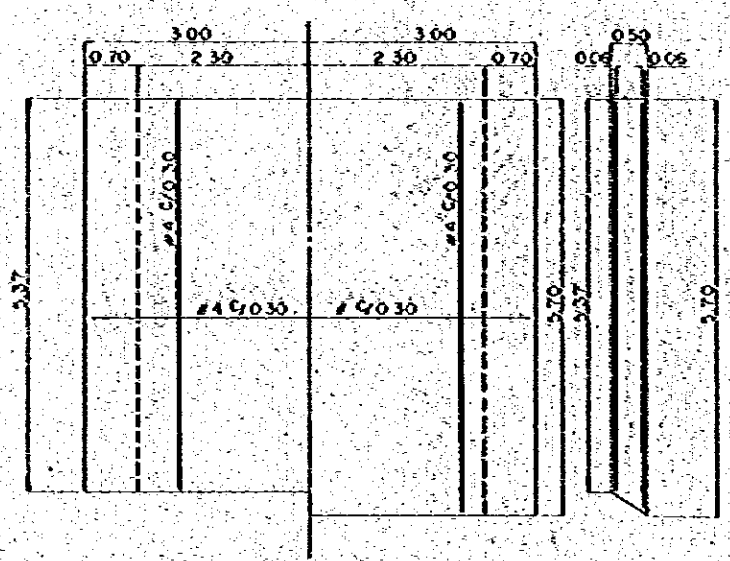
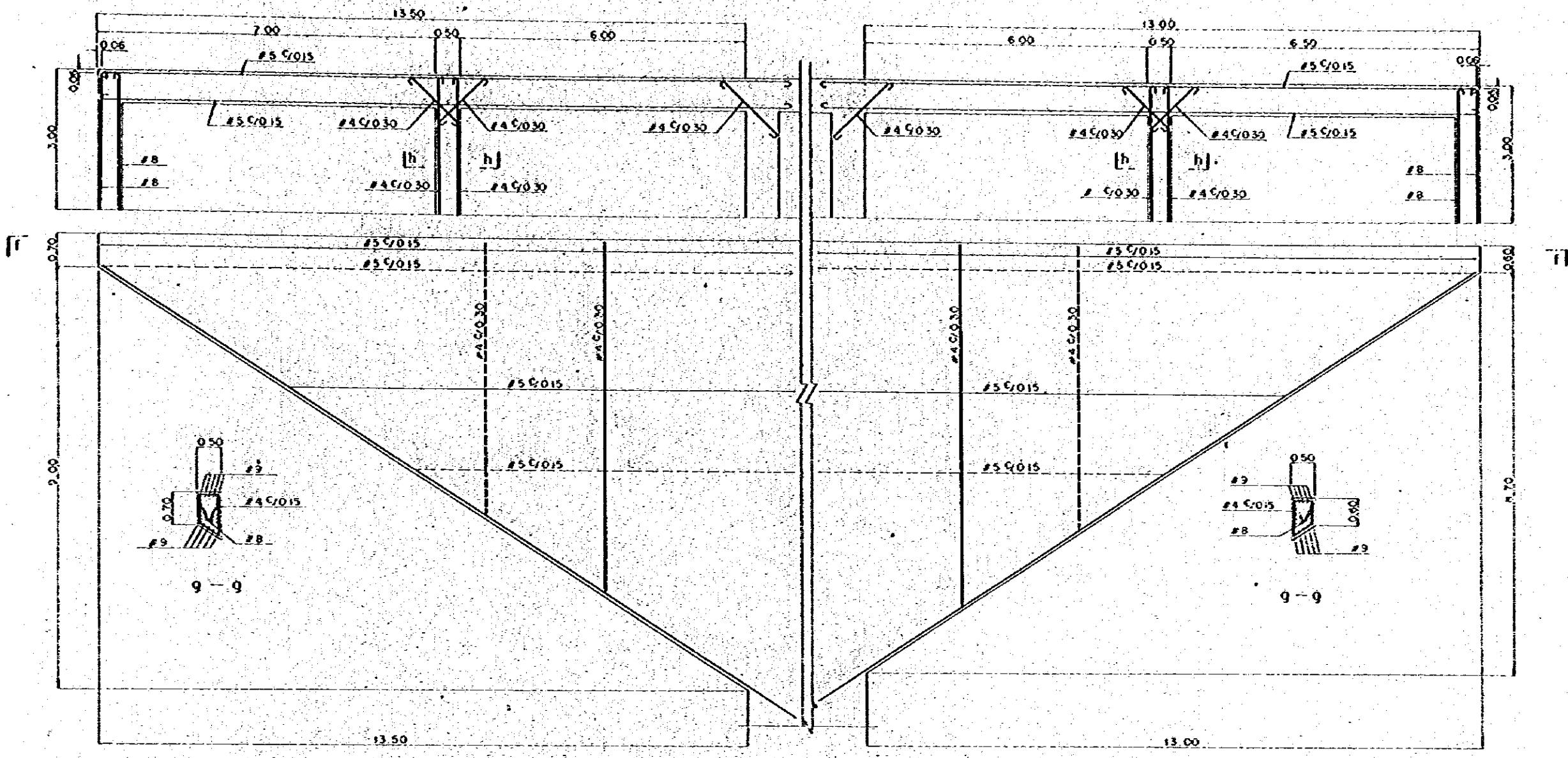
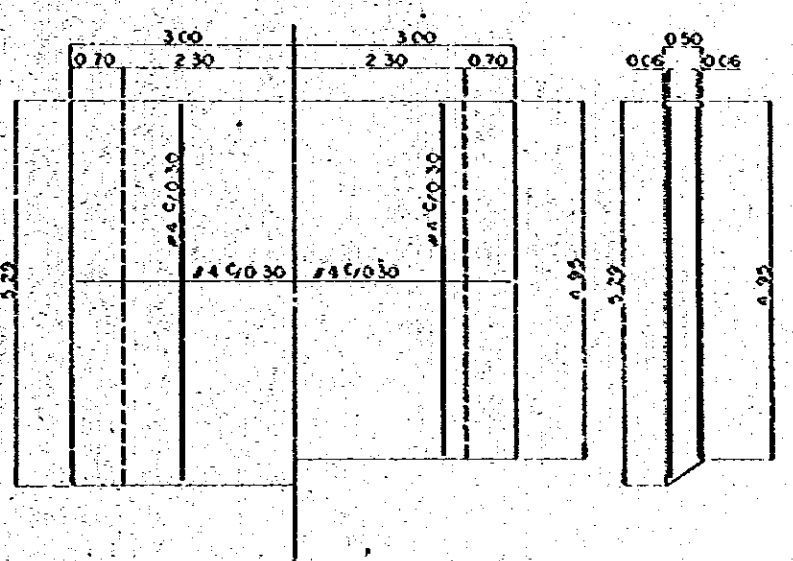


1-1



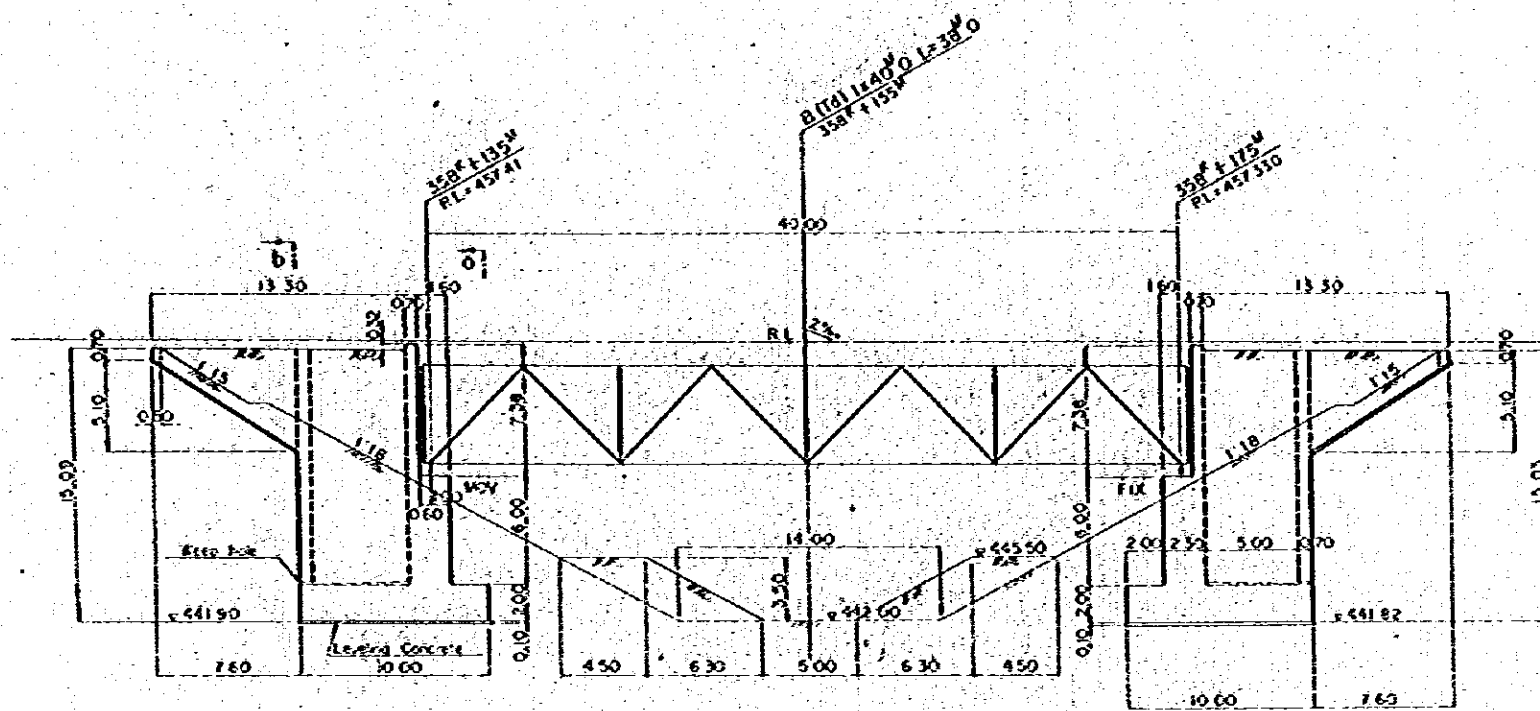
h - h



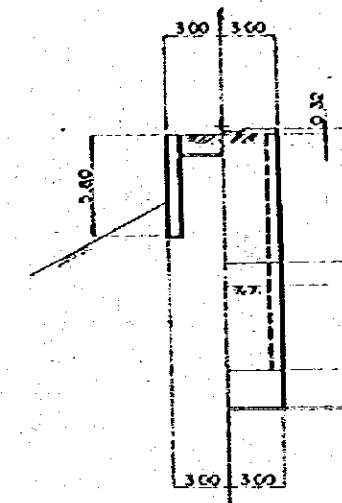
S = 1:50

- NOTES
- 1 COMPRESSIVE STRENGTH OF CONCRETE AT 28 DAYS
 - (a) STRUCTURAL CONCRETE $f_{28} = 20 \text{ MPa}$
 - (b) LEVELING CONCRETE $f_{28} = 15 \text{ MPa}$
 - 2 REINFORCING STEEL BAR ASTM A615 GRADE 60 OR A615 GRADE 60 OR A617 GRADED

EMPRESA NACIONAL DE FERROCARRILES		
RAILWAY REHABILITATION PROJECT (UPAS PROJECT)		
356# + 307# BRIDGE		
BAR ARRANGEMENT (Sheet 2 of 2)		
Ejecutor: Empresa		
Drawn by Date:	Checked by Date:	Approved by Date:
Contracting Enterprise		
Checked by Date:	Approved by Date:	73



