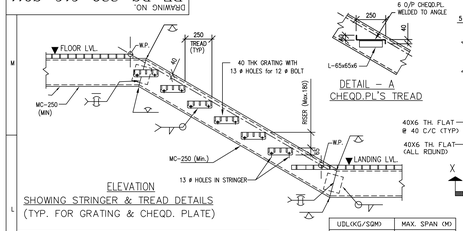
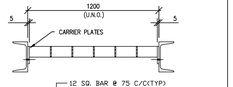
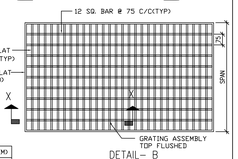


ELEVATION
SHOWING STRINGER & TREAD DETAILS
(TYP. FOR GRATING & CHEQD. PLATE)

DETAIL – A
CHEQD.PL'S TREAD





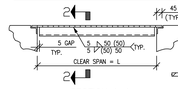
DETAIL – B
TYP. DETAIL OF GRATING WELDED TYPE

UDL(KG/SQM)	MAX. SPAN (M)
500	2.00
1000	1.60
1500	1.30

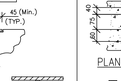
TYP. DETAIL OF GRATING FOR FLOOR/PLATFORM.

SCHEDULE OF STIFFENER

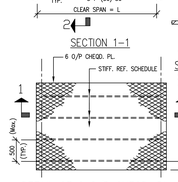
CLEAR SPAN (L)	STIFFENER
0 TO 450	–
450 TO 1000	FLAT 40x6
1000 TO 1500	FLAT 50x8
1500 TO 2000	L50X50X6



SECTION 1-1



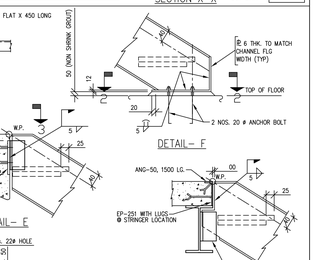
SECTION 2-2
(FOR ANGLE STIFF)



DETAIL OF 6 O/P CHEQD. PL.

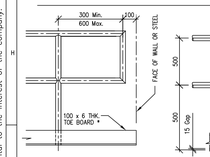
DETAIL – C

D-02

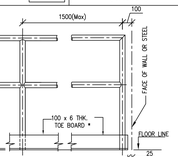


STRINGER TO CONCRETE CONNECTIONS

D-03

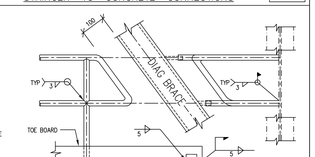


DETAIL – G



DETAIL – H

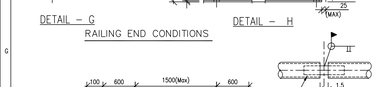
RAILING END CONDITIONS



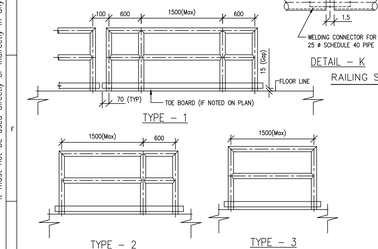
DETAIL – J

RAILING AT DIAG. BRACE

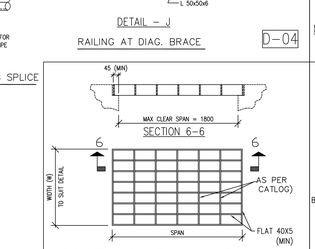
D-04



DETAIL – K
RAILING SPLICE

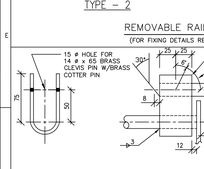


REMOVABLE RAILING SECTIONS
(FOR FIXING DETAILS REF. DETAIL NO. D-11)

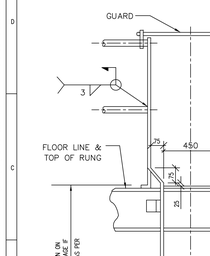


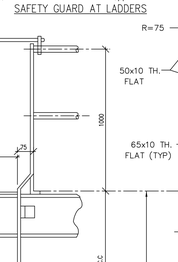
TYP. DETAIL OF 40 THK. M.S. GRATING
(ELECTROFORGED AND PAINTED)
(DETAILS AS PER MANUFACTURER'S CATLOG)

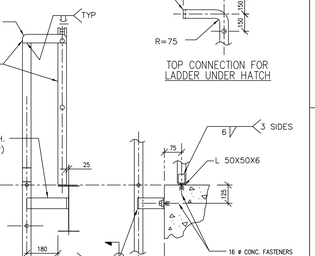
D-05



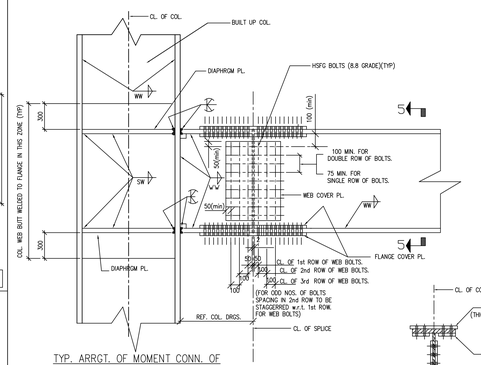
SAFETY GUARD AT LADDERS



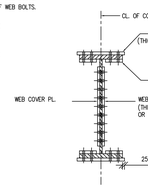




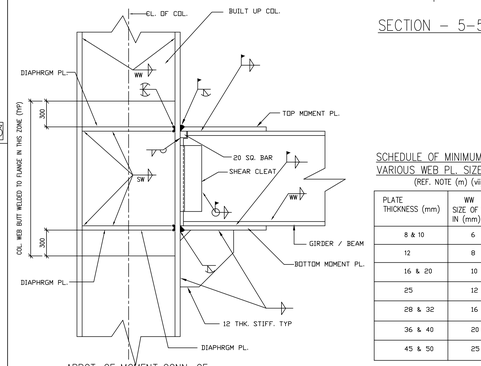
D-06



TYP. ARRGT. OF MOMENT CONN. OF
MAIN BEAM/GIRDER TO COLUMN (BOLTED FIELD CONNECTION)



SECTION – 5-5



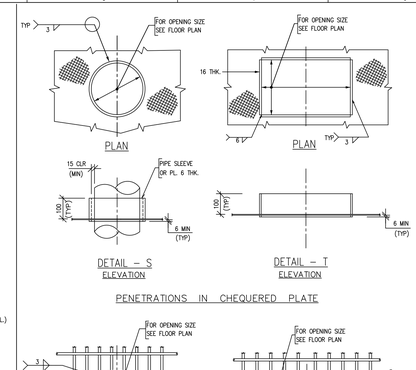
ARRGT. OF MOMENT CONN. OF
MAIN BEAM/GIRDER TO COLUMN (WELDED FIELD CONNECTION IF APPROVED)

(SPLICE SHOWN IS INDICATIVE AND SHALL BE DESIGNED AS PER RESPECTIVE MEMBER CAPACITY)

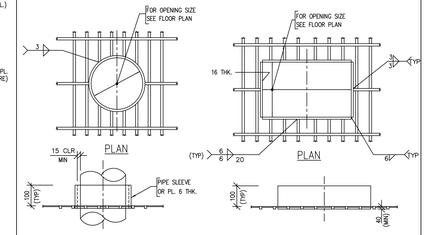
SCHEDULE OF MINIMUM WELD SIZE FOR VARIOUS WEB PL. SIZE OF WELD
(REF. NOTE (m) (vii))

PLATE THICKNESS (mm)	WW SIZE OF WELD IN (mm)	SW SIZE OF WELD IN (mm)
8 & 10	6	6
12	8	8
16 & 20	10	12
25	12	14
28 & 32	16	20
36 & 40	20	22
45 & 50	25	25

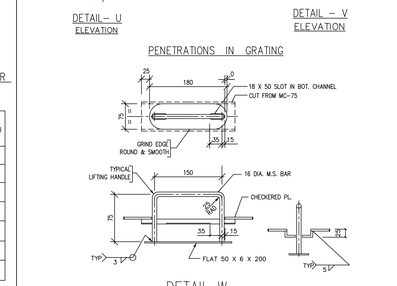
D-07



PENETRATIONS IN CHEQUERED PLATE

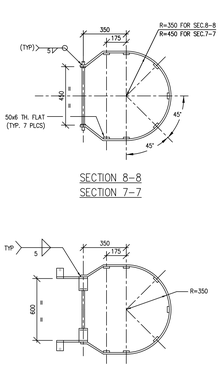


PENETRATIONS IN GRATING

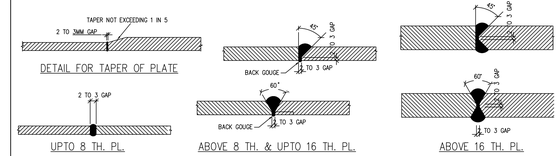


DETAIL W
CHEQUERED P COVER LIFTING HANDLE

D-08



D-09



TYP. DETAIL OF BUTT WELD FOR SPLICE (SHOP/ SITE)

GENERAL NOTES FOR STRUCTURAL STEEL AND MISCELLANEOUS STEEL WORKS

A. GENERAL

a.) ALL DIMENSIONS ARE IN MILLIMETRES EXCEPT FLOOR ELEVATIONS AND PLANT GRID WHICH ARE IN METRE UNLESS STATED OTHERWISE.

b.) ALL ELEVATIONS ARE WITH RESPECT TO MAIN POWER HOUSE BUILDING GROUND FLOOR LEVEL AS EL.(±)0.00 M. WHICH CORRESPONDS TO RL+++++ ABOVE M.S.L.

c.) ALL DRAWINGS SHALL BE READ IN CONJUNCTION WITH THE TERMS, CONDITIONS AND SPECIFICATIONS OF THE CONTRACT.

d.) THE FABRICATION & ERECTION OF STRUCTURAL STEEL SHALL BE IN ACCORDANCE WITH IS:800 – CODE OF PRACTICE FOR GENERAL CONSTRUCTION IN STEEL AND AS SPECIFIED IN THE CONTRACT TECHNICAL SPECIFICATIONS.

B. MATERIAL

a.) ALL MATERIALS SHALL BE NEW, CLEAN, RUST FREE AND STRAIGHTENED IF NECESSARY BEFORE BEING WORKED.

b.) ALL WELDING ELECTRODES SHALL BE OF LOW HYDROGEN TYPE CONFORMING TO IS:814 AND SHALL BE E8542H3UX TYPE. ALL ELECTRODES, FLUX, WIRE ETC. SHALL BE OF ADOR WELDING LTD., ESAB INDIA LTD., D&H SECHERON ELECTRODES PVT. LTD.

c.) ALL MILD STEEL BOLTS SHALL BE OF PROPERTY CLASS 4.6 GRADE–C CONFORMING TO IS:1367.

d.) ALL HIGH STRENGTH STRUCTURAL BOLTS SHALL BE OF PROPERTY CLASS 8.8 GRADE–A CONFORMING TO IS:1367 & SHALL BE SUPPLIED CONFORMING TO IS:3757

e.) ALL NUTS SHALL BE OF HEAVY DUTY HEXAGONAL TYPE AND SHALL BE COMPATIBLE WITH THE BOLTS, MS NUTS SHALL BE OF CARBON STEEL PRODUCT GRADE–C OF IS:1363 AND OF PROPERTY CLASS 5 OF IS:1367

f.) ALL NUTS & WASHERS FOR HIGH STRENGTH BOLTS (H.S.F.G.) SHALL CONFORM TO IS:6623 & IS:6649 RESPECTIVELY.

g.) WASHERS FOR MILD STEEL BOLTS SHALL BE OF MILD STEEL CONFORMING TO IS:5369 / IS:5372 OR IS:5374 OR IS:2016 AS THE CASE MAY BE.

h.) ALL ANCHOR BOLTS SHALL BE MILD STEEL OF GRADE 4.6 CONFORMING TO IS:5624

i.) ALL STRUCTURAL AND MISCELLANEOUS STEEL WORK SHALL BE OF MILD STEEL CONFORMING TO FOLLOWING INDIAN STANDARDS:–

i) STRUCTURAL SHAPES	IS:2062 (GRADE A)
ii) PLATE UPTO 20 MM. THICKNESS	IS:2062 (GRADE A)
iii) PLATE ABOVE 20 MM. THICKNESS (KILLED & NORMALISED)	IS:2062 (GRADE B)
iv) PLATE FOR CRANE GIRDER	IS:2062 (GRADE C)
v) STRUCTURAL PIPES	IS:806 (YST 25)
vi) STRUCTURAL HOLLOW SECTIONS (SQUARE & RECTANGULAR)	IS:4923
vii) M.S PIPES HANDRAIL	IS:1239(MEDIUM CLASS)
viii) CHEQUERED PLATE (6 MM. THK.)	IS:3502
ix) 3.15MM STAINLESS STEEL BUNKER LINNER	AISI 304

C CONNECTIONS

a.) UNLESS STATED OTHERWISE, ALL SHOP CONNECTIONS SHALL BE BY WELDING AND FIELD CONNECTION GENERALLY SHALL BE BOLTED USING HIGH STRENGTH FRICTION GRIP (HSFG) BOLTS OF 8.8 GRADE EXCEPT FOR SECONDARY TO MAIN BEAMS SHALL WITH WELDING.

b.) ALL CONNECTIONS SHALL BE DEVELOPED IN LINE WITH GOOD ENGINEERING PRACTICE AND SHALL BE SUBJECT TO THE APPROVAL OF THE ENGINEER.

c.) THE SIZE OF FILLET WELD SHALL BE 6 MM. MINIMUM UNLESS NOTED OTHERWISE.

d.) THE FIELD CONNECTION OF PURLINS SHALL BE WITH WELDED & FOR SAG ANGLE & WALL BEAMS SHALL BE DONE WITH M.S BOLTS

e.) THE DIAMETER OF BOLT SHALL BE 20MM (MINIMUM) FOR HIGH STRENGTH FRICTION GRIP AND 16 MM. (MINIMUM) FOR MS BOLTS.

f.) ALL BOLT CONNECTIONS SHALL HAVE MINIMUM TWO BOLTS.

g.) LENGTH OF FILLET WELDS SHALL NOT BE LESS THAN FOUR TIMES OF THE NOMINAL SIZE OF THE WELD OR 40 MM. WHICHEVER IS MORE.

h.) FILLET WELD TERMINATING AT ENDS MUST HAVE RETURN AROUND CORNERS NOT LESS THAN TWCE THE NOMINAL SIZE OF THE WELD.

i.) BUTT WELDS SHALL BE FULL PENETRATION BUTT WELD.

j.) THE DIAMETER OF BOLT HOLES SHALL NOT BE MORE THAN 2 MM. OF THE DIAMETER OF BOLT UNLESS STATED OTHERWISE.

k.) THE ERECTION CLEARENCE FOR END OF MEMBERS SHALL NOT BE MORE THAN 5 MM. AT EACH END UNLESS STATED OTHERWISE.

