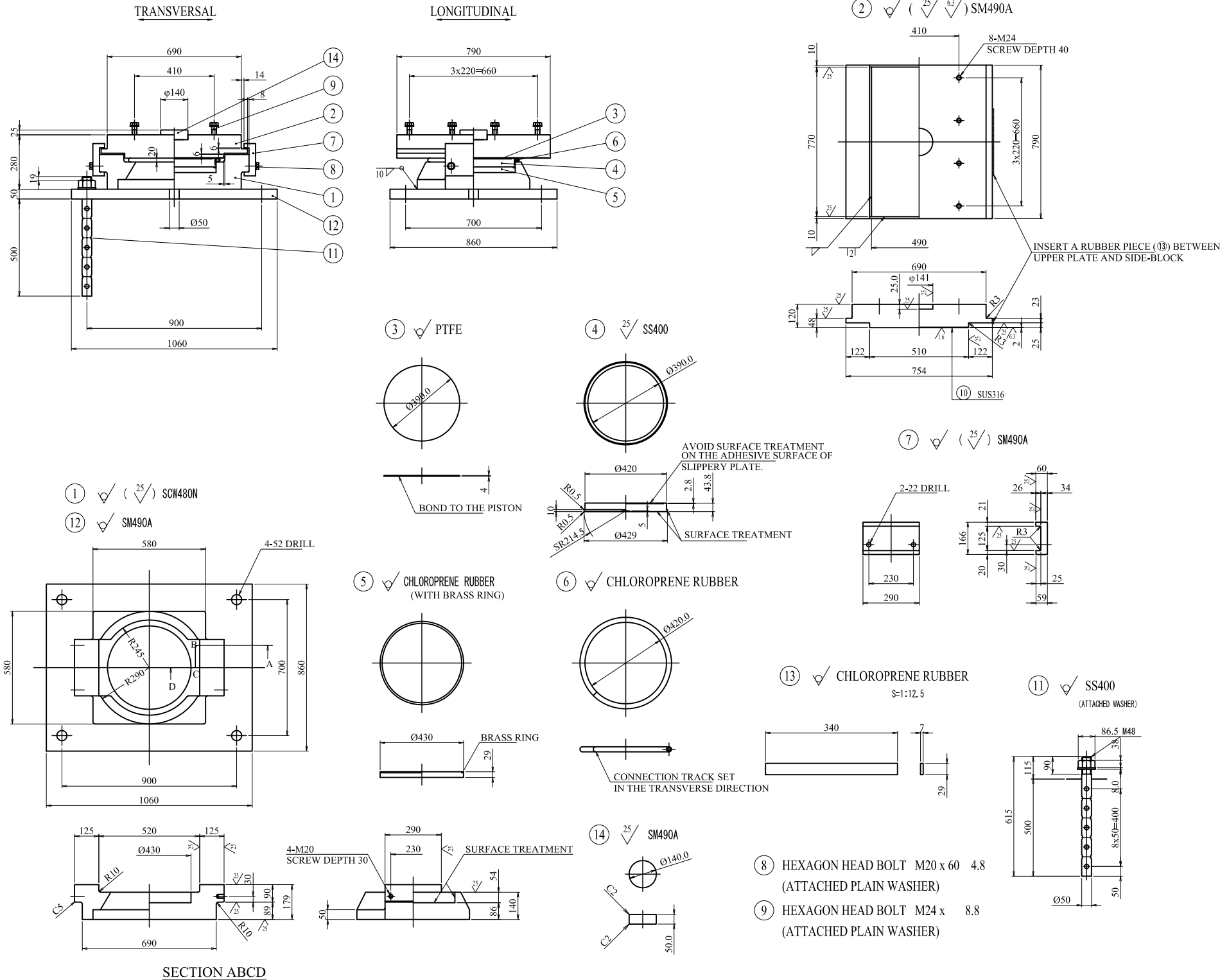


# DETAIL OF STEEL BEARING (MOVABLE TYPE, P13) (1) S=1:25



## DESIGN CONDITION

REACTION		
MAXIMUM TOTAL REACTION	R	3200 kN
DEAD LOAD REACTION	R <sub>d</sub>	2200 kN
LONGITUDINAL HORIZONTAL FORCE (IN MOVEMENT)	R <sub>llf</sub>	350 kN
TRANVERSE HORIZONTAL FORCE (IN SEISMIC L1)	R <sub>lt</sub>	700 kN
UPLIFT FORCE (IN SEISMIC L1)	V	220 kN
AMOUNT OF DISPLACEMENT		
TOTAL DESIGN DISPLACEMENT	e	±130 mm
SEISMIC COEFFICIENT		
HORIZONTAL SEISMIC COEFFICIENT	K <sub>hc</sub>	0.30
FRICTION COEFFICIENT		
DESIGN FRICTION COEFFICIENT	f	0.10
SUPPORTING CONDITIONS		
BRIDGE LONGITUDINAL DIRECTION : MOVE	BRIDGE TRANVERSE DIRECTION : FIX	

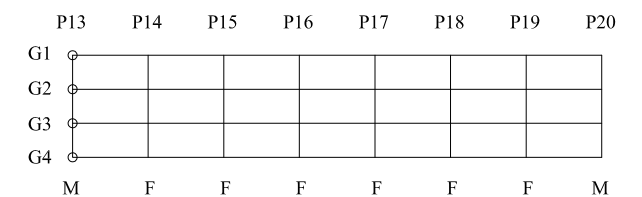
## TABLE OF MATERIAL

No.	COMPONENTS	MATERIAL	Qty	WEIGHT (kg)	NOTE
1	POT	SCW480N	1	310.8	
2	UPPER PLATE	SM490A	1	490.6	
3	SLIPPERY PLATE	PTFE	1	1.1	
4	PISTON	SS400	1	45.5	
5	RUBBER PLATE	CHLOROPRENE RUBBER	1	5.5	WITH BRASS RING
6	SEALING RING	CHLOROPRENE RUBBER	1	0.5	
7	SIDE BLOCKS	SM490A	2	30.0	
8	HEXAGON HEAD BOLT+ WASHER	—	4	0.9	
9	HEXAGON HEAD BOLT+ WASHER	—	8	3.4	
10	STAINLESS PLATE	SUS316	1	6.0	490x2x766
11	ANCHOR BOLT+ NUT+ WASHER	SS400	4	42.8	
12	BASE PLATE	SM490A	1	354.3	
13	RUBBER PIECES	CHLOROPRENE RUBBER	2	—	FOR INSTALLATION
14	SHEAR KEY	SM490A	1	6.0	
TOTAL WEIGHT				1297.4 (kg)	

### Notes:

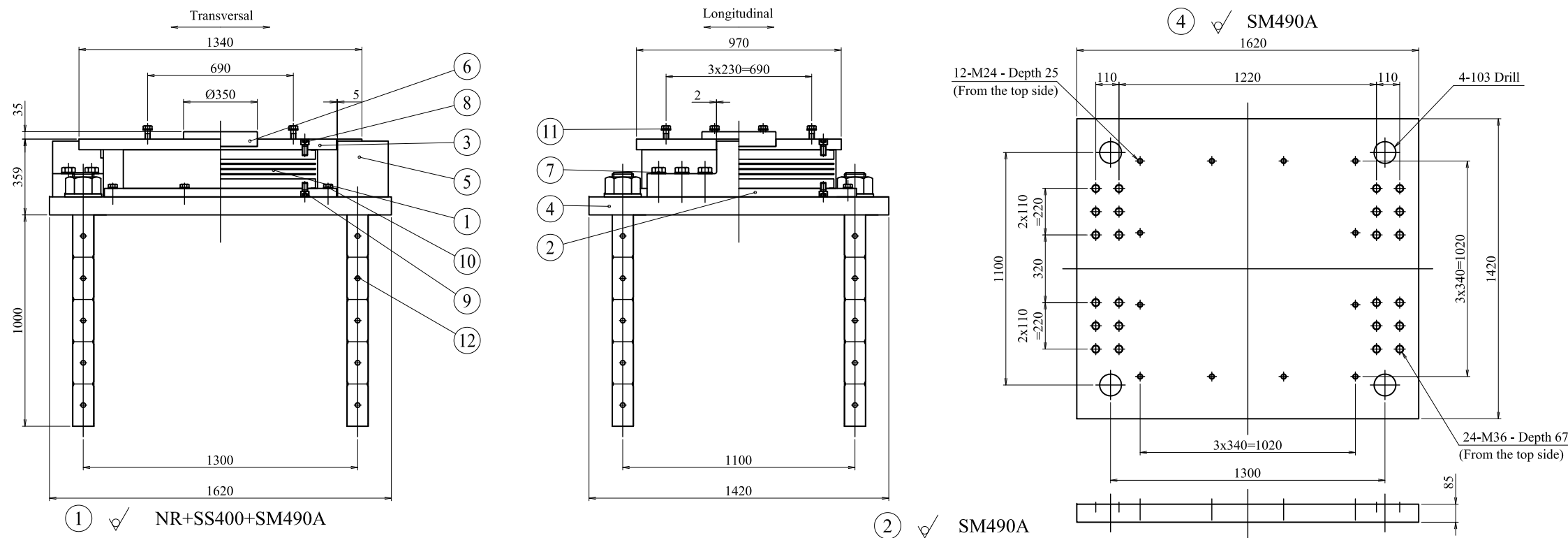
- Surface treatment shall be Hot Dipped Galvanized for steel block and plate with more than 550kg/sq.m and bolt, nut, washer with more than 350kg/sq.m.
- The rubber piece number ⑬ shall be removed after the installation of the bearing.
- The weight of bolt number ⑨ is for reference.
- Detail of fix holes shall be decided by bearing manufacture in necessary.
- Details of the slab and girder are designed based on the product shown in this Drawing.
- The Contractor has option to propose an alternative equivalent to the specified product, which shall be subjected to the Engineer's approval.

## LAYOUT



PROJECT NAME DETAILED DESIGN ON BAGO RIVER BRIDGE CONSTRUCTION PROJECT	FINANCED BY jica JAPAN INTERNATIONAL COOPERATION AGENCY	COUNTERPART REPUBLIC OF THE UNION OF MYANMAR MINISTRY OF CONSTRUCTION DEPARTMENT OF BRIDGE	JICA STUDY TEAM NIPPON KOEI CO., LTD. ORIENTAL CONSULTANTS GLOBAL CO., LTD. METROPOLITAN EXPRESSWAY COMPANY LIMITED CHODAI CO., LTD. NIPPON ENGINEERING CONSULTANTS CO., LTD.	NAME S. IMADA T. HAYAKAWA Y. SANO	SIGNATURE <i>S. Imada</i> <i>T. Hayakawa</i> <i>Y. Sano</i>	DATE 15 Jun.2017 20 Jun.2017 21 Jun.2017	DRAWING TITLE DETAIL OF STEEL BEARING (MOVABLE TYPE,P13) (1)	PACKAGE 2 DWG No. P2-SB-3001
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# DETAIL OF RUBBER BEARING (FIXED TYPE, P14 & P19) (2) S=1:25



### Design conditions

Maximum Reaction Load	R	8070	kN
Dead Load	Rd	6101	kN
Longitudinal Horizontal Force (EQ Level 1)	Rh1	2060	kN
Transversal Horizontal Force (EQ Level 1)	Rh2	1892	kN
Uplift Load (Earthquake)	V	610	kN

Rubber		
Static Elastic Shear Modulus	G0	0.8 N/mm <sup>2</sup>
Elongation at Break	γu	550 %
Testing Load for Rotation	R1	7653 kN
Vertical Deflection (at Rotation Checking)	δr	1.50 mm

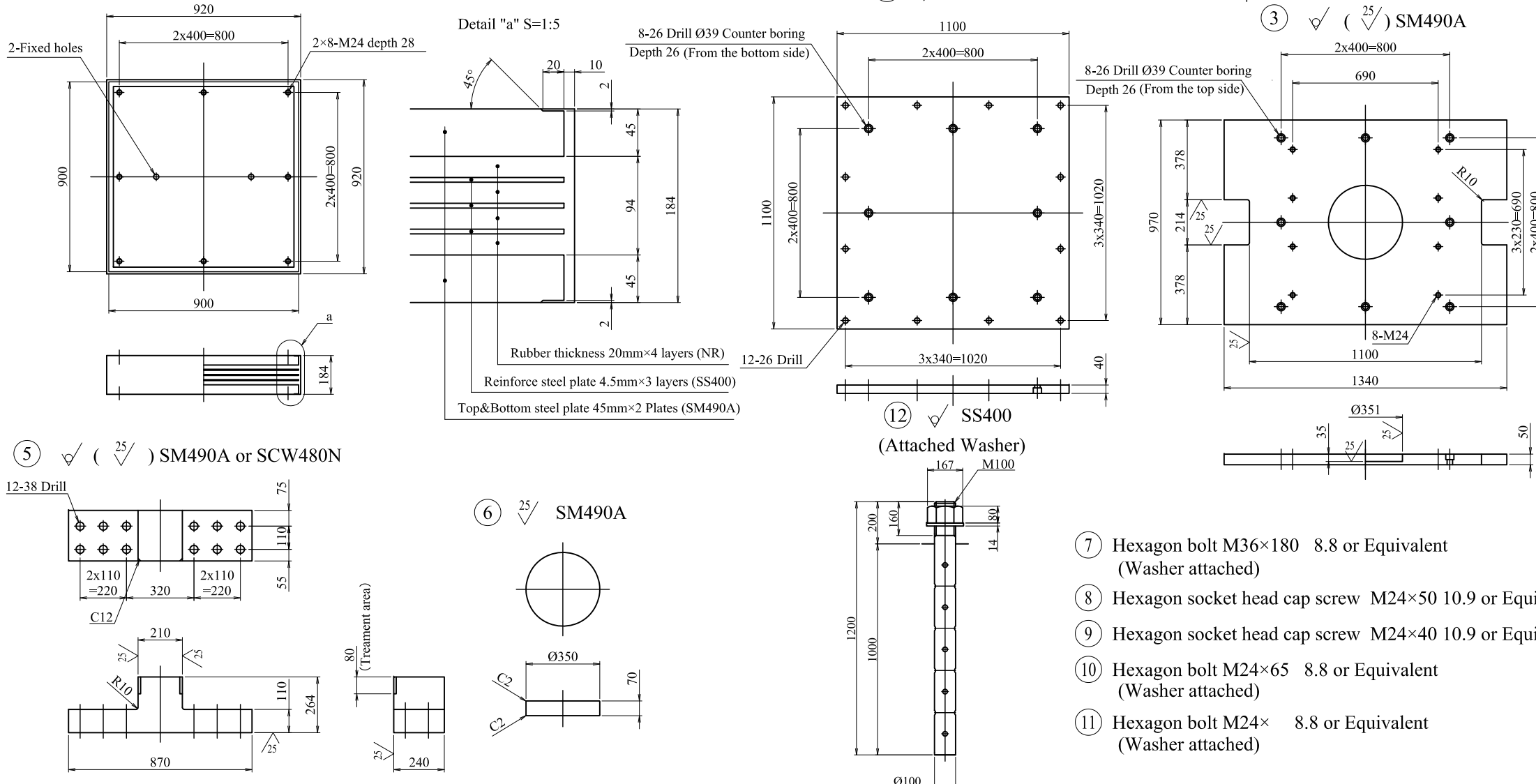
Support Condition of Bearing		
Longitudinal Direction:	Fix	Transversal Direction: Fix

### Material

Num	Part	Material	Qty.	Weight (kg)	Note
1	Rubber	NR+SS400+SM490A	1	739.2	
2	Middle Plate	SM490A	1	375.5	
3	Upper Plate	SM490A	1	459.4	
4	Base Plate	SM490A	1	1498.8	
5	Side Block	SM490A or SCW480N	2	459.0	
6	Shear Key	SM490A	1	52.9	
7	Hexagon Bolt + Washer	—	24	46.1	
8	Hexagon Socket Head Cap Screws Bolt	—	8	2.4	
9	Hexagon Socket Head Cap Screws Bolt	—	8	2.1	
10	Hexagon Bolt + Washer	—	12	4.3	
11	Hexagon Bolt + Washer	—	8	3.4	
12	Anchor Bolt + Washer	SS400	4	324.8	
Total weight				3967.9	(kg)

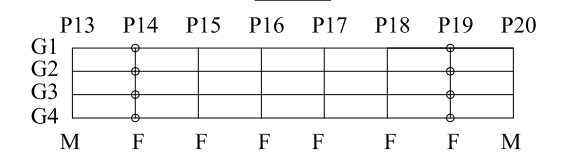
### Notes:

- Surface treatment shall be Hot Dipped Galvanized for steel block and plate with more than 550kg/sq.m and bolt, nut, washer with more than 350kg/sq.m.
- Weight of bolt (11) is reference value.
- Detail of Fix holes shall be decided by bearing manufacture in necessary.
- Details of the slab and girder are designed based on the product shown in this Drawing.
- The Contractor has option to propose an alternative equivalent to the specified product, which shall be subjected to the Engineer's approval.



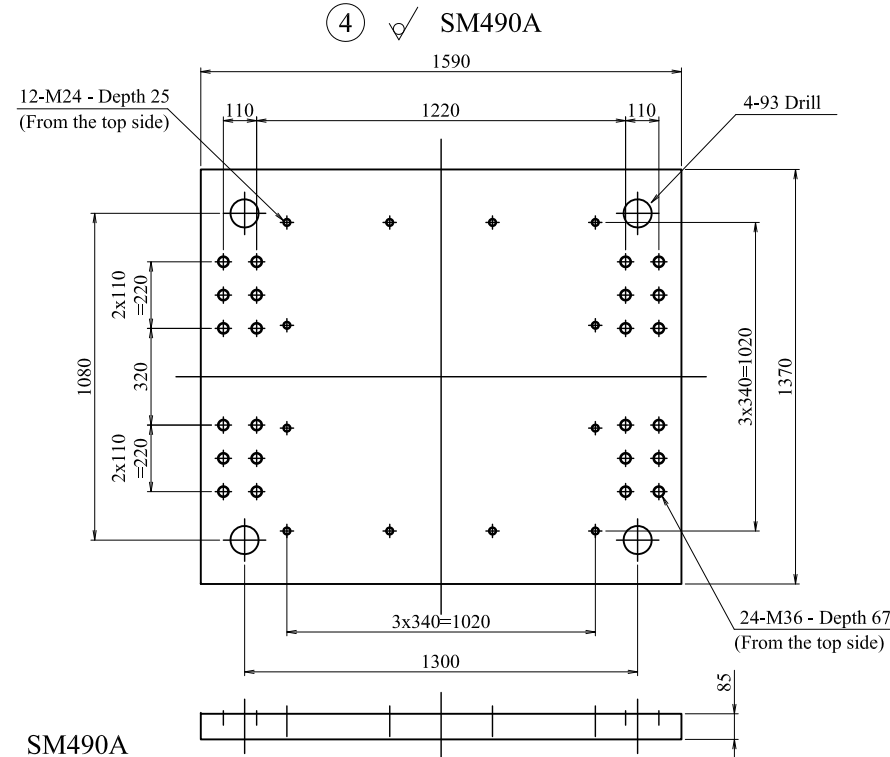
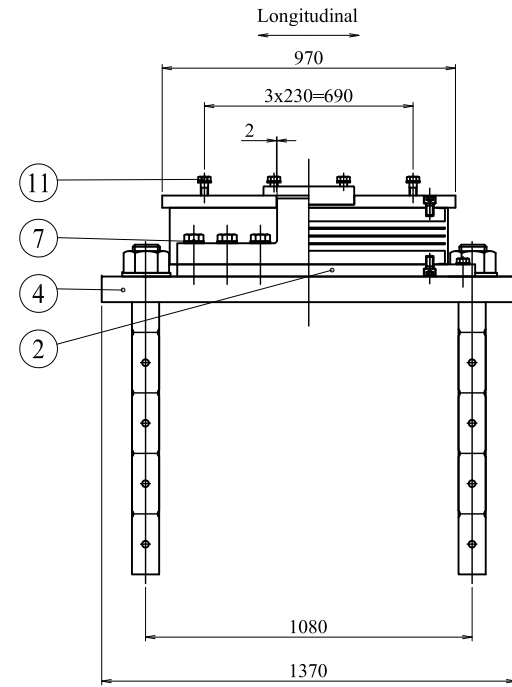
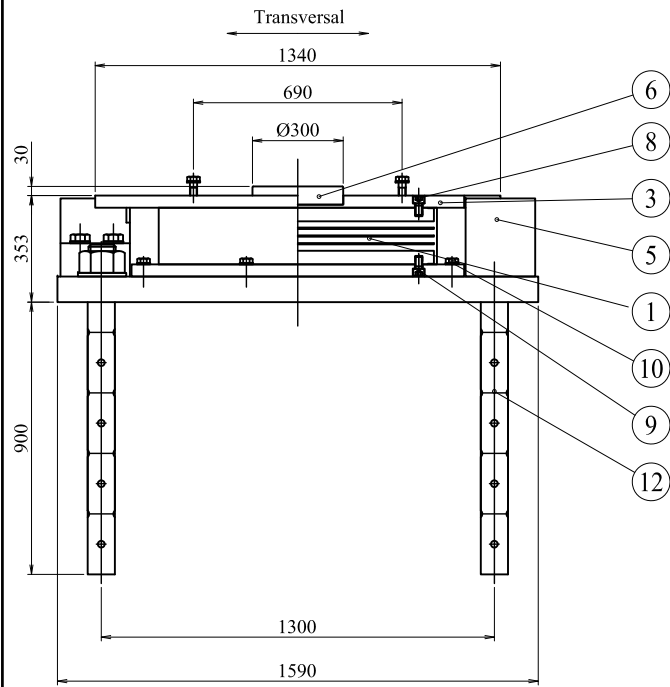
- (7) Hexagon bolt M36×180 8.8 or Equivalent (Washer attached)
- (8) Hexagon socket head cap screw M24×50 10.9 or Equivalent
- (9) Hexagon socket head cap screw M24×40 10.9 or Equivalent
- (10) Hexagon bolt M24×65 8.8 or Equivalent (Washer attached)
- (11) Hexagon bolt M24× 8.8 or Equivalent (Washer attached)

### Layouts



PROJECT NAME DETAILED DESIGN ON BAGO RIVER BRIDGE CONSTRUCTION PROJECT	FINANCED BY jica JAPAN INTERNATIONAL COOPERATION AGENCY	COUNTERPART REPUBLIC OF THE UNION OF MYANMAR MINISTRY OF CONSTRUCTION DEPARTMENT OF BRIDGE	JICA STUDY TEAM NIPPON KOEI CO., LTD. ORIENTAL CONSULTANTS GLOBAL CO., LTD. METROPOLITAN EXPRESSWAY COMPANY LIMITED CHODAI CO., LTD. NIPPON ENGINEERING CONSULTANTS CO., LTD.	NAME S. IMADA T. HAYAKAWA Y. SANO	SIGNATURE <i>S. Imada</i> <i>T. Hayakawa</i> <i>Y. Sano</i>	DATE 15 Jun.2017 20 Jun.2017 21 Jun.2017	DRAWING TITLE DETAIL OF RUBBER BEARING (FIXED TYPE,P14 & P19) (2)	PACKAGE 2 DWG No. P2-SB-3002
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# DETAIL OF RUBBER BEARING (FIXED TYPE, P15 - P18) (3) S=1:25



### Design conditions

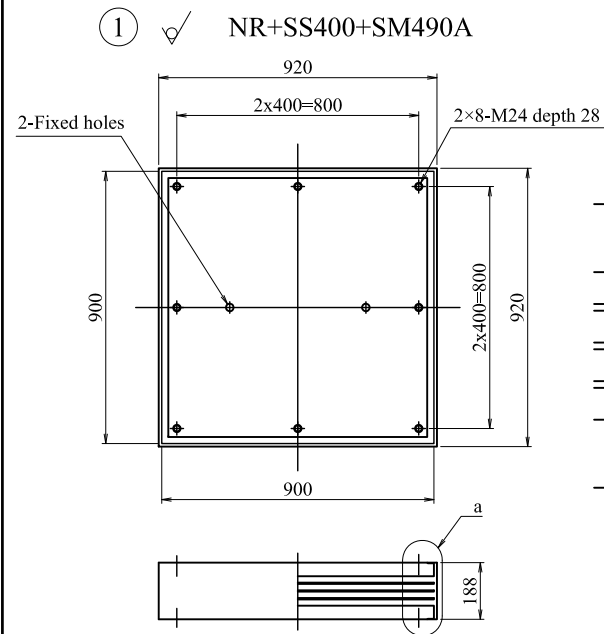
Maximum Reaction Load	R	7442	kN
Dead Load	Rd	5332	kN
Longitudinal Horizontal Force (EQ Level 1)	Rh1	1867	kN
Transversal Horizontal Force (EQ Level 1)	Rh2	1678	kN
Uplift Load (Earthquake)	V	533	kN
Rubber			
Static Elastic Shear Modulus	G0	0.8	N/mm <sup>2</sup>
Elongation at Break	γ <sub>u</sub>	550	%
Testing Load for Rotation	R1	6941	kN
Vertical Deflection (at Rotation Checking)	δ <sub>r</sub>	1.50	mm
Support Condition of Bearing			
Longitudinal Direction:	Fix	Transversal Direction:	Fix

### Material

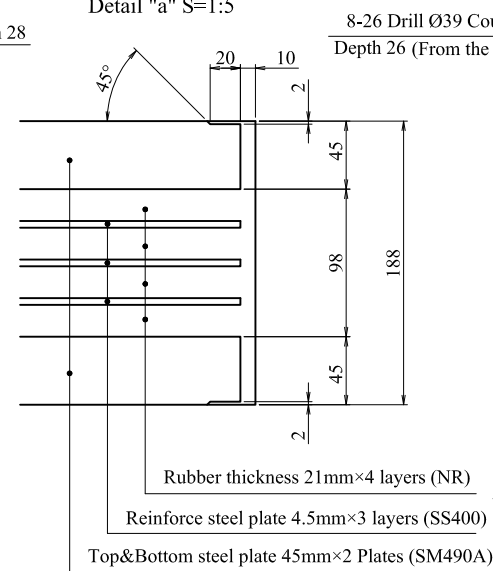
Num	Part	Material	Qty.	Weight (kg)	Note
1	Rubber	NR+SS400+SM490A	1	743.1	
2	Middle Plate	SM490A	1	375.5	
3	Upper Plate	SM490A	1	371.8	
4	Base Plate	SM490A	1	1421.4	
5	Side Block	SM490A or SCW480N	2	434.3	
6	Shear Key	SM490A	1	33.3	
7	Hexagon Bolt + Washer	—	24	46.1	
8	Hexagon Socket Head Cap Screws Bolt	—	8	2.1	
9	Hexagon Socket Head Cap Screws Bolt	—	8	2.1	
10	Hexagon Bolt + Washer	—	12	4.3	
11	Hexagon Bolt + Washer	—	8	3.4	
12	Anchor Bolt + Washer	SS400	4	238.9	
Total weight				3676.3	(kg)

### Notes:

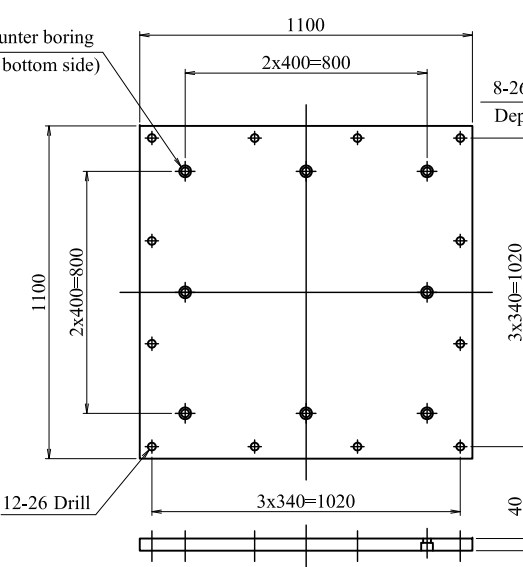
- Surface treatment shall be Hot Dipped Galvanized for steel block and plate with more than 550kg/sq.m and bolt, nut, washer with more than 350kg/sq.m.
- Weight of bolt ⑩ is reference value.
- Detail of Fix holes shall be decided by bearing manufacture in necessary.
- Details of the slab and girder are designed based on the product shown in this Drawing.
- The Contractor has option to propose an alternative equivalent to the specified product, which shall be subjected to the Engineer's approval.