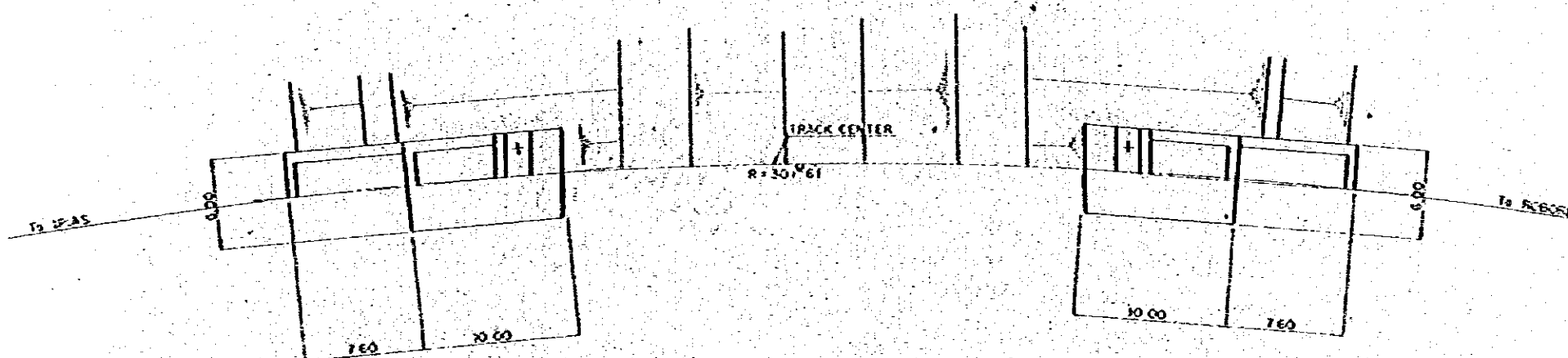
SIDE VIEW S=1/200



b-b a-a

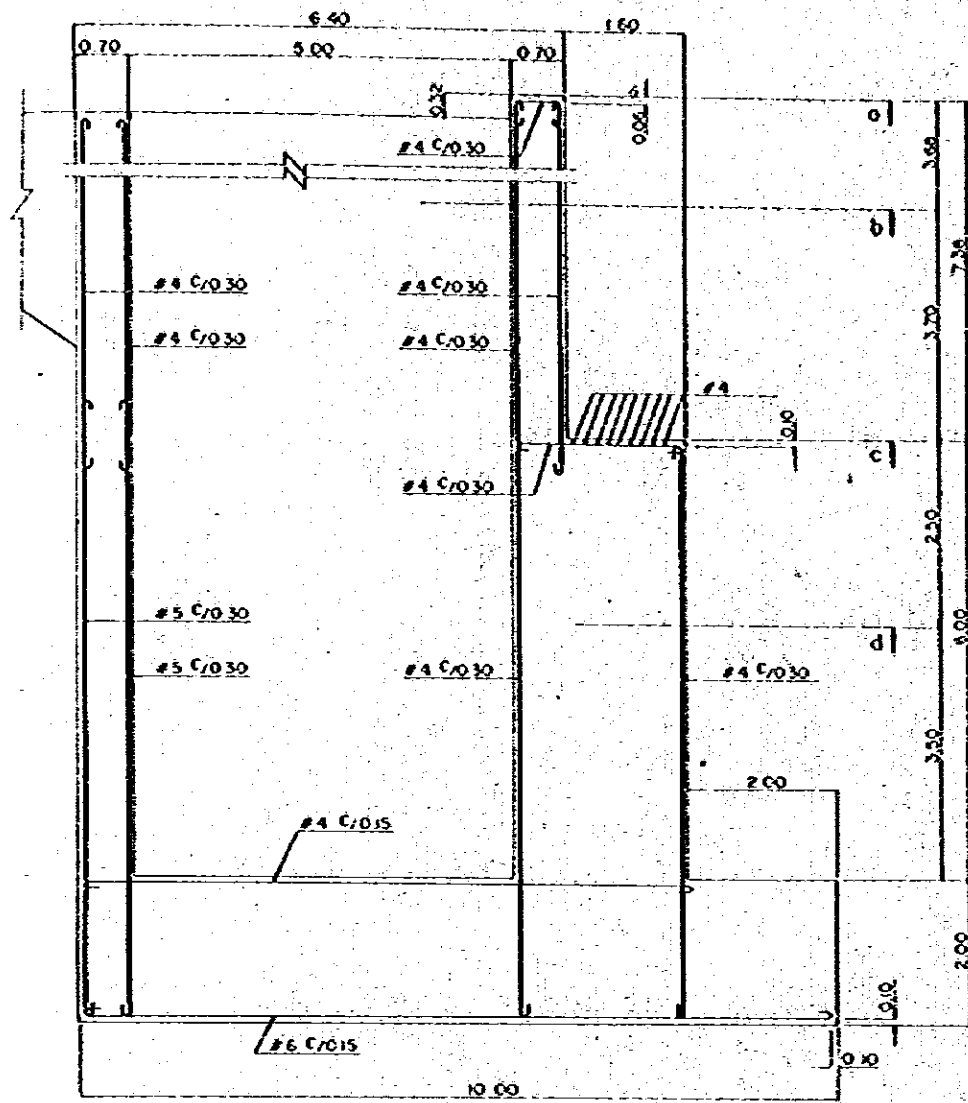
SECCIÓN S=1/200

PLAN S=1/200

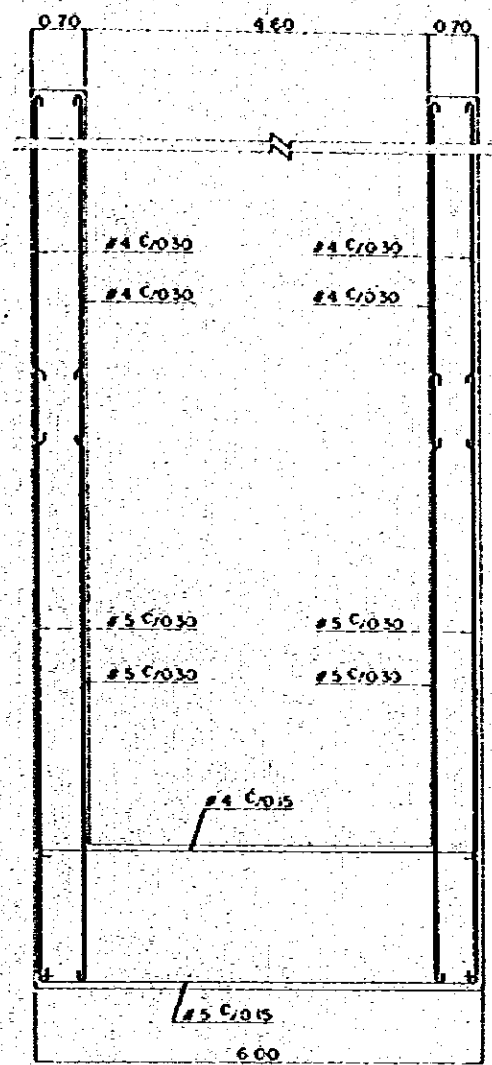


FOUNDATION PLAN S=1/200

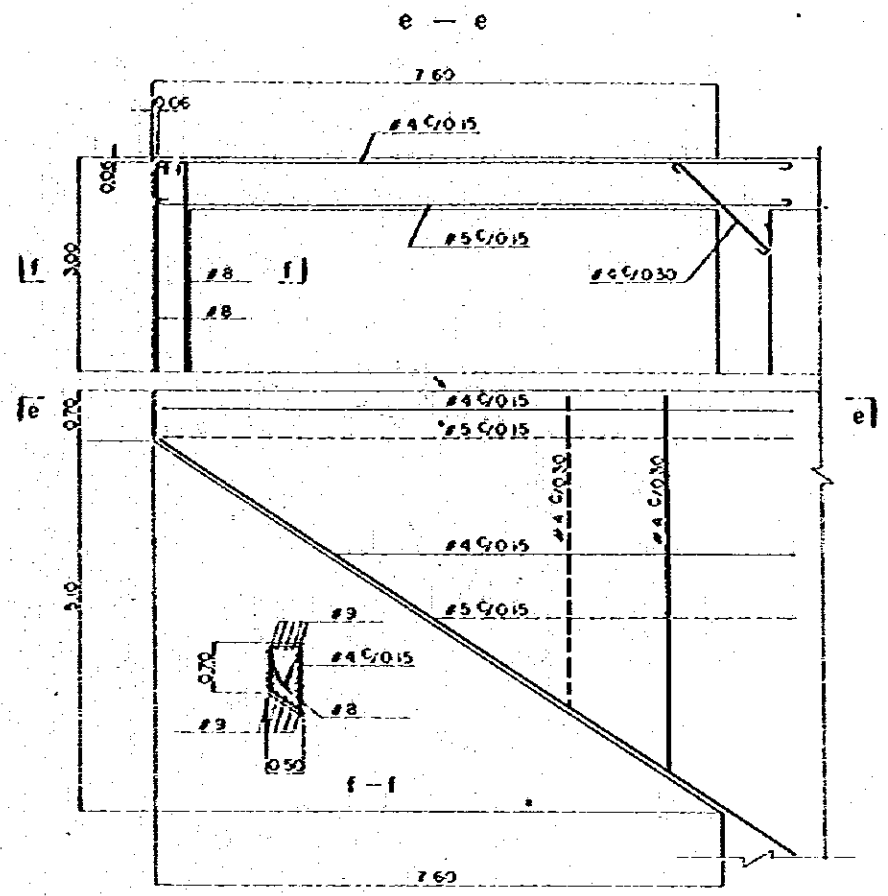
EMPRESA NACIONAL DE FERROCARRILES RAILWAY REHABILITATION PROJECT (1945-1966)		
358 ⁺ + 155 ⁺ BRIDGE		
GENERAL VIEW		
Executing Enterprise		
Drawn by Date	Checked by Date	Approved by Date
Contracting Enterprise		
Checked by Date	Approved by Date	74



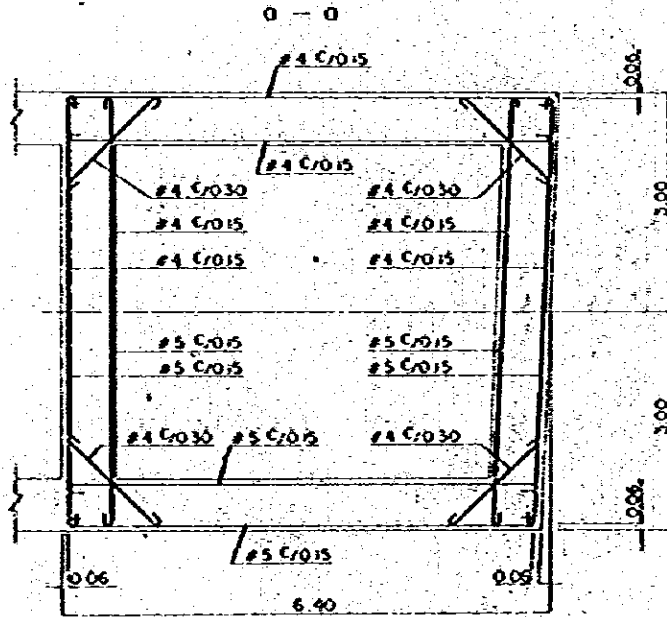
A - A



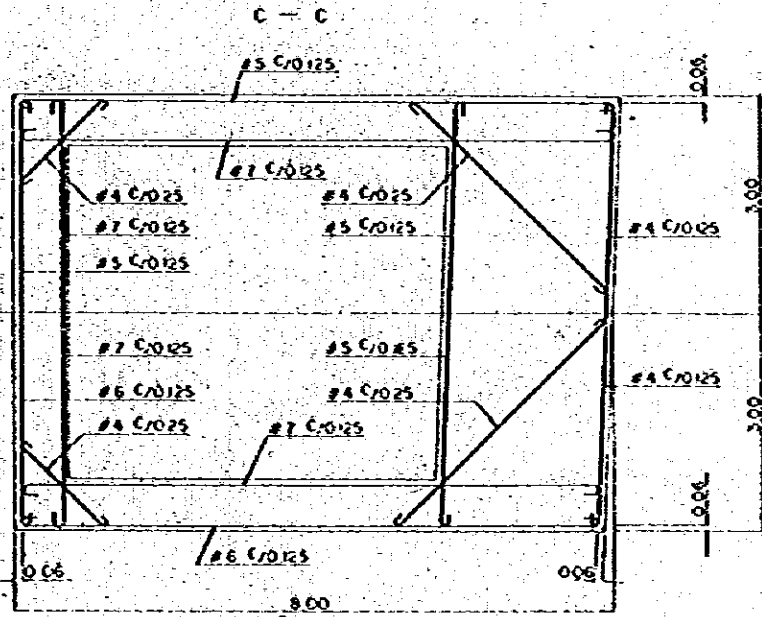
B - B



WING



b - b

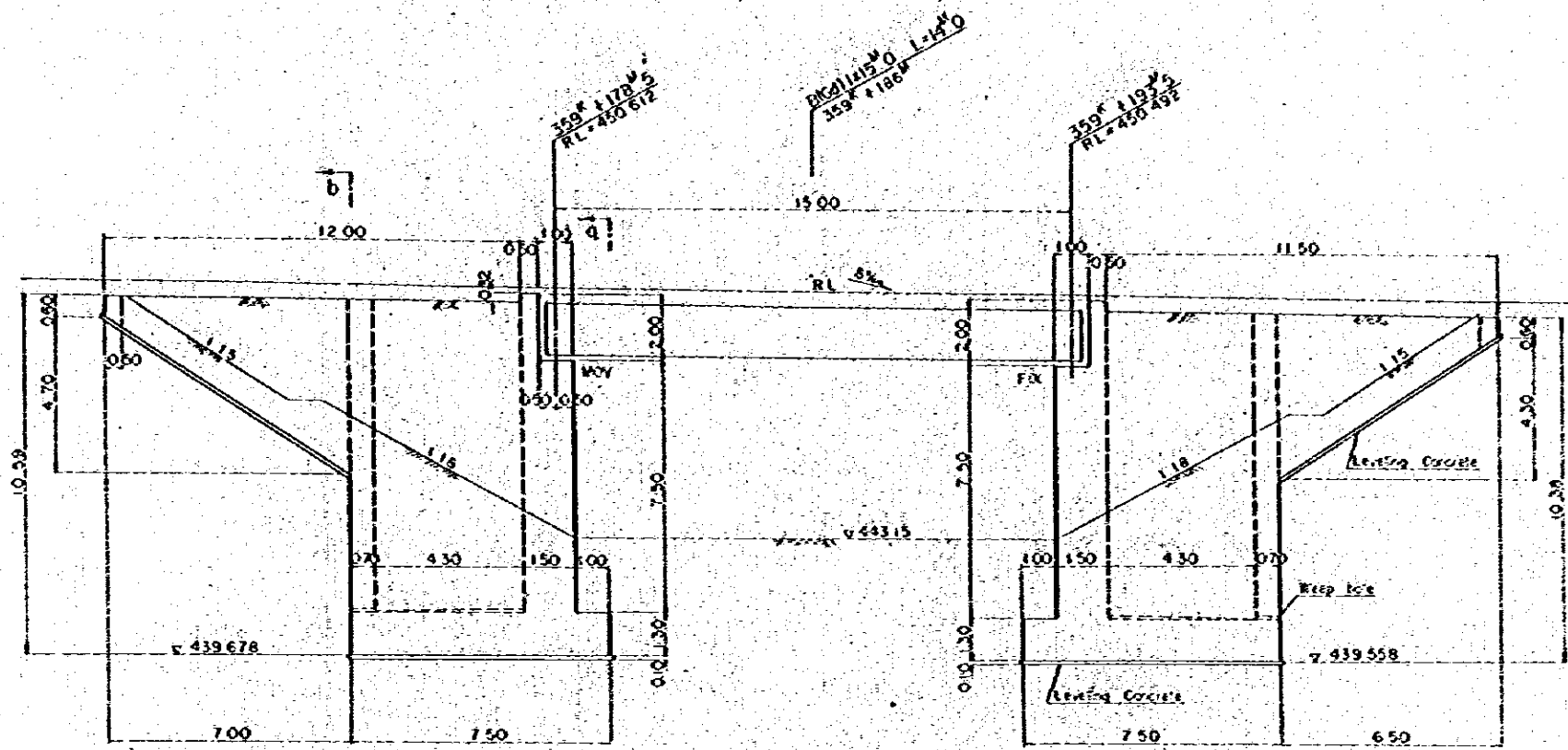


d - d

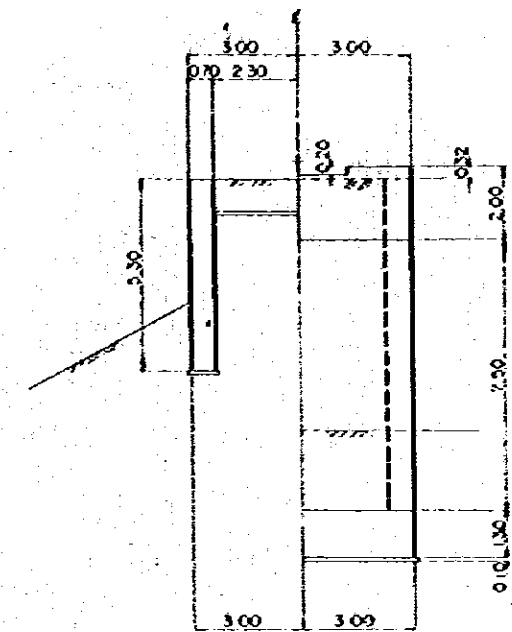
S=1.50

- NOTES
1. COMPRESSIVE STRENGTH OF CONCRETE AT 28 DAYS
 a) STRUCTURAL CONCRETE $f_{cm} = 200 \text{ kg/cm}^2$
 b) LEVELING CONCRETE $f_{cm} = 100 \text{ kg/cm}^2$
 2. REINFORCING STEEL BAR
 ASTM A615 GRADE 60 OR A55 GRADE 60 OR A617 GRADE 60

EMPRESA NACIONAL DE FERROCARRILES		
RAILWAY REHABILITATION PROJECT (ETAPAS B-D-E)		
358+1155 ^m BRIDGE		
BAR ARRANGEMENT		
Executing Enterprise		
Drawn by D12	Checked by D14	Approved by D16
Contracting Enterprise		
Checked by D16	Approved by D16	No 75