L.) GUSSET/END PLATES SHALL BE OF FOLLOWING MINIMUM THICKNESS UNLESS SPECIFIED OTHERWISE :–
i) FOR BEAMS OF DEPTH LESS THAN 450 :– 8 MM.
ii) FOR BEAMS OF DEPTH 450 TO 600 :– 10 MM.
iii) TRUSS/BRACINGS, WITH MEMBER THICKNESS 8 MM. & LESS :– 8MM.
iv) TRUSS/BRACINGS, WITH MEMBER THICKNESS 10MM & MORE :–12MM.

m.) UNLESS OTHERWISE STATED IN THE DESIGN DRAWINGS, THE CONNECTION SHALL BE DESIGNED FOR THE FOLLOWING LOADS:–
i) MOMENT CONNECTIONS DESIGNATED AS 'MC' TO BE DESIGNED FOR THE FULL CAPACITY OF THE MEMBER.
ii) SHEAR CONNECTIONS WILL BE DESIGNED FOR 75% OF SECTION STRENGTH FOR ROLLED SECTIONS AND 80% OF SECTION STRENGTH FOR BUILT UP SECTION OR ROLLED SECTION WITH COVER PLATES. IN ANY CASE, THE DESIGNED VALUE SHALL NOT BE LESS THAN THE ACTUAL SHEAR.
iii) CONNECTIONS FOR BEAMS IN MAIN AXIS/GRID TO BE DESIGNED FOR THE MINIMUM AXIAL LOAD OF 7.5 MT.(TENSION/COMPRESSION) UNLESS HIGHER LOAD IS SPECIFIED IN ADDITION TO REQUIRED SHEAR/ MOMENT LOAD. IN ANY CASE, THE DESIGNED AXIAL LOAD SHALL NOT BE LESS THAN THAN THE ACTUAL TENSION/ COMPRESSION.
iv) COLUMN SPLICE TO BE DESIGNED FOR FULL CAPACITY PLUS 5% ADDITION CAPACITY OF LOWER SECTIONS.
v) CONNECTION FOR ALL TRUSS MEMBERS TO BE DESIGNED FOR FULL TENSILE STRENGTH OF THE MEMBER.
vi) CONNECTION FOR BRACING MEMBERS TO BE DESIGNED FOR FULL TENSILE STRENGTH OF THE MEMBER.
vii) SIZE OF FILLET WELD FOR FLANGE TO WEB CONNECTION FOR BUILT UP SECTION SHALL BE AS FOLLOWS :–
a) FULL SHEAR CAPACITY OR ACTUAL SHEAR WHICHEVER IS MORE FOR BOX SECTION.
b) 80% OF FULL SHEAR CAPACITY OR ACTUAL SHEAR OR 0.5 OF WEB THICKNESS, WHICHEVER IS MORE. FOR BUILT–UP SECTION, WELD SHALL BE DOUBLE FILLET.
viii) THE CONNECTION BETWEEN TOP FLANGE AND WEB OF CRANE GIRDER SHALL BE FULL PENETRATION BUTT WELD AND FOR BOTTOM FLANGE CONNECTION, FILLET WELD MAY BE PROVIDED.
ix) CONNECTION OF BASE PLATE AND GUSSET MEMBERS WITH COLUMNS SHALL BE DONE CONSIDERING THAT TOTAL LOAD GETS TRANSFERED THROUGH WELD

n.) IN ALL CASES, THE UNTHREADED PORTION OF THE BOLT SHALL BEAR ON THE MEMBERS CONNECTED. A WASHER OF ADEQUATE THICKNESS MAY BE PROVIDED TO EXCLUDE THE THREADS FROM THE BEARING THICKNESS IF A LARGER GRIP BOLT HAS TO BE USED FOR THIS PURPOSE. ALL ERECTION BOLT HOLES SHALL BE SUITABLY PLUGGED.

o.) FOR ERECTION AND TEMPORARY ASSEMBLY M.S BLACK BOLTS TO BE USED, WHICH SHALL BE REMOVED AFTER FINAL WELDING. OPENING OF HOLES THUS LEFT SHALL BE PLUG WELDED.

p.) FOR COLUMNS FOUNDATION BOLTS, AT LEAST DOUBLE NUTS SHALL BE PROVIDED.

q.) OVER HEAD WELDING SHALL NOT BE RESORTED TO UNLESS SPECIFICALLY PROVIDED IN DRAWING..

r.) PROPER PRE–HEATING TEMPERATURE SHALL BE MAINTAINED AS PER SPEC.

s.) THE WELDING SEQUENCE/ PROCESS SHALL BE SO ADOPTED THAT NO ACCUMULATION OF SECONDARY WELDING STRESSES TAKES PLACE IN THE MEMBERS.

t.) DESIGN CALCULATIONS FOR MAJOR CONNECTIONS SHALL BE FURNISHED BY BHEL FOR APPROVAL DURING PREPARATION OF FABRICATION/ DETAIL DRGS.

D PAINTING

FOR INDOOR & OUTDOOR STEEL STRUCTURES
(ALL STRUCTURAL STEEL AND M.S HANDRAILS SHALL BE PAINTED AS FOLLOWS)

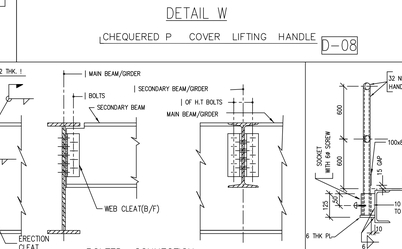
7.1 ONE OR MORE SHOP COAT OF EPOXY RESIN BASED ZINC PHOSPHATE PRIMER (IS:2074) DURING FABRICATION (DFT NOT LESS THAN 25 MICRONS)

7.2 ONE ADDITIONAL COAT OF EPOXY RESIN BASED ZINC PHOSPHATE PRIMER AND FINISHING COATS OF EPOXY RESIN BASED PAINT PIGMENTED WITH TITANIUM DIOXIDE APPROVED SHADE AND QUALITY SHALL BE PROVIDED AFTER COMPLETION OF ERECTION. AS PER SPEC. (DFT NOT LESS THAN 25 MICRONS)

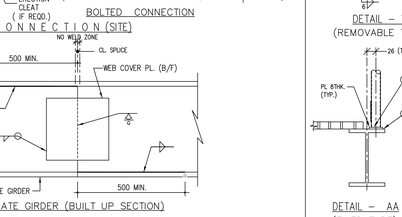
7.3 THE FINISHING PAINT SHALL BE WITH MINIMUM TWO OR MORE COATS OF EPOXY RESIN BASED PAINT PIGMENTED WITH TITANIUM DIOXIDE AND THE TOTAL DRY FILM THICKNESS (DFT) OF THE FINISHED PAINT SHOULD NOT BE LESS THAN 100 MICRON.(EXCLUDING PRIMER)

7.4 FOR INDOOR STRUCTURES SURFACE PREPARATION SHALL BE DONE EITHER MANUALLY OR BY ANY OTHER APPROVED METHOD.(EXCEPT SAND BLASTING SHOT BLASTING/FLAME CLEANING)

7.5 FOR OUTDOOR STRUCTURES SURFACE PREPARATION SHALL BE DONE WITH MECHANICAL POWER TOOLS AS PER IS:1477(PART–1) SUCH THAT THE RUST, DIRT & SCALES ETC., ARE COMPLETELY REMOVED.



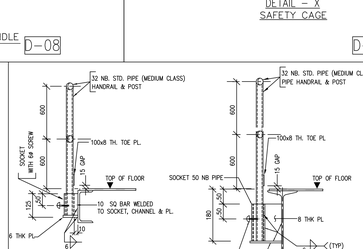
SECONDARY BEAM TO MAIN BEAM/GIRDER CONNECTION (SITE)

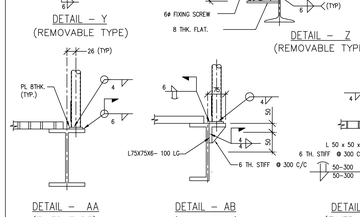


TYP. DETAIL OF SHOP SPLICE FOR BEAMS AND GIRDERS

1. LOCATION OF SPLICE SHALL BE PLACED IN THE ZONE L/4 TO L/5 FROM SUPPORT; WHERE L=CLEAR SPAN
2. NO. OF SPLICE JOINT SHALL NOT BE MORE THAN ONE IN A PARTICULAR BEAM/GIRDER.

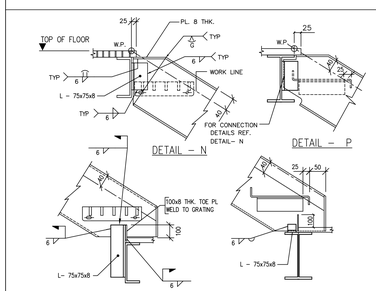
D-10





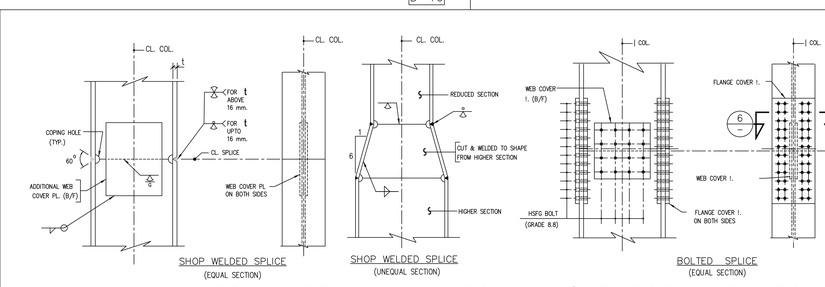
HANDRAIL FIXING DETAILS
(HANDRAIL SHALL BE GALVANISED)

D-11



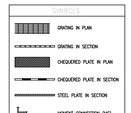
STRINGER TO STEEL CONNECTIONS

D-12



TYPICAL DETAIL OF COLUMN SPLICE (WELDED & BOLTED)

D-13



BHEL–PROJECT ENGINEERING MANAGEMENT(CIVIL)
THIS DRAWING MARKED(✓) IS RELEASED FOR
☑ COMMENTS/APPROVAL
☐ PLANNING/INFORMATION
☐ CONSTRUCTION
STAMP ALL PREVIOUS REVISION AS SUPERSEDED

	ISSUED BY
NAME	MP
SIGNATURE	
DATE	24.07.2009

CUSTOMER'S CONSULTANT : DEVELOPMENT CONSULTANT PVT LTD.,CHENNAI

CUSTOMER : JINDAL

O.P. JINDAL SUPER THERMAL POWER PLANT
4 X 600 MW UNITS PHASE–III
JINDAL POWER LIMITED RAIGARH

JOB NO. 307 & 318
STATUS : CONTRACT

BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NEW DELHI

DEPT CODE		NAME	SIGN	DATE
C	DRN	DSR	Sd/–	22.07.2009
	DESN	MGA	Sd/–	20.07.2009
	CHD	MP	Sd/–	23.07.2009
	APPD	BK	Sd/–	24.07.2009

TITLE :–
MILL AND BUNKER BUILDING
GENERAL NOTES & STANDARD DETAILS FOR STRUCTURAL STEEL WORKS

CIVIL	MPL	ELEC	C&I	MSE	MAX	DEPT.	SCALE 1:100
						SIGN	
						DATE	

DRAWING NO.
PE–DG–329–616–C011
SHEET 1 OF 1 REV. 0

FORMAT SIZE A0

DATE	ALTD	CHD	APPD	REV.

COPY RIGHT AND CONFIDENTIAL
The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED
It must not be used directly or indirectly in any way detrimental to the interest of BHEL.

CAD FILE NAME: C:\Users\306363\1.PDM\Desktop\PROJECTS\4X600MW OPJ STAGE II, RAIGARH\DWG\R0\PE-DG-329-616-C011 R0 STD DET STEEL DRG.dwg

DRAWING NO. 0-00-022-74978

REFERENCE DRAWING NUMBERS:-

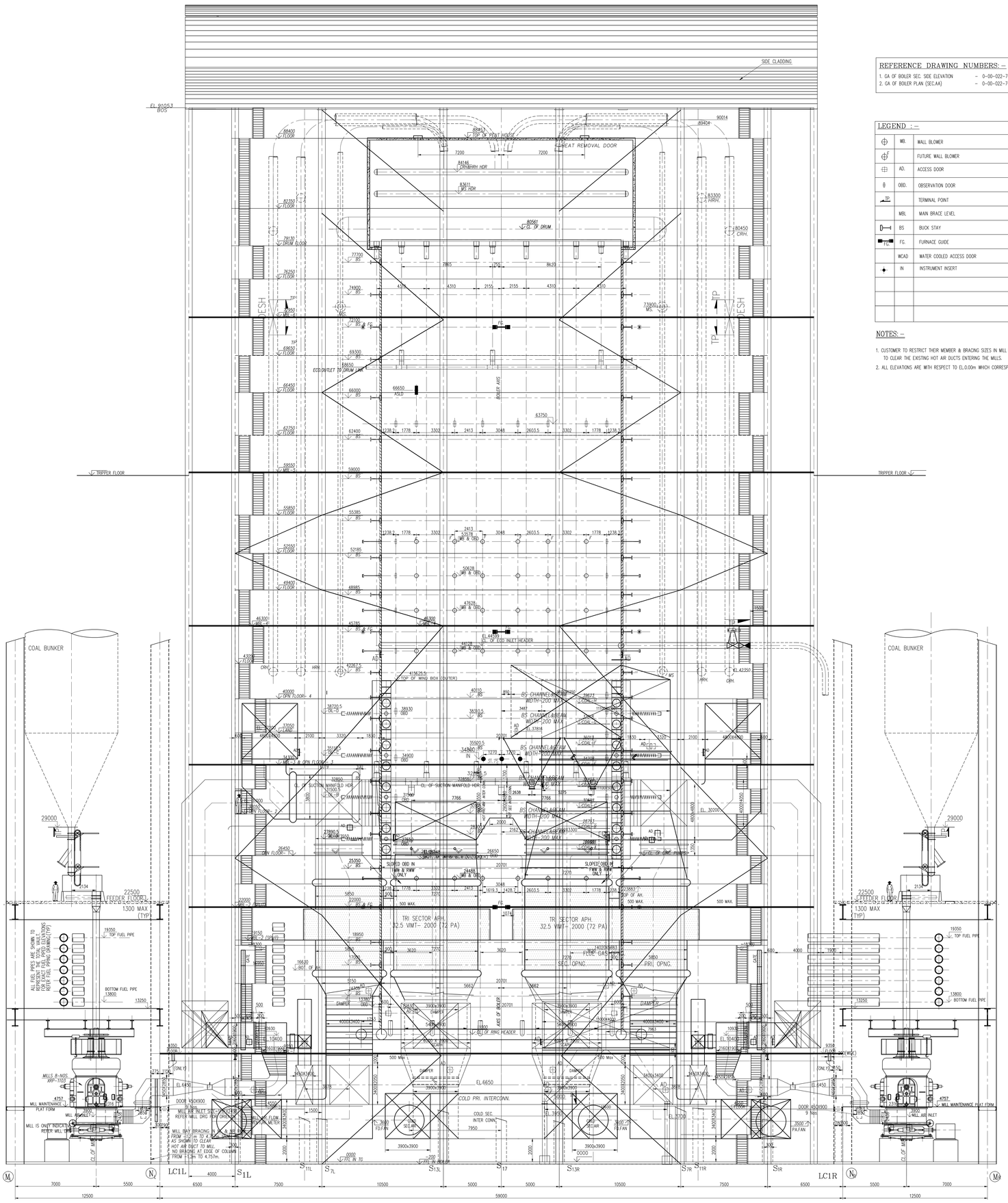
1. GA OF BOILER SEC. SIDE ELEVATION - 0-00-022-74976
2. GA OF BOILER PLAN (SEC.AA) - 0-00-022-74977

LEGEND :-

⊕	WB.	WALL BLOWER
⊕		FUTURE WALL BLOWER
⊞	AD.	ACCESS DOOR
⊞	OBD.	OBSERVATION DOOR
TP		TERMINAL POINT
	MBL	MAIN BRACE LEVEL
BS	BS	BUCK STAY
FG	FG.	FURNACE GUIDE
	WCAD	WATER COOLED ACCESS DOOR
IN	IN	INSTRUMENT INSERT

NOTES:-

1. CUSTOMER TO RESTRICT THEIR MEMBER & BRACING SIZES IN MILL BAY AREA TO CLEAR THE EXISTING HOT AIR DUCTS ENTERING THE MILLS.
2. ALL ELEVATIONS ARE WITH RESPECT TO EL.0.00m WHICH CORRESPONDS TO RL.____M.