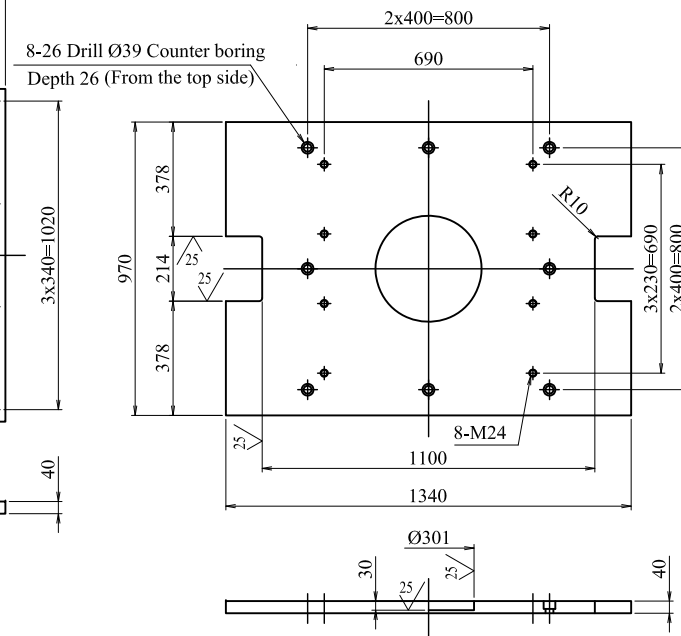
### Detail "a" S=1:5



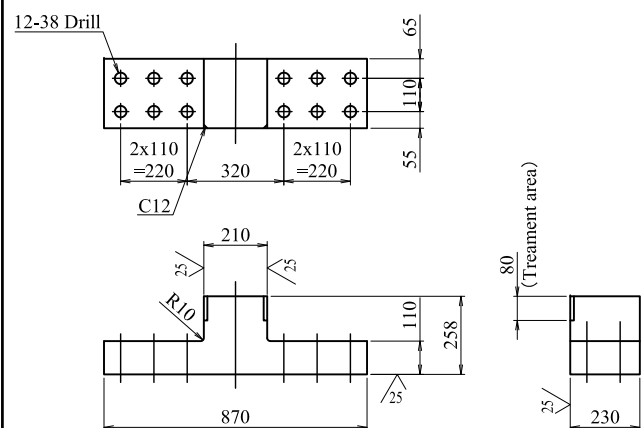
### ② SM490A



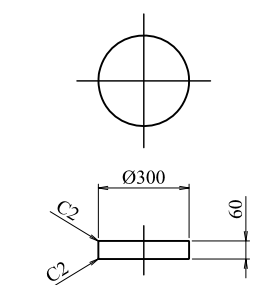
### ③ (25) SM490A



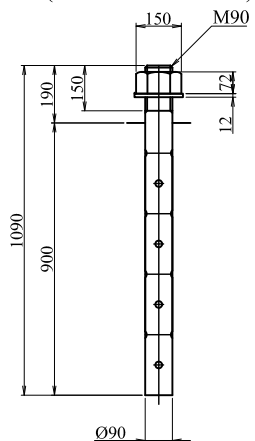
### ⑤ (25) SM490A or SCW480N



### ⑥ 25 SM490A

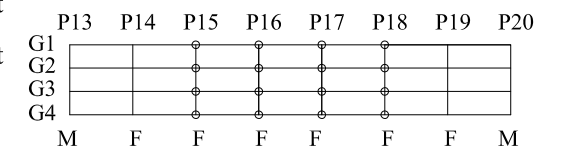


### ⑫ SS400 (Attached Washer)

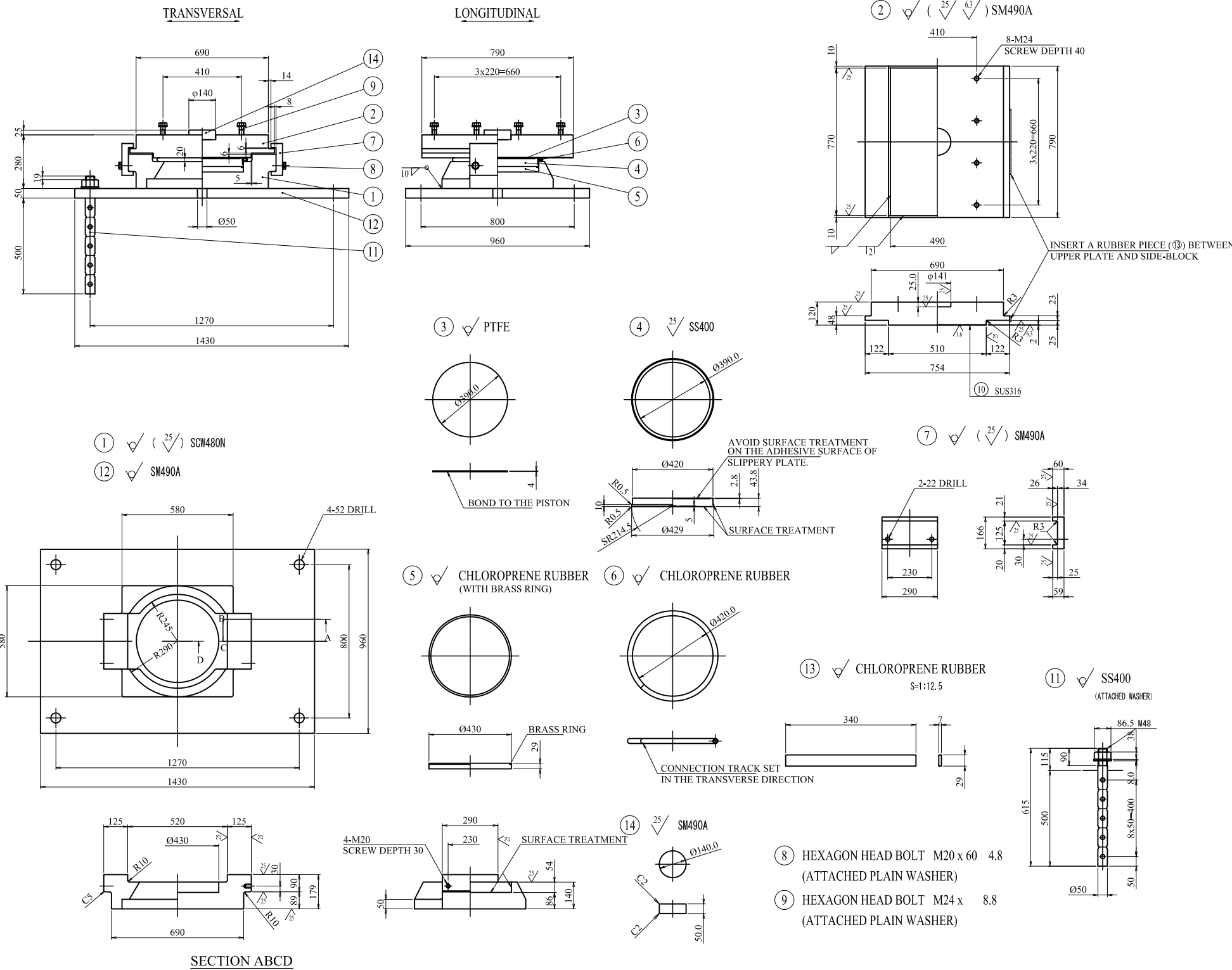


- ⑦ Hexagon bolt M36×180 8.8 or Equivalent (Washer attached)
- ⑧ Hexagon socket head cap screw M24×40 10.9 or Equivalent
- ⑨ Hexagon socket head cap screw M24×40 10.9 or Equivalent
- ⑩ Hexagon bolt M24×65 8.8 or Equivalent (Washer attached)
- ⑪ Hexagon bolt M24× 8.8 or Equivalent (Washer attached)

### Layouts



# DETAIL OF STEEL BEARING (MOVABLE TYPE, P20) (4) S=1:25



## DESIGN CONDITION

REACTION		
MAXIMUM TOTAL REACTION	R	3000 kN
DEAD LOAD REACTION	Rd	1900 kN
LONGITUDINAL HORIZONTAL FORCE (IN MOVEMENT)	R <sub>11r</sub>	300 kN
TRANVERSE HORIZONTAL FORCE (IN SEISMIC L1)	R <sub>11t</sub>	600 kN
UPLIFT FORCE (IN SEISMIC L1)	V	190 kN
AMOUNT OF DISPLACEMENT		
TOTAL DESIGN DISPLACEMENT	e	±130 mm
SEISMIC COEFFICIENT		
HORIZONTAL SEISMIC COEFFICIENT	K <sub>hc</sub>	0.30
FRICTION COEFFICIENT		
DESIGN FRICTION COEFFICIENT	f	0.10
SUPPORTING CONDITIONS		
BRIDGE LONGITUDINAL DIRECTION : MOVE	BRIDGE TRANVERSE DIRECTION : FIX	

## TABLE OF MATERIAL

No.	COMPONENTS	MATERIAL	Qty	WEIGHT (kg)	NOTE
1	POT	SCW480N	1	310.8	
2	UPPER PLATE	SM490A	1	490.6	
3	SLIPPERY PLATE	PTFE	1	1.1	
4	PISTON	SS400	1	45.5	
5	RUBBER PLATE	CHLOROPRENE RUBBER	1	5.5	WITH BRASS RING
6	SEALING RING	CHLOROPRENE RUBBER	1	0.5	
7	SIDE BLOCKS	SM490A	2	30.0	
8	HEXAGON HEAD BOLT+ WASHER		4	0.9	
9	HEXAGON HEAD BOLT+ WASHER		8	3.4	
10	STAINLESS PLATE	SUS316	1	6.0	490x2x766
11	ANCHOR BOLT+ NUT+ WASHER	SS400	4	42.8	
12	BASE PLATE	SM490A	1	534.4	
13	RUBBER PIECES	CHLOROPRENE RUBBER	2		FOR INSTALLATION
14	SHEAR KEY	SM490A	1	6.0	
TOTAL WEIGHT				1478.5 (kg)	

### Notes;

- 1) Surface treatment shall be Hot Dipped Galvanized for steel block and plate with more than 550kg/sq.m and bolt, nut, washer with more than 350kg/sq.m.
- 2) The rubber piece number ⑬ shall be removed after the installation of the bearing.
- 3) The weight of bolt number ⑨ is for reference.
- 4) Detail of fix holes shall be decided by bearing manufacture in necessary.
- 5) Details of the slab and girder are designed based on the product shown in this Drawing.
- 6) The Contractor has option to propose an alternative equivalent to the specified product, which shall be subjected to the Engineer's approval.

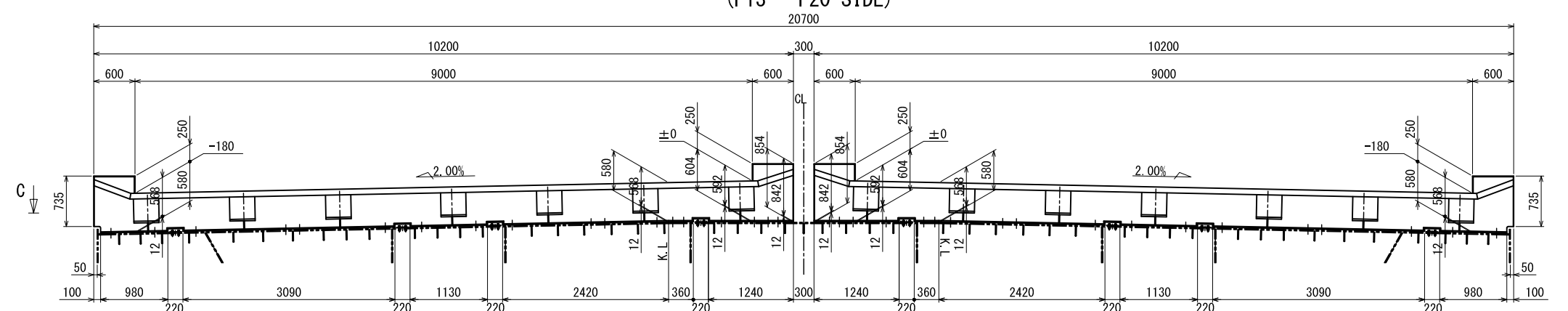
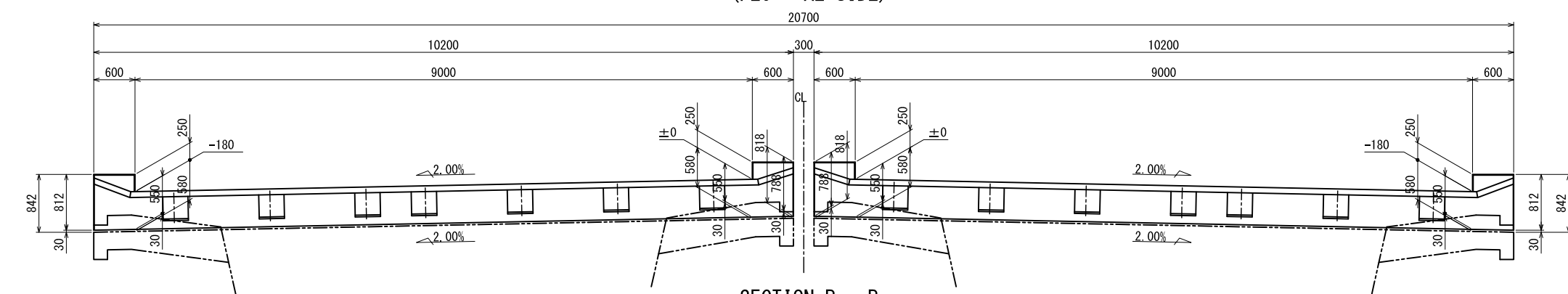
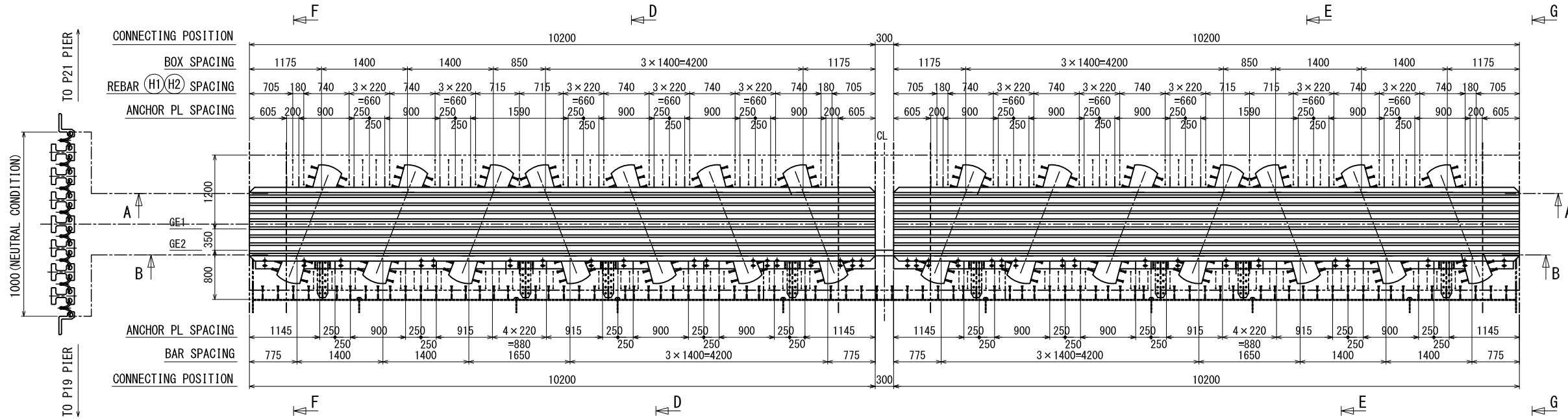
## LAYOUT





# DETAIL OF EXPANSION JOINT (P20) (1) S=1:80

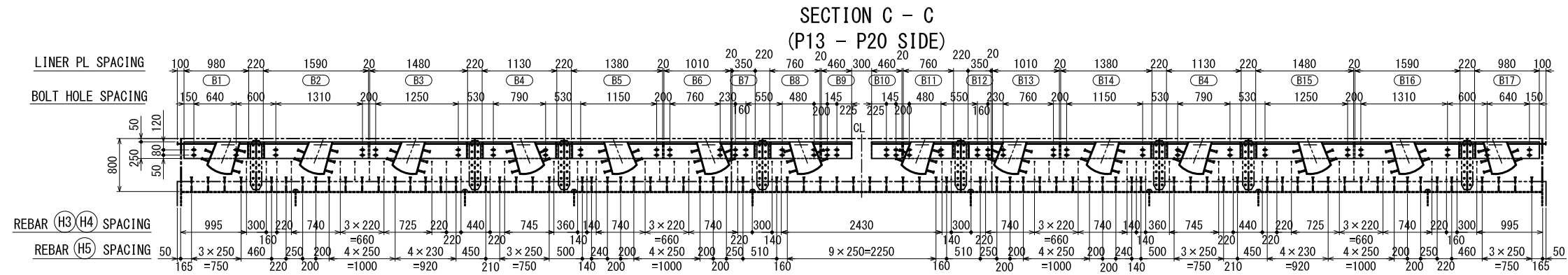
## EJ - 3 ASSEMBLY DRAWING (1/2)



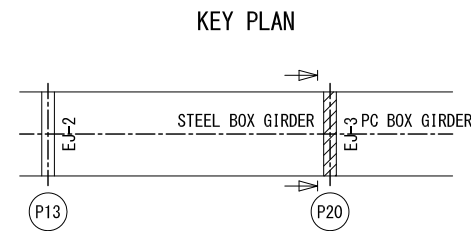
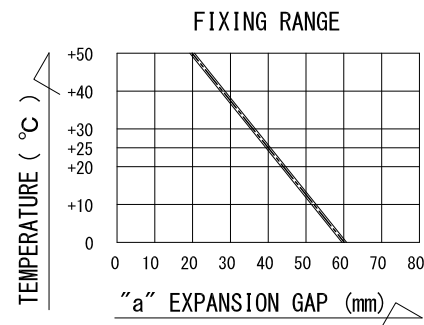
PROJECT NAME DETAILED DESIGN ON BAGO RIVER BRIDGE CONSTRUCTION PROJECT	FINANCED BY JAPAN INTERNATIONAL COOPERATION AGENCY	COUNTERPART REPUBLIC OF THE UNION OF MYANMAR MINISTRY OF CONSTRUCTION DEPARTMENT OF BRIDGE	JICA STUDY TEAM NIPPON KOEI CO., LTD. ORIENTAL CONSULTANTS GLOBAL CO., LTD. METROPOLITAN EXPRESSWAY COMPANY LIMITED CHODAI CO., LTD. NIPPON ENGINEERING CONSULTANTS CO., LTD.	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;">NAME</th> <th style="width: 15%;">SIGNATURE</th> <th style="width: 15%;">DATE</th> </tr> </thead> <tbody> <tr> <td>PREPARED BY S. IMADA</td> <td></td> <td>15 Jun.2017</td> </tr> <tr> <td>CHECKED BY T. HAYAKAWA</td> <td></td> <td>20 Jun.2017</td> </tr> <tr> <td>APPROVED BY Y. SANO</td> <td></td> <td>21 Jun.2017</td> </tr> </tbody> </table>	NAME	SIGNATURE	DATE	PREPARED BY S. IMADA		15 Jun.2017	CHECKED BY T. HAYAKAWA		20 Jun.2017	APPROVED BY Y. SANO		21 Jun.2017	DRAWING TITLE DETAIL OF EXPANSION JOINT (P20) (1)	PACKAGE 2 DWG No. P2-SB-3011
NAME	SIGNATURE	DATE																
PREPARED BY S. IMADA		15 Jun.2017																
CHECKED BY T. HAYAKAWA		20 Jun.2017																
APPROVED BY Y. SANO		21 Jun.2017																

# DETAIL OF EXPANSION JOINT (P20) (2) S=1:80

## EJ - 3 ASSEMBLY DRAWING (2/2)



DESIGN CRITERIA	
LOAD (WHEEL LOAD)	72.5 kN
TEMPERATURE RANGE	0°C ~ +50°C
DISPLACEMENT IN ORDINARY CONDITION	322 mm
AMOUNT OF RESERVE IN ORDINARY CONDITION	65 mm
TOTAL DISPLACEMENT IN ORDINARY CONDITION	387 mm
SEISMIC DISPLACEMENT	630 mm



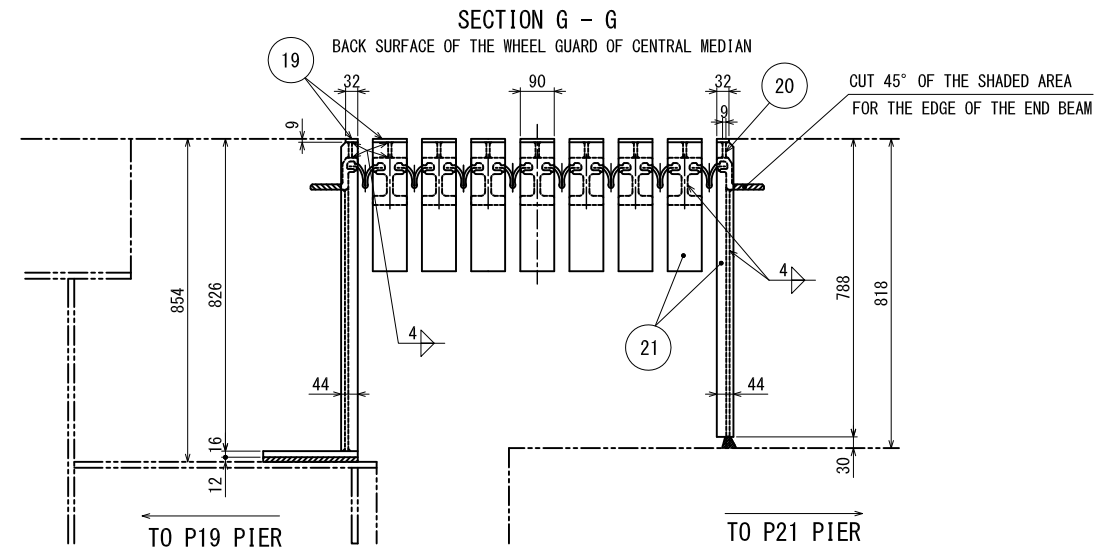
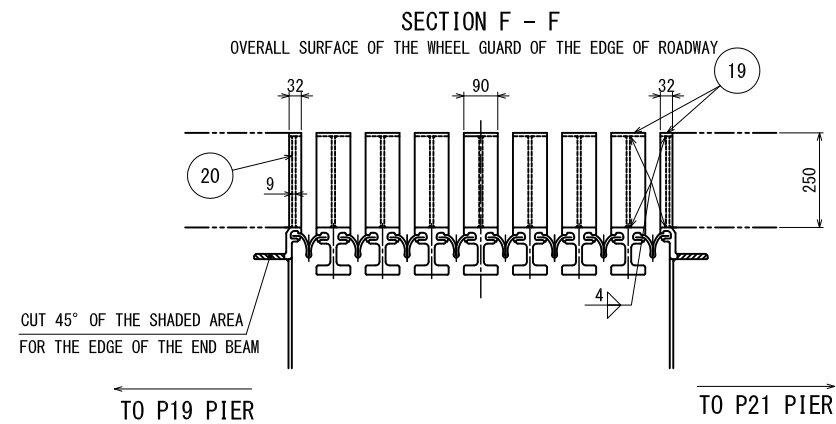
**NOTES (for P2-SB-3011, P2-SB-3012) :**

- 1 - This Drawing shows the condition of expansion gap "A"=40mm (at 25°C) per cell.
- 2 - Painting: Concrete bonding sections painted with ZINC-RICH PRIMER (15 μm), and for sections remaining modified epoxy resin is painted twice (top coating: black).
- 3 - Unless otherwise instructed, welding points shall be implemented fillet welding of 6mm.
- 4 - Details of the slab and girder are designed based on the product shown in this Drawing.
- 5 - The Contractor has option to propose an alternative equivalent to the specified product, which shall be subjected to the Engineer's approval.
- 6 - The expansion joint shall be set in consideration of thermal expansion.