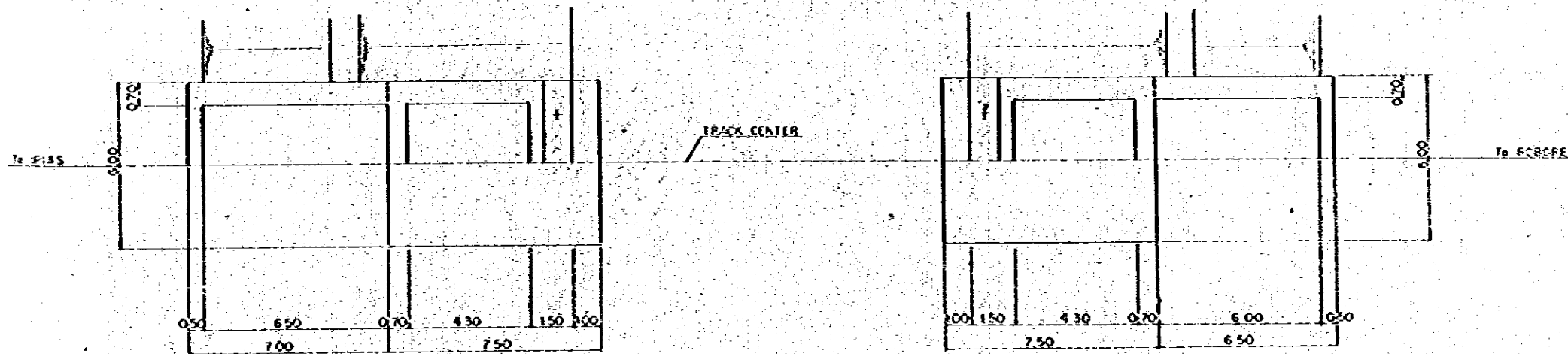


SIDE VIEW S=1:100



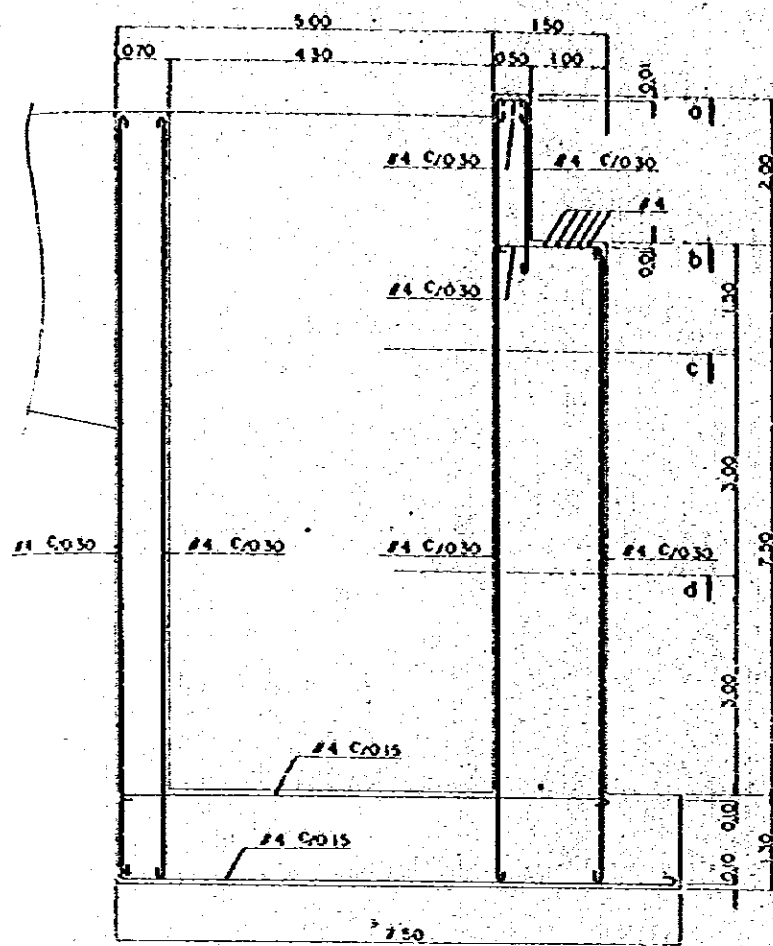
b-b a-a
SECTION S=1:100

PLAN S=1:100

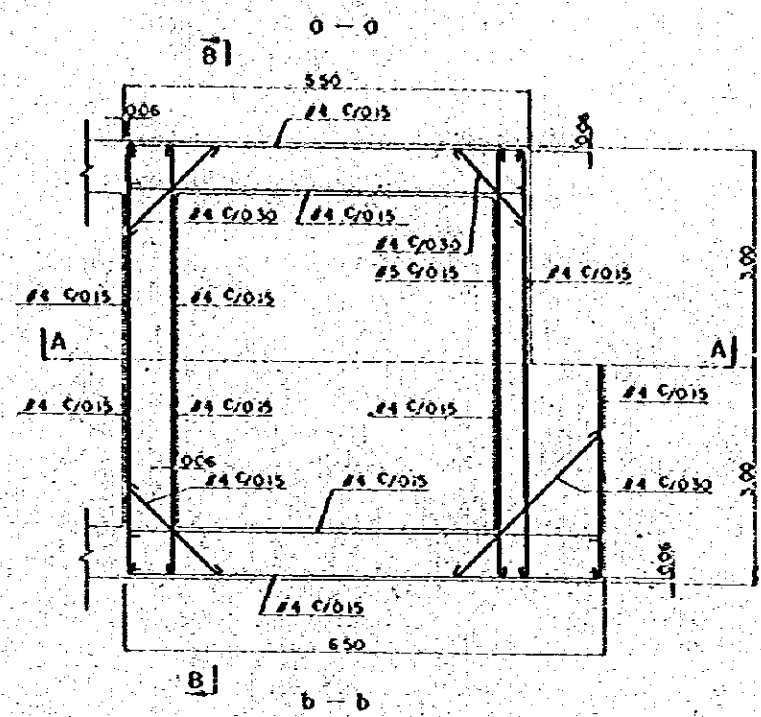


FOUNDATION PLAN S=1:100

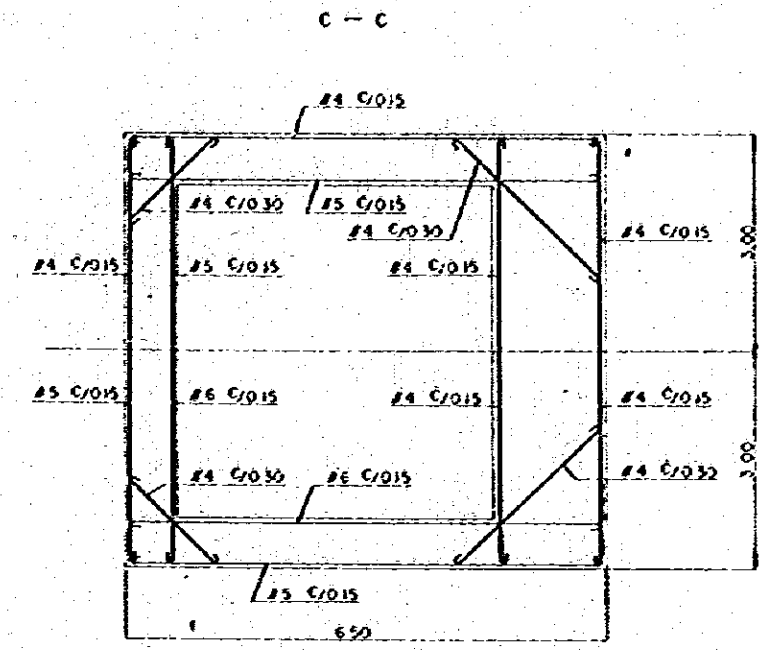
EMPRESA NACIONAL DE FERROCARRILES		
RAILWAY RENOVATION PROJECT (I PLUS BICOP)		
359 ^m #186 ^m BRIDGE		
GENERAL VIEW		
Executing Enterprise		
Drawn by Date	Checked by Date	Accepted by Date
Contracting Enterprise		
Checked by Date	Accepted by Date	76



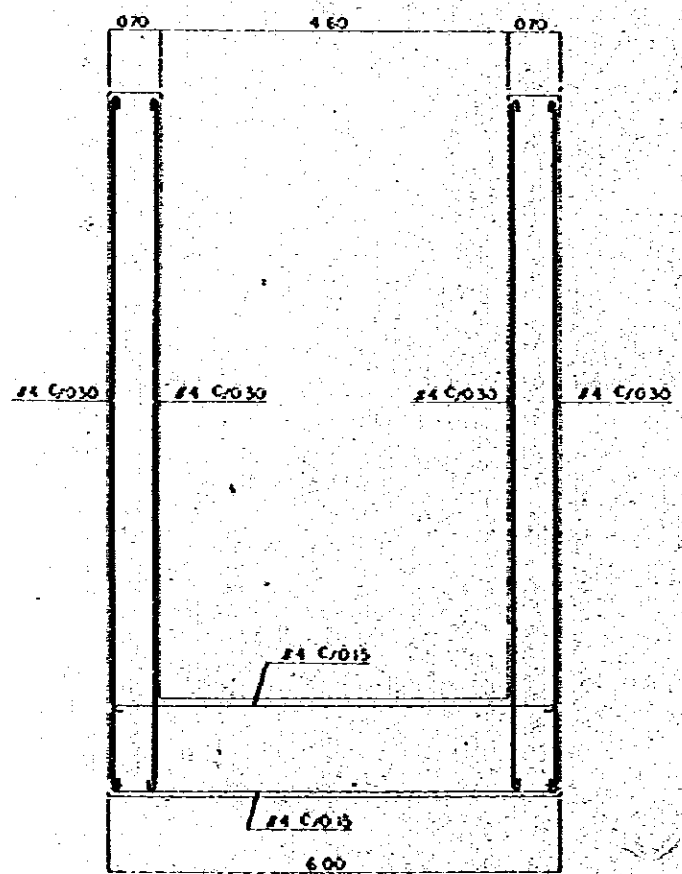
A - A



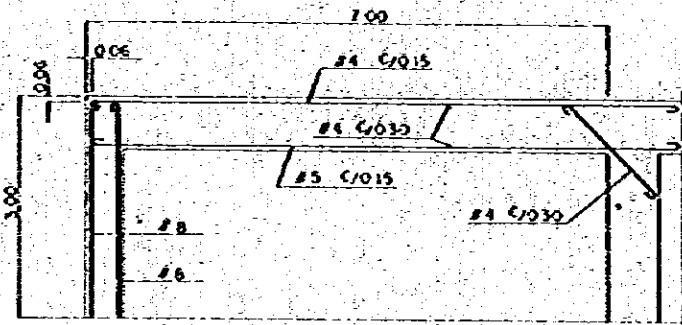
B - B



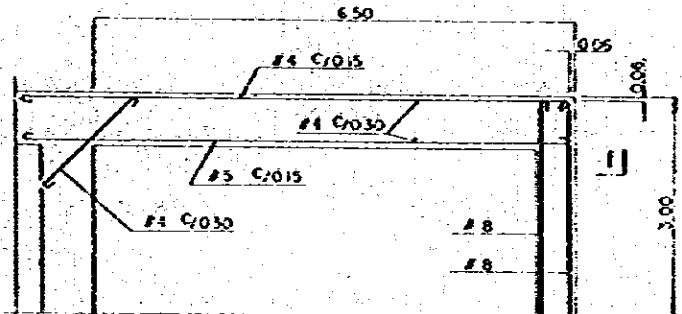
C - C



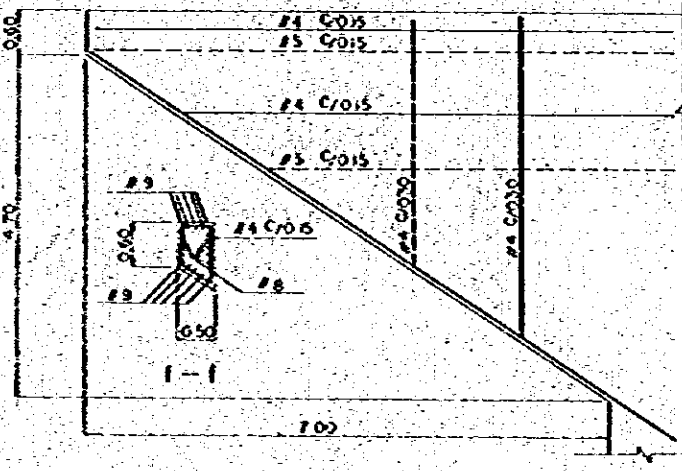
B - B



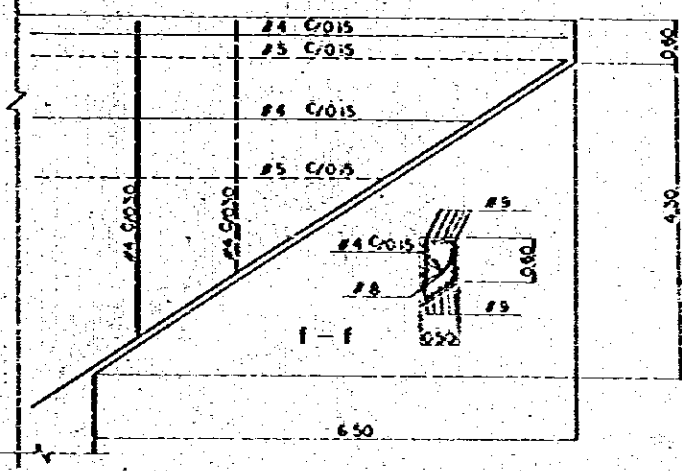
D - D



E - E



F - F



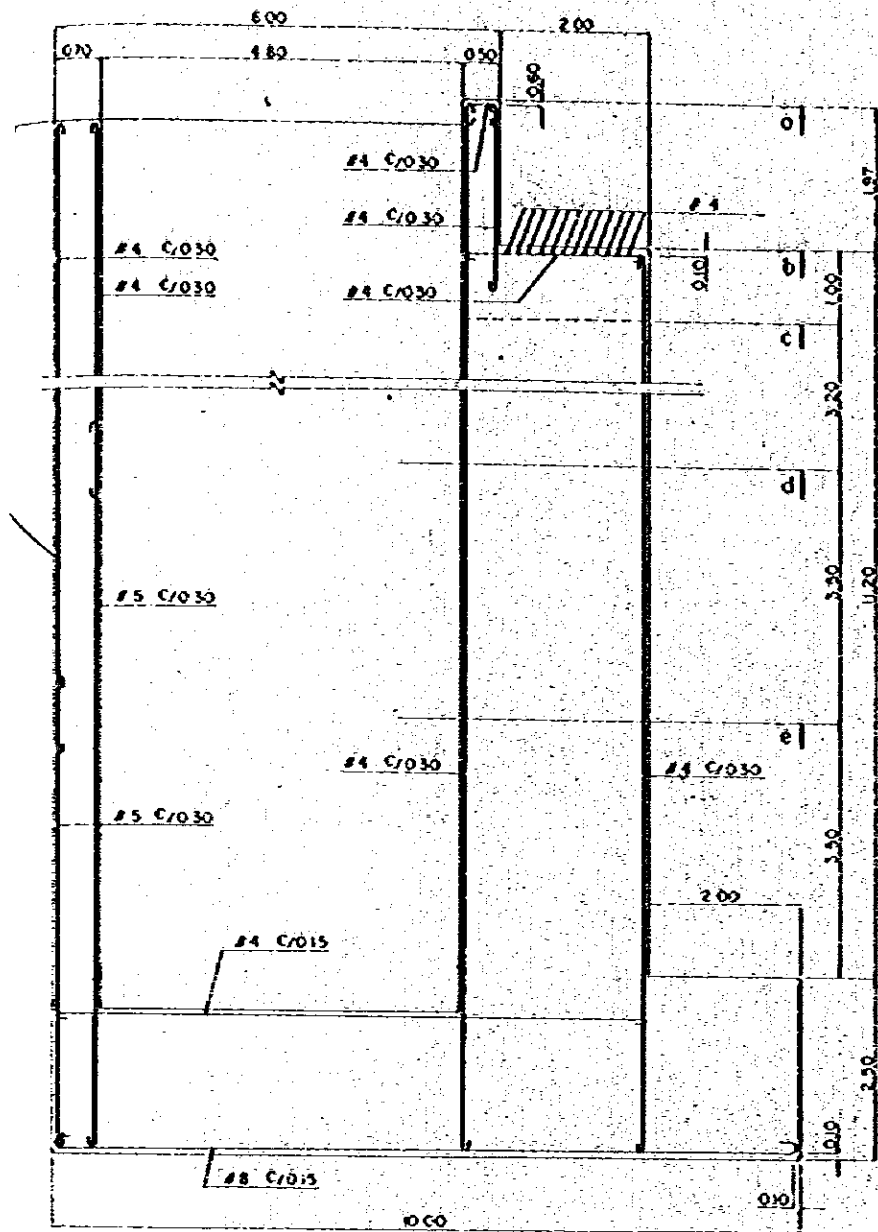
G - G

WING

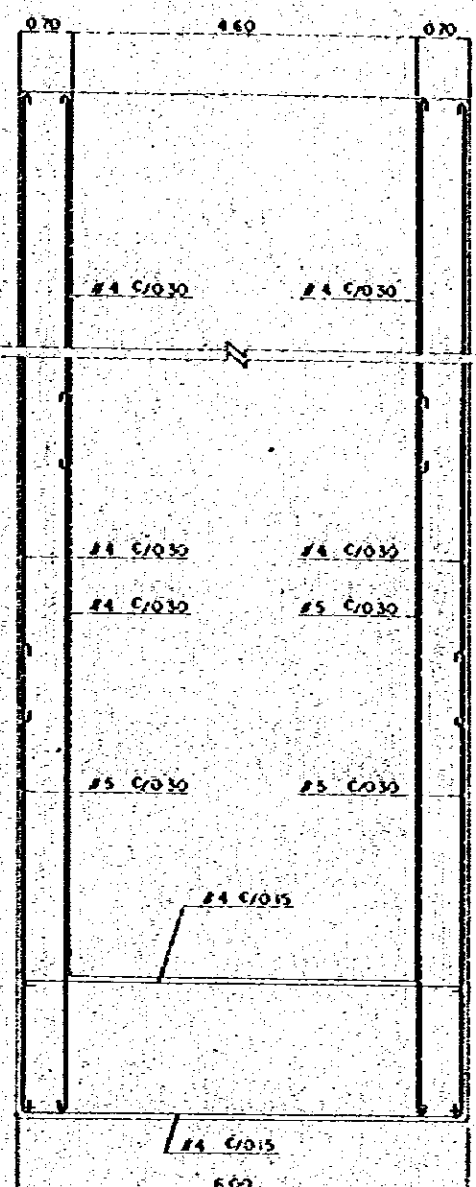
S=1/50

- NOTES
1. COMPRESSIVE STRENGTH OF CONCRETE AT 28 DAYS
 a) STRUCTURAL CONCRETE $f_{cu} = 2400 \text{ kg/cm}^2$
 b) LEVELING CONCRETE $f_{cu} = 1800 \text{ kg/cm}^2$
 2. REINFORCING STEEL BAR
 ASTM A615 GRADE 60 OR A616 GRADE 60 OR A617 GRADE 60