FRONT ELEVATION

CUSTOMER NO. 1604, 1605, 1606, 1607

CUSTOMER: M/S JINDAL POWER LIMITED., RAIGARH

PROJECT: O.P. JINDAL SUPER THERMAL POWER PROJECT
4 X 600 MW BOILERS- UNIT NOS. 1,2,3 & 4
1950 T/HR; 178 KG/SQ.CM(G); 540°C/ 540°C

BHARAT HEAVY ELECTRICALS LIMITED.,
BOILER PLANT UNIT; TIRUCHIRAPALLI-INDIA-620 014
EQUIPMENT : STEAM GENERATOR

355-029

	NAME	SIGNATURE	DATE
DRAWN	T.Selvaraju	Sd...	15-07-2009
CHECKED	S.Srinivas	Sd...	15-07-2009
APPROVED	G.Veeramani	Sd...	15-07-2009

TITLE: GENERAL ARRANGEMENT OF BOILER FRONT ELEVATION

ALL DIMENSIONS IN MILLIMETRE
PROJECTION
SCALE 1 : 125

DRG.NO. 0-00-022-74978 REV. 01

REV.	DATE	ALTERED	S.Srinivasan
01	24-07-2009	CHD. & APPD.	G.Veeramani

1. MILL BAY WIDTH IS CORRECTED FROM 13200 TO 12500
2. SIZE OF HOT AIR DUCT TO MILLS UPDATED IN LINE WITH HOT AIR DUCTING DRG.

CAUTION: THE INFORMATION ON THIS DOCUMENT IS THE PROPERTY OF BHARAT HEAVY ELECTRICALS LIMITED. IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY.

DRAWING NO. PE-DG-329-616-C019

FIRST ANGLE PROJECTION — ALL DIMENSIONS ARE IN MM

COPY RIGHT AND CONFIDENTIAL
BHARAT HEAVY ELECTRICALS LIMITED
The information on this document is the property of BHEL and it must not be used directly or indirectly in any way detrimental to the interest of the company.

PLAN 6–6

SECT 13–13

SECT 14–14

TYP JOINT DET FOR BUNKER PL
NTS

TYP DET FOR FIXING SST LINER PL TO HOPPER PL

DET G

DET–H

DET–F

DET–E

SECT 11–11

SECT 12–12

DET–D

STRUCTURAL BEAM

NORTH

KEY PLAN

SECTION 5–5

SECTION 3–3

SECTION 4–4

ELEVATION–COL C1
(6 NO REQD PER BUNKER)

VIEW 7–7

SECT 8–8

SECT 9–9
(ALL EXCEPT M & Q)

SECT 9–9
(FOR M & Q ONLY)

SECTION 1–1

SECTION 2–2

SECT 10–10

DET–B

DET–C
NTS

DETAIL –A

DETAIL B1

PLAN 5A–5A
(* The cool vendor's confirmation needed before the erection)

NOTES

1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH CONTRACT TERMS AND CONDITIONS, SPECIFICATIONS AND SCHEDULE OF ITEMS.
2. ALL ELEVATIONS ARE REFERRED TO THE FINISHED FLOOR LEVEL OF POWERHOUSE 0.0M FLOOR WHICH CORRESPONDS TO RL 255.25M.
3. ALL DIMENSIONS ARE IN MILLIMETRE AND ALL LEVELS ARE IN METRE.
4. PROPER CARE SHALL BE TAKEN IN WELDING OF BUNKER PLATES, HORIZONTAL & VERTICAL JOINTS IN BUNKER & HOPPER SHALL BE SUBJECT TO NDT AS PER FQP.
5. VERTICAL JOINTS IN BUNKER PL SHALL BE STAGGERED.
6. PLATE SHALL BE CUT TO MAX WIDTH TO REDUCE NUMBER OF JOINTS.
7. BEFORE COMMENCING REGULAR FABRICATION OF THE BUNKER TRIAL ASSEMBLY OF THE BUNKER INCLUDING HOPPER SHALL BE MADE ATLEAST FOR ONE BUNKER.
8. ALL END CONNECTIONS FOR BRCG SHALL BE DESIGNED FOR FULL TENSILE STRENGTH OF MEMBERS.
9. ALL DESIGN FORCES INDICATED ARE UNDER SEISMIC CONDITIONS.
10. STAINLESS STEEL LINER IN THE COAL BUNKERS SHALL BE OF 3.15MM THICKNESS OF GRADE AISI–304 FINISH GRADE 2B(COLD ROLLED,ANNEALED & PICKELED AND SKIN PASSED) AND SHALL BE PROVIDED ON THE INNER FACES OF ENTIRE INCLINED PORTION OF HOPPERS AND MOUTH OF THE HOPPERS, WITHOUT ALLOWING ANY PROJECTIONS IN COAL FLOW PATH.
11. PLUG WELD IN SST LINER PLATE SHALL BE GROUND SMOOTH TO MATCH WITH PLATE PROFILE.
12. THE ELECTRODES USED FOR WELDING SHALL BE AUSTENITIC STAINLESS STEEL ELECTRODE E308L FOR WELD JOINTS BET SST PLATES & E309L FOR WELD JOINTS BETWEEN SST PL & MS PLATE.
13. ALL BUTT WELDS FOR BUNKER SUPPORTING GIRDERS (LONGITUDINALLY TRANSVERSE) SHALL BE RADIOGRAPHIC SUBJECTED TO 100%.
14. ALL SITE FILLET WELDS OF BUNKER AND BUNKER SUPPORTING GIRDERS/BEAMS SHALL BE SUBJECTED TO 100% NON DESTRUCTIVE TESTED.
15. QUALITY CONTROL AND SUPERVISION FOR ABOVE MENTIONED TESTS SHALL BE CARRIED OUT BY AN INDEPENDENT INSPECTION AGENCY.

BEAM SCHEDULE AT EL+31.780M SUPPORTING BUNKERS

D	GIRDER DETIALS FW	FT	WT	
1800	600	50	40	PG1
900	600	50	32	PG2
900	600	50	32	PG3

(PROVIDE 10 TH. WEB STIFF. @ 1500 C/C (MAX))

BHEL–PROJECT ENGINEERING MANAGEMENT(CIVIL)
THIS DRAWING MARKED(✓) IS RELEASED FOR
☑ COMMENTS/APPROVAL
☐ PLANNING/INFORMATION
☐ CONSTRUCTION
STAMP ALL PREVIOUS REVISION AS SUPERSEDED

	ISSUED BY	REVIEWED BY
NAME		
SIGNATURE		
DATE	09/04/2010	

CUSTOMER'S CONSULTANT : DEVELOPMENT CONSULTANT PVT LTD.,CHENNAI

CUSTOMER : JINDAL

O.P. JINDAL SUPER THERMAL POWER PLANT
4 X 600 MW UNITS PHASE– III
JINDAL POWER LIMITED RAIGARH

JOB NO. 329
STATUS : CONTRACT

BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NEW DELHI

DEPT CODE		NAME	SIGN	DATE
C	DRN	DRS		29.12.09
	DSGN	MGA/LP		29.12.09
	CHD	MP		30.12.09
	APPD	RK		30.12.09

TITLE :–
MILL AND BUNKER BUILDING
BUNKERS AND SUPPORTING DETAILS

CIVIL	MPL	ELEC	C&I	MSE	MAX	DEPT.	SCALE 1:100
						SIGN	
						DATE	

DRAWING NO. PE–DG–329–616–C019
SHEET 1 OF 1 REV. 01

FORMAT SIZE A0

DATE	ALTD	CHD	APPD	REV.
09.04.10	MGA	MP	RK	01

REVISED IN THE LINE WITH THE COMMENTS OF M/s JPL
DRAWING REVISED & MARKED AS

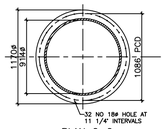
CAD FILE NAME: C:\Documents and Settings\306102?\Desktop\JPL MIVFE-DG-329-616-C019 R01 BunkersAndSupportingDetails050410.dwg

DRAWING NO. PE-DG-329-616-C019

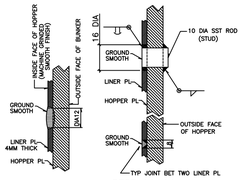
COPY RIGHT AND CONFERENTIAL
The information contained in this document is the property of BHARAT HEAVY ELECTRICALS LIMITED
Reproduction or disclosure in whole or in part or its use for any purpose other than for which it is furnished is forbidden without the consent of BHEL, New Delhi. On any infringement BHEL will take legal action

CAD FILE NAME: C:\Users\30636831.PEMA\Desktop\PROJECTS\4X600MW OPJ STAGE II, RAIGARH\UNIT\RO\PE-DG-329-616-C019 RO MILL & BUNKER BUILDING BUNKERS & SUPPORTING DETAILS.dwg

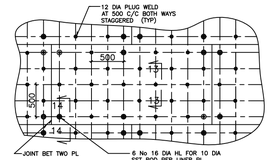
FIRST ANGLE PROJECTION — ALL DIMENSIONS ARE IN MM



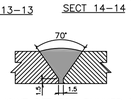
PLAN 6–6



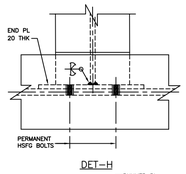
SECT 13–13 SECT 14–14



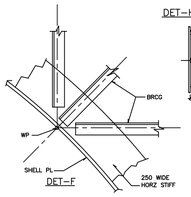
TYP DET FOR FIXING SST LINER PL TO HOPPER PL



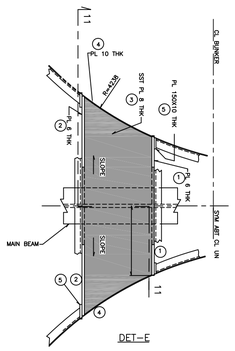
TYP JOINT DET FOR BUNKER PL NTS



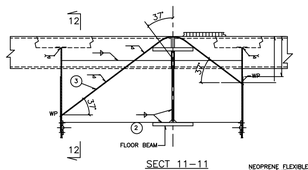
DET–H



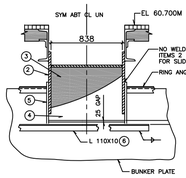
DET–G 1:10 DET–F



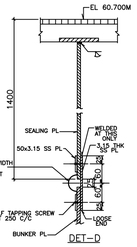
DET–E



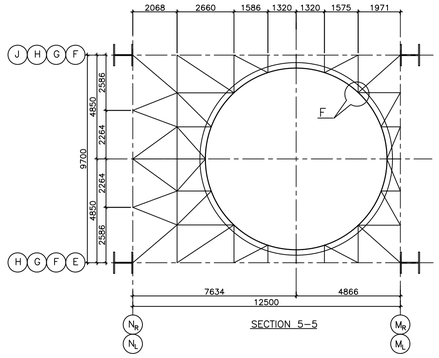
SECT 11–11



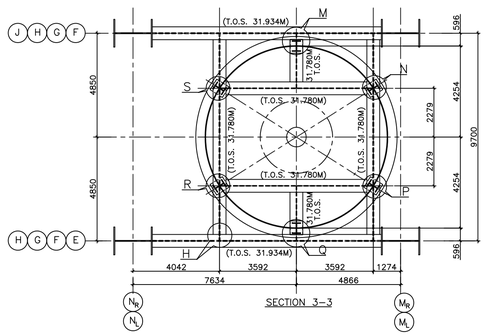
SECT 12–12 1:20



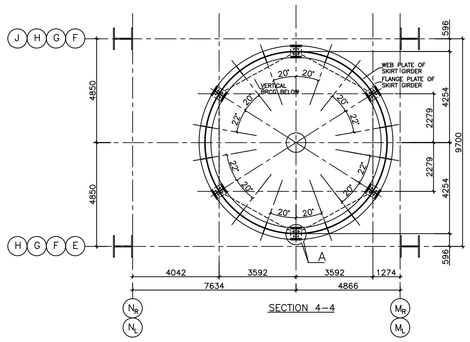
DET–D



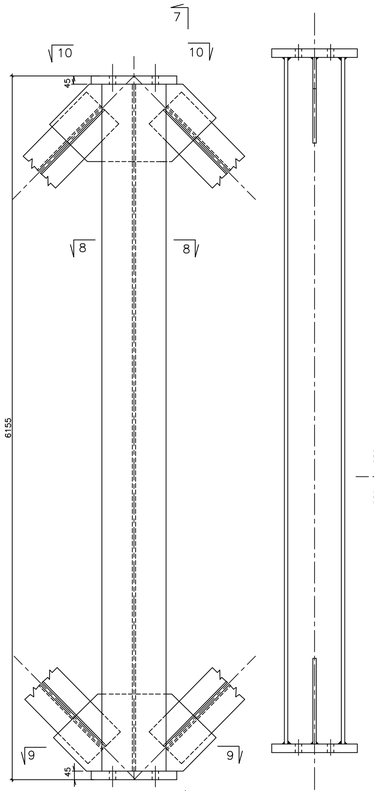
SECTION 5–5



SECTION 3–3

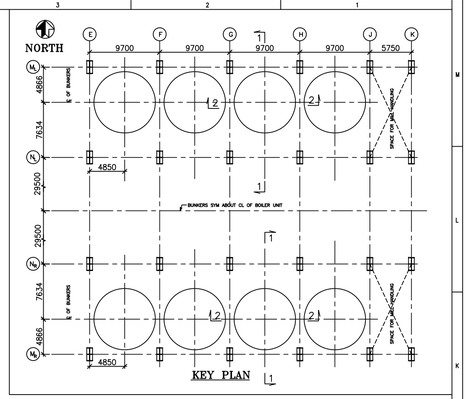


SECTION 4–4

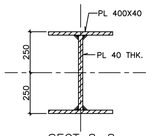


ELEVATION–COL C1 (6 NO REQD PER BUNKER)

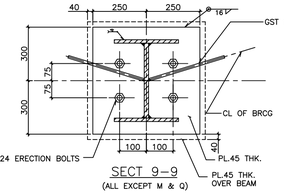
VIEW 7–7



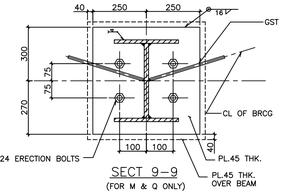
KEY PLAN



SECT 8–8



SECT 9–9 (ALL EXCEPT M & Q)



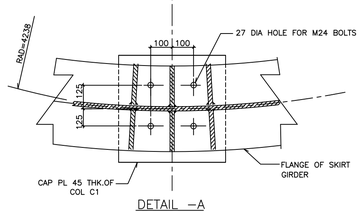
SECT 9–9 (FOR M & Q ONLY)

SECTION 1–1

SECTION 2–2

DET–B

DET–C NTS



DETAIL –A

SECT 10–10

PLAN 5A–5A

NOTES

1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH CONTRACT TERMS AND CONDITIONS, SPECIFICATIONS AND SCHEDULE OF ITEMS.
2. ALL ELEVATIONS ARE WITH RESPECT TO EL 0.00M WHICH CORRESPONDS TO RL---M.
3. ALL DIMENSIONS ARE IN MILLIMETRE AND ALL LEVELS ARE IN METRE
4. PROPER CARE SHALL BE TAKEN IN WELDING OF BUNKER PLATES. HORIZONTAL & VERTICAL JOINTS IN BUNKER & HOPPER SHALL BE SUBJECT TO NDT AS PER FQP.
5. VERTICAL JOINTS IN BUNKER PL SHALL BE STAGGERED
6. PLATE SHALL BE CUT TO MAX WIDTH TO REDUCE NUMBER OF JOINTS
7. BEFORE COMMENCING REGULAR FABRICATION OF THE BUNKER TRIAL ASSEMBLY OF THE BUNKER INCLUDING HOPPER SHALL BE MADE ATLEAST FOR ONE BUNKER
8. ALL END CONNECTIONS FOR BRCG SHALL BE DESIGNED FOR FULL TENSILE STRENGTH OF MEMBERS
9. ALL DESIGN FORCES INDICATED ARE UNDER SEISMIC CONDITIONS
10. STAINLESS STEEL LINER IN THE COAL BUNKERS SHALL BE OF 3.15MM THICKNESS OF GRADE AISI–304 FINISH GRADE 2B(COLD ROLLED,ANNEALED & PICKELED AND SKIN PASSED) AND SHALL BE PROVIDED ON THE INNER FACES OF ENTIRE INCLINED PORTION OF HOPPERS AND MOUTH OF THE HOPPERS,WITHOUT ALOOWING ANY PROJECTIONS IN COAL FLOW PATH
11. PLUG WELD IN SST LINER PLATE SHALL BE GROUND SMOOTH TO MATCH WITH PLATE PROFILE
12. THE ELECTRODES USED FOR WELDING SHALL BE AUSTENITIC STAINLESS STEEL ELECTRODE E309L FOR WELD JOINTS BET SST PLATES & E309L FOR WELD JOINTS BET SST PL & MS PLATE
13. ALL BUTT WELDS FOR BUNKER SUPPORTING GIRDERS (LONGITUDINALLY TRANSVERSE) SHALL BE RADIOGRAPHIC SUBJECTED TO100%
14. ALL SITE FILLET WELDS OF BUNKER AND BUNKER SUPPORTING GIRDERS/BEAMS SHALL BE SUBJECTED TO 100% NON DESTRUCTIVE TESTED
15. QUALITY CONTROL AND SUPERVISION FOR ABOVE MENTIONED TESTS SHALL BE CARRIED OUT BY AN INDEPENDENT INSPECTION AGENCY

DATE	ALTD	CHD	APPD	REV.