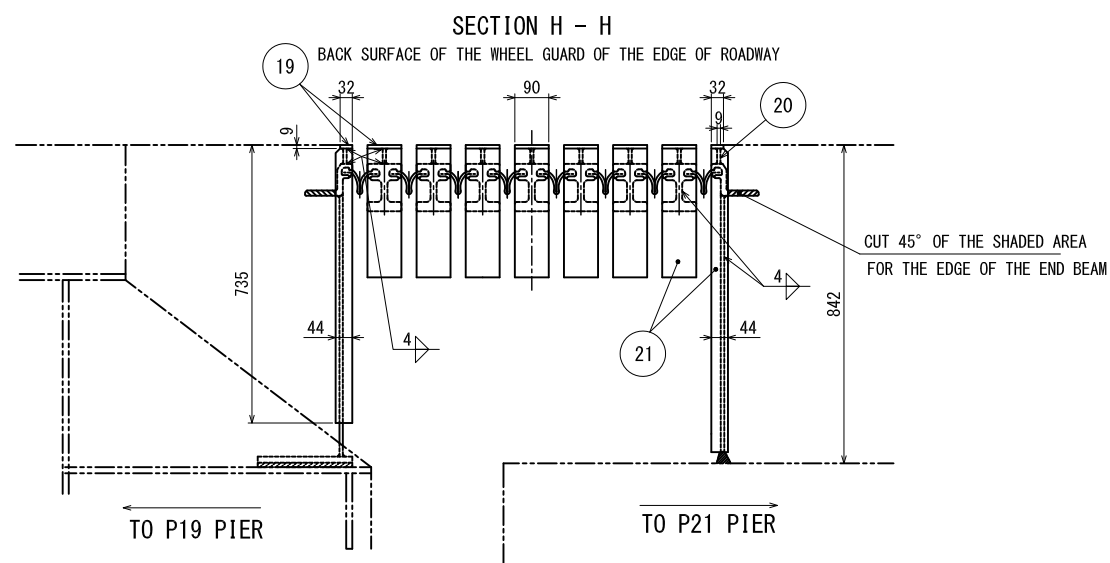


# DETAIL OF EXPANSION JOINT (P20) (4) S=1:20

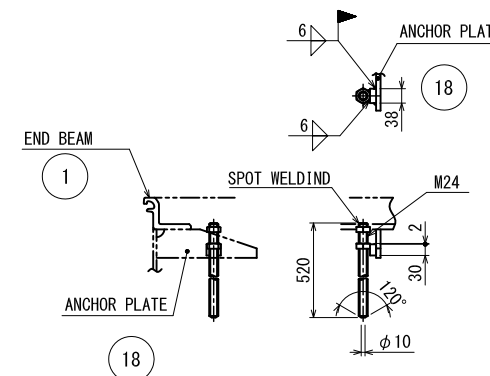
EJ - 3 DETAIL DRAWING (2/2)



NO.	COMPONENT	MATERIAL
1	END BEAM	S355J2+AR
2	MIDDLE BEAM	S355J2+N
3	SEAL RUBBER	CR
4	WEB	SM490A
5	BOX	SM490A
6	SUPPORTING BEAM	SM490A
7	BUSH	POLYETHYLENE
8	SPRING	NR
9	EB BEARING	NR
10	MB BEARING	NR
11	SPRING-FACE A	SM490A
12	BEARING-FACE A	SM490A
13	SPRING-FACE B	SM490A
14	BEARING-FACE B	SM490A
15	SUS DISK	SUS316L
16	SLIPPING DISK	METALLOPLAST
17	PROTECTIVE PL	SM490A
18	ANCHOR	SM490A
19	COVER	SM490A
20	PL	SM490A
21	END PL	SM490A
22	REINFORCING BAR	SD345
23	STUD	JIS B1198
24	WELDED WIRE FABRIC	SUS304
25	WIRE RACK	SR235
26	BOTTOM FLANGE	SM490A
27	LINER	SS400
28	HTB	F10T
29	SUPPORT	SM490A
30	CONNECTION	SS400



## 30 CONNECTION



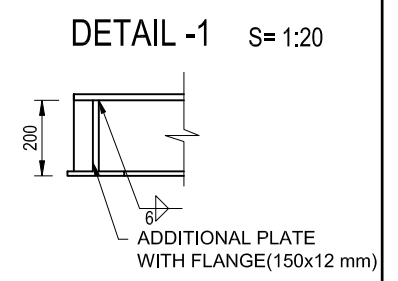
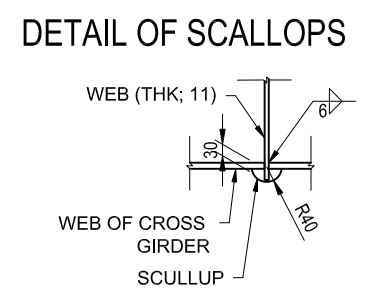
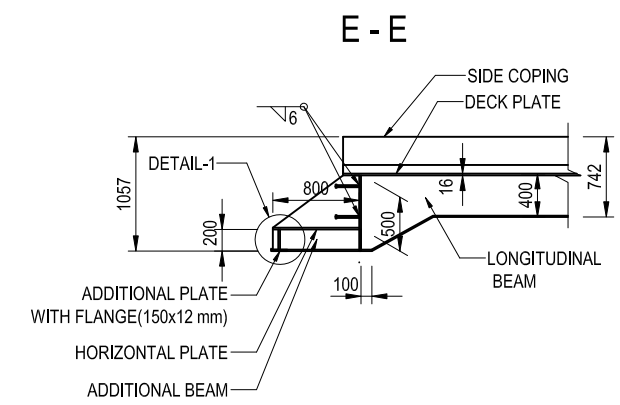
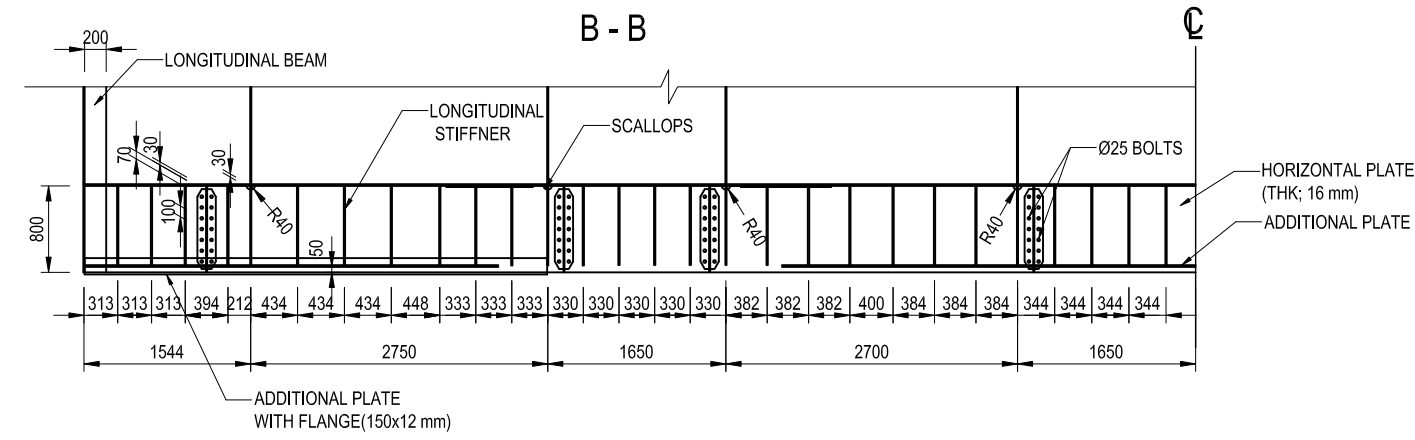
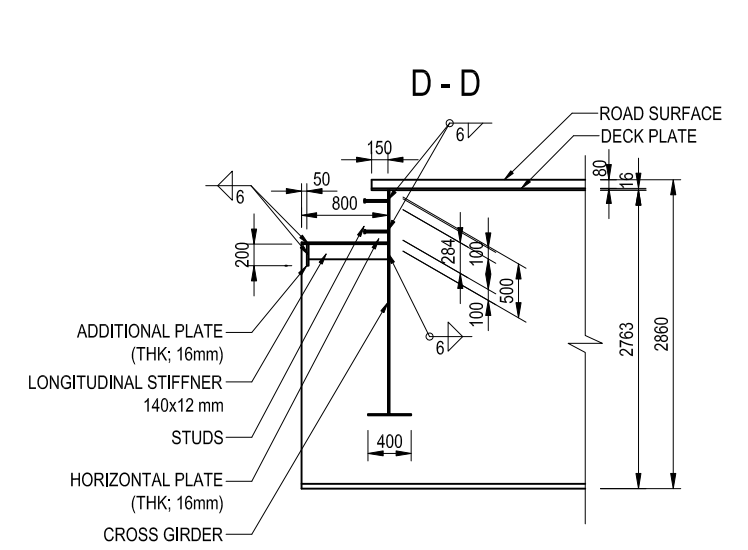
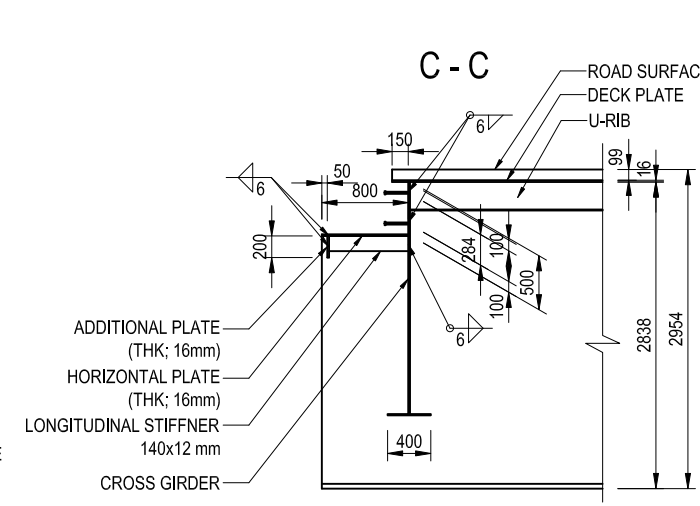
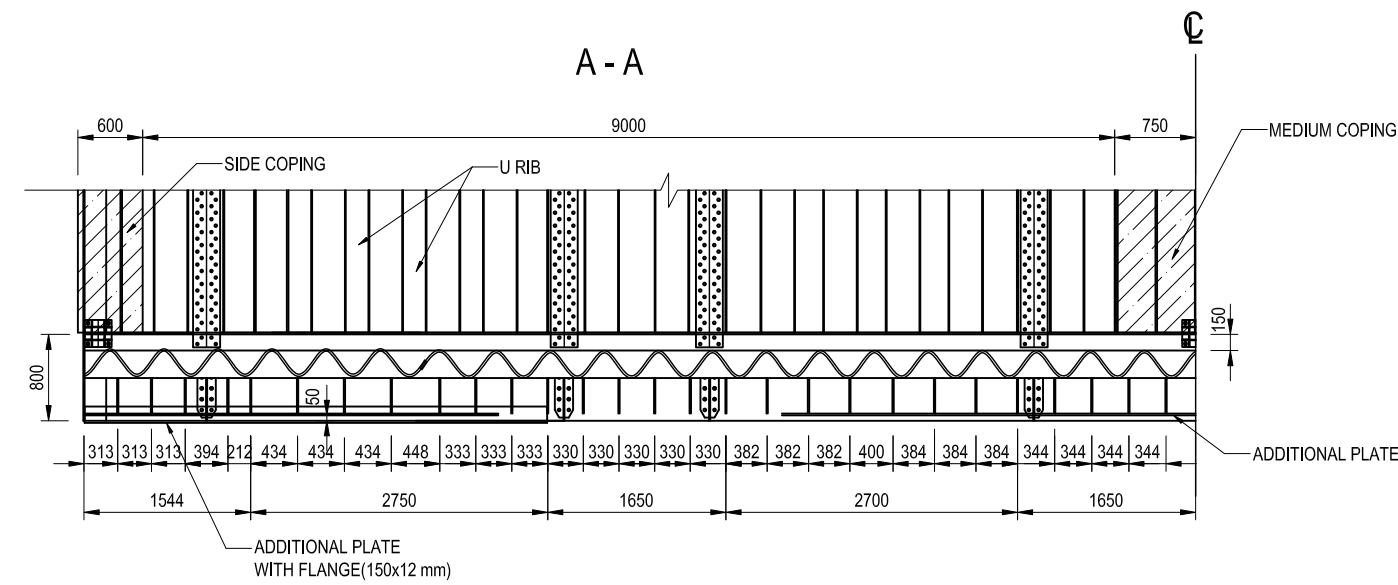
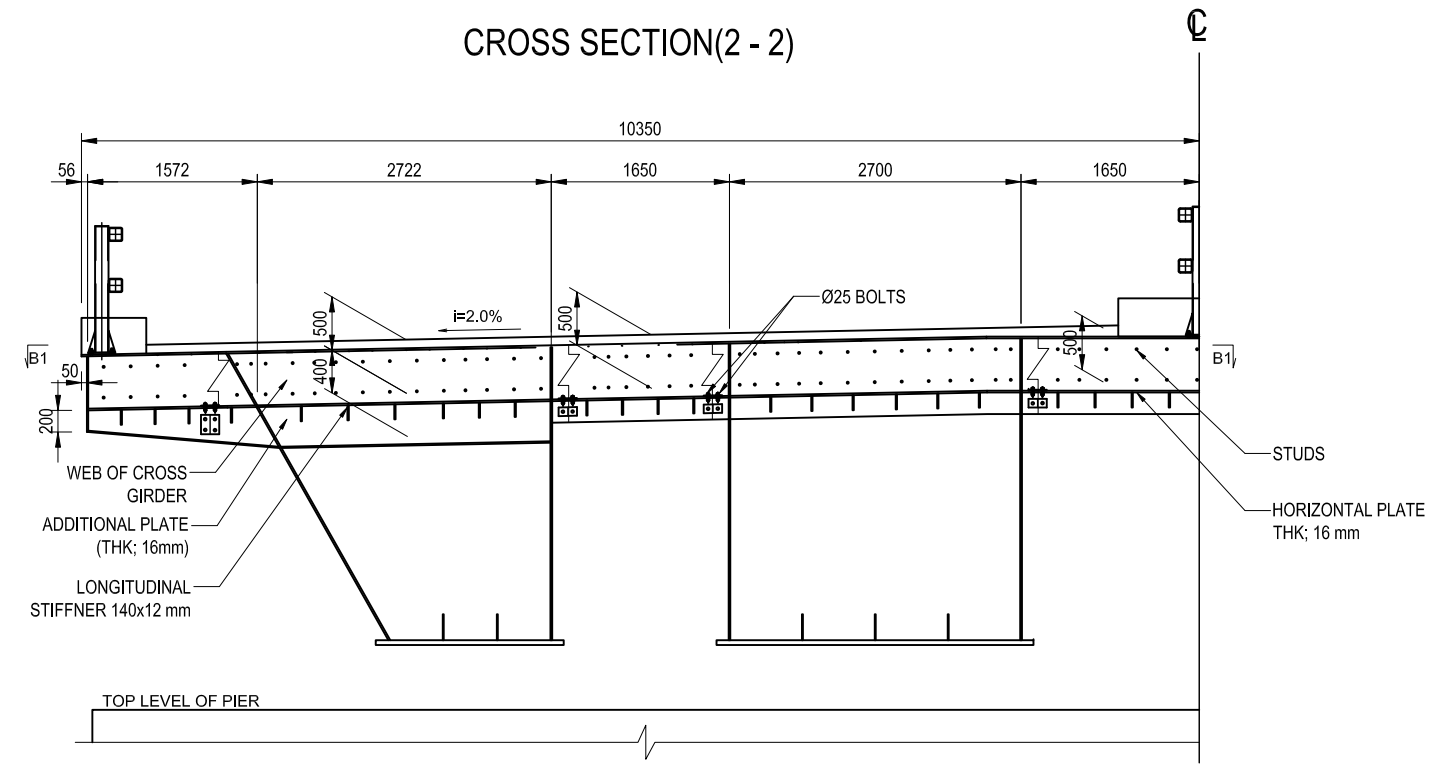
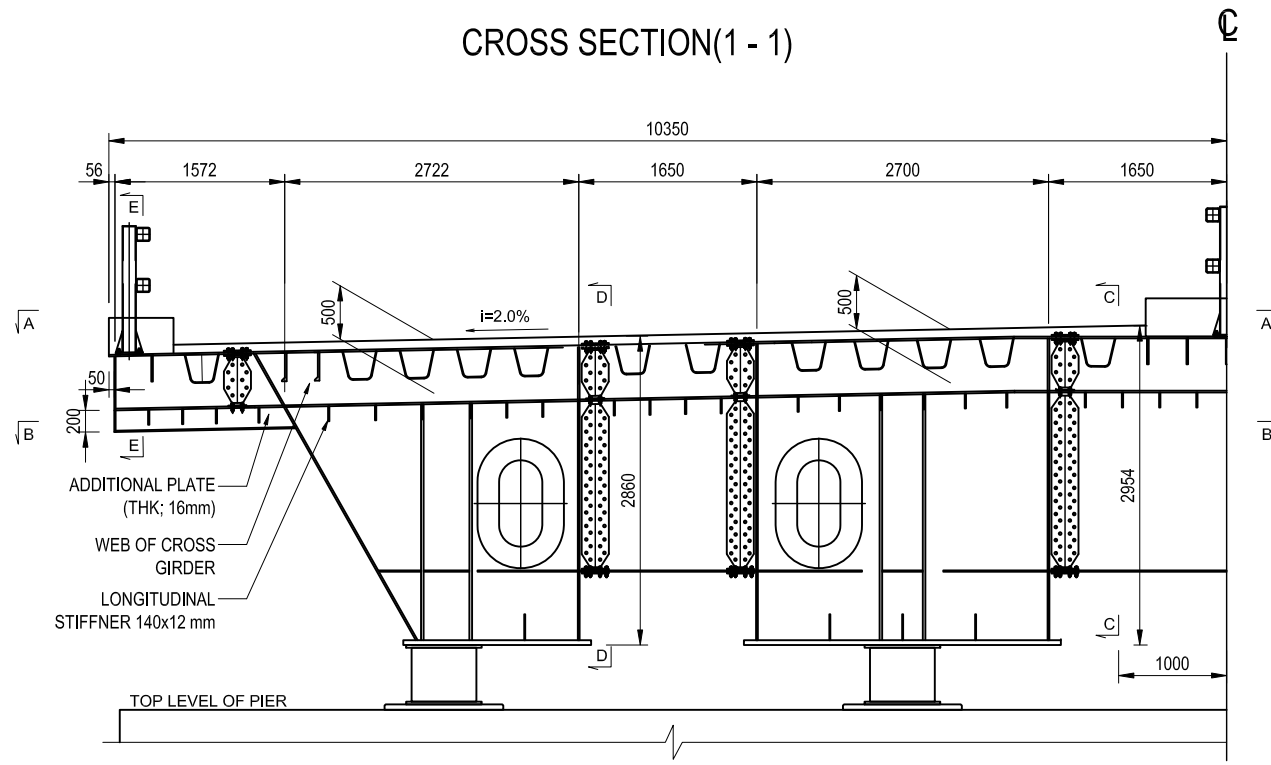
## NOTES (for P2-SB-3013, P2-SB-3014) :

- This Drawing shows the condition of expansion gap "A"=40mm (at 25°C) per cell.
- Painting: Concrete bonding sections painted with ZINC-RICH PRIMER (15 μm), and for sections remaining modified epoxy resin is painted twice (top coating: black).
- Unless otherwise instructed, welding points shall be implemented fillet welding of 6mm.
- (22) Side Welding is implemented partially on the re-bar.
- \*: Be sure to make preparation for re-bar and studs at time of superstructure work.
- Details of the slab and girder are designed based on the product shown in this Drawing.
- The Contractor has option to propose an alternative equivalent to the specified product, which shall be subjected to the Engineer's approval.
- The expansion joint shall be set in consideration of thermal expansion.

PROJECT NAME	FINANCED BY	COUNTERPART	JICA STUDY TEAM	NAME	SIGNATURE	DATE	DRAWING TITLE	PACKAGE
DETAILED DESIGN ON BAGO RIVER BRIDGE CONSTRUCTION PROJECT	JICA JAPAN INTERNATIONAL COOPERATION AGENCY	REPUBLIC OF THE UNION OF MYANMAR MINISTRY OF CONSTRUCTION DEPARTMENT OF BRIDGE	NIPPON KOEI CO., LTD. ORIENTAL CONSULTANTS GLOBAL CO., LTD. METROPOLITAN EXPRESSWAY COMPANY LIMITED CHODAI CO., LTD. NIPPON ENGINEERING CONSULTANTS CO., LTD.	S. IMADA	<i>S. Imada</i>	15 Jun.2017	DETAIL OF EXPANSION JOINT (P20) (4)	2
				T. HAYAKAWA	<i>T. Hayakawa</i>	20 Jun.2017		DWG No.
				Y. SANO	<i>Y. Sano</i>	21 Jun.2017		P2-SB-3014



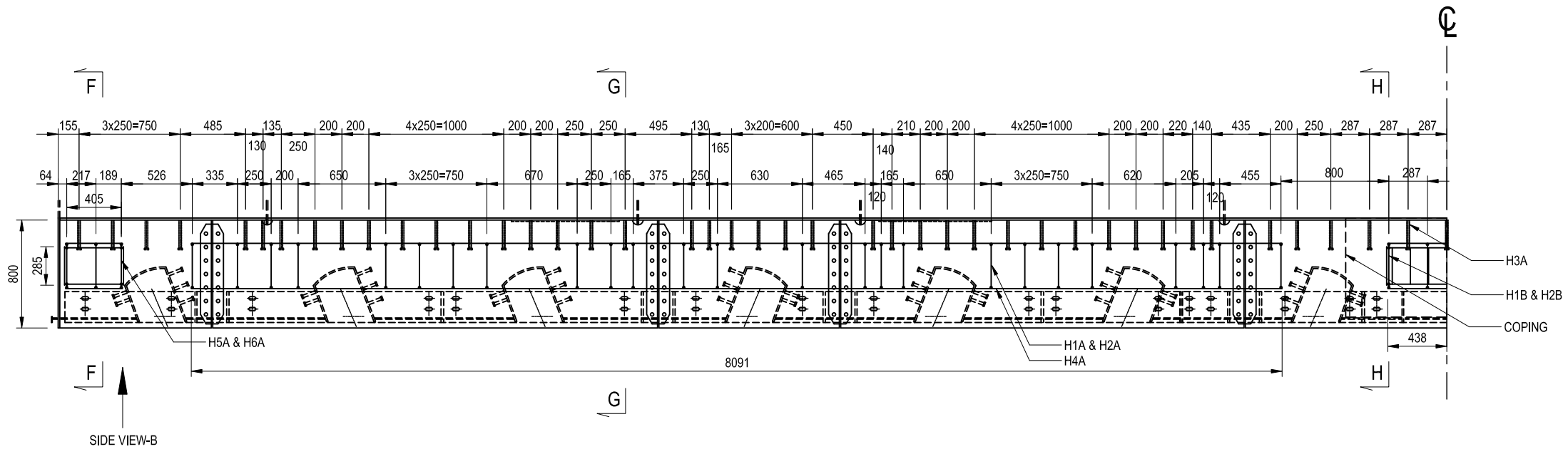
# DETAIL OF STEEL GIRDER END FOR EXPANSION JOINT (P20) (1) S= 1:70



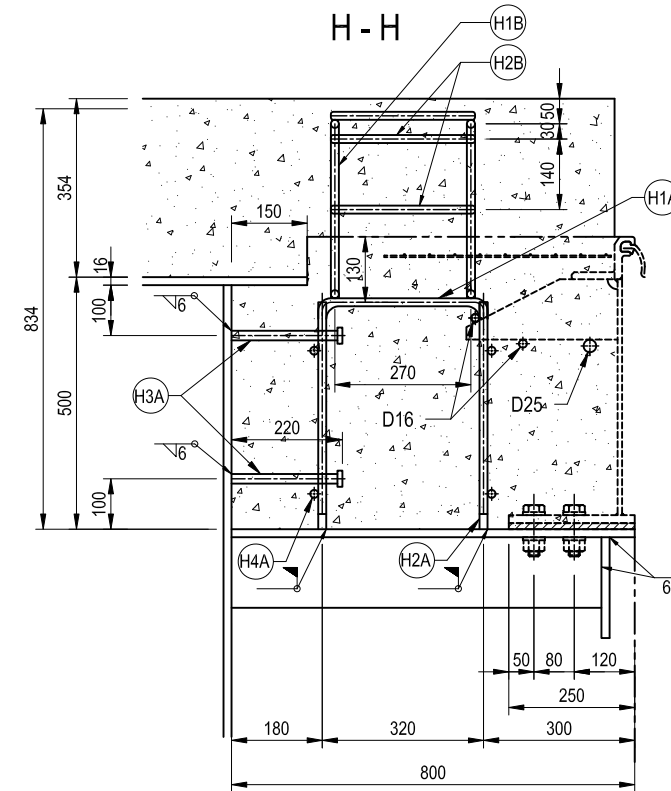
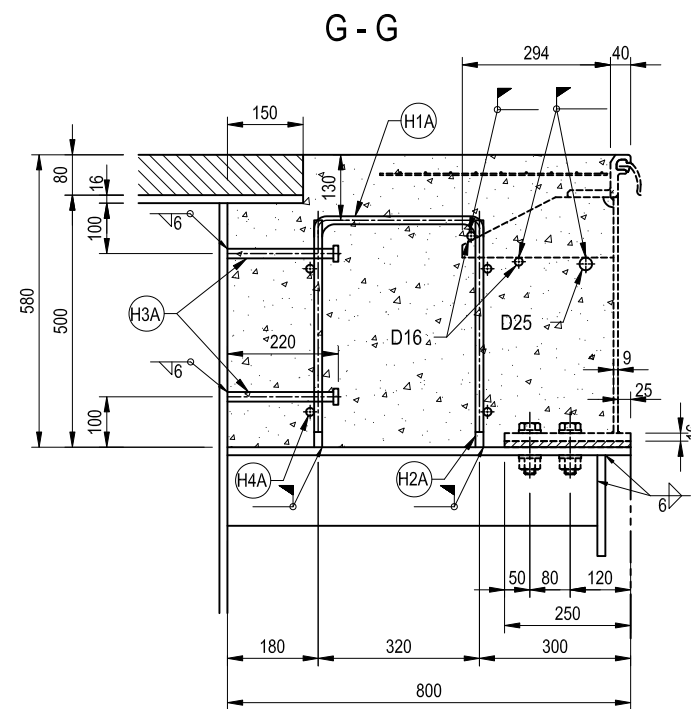
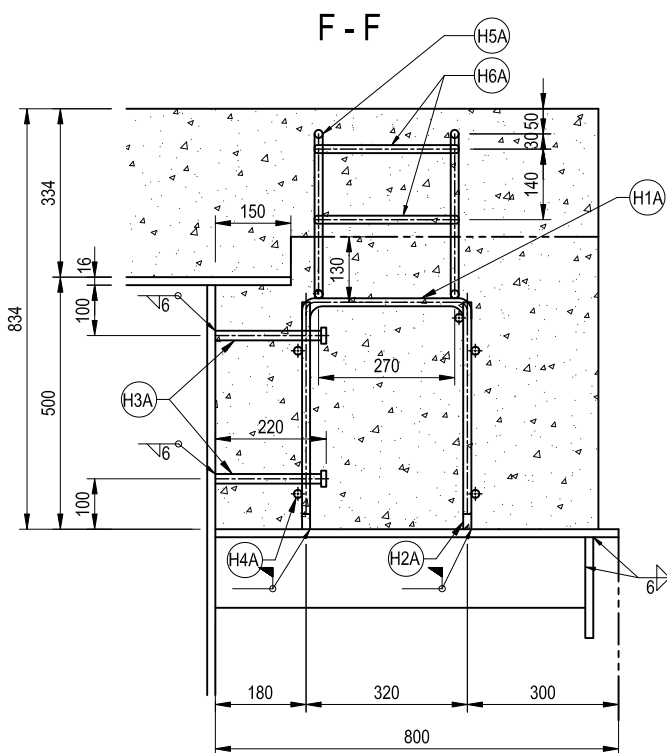
<p>PROJECT NAME</p> <p>DETAILED DESIGN ON BAGO RIVER BRIDGE CONSTRUCTION PROJECT</p>	<p>FINANCED BY</p> <p>JAPAN INTERNATIONAL COOPERATION AGENCY</p>	<p>COUNTERPART</p> <p>REPUBLIC OF THE UNION OF MYANMAR MINISTRY OF CONSTRUCTION DEPARTMENT OF BRIDGE</p>	<p>JICA STUDY TEAM</p> <p>NIPPON KOEI CO., LTD. ORIENTAL CONSULTANTS GLOBAL CO., LTD. METROPOLITAN EXPRESSWAY COMPANY LIMITED CHODAI CO., LTD. NIPPON ENGINEERING CONSULTANTS CO., LTD.</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>NAME</th> <th>SIGNATURE</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td>PREPARED BY</td> <td>S. IMADA</td> <td>27 Nov.2017</td> </tr> <tr> <td>CHECKED BY</td> <td>T. HAYAKAWA</td> <td>28 Nov.2017</td> </tr> <tr> <td>APPROVED BY</td> <td>Y. SANO</td> <td>29 Nov.2017</td> </tr> </tbody> </table>	NAME	SIGNATURE	DATE	PREPARED BY	S. IMADA	27 Nov.2017	CHECKED BY	T. HAYAKAWA	28 Nov.2017	APPROVED BY	Y. SANO	29 Nov.2017	<p>DRAWING TITLE</p> <p style="text-align: center;"><b>DETAIL OF STEEL GIRDER END FOR EXPANSION JOINT (P20) (1)</b></p>	<p>PACKAGE</p> <p style="text-align: center;">2 DWG No. P2-SB-3015</p>
NAME	SIGNATURE	DATE																
PREPARED BY	S. IMADA	27 Nov.2017																
CHECKED BY	T. HAYAKAWA	28 Nov.2017																
APPROVED BY	Y. SANO	29 Nov.2017																