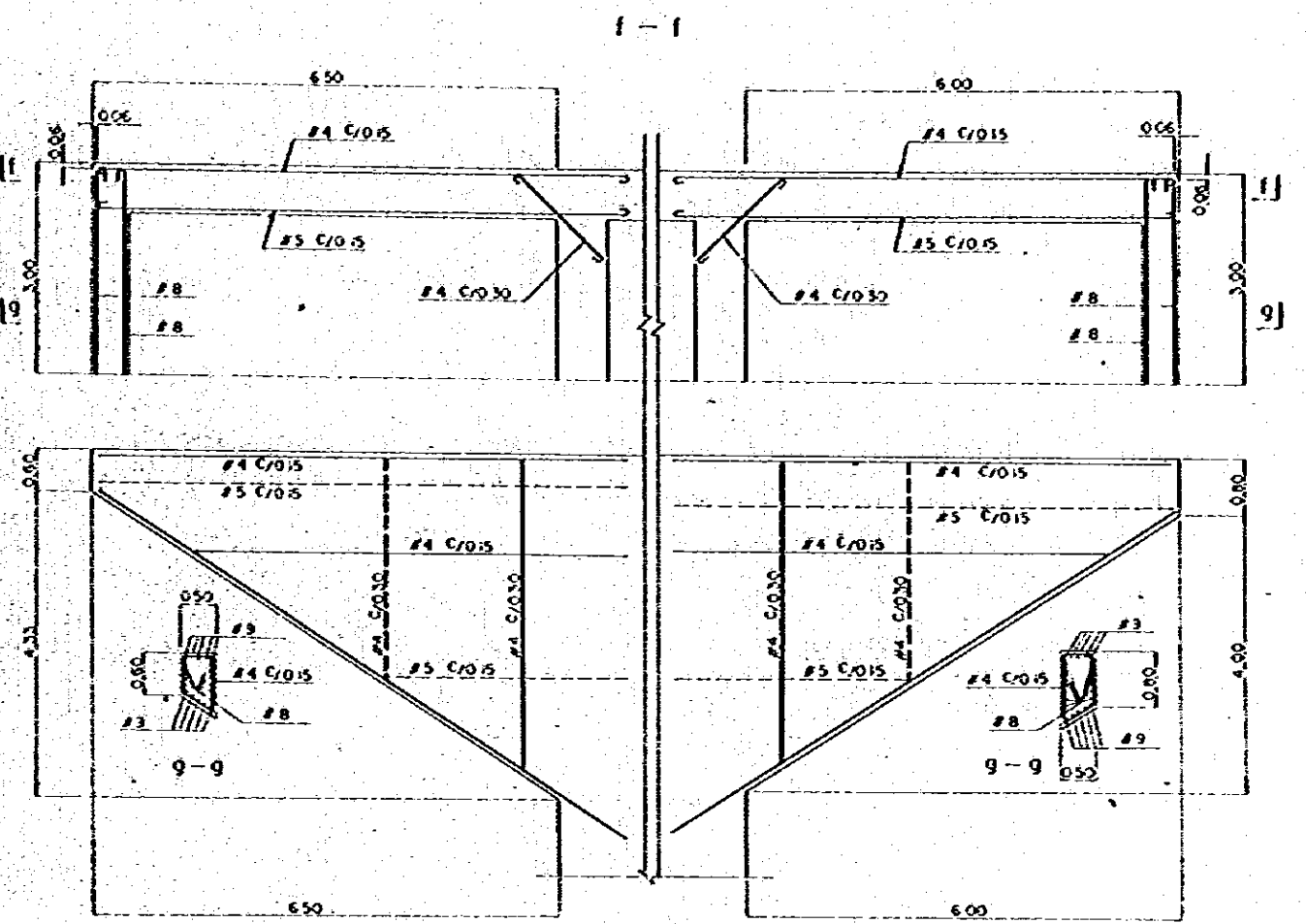
EMPRESA NACIONAL DE FERROCARRILES		
RAILWAY REHABILITATION PROJECT (IPAS-2000)		
359 th 1186 ^m BRIDGE		
BAR ARRANGEMENT		
Executing Enterprise		
Drawn by Date	Checked by Date	Approved by Date
Contracting Enterprise		
Checked by Date	Approved by Date	No. 77



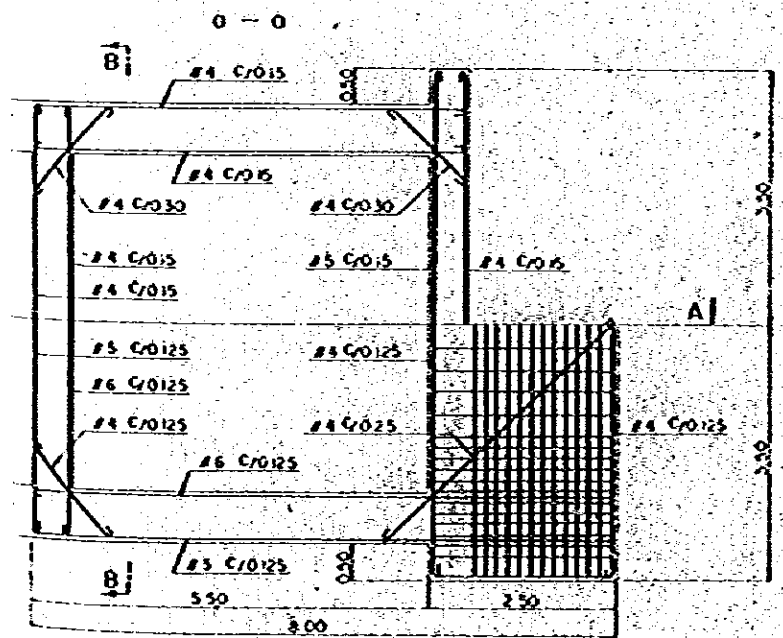
A - A



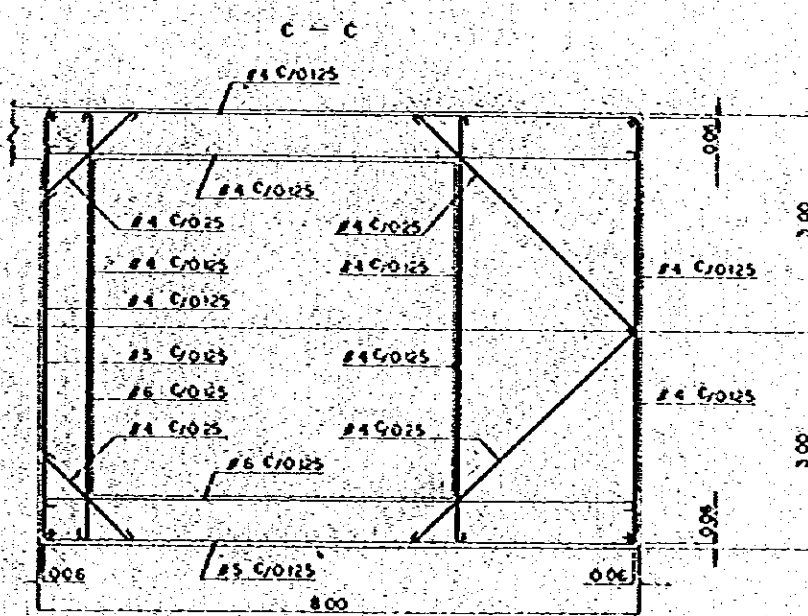
B - B



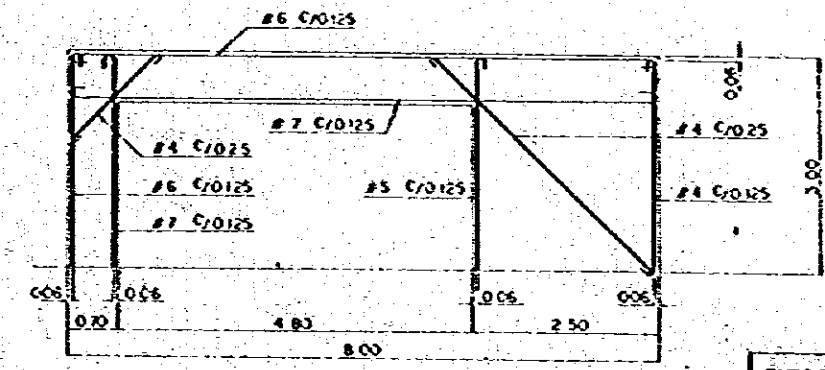
WING



b - b



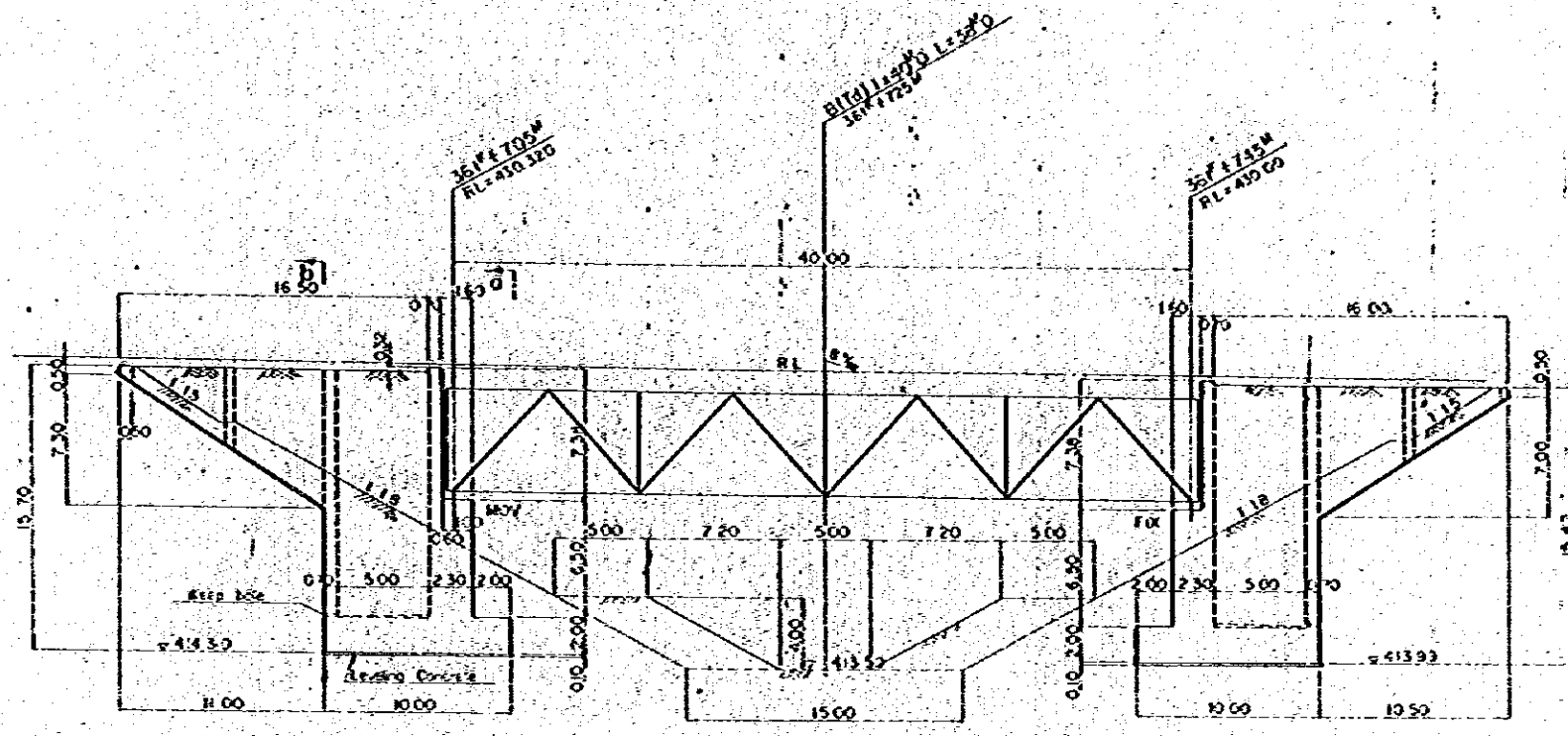
d - d



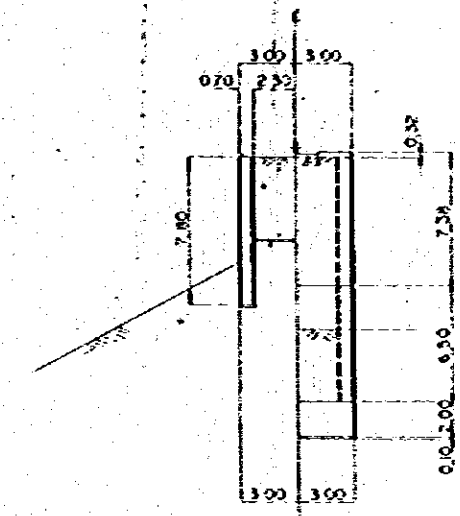
e - e

- NOTES
- 1 COMPRESSIVE STRENGTH OF CONCRETE AT 28 DAYS OF STRUCTURAL CONCRETE
 For: 2045 kg/cm²
 LEVELING CONCRETE
 For: 805 kg/cm²
 - 2 REINFORCING STEEL BAR
 ASTM A601 GRADE 60 OR
 A615 GRADE 60 OR A617
 GRADE 60

ENTRADA NACIONAL DE FERROCARRILES		
RAILWAY REHABILITATION PROJECT (LIMAS RUCOR)		
360' x 364'5" BRIDGE		
BAR ARRANGEMENT		
Executing Enterprise		
Drawn by Date	Checked by Date	Approved by Date
Contracting Enterprise		
Checked by Date	Approved by Date	No. 79

