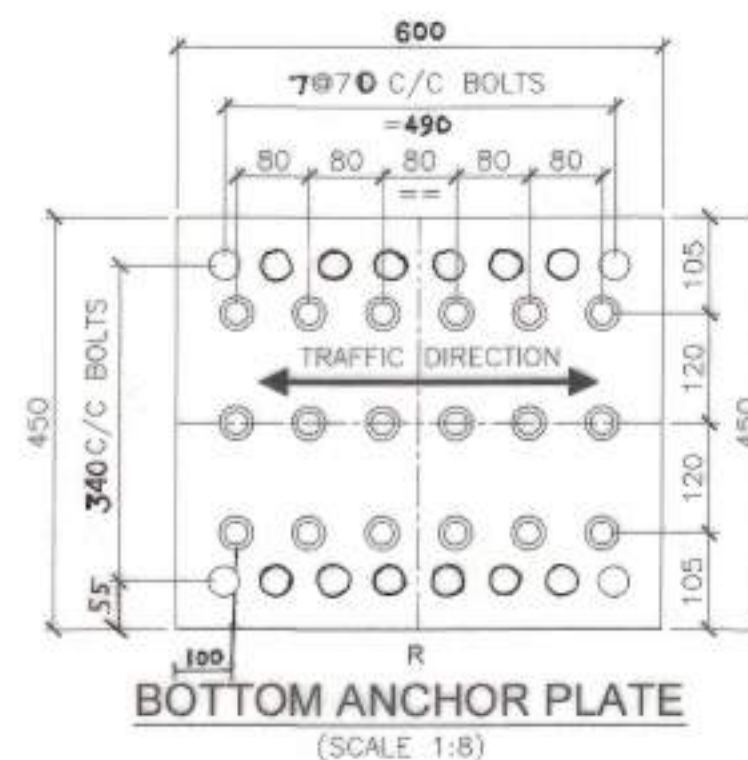
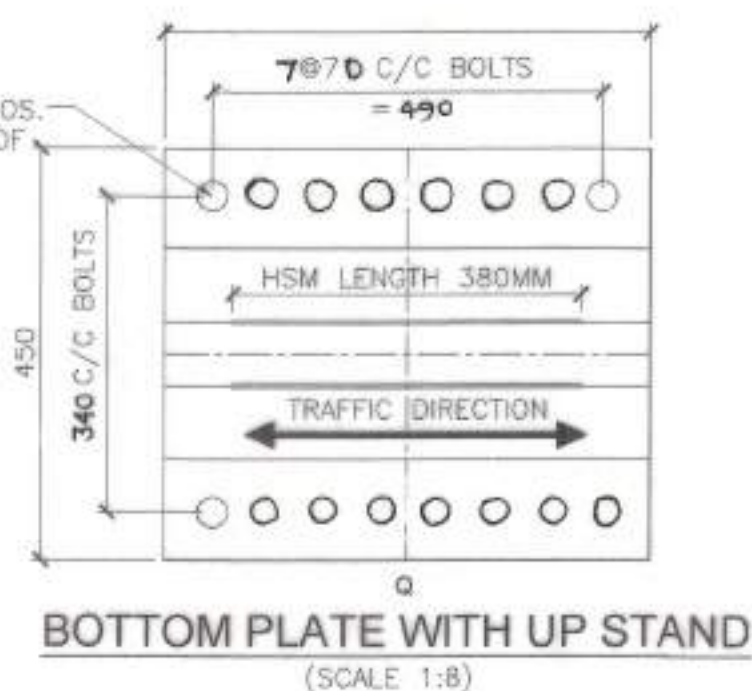


				DESIGN CONSULTANT:  <b>SPARSH ENGINEERING COMPANY PRIVATE LIMITED</b> H-05, Harmu Housing Colony, Near Nigam Park, Ranchi, Jharkhand - 834 002, PH- 0951-2340659		CLIENT:  <b>MRF</b> DEDICATED FREIGHT CORRIDOR CORPORATION OF INDIA LIMITED (A Govt. of India Enterprise) Ministry of Railway.		THIS DRAWING IS THE PROPERTY OF RESEARCH DESIGNS & STANDARDS ORGANISATION (MINISTRY OF RAILWAYS) LUCKNOW - 226011 (INDIA) AND SHALL NOT BE USED, COPIED OR REPRODUCED IN PART OR WHOLE WITHOUT PRIOR CONSENT IN WRITING.				<b>R. D. S. O.</b> SHEET NO:- 6 OF 14							
				DRAWN BY:-  <b>SANJOY BERA</b>		DESIGNED BY:-  <b>RAVI PRASAD</b>		CHECKED BY:-  <b>SUDHIR KUMAR</b>		DESIGN CHECKED BY:-  <b>PRASHANT SRIVASTAVA (E/D&amp;S)</b>		SCRUTINISED & CHECKED BY  <b>SANDEEP AGARWAL (ADE/GB-I/S&amp;S)</b>		SCRUTINISED & RECOMMENDED BY  <b>MANISH KUMAR (CBS-VI&amp;S)</b>		APPROVED BY  <b>RAJESH KUMAR SRIVASTAVA (E/D&amp;S)</b>		NAME OF WORK:- <b>"IRC-6 LOADING - 2017"</b> <b>18 M SPAN COMPOSITE WELDED</b> <b>ROB GIRDERS</b> SCALE:- AS SHOWN ORIGINAL SIZE:- A2 DATE:-	
SR. NO. DESCRIPTION OF WORK ADE/S&S CIR/S&S ED/S&S REVISIONAL ITERATIONS				KHOWMISH BISWAS DY CPWKKK		SOUVIK SENGUPTA GM/CIVIL/KKK		ALAY KUMAR GCM/CIVIL/KKK		DRAWING CHECKED BY:-  <b>DURGESH KUMAR SHARMA (E/D&amp;S)</b>		TITLE:- <b>DETAILS OF ELASTOMERIC BEARING</b>		MAIN DRAWING NO: RDSO/B-11781					
										DRAWING NO:- RDSO/B-11781/5		PROVISIONAL							





DRILL HOLE 14/14 NOS. FOR M33x70 BOLTS OF GRADE 10.9



### NOTES:

- ALL DIMENSIONS ARE IN MILLIMETERS. LEVELS ARE IN METERS & CHAINAGES ARE IN KILOMETERS. UNLESS STATED OTHERWISE MENTIONED. ONLY WRITTEN DIMENSIONS SHALL BE FOLLOWED.
- THE DESIGN IS BASED ON IRC:83 (Part-II)-2018.
- TOLERANCES:
  - PLAN DIMENSIONS : -0 TO +5MM
  - OVERALL LENGTH : -0 TO +5MM
  - HEIGHT OF ANY STEEL COMPONENT:-
    - MACHINED : -0 TO +1MM
    - UNMACHINED : CLASS 2 OF IS:4897.
- THE ELASTOMERIC PADS SHALL BE OF IRHD-60+5 AND SHALL CONFIRM TO THE SPECIFICATION Laid DOWN IN IRC:83 (Part-II)-2018.
- IT IS PREFERABLE THAT BEARING SHALL BE INSTALLED AT NEARLY MEAN TEMPERATURE.
- ALL STRUCTURAL STEEL SHALL CONFORM TO MILD STEEL IS: 2062-2011.
- THE ANCHOR BOLTS AND THEIR NUTS SHALL BE HOT DIP GALVANISED 100 MICRON THICK, AS PER IS:4759.
- ALL BOLTS, NUTS ETC SHALL BE OF PROPERTY CLASS 10.9 AND SHALL CONFORM TO PROVISIONS OF IS:1367.
- PEDESTALS, BED BLOCKS, SHALL PROJECT MINIMUM 150MM BEYOND THE BOTTOM PLATE.








### BILL OF QUANTITY

SR. NO.	DESCRIPTION	MATERIAL	QTY.	SPECIFICATION
1.	SHEAR HEADED STUDS Ø 25 X 100	MILD STEEL	18	IS : 2062, GRADE - E 250
2.	STAINLESS STEEL SHEET (3MM THK.)	S.S	02	AISI : 316L
3.	TOP PLATE WITH DOWN STAND	CAST STEEL	01	IS:1030, GRADE - 340-570W
4.	BOTTOM PLATE WITH UP STAND	CAST STEEL	01	IS:1030, GRADE - 340-570W
5.	BOTTOM ANCHORAGE PLATE	MILD STEEL	01	IS:2062, GRADE - E 250
6.	DIMPLED HSM(08MM THK.)	HSM	2	EN : 1337 - 2 : 2004
7.	BOLT - M33 X 70 (TOP)	Gr.-10.9 HT	16	IS : 1367
	BOLT - M33 X 70 (BOTTOM)	Gr.-10.9 HT	16	IS : 1367
8.	FLAT WASHER	MILD STEEL	32	IS : 2062