# DETAIL OF STEEL GIRDER END FOR EXPANSION JOINT (P20) (2) S= 1:15

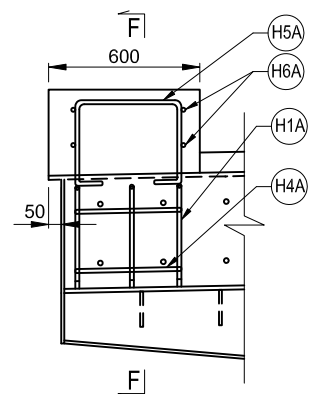
B1 - B1 S= 1:40



SIDE VIEW-B



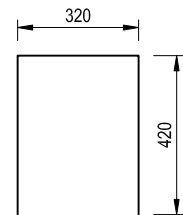
SIDE VIEW-B S= 1:30



PROJECT NAME DETAILED DESIGN ON BAGO RIVER BRIDGE CONSTRUCTION PROJECT	FINANCED BY JAPAN INTERNATIONAL COOPERATION AGENCY	COUNTERPART REPUBLIC OF THE UNION OF MYANMAR MINISTRY OF CONSTRUCTION DEPARTMENT OF BRIDGE	JICA STUDY TEAM NIPPON KOEI CO., LTD. ORIENTAL CONSULTANTS GLOBAL CO., LTD. METROPOLITAN EXPRESSWAY COMPANY LIMITED CHODAI CO., LTD. NIPPON ENGINEERING CONSULTANTS CO., LTD.	NAME	SIGNATURE	DATE	DRAWING TITLE DETAIL OF STEEL GIRDER END FOR EXPANSION JOINT (P20) (2)	PACKAGE	
				PREPARED BY	S. IMADA			27 Nov.2017	2
				CHECKED BY	T. HAYAKAWA			28 Nov.2017	DWG No.
				APPROVED BY	Y. SANO			29 Nov.2017	P2-SB-3016

# DETAIL OF STEEL GIRDER END FOR EXPANSION JOINT (P20) (3) S= 1:20

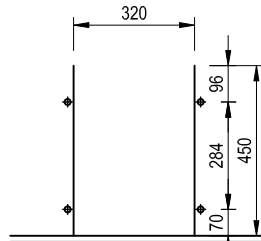
ⓂH1A 60-D16x1160L



NUMBER: 60

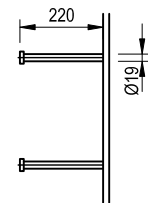
ⓂH2A 120-D16x450L

ⓂH4A 8 -D16x420L, 8090L, 875L



NUMBER: 120 (H2A)  
NUMBER: 8 (H4A)

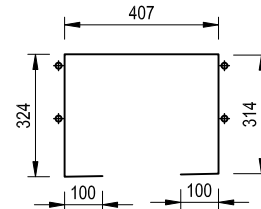
ⓂH3A 85-Ø19x220L



NUMBER: 85

ⓂH5A 4-D16x1245L

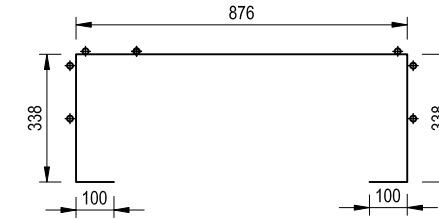
ⓂH6A 8-D16x315L



NUMBER: 4(H5A)  
NUMBER: 8(H6A)

ⓂH1B 4-D16x1552L S= 1:20

ⓂH2B 22-D16x315L



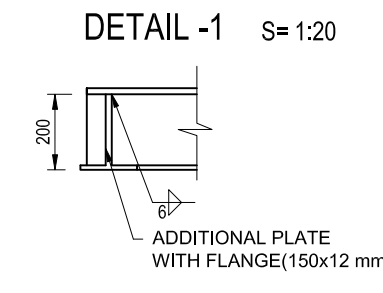
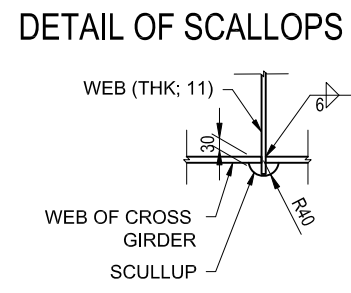
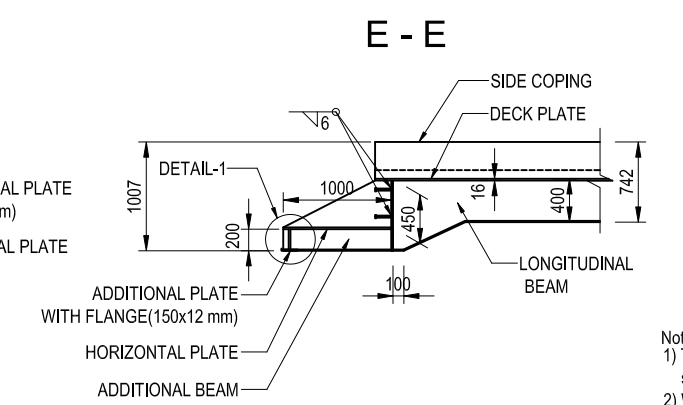
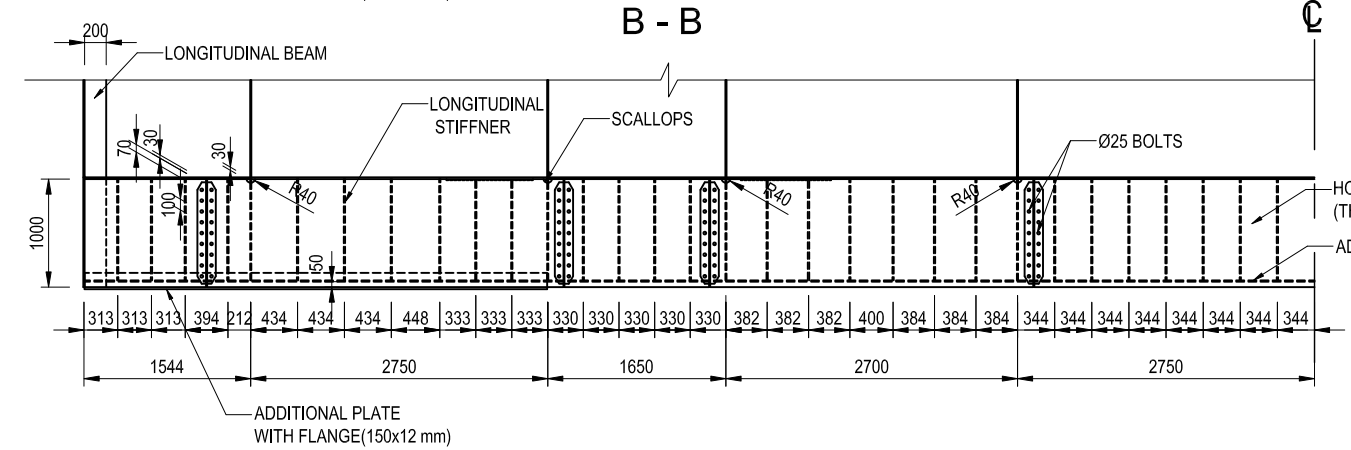
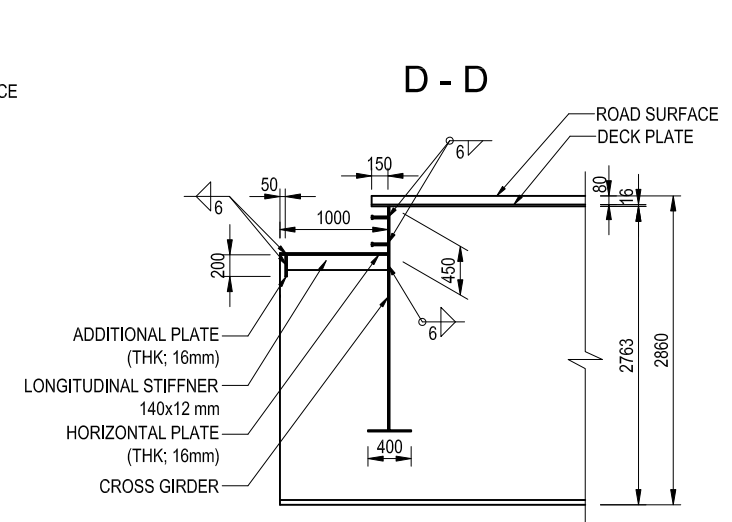
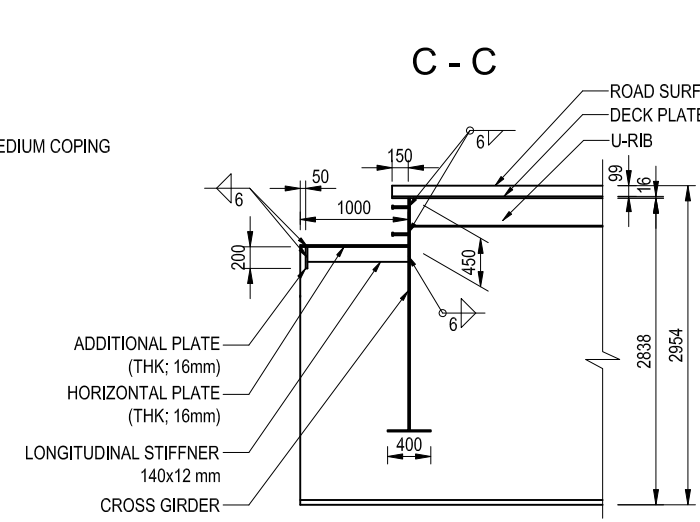
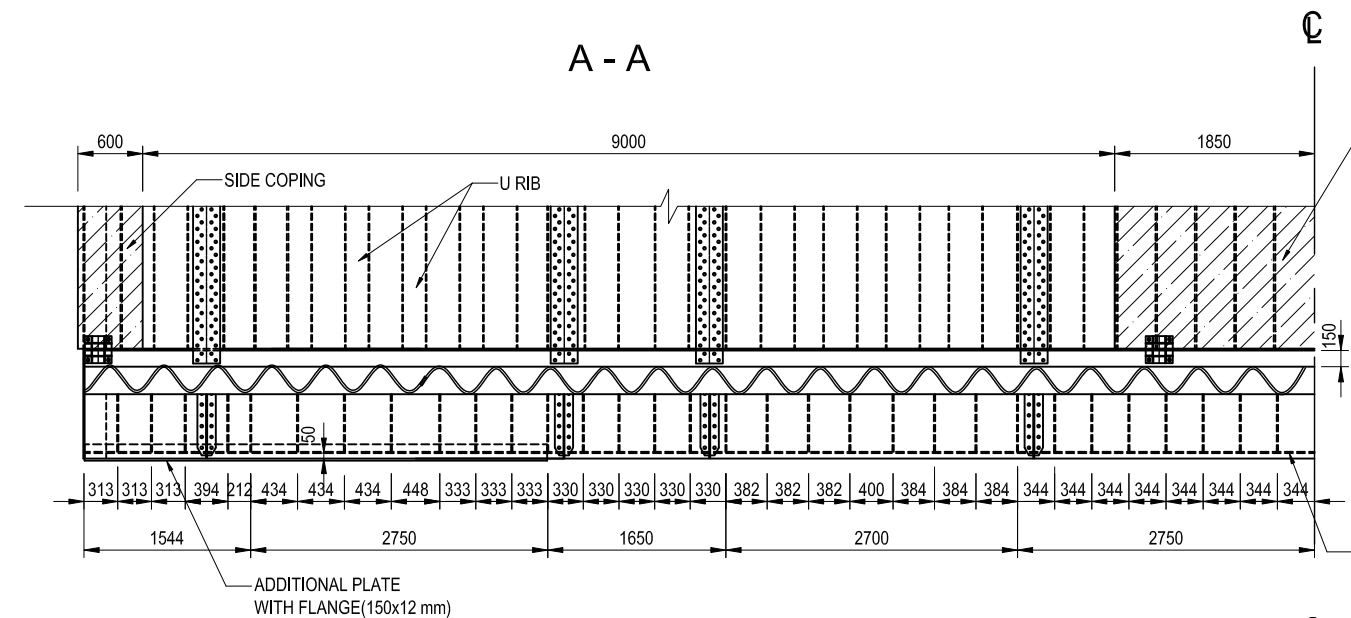
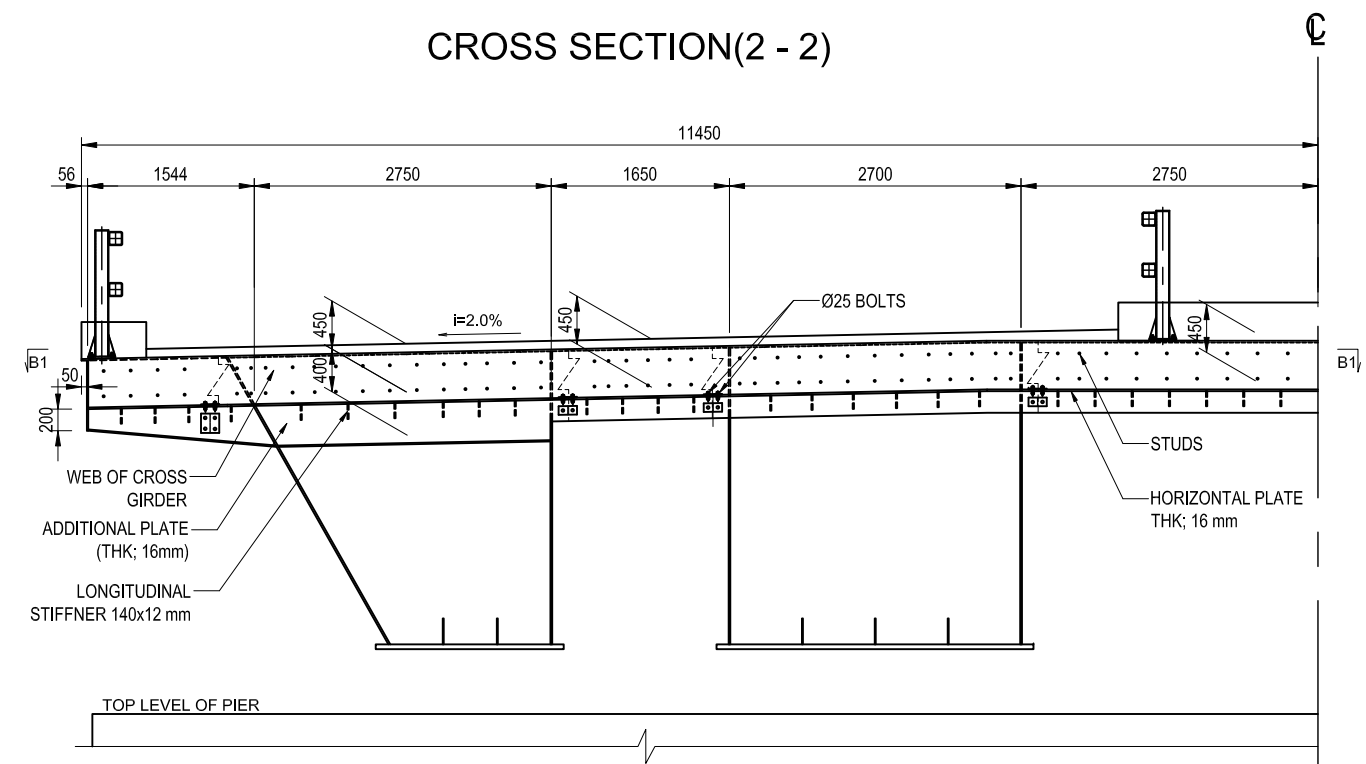
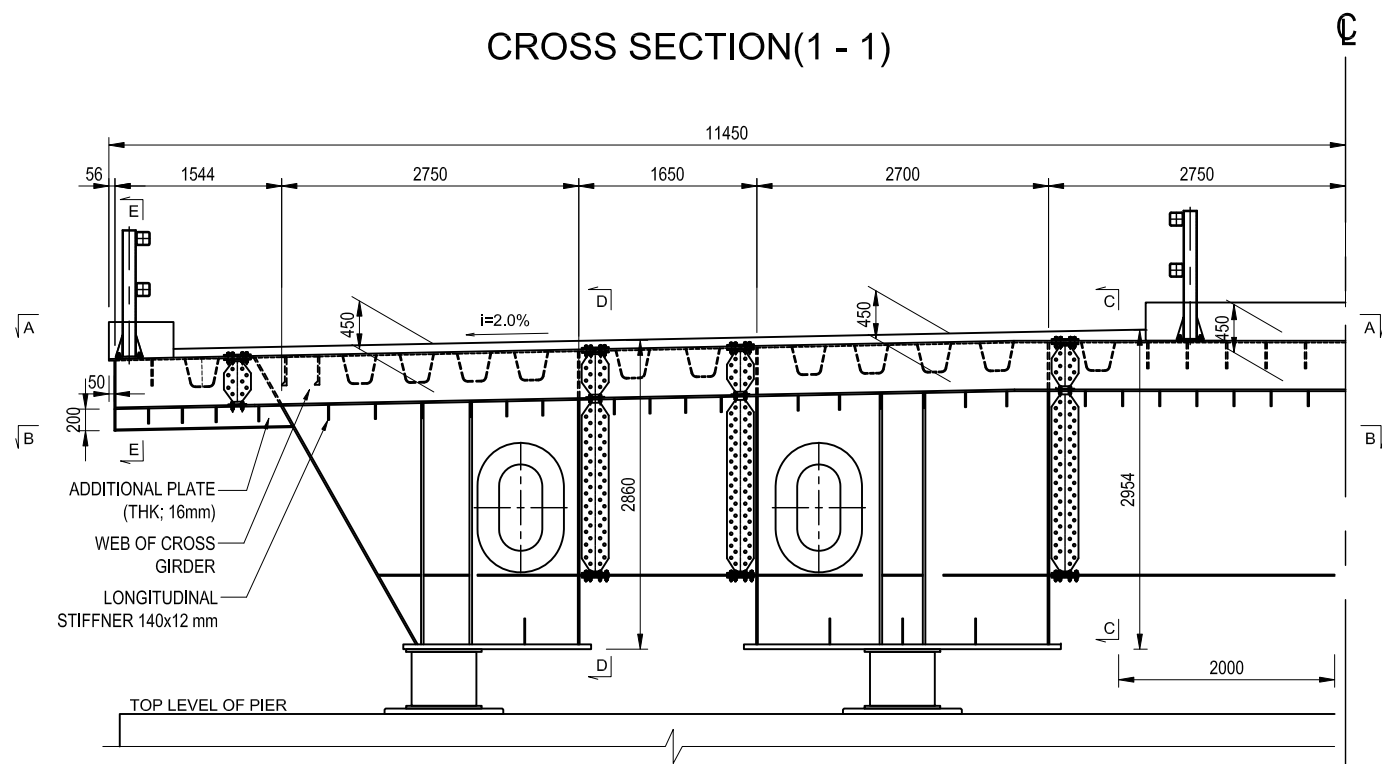
NUMBER: 4(H1B)  
NUMBER: 22(H2B)

	Length	Diameter	NO.
H1A	1160	D16	60
H2A	450	D16	120
H3A	220	Ø19	85
H4A	420	D16	8
	8090	D16	8
	875	D16	8
H5A	1245	D16	4
H6A	315	D16	8
H1B	1552	D16	4
H2B	315	D16	22

## MATERIAL LIST

No.	Item	Size	Material	Width (mm)	Length (mm)	Thickness (mm)	Unit Weight (kg/m <sup>3</sup> )	Weight (kg/pce)	Number	Weight(kg)	Remarks
1.	Horizontal Plate	800x22779.32x16 mm	SM400	800	22779.32	16	7850	2288.87	1	2288.87	
2.	Additional Plate	200x22779.32x16 mm	SM400	200	22779.32	16	7850	572.22	1	572.22	
	Sub-Total									2861.08	
3.	Longitudinal Stiffener(140x12)mm	140x734x12 mm	SM400	140	734	12	7850	9.68	63	609.84	
4.	Flange of Additional Plate	150x4282.5x12 mm	SM400	150	4282.5	12	7850	60.51	2	121.02	
	Sub-Total									730.86	
5.	Base Plate for Bolt	170x740x8 mm	SM400	170	740	8	7850	7.90	8	63.20	
6.	25Ø Bolt	M25x80 mm	S10T	-	-	-	-	0.785	112	87.92	
7.	H1A	Ø16 mm	SD345	-	1160	-	1.58(kg/m)	1.83	60	109.79	
8.	H2A	Ø16 mm	SD345	-	450	-	1.58(kg/m)	0.71	120	85.19	
9.	H4A	Ø16 mm	SD345	-	420	-	1.58(kg/m)	0.66	8	5.30	
		Ø16 mm	SD345	-	875	-	1.58(kg/m)	1.38	8	11.04	
		Ø16 mm	SD345	-	8090	-	1.58(kg/m)	12.76	8	102.10	
10.	H5A	Ø16 mm	SD345	-	1245	-	1.58(kg/m)	1.96	4	7.86	
11.	H6A	Ø16 mm	SD345	-	315	-	1.58(kg/m)	0.50	8	3.98	
12.	H1B	Ø16 mm	SD345	-	1552	-	1.58(kg/m)	2.45	4	9.79	
13.	H2B	Ø16 mm	SD345	-	315	-	1.58(kg/m)	0.50	22	10.93	
	Sub-Total									345.97	
14.	H3A(Stud Bolt)	Ø19 mm	JIS B 1198	-	220	-	-	0.092	85	7.82	
15.	Nut for Stud Bolt	Ø19 mm - Nut	JIS B 1181	-	-	-	-	0.092	85	7.82	
16.	Concrete@(F-F)	-	24MPa	600	610	334	2400	293.39	2	586.77	
		-	24MPa	600	760	500	2400	547.20	2	1094.40	
	Concrete@(G-G)	-	24MPa	8950	775	580	2400	9655.26	2	19310.52	
	Concrete@(H-H)	-	24MPa	750	610	354	2400	388.69	2	777.38	
		-	24MPa	750	775	500	2400	697.50	2	1395	
	Sub-Total									23164.08	
	Total									27165.20	

(REFERENCE) DETAIL OF STEEL GIRDER END FOR EXPANSION JOINT(P13) (1) S= 1:70



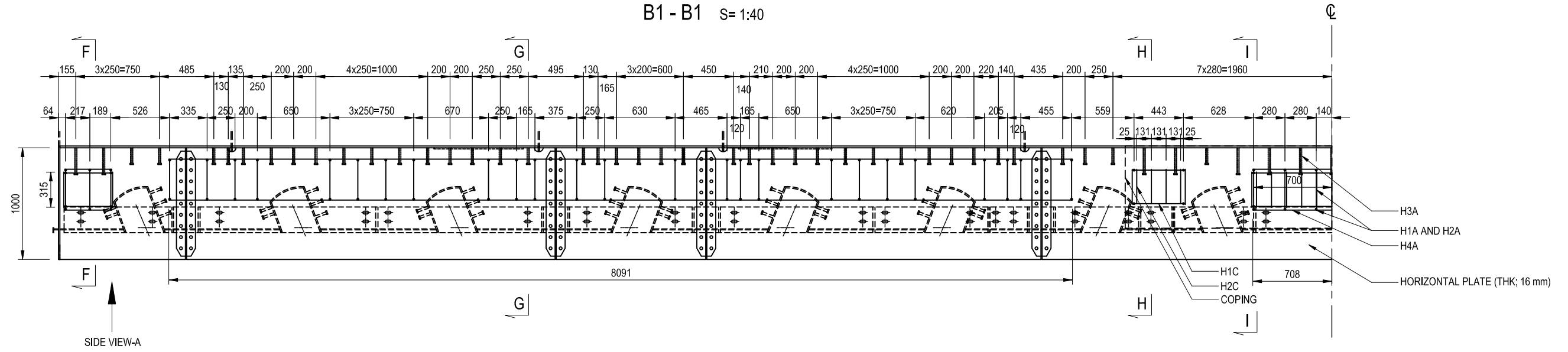
Notes:  
 1) This Drawing of detail of steel girder end for expansion joint P13 is prepared based on the type of expansion joint specified in Package-1 Drawings.  
 2) Work demarcation between Package-1 and Package-2 shall be referred to the table in DWG.No.P2-SB-3020.  
 3) Design of the end girder shall be modified accordingly if the type of expansion joint of P13 might be changed.