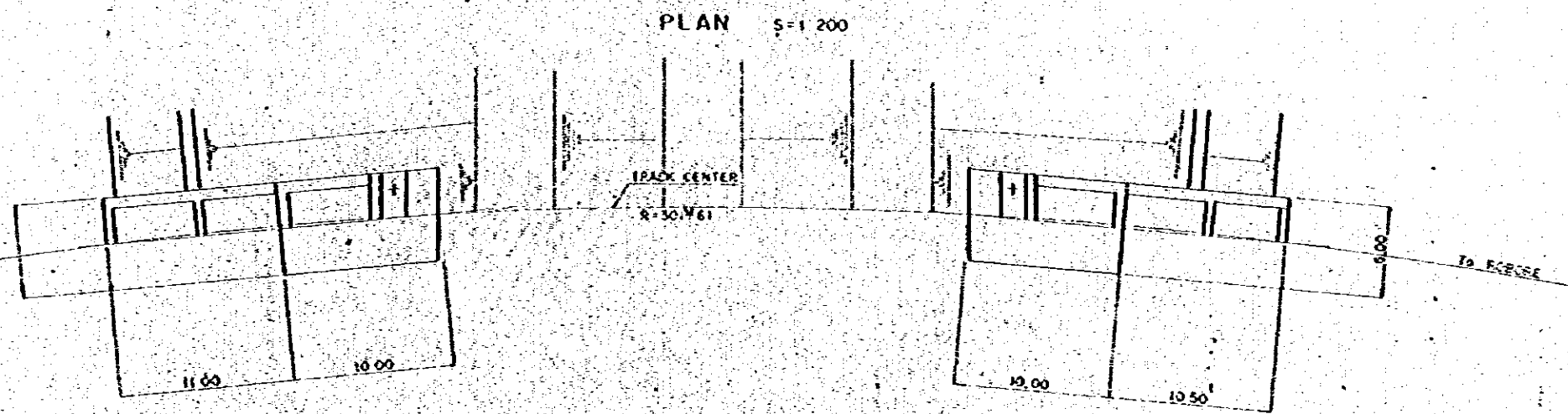


SIDE VIEW S=1:200



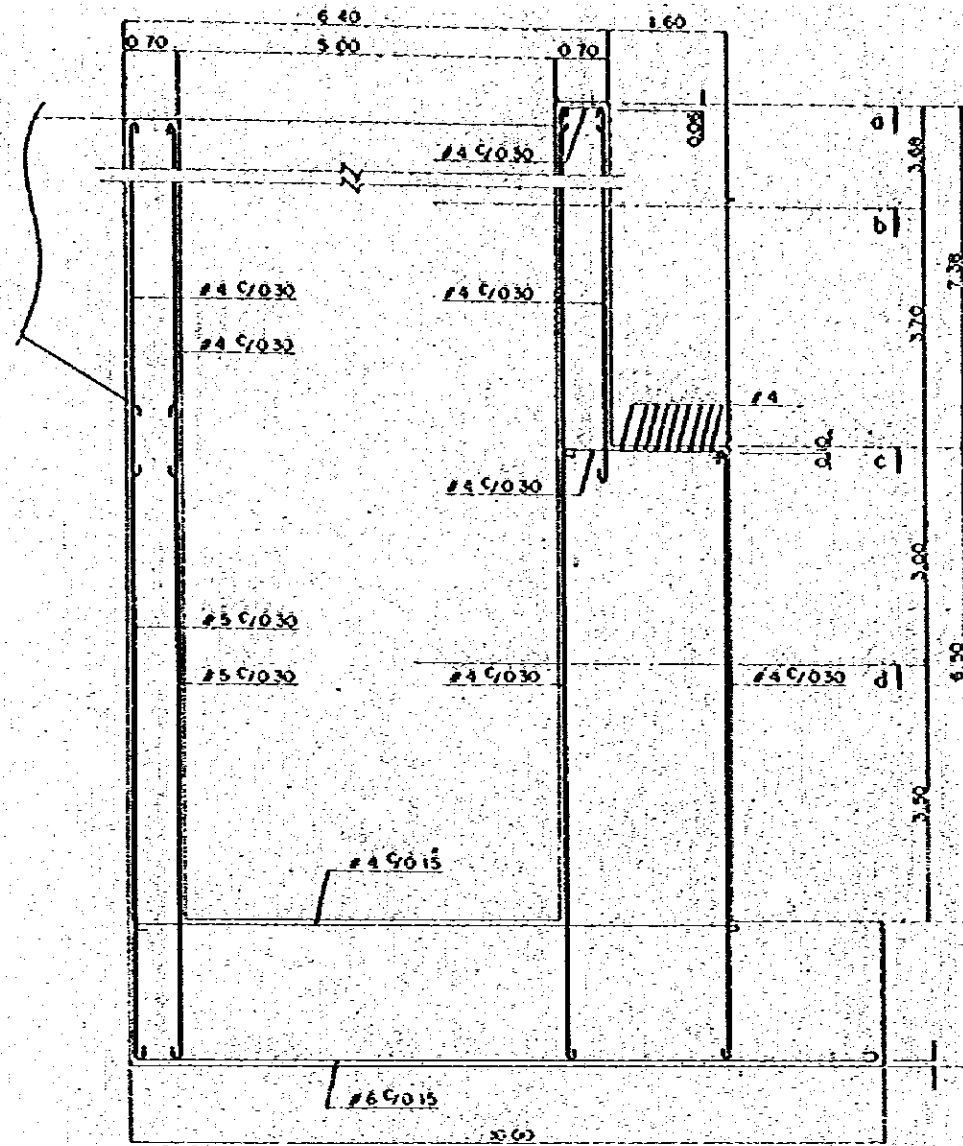
b-b o-o

SECTION S=1:200

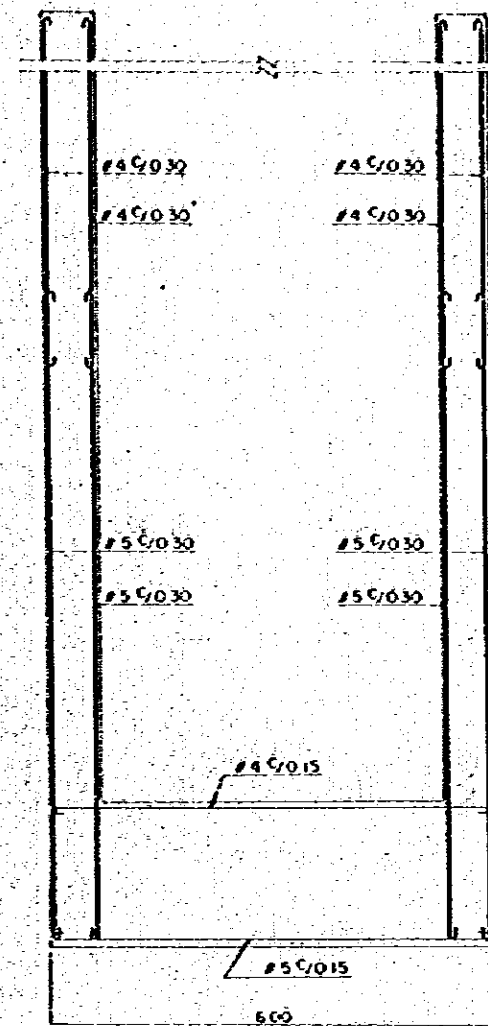


FOUNDATION PLAN S=1:200

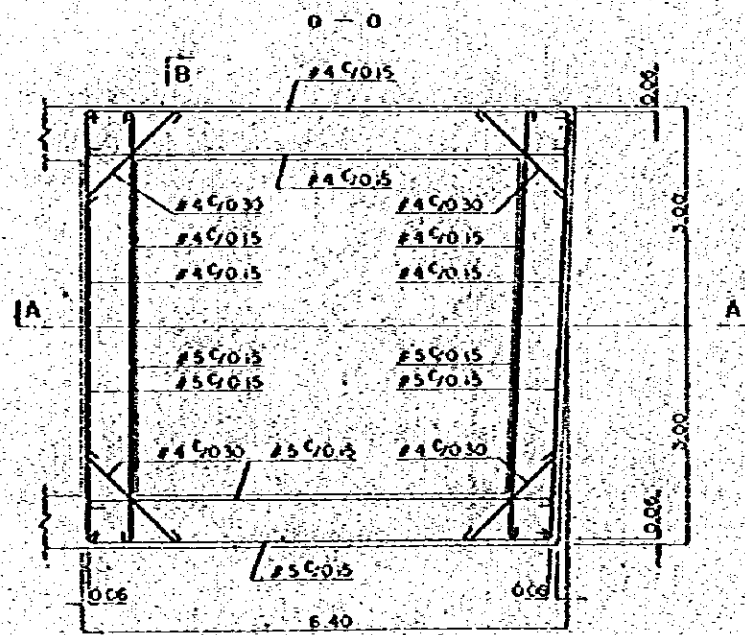
EMPRESA NACIONAL DE FERROCARRILES RAILWAY RECONSTRUCTION PROJECT (1945-1960)		
361+725^M BRIDGE GENERAL VIEW		
Executing Enterprise		
Drawn by Date	Checked by Date	Approved by Date
Contracting Enterprise		
Checked by Date	Approved by Date	80



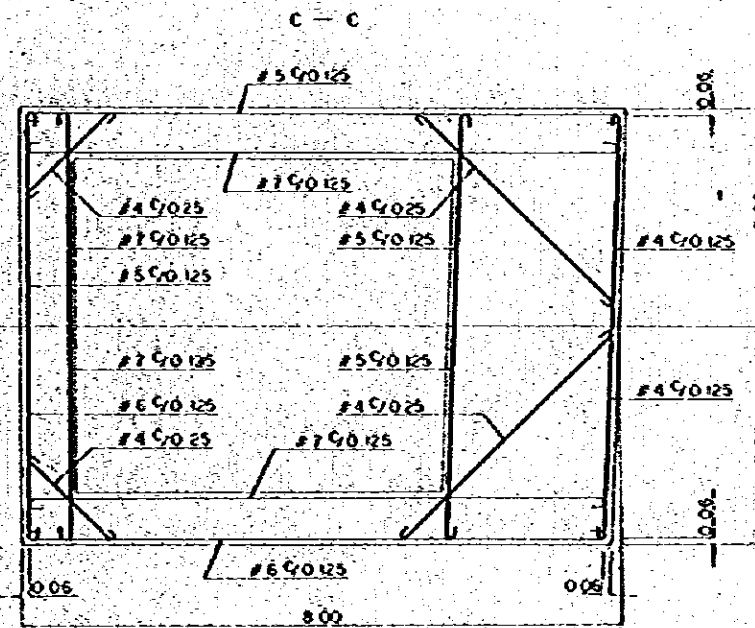
A - A



B - B



b - b



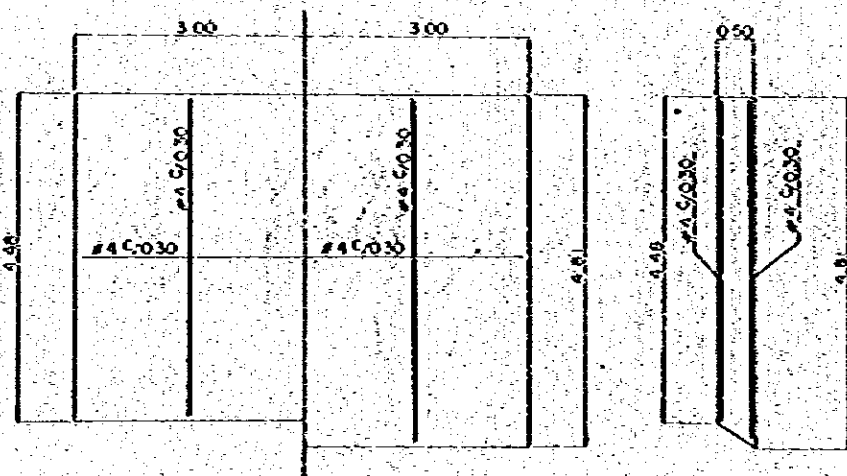
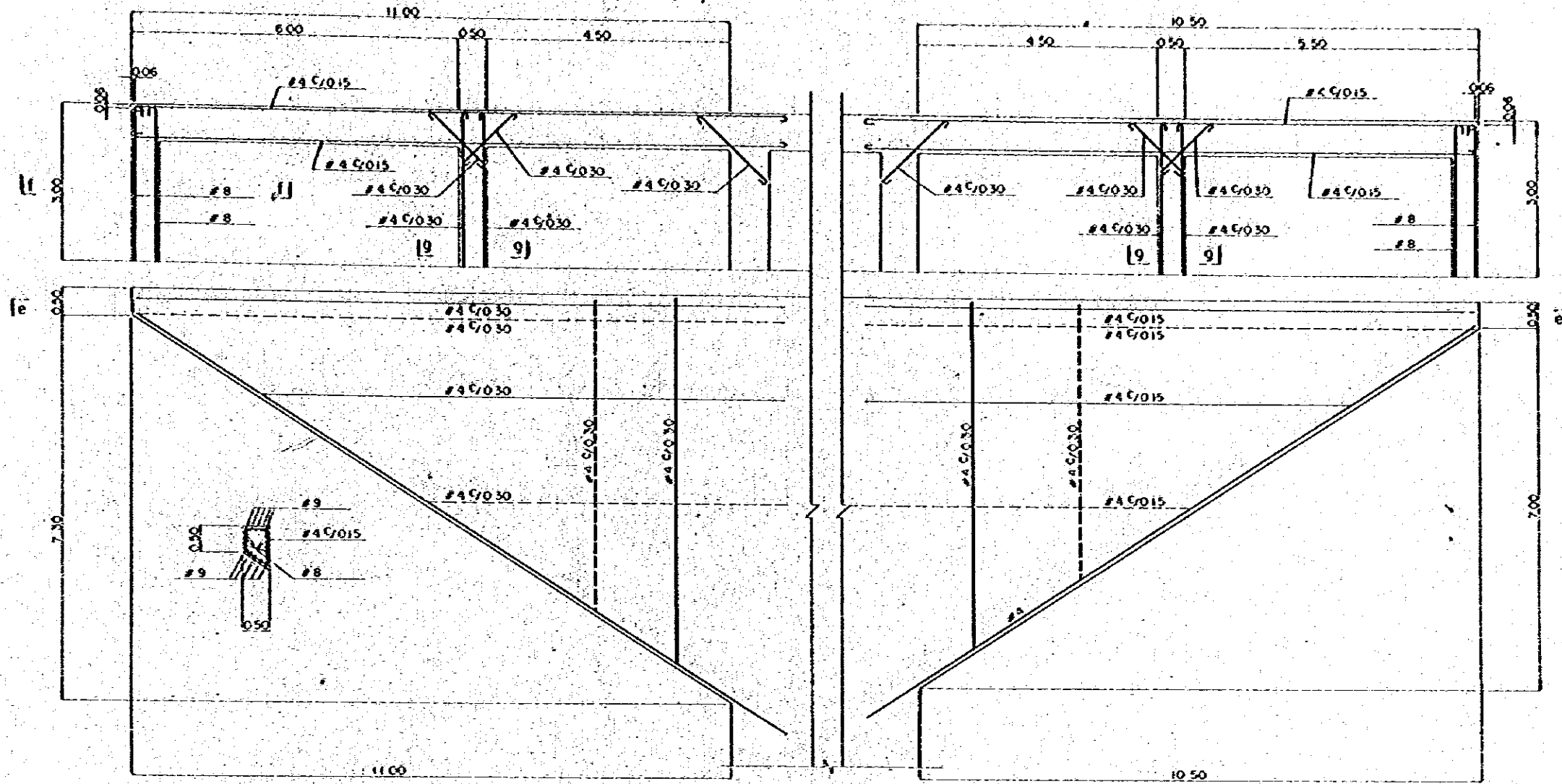
d - d