CUSTOMER'S CONSULTANT : DEVELOPMENT CONSULTANT PVT LTD.,CHENNAI

CUSTOMER : JINDAL

O.P. JINDAL SUPER THERMAL POWER PLANT
4 X 600 MW UNITS PHASE–III
JINDAL POWER LIMITED RAIGARH

JOB NO. 329
STATUS : CONTRACT
0 2 4 6 8 10 20 30 40 50

BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NEW DELHI

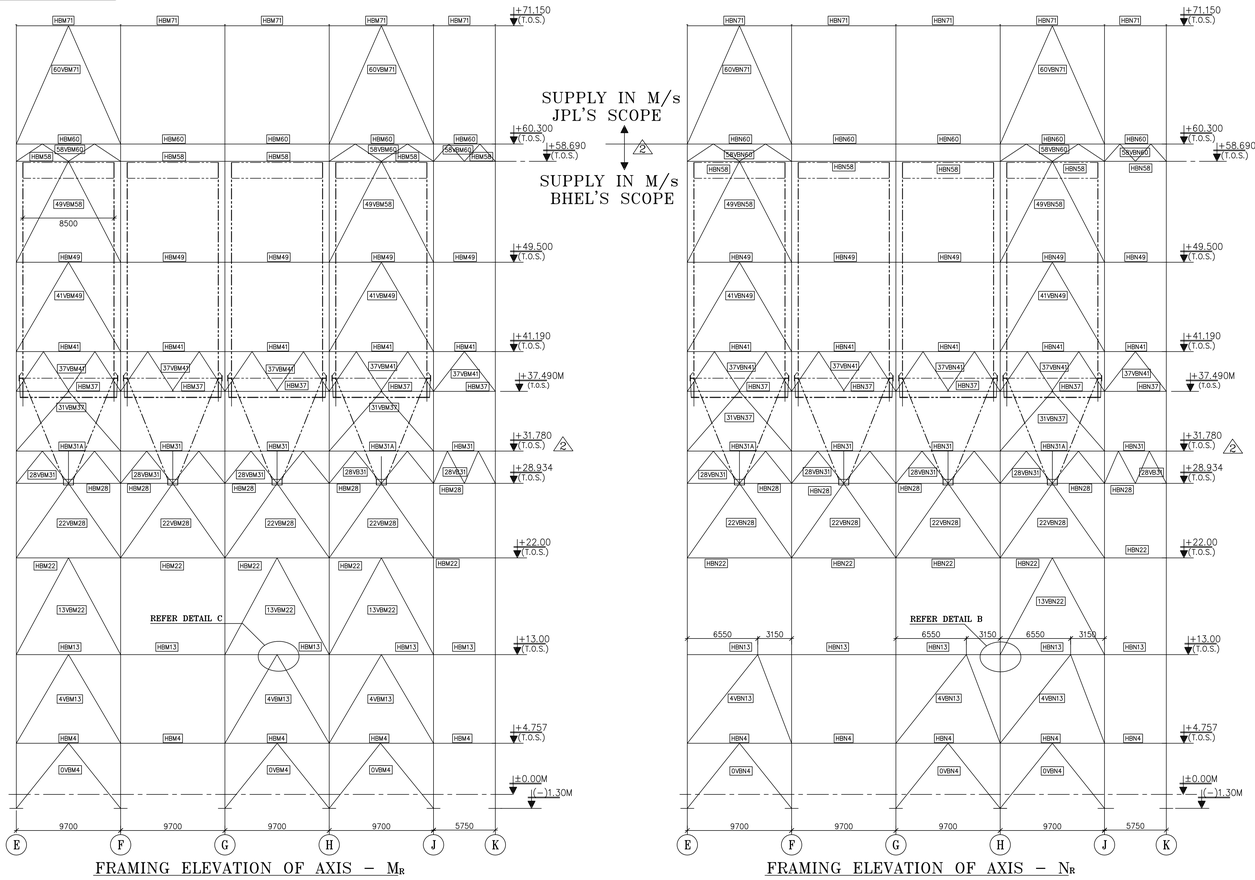
DEPT CODE		NAME	SIGN	DATE
C	DRN	DRS		29.12.09
	DSGN	MGA/LP		29.12.09
	CHD	MP		30.12.09
	APPD	RK		30.12.09

TITLE : – MILL AND BUNKER BUILDING
BUNKERS AND SUPPORTING DETAILS

CIVIL	MPL	ELEC	C&I	MSE	MAX	DEPT.	SCALE 1:100	DRAWING NO.
						SIGN		PE–DG–329–616–C019
						DATE		SHEET 1 OF 1 REV. 0

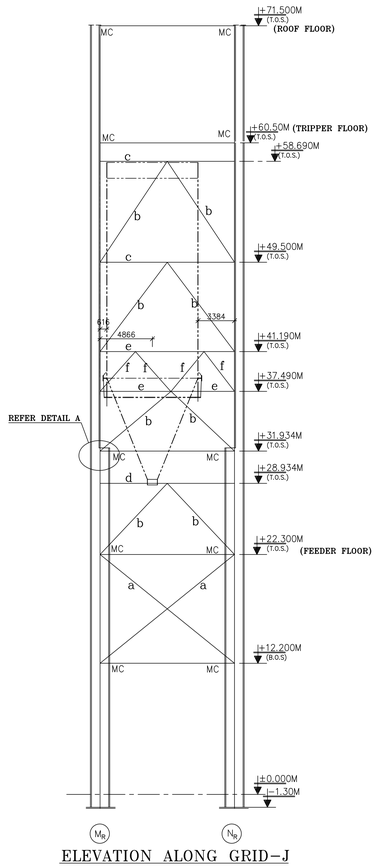
FORMAT SIZE A0

COPY RIGHT AND CONFIDENTIAL
The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED
must not be used directly or indirectly in any way detrimental to the interest of the company.



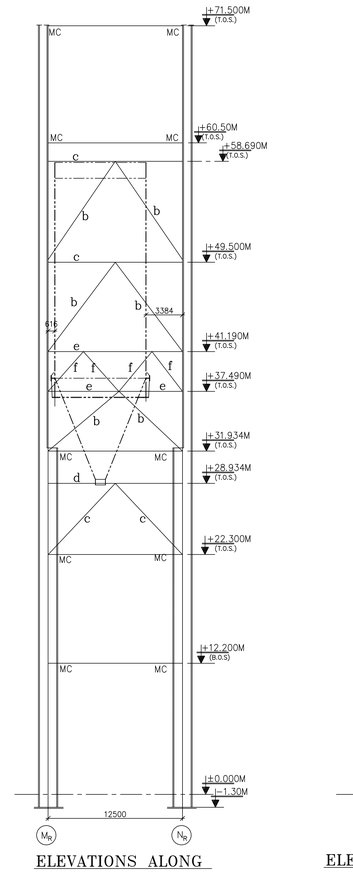
FRAMING ELEVATION OF AXIS – M_R

FRAMING ELEVATION OF AXIS – N_R

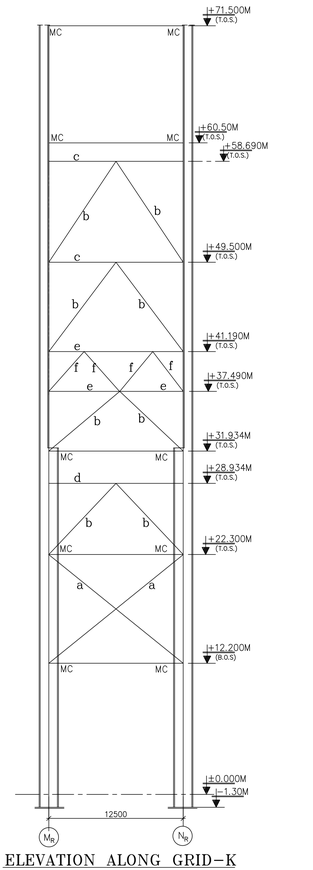


ELEVATION ALONG GRID–J

(MC – MOMENT CONNECTIONS)
(B.O.S – BOTTOM OF STEEL)
(T.O.S – TOP OF STEEL)



ELEVATIONS ALONG GRIDS–E, F, G & H



ELEVATION ALONG GRID–K

COLUMN SCHEDULE.

ONE BOLTED ERECTION JOINT IF REQUIRED SHALL BE PROVIDED.			1- FL PL.660X32 2- WEB PL. 25 TH.	1- FL PL.660X40 2- WEB PL. 32 TH.	1- FL PL.660X32 2- WEB PL. 25 TH.	1- FL PL.660X40 2- WEB PL. 32 TH.	10 TH. WEB STIFF. @ 1200 C/C (TYP. U.N.)
	(+)31.934		1- FL PL. 920x50 2- WEB PL. 40 TH. 3-PL. 440x40 THK.	1- FL PL. 1300x50 2- WEB PL. 45 TH. 3-PL. 475x40 THK.	1- FL PL. 660x40 2- WEB PL. 32 TH. 3-PL. 305x32 THK.	1- FL PL. 1300x50 2- WEB PL. 45 TH. 3-PL. 475x40 THK.	
	(+)27.4340		1- FL PL. 800x50 2- WEB PL. 40 TH. 3-PL. 375x40 THK.	1- FL PL. 1000x50 2- WEB PL. 45 TH. 3-PL. 475x45 THK.	1- FL PL. 660x40 2- WEB PL. 32 TH. 3-PL. 305x32 THK.	1- FL PL. 1000x50 2- WEB PL. 45 TH. 3-PL. 475x45 THK.	12TH. WEB STIFF. @ 1200 C/C (TYP. U.N.)
	(-)1.300 (BOT. OF BASE PL.)						
	ELEVATION	COLUMN SECTION.	M–E, N–E	M–F, M–G M–H, M–J	M–K, N–K	N–F, N–G N–H, N–J	REMARKS
			GROUP–1	GROUP–2	GROUP–3	GROUP–4	

VERTICAL BRACING SCHEDULE ALONG AXIS M_R & N_R

BRACING MKD.	BRACING SECTION	REMARKS
41VBM49 41VBN49	MC 400 BOX (T/T)	2 *9700 EXCEPT BETWEEN GRIDS J & K
49VBM58 49VBN58	MC 400 BOX (T/T)	
58VBM60 58VBN60	MC150BOX(T/T)	
31VBM37 60VBM71 31VBN37 60VBN71	MC 300 BOX (T/T)	
37VBM41 37VBN41	MC 200 BOX (T/T)	
28VBM31 28VBN31	MC 150 BOX	BRACING TYP. ON BOTH FLANGES OF COL.
0VBM4	MC 400 BOX (T/T)	
4VBM13 13VBM22 4VBN13 13VBN22	MC 400 BOX (T/T)	
22VBM28 22VBN28	MC 300 BOX (T/T)	
0VBN4	MC 400 BOX (T/T)	

HORIZONTAL BRACING SCHEDULE

BRACING MKD.	BRACING SECTION	
HBM58 HBN58	MC 300 BOX (T/T)	
HBM71 HBN71	MC 250 BOX (T/T)	
HBM37 HBN37 HBM41 HBN41 HBM49 HBN49 HBM60 HBN60	MC 300 BOX (T/T)	
HBM28 HBN28	MC 200 BOX (T/T)	
HBM4	MC 300 BOX (T/T)	
HBN31 HBM31	MC 200 BOX (T/T)	
HBN13 HBN22 HBM13 HBM22	MC 300 BOX (T/T)	
HBN4	MC 300 BOX (T/T)	
HBN31A HBM31A	MC 200 BOX (T/T)	2

TRANSVERSE BEAMS & BRACING SCHEDULE

MARKED	MEMBER SIZE	MEMBER SHAPE
a	MC 400 BOX + 300x16 THK PL. (T/B)	150 350
b	MC 300 BOX (T/T)	
c	MC 400 BOX (T/T)	
d	MC 300 BOX + 250x16 THK PL. (T/B)	100 280
e	MC 400 BOX (T/T) + 170xB THK FLANGE PL.	
f	MC 200 BOX (T/T)	

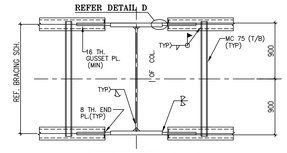
M_R –N_R BAY TRANSVERSE GIRDER SCHEDULE

GIRDER DETIALS D	FW	FT	WT	GIRDER ON GRIDS AT ELEVATION (T.O.S.) UNLESS NOTED +12.95	+22.300	+31.934	+60.500	+71.500	REMARKS
800	480	25	20					E, & K	2
		40	25					J, F, G, H,	
1200	600	45	32		F, G, H & J				
1250	660	40	25				E & K		
		45	32				F, G, H & J		
750	480	25	20			K			
		32	20	E, F, G, H, J, & K					
1000	480	32	25		E & K				
2500	600	50	32			E			
		50	50			F, G, H & J			

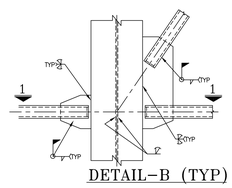
(PROVIDE 10 TH. WEB STIFF. @ 1200 C/C (MAX) (FABRICATOR TO CHECK INTERFERENCE WITH SECONDARY BEAMS)

NOTES 2

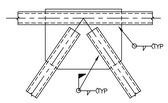
1. M/s JPL'S SECTIONS SHALL BE PREFERABLY USED AS PER THEIR AVAILABILITY.
2. SECONDARY BEAMS OF TRIPPER FLOOR, ALL BEAMS OF ROOF, COLUMNS & BRACINGS FROM TRIPPER FLOOR TO ROOF, ALL COMPONENTS OF CLADDING SYSTEM, SHEETINGS, ALL RCC COMPONENTS AND THEIR EMBEDDED PLATES AND OTHER PARTS, METAL DECKING SHEETS ARE IN THE M/S JPL'S SCOPE OF SUPPLY.
3. THE PROVISION OF BRACKETS EXCLUDING THE PTFE BEARINGS ETC TO SUPPORT THE CONVEYOR GAALERY IS IN THE BHEL'S SCOPE OF SUPPLY.
4. THE STRUCTURAL STEEL SHOULD BE OF GRADE B AS PER IS: 2062 AND SHALL COMPLY THE QUALITY NORMS WITH STANDARD FABRICATION AND ERECTION PRACTICES AS PER IS: 7215 & IS:12843.