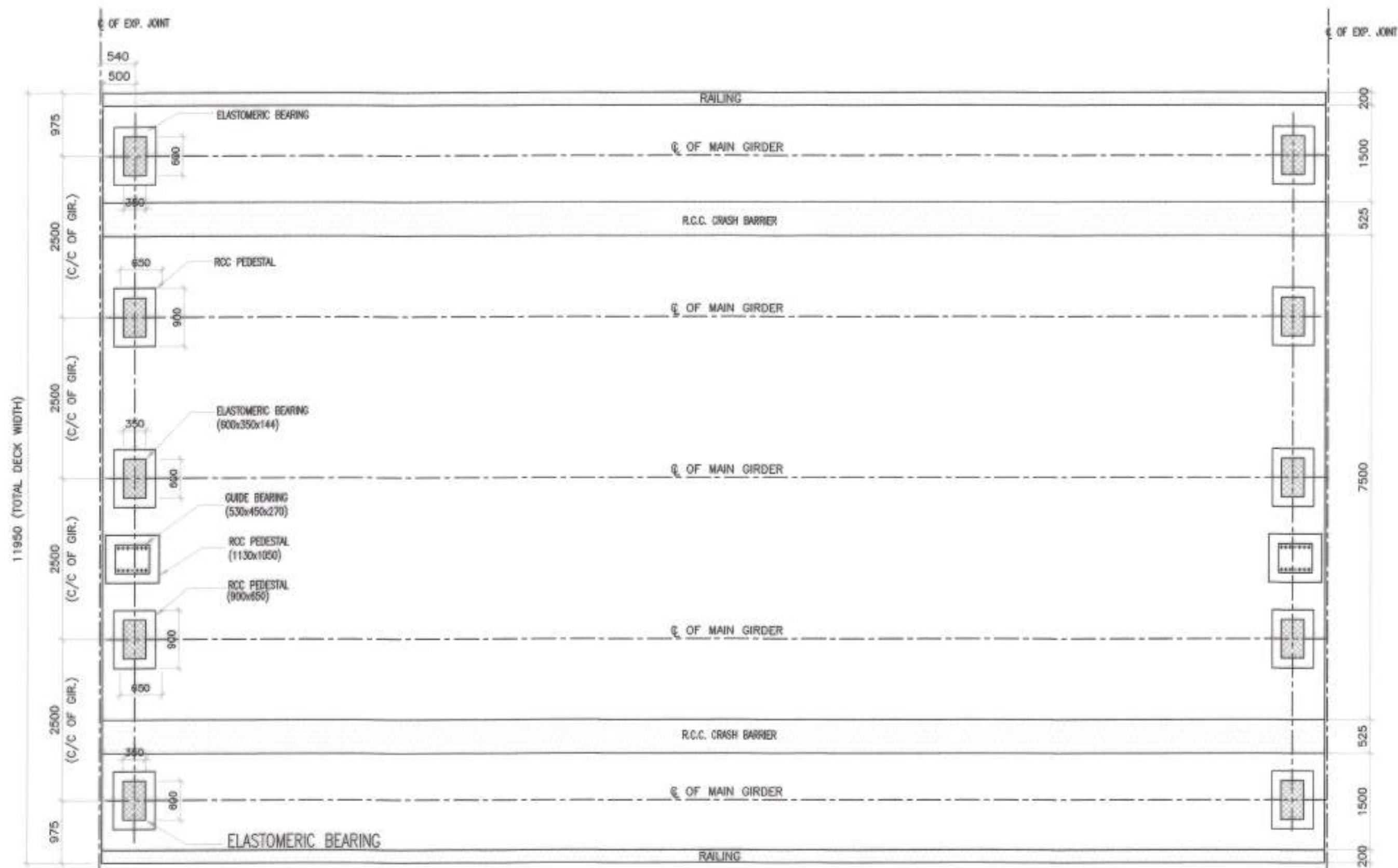
### DISPLACEMENT (mm)

	DISPLACEMENT (mm)
1.	IN TRAFFIC DIRECTION (LONG.)
2.	IN TRAFFIC DIRECTION (TRANS.)
3.	ROTATION (RADIAN)
4.	CONCRETE GRADE FOR PEDESTAL
5.	STEEL GRADE FOR SUPERSTRUCTURE

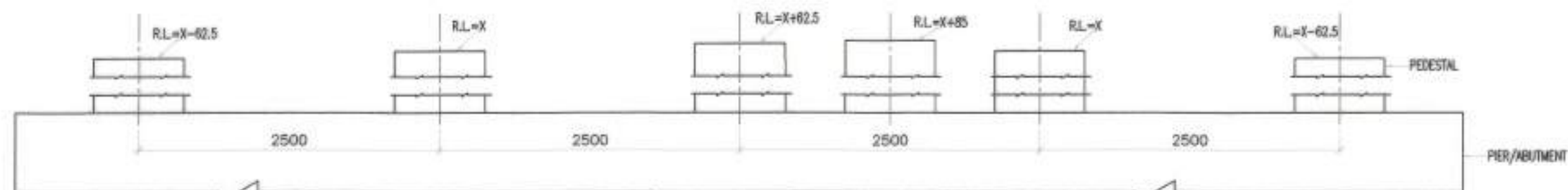
DESCRIPTION	SYMBOL
FILLET WELD (ONE SIDE)	—
FILLET WELD (BOTH SIDE)	—
HOLE FOR TURNED BOLT	○
HSPG BOLT	⊙
SHEAR STUD	●

				<div>DESIGN CONSULTANT</div> <div><div>SPARSH ENGINEERING COMPANY PRIVATE LIMITED H-55, Harmu Housing Colony, Near Nilgum Park, Ranchi, Jharkhand - 834 002, PH- 0651-2340669</div></div>		<div>CLIENT</div> <div><div>DEDICATED FREIGHT CORRIDOR CORPORATION OF INDIA LIMITED (A Govt. of India Enterprise) Ministry of Railway.</div></div>		<div>THIS DRAWING IS THE PROPERTY OF RESEARCH DESIGNS &amp; STANDARDS ORGANISATION (MINISTRY OF RAILWAYS) LUCKNOW - 220011 (INDIA) AND SHALL NOT BE USED, COPIED OR REPRODUCED IN PART OR WHOLE WITHOUT PRIOR CONSENT IN WRITING.</div>				<div>R. D. S. O.</div> <div><div>NAME OF WORK:-</div><div>"IRC-6 LOADING - 2017"</div><div>18 M SPAN COMPOSITE WELDED ROB GIRDERS</div></div>		<div>SHEET NO:- 7 OF 14</div>							
				<div>DRAWN BY:-</div> <div><div>SANJOY BERA</div></div>		<div>DESIGNED BY:-</div> <div><div>RAVI PRASAD</div></div>		<div>CHECKED BY:-</div> <div><div>SUDHIR KUMAR</div></div>		<div>DESIGN CHECKED BY:-</div> <div><div>PRASHANT SRIVASTAVA (JE/D/S&amp;S)</div></div>		<div>SCHEMATISED &amp; CHECKED BY:-</div> <div><div>SANDEEP AGARWAL (AD/S&amp;S-H&amp;S)</div></div>		<div>SCHEMATISED &amp; RECOMMENDED BY:-</div> <div><div>MANISH KUMAR (DBS-VI/S&amp;S)</div></div>		<div>APPROVED BY:-</div> <div><div>RAJESH KUMAR SRIVASTAVA (ED/S&amp;S)</div></div>		<div>TITLE:-</div> <div>DETAILS OF METALLIC GUIDED BEARING</div>		<div>MAIN DRAWING NO: RDSO/B-1178</div>	
<div>SR. NO.</div> <div>DESCRIPTION OF WORK</div> <div>ADP/S&amp;S</div> <div>DIR. S&amp;S</div> <div>ED/S&amp;S</div>				<div>REVISIONAL ALTERATIONS</div>										<div>DRAWING NO:- RDSO/B-11781/6</div>		<div>PROVISIONAL</div>					





⊖ LAYOUT PLAN OF ELASTOMERIC BEARINGS AND METALLIC GUIDE BEARINGS  
(SCALE 1:60)



⊖ DETAILS OF PEDESTALS FOR FIVE - GIRDER ARRANGEMENT ON STRAIGHT ALIGNMENT  
(SCALE 1:40)