S = 1 50

- NOTES
1. COMPRESSIVE STRENGTH OF CONCRETE AT 28 DAYS
 - a) STRUCTURAL CONCRETE $f_{cu} = 200 \text{ kg/cm}^2$
 - b) LEVELING CONCRETE $f_{cu} = 160 \text{ kg/cm}^2$
 2. REINFORCING STEEL BAR
 - ASTM A575 GRADE 60 OR A616 GRADE 60 OR A617 GRADE 60

ENTRASA NACIONAL DE FERROCARRILES		
RAILWAY REHABILITATION PROJECT (PLUS BOGOTES)		
361 F 4725 ^M BRIDGE		
BAR ARRANGEMENT (Sheet 1 of 2)		
Executing Enterprise		
Drawn by Date	Checked by Date	Approved by Date
Contracting Enterprise		
Checked by Date	Approved by Date	No. 81

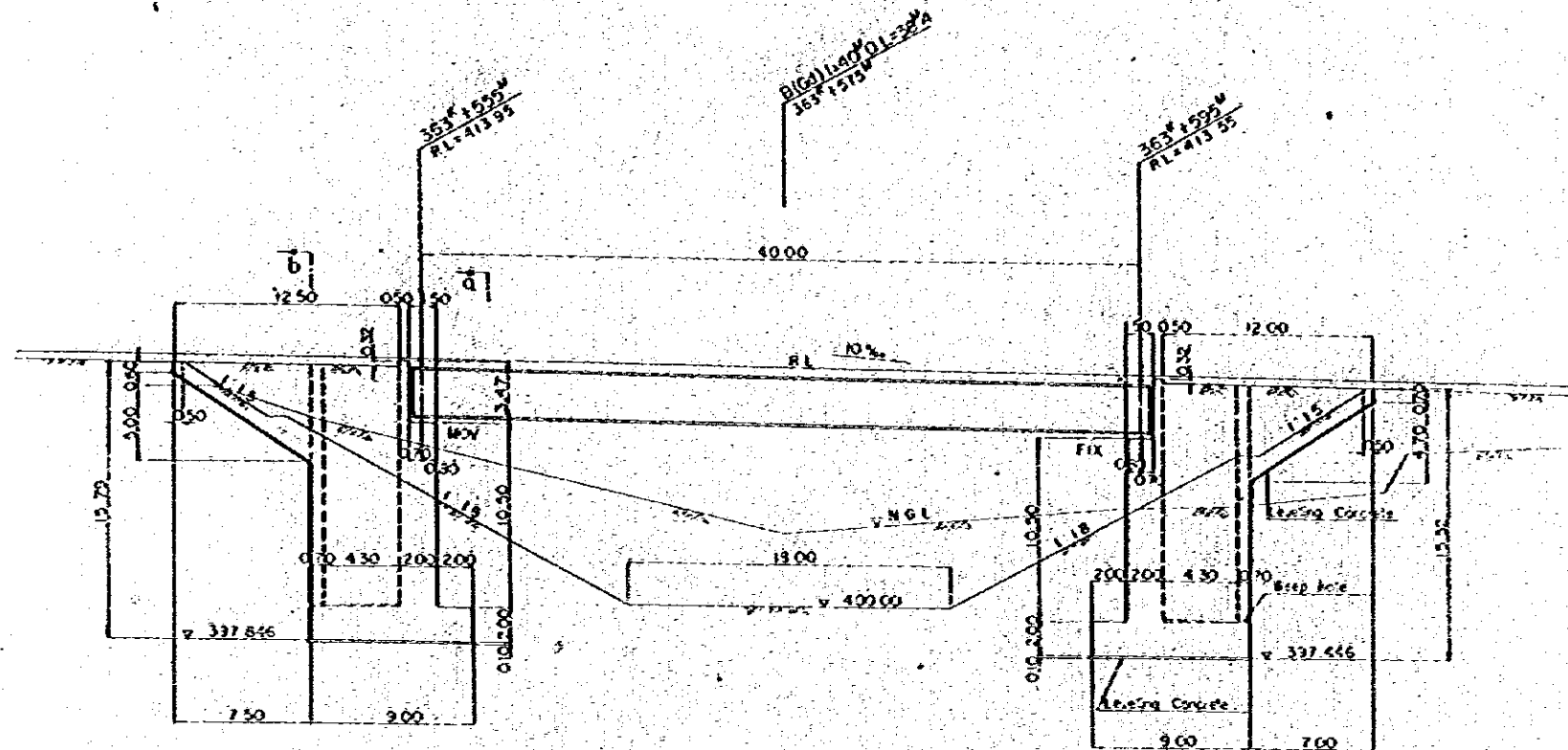
e - e



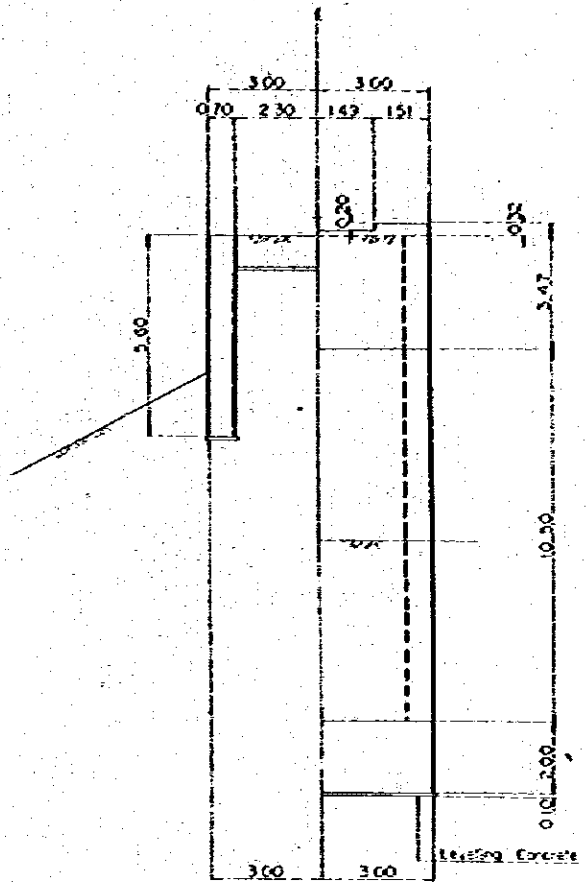
g - g

- NOTES
- 1 COMPRESSIVE STRENGTH OF CONCRETE AT 28 DAYS
 - a) STRUCTURAL CONCRETE $f_{cm} = 20 \text{ MPa}$
 - b) LEVELING CONCRETE $f_{cm} = 16 \text{ MPa}$
 - 2 REINFORCING STEEL BAR ASTM A615 GRADE 60 OR A615 GRADE 60 OR A617 GRADE 60

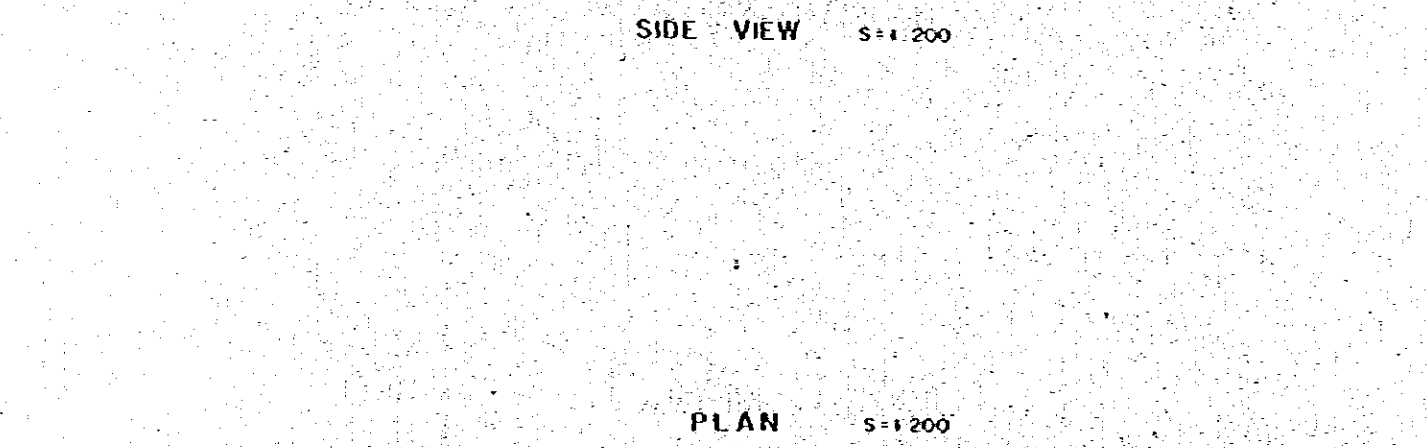
EMPRESA NACIONAL DE FERROCARRILES RAILWAY REHABILITATION PROJECT (IIRIAS-BIGOS)		
361 ^K 4725 ^M BRIDGE BAR ARRANGEMENT (sheet 2 OF 2)		
Executing Enterprise		
Drawn by Date	Checked by Date	Approved by Date
/ Contracting Enterprise		
Checked by Date	Approved by Date	No. 82



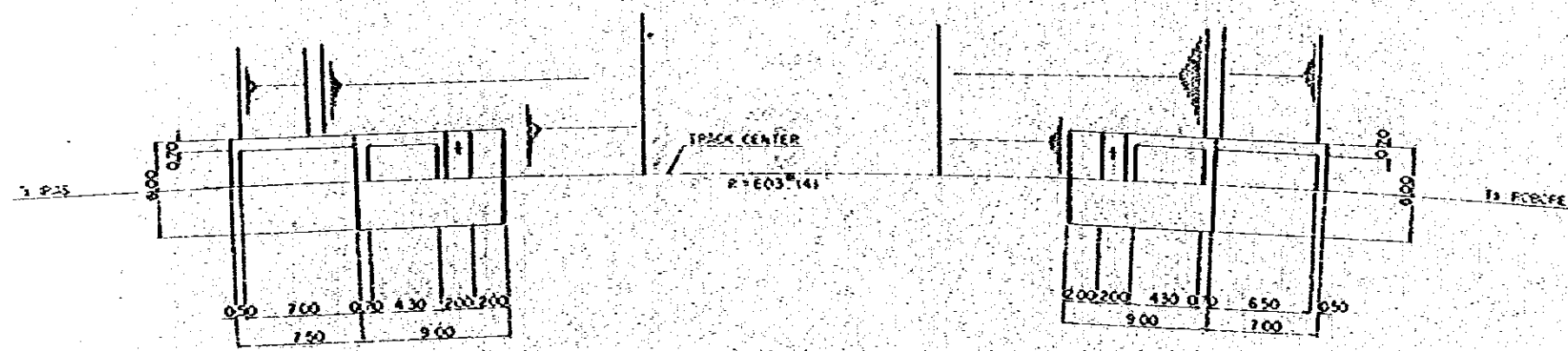
SIDE VIEW S=1:200



SECTION S=1:100

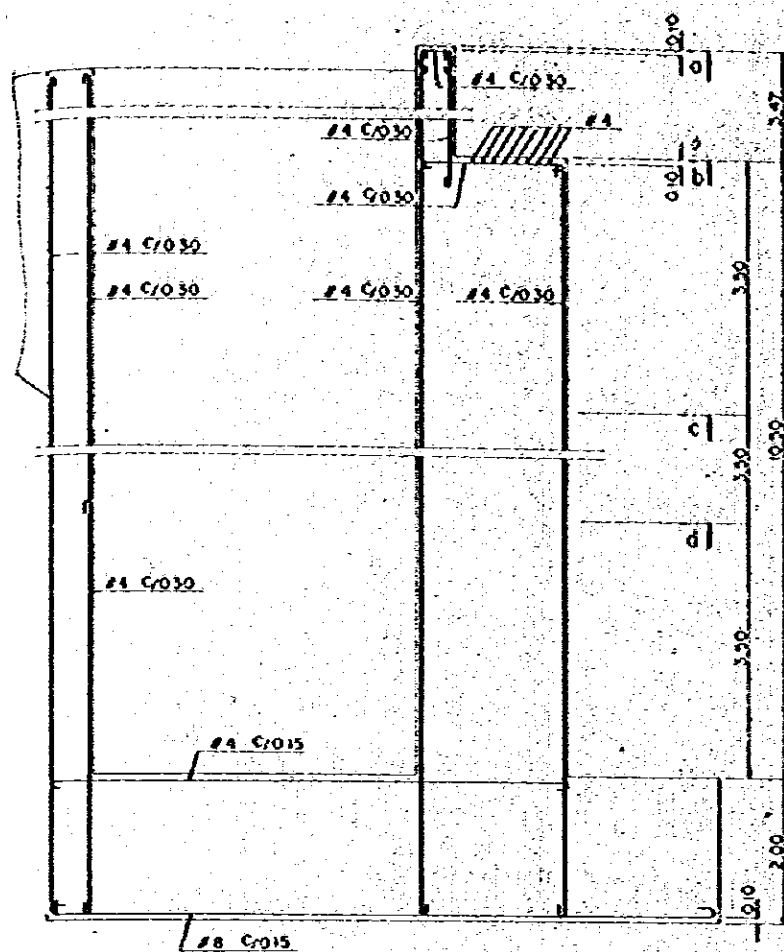


PLAN S=1:200

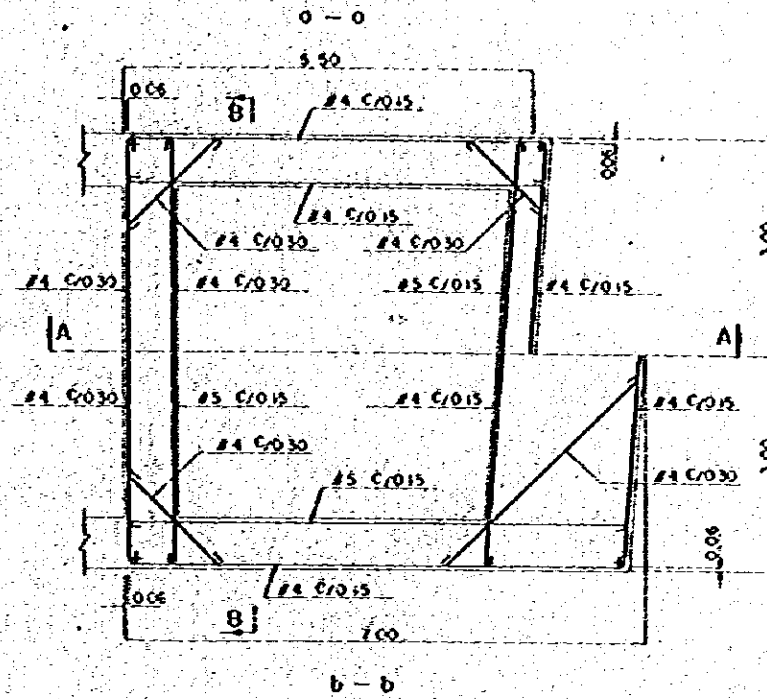


FOUNDATION PLAN S=1:200

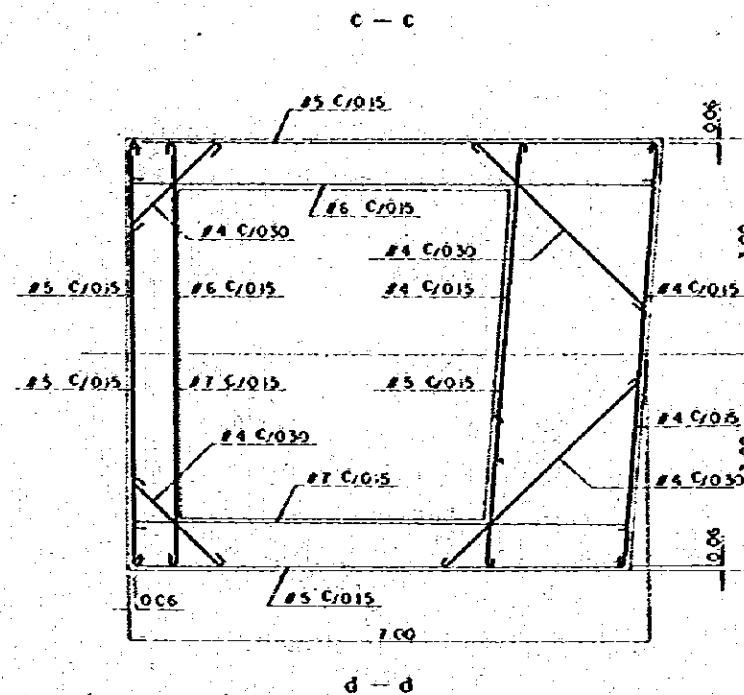
EMPRESA NACIONAL DE FERROCARRILES RUMAY LEXULITADAN ERRECT (IRUS-ROOGE)		
363° 1575M BRIDGE GENERAL VIEW		
Executing Enterprise		
Drawn by Date	Checked by Date	Approved by Date
Contracting Enterprise		
Checked by Date	Approved by Date	83