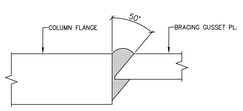
SECTION 1–1



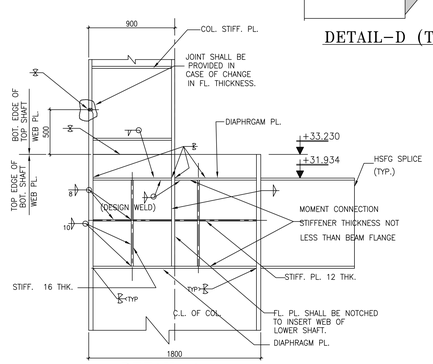
DETAIL–B (TYP)



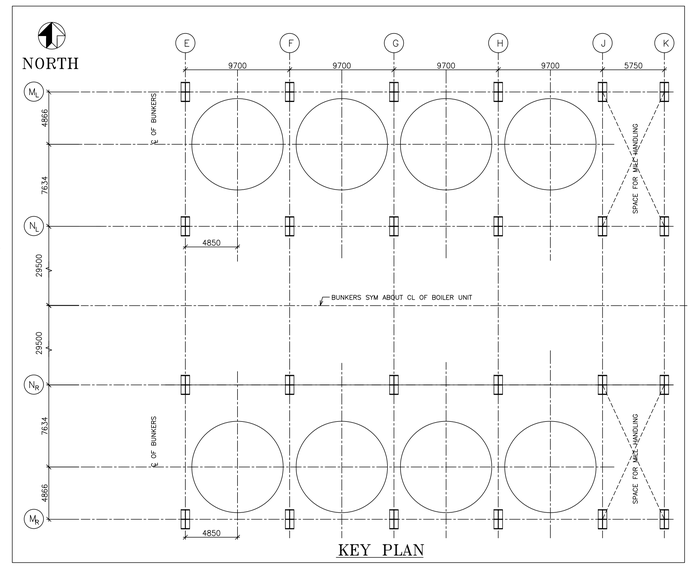
DETAIL–C (TYP)



DETAIL–D (TYP)



DETAIL–A



KEY PLAN

BHEL–PROJECT ENGINEERING MANAGEMENT(CIVIL)
THIS DRAWING MARKED(✓) IS RELEASED FOR
☐ COMMENTS/APPROVAL
☐ PLANNING/INFORMATION
☐ CONSTRUCTION
STAMP ALL PREVIOUS REVISION AS SUPERSEDED

ISSUED BY	
NAME	
SIGNATURE	
DATE	31/03/2010

REVISION 02	DATE	ALTD	CHD	APPD
	31.03.10	MCA	MP	RK

REVISED IN THE LINE WITH THE COMMENTS OF M/s JPL. DRAWING REVISED & MARKED AS 2

REVISION 01	DATE	ALTD	CHD	APPD
	23.12.09	DRS	MCA	RK

REVISED IN THE LINE WITH THE COMMENTS OF M/s JPL.

JOB NO.	329
STATUS :	CONTRACT

CUSTOMER'S CONSULTANT : DEVELOPMENT CONSULTANT PVT LTD.,CHENNAI

CUSTOMER : JINDAL

O.P. JINDAL SUPER THERMAL POWER PLANT
4 X 600 MW UNITS PHASE–III
JINDAL POWER LIMITED RAIGARH

BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NEW DELHI

DEPT CODE C

	NAME	SIGN	DATE
DRN	JKY	Sd/–	12.09.09
DESN	MGA/LP	Sd/–	10.09.09
CHD	MP	Sd/–	14.09.09
APPD	RK	Sd/–	15.09.09

TITLE :– MILL AND BUNKER BUILDING
LONGITUDINAL & TRANSVERSE ARRANGEMENT SH–2

CIVIL	MPL	ELEC	C&I	MSE	MAX

SCALE 1:100

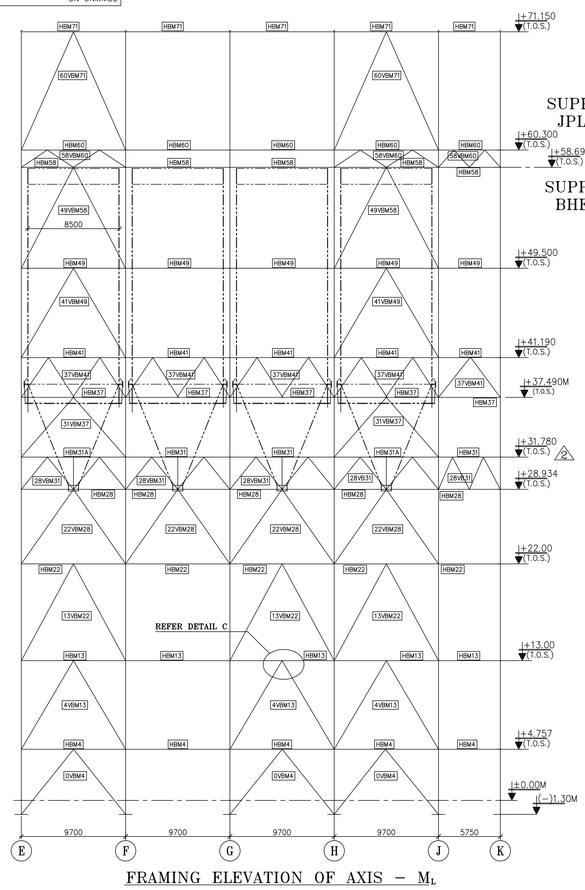
DRAWING NO. PE–DG–329–616–C014

SHEET 1 OF 1 REV. 02

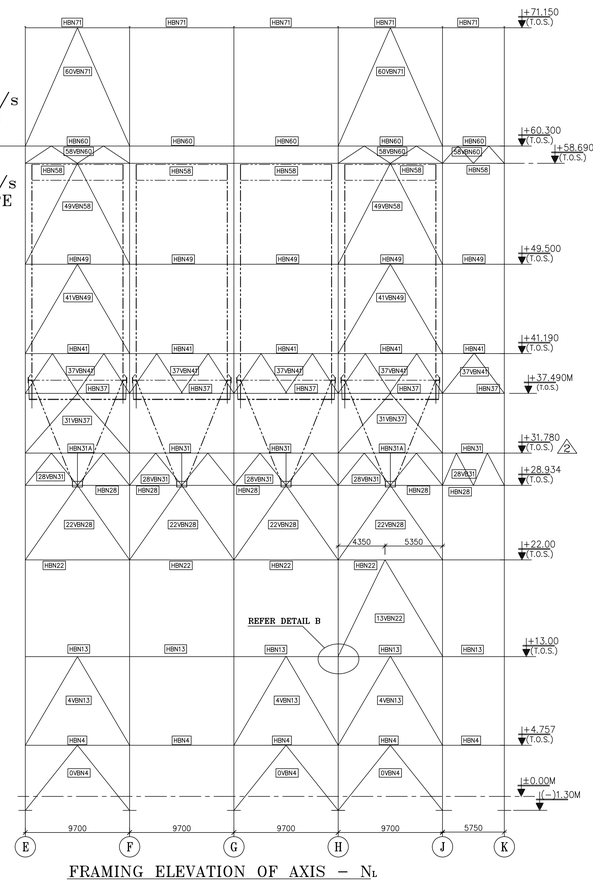
FORMAT SIZE A0

CAD FILE NAME: C:\Users\305351.PRM\Desktop\PROJECTS\4X600MW OPJ STAGE II, RAIGARH\DWG\R2\PE-DG-329-616-C013 & C014 R02 LongAndTransAxSh1n2 01042010.dwg

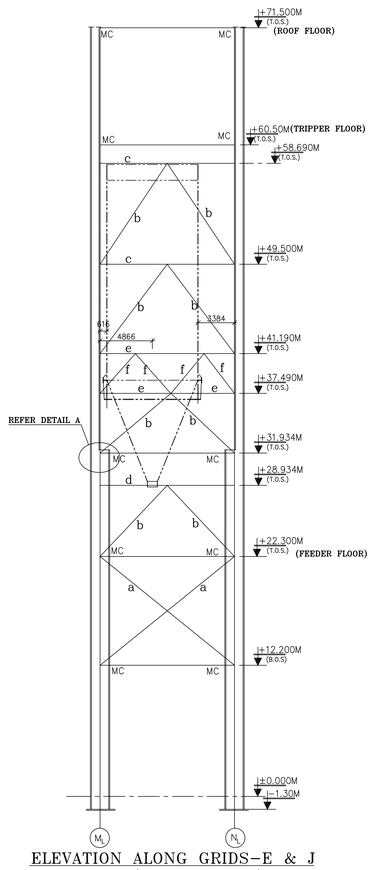
COPY RIGHT AND CONFIDENTIAL
The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED
It must not be used directly or indirectly in any way detrimental to the interest of the company.



FRAMING ELEVATION OF AXIS – M_L

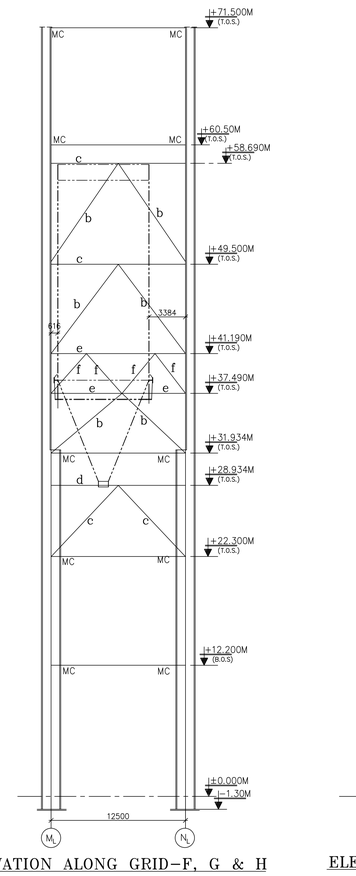


FRAMING ELEVATION OF AXIS – N_L

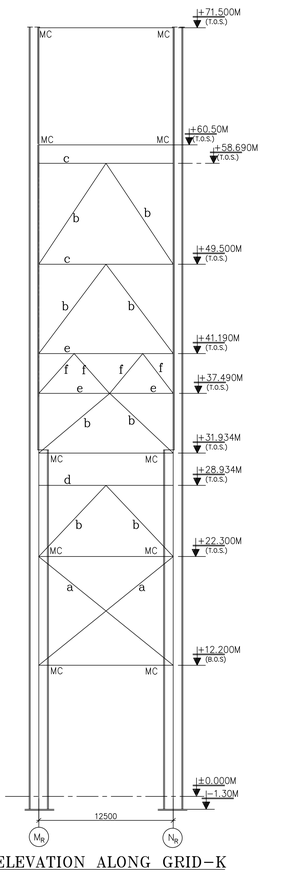


ELEVATION ALONG GRIDS–E & J

(MC – MOMENT CONNECTIONS)
(B.O.S – BOTTOM OF STEEL)
(T.O.S – TOP OF STEEL)



ELEVATION ALONG GRID–F, G & H



ELEVATION ALONG GRID–K

COLUMN SCHEDULE.

ONE BOLTED ERECTION JOINT IF REQUIRED SHALL BE PROVIDED.							
	(+)71.50 (T.O. CAP PL.)		1- FL PL.660X32 2- WEB PL. 25 TH.	1- FL PL.660X40 2- WEB PL. 32 TH.	1- FL PL.660X32 2- WEB PL. 25 TH.	1- FL PL.660X40 2- WEB PL. 32 TH.	10 TH. WEB STIFF. @ 1200 C/C. (TYP. U.N.)
	(+)31.934		1- FL PL. 920x50 2- WEB PL. 40 TH. 3-PL. 440x40 THK.	1- FL PL. 1300x50 2- WEB PL. 45 TH. 3-PL. 475x40 THK.	1- FL PL. 660x40 2- WEB PL. 32 TH. 3-PL. 305x32 THK.	1- FL PL. 1300x50 2- WEB PL. 45 TH. 3-PL. 475x40 THK.	
	(+)27.4340		1- FL PL. 800x50 2- WEB PL. 40 TH. 3-PL. 375x40 THK.	1- FL PL. 1000x50 2- WEB PL. 45 TH. 3-PL. 475x45 THK.	1- FL PL. 660x40 2- WEB PL. 32 TH. 3-PL. 305x32 THK.	1- FL PL. 1000x50 2- WEB PL. 45 TH. 3-PL. 475x45 THK.	12TH. WEB STIFF. @ 600 C/C (TYP. U.N.)
	(-)1.300 (BOT. OF BASE PL.)						
	ELEVATION	COLUMN SECTION.	M–E, N–E	M–F, M–G M–H, M–J	M–K, N–K	N–F, N–G N–H, N–J	REMARKS
			GROUP–1	GROUP–2	GROUP–3	GROUP–4	

M_L –N_L BAY TRANSVERSE GIRDER SCHEDULE

GIRDER DETIALS				GIRDER ON GRIDS AT ELEVATION (T.O.S.) UNLESS NOTED					REMARKS
D	FW	FT	WT	+12.95	+22.300	+31.934	+60.500	+71.500	
800	480	25	20					E, & K	2
		40	25					J, F, G, H,	
1200	600	45	32		F, G, H & J				
		40	25				E & K		
1250	660	45	32				F, G, H & J		
750	480	25	20			K			
		32	20	E, F, G, H, J, & K					
1000	480	32	25		E & K				
2500	600	50	32			E			
		50	50			F, G, H & J			

(PROVIDE 10 TH. WEB STIFF. @ 1200 C/C (MAX) (FABRICATOR TO CHECK INTERFERENCE WITH SECONDARY BEAMS)

VERTICAL BRACING SCHEDULE ALONG AXIS M_L & N_L

BRACING MKD.	BRACING SECTION	REMARKS
41VBM49 41VBN49	MC 400 BOX (T/T)	2 *9700 EXCEPT BETWEEN GRIDS J & K
49VBM58 49VBN58	MC 400 BOX (T/T)	
58VBM60 58VBN60	MC150BOX(T/T)	
31VBM37 60VBM71 31VBN37 60VBN71	MC 300 BOX (T/T)	
37VBM41 37VBN41	MC 200 BOX (T/T)	
28VBM31 28VBN31	MC 150 BOX	BRACING TYP. ON BOTH FLANGES OF COL
0VBM4	MC 400 BOX (T/T)	
4VBM13 13VBM22 4VBN13 13VBN22	MC 400 BOX (T/T)	
22VBM28 22VBN28	MC 300 BOX (T/T)	
0VBN4	MC 400 BOX (T/T)	

HORIZONTAL BRACING SCHEDULE

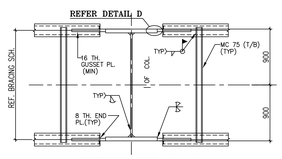
BRACING MKD.	BRACING SECTION
HBM58 HBN58	MC 300 BOX (T/T)
HBM71 HBN71	MC 250 BOX (T/T)
HBM37 HBN37 HBM41 HBN41 HBM49 HBN49 HBM60 HBN60	MC 300 BOX (T/T)
HBM28 HBN28	MC 200 BOX (T/T)
HBM4	MC 300 BOX (T/T)
HBN31 HBM31	MC 200 BOX (T/T)
HBN13 HBN22 HBM13 HBM22	MC 300 BOX (T/T)
HBN4	MC 300 BOX (T/T)
HBN31A HBM31A	MC 200 BOX (T/T) 2

TRANSVERSE BEAMS & BRACING SCHEDULE

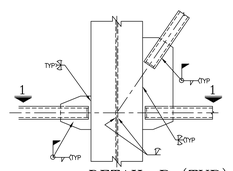
MARKED	MEMBER SIZE	MEMBER SHAPE
a	MC 400 BOX + 300x16 THK PL. (T/B)	150 300
b	MC 300 BOX (T/T)	
c	MC 400 BOX (T/T)	
d	MC 300 BOX + 250x16 THK PL. (T/B)	150 250
e	MC 400 BOX (T/T) + 170x6 THK FLANGE PL.	
f	MC 200 BOX (T/T)	

NOTES 2

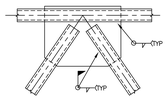
1. M/s JPL'S SECTIONS SHALL BE PREFERABLY USED AS PER THEIR AVAILABILITY.
2. SECONDARY BEAMS OF TRIPPER FLOOR, ALL BEAMS OF ROOF, COLUMNS & BRACINGS FROM TRIPPER FLOOR TO ROOF, ALL COMPONENTS OF CLADDING SYSTEM, SHEETINGS, ALL RCC COMPONENTS AND THEIR EMBEDDED PLATES AND OTHER PARTS, METAL DECKING SHEETS ARE IN THE M/S JPL'S SCOPE OF SUPPLY.
3. THE PROVISION OF BRACKETS EXCLUDING THE PTFE BEARINGS ETC TO SUPPORT THE CONVEYOR GAALERY IS IN THE BHEL'S SCOPE OF SUPPLY.
4. THE STRUCTURAL STEEL SHOULD BE OF GRADE B AS PER IS: 2062 AND SHALL COMPLY THE QUALITY NORMS WITH STANDARD FABRICATION AND ERECTION PRACTICES AS PER IS: 7215 & IS:12843.