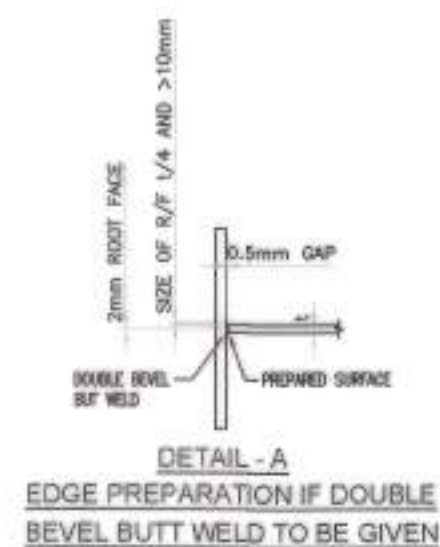
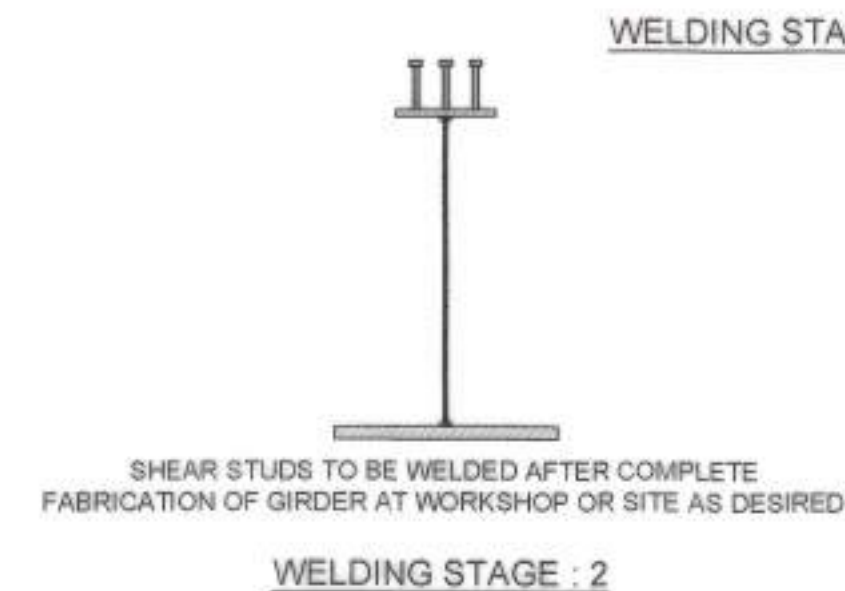
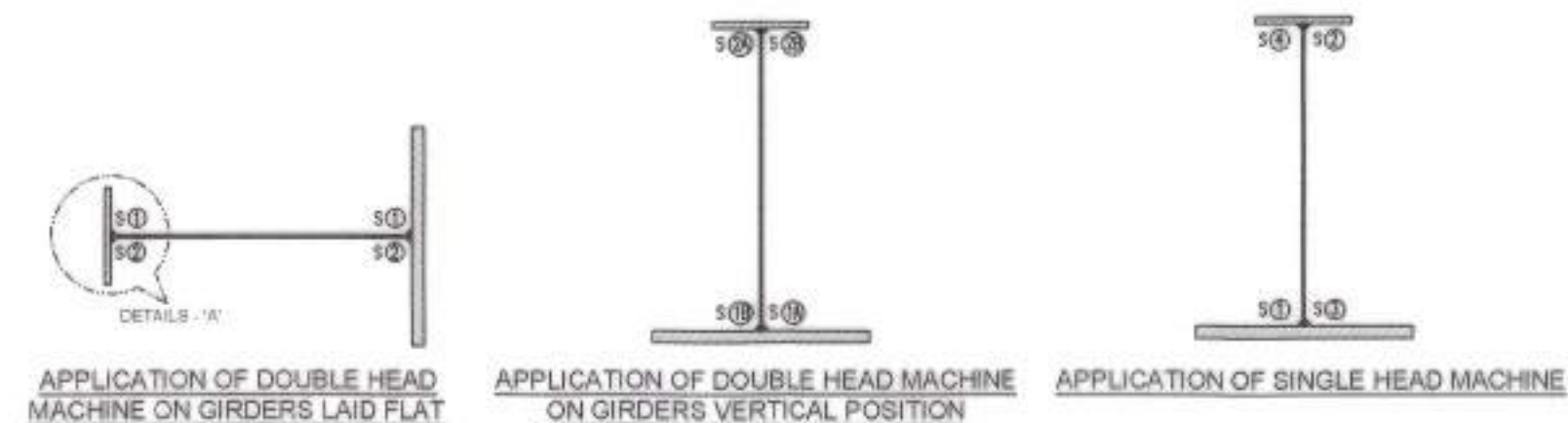
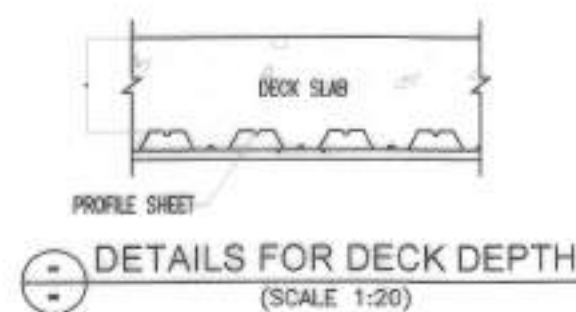
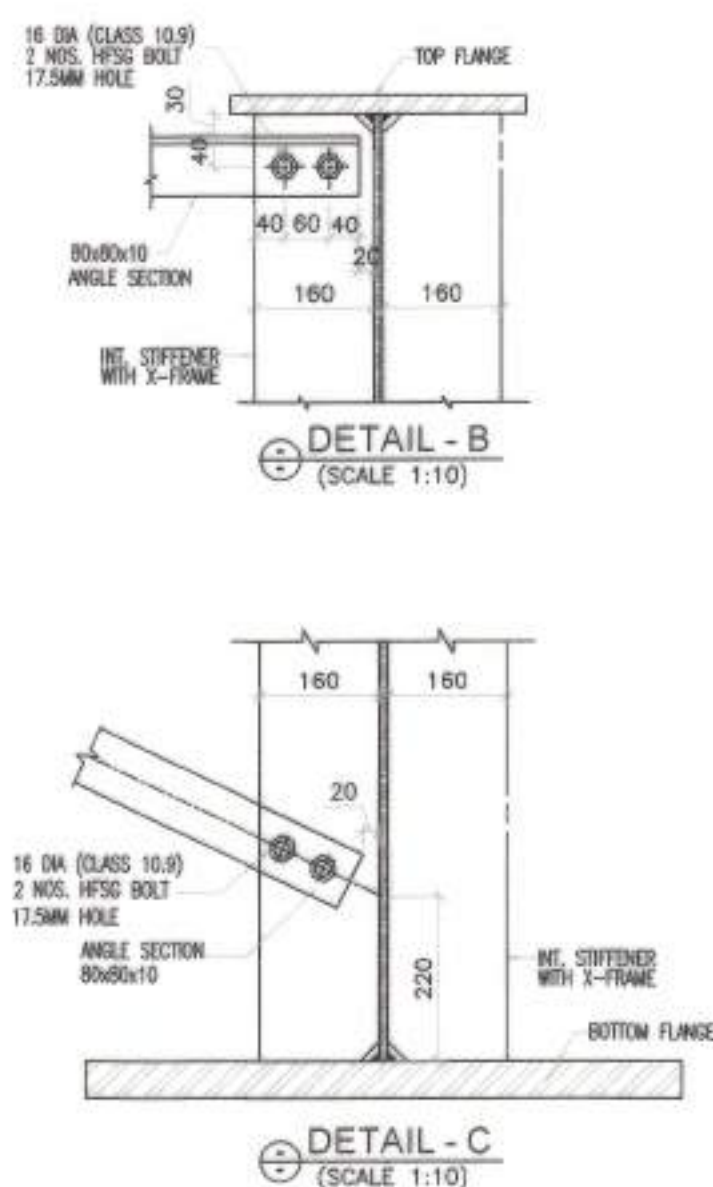
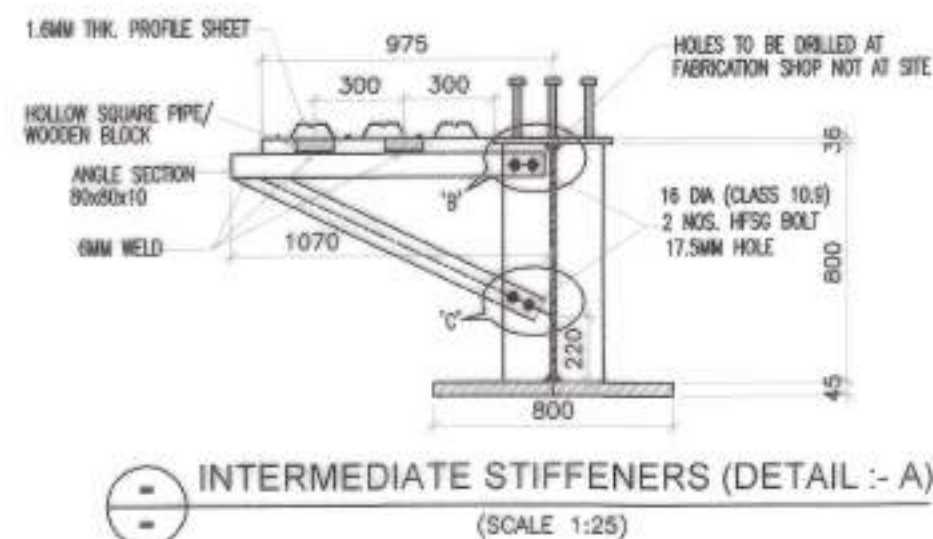
### NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS. LEVELS ARE IN METERS & CHAINAGES ARE IN KILOMETERS. UNLESS STATED OTHERWISE MENTIONED. ONLY WRITTEN DIMENSIONS SHALL BE FOLLOWED.
2. SEISMIC ZONE : V
3. AUTOMATIC SUBMERGED ARC WELDING SHOULD BE EMPLOYED FOR FILLET WELDS IN FLANGES TO WEB OTHER WELDS SHOULD ALSO BE DONE BY SUBMERGED ARC WELDING TO THE MAXIMUM EXTENT POSSIBLE CO2 WELDING SHALL BE PREFERRED OVER MANUAL METAL ARC WELDING.
4. THE GIRDERS SHALL BE PLACED ON PEDESTALS PROPERLY FINISHED TO PROPER ALIGNMENT, LEVEL AND CROSS SLOPE ETC AS PER CLAUSE 930 OF IRC:83 PART III. CENTER LINE OF THE FINAL BEARING LOCATION SHALL BE PAINT MARKED IN LONGITUDINAL AS WELL AS TRANSVERSE DIRECTION WHILE PLACING THE GIRDER, THE CENTER LINE OF THE BEARING LOCATION SHALL BE MATCHED WITH THE MARKING ON THE PEDESTALS.
5. THE PEDESTAL ARE AT DIFFERENT LEVEL TO PROVIDED CROSS SLOPE OF 1:40 IN THE DECK SLAB/ROAD. THIS ASPECT MUST BE KEPT INTO MIND WHILE PLANNING THE PIERS.
6. THE REDUCE LEVEL (R.L.) OF THE TOP OF THE PEDESTAL FOR GIRDER G2 HAS BEEN TAKEN REFERENCE (X). THE LEVELS OF OTHER PEDESTAL HAS BEEN INDICATED IN REFERENCE TO THIS.
7. THE BEARINGS AND PEDESTAL SHOWN IN THIS DRAWING ARE INDICATIVE ONLY. ACTUAL BEARINGS SHALL BE PROVIDED AS PER MAIN DRAWING. THE DIMENSIONS SHALL BE AS GIVEN BY THE DESIGNER FOR SUB STRUCTURE. THE DIMENSIONS OF THE PEDESTAL SHALL NOT BE SCALED/MEASURED FROM THIS DRAWINGS.
8. THE PEDESTALS FOR THE SLIDE GUIDE BEARING SHALL BE PROVIDED ONLY IN SEISMIC ZONE V. THERE IS NO CROSS SLOPE IN ANY OF THE PEDESTALS IN STRAIGHT ALIGNMENT.
9. THIS DRAWING GIVES DETAILS OF ONLY SQUARE ARRANGEMENT.

DESCRIPTION	SYMBOL
FILLET WELD (ONE SIDE)	—
FILLET WELD (BOTH SIDE)	—
HOLE FOR TURNED BOLT	○
HSFG BOLT	⊙
SHEAR STUD	•

DESIGN CONSULTANT:				CLIENT:				THIS DRAWING IS THE PROPERTY OF RESEARCH DESIGNS & STANDARDS ORGANISATION (MINISTRY OF RAILWAYS) LUCKNOW - 226011 (INDIA) AND SHALL NOT BE USED, COPIED OR REPRODUCED IN PART OR WHOLE WITHOUT PRIOR CONSENT IN WRITING.				R. D. S. O.		SHEET NO:- 8 OF 14	
SPARSH ENGINEERING COMPANY PRIVATE LIMITED H-55, Harmu Housing Colony, Near Tilgum Park, Ranchi, Jharkhand - 834 002, PH- 0651-2340669				DEDICATED FREIGHT CORRIDOR CORPORATION OF INDIA LIMITED (A Govt. of India Enterprise) Ministry of Railway				NAME OF WORK: "IRC-6 LOADING - 2017" 18 M SPAN COMPOSITE WELDED ROB GIRDERS				SCALE: AS SHOWN		ORIGINAL SIZE:- A2	
DRAWN BY: SANJIV BERA				DESIGNED BY: RAVI PRASAD				CHECKED BY: SUDHIR KUMAR				TITLE: GENERAL LAYOUT PLAN OF BEARINGS AND PEDESTAL ARRANGEMENT		DATE:-	
SR. NO.				DESCRIPTION OF WORK				DESIGN CHECKED BY: PRASHANT SRIVASTAVA (JE/DB/S)				DRAWING NO:- RDSO/B-11781/7		MAIN DRAWING NO: RDSO/B-11781	
REVISION/ALTERATIONS				KHOWNISH BISWAS DY. CPM/KKK				SCOUK SINGUPTA GM/CIVIL/KKK				PROVISIONAL			
				AJAY KUMAR CGM/CIVIL/KKK				DURGESH KUMAR SHARMA (JE/DB/S)							
				SANDHEEP AGARWAL (ADE/BB-I/BS)				MANISH KUMAR (DBS-VI/BS)							
				RAJESH KUMAR SRIVASTVA (ED/BS)											





