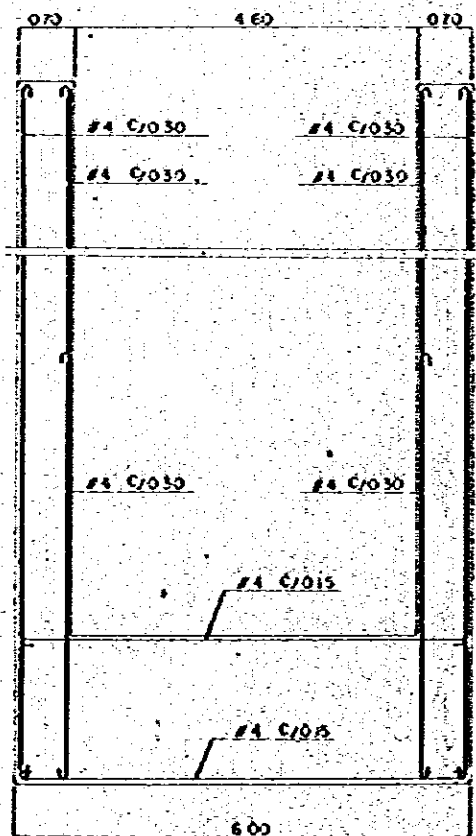
A - A



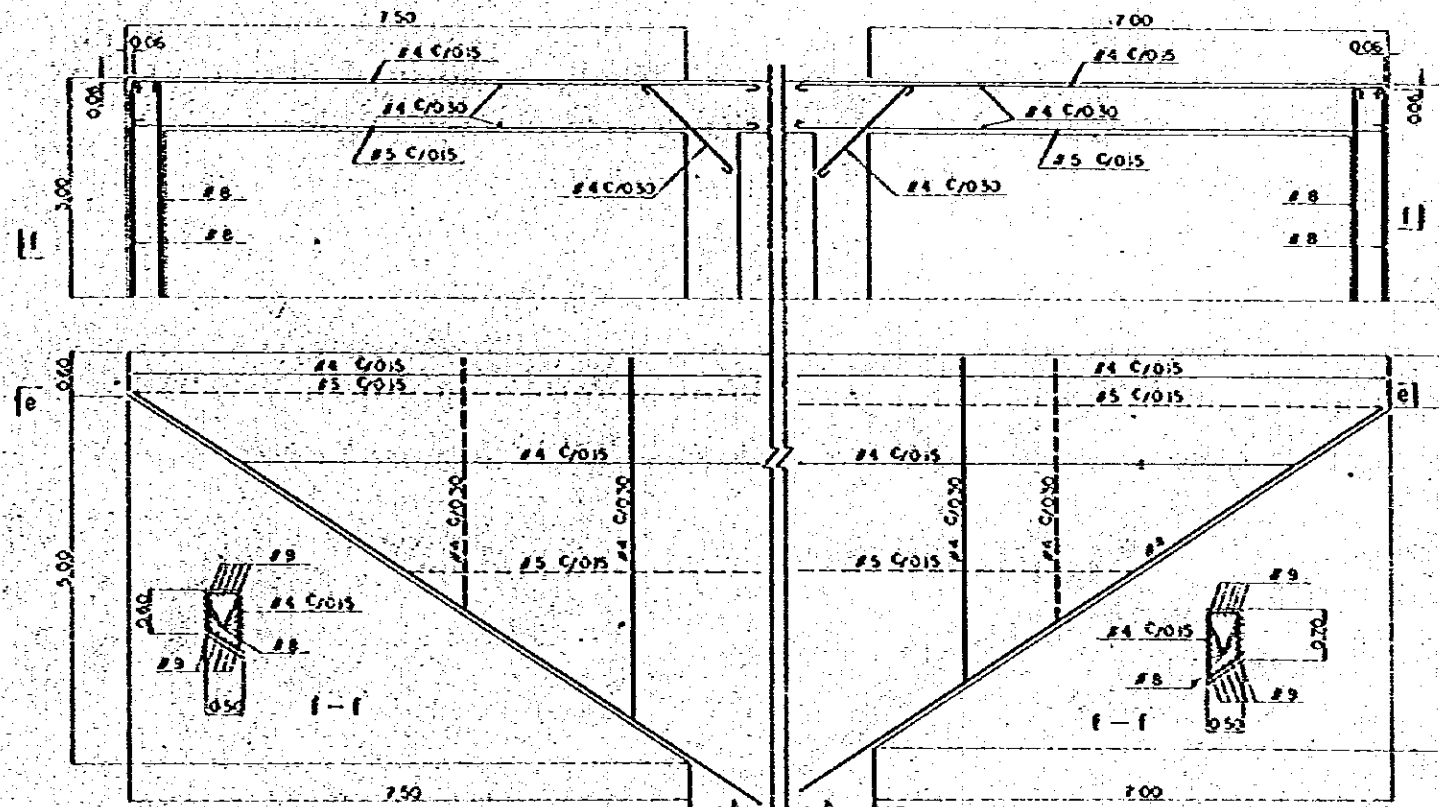
b - b



d - d



B - B

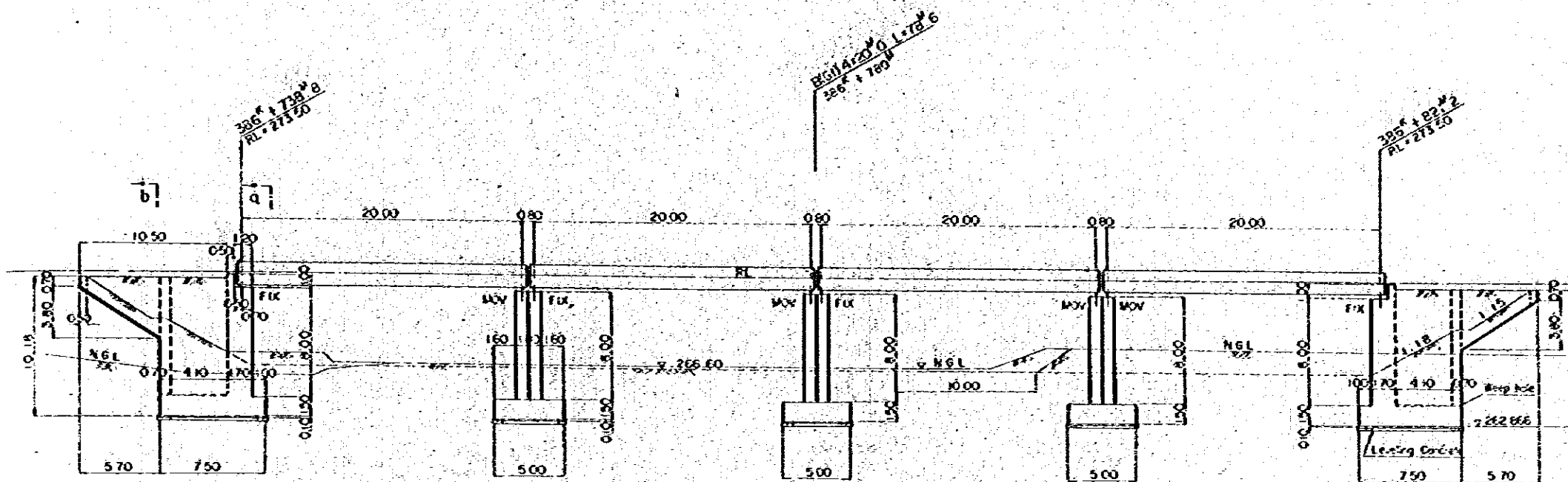


WING

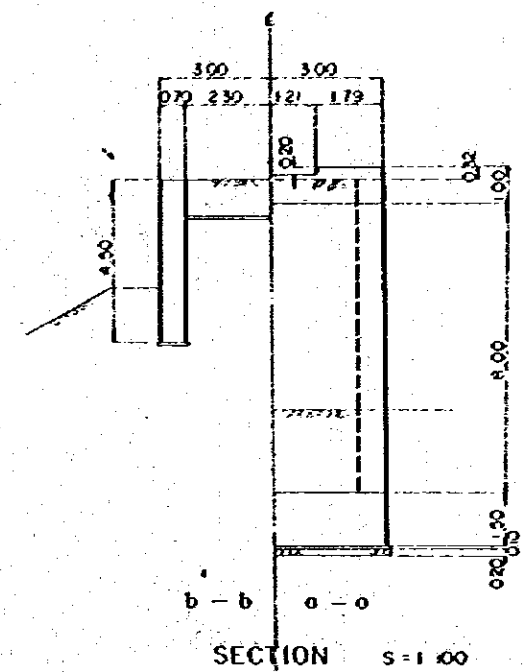
S = 1:50

- NOTES
1. COMPRESSIVE STRENGTH OF CONCRETE AT 28 DAYS
 - a) STRUCTURAL CONCRETE $f_{cu} = 20 \text{ N/cm}^2$
 - b) LEVELING CONCRETE $f_{cu} = 10 \text{ N/cm}^2$
 2. REINFORCING STEEL BAR
 - ASTM A615 GRADE 60 OR A617 GRADE 60

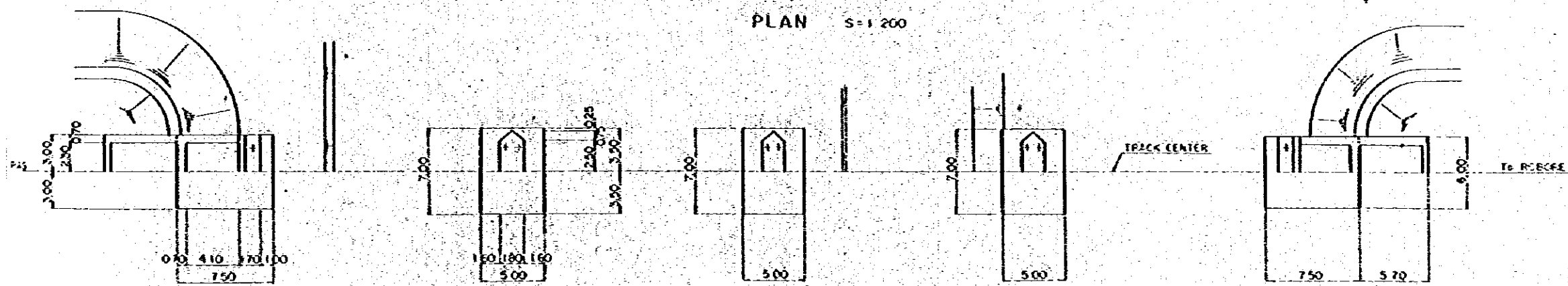
EMPRESA NACIONAL DE FERROCARRILES		
RAILWAY REHABILITATION PROJECT (LUS RIVER)		
363+1575M BRIDGE		
BAR ARRANGEMENT		
Executing Enterprise		
Drawn by Date	Checked by Date	Approved by Date
Contracting Enterprise		
Checked by Date	Accepted by Date	No 84