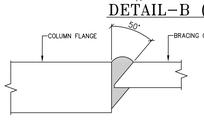
SECTION 1–1



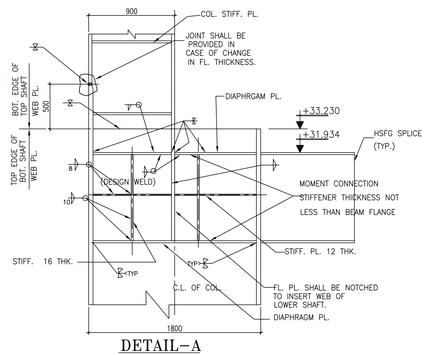
DETAIL–B (TYP)



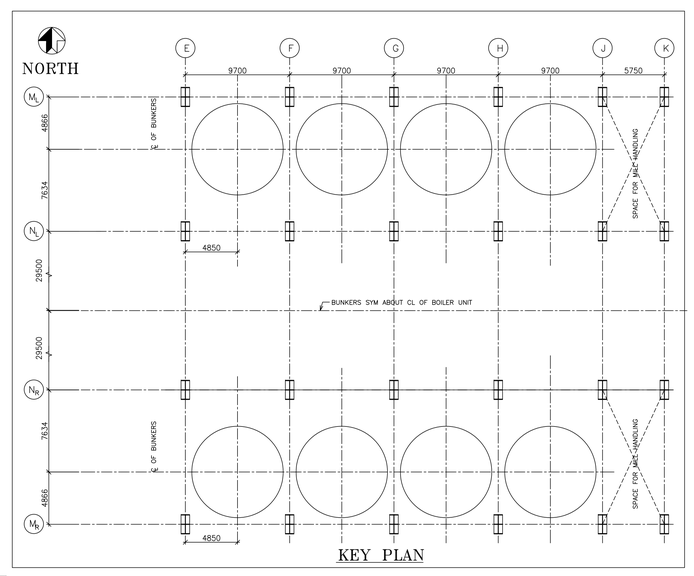
DETAIL–C (TYP)



DETAIL–D (TYP)



DETAIL–A



KEY PLAN

BHEL–PROJECT ENGINEERING MANAGEMENT(CIVIL)
THIS DRAWING MARKED(✓) IS RELEASED FOR
☑ COMMENTS/APPROVAL
☐ PLANNING/INFORMATION
☐ CONSTRUCTION
STAMP ALL PREVIOUS REVISION AS SUPERSEDED
ISSUED BY
NAME MP
SIGNATURE
DATE 31/03/2010

JOB NO.	329
STATUS :	CONTRACT

CUSTOMER'S CONSULTANT : DEVELOPMENT CONSULTANT PVT LTD.,CHENNAI

CUSTOMER : JINDAL

O.P. JINDAL SUPER THERMAL POWER PLANT
4 X 600 MW UNITS PHASE– III
JINDAL POWER LIMITED RAIGARH

BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NEW DELHI

DEPT CODE		NAME	SIGN	DATE
C	DRN	JKY	Sd/–	12.09.09
	DESN	MGA/LP	Sd/–	10.09.09
	CHD	MP	Sd/–	14.09.09
	APPD	RK	Sd/–	15.09.09

TITLE :–
MILL AND BUNKER BUILDING
LONGITUDINAL & TRANSVERSE ARRANGEMENT SH–1

CIVIL	MPL	ELEC	C&I	MSE	MAX	DEPT.	SCALE 1: 100	DRAWING NO.
						SIGN		PE–DG–329–616–C013
						DATE		SHEET 1 OF 1 REV. 02

REVISION 02	DATE	ALTD	CHD	APPD
	31.03.10	MGA	MP	RK

REVISED IN THE LINE WITH THE COMMENTS OF M/s JPL.
DRAWING REVISED & MARKED AS 2

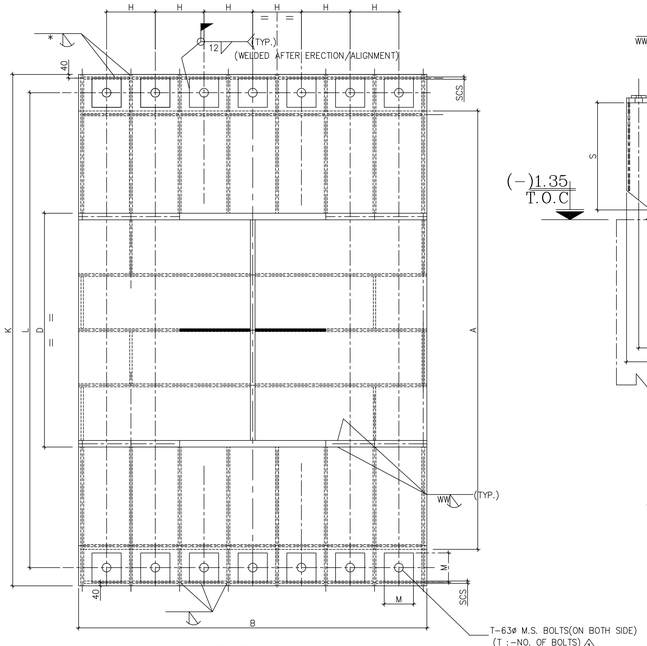
REVISION 01	DATE	ALTD	CHD	APPD
	23.12.09	DRS	MGA	RK

REVISED IN THE LINE WITH THE COMMENTS OF M/s JPL.

CAD FILE NAME: C:\Users\306363\PEM\Desktop\PROJECTS\V600MW (PH) STAGE II, RAIGARH(JPWR)\PE-DC-329-616-C013 & C014 R02 LongArchTransArch.ts2 01042010.dwg

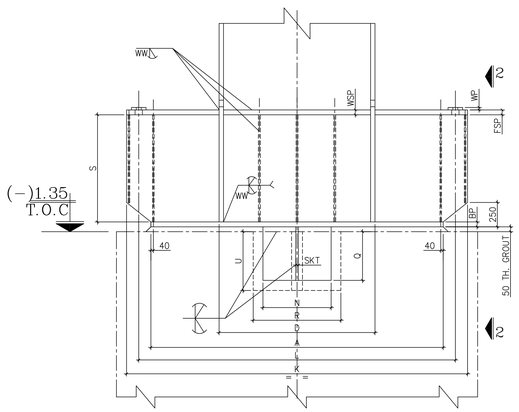
FORMAT SIZE A0

COPY RIGHT AND CONFIDENTIAL
The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED
it must not be used directly or indirectly in any way detrimental to the interest of the company.

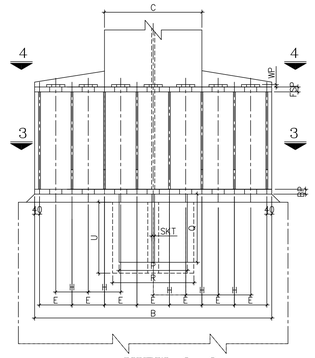


SECTION 4-4

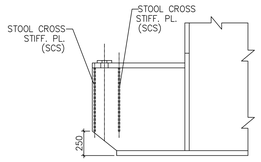
(WELDING MKD. THUS * SHALL BE DONE AFTER ERECTION, GROUTING BUT BEFORE FINAL TIGHTENING OF BOLTS)



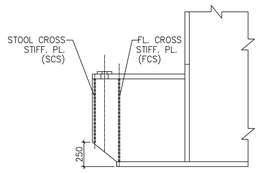
VIEW A-A



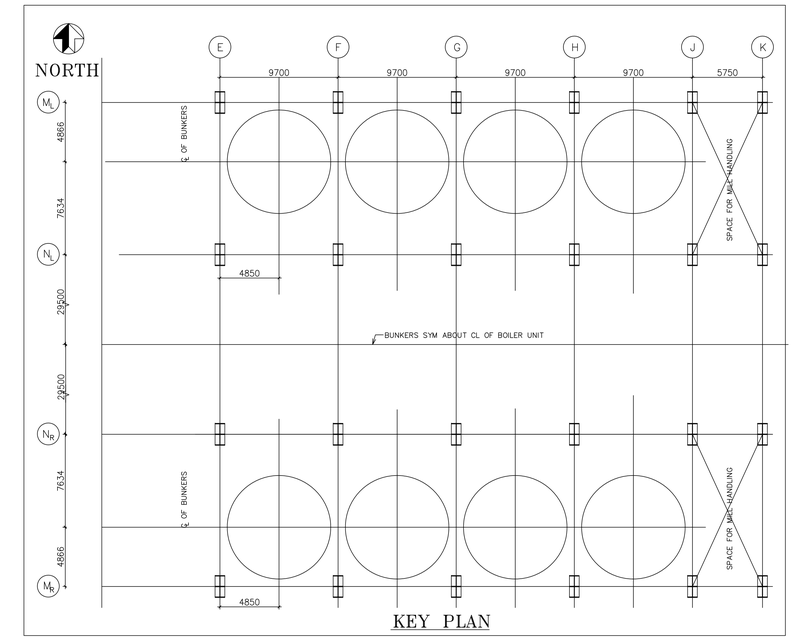
VIEW 2-2



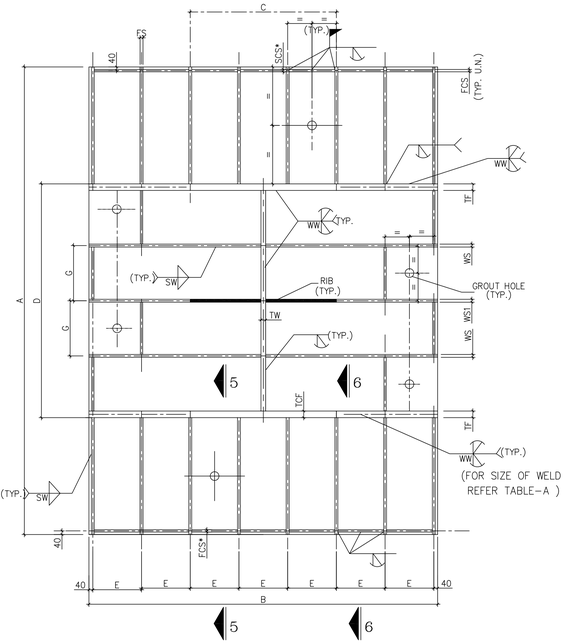
SECTION 5-5



SECTION 6-6



KEY PLAN



SECTION 3-3

(STIFF. MKD. THUS * SHALL BE DONE AFTER ERECTION, GROUTING BUT BEFORE FINAL TIGHTENING OF BOLTS)

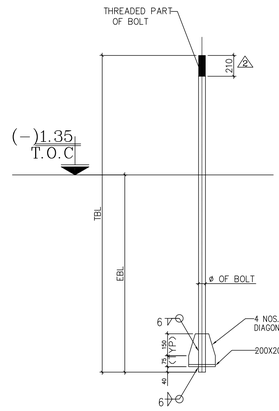
BASE PL. SCHEDULE 1 ⚠

ITEM MKD.	SIZE M-E & N-E	M-F & N-F	M-G & N-G	M-H & N-H	M-J & N-J	M-K & N-K	NOS. / COLUMN	REMARKS
BP	50	50				50	1	BASE PL WITH 6-50 ø GROUT HOLES.
FSP	50	50				50	2	FLANGE STOOL PL.WITH 8- * ø BOLT HOLES.
TF	50	50				40	4	PL. BUTT WELDED TO COL. FL. PL.
FS	32	32				32	16	FL. STIFF. PL.
WS	32	32				32	4	WEB STIFF. PL.
WP	25	25				25	14	WASHER PL. WITH 1-** ø BOLT HOLE
FCS	32	32				32	14	FL. CROSS STIFF. PL.
WCS	25	25				25	8	WEB CROSS STIFF. PL.
SCS	25	25				25	14	STOOL CROSS STIFF. PL.
WSP	50	50				50	4	WEB STOOL PL.
SKT	50	50				50	2	SHEAR KEY
WS1	40	45				32	2	WEB STIFF. PL. AT RIB PL.

* ø HOLES. = DIA. OF BOLT + 10 MM
** ø HOLES. = DIA. OF BOLT + 3 MM

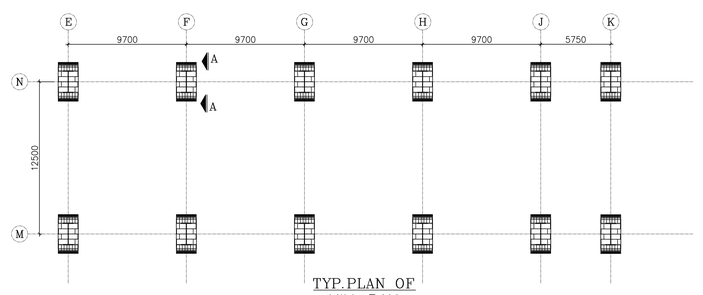
BASE PL. SCHEDULE 2

DIM MKD.	SIZE COLUMN MARKED M-E & N-E	M-F & N-F	M-G & N-G	M-H & N-H	M-J & N-J	M-K & N-K	REMARKS
A	3200	3200				2600	BASE PLATE
B	1600	1800				1350	
C	800 ⚠	1000				660	COLUMN WIDTH
D	1800	1800				1800	COLUMN DEPTH
E	215	245				210	C/C SPACING OF FLANGE STIFFNER
G	450	450				450	C/C SPACING OF WEB STIFFNER
H	215	245				210	
K	3640	3640				3040	E/E OF STOOL PL.
L	3400	3400				2800	C/C OF BOLT
M	160	160				160	WASHER PL.
N	750	1250				750	SHEAR KEY
P	750	1250				750	
Q	150	160				150	
R	900	1400				900	GROUTING WIDTH
S	850	1000				750	HEIGHT OF STIFFNER
T	14	14				12	NO. OF BOLTS
U	200	210				200	GROUTING DEPTH
TW	40	45				32 ⚠	THICKNESS OF COL. WEB PL.
⚠ TCF	50	50				40	THICKNESS OF COL. FLANGE PL.
EBL	1200	1400				1100	EMBEDDED BOLT LENGTH
TBL	2415	2765				2215	TOTAL BOLT LENGTH



DETAIL OF BOLTS.