1. SEQUENCE AND POSITION OF WELDING.  
ALL THE WELDING IS TO BE DONE ENTIRELY IN DOWN HAND POSITION. S INDICATES SUBMERGED ARC WELDING. NOS. 1, 2, 3 ETC. NEXT TO ABOVE NOTATION INDICATE SEQUENCE BY WHICH THE WELDING IS TO BE PERFORMED. RUN-ON AND RUN-OFF PIECES SHALL BE PROVIDED.
2. APPLICATION OF SINGLE HEAD MACHINE.  
TO WELD GIRDERS WITH SINGLE HEAD MACHINE, FLANGES AND WEBS ARE TO BE SET IN FIXTURE AND TACKED.
3. APPLICATION OF DOUBLE HEAD MACHINE ON GIRDERS LAID FLAT.  
TWO WELDS ARE DEPOSITED ON ONE FACE OF WEB AT A TIME. THIS ARRANGEMENT DOES NOT REQUIRE REMOVAL OF THE ASSEMBLY FROM THE FIXTURE AFTER TACKING. THE FLANGE PLATES ARE SET AGAINST THE WEB IN THE FIXTURE AND TACKED MAIN WELDS, EACH JOINING FLANGE WITH THE WEB, ARE TO BE LAID WHILE ASSEMBLY IS STILL IN THE FIXTURE. AFTER COMPLETION OF FIRST FACE WELDING OF WEB, THE ASSEMBLY IS TO BE TURNED OVER AND WELDING OF THE SECOND FACE DONE.
4. APPLICATION OF DOUBLE HEAD MACHINE ON GIRDERS IN VERTICAL POSITION.  
IN THIS CASE TWO WELDS ARE LAID JOINING EACH FLANGE WITH THE WEB AT A TIME. THIS WILL REQUIRE TACKING OF THE FLANGES WITH THE WEB, WHICH ARE PREVIOUSLY SET IN FIXTURE SPECIALLY MADE FOR THE PURPOSE. THE ASSEMBLY IS TO BE REMOVED FROM THE FIXTURE AFTER TACKING IS COMPLETED AND POSITIONED IN A MANIPULATOR, THE TWO WELDING HEADS ARE OPERATED IN SUCH A WAY ONE HEAD WILL BE AWAY BY 600 MM, BOTH THE HEADS TRAVELING AT THE SAME SPEED. IT IS ADVISABLE TO LIMIT THE SINGLE RUN WELD TO 6 MM SIZE.
5. AFTER EACH RUN OF WELDING, THE FABRICATED ARTICLE SHALL BE CHECKED FOR ANY DEFORMATION. IN CASE OF DEFORMATION BEYOND PERMISSIBLE LIMITS, THE SAME SHALL BE RECTIFIED BEFORE NEXT STAGE WELDING IS TAKEN UP.

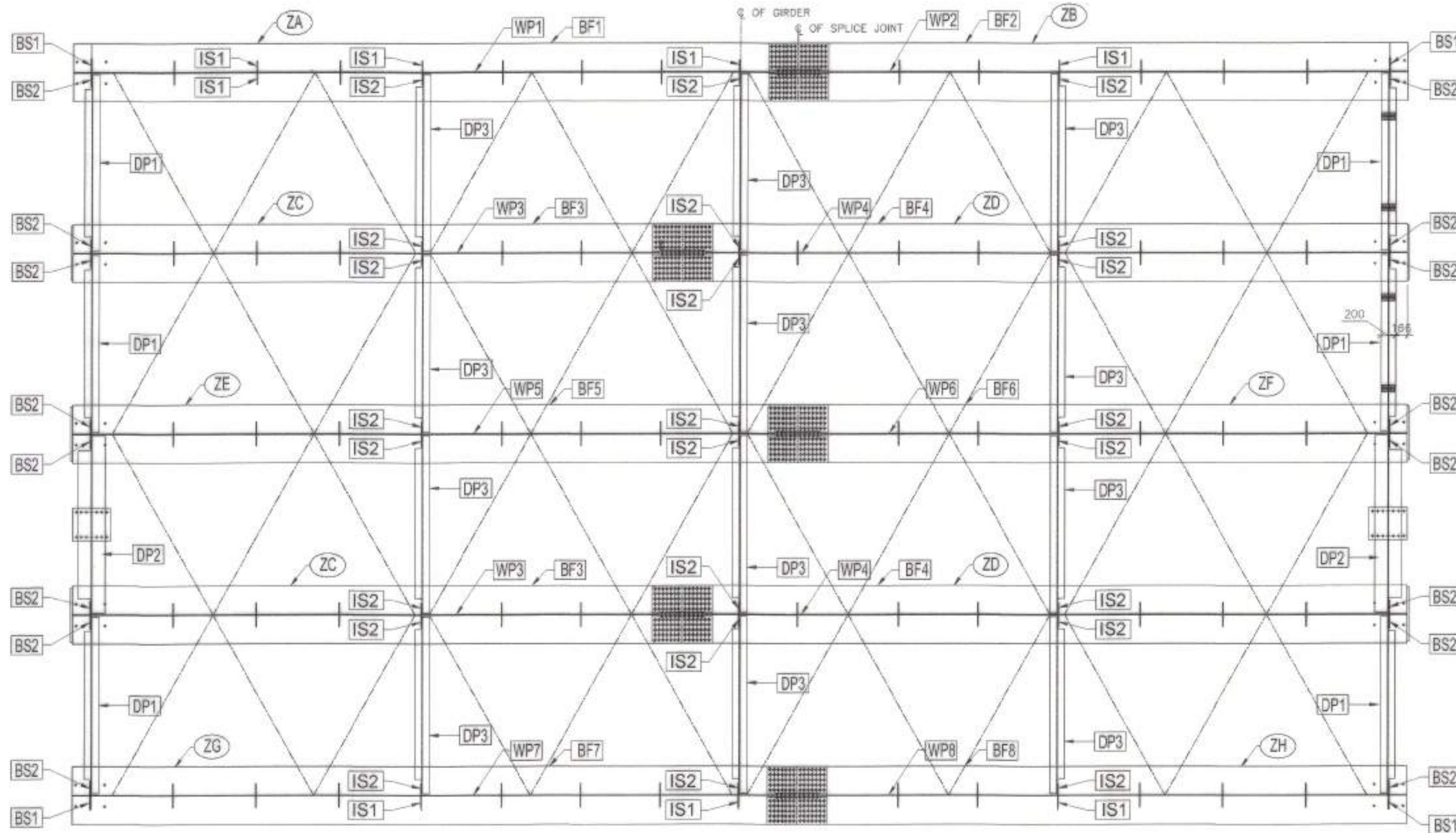
1. STUD WELDING SHALL BE DONE IN WORKSHOP.
2. IF GIRDERS ARE TO BE HANDLED AFTER WELDING OF STUD SHEAR CONNECTORS, THE STUDS SHALL BE PROTECTED SUITABLY TO ENSURE THAT THERE IS NO DAMAGE TO THEM.

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
2. GRADE OF PROFILE SHEET SHALL BE E350 AND FOR ANGLE SECTION E250.
6. ALL STRUCTURAL STEEL SHALL CONFORM TO IS: 2062-2011.
7. THE ANCHOR BOLTS AND THEIR NUTS SHALL BE HOT DIP GALVANISED 100 MICRON THICK, AS PER IS:4759.
8. ALL BOLTS, NUTS ETC SHALL BE OF PROPERTY CLASS 10.9 AND SHALL CONFORM TO PROVISIONS OF IS:1367.

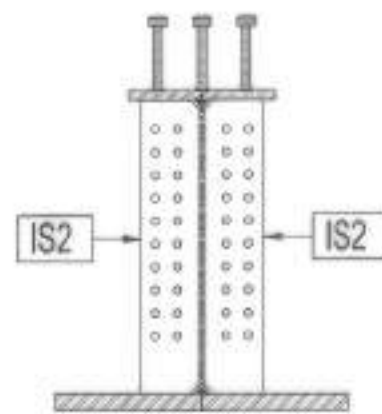
DESCRIPTION	SYMBOL
FILLET WELD (ONE SIDE)	
FILLET WELD (BOTH SIDE)	
HOLE FOR TURNED BOLT	
HSFG BOLT	
SHEAR STUD	

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					 SPARSH ENGINEERING COMPANY PRIVATE LIMITED H-55, Harmu Housing Colony, Near Nigam Park, Ranchi, Jharkhand - 834 002, PH- 0651-2340699		 DEDICATED FREIGHT CORRIDOR CORPORATION OF INDIA LIMITED (A Govt. of India Enterprise) Ministry of Railway.						NAME OF WORK: "IRC-6 LOADING - 2017" 18 M SPAN COMPOSITE WELDED ROB GIRDERS		SCALE:- AS SHOWN ORIGINAL SIZE:- A2 DATE:-					
					DRAWN BY:-  SANJOY BERA		DESIGNED BY:-  RAVI PRASAD		CHECKED BY:-  SUDHIR KUMAR		APPROVED BY:-  RAVI PRASAD		DESIGN CHECKED BY:-  PRASHANT SRIVASTAVA (JEDBS)		SCRUTINISED & CHECKED BY:-  SANDEEP AGARWAL (ADE/SS-RDS)		SCRUTINISED & RECOMMENDED BY:-  MANISH KUMAR (DBS-VI/SS)		APPROVED BY:-  RAJESH KUMAR SRIVASTAVA (EDBS)	
					DRAWING CHECKED BY:-  DURGESH KUMAR SHARMA (JEDBS)		19-03-2025		19-03-2025		19-03-2025		TITLE:- DETAILS OF STAGING FOR DECK SLAB AND WELDING SEQUENCE		MAIN DRAWING NO: RDSO/B-1178					
SR. NO. DESCRIPTION OF WORK REVISION/ALTERATIONS					ADE/BS DR./SS ED/SS		KHANNA SRIVASTAVA DY. CM/SS		19-03-2025		19-03-2025		DRAWING NO:- RDSO/B-11781/10		PROVISIONAL					

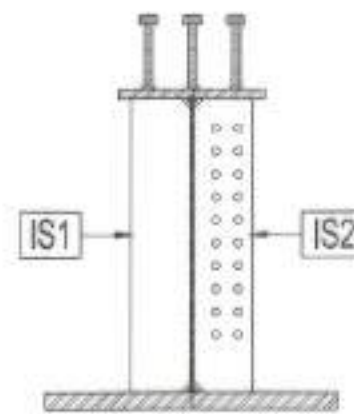




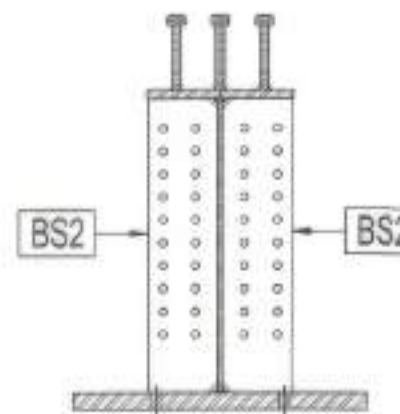
MAIN GIRDER PIECES ( BOTTOM PLAN ARRANGEMENT FOR 5 - GIRDER LEAVES )  
(SCALE 1:50)