PROJECT NAME DETAILED DESIGN ON BAGO RIVER BRIDGE CONSTRUCTION PROJECT	FINANCED BY JAPAN INTERNATIONAL COOPERATION AGENCY	COUNTERPART REPUBLIC OF THE UNION OF MYANMAR MINISTRY OF CONSTRUCTION DEPARTMENT OF BRIDGE	JICA STUDY TEAM NIPPON KOEI CO., LTD. ORIENTAL CONSULTANTS GLOBAL CO., LTD. METROPOLITAN EXPRESSWAY COMPANY LIMITED CHODAI CO., LTD. NIPPON ENGINEERING CONSULTANTS CO., LTD.	NAME	SIGNATURE	DATE	DRAWING TITLE (REFERENCE) DETAIL OF STEEL GIRDER END FOR EXPANSION JOINT (P13) (1)	PACKAGE	
				PREPARED BY	S. IMADA			27 Nov.2017	2
				CHECKED BY	T. HAYAKAWA			28 Nov.2017	DWG No.
				APPROVED BY	Y. SANO			29 Nov.2017	P2-SB-3018

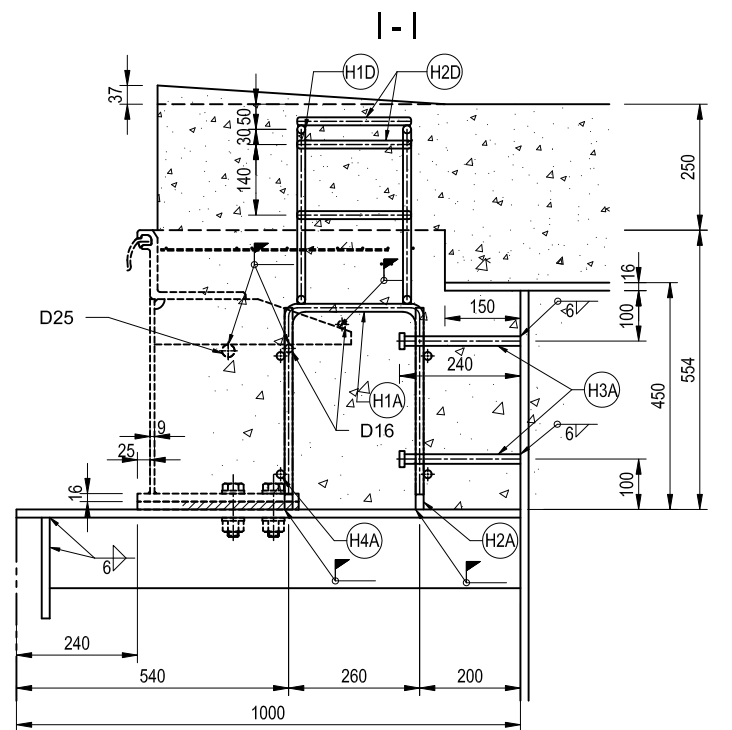
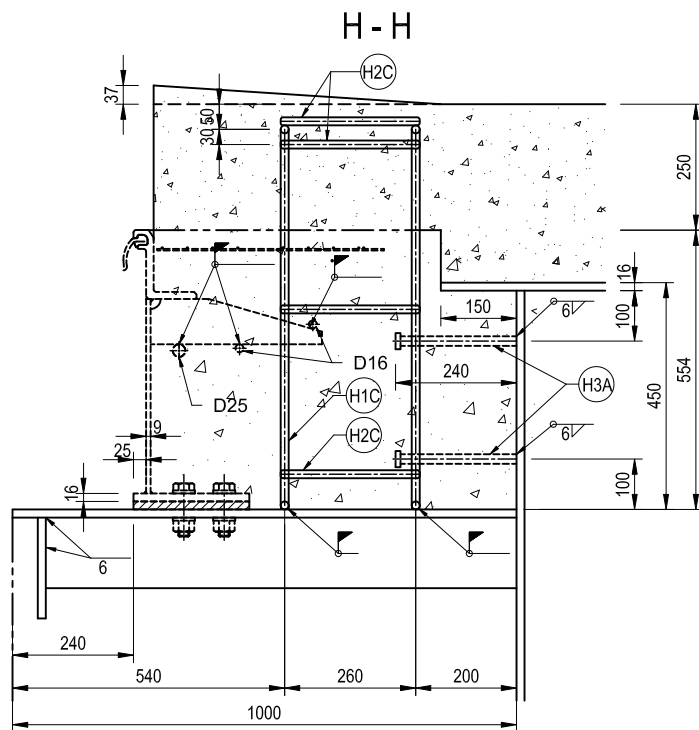
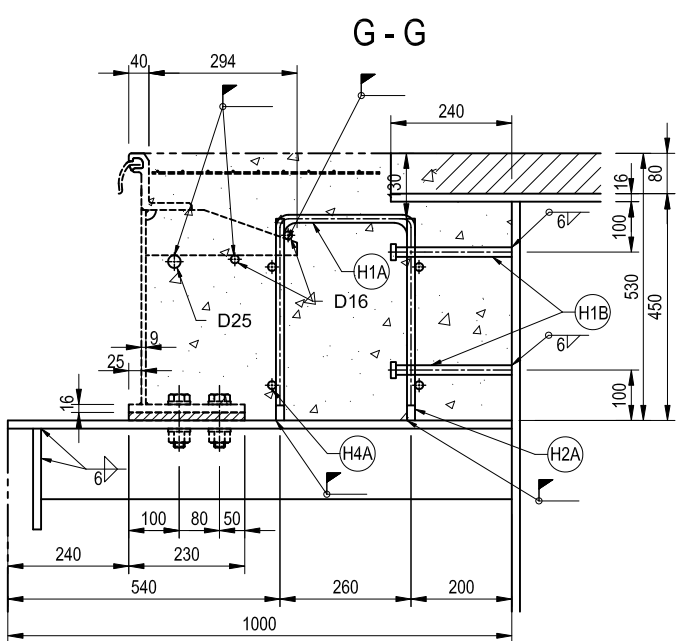
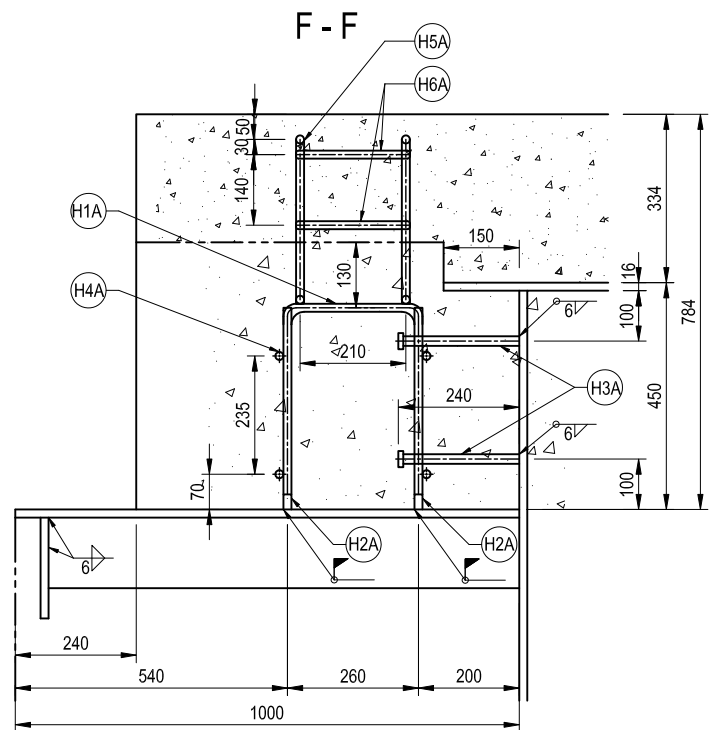


(REFERENCE) DETAIL OF STEEL GIRDER END FOR EXPANSION JOINT(P13) (2) S= 1:15

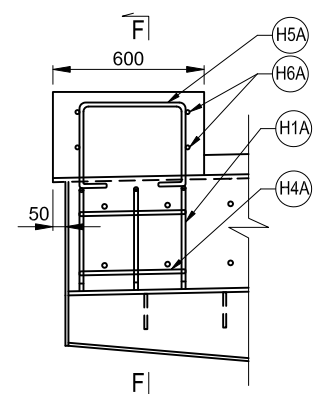
B1 - B1 S= 1:40



SIDE VIEW-A



SIDE VIEW-A S= 1:30

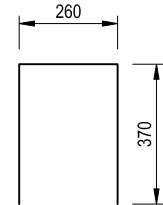


Notes:  
 1) This Drawing of detail of steel girder end for expansion joint P13 is prepared based on the type of expansion joint specified in Package-1 Drawings.  
 2) Work demarcation between Package-1 and Package-2 shall be referred to the table in DWG.No.P2-SB-3020.  
 3) Design of the end girder shall be modified accordingly if the type of expansion joint of P13 might be changed.

PROJECT NAME DETAILED DESIGN ON BAGO RIVER BRIDGE CONSTRUCTION PROJECT	FINANCED BY JAPAN INTERNATIONAL COOPERATION AGENCY	COUNTERPART REPUBLIC OF THE UNION OF MYANMAR MINISTRY OF CONSTRUCTION DEPARTMENT OF BRIDGE	JICA STUDY TEAM NIPPON KOEI CO., LTD. ORIENTAL CONSULTANTS GLOBAL CO., LTD. METROPOLITAN EXPRESSWAY COMPANY LIMITED CHODAI CO., LTD. NIPPON ENGINEERING CONSULTANTS CO., LTD.	NAME	SIGNATURE	DATE	DRAWING TITLE (REFERENCE) DETAIL OF STEEL GIRDER END FOR EXPANSION JOINT (P13) (2)	PACKAGE	
				PREPARED BY	S. IMADA			27 Nov.2017	2
				CHECKED BY	T. HAYAKAWA			28 Nov.2017	DWG No.
				APPROVED BY	Y. SANO			29 Nov.2017	P2-SB-3019

(REFERENCE) DETAIL OF STEEL GIRDER END FOR EXPANSION JOINT(P13) (3) S= 1:20

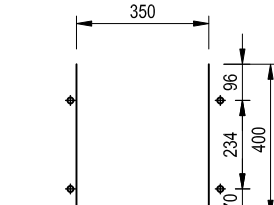
H1A 62-D16x1000L



NUMBER: 62

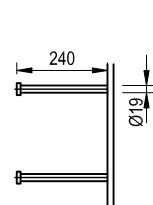
H2A 124-D16x400L

H4A 8 -D16x420L, 8090L, 1415L



NUMBER: 124 (H2A)  
NUMBER: 8 (H4A)

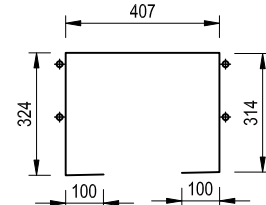
H3A 30-Ø19x240L



NUMBER: 30

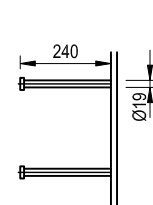
H5A 4-D16x1245L

H6A 8-D16x315L



NUMBER: 4(H5A)  
NUMBER: 8(H6A)

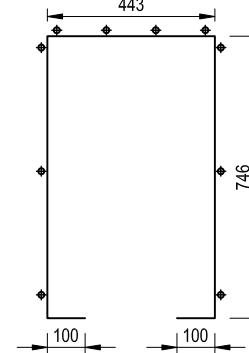
H1B 156-Ø19x240L



NUMBER: 156

H1C 4-D16x2135L

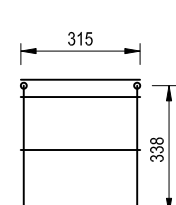
H2C 20-D16x315L



NUMBER: 4 (H1C)  
NUMBER: 20 (H2C)

H1D 2-D16x2275L

H2D 11-D16x315L



NUMBER: 2 (H1D)  
NUMBER: 11(H2D)

	Length	Diameter	NO.
H1A	1000	D16	62
H2A	400	D16	124
H3A	240	Ø19	30
H4A	420	D16	8
	8090	D16	8
	1415	D16	8
H5A	1245	D16	4
H6A	315	D16	8
H1B	240	Ø19	156
H1C	2135	D16	4
H2C	315	D16	20
H1D	2275	D16	2
H2D	315	D16	11

MATERIAL LIST

No.	Item	Size	Material	Width (mm)	Length (mm)	Thickness (mm)	Unit Weight (kg/m <sup>3</sup> )	Weight (kg/pce)	Number	Weight(kg)	Remarks
1.	Horizontal Plate	1000x22779.32x16 mm	SM400	1000	22779.32	16	7850	2861.08	1	2861.08	*
2.	Additional Plate	200x22779.32x16 mm	SM400	200	22779.32	16	7850	572.22	1	572.22	*
	Sub-Total									3433.30	
3.	Longitudinal Stiffener(140x12)mm	140x934x12 mm	SM400	140	934	12	7850	12.32	63	776.01	*
4.	Flange of Additional Plate	150x4282.5x12 mm	SM400	150	4282.5	12	7850	60.51	2	121.02	*
	Sub-Total									897.03	
5.	Base Plate for Bolt	170x940x8 mm	SM400	170	940	8	7850	10.04	8	80.28	*
6.	25Ø Bolt	M25x80 mm	S10T	-	-	-	-	0.785	144	113.04	
7.	H1A	Ø16 mm	SD345	-	1000	-	1.58(kg/m)	1.58	62	97.96	
8.	H2A	Ø16 mm	SD345	-	400	-	1.58(kg/m)	0.63	124	78.24	
9.	H4A	Ø16 mm	SD345	-	420	-	1.58(kg/m)	0.66	8	5.30	
		Ø16 mm	SD345	-	1415	-	1.58(kg/m)	2.23	8	17.86	
		Ø16 mm	SD345	-	8090	-	1.58(kg/m)	12.76	8	102.10	
10.	H5A	Ø16 mm	SD345	-	1245	-	1.58(kg/m)	1.96	4	7.86	
11.	H6A	Ø16 mm	SD345	-	315	-	1.58(kg/m)	0.50	8	3.98	
12.	H1C	Ø16 mm	SD345	-	2135	-	1.58(kg/m)	3.37	4	13.47	
13.	H2C	Ø16 mm	SD345	-	315	-	1.58(kg/m)	0.50	20	9.94	
14.	H1D	Ø16 mm	SD345	-	2275	-	1.58(kg/m)	3.59	2	7.18	
15.	H2D	Ø16 mm	SD345	-	315	-	1.58(kg/m)	0.50	11	5.47	
	Sub-Total									349.34	
16.	H3A(Stud Bolt)	Ø19 mm	JIS B 1198	-	240	-	-	0.092	30	2.76	*
17.	H1B(Stud Bolt)	Ø19 mm	JIS B 1198	-	240	-	-	0.092	156	14.35	*
18.	Nut for Stud Bolt	Ø19 mm - Nut	JIS B 1181	-	-	-	-	0.092	186	17.11	
19.	Concrete@(F-F)	-	24MPa	600	570	334	2400	274.15	2	548.29	
		-	24MPa	600	720	500	2400	518.40	2	1036.80	
	Concrete@(G-G)	-	24MPa	8950	735	530	2400	8367.53	2	16735.07	
	Concrete@(H-H)	-	24MPa	1850	570	250, 287	2400	679.52	2	1359.04	
		-	24MPa	1850	735	555	2400	1811.19	2	3622.37	
	Sub-Total									23301.58	
	Total									28061.53	

Note: The designation "\*" in remarks shows that those materials shall be included in the scope of fabrication of steel box girder in Package-2. Other items shall be scope of Package-1.

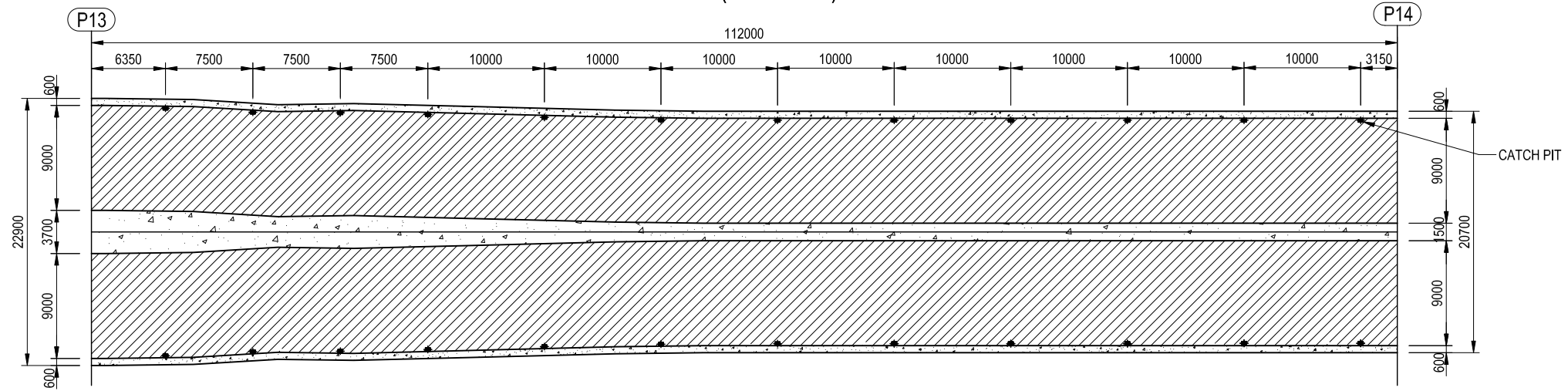
Notes:

- 1) This Drawing of detail of steel girder end for expansion joint P13 is prepared based on the type of expansion joint specified in Package-1 Drawings.
- 2) Work demarcation between Package-1 and Package-2 shall be referred to the table in DWG.No.P2-SB-3020.
- 3) Design of the end girder shall be modified accordingly if the type of expansion joint of P13 might be changed.

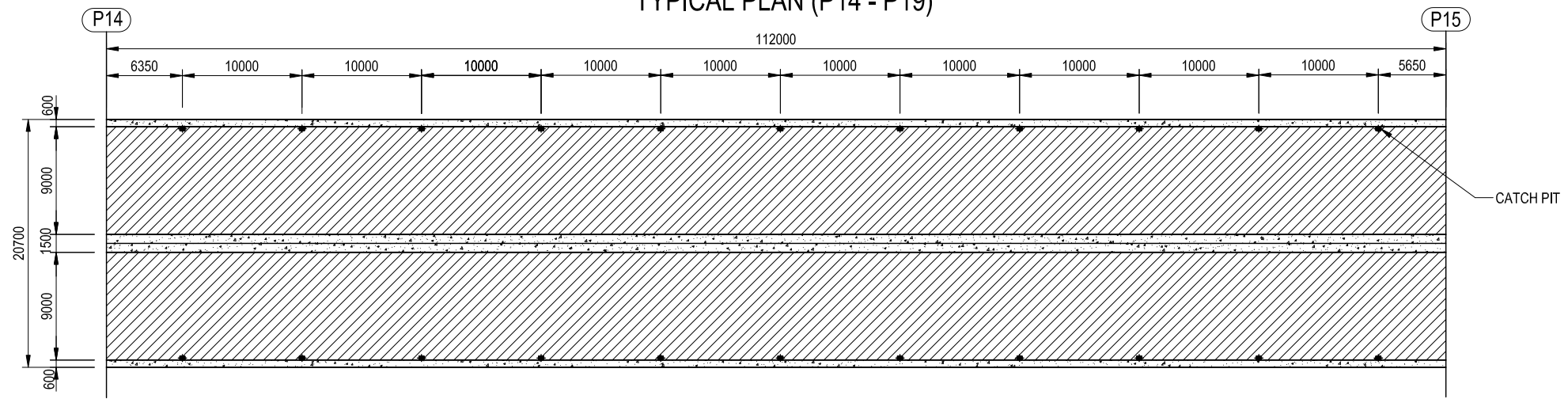
PROJECT NAME DETAILED DESIGN ON BAGO RIVER BRIDGE CONSTRUCTION PROJECT	FINANCED BY jica JAPAN INTERNATIONAL COOPERATION AGENCY	COUNTERPART REPUBLIC OF THE UNION OF MYANMAR MINISTRY OF CONSTRUCTION DEPARTMENT OF BRIDGE	JICA STUDY TEAM NIPPON KOEI CO., LTD. ORIENTAL CONSULTANTS GLOBAL CO., LTD. METROPOLITAN EXPRESSWAY COMPANY LIMITED CHODAI CO.,LTD. NIPPON ENGINEERING CONSULTANTS CO.,LTD.	NAME	SIGNATURE	DATE	DRAWING TITLE (REFERENCE) DETAIL OF STEEL GIRDER END FOR EXPANSION JOINT (P13) (3)	PACKAGE 2 DWG No. P2-SB-3020
				PREPARED BY	S. IMADA	27 Nov.2017		
				CHECKED BY	T. HAYAKAWA	28 Nov.2017		
				APPROVED BY	Y. SANO	29 Nov.2017		

# DRAINAGE DETAIL OF STEEL BOX GIRDER(1) S=1:500

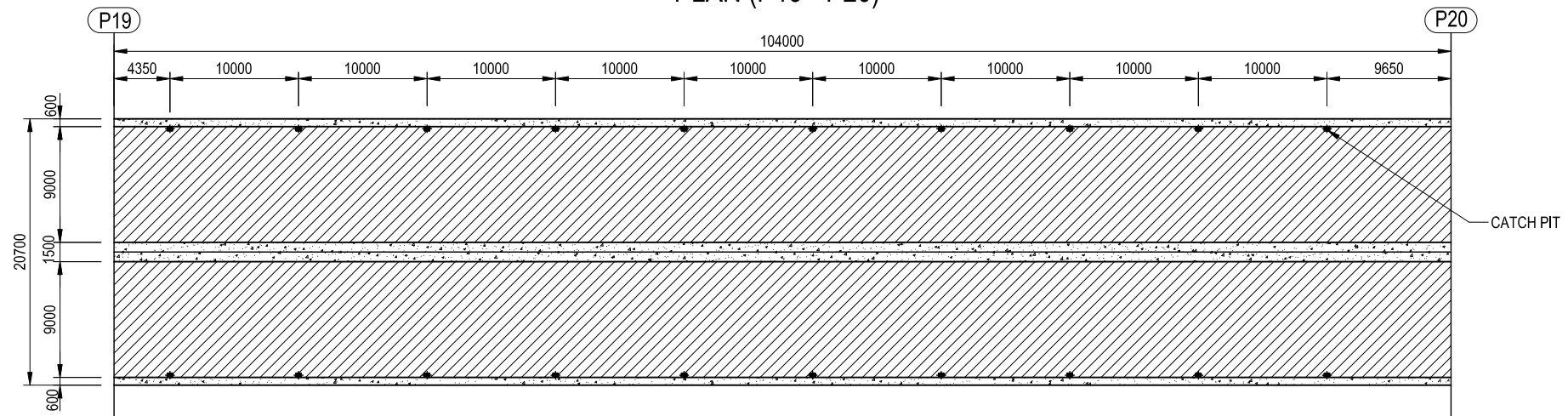
## PLAN (P13 - P14)



## TYPICAL PLAN (P14 - P19)



## PLAN (P19 - P20)



<small>PROJECT NAME</small> DETAILED DESIGN ON BAGO RIVER BRIDGE CONSTRUCTION PROJECT	<small>FINANCED BY</small> JAPAN INTERNATIONAL COOPERATION AGENCY	<small>COUNTERPART</small> REPUBLIC OF THE UNION OF MYANMAR MINISTRY OF CONSTRUCTION DEPARTMENT OF BRIDGE	<small>JICA STUDY TEAM</small> NIPPON KOEI CO., LTD. ORIENTAL CONSULTANTS GLOBAL CO., LTD. METROPOLITAN EXPRESSWAY COMPANY LIMITED CHODAI CO., LTD. NIPPON ENGINEERING CONSULTANTS CO., LTD.	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;"></th> <th style="width: 20%;">NAME</th> <th style="width: 20%;">SIGNATURE</th> <th style="width: 20%;">DATE</th> </tr> </thead> <tbody> <tr> <td>PREPARED BY</td> <td>S. IMADA</td> <td></td> <td>15 Jun.2017</td> </tr> <tr> <td>CHECKED BY</td> <td>T. HAYAKAWA</td> <td></td> <td>20 Jun.2017</td> </tr> <tr> <td>APPROVED BY</td> <td>Y. SANO</td> <td></td> <td>21 Jun.2017</td> </tr> </tbody> </table>		NAME	SIGNATURE	DATE	PREPARED BY	S. IMADA		15 Jun.2017	CHECKED BY	T. HAYAKAWA		20 Jun.2017	APPROVED BY	Y. SANO		21 Jun.2017	<small>DRAWING TITLE</small> DRAINAGE DETAIL OF STEEL BOX GIRDER (1)	<small>PACKAGE</small> 2 DWG No. P2-SB-3031
	NAME	SIGNATURE	DATE																			
PREPARED BY	S. IMADA		15 Jun.2017																			
CHECKED BY	T. HAYAKAWA		20 Jun.2017																			
APPROVED BY	Y. SANO		21 Jun.2017																			

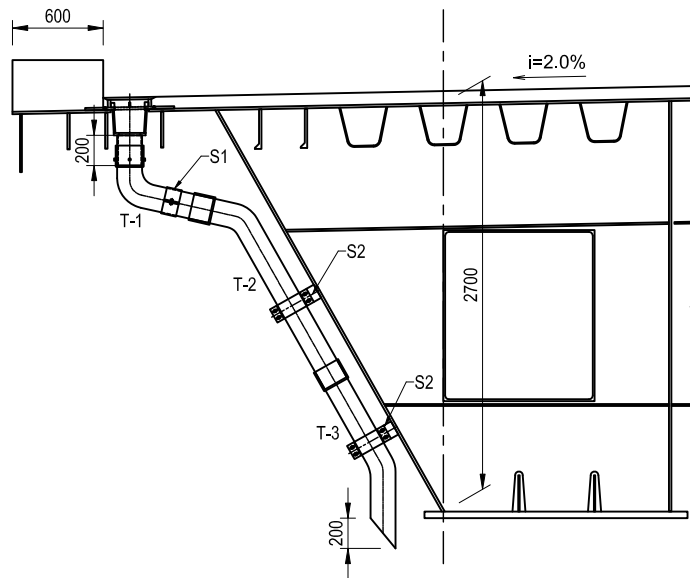
# DRAINAGE DETAIL OF STEEL BOX GIRDER(2) S=1:50