(ALL BOLTS SHALL HAVE 2 NOS. OF NUTS.)



TYP.PLAN OF MILL BAY

BILL OF MATERIALS ⚠ (APPROX. FOR ALL UNITS)

MATERIAL/PLATES	WT (T)
50 THK. PLATE	660.0
45 THK. PLATE	20.0
40 THK. PLATE	10.0
32 THK. PLATE	530.0
25 THK. PLATE	60.0
TOTAL	1280.0

MATERIAL	WT (T)
63 MM DIA. OF BOLTS	125

MATERIAL	CUM
GROUTING	32

TABLE - A

(SHOWING SIZE OF WELD)

PL. THICKNESS.	WW (SIZE OF WELD IN MM)	SW(Minimum) (SIZE OF WELD IN MM)
8 & 10	DOUBLE BEVEL BUTT WELD WITH REINFORCED FILLET WELD OF 6 MM THICK WHEREVER REQD.	6
12		8
16 & 20		12
25		14
28 & 32		20
36 & 40		20
45 & 50		25

NOTES

1. ALL DIMENSIONS ARE IN MM. UNLESS OTHERWISE SPECIFIED.
2. FOR ALL OTHER GEN. NOTES AND DETAILS REF. DRG.PE-DG-329-616-C011
3. ALL HOLDING DOWN BOLTS SHALL BE M.S. AS PER IS:2062
4. ALL ELEVATIONS ARE REFERRED TO THE FINISHED FLOOR LEVEL OF POWERHOUSE 0.0M FLOOR WHICH CORRESPONDS TO RL 255.25M. ⚠

FOR FOUNDATION LOADING REFER DOC. NO. PE-DC-329-616-C003-R01 TITLED AS FOUNDATION LOADING & DESIGN OF BASE PLATES FOR MILL & BUNKER BAY COLUMNS.

BHEL-PROJECT ENGINEERING MANAGEMENT(CIVIL)
THIS DRAWING MARKED(✓) IS RELEASED FOR
☑ COMMENTS/APPROVAL
☐ PLANNING/INFORMATION
☐ CONSTRUCTION
STAMP ALL PREVIOUS REVISION AS SUPERSEDED

ISSUED BY	
NAME	MP
SIGNATURE	
DATE	26.03.2010

REV.	DATE	ALTD	CHD	APPD
02	26.03.2010	MGA	MP	RK
1.	DRAWING REVISED & MARKED AS ⚠			
01	11.01.2010	MGA	MP	RK
1.	DRAWING REVISED & MARKED AS ⚠			

JOB NO. 329
STATUS CONTRACT
DISTRIBUTION
PRINT SCALE IN METRE 0 2 4 6 8 10 20 30 40 50

CUSTOMER'S CONSULTANT : DEVELOPMENT CONSULTANT PVT LTD., KOLKATA

CUSTOMER : JINDAL

O.P. JINDAL SUPER THERMAL POWER PLANT
4 X 600 MW UNITS PHASE-III
JINDAL POWER LIMITED RAIGARH

BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NEW DELHI

DEPT CODE		NAME	SIGN	DATE
C	DRN	MGA	sd/-	30.09.09
	DESN	MGA/LP	sd/-	30.09.09
	CHD	MP	sd/-	05.10.09
	APPD	RK	sd/-	07.10.09

TITLE :-
MILL AND BUNKER BUILDING
GA & FOUNDATION LOADING WITH BASE PLATE DETAILS

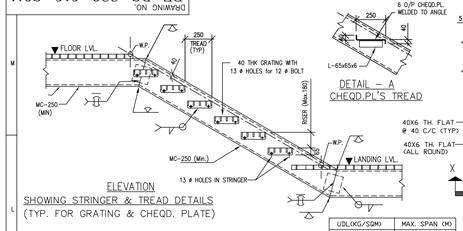
CIVIL	MPL	ELEC	C&I	MSE	MAX	DEPT. SIGN DATE	SCALE 1:100

DRAWING NO. PE-DG-329-616-C012

SHEET 1 OF 1 REV. 02

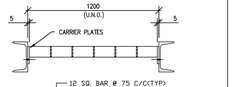
FORMAT SIZE A1

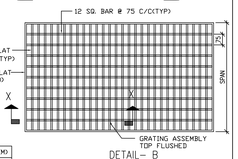
CAD FILE NAME: C:\Documents and Settings\3061027\Desktop\FdnBoltsCode\PE-DG-329-616-C012 R02 GAnFdnBolts.dwg



ELEVATION
SHOWING STRINGER & TREAD DETAILS
(TYP. FOR GRATING & CHEQD. PLATE)

DETAIL – A
CHEQD.PL'S TREAD





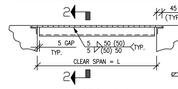
DETAIL – B
TYP. DETAIL OF GRATING WELDED TYPE

UDL(KG/SQM)	MAX. SPAN (M)
500	2.00
1000	1.60
1500	1.30

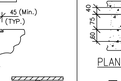
TYP. DETAIL OF GRATING FOR FLOOR/PLATFORM.

SCHEDULE OF STIFFENER

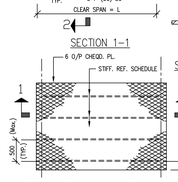
CLEAR SPAN (L)	STIFFENER
0 TO 450	–
450 TO 1000	FLAT 40x6
1000 TO 1500	FLAT 50x8
1500 TO 2000	L50X50X6



SECTION 1-1



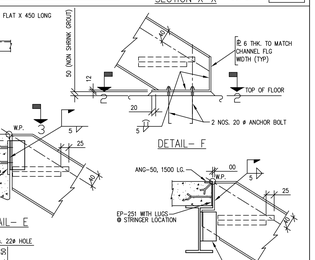
SECTION 2-2
(FOR ANGLE STIFF)



DETAIL OF 6 O/P CHEQD. PL.

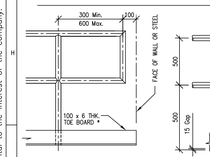
DETAIL – C

D-02

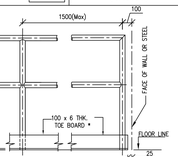


STRINGER TO CONCRETE CONNECTIONS

D-03

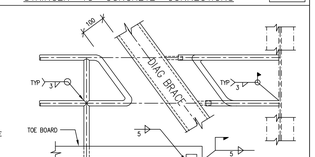


DETAIL – G



DETAIL – H

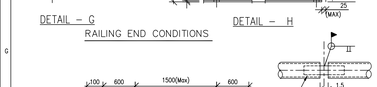
RAILING END CONDITIONS



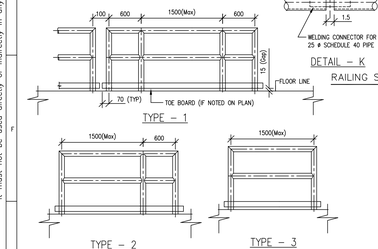
DETAIL – J

RAILING AT DIAG. BRACE

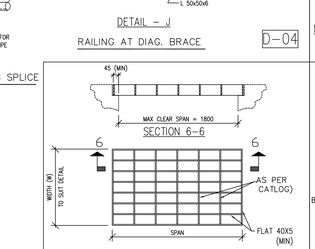
D-04



DETAIL – K
RAILING SPLICE

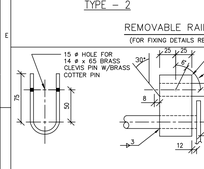


REMOVABLE RAILING SECTIONS
(FOR FIXING DETAILS REF. DETAIL NO. D-11)

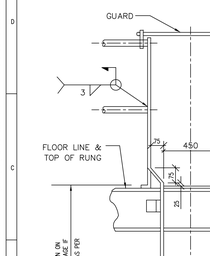


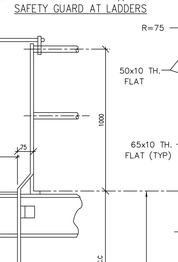
TYP. DETAIL OF 40 THK. M.S. GRATING
(ELECTROFORGED AND PAINTED)
(DETAILS AS PER MANUFACTURER'S CATLOG)

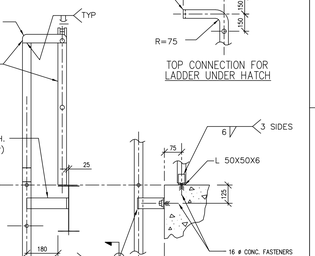
D-05



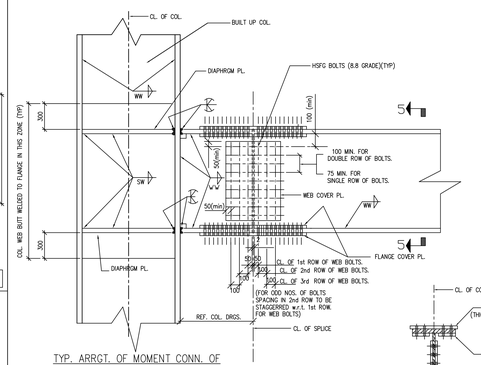
SAFETY GUARD AT LADDERS



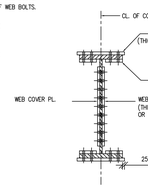




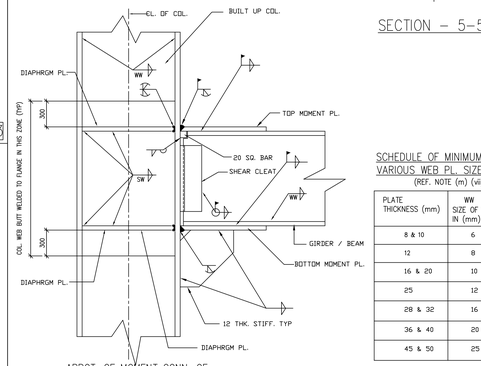
D-06



TYP. ARRGT. OF MOMENT CONN. OF
MAIN BEAM/GIRDER TO COLUMN (BOLTED FIELD CONNECTION)



SECTION – 5-5



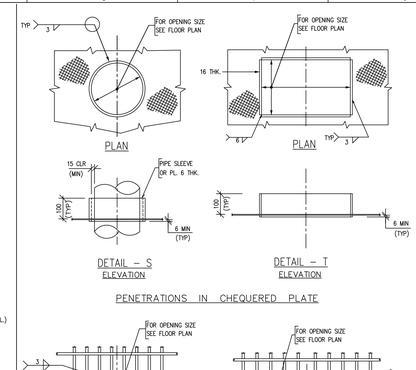
ARRGT. OF MOMENT CONN. OF
MAIN BEAM/GIRDER TO COLUMN (WELDED FIELD CONNECTION IF APPROVED)

(SPLICE SHOWN IS INDICATIVE AND SHALL BE DESIGNED AS PER RESPECTIVE MEMBER CAPACITY)

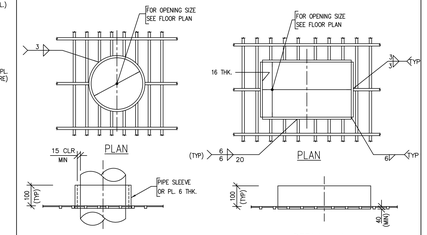
SCHEDULE OF MINIMUM WELD SIZE FOR VARIOUS WEB PL. SIZE OF WELD
(REF. NOTE (m) (vii))

PLATE THICKNESS (mm)	WW SIZE OF WELD IN (mm)	SW SIZE OF WELD IN (mm)
8 & 10	6	6
12	8	8
16 & 20	10	12
25	12	14
28 & 32	16	20
36 & 40	20	22
45 & 50	25	25

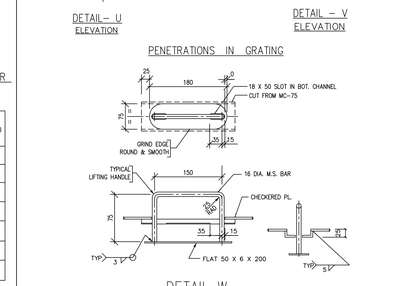
D-07



PENETRATIONS IN CHEQUERED PLATE

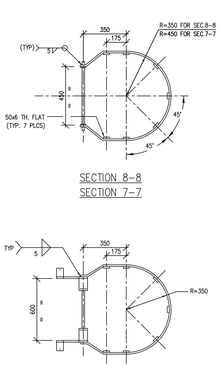


PENETRATIONS IN GRATING

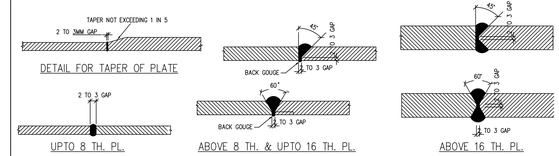


DETAIL W
CHEQUERED P COVER LIFTING HANDLE

D-08



D-09



TYP. DETAIL OF BUTT WELD FOR SPLICE (SHOP/ SITE)

GENERAL NOTES FOR STRUCTURAL STEEL AND MISCELLANEOUS STEEL WORKS

A. GENERAL

a.) ALL DIMENSIONS ARE IN MILLIMETRES EXCEPT FLOOR ELEVATIONS AND PLANT GRID WHICH ARE IN METRE UNLESS STATED OTHERWISE.

b.) ALL ELEVATIONS ARE WITH RESPECT TO MAIN POWER HOUSE BUILDING GROUND FLOOR LEVEL AS EL.(±)0.00 M. WHICH CORRESPONDS TO RL+++++ ABOVE M.S.L.

c.) ALL DRAWINGS SHALL BE READ IN CONJUNCTION WITH THE TERMS, CONDITIONS AND SPECIFICATIONS OF THE CONTRACT.

d.) THE FABRICATION & ERECTION OF STRUCTURAL STEEL SHALL BE IN ACCORDANCE WITH IS:800 – CODE OF PRACTICE FOR GENERAL CONSTRUCTION IN STEEL AND AS SPECIFIED IN THE CONTRACT TECHNICAL SPECIFICATIONS.