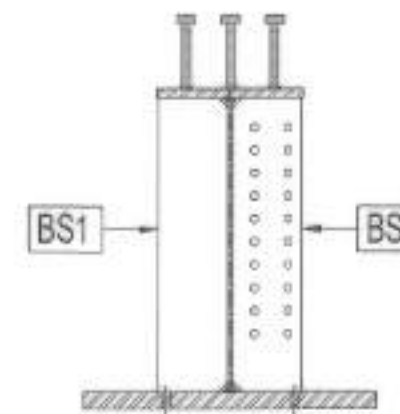
INTERMEDIATE STIFFENER HOLE  
ARRANGEMENT FOR INNER GIRDER  
(SCALE 1:20)



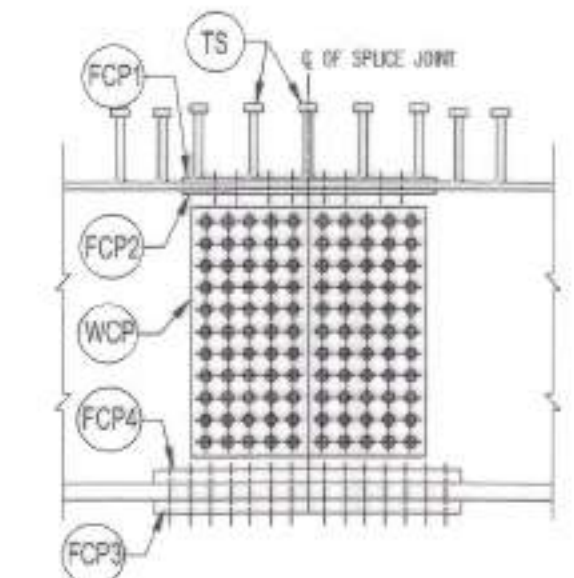
INTERMEDIATE STIFFENER HOLE  
ARRANGEMENT FOR OUTER GIRDER  
(SCALE 1:20)



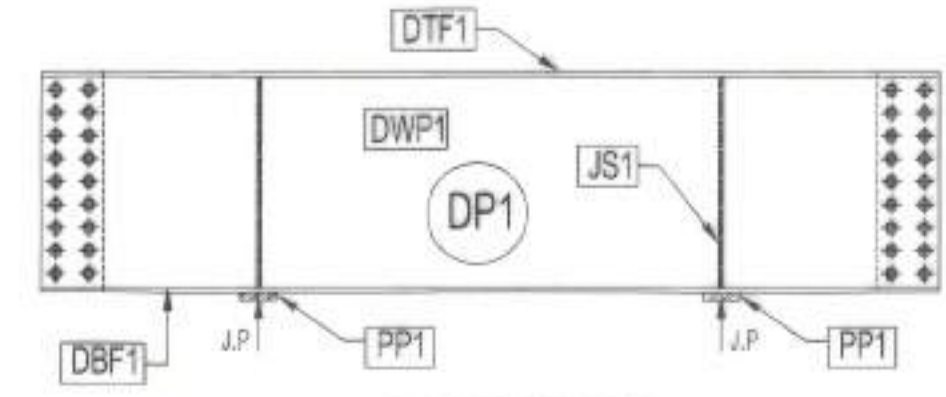
BEARING STIFFENER HOLE  
ARRANGEMENT FOR INNER GIRDER  
(SCALE 1:20)



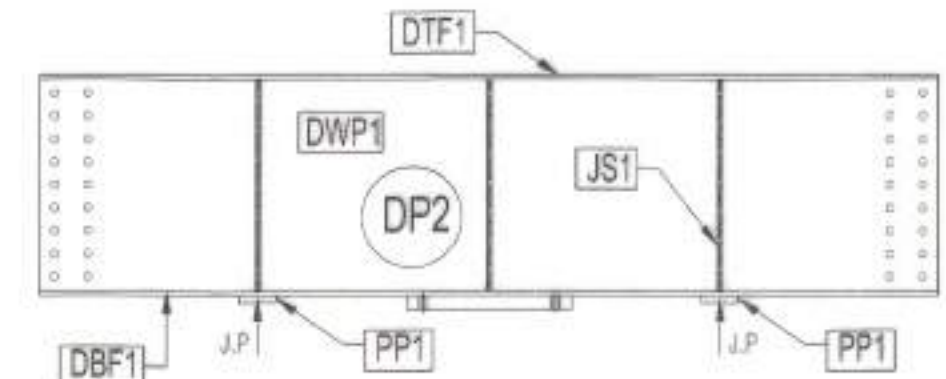
BEARING STIFFENER HOLE  
ARRANGEMENT FOR OUTER GIRDER  
(SCALE 1:20)



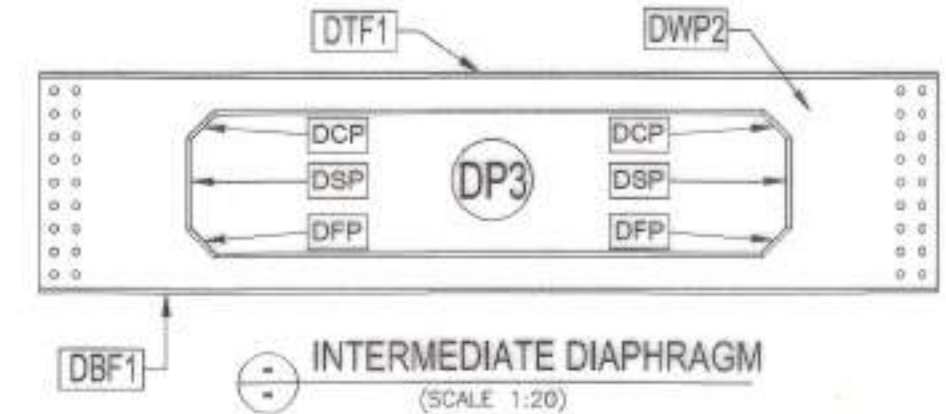
HOLES ARRANGEMENT FOR  
SPLICE JOINT LOCATION  
(SCALE 1:20)



END DIAPHRAGM  
(SCALE 1:20)










END DIAPHRAGM  
(ONLY FOR SEISMIC ZONE IV AND V)  
(SCALE 1:20)



INTERMEDIATE DIAPHRAGM  
(SCALE 1:20)

DESCRIPTION	SYMBOL
FILLET WELD (ONE SIDE)	—
FILLET WELD (BOTH SIDE)	—
HOLE FOR TURNED BOLT	o
HSFG BOLT	⊙
SHEAR STUD	•

					DESIGN CONSULTANT :			CLIENT :			THIS DRAWING IS THE PROPERTY OF RESEARCH DESIGNS & STANDARDS ORGANISATION (MINISTRY OF RAILWAYS) LUCKNOW - 228011 (INDIA) AND SHALL NOT BE USED, COPIED OR REPRODUCED IN PART OR WHOLE WITHOUT PRIOR CONSENT IN WRITING.				R. D. S. O.		SHEET NO:- 12 OF 14	
					 SPARSH ENGINEERING COMPANY PRIVATE LIMITED H-55, Harmu Housing Colony, Near Nigam Park, Ranchi, Jharkhand - 834 002, PH- 0661-2340659			 DEDICATED FREIGHT CORRIDOR CORPORATION OF INDIA LIMITED (A Govt. of India Enterprise) Ministry of Railway.							NAME OF WORK:- "IRC-6 LOADING - 2017" 18 M SPAN COMPOSITE WELDED ROB GIRDERS		SCALE:- AS SHOWN	
					DRAWN BY:-  SANJOY BERA	DESIGNED BY:-  RAVI PRASAD	CHECKED BY:-  SUDHIR KUMAR	 KHAWISH BISWAS DY. CPMIRKK	 SOUVIK BHOSWAL GM/CIVIL/KKK	 AJAY KUMAR CGM/CIVIL/KKK					TITLE:- ASSEMBLY DRAWING	MAIN DRAWING NO: RDSO/B-11781		
BR. NO.					DESCRIPTION OF WORK					ACR/BS		DR/BS		ED/BS		DRAWING NO:- RDSO/B-11781/11		PROVISIONAL
REVISIONAL ITERATIONS																		