## MATERIAL LIST

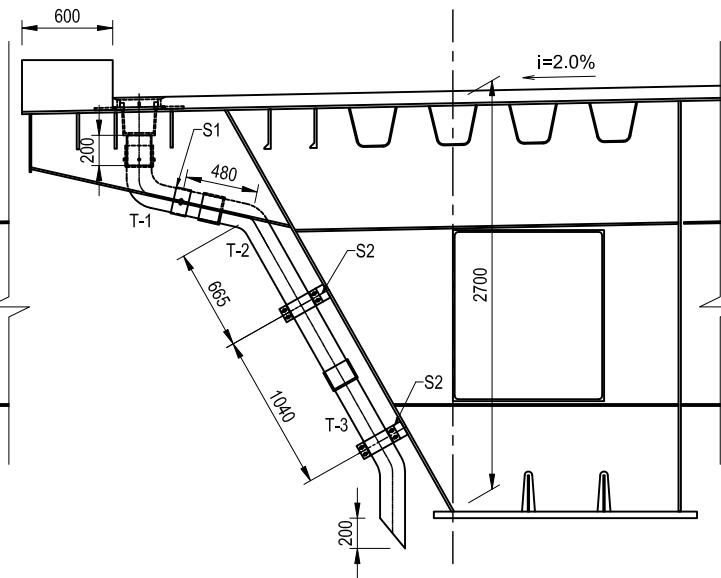
No.	Item	Size	Material	Width (mm)	Length (mm)	Thickness (mm)	Area (mm <sup>2</sup> )	Used Area (mm <sup>2</sup> )	Unit Weight (kg/m <sup>2</sup> )	Weight (kg/pce)	Number	Weight(kg)	Total Length (m)	Remarks
1.	Cover Plate (Thk; 19 mm)	250x362x19 mm	SS400	250	362	19	90500	68170.29	7850	10.17	154	1565.81	-	
2.	Plate (Thk; 19 mm)	50x362x19 mm	SM400	50	362	19	18100	18100	7850	2.70	308	831.48	-	*
3.	Plate (Thk; 19 mm)	50x288x19 mm	SM400	50	288	19	14400	14400	7850	2.15	308	661.51	-	*
Sub-Total												3058.80		
4.	Plate (Thk; 16 mm)	308x420x16 mm	SM400	308	420	16	129360	66960	7850	8.41	154	1295.17	-	*
5.	Reinforcing Plate (Thk; 16 mm)	588x700x16 mm	SM400	588	700	16	411600	259500	7850	32.59	154	5019.35	-	*
6.	Plate (Thk; 16 mm)	210x250x16 mm	SM400	210	250	16	52500	37106.65	7850	4.66	154	717.73	-	
Sub-Total												7032.25		
7.	Plate (Thk; 10 mm)	165x229x10 mm	SM400	165	229	10	37785	36217.50	7850	2.84	308	875.67	-	*
8.	Plate (Thk; 10 mm)	157x322x10 mm	SM400	157	322	10	50554	44902	7850	3.52	308	1085.64	-	*
9.	Plate (Thk; 10 mm)	25x30x10 mm	SM400	25	30	10	750	750	7850	0.06	924	54.40	-	*
Sub-Total												2015.71		
10.	Chain 5 mmØ x 250	-	SUS304	-	-	-	-	-	-	-	154	-	-	*
11.	Plate (Thk; 8 mm)	100x140x8 mm	SM400A	100	140	8	14000	14000	7850	0.88	154	135.40	-	
12.	Plate (Thk; 8 mm)	100x106x8 mm	SM400A	100	106	8	10600	10600	7850	0.67	308	205.03	-	
Sub-Total												340.43		
13.	FB (Thk; 6 mm)	100x491x6 mm	SS400	100	491	6	49100	49100	7850	2.31	308	712.28	-	*
14.	FB (Thk; 6 mm)	100x365x6 mm	SS400	100	365	6	36500	36500	7850	1.72	616	1059.00	-	*
Sub-Total												1771.28		
15.	BN (M12x40(2-W))	-	JIS B 3507	-	-	-	-	-	-	-	616	-	-	*
16.	BN (M12x40(2-W))	-	JIS B 3507	-	-	-	-	-	-	-	1232	-	-	*
Sub-Total												1848		
17.	BN (M12x45(2-W))	-	JIS B 3507	-	-	-	-	-	-	-	616	-	-	*
18.	T1	-	VP150A	-	718	-	-	-	-	-	154	-	110.57	
19.	T2	-	VP150A	-	1456	-	-	-	-	-	154	-	224.22	
20.	T3	-	VP150A	-	1063	-	-	-	-	-	154	-	163.70	
Sub-Total												498.50		
21.	Sleeve	-	VP150A	-	142	-	-	-	-	-	462	-	65.60	
Total												14218.47		

Note: The Notation (\*) in the table shows galvanized material in accordance with the Specifications.

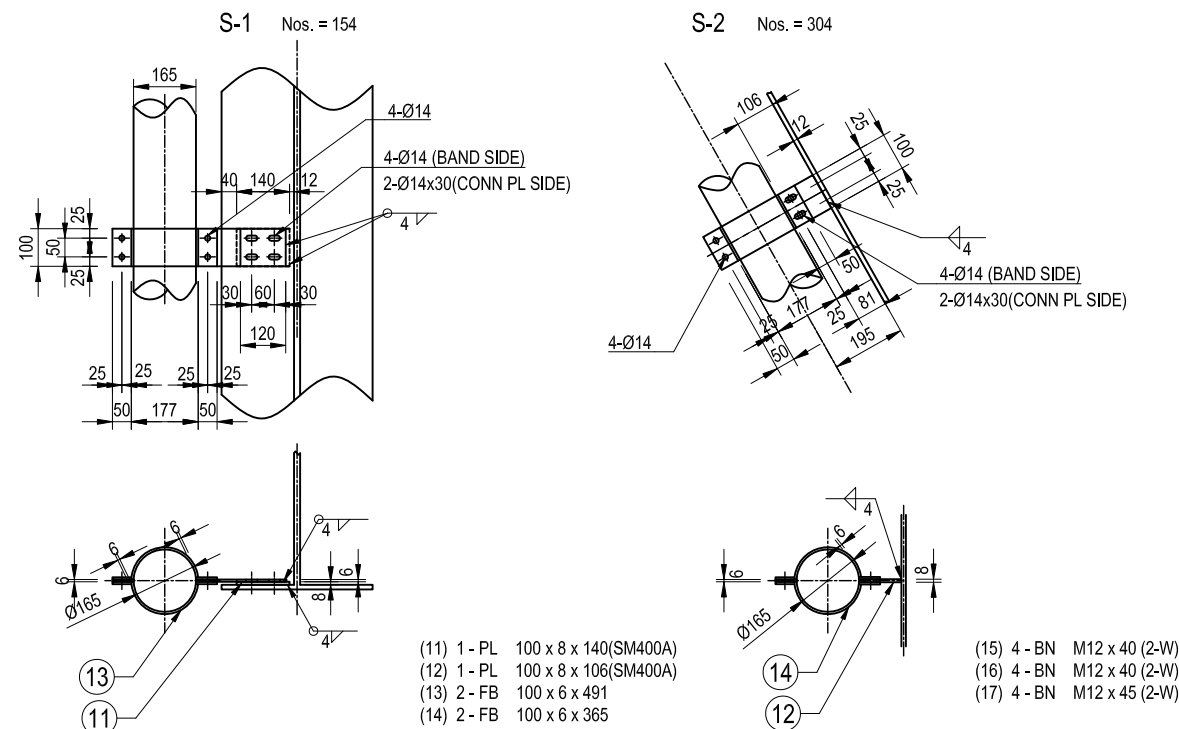
### CROSS SECTION(1)



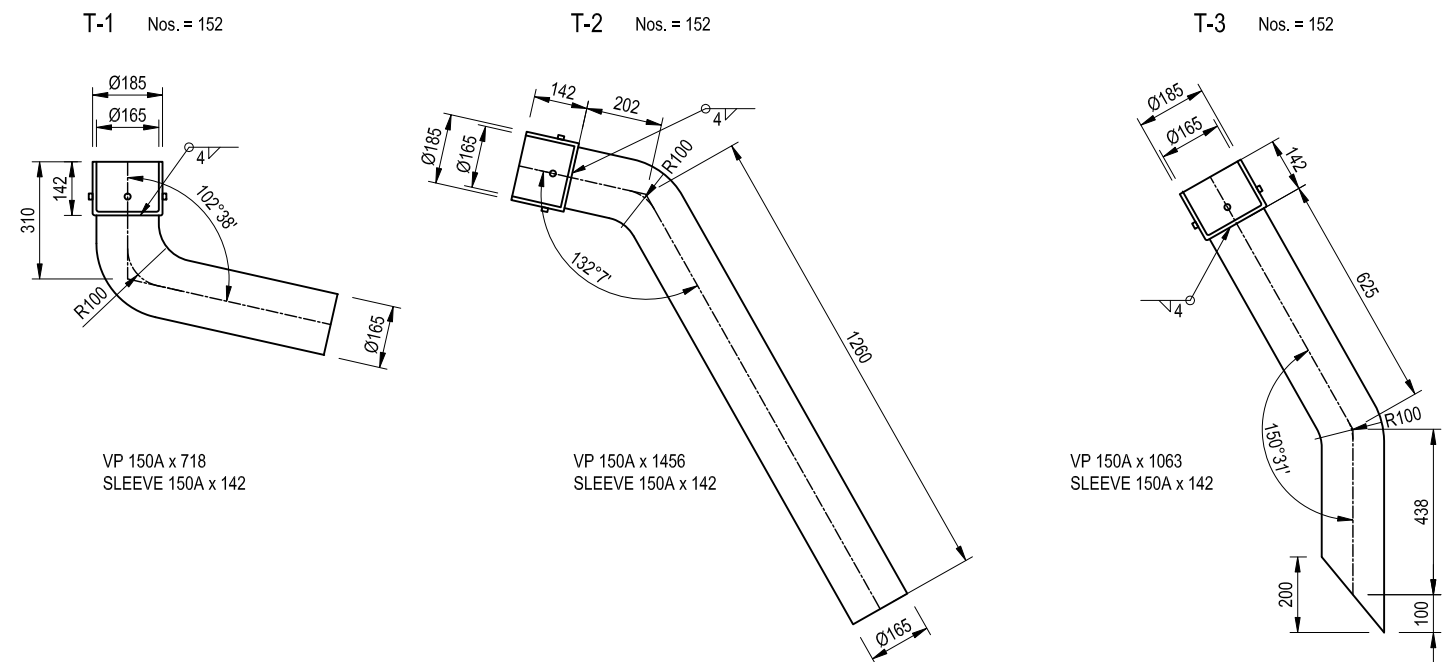
### CROSS SECTION(2)



### SUPPORT DEVICES S=1:20



### BENDING PIPE S=1:20



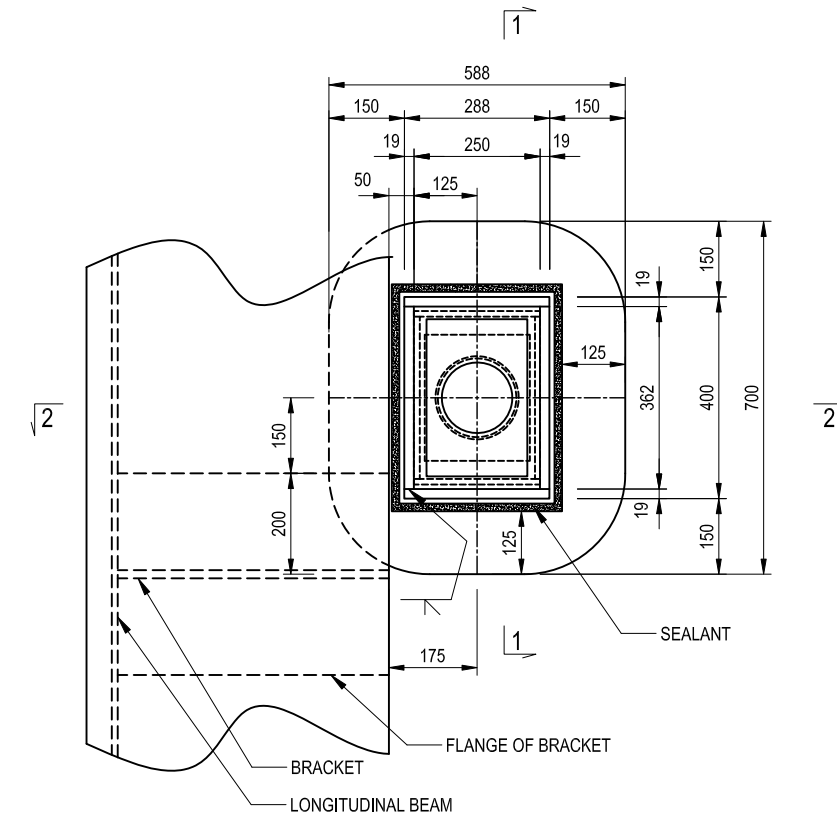
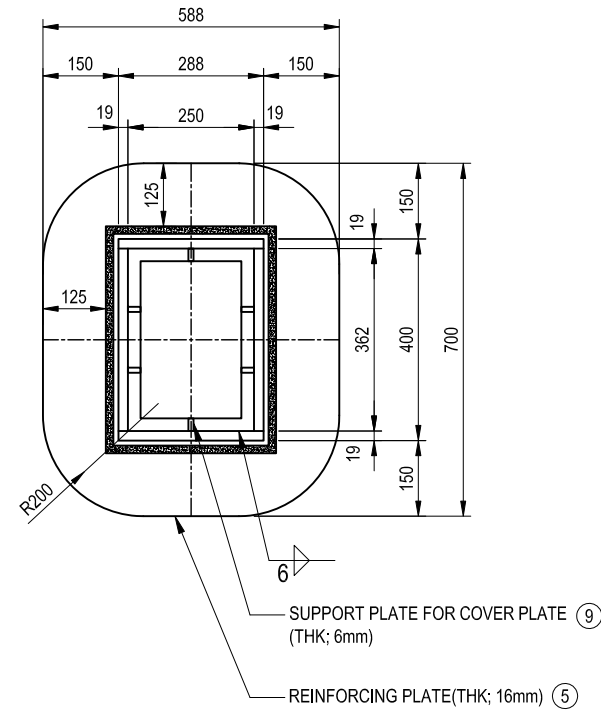
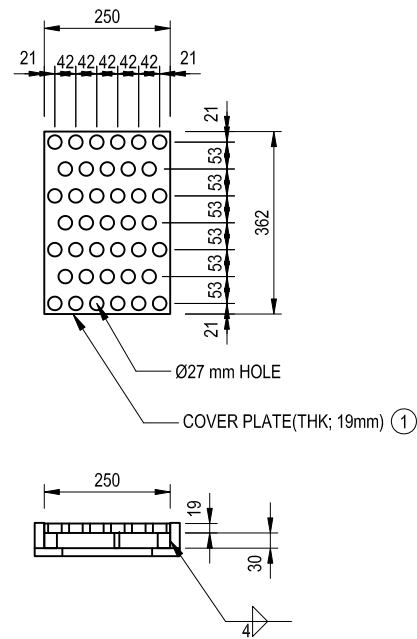


# DRAINAGE DETAIL OF STEEL BOX GIRDER(3) S=1:15

CATCH PIT (NUMBER : 154 )

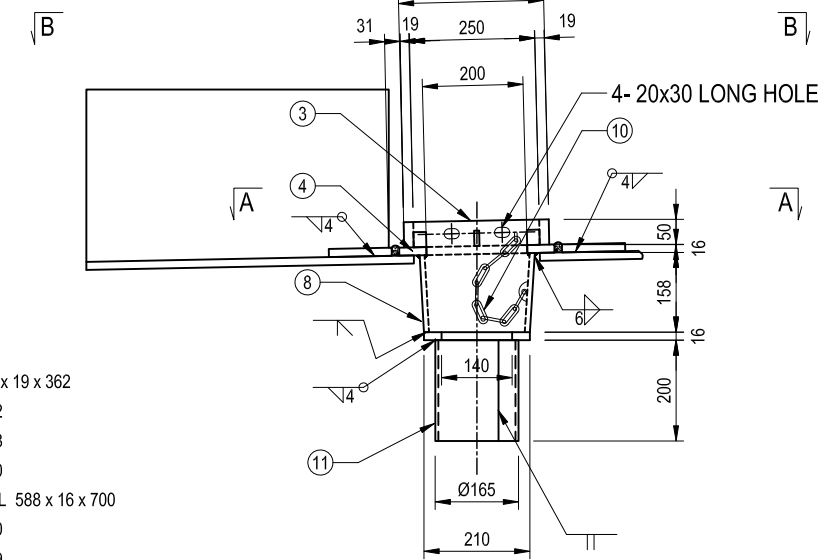
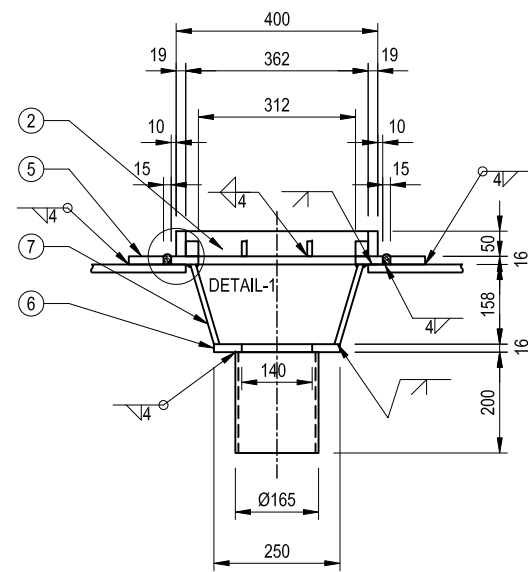
A - A

B - B



1 - 1

2 - 2

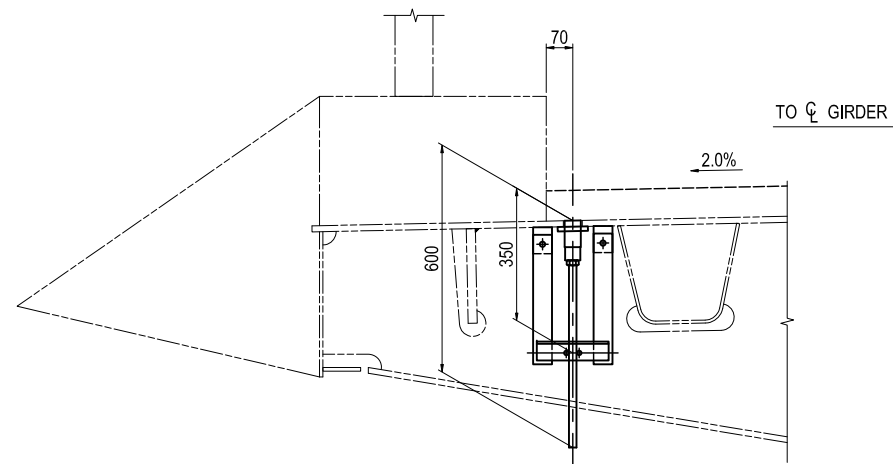


- (1) 1 - COVER PL 250 x 19 x 362
- (2) 2 - PL 50 x 19 x 362
- (3) 2 - PL 50 x 19 x 288
- (4) 1 - PL 308 x 16 x 420
- (5) 1 - REINFORCING PL 588 x 16 x 700
- (6) 1 - PL 210 x 16 x 250
- (7) 2 - PL 165 x 10 x 229
- (8) 2 - PL 157 x 10 x 322
- (9) 6 - PL 25 x 10 x 30
- (10) 1 - Chain 5Φ x 250(SUS304)
- (11) 1 - Pipe165.2 x 4.5 x 200(STK400)

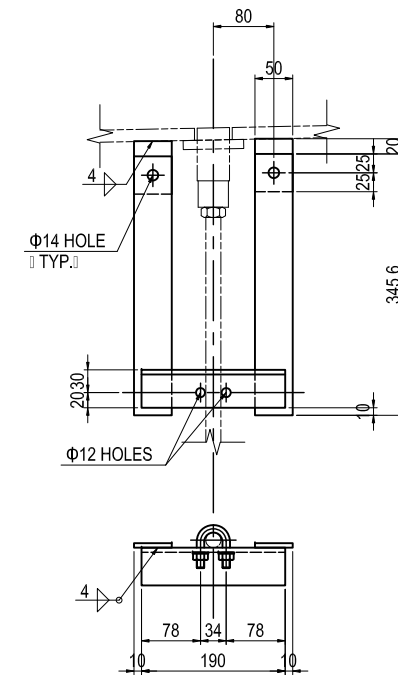
PROJECT NAME	FINANCED BY	COUNTERPART	JICA STUDY TEAM	NAME	SIGNATURE	DATE	DRAWING TITLE	PACKAGE
DETAILED DESIGN ON BAGO RIVER BRIDGE CONSTRUCTION PROJECT	JICA JAPAN INTERNATIONAL COOPERATION AGENCY	REPUBLIC OF THE UNION OF MYANMAR MINISTRY OF CONSTRUCTION DEPARTMENT OF BRIDGE	NIPPON KOEI CO., LTD. ORIENTAL CONSULTANTS GLOBAL CO., LTD. METROPOLITAN EXPRESSWAY COMPANY LIMITED CHODAI CO.,LTD. NIPPON ENGINEERING CONSULTANTS CO.,LTD.	PREPARED BY S. IMADA	<i>S. Imada</i>	15 Jun.2017	DRAINAGE DETAIL OF STEEL BOX GIRDER (3)	2
				CHECKED BY T. HAYAKAWA	<i>T. Hayakawa</i>	20 Jun.2017		DWG No.
				APPROVED BY Y. SANO	<i>Y. Sano</i>	21 Jun.2017		P2-SB-3033