B. MATERIAL

a.) ALL MATERIALS SHALL BE NEW, CLEAN, RUST FREE AND STRAIGHTENED IF NECESSARY BEFORE BEING WORKED.

b.) ALL WELDING ELECTRODES SHALL BE OF LOW HYDROGEN TYPE CONFORMING TO IS:814 AND SHALL BE E8542H3UX TYPE. ALL ELECTRODES, FLUX, WIRE ETC. SHALL BE OF ADOR WELDING LTD., ESAB INDIA LTD., D&H SECHERON ELECTRODES PVT. LTD.

c.) ALL MILD STEEL BOLTS SHALL BE OF PROPERTY CLASS 4.6 GRADE–C CONFORMING TO IS:1367.

d.) ALL HIGH STRENGTH STRUCTURAL BOLTS SHALL BE OF PROPERTY CLASS 8.8 GRADE–A CONFORMING TO IS:1367 & SHALL BE SUPPLIED CONFORMING TO IS:3757

e.) ALL NUTS SHALL BE OF HEAVY DUTY HEXAGONAL TYPE AND SHALL BE COMPATIBLE WITH THE BOLTS, MS NUTS SHALL BE OF CARBON STEEL PRODUCT GRADE–C OF IS:1363 AND OF PROPERTY CLASS 5 OF IS:1367

f.) ALL NUTS & WASHERS FOR HIGH STRENGTH BOLTS (H.S.F.G.) SHALL CONFORM TO IS:6623 & IS:6649 RESPECTIVELY.

g.) WASHERS FOR MILD STEEL BOLTS SHALL BE OF MILD STEEL CONFORMING TO IS:5369 / IS:5372 OR IS:5374 OR IS:2016 AS THE CASE MAY BE.

h.) ALL ANCHOR BOLTS SHALL BE MILD STEEL OF GRADE 4.6 CONFORMING TO IS:5624

i.) ALL STRUCTURAL AND MISCELLANEOUS STEEL WORK SHALL BE OF MILD STEEL CONFORMING TO FOLLOWING INDIAN STANDARDS:–

i) STRUCTURAL SHAPES	IS:2062 (GRADE A)
ii) PLATE UPTO 20 MM. THICKNESS	IS:2062 (GRADE A)
iii) PLATE ABOVE 20 MM. THICKNESS (KILLED & NORMALISED)	IS:2062 (GRADE B)
iv) PLATE FOR CRANE GIRDER	IS:2062 (GRADE C)
v) STRUCTURAL PIPES	IS:806 (YST 25)
vi) STRUCTURAL HOLLOW SECTIONS (SQUARE & RECTANGULAR)	IS:4923
vii) M.S PIPES HANDRAIL	IS:1239(MEDIUM CLASS)
viii) CHEQUERED PLATE (6 MM. THK.)	IS:3502
ix) 3.15MM STAINLESS STEEL BUNKER LINNER	AISI 304

C CONNECTIONS

a.) UNLESS STATED OTHERWISE, ALL SHOP CONNECTIONS SHALL BE BY WELDING AND FIELD CONNECTION GENERALLY SHALL BE BOLTED USING HIGH STRENGTH FRICTION GRIP (HSFG) BOLTS OF 8.8 GRADE EXCEPT FOR SECONDARY TO MAIN BEAMS SHALL WITH WELDING.

b.) ALL CONNECTIONS SHALL BE DEVELOPED IN LINE WITH GOOD ENGINEERING PRACTICE AND SHALL BE SUBJECT TO THE APPROVAL OF THE ENGINEER.

c.) THE SIZE OF FILLET WELD SHALL BE 6 MM. MINIMUM UNLESS NOTED OTHERWISE.

d.) THE FIELD CONNECTION OF PURLINS SHALL BE WITH WELDED & FOR SAG ANGLE & WALL BEAMS SHALL BE DONE WITH M.S BOLTS

e.) THE DIAMETER OF BOLT SHALL BE 20MM (MINIMUM) FOR HIGH STRENGTH FRICTION GRIP AND 16 MM. (MINIMUM) FOR MS BOLTS.

f.) ALL BOLT CONNECTIONS SHALL HAVE MINIMUM TWO BOLTS.

g.) LENGTH OF FILLET WELDS SHALL NOT BE LESS THAN FOUR TIMES OF THE NOMINAL SIZE OF THE WELD OR 40 MM. WHICHEVER IS MORE.

h.) FILLET WELD TERMINATING AT ENDS MUST HAVE RETURN AROUND CORNERS NOT LESS THAN TWCE THE NOMINAL SIZE OF THE WELD.

i.) BUTT WELDS SHALL BE FULL PENETRATION BUTT WELD.

j.) THE DIAMETER OF BOLT HOLES SHALL NOT BE MORE THAN 2 MM. OF THE DIAMETER OF BOLT UNLESS STATED OTHERWISE.

k.) THE ERECTION CLEARENCE FOR END OF MEMBERS SHALL NOT BE MORE THAN 5 MM. AT EACH END UNLESS STATED OTHERWISE.

L.) GUSSET/END PLATES SHALL BE OF FOLLOWING MINIMUM THICKNESS UNLESS SPECIFIED OTHERWISE :–
i) FOR BEAMS OF DEPTH LESS THAN 450 :– 8 MM.
ii) FOR BEAMS OF DEPTH 450 TO 600 :– 10 MM.
iii) TRUSS/BRACINGS, WITH MEMBER THICKNESS 8 MM. & LESS :– 8MM.
iv) TRUSS/BRACINGS, WITH MEMBER THICKNESS 10MM & MORE :–12MM.

m.) UNLESS OTHERWISE STATED IN THE DESIGN DRAWINGS, THE CONNECTION SHALL BE DESIGNED FOR THE FOLLOWING LOADS:–
i) MOMENT CONNECTIONS DESIGNATED AS 'MC' TO BE DESIGNED FOR THE FULL CAPACITY OF THE MEMBER.
ii) SHEAR CONNECTIONS WILL BE DESIGNED FOR 75% OF SECTION STRENGTH FOR ROLLED SECTIONS AND 80% OF SECTION STRENGTH FOR BUILT UP SECTION OR ROLLED SECTION WITH COVER PLATES. IN ANY CASE, THE DESIGNED VALUE SHALL NOT BE LESS THAN THE ACTUAL SHEAR.
iii) CONNECTIONS FOR BEAMS IN MAIN AXIS/GRID TO BE DESIGNED FOR THE MINIMUM AXIAL LOAD OF 7.5 MT.(TENSION/COMPRESSION) UNLESS HIGHER LOAD IS SPECIFIED IN ADDITION TO REQUIRED SHEAR/ MOMENT LOAD. IN ANY CASE, THE DESIGNED AXIAL LOAD SHALL NOT BE LESS THAN THAN THE ACTUAL TENSION/ COMPRESSION.
iv) COLUMN SPLICE TO BE DESIGNED FOR FULL CAPACITY PLUS 5% ADDITION CAPACITY OF LOWER SECTIONS.
v) CONNECTION FOR ALL TRUSS MEMBERS TO BE DESIGNED FOR FULL TENSILE STRENGTH OF THE MEMBER.
vi) CONNECTION FOR BRACING MEMBERS TO BE DESIGNED FOR FULL TENSILE STRENGTH OF THE MEMBER.
vii) SIZE OF FILLET WELD FOR FLANGE TO WEB CONNECTION FOR BUILT UP SECTION SHALL BE AS FOLLOWS :–
a) FULL SHEAR CAPACITY OR ACTUAL SHEAR WHICHEVER IS MORE FOR BOX SECTION.
b) 80% OF FULL SHEAR CAPACITY OR ACTUAL SHEAR OR 0.5 OF WEB THICKNESS, WHICHEVER IS MORE. FOR BUILT–UP SECTION, WELD SHALL BE DOUBLE FILLET.
viii) THE CONNECTION BETWEEN TOP FLANGE AND WEB OF CRANE GIRDER SHALL BE FULL PENETRATION BUTT WELD AND FOR BOTTOM FLANGE CONNECTION, FILLET WELD MAY BE PROVIDED.
ix) CONNECTION OF BASE PLATE AND GUSSET MEMBERS WITH COLUMNS SHALL BE DONE CONSIDERING THAT TOTAL LOAD GETS TRANSFERED THROUGH WELD

n.) IN ALL CASES, THE UNTHREADED PORTION OF THE BOLT SHALL BEAR ON THE MEMBERS CONNECTED. A WASHER OF ADEQUATE THICKNESS MAY BE PROVIDED TO EXCLUDE THE THREADS FROM THE BEARING THICKNESS IF A LARGER GRIP BOLT HAS TO BE USED FOR THIS PURPOSE. ALL ERECTION BOLT HOLES SHALL BE SUITABLY PLUGGED.

o.) FOR ERECTION AND TEMPORARY ASSEMBLY M.S BLACK BOLTS TO BE USED, WHICH SHALL BE REMOVED AFTER FINAL WELDING. OPENING OF HOLES THUS LEFT SHALL BE PLUG WELDED.

p.) FOR COLUMNS FOUNDATION BOLTS, AT LEAST DOUBLE NUTS SHALL BE PROVIDED.

q.) OVER HEAD WELDING SHALL NOT BE RESORTED TO UNLESS SPECIFICALLY PROVIDED IN DRAWING..

r.) PROPER PRE–HEATING TEMPERATURE SHALL BE MAINTAINED AS PER SPEC.

s.) THE WELDING SEQUENCE/ PROCESS SHALL BE SO ADOPTED THAT NO ACCUMULATION OF SECONDARY WELDING STRESSES TAKES PLACE IN THE MEMBERS.

t.) DESIGN CALCULATIONS FOR MAJOR CONNECTIONS SHALL BE FURNISHED BY BHEL FOR APPROVAL DURING PREPARATION OF FABRICATION/ DETAIL DRGS.

D PAINTING

FOR INDOOR & OUTDOOR STEEL STRUCTURES
(ALL STRUCTURAL STEEL AND M.S HANDRAILS SHALL BE PAINTED AS FOLLOWS)

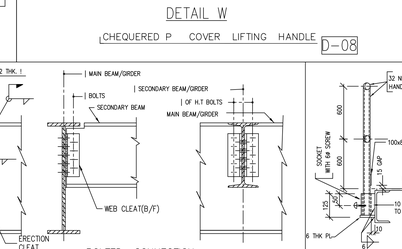
7.1 ONE OR MORE SHOP COAT OF EPOXY RESIN BASED ZINC PHOSPHATE PRIMER (IS:2074) DURING FABRICATION (DFT NOT LESS THAN 25 MICRONS)

7.2 ONE ADDITIONAL COAT OF EPOXY RESIN BASED ZINC PHOSPHATE PRIMER AND FINISHING COATS OF EPOXY RESIN BASED PAINT PIGMENTED WITH TITANIUM DIOXIDE APPROVED SHADE AND QUALITY SHALL BE PROVIDED AFTER COMPLETION OF ERECTION. AS PER SPEC. (DFT NOT LESS THAN 25 MICRONS)

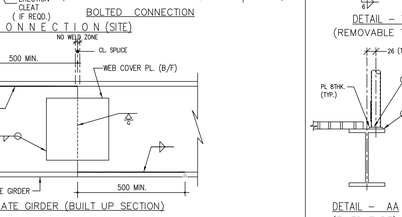
7.3 THE FINISHING PAINT SHALL BE WITH MINIMUM TWO OR MORE COATS OF EPOXY RESIN BASED PAINT PIGMENTED WITH TITANIUM DIOXIDE AND THE TOTAL DRY FILM THICKNESS (DFT) OF THE FINISHED PAINT SHOULD NOT BE LESS THAN 100 MICRON.(EXCLUDING PRIMER)

7.4 FOR INDOOR STRUCTURES SURFACE PREPARATION SHALL BE DONE EITHER MANUALLY OR BY ANY OTHER APPROVED METHOD.(EXCEPT SAND BLASTING SHOT BLASTING/FLAME CLEANING)

7.5 FOR OUTDOOR STRUCTURES SURFACE PREPARATION SHALL BE DONE WITH MECHANICAL POWER TOOLS AS PER IS:1477(PART–1) SUCH THAT THE RUST, DIRT & SCALES ETC., ARE COMPLETELY REMOVED.



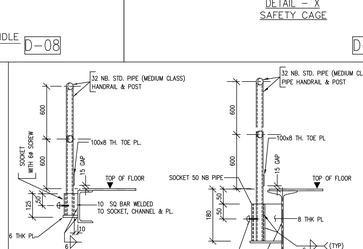
SECONDARY BEAM TO MAIN BEAM/GIRDER CONNECTION (SITE)

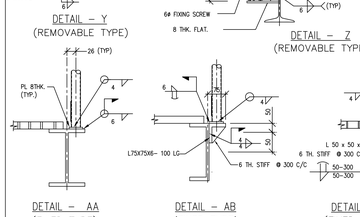


TYP. DETAIL OF SHOP SPLICE FOR BEAMS AND GIRDERS

1. LOCATION OF SPLICE SHALL BE PLACED IN THE ZONE L/4 TO L/5 FROM SUPPORT; WHERE L=CLEAR SPAN
2. NO. OF SPLICE JOINT SHALL NOT BE MORE THAN ONE IN A PARTICULAR BEAM/GIRDER.

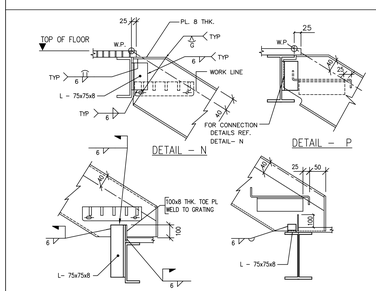
D-10





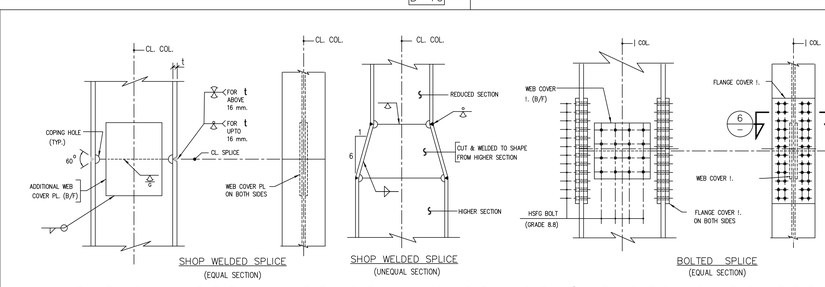
HANDRAIL FIXING DETAILS
(HANDRAIL SHALL BE GALVANISED)

D-11



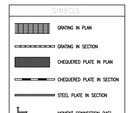
STRINGER TO STEEL CONNECTIONS

D-12



TYPICAL DETAIL OF COLUMN SPLICE (WELDED & BOLTED)

D-13



BHEL–PROJECT ENGINEERING MANAGEMENT(CIVIL)
THIS DRAWING MARKED(✓) IS RELEASED FOR
☑ COMMENTS/APPROVAL
☐ PLANNING/INFORMATION
☐ CONSTRUCTION
STAMP ALL PREVIOUS REVISION AS SUPERSEDED

	ISSUED BY
NAME	MP
SIGNATURE	
DATE	24.07.2009

CUSTOMER'S CONSULTANT : DEVELOPMENT CONSULTANT PVT LTD.,CHENNAI

CUSTOMER : JINDAL

O.P. JINDAL SUPER THERMAL POWER PLANT
4 X 600 MW UNITS PHASE–III
JINDAL POWER LIMITED RAIGARH

JOB NO. 307 & 318
STATUS : CONTRACT

BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NEW DELHI

DEPT CODE		NAME	SIGN	DATE
C	DRN	DSR	Sd/–	22.07.2009
	DESN	MGA	Sd/–	20.07.2009
	CHD	MP	Sd/–	23.07.2009
	APPD	BK	Sd/–	24.07.2009

TITLE :–
MILL AND BUNKER BUILDING
GENERAL NOTES & STANDARD DETAILS FOR STRUCTURAL STEEL WORKS

CIVIL	MPL	ELEC	C&I	MSE	MAX	DEPT.	SCALE 1:100
						SIGN	
						DATE	

DRAWING NO.
PE–DG–329–616–C011
SHEET 1 OF 1 REV. 0

FORMAT SIZE A0

DATE	ALTD	CHD	APPD	REV.

COPY RIGHT AND CONFIDENTIAL
The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED
It must not be used directly or indirectly in any way detrimental to the interest of BHEL.

CAD FILE NAME: C:\Users\306363\1.PDM\Desktop\PROJECTS\4X600MW OPJ STAGE II, RAIGARH\DWG\R0\PE-DG-329-616-C011 R0 STD DET STEEL DRG.dwg