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SL. NO.	DIMENSIONS (IN MM)			PART LIST / PART NAME	NOS. PER SHIPPING MARK	SHIPPING MARK / NAME	DIMENSIONS (LxWxH) mm x mm x mm	TOTAL NOS. PAR SPAN ARANGEMENT	WEIGHT OF 5-GIRDER LEAVES (IN TONNE)
	LENGTH	WIDTH	THICKNESS						
1.1	10050	400	20	TF1/TOP FLANGE	1	ZA/GIRDER COMPLETE	10050x800x865	1	0.631
1.2	10050	800	45	BF1/BOTTOM FLANGE	1				2.840
1.3	10050	800	12	WP1/WEB PLATE	1				0.757
1.4	800	190	20	BS1/BEARING STIFFENER	1				0.024
1.5	800	190	20	BS2/BEARING STIFFENER	1				0.024
1.6	800	160	12	IS1/INTERMEDIATE STIFFENER	14				0.169
1.7	800	160	12	IS2/INTERMEDIATE STIFFENER	2				0.024
1.8		200 x 25		TS/SHEAR STUD	315				0.243
2.1	8450	400	20	TF2/TOP FLANGE	1	ZB/GIRDER COMPLETE	8450x800x865	1	0.531
2.2	8450	800	45	BF2/BOTTOM FLANGE	1				2.388
2.3	8450	800	12	WP2/WEB PLATE	1				0.637
2.4	800	190	20	BS1/BEARING STIFFENER	1				0.024
2.5	800	190	20	BS2/BEARING STIFFENER	1				0.024
2.6	800	160	12	IS1/INTERMEDIATE STIFFENER	11				0.133
2.7	800	160	12	IS2/INTERMEDIATE STIFFENER	1				0.012
2.8		200 x 25		TS/SHEAR STUD	273				0.211
3.1	8450	400	20	TF3/TOP FLANGE	1	ZC/GIRDER COMPLETE	8425x800x865	2	1.061
3.2	8450	800	45	BF3/BOTTOM FLANGE	1				4.776
3.3	8450	800	12	WP3/WEB PLATE	1				1.274
3.4	800	190	20	BS2/BEARING STIFFENER	2				0.095
3.5	890	160	12	IS1/INTERMEDIATE STIFFENER	10				0.241
3.6	800	160	12	IS2/INTERMEDIATE STIFFENER	2				0.048
3.7	369	190	12	SEISMIC STOPPER STIFFENER PL	4				0.053
3.8	750	330	25	SEISMIC STOPPER FACE PL	1				0.097
3.9		200 x 25		TS/SHEAR STUD	273	ZD/GIRDER COMPLETE	10025x800x865	2	0.421
4.1	10050	400	20	TF4/TOP FLANGE	1				1.262
4.2	10050	800	45	BF4/BOTTOM FLANGE	1				5.680
4.3	10050	800	12	WP4/WEB PLATE	1				1.515
4.4	800	190	20	BS2/BEARING STIFFENER	2				0.095
4.5	800	160	12	IS1/INTERMEDIATE STIFFENER	12				0.289
4.6	800	160	12	IS2/INTERMEDIATE STIFFENER	4				0.096
4.7	369	190	12	SEISMIC STOPPER STIFFENER PL	4				0.053
4.8	750	330	25	SEISMIC STOPPER FACE PL	1	ZE/GIRDER COMPLETE	10025x800x865	1	0.097
4.9		200 x 25		TS/SHEAR STUD	315				0.486
5.1	10050	400	20	TF5/TOP FLANGE	1				0.631
5.2	10050	800	45	BF5/BOTTOM FLANGE	1				2.840
5.3	10050	800	12	WP5/WEB PLATE	1				0.757
5.4	800	190	20	BS2/BEARING STIFFENER	2				0.048
5.5	800	160	12	IS1/INTERMEDIATE STIFFENER	12				0.145
5.6	800	160	12	IS2/INTERMEDIATE STIFFENER	4				0.048
5.7	369	190	12	SEISMIC STOPPER STIFFENER PL	4	ZF/GIRDER COMPLETE	8425x800x865	1	0.026
5.8	750	330	25	SEISMIC STOPPER FACE PL	1				0.049
5.9		200 x 25		TS/SHEAR STUD	315				0.243
6.1	8450	400	20	TF6/TOP FLANGE	1				0.531
6.2	8450	800	45	BF6/BOTTOM FLANGE	1				2.388
6.3	8450	800	12	WP6/WEB PLATE	1				0.637
6.4	800	190	20	BS2/BEARING STIFFENER	2				0.048
6.5	800	160	12	IS1/INTERMEDIATE STIFFENER	10				0.121
6.6	800	160	12	IS2/INTERMEDIATE STIFFENER	2	ZG/GIRDER COMPLETE	10150x800x865	1	0.024
6.7	369	190	12	SEISMIC STOPPER STIFFENER PL	4				0.026
6.8	750	330	25	SEISMIC STOPPER FACE PL	1				0.049
6.9		200 x 25		TS/SHEAR STUD	273				0.211
7.1	10050	400	20	TF7/TOP FLANGE	1				0.631
7.2	10050	800	45	BF7/BOTTOM FLANGE	1				2.840
7.3	10050	800	12	WP7/WEB PLATE	1				0.757
7.4	800	190	20	BS1/BEARING STIFFENER	1				0.024
7.5	800	190	20	BS2/BEARING STIFFENER	1				0.024
7.6	800	160	12	IS1/INTERMEDIATE STIFFENER	14				0.169
7.7	800	160	12	IS2/INTERMEDIATE STIFFENER	2				0.024
7.8		200 x 25		TS/SHEAR STUD	315				0.243

SL. NO.	DIMENSIONS (IN MM)			PART LIST / PART NAME	NOS. PER SHIPPING MARK	SHIPPING MARK / NAME	DIMENSIONS (LxWxH) mm x mm x mm	TOTAL NOS. PAR SPAN ARANGEMENT	WEIGHT OF 5-GIRDER LEAVES (IN TONNE)
	LENGTH	WIDTH	THICKNESS						
8.1	8450	400	20	TF8/TOP FLANGE	1	ZH/GIRDER COMPLETE	8550x800x865	1	0.531
8.2	8450	800	45	BF8/BOTTOM FLANGE	1				2.388
8.3	8450	800	12	WP8/WEB PLATE	1				0.637
8.4	800	190	20	BS1/BEARING STIFFENER	1				0.024
8.5	800	190	20	BS2/BEARING STIFFENER	1				0.024
8.6	800	160	12	IS1/INTERMEDIATE STIFFENER	11				0.133
8.7	800	160	12	IS2/INTERMEDIATE STIFFENER	1				0.012
8.8		200 x 25		TS/SHEAR STUD	273				0.211
9.1	2448	200	12	DTF1/DIAPHRAGM TOP FLANGE	1	DP1/END DIAPHRAGM	2448x200x611	5	0.277
9.2	2448	200	12	DBF1/DIAPHRAGM BOTTOM FLANGE	1				0.277
9.3	2448	575	12	DWP1/DIAPHRAGM WEB FLANGE	1				0.796
9.4	575	90	12	IS1/JACKING STIFFENER	4				0.116
9.5	180	100	12	PP1/PAD PLATE	2	DP2/END DIAPHRAGM	2448x370x611	2	0.020
10.1	2448	200	12	DTF2/DIAPHRAGM TOP FLANGE	1				0.092
10.2	2448	370	12	DBF2/DIAPHRAGM BOTTOM FLANGE	1				0.171
10.3	2448	575	12	DWP1/DIAPHRAGM WEB FLANGE	1				0.265
10.4	575	90	12	IS1/JACKING STIFFENER	6	DP3/ INTERMEDIATE DIAPHRAGM	2448x200x599	12	0.060
10.5	180	100	12	PP1/PAD PLATE	2				0.006
11.1	2448	200	12	DTF1/DIAPHRAGM TOP FLANGE	1				0.553
11.2	2448	200	12	DBF1/DIAPHRAGM BOTTOM FLANGE	1				0.553
11.3	2448	575	12	DWP2/WEB PLATE	1	SP1/SPLICE JOINT	1440x640x104	5	1.591
11.4	AREA = 0.648 (IN M SQR)			DEDUCT (OPENING IN WEB)	1				-0.732
11.5	1498	80	12	DFF/DIAPHRAGM INNER FLANGE PLATE	2				0.270
11.6	250	80	12	DSP/DIAPHRAGM INNER SIDE PLATE	2				0.046
11.7	106	80	12	DCP/DIAPHRAGM INNER CORNER PLATE	4	SP1/SPLICE JOINT	1440x640x104	5	0.040
12.1	690	400	12	FCP1/TOP FLANGE OUTER COVER PLATE	1				0.130
12.2	690	180	12	FCP2/TOP FLANGE INNER COVER PLATE	2				0.116
12.3	680	640	12	WCP/WEB COVER PLATE	2				0.410
12.4	840	800	36	FCP3/BOTTOM FLANGE OUTER COVER PLATE	1				0.950
12.5	840	375	36	FCP4/BOTTOM FLANGE INNER COVER PLATE	2	BLB1/BLB2/ BOTTOM LATERAL BRACING	1850X100x100x10	60	0.890
12.6		200 x 25		TS/SHEAR STUD	15				0.058
13.1	1850	ISA 100x100x10		ANG1/ANGLE	1				1.654
13.2	430	120	16	GUS1/GUS2 BENT GUSSET	2				0.778
14.1	1050	ISA 80x80x10		ANG2/ANGLE	2	STAGING ASSEMBLY	1050X80X80X10	16	0.396
14.2	1125	ISA 80x80x10		ANG3/ANGLE			1125X80X80X10		0.425
15	-	-	-	ELASTOMERIC BEARING ASSEMBLY	1	ELASTOMERIC BEARING	-	10	-
16	-	-	-	METALLIC GUIDE BEARING ASSEMBLY	1	METALLIC GUIDE BEARING	-	2	-
17.1	-	-	-	ANCHOR BOLT (ON ELASTOMERIC BEARING)	1	30MM DIA OF PROPERTY CLASS 8.8 AS PER IS:1364	-	40	-
17.2	-	-	-	HTS BOLTS (ON ELASTOMERIC BEARING)	1		-	40	-
18.1	-	-	-	HSFG BOLTS (ON SPLICE JOINT)	1	HSFG BOLTS (22MM DIA OF PROPERTY CLASS 8.8 AS PER IS:4000)	-	2130	-
18.2	-	-	-	HSFG BOLTS (ON END AND INT. DIAPHRAGM)			-		-
19	-	-	-	HSFG BOLTS (ON BOTTOM LATERAL BRACING)	1	HSFG BOLTS (20MM DIA OF PROPERTY CLASS 8.8 AS PER IS:4000)	-	384	-
20	-	-	-	HSFG BOLTS (ON STAGING ASSEMBLY)	4	HSFG BOLTS (16MM DIA OF PROPERTY CLASS 10.9 AS PER IS:4000)	-	128	-
WEIGHT OF STEEL PORTION (T) =									54.013
ADD 2% FOR BOLTS / WELDS (T) =									1.080
TOTAL WEIGHT OF STEEL PORTION (T) =									55.093

## NOTES




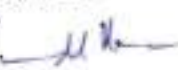


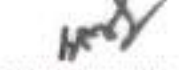


- PART LIST NO. OF ALL STIFFENERS MUST BE MARKED ON COMPLETE GIRDERS TO HELP THE ENGINEERS IN CORRECT ORIENTATION OF THE GIRDER PIECES DURING ASSEMBLY OF THE GIRDERS.
- SHIPPING LIST NOS MUST BE PAINTED ON ALL ASSEMBLED PARTS, AT LEAST 100mm HIGH OR AS HIGH AS THE PART WILL PERMIT.