# DRAINAGE DETAIL OF STEEL BOX GIRDER(4) S=1:20

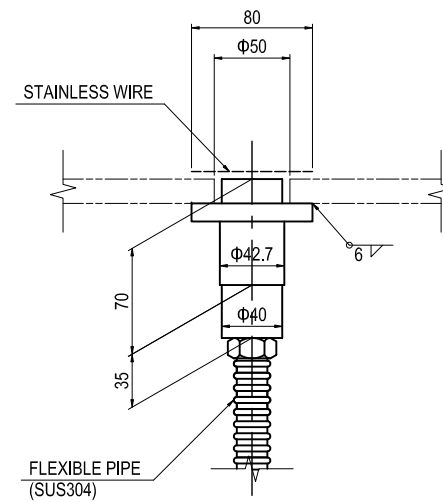
## DETAIL OF FLOOR DRAINAGE



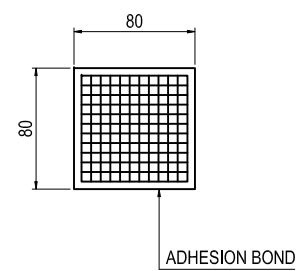
## STEADY PIECE DETAIL S=1:10



## FLEXIBLE PIPE DETAIL S=1:5



## STAINLESS WIRE DETAIL S=1:5



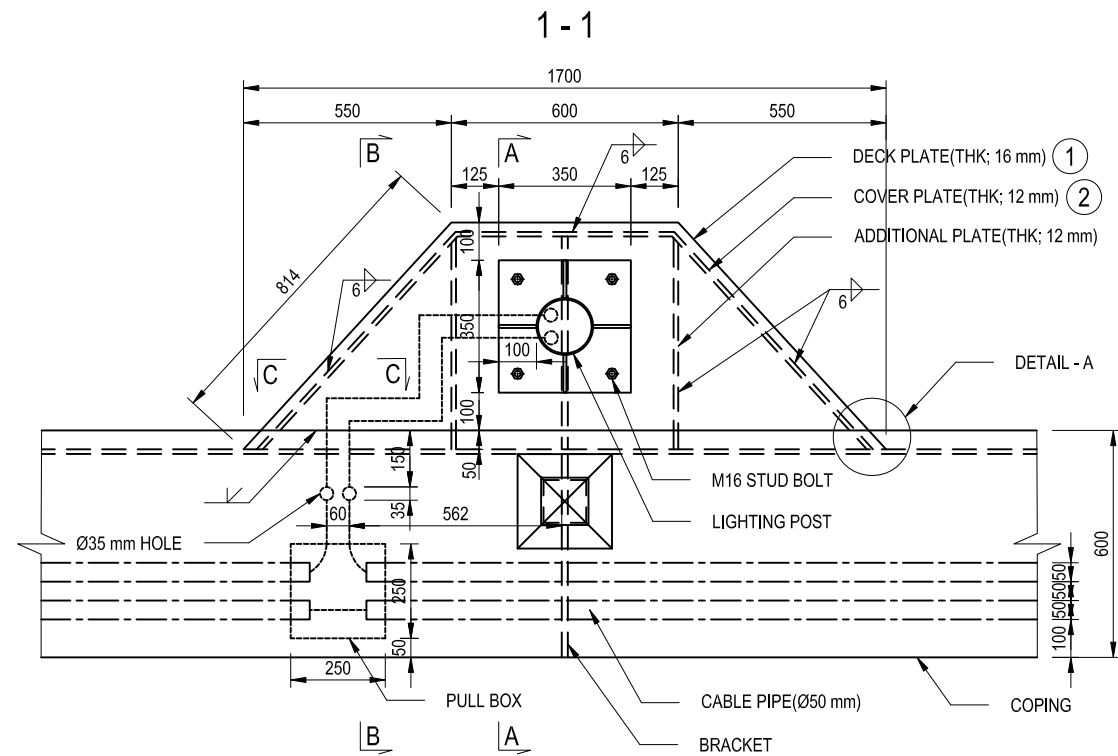
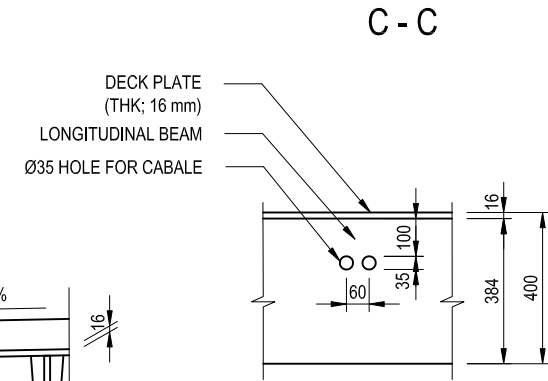
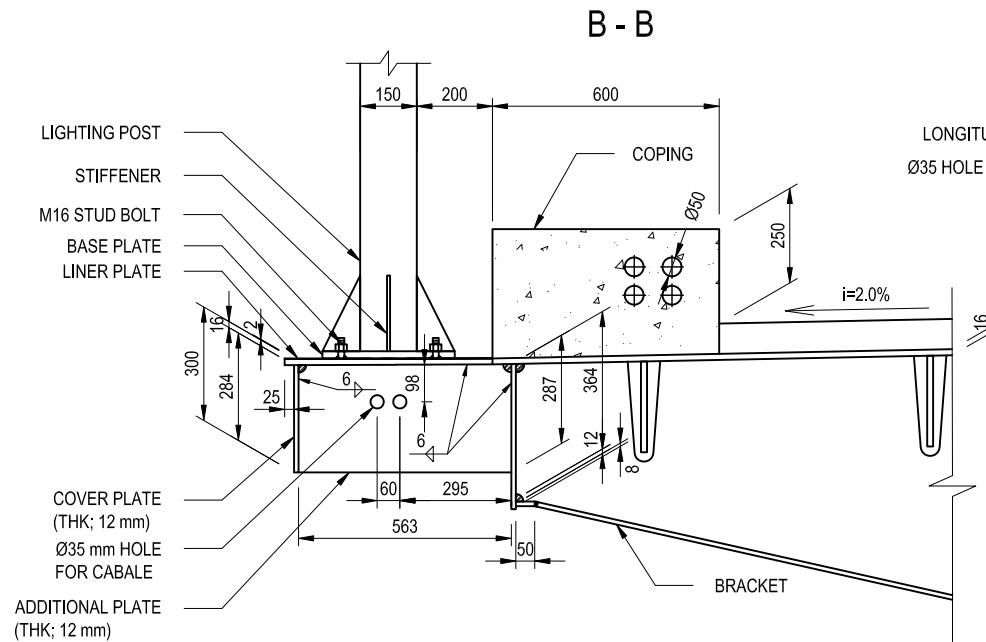
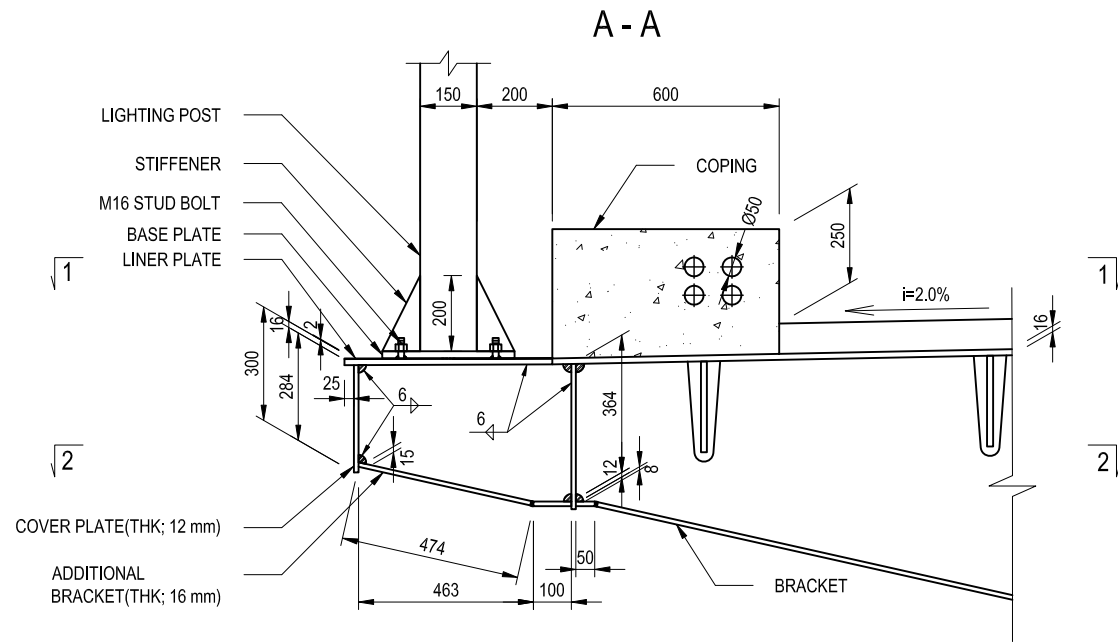
- 2-PL 50x6x70(SM400A)
- 2-PL 50x6x346(SS400)
- 1-L 50x50x6x190(SS400)
- 2-BN M12x35(1-W,1-UNut)(SS400)
- 1-U.BOLT M10(15C)(2-W)(SS400)
- 2-WASHER M10(SS400)

### NOTES:

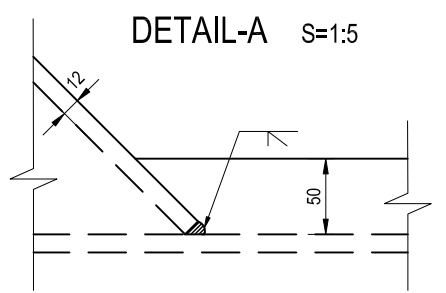
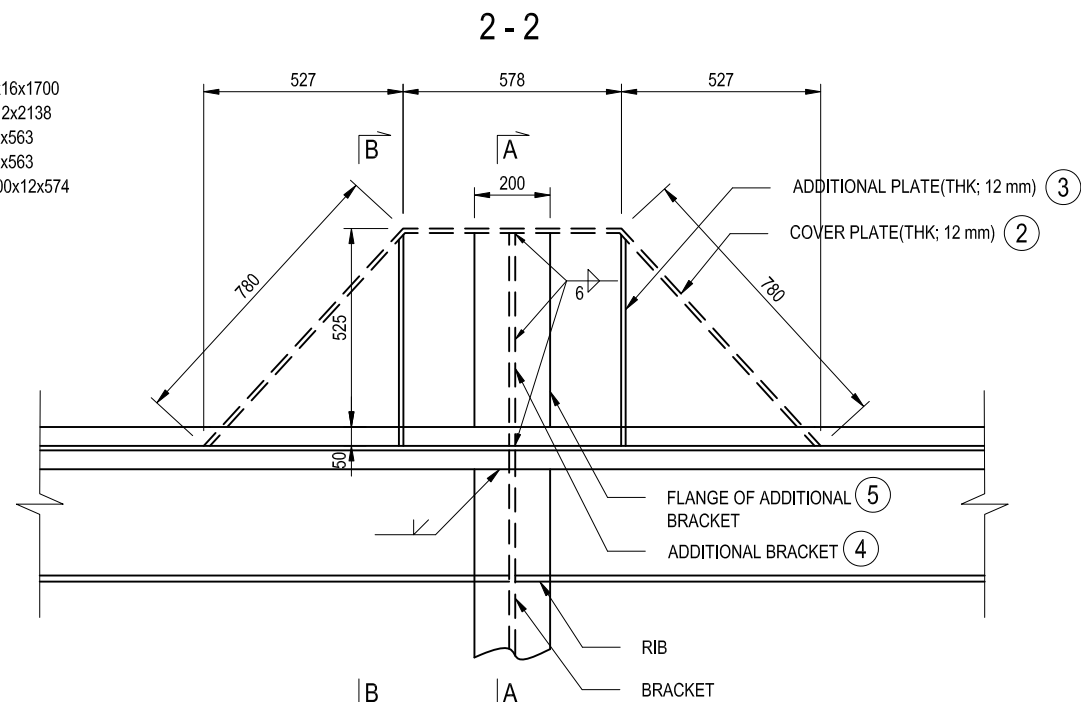
- 1 - HOT-DIP GALVANIZED COATING OVER 550g/m<sup>2</sup>, 350g/m<sup>2</sup> || FOR BOLT, WASHER & NUT AND MEMBER WITH A THICKNESS OF LESS THAN 3.2mm||
- 2 - Floor Drainage shall be installed at maximum 5m interval and Quantity is estimated at nos.346.

PROJECT NAME DETAILED DESIGN ON BAGO RIVER BRIDGE CONSTRUCTION PROJECT	FINANCED BY JAPAN INTERNATIONAL COOPERATION AGENCY	COUNTERPART REPUBLIC OF THE UNION OF MYANMAR MINISTRY OF CONSTRUCTION DEPARTMENT OF BRIDGE	JICA STUDY TEAM NIPPON KOEI CO., LTD. ORIENTAL CONSULTANTS GLOBAL CO., LTD. METROPOLITAN EXPRESSWAY COMPANY LIMITED CHODAI CO., LTD. NIPPON ENGINEERING CONSULTANTS CO., LTD.	NAME	SIGNATURE	DATE	DRAWING TITLE	PACKAGE			
				PREPARED BY	S. IMADA				15 Jun.2017	DRAINAGE DETAIL OF STEEL BOX GIRDER (4)	2
				CHECKED BY	T. HAYAKAWA				20 Jun.2017		DWG No.
				APPROVED BY	Y. SANO				21 Jun.2017		P2-SB-3034

# DETAIL OF BRACKET FOR LIGHTING POST S=1:20



- (1) 1-DECK PL 550x16x1700
- (2) 1-WEB PL 284x12x2138
- (3) 2-RIB PL 287x12x563
- (4) 1-RIB PL 364x12x563
- (5) 1-FLANGE PL 200x12x574

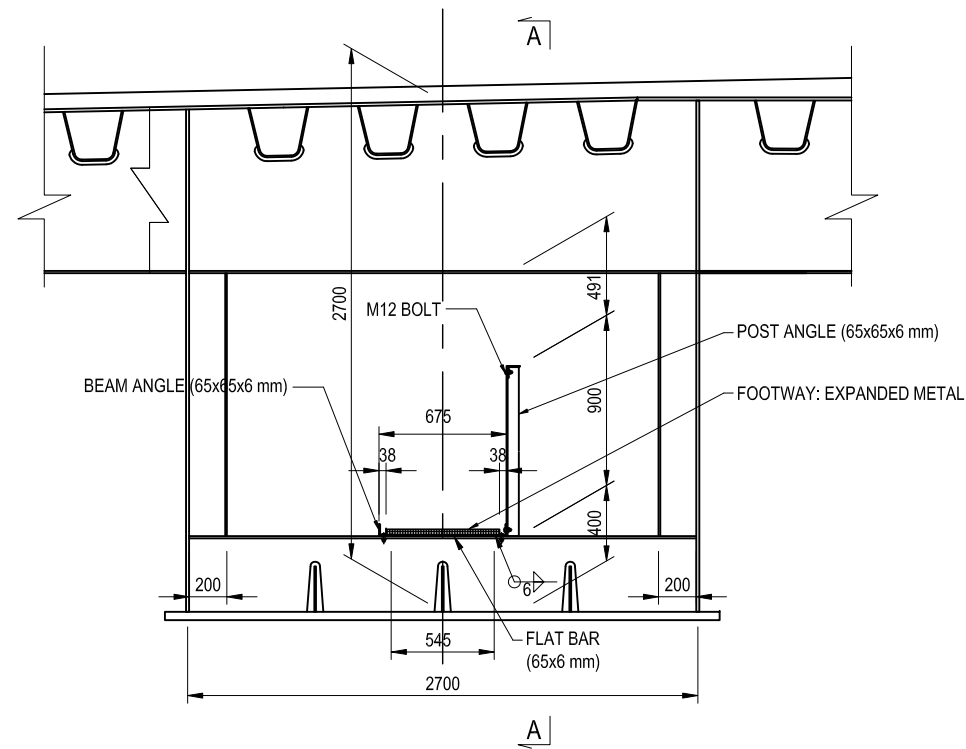


## MATERIAL LIST

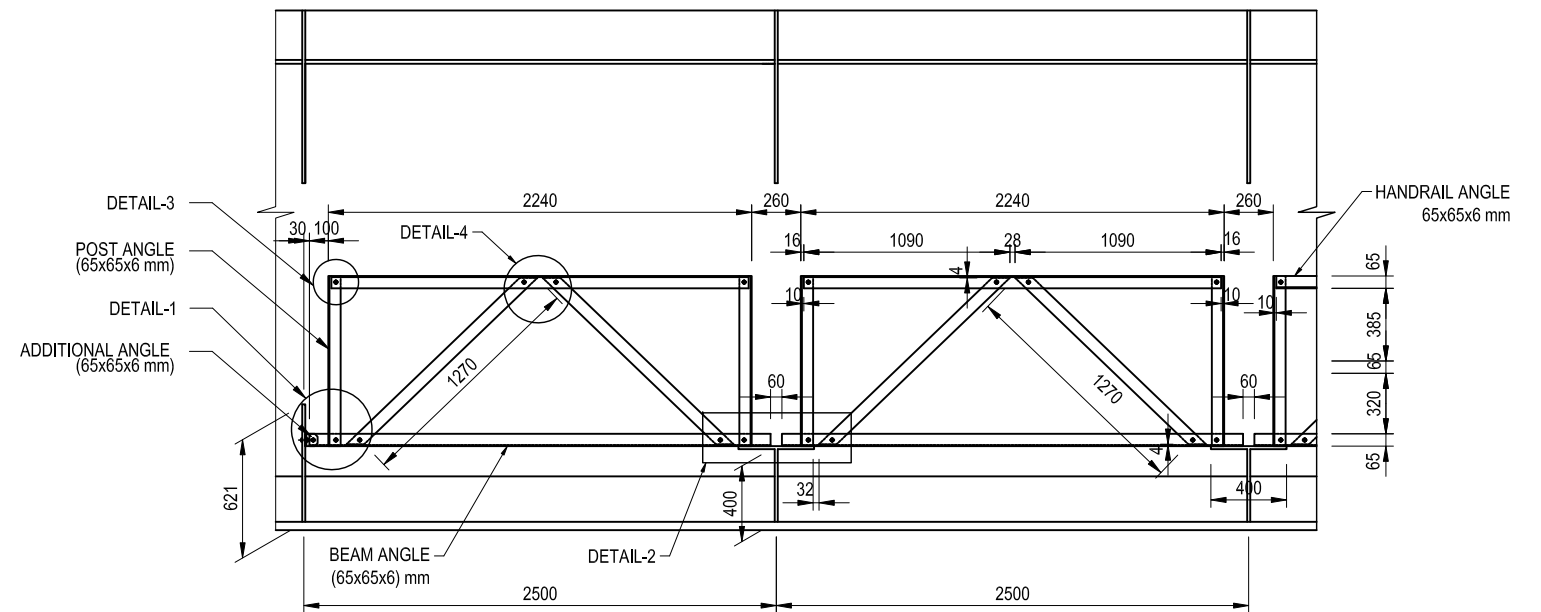
No.	Item	Material	Width (mm)	Length (mm)	Thickness (mm)	Area(mm <sup>2</sup> )	Used Area (mm <sup>2</sup> )	Net(%)	Unit Weight (kg/m <sup>2</sup> )	Weight (kg/pce)	Number	Weight(kg)	Remarks
1.	Deck Plate (Thk; 16 mm)	SM490Y	550	1700	16	935000	632500	67.65%	7850	79.44	40	3177.68	
2.	Cover Plate (Thk; 12 mm)	SM490Y	284	2138	12	607192	607192	-	7850	57.20	40	2287.90	
3.	Additional Plate (Thk; 12 mm)	SM490Y	287	563	12	161581	160736.50	99.48%	7850	15.14	80	1211.31	
4.	Additional Bracket (Thk; 12 mm)	SM490Y	364	563	12	204932	179742.24	87.71%	7850	16.93	40	677.27	
5.	Flange of Additional Bracket (Thk; 12 mm)	SM490Y	200	574	12	114800	114800	-	7850	10.81	40	432.57	
Sub-Total											4609.04		
6.	Stud Bolt (M16x35 mm)	JIS B 3507	-	-	-	-	-	-	-	0.057	160	9.12	
7.	Nut for Stud Bolt M16	JIS B 1181	-	-	-	-	-	-	-	0.057	160	9.12	
Total											7804.96		

# INSPECTION WALKWAY S=1:40

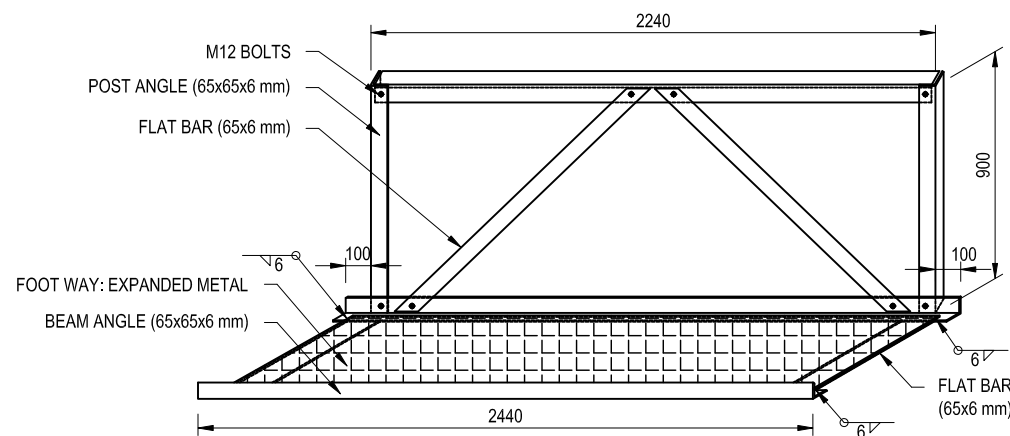
## CROSS SECTION



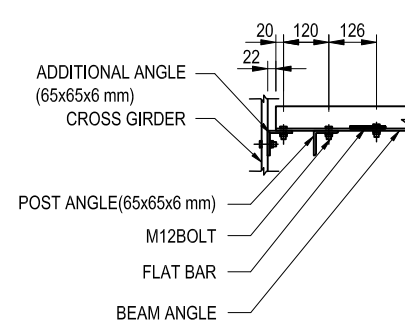
## SECTION A - A



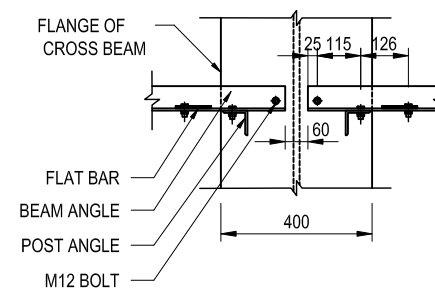
## INSEPECTION WALKWAY UNIT S=1:30



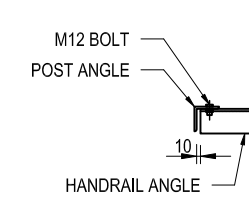
## DETAIL - 1



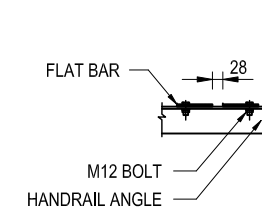
## DETAIL - 2



## DETAIL - 3



## DETAIL - 4 S=1:20



## MATERIAL LIST

No.	Item	Size	Material	Width (mm)	Length (mm)	Unit Weight (kg/m)	Unit Weight (kg/m <sup>2</sup> )	Weight (kg/pce)	Number	Weight(kg)	Remarks
1.	Beam Angle	65x65x6mm	SM400	-	2440	5.91	-	14.42	464	6691.07	*
		65x65x6mm	SM400	-	1940	5.91	-	11.47	196	2247.22	*
	Additional Angle	65x65x6mm	SM400	-	65	5.91	-	0.38	166	63.77	
	Sub-Total									9002.05	
2.	Post Angle	65x65x6mm	SS400	-	900	5.91	-	5.32	660	3510.54	*
	Handrail Angle	65x65x6mm	SS400	-	2208	5.91	-	13.05	232	3027.43	*
		65x65x6mm	SS400	-	1708	5.91	-	10.09	98	989.24	*
	Sub-Total									7527.21	
3.	Flat Bar(Diagonal)	65x6mm	SS400	-	1270	3.06	-	3.89	464	1803.20	*
	Flat Bar(Horizontal)	65x6mm	SS400	-	1104	3.06	-	3.38	196	662.14	*
	Flat Bar(Horizontal)	65x6mm	SS400	-	545	3.06	-	1.67	660	1100.68	*
	Sub-Total									3566.01	
4.	Foot Way(Expanded Metal)	-	SM400	600	2400	-	2.28	3.28	232	761.70	*
	Foot Way(Expanded Metal)	-	SM400	600	1900	-	2.28	2.60	98	254.72	*
	Sub-Total									1016.42	
5.	Set Bolt	M12x35 mm	SS400	-	-	-	-	0.057	4292	244.64	
	Total									21356.35	

Note: The Notation (\*) in the table shows galvanized material in accordance with the Specifications.