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					 SPARSH ENGINEERING COMPANY PRIVATE LIMITED H-55, Harmu Housing Colony, Near Nigam Park, Ranchi, Jharkhand - 834 002, PH- 0851-2340889		 DEDICATED FREIGHT CORRIDOR CORPORATION OF INDIA LIMITED (A Govt. of India Enterprise) Ministry of Railway.						NAME OF WORK :- "IRC-8 LOADING - 2017" 18 M SPAN COMPOSITE WELDED ROB GIRDERS		SCALE :- AS SHOWN							
					DRAWN BY :-  SANJOY BERA		DESIGNED BY :-  RAVI PRASAD		CHECKED BY :-  SUDHIR KUMAR		DESIGN CHECKED BY :-  PRASHANT SRIVASTAVA (JE/D/S&S)		SCRUTINISED & CHECKED BY :-  SANDEEP AGARWAL (JCE/S&S)		SCRUTINISED & RECOMMENDED BY :-  MANISH KUMAR (DSE-VI/S&S)		APPROVED BY :-  RAJESH KUMAR SRIVASTAVA (ED/S&S)		TITLE :- PART AND SHIPPING LIST		MAIN DRAWING NO: RDSO/B-11781	
					CRAWING CHECKED BY :-  DURGESH KUMAR SHARMA (JED/S&S)												DRAWING NO:- RDSO/B-11781/12		PROVISIONAL			
BR NO					DESCRIPTION OF WORK					REVISION/ALTERATIONS												



**SUGGESTED SEQUENCE FOR FABRICATION/ERECTION OF GIRDERS**

- STEP I: THE DRAWINGS SHALL BE STUDIED CAREFULLY INCLUDING THE NOTES AND THE ACTUAL FABRICATION REQUIREMENTS SHALL BE FINALIZED. TO AVOID CONFUSION, DRAWINGS HAVE BEEN KEPT TO MINIMUM POSSIBLE LEVELS AND OTHER ASPECTS COVERED IN NOTES. THE GIRDERS OF SAME LENGTHS ARE IDENTICAL IN SECTION BUT DIFFER IN HOLES FOR BRACING/CROSS-FRAMES. AFTER HOLES ARE DRILLED, THESE MEMBERS SHALL BE MARKED SUITABLY TO IDENTIFY THEM DISTINCTLY AS PER SHIPPING LIST.
- STEP II: **SITE FOR STORAGE AND ASSEMBLY:** THE SITE FOR STORAGE/ASSEMBLY CHOSEN SHALL BE FIRM LEVEL GROUND WITH GOOD DRAINAGE ARRANGEMENT AND ALL GIRDER PARTS SHALL BE PROPERLY STACKED ON WOODEN BLOCKS ETC, LEAVING SUFFICIENT AREA FOR ASSEMBLY. GIRDER PIECES SHALL BE KEPT IN VERTICAL I-SECTION POSITION WITH SUITABLE RESTRAINTS ON SIDES IF VIBRATIONS ETC ARE LIKELY TO COME. THE SMALLER MEMBERS SHALL BE STACKED SUCH AS TO ENSURE THAT NONE OF THE MEMBERS SUFFERS ANY DAMAGE.
- STEP III: **TRANSPORTATION AND STORAGE:** FABRICATED GIRDER PIECES AS PER SHIPPING LIST SHALL BE TRANSPORTED TO SITE ASSEMBLY YARD. THE SMALL PARTS LIKE BOLTS, HSFG BOLTS, BEARINGS ETC MUST BE STORED PROPERLY AWAY FROM SUN, DUST, DIRT, MOISTURE AND ANY OTHER DELETERIOUS CIRCUMSTANCES AS ADVISED BY MANUFACTURER OR CODAL PROVISIONS. PROPER VENTILATION OF THE STORAGE LOCATION IS A MUST. STACKING MUST BE DONE IN SUCH A MANNER AS NOT TO OVERSTRESS/ DAMAGE ANY COMPONENT.
- STEP IV: **COMMENCEMENT OF ASSEMBLY:** WHEN REQUISITE PARTS FOR ONE GIRDER ARE AVAILABLE, THE SAME SHALL BE VERIFIED USING THE PART/SIPPING LIST. ALL PARTS SHALL BE INSPECTED FOR ANY DAMAGE DURING TRANSPORTATION/ STORAGE ETC. ANY BENT/ BADLY CORRODED MEMBERS SHALL NOT BE USED FOR ASSEMBLY. ANY STUD SHEAR CONNECTORS BENT DURING TRANSPORTATION SHALL BE EXAMINED FOR DAMAGE. GIRDER LEAVES WITH EXCESSIVELY DAMAGED STUD SHEAR CONNECTORS SHALL NOT BE USED FOR FURTHER ASSEMBLY. IF THE DAMAGE IS NOT EXCESSIVE, THE SAME MAY BE ALLOWED BY THE ENGINEER IN CHARGE OF WORK. IN NO CASE SHALL THE BENT STUD SHEAR CONNECTORS (INCLUDING THOSE BENT AS PART OF BEND TEST) SHALL BE STRAIGHTENED. THE GIRDERS ARE NOT SYMMETRICAL ESPECIALLY THE OUTER GIRDERS WHICH HAVE NO HOLES ON THE OUTSIDE AND THE END PIECES WHERE THE HOLES FOR DIAPHRAGM ARE ASYMMETRIC FOR WHICH THE ASSEMBLY DRAWING SHALL BE SEEN. THE FABRICATOR SHALL MARK THE PART LIST NO OF THE STIFFENERS ON THE COMPLETE GIRDERS WHICH SHALL BE REFERRED DURING ASSEMBLY. IF THESE PART LIST NOS ARE NOT MARKED/VISIBLE, HOLE DISTANCES SHALL BE MEASURED AS PER DRAWING AND PART LIST NOS SHALL BE MARKED BEFORE START OF ASSEMBLY THIS ASPECT REQUIRES CARE IN FABRICATION AS WELL AS ASSEMBLY. IT IS ADVISED THAT THE INDIVIDUAL PIECES BE ROTATED IN PROPER DIRECTION BEFORE THE START OF ASSEMBLY WORK.
- STEP V: **METALLISING IN SHOP:** THE GIRDER PARTS EXCEPT TOP FLANGE AND SHEAR CONNECTORS COMPLETELY READY AFTER FABRICATION INCLUDING ALL WELDING, HOLE DRILLING AND GRINDING EDGES ETC SHALL BE METALLISED EITHER AT SITE OR IN WORKSHOP AS PER CONVENIENCE. THE METALLISING AND PAINTING SHALL BE DONE AS PER PARA 39.1 OF IRS BI. IF THE METALLISING IS BEING DONE IN SHOP, THE SECOND COAT OF ALUMINIUM PAINT SHALL BE LEFT TO BE APPLIED IN FIELD AFTER ERECTION IS COMPLETE. TOP FLANGE AND SHEAR CONNECTORS SHALL NOT BE METALLISED/PAINTED AS THIS CAN REDUCE THE BOND STRENGTH WITH CONCRETE.
- STEP VI: **PRELIMINARY ASSEMBLY OF GIRDERS:** IF THE METALLISING IS DONE IN SHOP, THE PARTS WHICH ARE TO BE AT THE INTERFACE OF MEMBERS TO BE JOINED BY HSFG BOLTS SHALL BE LIGHT SAND BLASTED TO REMOVE THE PAINT LAYER(S) ONLY (I.E. THE METALLISING LAYER MUST BE LEFT INTACT). THIS TREATMENT IS REQUIRED TO BE DONE AT SPLICE, STIFFENERS AND BOTTOM LATERAL BRACING LOCATIONS IN MAIN GIRDERS AND IN ALL THE SECONDARY MEMBERS. ALTERNATELY, IF METALLISING WORK AND ASSEMBLY WORK ARE PROCEEDING SIMULTANEOUSLY, THE INTERFACE LOCATIONS WHERE THE HSFG BOLTS ARE TO BE PROVIDED SHALL NOT BE PAINTED AND LEFT AS IT IS. IN EITHER CASE, BEFORE THE MEMBERS ARE ASSEMBLED FOR PROVISION OF HSFG BOLTS, IT MUST BE CERTIFIED BY SITE IN-CHARGE THAT THE INTERFACE IS METALLISED AND FREE FROM ANY OVERCOAT ON THE SAME. THE GIRDER LEAVES SHALL BE BROUGHT TO VERTICAL UPRIGHT POSITION USING CRANES, DERRICKS ETC. THE LEAVES SHALL BE BROUGHT TO ONE LINE AND LEVEL AND THE SPLICE MEMBERS SHALL BE ASSEMBLED USING SERVICE BOLTS/DRIFTS ETC.
- STEP VII: **FINAL ASSEMBLY OF GIRDERS:** THE GEOMETRY OF THE GIRDER, ITS LINE/LEVEL AND LENGTH ETC SHALL BE CHECKED AS PER DRAWINGS. IF THE SAME ARE WITHIN TOLERANCES FOR PLATE GIRDERS SPECIFIED IN PARA 13 OF IRS BI AS APPLICABLE FOR PLATE GIRDERS, THE PRELIMINARY ASSEMBLY SHALL BE APPROVED. FINAL ASSEMBLY SHALL COMMENCE FROM ONE SIDE AND THE PROCEDURE FOR PROVIDING THE HSFG BOLTS AS PER IRS BI/ DRAWING NO RDSO/B-11760 SHALL BE FOLLOWED.
- STEP VIII: **CHECKING CONSTRUCTION OF SUB STRUCTURE:** THE SUB STRUCTURE SHALL BE COMPLETELY READY WITH SUFFICIENT TIME BEING GIVEN FOR THE CONCRETE TO ATTAIN ITS STRENGTH ASSUMED IN DESIGN BY THE TIME LAUNCHING STARTS. THE SUB STRUCTURE CAN BE WITH PEDESTAL OR WITHOUT IT AS PER DESIGN (DUE CARE BEING TAKEN THAT ADEQUATE SPACE FOR JACKING IS AVAILABLE). WIDTH OF THE SUB STRUCTURE FOR PROVIDING THE GIRDER SHALL BE AS PER THE CHOSEN OVERHANG OF THE CONCRETE SLAB. THE PEDESTAL OR PIER TOP SHALL HAVE SUFFICIENT SPACE FOR PROVISION OF HOLDING DOWN BOLTS FOR THE POT-PTFE BEARINGS AND FOR THE PIN/SLIDE GUIDES. THE HOLDING DOWN BOLTS CAN BE PROVIDED IN HOLES DRILLED IN CONCRETE OR CAN BE PROVIDED IN THE HOLES LEFT IN CONCRETE DURING CASTING. IN EITHER CASE, CARE SHALL BE TAKEN THAT THE BOLTS ARE IN PROPER POSITION MATCHING THE HOLES PROVIDED IN BEARINGS. A STEEL TEMPLATE WITH HOLES AT CORRECT LOCATION FOR DIFFERENT TYPES OF BEARINGS SHALL BE USED TO CHECK PROPER POSITIONING OF THE HOLES IN SUB STRUCTURE OR FOR MARKING THE LOCATION OF BOLTS. FURTHER, DIMENSIONS OF THE GIRDER SUPPORT POINTS SHALL BE CHECKED FOR POSITION, SLOPE AND SURFACE FINISH. THE CENTER TO CENTER DISTANCES LONGITUDINALLY AND TRANSVERSELY AS WELL AS DIAGONALLY SHALL BE CHECKED AND SHALL BE WITHIN TOLERANCES SPECIFIED IN PARA 930 OF IRC 83 PART III. SIMILARLY THE SURFACE FINISH, SLOPE OF THE SURFACE AND OTHER PARAMETERS SHALL BE VERIFIED.
- STEP IX: **PREPARATION OF SUB STRUCTURE FOR LAUNCHING OF GIRDERS:** IF ANY DEFECTS ARE FOUND, THE SAME SHALL BE RECTIFIED WELL BEFORE THE START OF LAUNCHING OPERATIONS. THE FINAL HEIGHT OF THE PEDESTALS VARIES FROM GIRDER TO GIRDER FOR PROVIDING THE CROSS SLOPE IN DECK AND THE SAME SHALL BE VERIFIED BEFORE LAUNCHING IS PLANNED. THE CENTER LINE OF THE PROPOSED BEARINGS SHALL BE MARKED IN LONGITUDINAL AS WELL AS TRANSVERSE DIRECTIONS ON THE PIER/ PEDESTAL TOP, EXTENDING WELL OUTSIDE THE DIMENSIONS OF THE BEARINGS. THE MARKINGS SHALL BE SUCH THAT THESE CAN BE SEEN DURING THE ENTIRE CONSTRUCTION PHASE. THE CENTER OF BEARINGS SHALL BE MARKED AT A TEMPERATURE NEAR MEAN TEMPERATURE OF THE LOCATION AND THE SAME SHALL BE NOTED.
- STEP X: **PROVIDING BEARINGS:** IF IT IS PLANNED TO PROVIDE THE POT-PTFE BEARINGS BEFORE LAUNCHING OF GIRDERS, THE BEARINGS DULY FITTED WITH THE TRANSPORTATION CLAMPS PROVIDED BY THE MANUFACTURER SHALL BE BROUGHT TO SITE. THE CENTER LINE MARKINGS PROVIDED BY MANUFACTURER ON BEARINGS SHALL BE PROPERLY MATCHED WITH THE CENTER LINE MARKED ON THE PIER/PEDESTAL TOP IN STEP IX IN EITHER DIRECTION GIVING DUE ALLOWANCE FOR ANY EXPANSION/ CONTRACTION OF THE GIRDER DUE TO CHANGE IN TEMPERATURE AT THE TIME OF ACTUALLY PROVIDING THE BEARINGS VIS-A-VIS THE INITIAL MARKING TEMPERATURE. EXTRA CARE IS REQUIRED TO BE EXERCISED IN PROVIDING THE CORRECT BEARING AT CORRECT LOCATION AND IN SETTING ORIENTATION OF BEARINGS IS REQUIRED TO BE TAKEN ESPECIALLY IN THE CASE OF LONGITUDINAL GUIDE AND TRANSVERSE GUIDE TYPE BEARINGS. IT MAY BE NOTED THAT THE PIN BEARING AND SLIDE GUIDE BEARING ARE TO BE PROVIDED ONLY IN EARTHQUAKE ZONES IV AND V. THE HOLDING DOWN BOLTS SHALL NOT BE PROVIDED AND TRANSPORTATION CLAMPS SHALL NOT BE OPENED AT THIS STAGE.
- STEP XI: **LAUNCHING OF GIRDERS:** ONCE SUFFICIENT NUMBER OF GIRDERS ARE ASSEMBLED AND THE SUB STRUCTURE HAS BEEN CERTIFIED TO BE READY, LAUNCHING OF GIRDERS SHALL BE TAKEN UP. THE SCHEME FOR LAUNCHING SHALL BE APPROVED BEFOREHAND BY DESIGN OFFICE AND ANY STATUTORY CLEARANCES SUCH AS CRS SANCTION MUST BE OBTAINED. LAUNCHING CAN BE DONE BY ANY OF THE VARIOUS METHODS SUCH AS USING SINGLE CRANE, USING MULTIPLE CRANES, END LAUNCHING OR USING DERRICKS.
- STEP XII: **PROTECTION OF GIRDERS AFTER LAUNCHING:** IMMEDIATELY AFTER LAUNCHING, BEFORE THE BLOCK IS CLEARED OR THE LAUNCHING ARRANGEMENT IS REMOVED, THE GIRDER SHALL BE SECURED AGAINST TOPPLING OVER BY PROVIDING EITHER END DIAPHRAGM WITH THE ADJOINING GIRDER OR ADDITIONAL STEEL MEMBER(S) ON EITHER SIDE OF THE GIRDER. IF THE POT-PTFE BEARING HAS BEEN PROVIDED BEFORE LAUNCHING OF GIRDER, BOLTS SHALL ALSO BE PROVIDED IN THE BOTTOM FLANGE OF GIRDER TO SECURE THE SAME AGAINST TOPPLING OVER.
- STEP XIII: **PROVISION OF BRACING MEMBERS:** THE END DIAPHRAGMS, INTERMEDIATE CROSS FRAMES AND THE BOTTOM LATERAL BRACING SHALL BE PROVIDED ON DRIFTS/ SERVICE BOLTS. IF REQUIRED, THE GIRDERS MAY BE SHIFTED USING JACKS/CRANES. ONCE THE GIRDERS ARE IN PROPER ALIGNMENT, THE SERVICE BOLTS AND DRIFTS SHALL BE REMOVED AND HSFG BOLTS SHALL BE PROVIDED AND THE JOINTS FINISHED ONE BY ONE USING PROCEDURE GIVEN IN IRS BI/ DRAWING FOR HSFG BOLT TIGHTENING.
- STEP XIV: **STUD SHEAR CONNECTORS:** IF THE STUD SHEAR CONNECTORS ARE TO BE PROVIDED IN FIELD, THE SAME SHALL BE PROVIDED AFTER THE GIRDERS ARE LAUNCHED IN POSITION AND PROPERLY SECURED BY FIXING OF END DIAPHRAGMS AND CROSS BRACING.
- STEP XV: **PROVIDING THE BEARINGS:** IN CASE THE BEARINGS ARE TO BE PROVIDED AFTER THE GIRDER WORK IS OVER, THE BEARINGS DULY FITTED WITH THE TRANSPORTATION CLAMPS PROVIDED BY THE MANUFACTURER SHALL BE BROUGHT TO SITE. THE CENTER LINE MARKINGS PROVIDED BY MANUFACTURER ON BEARINGS SHALL BE PROPERLY MATCHED WITH THE CENTER LINE MARKED ON THE PIER/PEDESTAL TOP IN STEP IX IN EITHER DIRECTION GIVING DUE ALLOWANCE FOR ANY EXPANSION/ CONTRACTION OF THE GIRDER DUE TO CHANGE IN TEMPERATURE AT THE TIME OF ACTUALLY PROVIDING THE BEARINGS VIS-A-VIS THE INITIAL MARKING TEMPERATURE. EXTRA CARE IS REQUIRED TO BE EXERCISED IN PROVIDING THE CORRECT BEARING AT CORRECT LOCATION AND IN SETTING ORIENTATION OF BEARINGS IS REQUIRED TO BE TAKEN ESPECIALLY IN THE CASE OF LONGITUDINAL GUIDE AND TRANSVERSE GUIDE TYPE BEARINGS. IT MAY BE NOTED THAT THE PIN BEARING AND SLIDE GUIDE.
- STEP XVI: **PROVIDING HOLDING DOWN BOLTS:** THE HOLDING DOWN BOLTS SHALL BE EPOXY GROUTED IN THE HOLES ALREADY PROVIDED IN SUB STRUCTURE OR DRILLED AFTER PLACING THE BEARING IN POSITION. AFTER GIVING SUFFICIENT TIME FOR THE EPOXY TO SET, THE BEARING SHALL BE CONNECTED TO THE GIRDER WITH BOLTS AS PER DESIGN. ONCE THE BEARING IS PROPERLY CONNECTED TO THE SUB STRUCTURE AND THE GIRDER, TRANSPORTATION CLAMPS SHALL BE OPENED.
- STEP XVII: **SHUTTERING:** AFTER THE STEEL GIRDER IS ASSEMBLED COMPLETELY IN ALL RESPECTS, THE SHUTTERING AND OTHER ACTIVITIES FOR CONCRETING SHALL COMMENCE AS PER DRAWING. SHUTTERING SHALL BE PROVIDED TO PRODUCE CONCRETE PROFILE AS PER DRAWING. THE CROSS SLOPE IN THE DECK SLAB AND PROPER LONGITUDINAL PROFILE INCLUDING CAMBER PROVISIONS (IF ANY) SHALL BE TAKEN CARE OF IN THE SHUTTERING. GOOD QUALITY LEAK PROOF SHUTTERING SHALL BE PROVIDED. SHUTTERING CAN BE SUPPORTED ON GIRDER BOTTOM FLANGE. IF REQUIRED, HOLES UP TO 20 MM DIAMETER CAN BE DRILLED (NOT GAS CUT) IN THE INTERMEDIATE STIFFENER FOR SUPPORTING THE SHUTTERING. IT SHALL BE ENSURED THAT NO WELDING IS DONE IN ANY PART OF THE GIRDERS.
- STEP XVIII: **PROVIDING REINFORCEMENT:** REINFORCEMENT SHALL BE PROVIDED AS PER THE DRAWING, TAKING THE APPROPRIATE SPAN LENGTH AND ROAD WIDTH CONFIGURATION. BAR BENDING SCHEDULE SHALL BE CAREFULLY WORKED OUT FROM THE TABLE GIVEN IN THE DRAWING. EXTRA CARE SHALL BE TAKEN TO ENSURE PROPER PLACEMENT OF BARS, PROPER COVER TO THE REINFORCEMENT. LAPS HAVE NOT BEEN INDICATED IN THE DRAWING AND SHALL BE DECIDED AT SITE AS PER PROVISIONS FOLLOWED IN THE RAILWAY.
- STEP XIX: **CONCRETING OF SLAB:** CONCRETING SHALL BE DONE AFTER THE REINFORCEMENT IS PROVIDED AND CHECKED TO BE AS PER THE DRAWING BY THE SITE IN CHARGE. THE CONCRETING SHALL BE DONE AS PER THE POUR SEQUENCE GIVEN IN THE DRAWING. HAUNCHES SHALL BE CONCRETED BEFORE THE SLAB IS CONCRETED. DURING CONCRETING, PROPER LONGITUDINAL AND LATERAL PROFILES OF THE FINISHED SLAB SURFACE MUST BE ENSURED. REINFORCEMENT FOR PATHWAY/RAILING/ CRASH BARRIER ETC SHALL PROJECT ABOVE THE FINISHED SLAB.
- STEP XX: **CONCRETING OF OTHER MEMBERS:** AFTER THE DECK SLAB HAS BEEN CURED TO GAIN SUFFICIENT STRENGTH, THE WEARING COAT, PATHWAY, RAILING ETC SHALL BE CONCRETED. TRAFFIC SHALL BE ALLOWED ONLY AFTER THE CONCRETE HAS GAINED SUFFICIENT STRENGTH.

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