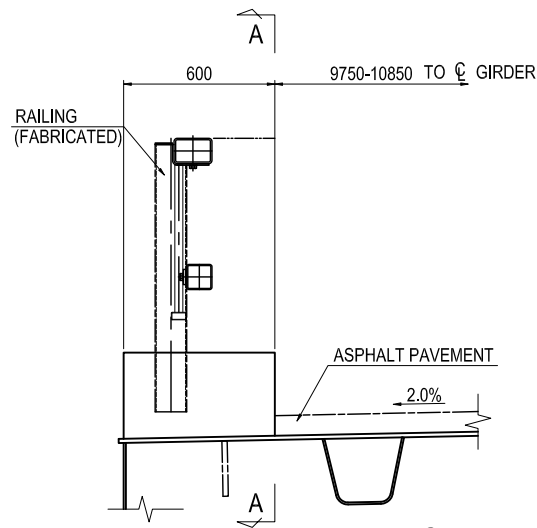


# DETAIL OF RAILING (1)

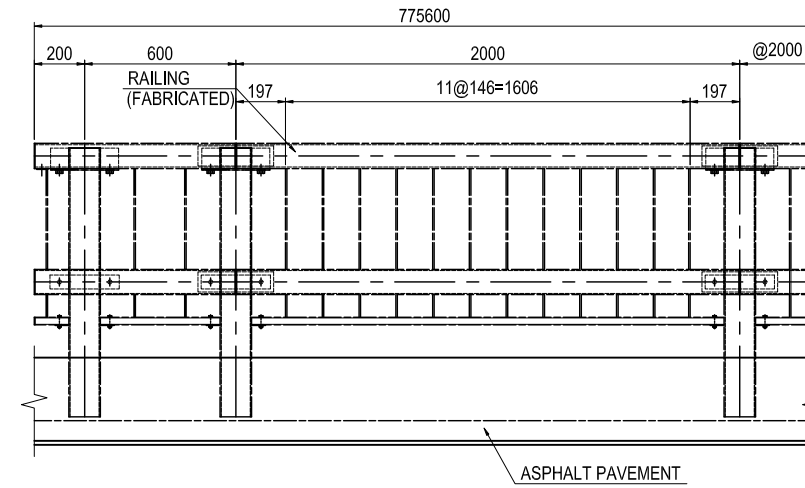
S=1:20

## COMPOSITE BARRIER

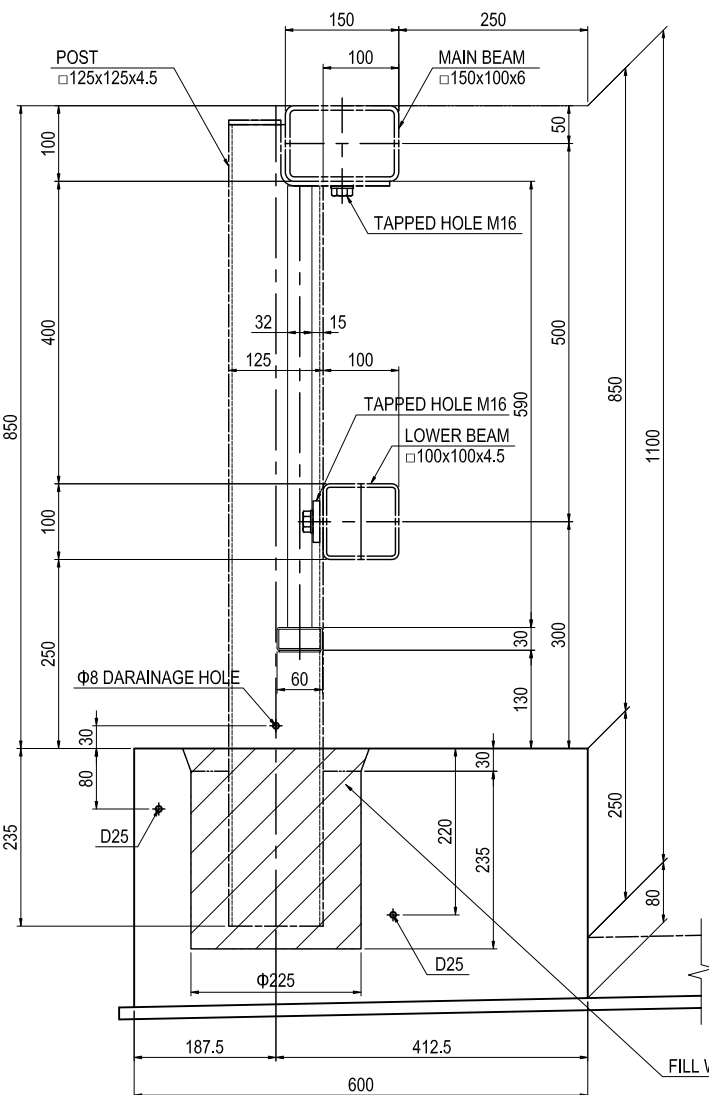
TYPICAL CROSS SECTION S=1:30



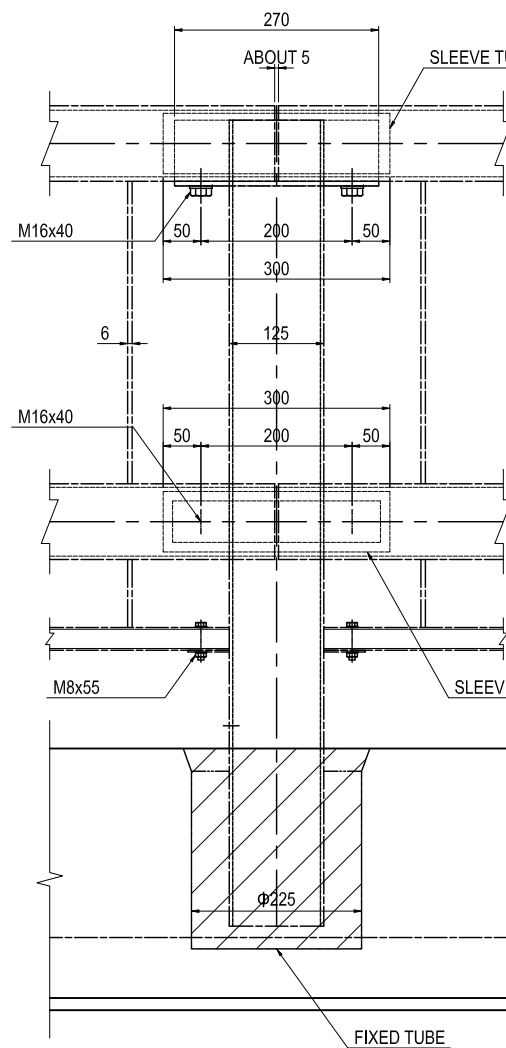
SECTION A-A S=1:30



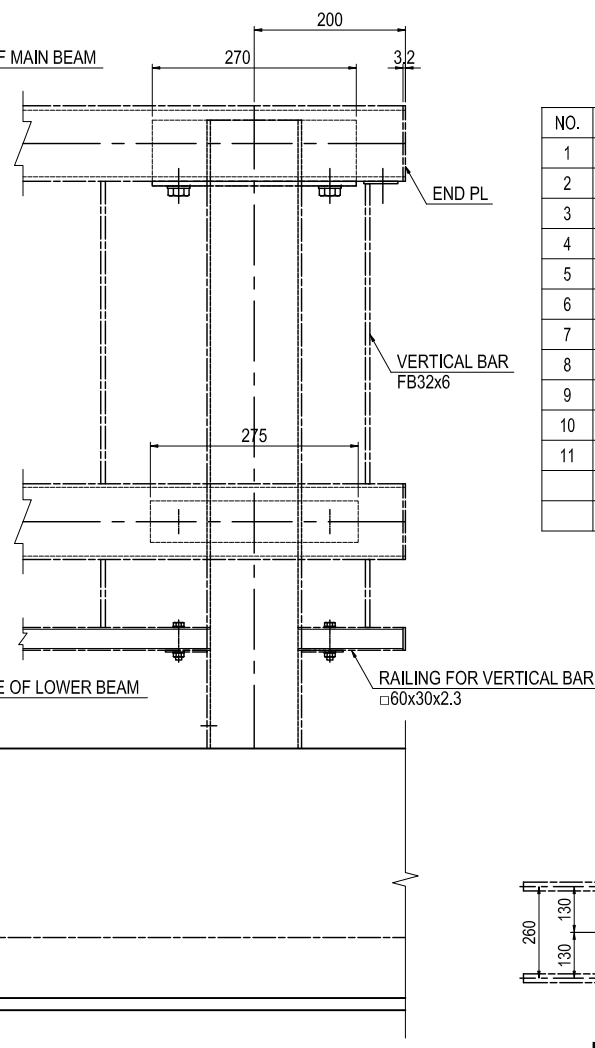
COMPOSITE BARRIER DETAIL S=1:10



JOINT DETAIL S=1:10



END POST DETAIL S=1:10



SUMMARY OF MEMBERS

NO.	MEMBER	SIZE DIMENSIONS	Q'TY	UNIT WEIGHT	WEIGHT PER UNIT	GROSS WEIGHT	MATERIAL	PER 10m	
								PAINTED AREA	MASS PER 1m
1	POST	□125x125x4.5	5		20.69	103.5	STKR 400	2.7m <sup>2</sup>	
2	MAIN BEAM	□150x100x6.0	5	21.70	43.29	216.5	STKR 400	5.0m <sup>2</sup>	
3	LOWER BEAM	□100x100x4.5	5	13.10	26.13	130.7	STKR 400	4.0m <sup>2</sup>	
4	SLEEVE TUBE OF MAIN BEAM	L=300	5		6.51	32.6	SS400		
5	SLEEVE TUBE OF LOWER BEAM	L=300	5		3.71	18.6	SS400		
6	RAILING FOR VERTICAL BAR	□60x30x12.3	5	2.98	5.55	27.8	STKR 400	1.7m <sup>2</sup>	
7	VERTICAL BAR	FB32x6	10		0.89	53.4	SS400	2.6m <sup>2</sup>	
8	HEXAGON BOLT	M16x40	10		0.12	1.2	GRADE 8.8		
9	HEXAGON BOLT	M16x40	10		0.12	1.2	GRADE 6.8		
10	HEXAGON BOLT	M8x55	10		0.04	0.4	GRADE 4.6		
11	FIXED TUBE	Φ225	5		-	-	SPCC		
TOTAL						585.9		18.0m <sup>2</sup>	

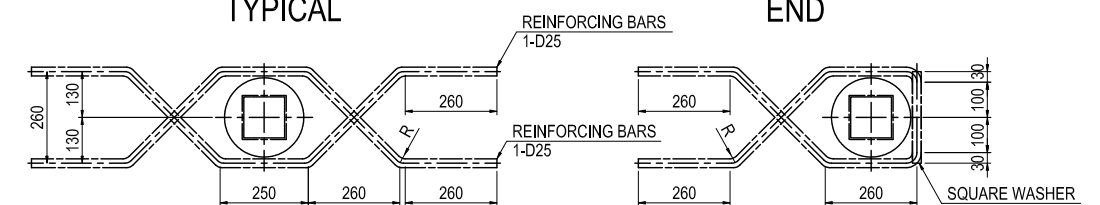
MASS PER 1m 58.6kg/m  
(EXCLUDING END SPAN)

MEMBER	SIZE DIMENSIONS	Q'TY	REMARKS
REINFORCING BAR (TYPICAL)	D25x1550	9625kg	SD345
REINFORCING BAR (END)	D25x1200	38kg	SD345

REINFORCING BARS DETAIL

TYPICAL

END



**NOTES:**

1 - INSTALLATION OF REINFORCING BAR SHALL BE ADJUSTED IN ACCORDANCE WITH REINFORCING BAR ARRANGEMENT OF THE CONCRETE CURB.

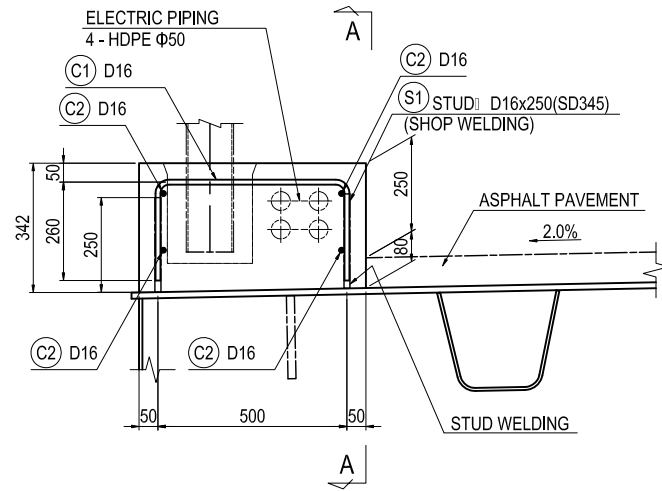


# DETAIL OF RAILING (3) S=1:20

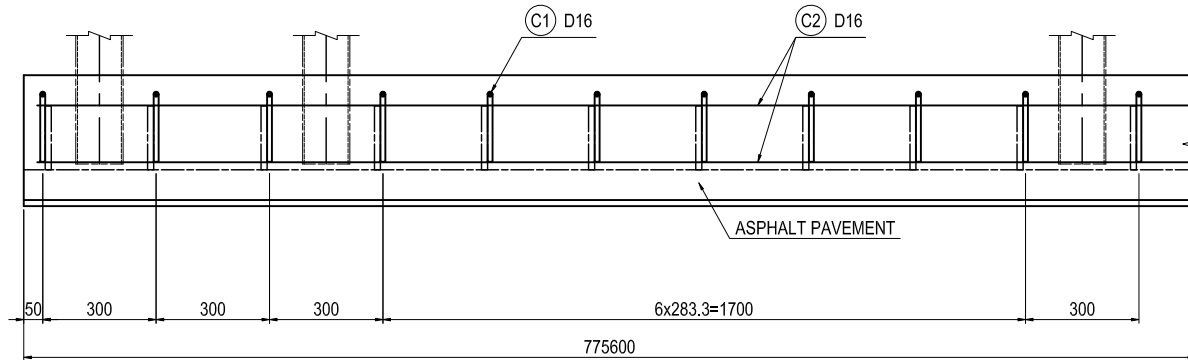
## DETAIL OF COPING AND MEDIAN

### WHEEL GUARD DETAIL

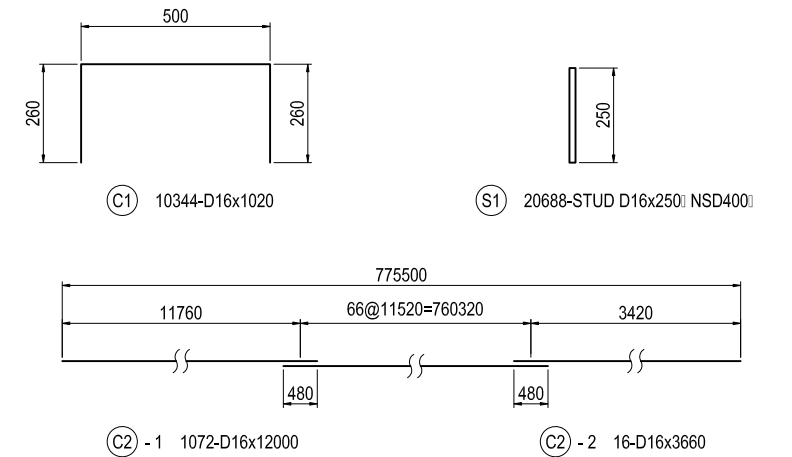
CROSS SECTION OF WHEEL GUARD



SECTION A-A

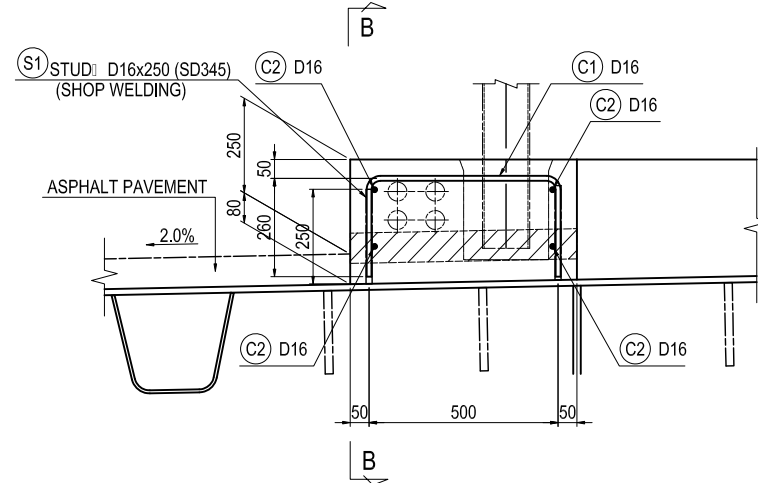


REINFORCING BAR BENDING SCHEDULE

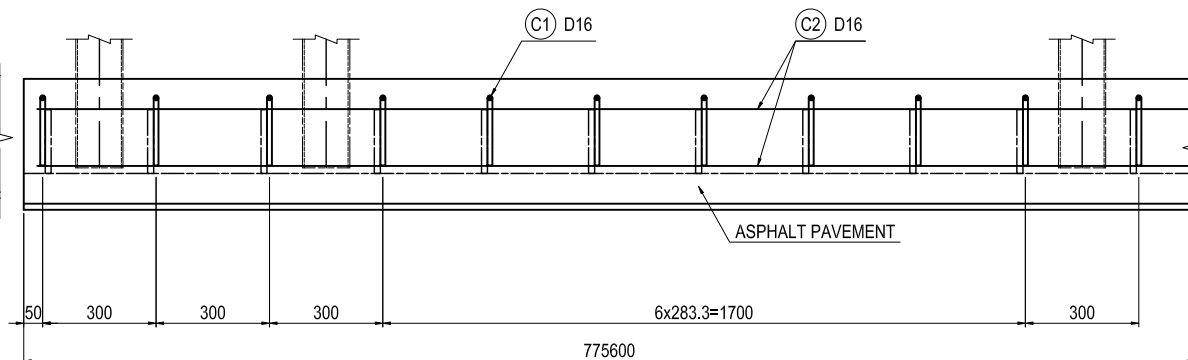


### MEDIAN STRIP DETAIL

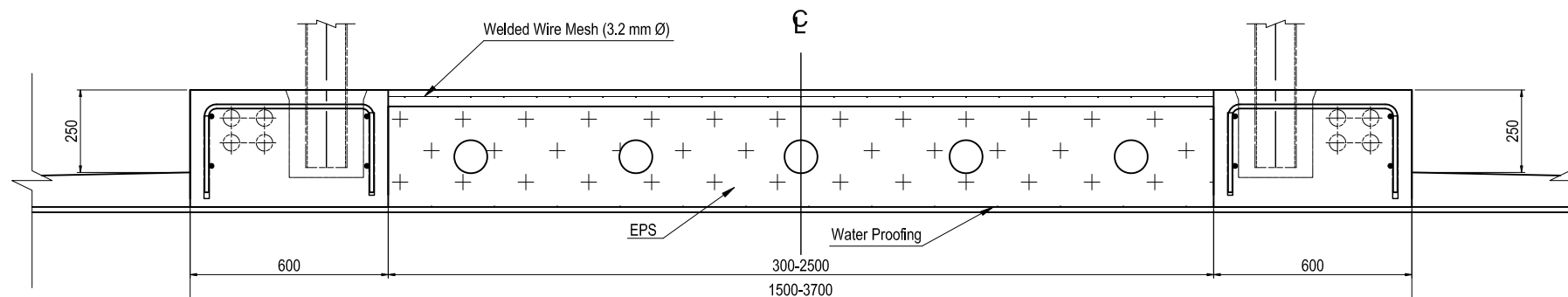
CROSS SECTION OF MEDIAN STRIP



SECTION B-B



### CROSS SECTION OF MEDIAN



SUMMARY OF MEMBERS

MEMBER	Q'TY	REMARKS
REINFORCING BAR	36606kg	SD345
STUD	8068kg	SD345 FOR STUD WELDING
CONCRETE(COPING)	691.82m <sup>3</sup>	σ <sub>ck</sub> =24N /mm <sup>2</sup>
COVER CONCRETE	3.68m <sup>3</sup>	σ <sub>ck</sub> =24N /mm <sup>2</sup>
FORM	1297 m <sup>2</sup>	
EPS	14.09 m <sup>3</sup>	
Welded Wire Mesh	50.34 m <sup>2</sup>	3.2 mm Ø
Waterproofing	50.34 m <sup>2</sup>	

**NOTES:**

1 - STUD SHALL BE INSTALLED AND INCLUDED IN THE SCOPE OF FABRICATION OF STEEL GIRDER.

PROJECT NAME DETAILED DESIGN ON BAGO RIVER BRIDGE CONSTRUCTION PROJECT	FINANCED BY JAPAN INTERNATIONAL COOPERATION AGENCY	COUNTERPART REPUBLIC OF THE UNION OF MYANMAR MINISTRY OF CONSTRUCTION DEPARTMENT OF BRIDGE	JICA STUDY TEAM NIPPON KOEI CO., LTD. ORIENTAL CONSULTANTS GLOBAL CO., LTD. METROPOLITAN EXPRESSWAY COMPANY LIMITED CHODAI CO., LTD. NIPPON ENGINEERING CONSULTANTS CO., LTD.	NAME	SIGNATURE	DATE	DRAWING TITLE DETAIL OF RAILING (3)	PACKAGE 2 DWG No. P2-SB-3053	
				PREPARED BY	S. IMADA				27 Nov.2017
				CHECKED BY	T. HAYAKAWA				28 Nov.2017
				APPROVED BY	Y. SANO				29 Nov.2017

# (REFERENCE) QUANTITY TABLE OF SUPER STRUCTURE

Not to Scale

## Quantity of Main Girder

Unit: kg

Category	Grade	Thickness - Size	Main Girder	Deck Plate Including Cross Beam	Steel Materials for Accessories	Sum
PL	SM570-H	54-42	181,252			181,252
	SM570	40-9	1,761,304			1,761,304
	SM490YB	38-17	592,088	637,638		1,229,726
	SM490YA	16-9	1,208,578	1,966,622	18,328	3,193,528
	SM490C	45	2,754			2,754
	SM490B	40-32	8,228			8,228
	SM400A	30-6	894,567	292,958	8,066	1,195,591
	SS400	22-2.3	11,806	142,128		153,934
PL	Sum	Subtotal	4,660,577	3,039,346	26,393	7,726,316
U-Shape	SM490YA	320* 240* 8		786,156		786,156
BULB-Shape	SM490YA	230* 11		220,726		220,726
Shapes	Sum	Subtotal		1,006,882		1,006,882
TCB	S10T	M 22	108,074	177,828	201	286,103
HTB	F10T	M 22		26,005		26,005
TCB&HTB	Sum	Subtotal	108,074	203,833	201	312,108
PIPE	SUS304	20	1			1
PIPE	Sum	Subtotal	1			1
RB	SS400	13 φ	61			61
RB	Sum	Subtotal	61			61
BN	SS400	M 16	359			359
	SUS304	M 16	114			114
BN	Sum	Subtotal	473			473
PIN	SUS304	5 φ	10			10
PIN	Sum	Subtotal	10			10
Stud Bolt & Nut	Sum				336	336
Sum Total			4,769,196	4,250,061	26,930	9,046,187

## Quantity of Painting Area

Unit m<sup>2</sup>

Painting System	C-5	D-5	F-11	F-12	J	E
	Exterior surface	Interior surface	Exterior surface of bolted connection	Interior surface of bolted connection	Contact surface of bolted connection	Interior surface of steel deck in contact with concrete
Area	41,957	92,191	4,118	643	2,306	16,156

## Quantity of Accessories

Category	Grade	Thickness - Size	Guard Rail and Coping	Inspection Walkway	Drainage Pit	Expansion Joint Support (P13)	Expansion Joint Support (P20)	Total
Tube	STKR 400	(150x150x6)	123,600					123,600 kg
Plate	SM400A	19-9			340			340 kg
	SS400	19			1,566			1,566 kg
	Plate Total				1,906			1,906 kg
Expanded Metal	SM400	22x50.8		1,016				1,016 kg
Flat Bar	SS400	65x6		3,566	1,771			5,337 kg
Angle	SM400	65x65x6		9,002				9,002 kg
	SS400	65x65x6		7,527				7,527 kg
	Angle Total			16,529				16,529 kg
Normal Bolt	SS400	M12		245				245
Rebar	SD345	19-13	55,932			358	346	56,636 kg
Total			179,532	21,356	3,678	358	346	205,270 kg
Washers	SS400	M12			16			16 Nos.
Chain	SUS304	5 mm φ x 250			1			1 Nos.
Pipe	PVC	VP150A			3.24			3.24 m
Concrete	24MPa		695.50			9.71	9.65	715 m3
EPS			14.09					14 m3

## Quantity of Bearing & Expansion Joint

Bearing Type	I	II	III	IV	
	Steel	Elastomer	Elastomer	Steel	
Capacity	Rmax (KN)	3200	8070	7442	3000
	Displacement X(mm)	±130	Fix	Fix	±130
	Displacement Y(mm)	Fix	Fix	Fix	Fix
Numbers		4	8	16	4

Expansion Joint (P20)	Width	Length	Capacity
Modular Type Joint	1.0m	10.2m	640mm
Number	2 Sets		

(REFERENCE) QUANTITY TABLE OF SUB STRUCTURE

Not to Scale

QUANTITY TABLE OF RC PIER COLUMN AND BEAM STRUCTURE

QUANTITY TABLE OF STEEL PIPE SHEET PILE FOUNDATION

Structure Component	Work Item	Specification	Division	Unit	Quantity						Total
					P14 PIER	P15 PIER	P16 PIER	P17 PIER	P18 PIER	P19 PIER	
Pier Column and Beam (Reinforced Concrete Structure)	Concrete	σck=30N/mm <sup>2</sup>		m <sup>3</sup>	970.7	958.1	945.5	930.2	917.4	904.6	5,626.5
	Re-bar	SD345	D 13	kg	—	—	—	—	—	—	—
			D16 ~ D25	"	65,532	64,666	63,810	62,542	61,682	60,837	379,069
			D29 ~ D32	"	8,476	8,476	8,476	8,476	8,476	8,476	50,856
			D 35	"	—	—	—	—	—	—	—
			D 38	"	—	—	—	—	—	—	—
			D 51	"	—	—	—	—	—	—	—
			Total		74,008	73,142	72,286	71,018	70,158	69,313	429,925
		SD390	D 38	"	66,550	65,771	64,992	63,954	63,175	62,399	386,841
	Mechanical splice	SD390	D 38	Point	580	580	580	580	580	580	3,480

Structure Component	Work Item	Specifications/Division	Unit	Quantity						Total	Remark			
				P14 PIER	P15 PIER	P16 PIER	P17 PIER	P18 PIER	P19 PIER					
Steel pipe well	Steel pipe length(φ1200mm)		m/Number	54.0	57.0	55.0	55.0	55.0	53.5	—	—			
	Pile number		Number	30	30	30	30	30	30	180	Outside Steel Pipe Well			
	Total		"	6	6	6	6	6	6	36	Diaphragm Steel Sheet Pipe Wall			
	Pile extension		m	1,944.0	2,052.0	1,980.0	1,980.0	1,980.0	1,926.0	11,862.0	—			
	A l l u m b e r	Steel pipe weight	φ1200	t=14mm	t	488,346	532,518	503,070	503,070	503,070	481,002	3,011,076	SKY400	
				t=14mm	"	110,430	110,430	110,430	110,430	110,430	110,430	662,580	SKY490	
				t=16mm	"	224,160	224,160	224,160	224,160	224,160	224,160	1,344,960	SKY400	
		Accessories weight	φ165.2	t=11mm	"	161,764	170,422	165,168	165,168	165,168	160,210	987,900	STK400	
				Reinforcement Band	PL t= 9mm	t	2,880	2,880	2,880	2,880	2,880	2,880	17,280	SS400
				Members for Perimeter Field Welding (Backing Ring Stopper)	PL t=14mm	"	0,432	0,432	0,432	0,432	0,432	0,432	2,592	SS400
					PL t=16mm	"	—	—	—	—	—	—	—	SS400
				Sling	PL t=22mm	"	1,296	1,296	1,296	1,296	1,296	1,296	7,776	SM490A
				Interlocking Toe	PL t=12mm	Piece	74	74	74	74	74	74	444	SS400
				In-situ Attached Interlocking		Point	74	74	74	74	74	74	444	STK400
	Precut		"	74	74	74	74	74	74	444	—			
	Excavation inside	Pile inside		m <sup>3</sup>	332.0	372.2	366.4	317.8	307.8	311.5	2,007.7	—		
		Pile head		"	47.4	55.4	54.3	44.6	42.6	43.3	287.6	—		
	Concrete filling	Fill concrete	σck=21N/mm <sup>2</sup>	m <sup>3</sup>	282.3	282.3	282.3	282.3	282.3	282.3	1,693.8	Correction factor=0.04		
		Pile head	σck=24N/mm <sup>2</sup>	"	8.1	8.1	8.1	8.1	8.1	8.1	48.6	—		
	Cleaning inside joint pipe			m	1,534.9	1,682.4	1,613.1	1,560.1	1,549.2	1,494.1	9,433.8	—		
Mortar filling inside joint pipe	σck=21N/mm <sup>2</sup>	Mortar length	m	1,468.9	1,572.5	1,509.6	1,509.6	1,509.6	1,450.4	9,020.6	Mortar=2.5m <sup>3</sup> /100m			
		Mortar quantity	m <sup>3</sup>	38.5	41.3	39.6	39.6	39.6	38.1	236.7	Correction factor=0.05			
Sealing inside joint pipe	σck=0.2N/mm <sup>2</sup>	Sealing length	m	378.0	378.0	378.0	378.0	378.0	378.0	2,268.0	—			
		Sealing quantity	m <sup>3</sup>	10.8	10.8	10.8	10.8	10.8	10.8	64.8	—			
		Sealing bag	m	756.0	756.0	756.0	756.0	756.0	756.0	4,536.0	—			
Excavation inside the well			m <sup>3</sup>	1,003.6	1,149.6	1,128.5	952.0	915.7	929.4	6,078.8	—			
Backfill inside the well			m <sup>3</sup>	226.2	376.5	354.8	173.1	135.8	149.9	1,416.3	—			
Surplus soil (waste soil)			m <sup>3</sup>	777.4	773.1	773.7	778.9	779.9	779.5	4,662.5	—			
Footing concrete		σck=24N/mm <sup>2</sup>	m <sup>3</sup>	492.8	492.8	492.8	492.8	492.8	492.8	2,956.8	Correction factor=0.09			
Bottom slab concrete		σck=21N/mm <sup>2</sup>	m <sup>3</sup>	253.8	253.8	253.8	253.8	253.8	253.8	1,522.8	—			
Spread sand			m <sup>3</sup>	58.2	58.2	58.2	58.2	58.2	58.2	349.2	—			
Pile head	Shear Connector	PL-32×16×3597	kg	174	174	174	174	174	174	1,044	—			
	Stopper	PL-25×9×50	"	3	3	3	3	3	3	18	—			
Pile head Re-bar	Re-bar	SD345	D 13	kg	307	307	307	307	307	307	1,842	—		
			D16 ~ D25	"	—	—	—	—	—	—	—	—		
			D29 ~ D32	"	918	918	918	918	918	918	5,508	—		
			Total	"	1,225	1,225	1,225	1,225	1,225	1,225	7,350	—		
Footing Re-bar	Re-bar	SD345	D 13	kg	—	—	—	—	—	—	—			
			D16 ~ D25	"	7,614	7,614	7,614	7,614	7,614	7,614	45,684			
			D29 ~ D32	"	12,134	12,134	12,134	12,134	12,134	12,134	72,804			
			D 35	"	—	—	—	—	—	—	—			
			D 38	"	—	—	—	—	—	—	—			
			D 51	"	33,024	31,707	31,707	31,707	31,707	33,024	192,876			
	Total	"	52,772	51,455	51,455	51,455	51,455	52,772	311,364					
	Mechanical splice	SD345	D 38	Point	—	—	—	—	—	—	—			
			D 51	"	87	89	89	89	89	87	530			
			Total	"	87	89	89	89	89	87	530			
Total			"	87	89	89	89	89	87	530				
Welding of the dowel	Welding of the dowel stage		Stage	870	840	840	840	840	840	5,070	—			
	Welding of the dowel Weight		kg	8,504	8,248	8,248	8,248	8,248	8,248	49,744	—			