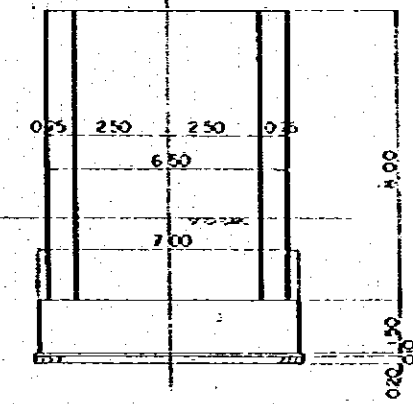
SIDE VIEW S=1:200



SECTION S=1:100

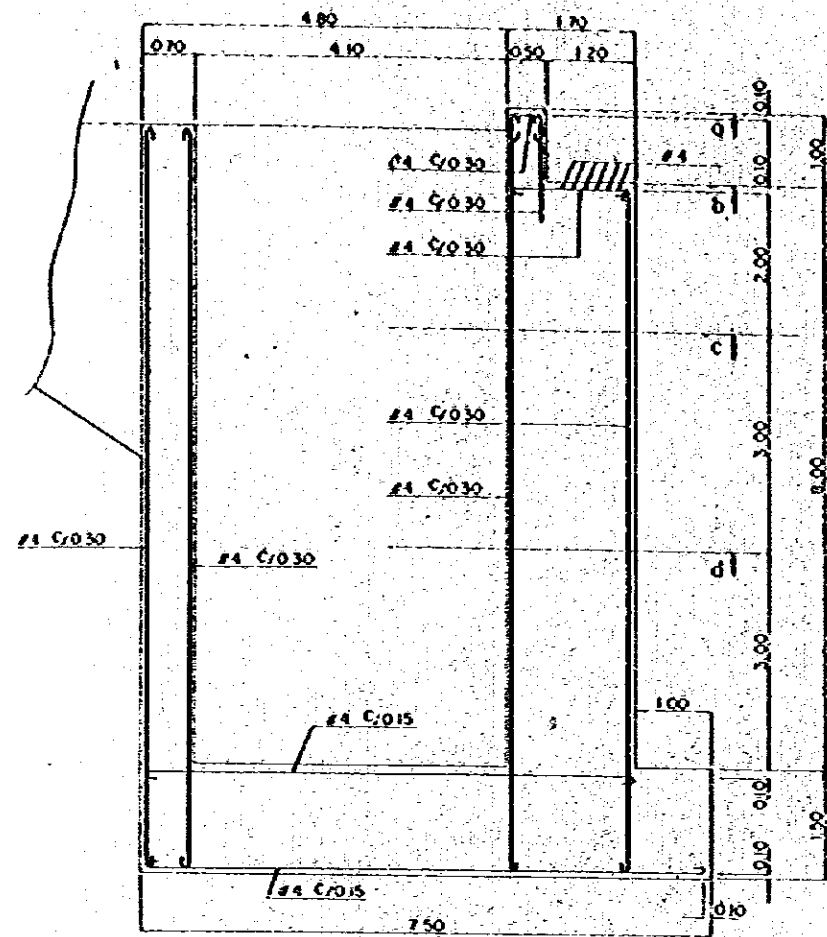


FOUNDATION PLAN S=1:200

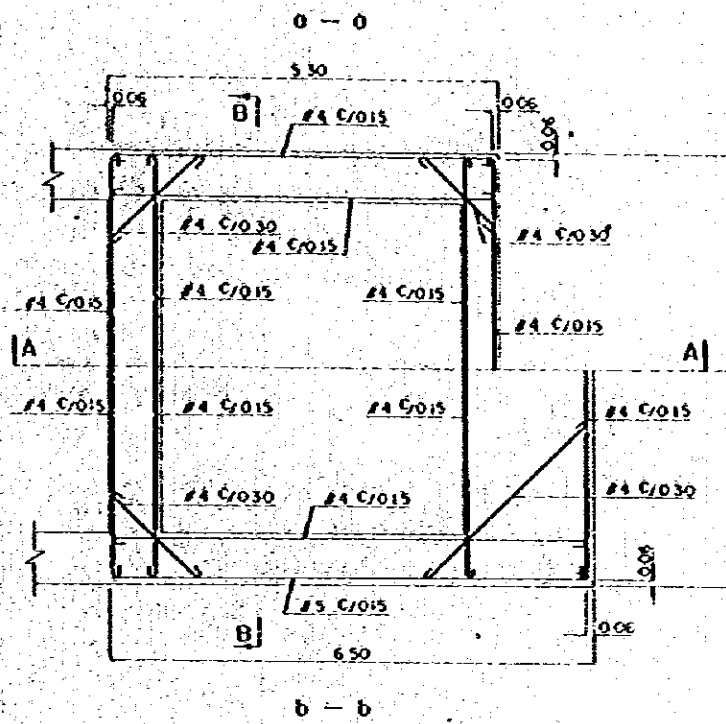


FRONT VIEW S=1:100

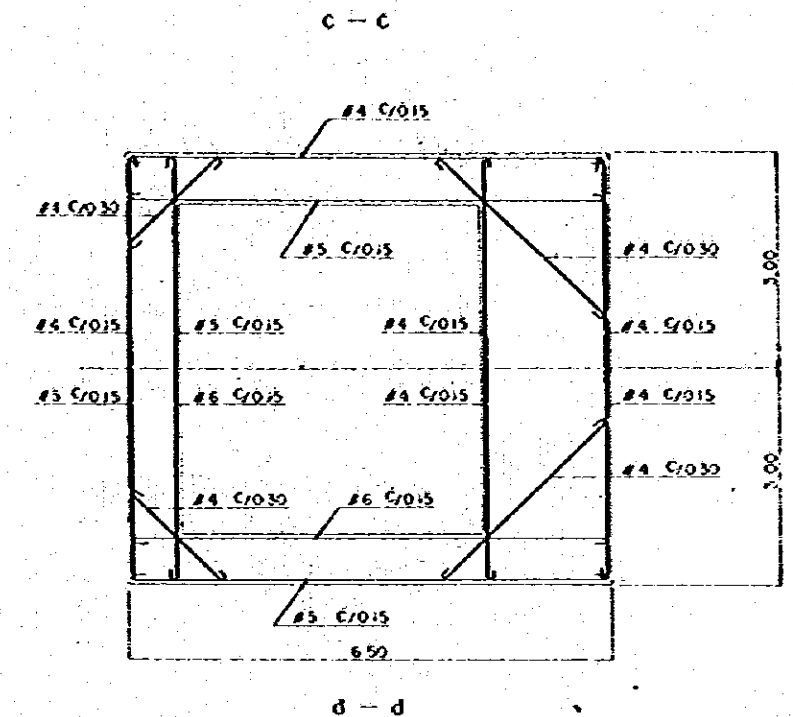
ENTRASA NACIONAL DE FERROCARRILES		
RAILWAY REHABILITATION PROJECT (1945-1965)		
386' x 780' BRIDGE		
GENERAL VIEW		
Executing Enterprise		
Drawn by Date	Checked by Date	Approved by Date
Contracting Enterprise		
Checked by Date	Approved by Date	85



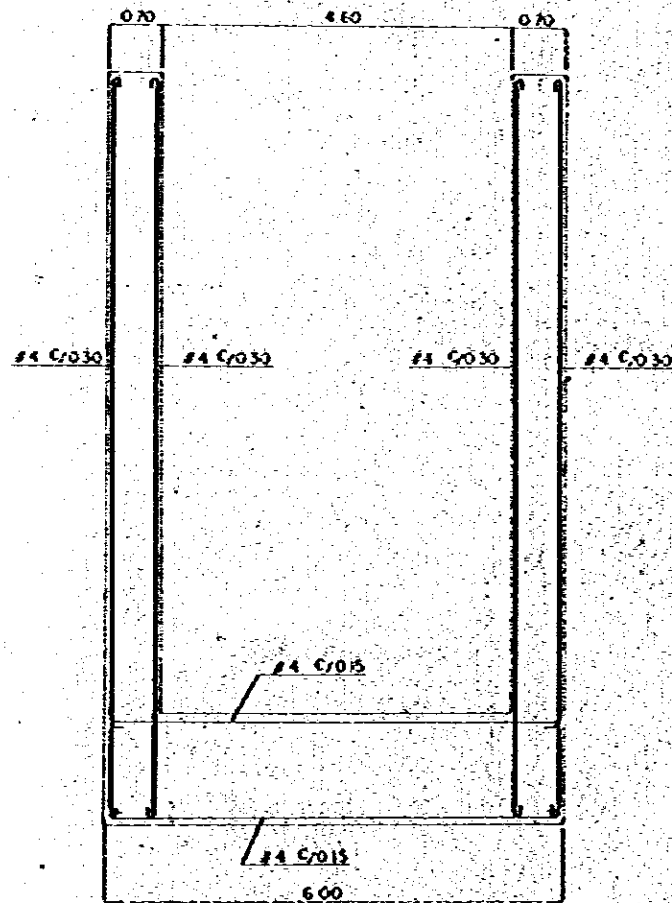
A - A



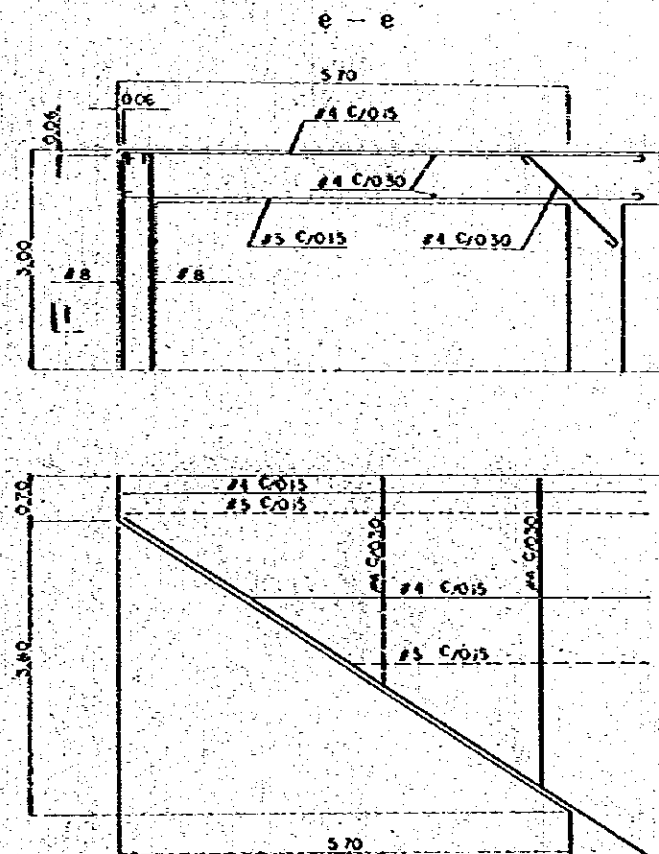
b - b



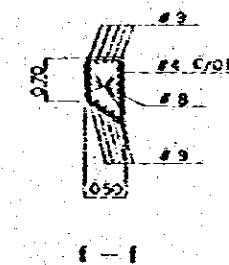
d - d



B - B



WING

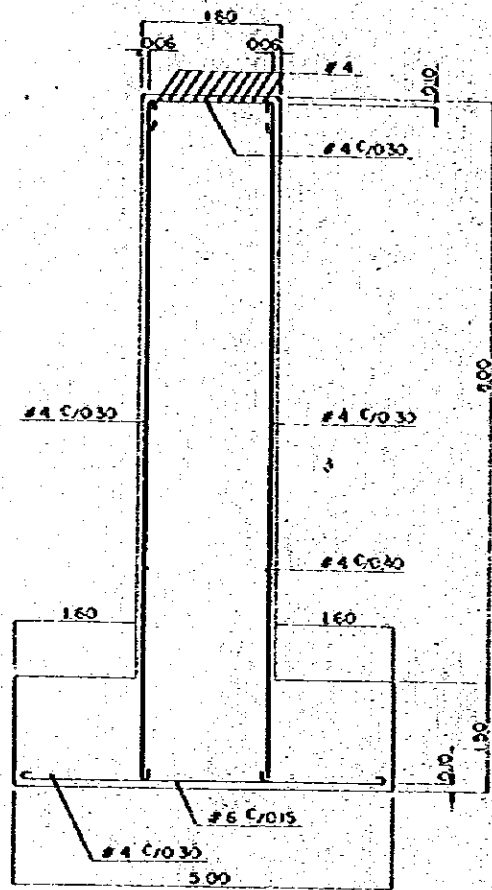


f - f

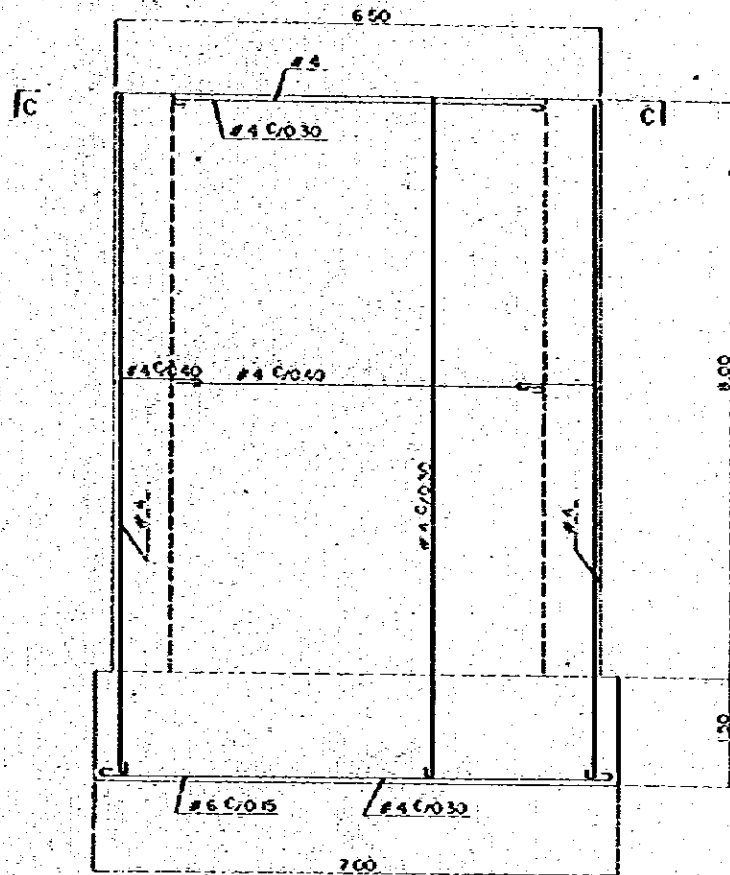
- NOTES
- 1 COMPRESSIVE STRENGTH OF CONCRETE AT 28 DAYS
 - (a) STRUCTURAL CONCRETE $F_{cu} = 20750 \text{ kg/cm}^2$
 - (b) LEVELING CONCRETE $F_{cu} = 10375 \text{ kg/cm}^2$
 - 2 REINFORCING STEEL BAR ASTM A615 GRADE 60 OR A615 GRADE 60 OR A617 GRADE 60

EMPRESA NACIONAL DE FERROCARRILES		
RAILWAY REHABILITATION PROJECT (IPLAS BOGOTÁ)		
386 ^K +780 ^M BRIDGE		
BAR ARRANGEMENT (steel 1 OF 2)		
Executing Enterprise		
Drawn by Date	Checked by Date	Approved by Date
Contracting Enterprise		
Checked by Date	Approved by Date	No. 86

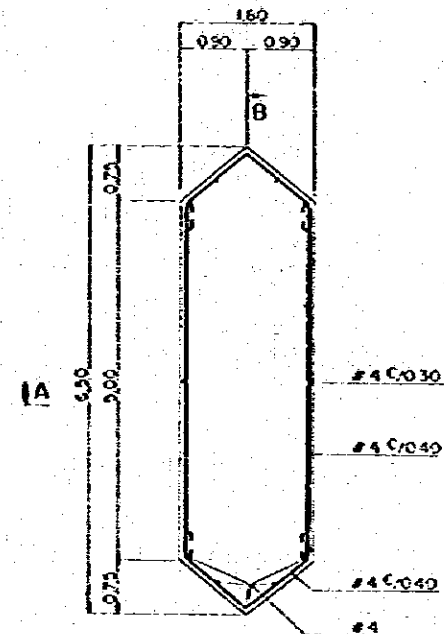
S=1.50



A - A



B - B



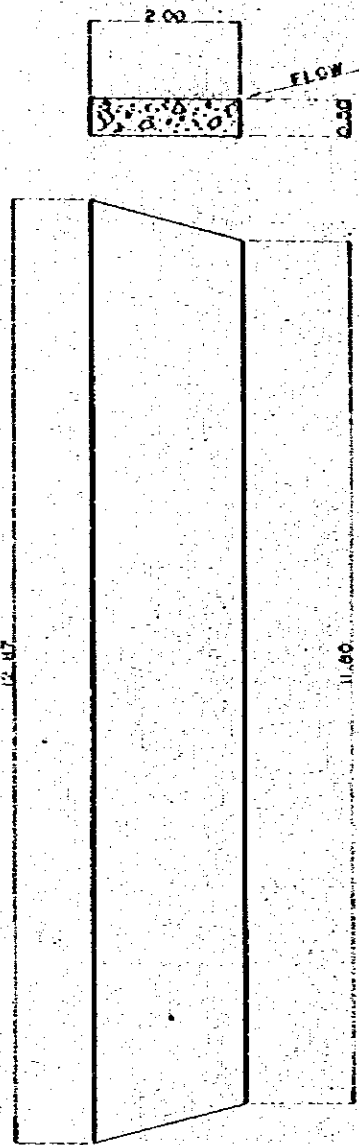
C - C

- NOTES
1. COMPRESSIVE STRENGTH OF CONCRETE AT 28 DAYS
 - a) STRUCTURAL CONCRETE $f_{28} = 200 \text{ kg/cm}^2$
 - b) LEVELING CONCRETE $f_{28} = 160 \text{ kg/cm}^2$
 2. REINFORCING STEEL BAR
 - a) ASTM A615 GRADE 60 OR A615 GRADE 60
 - b) OR A615 GRADE 60

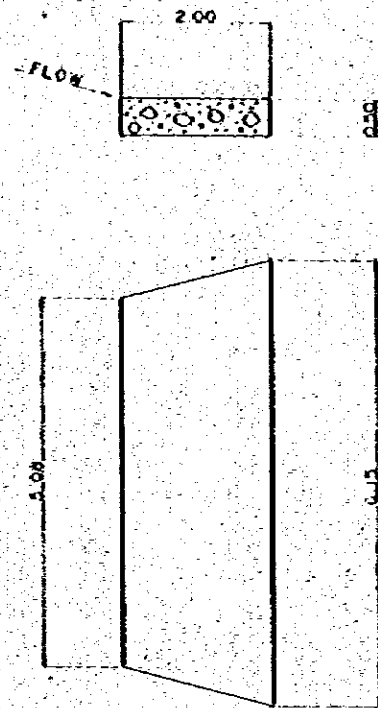
EMPRESA NACIONAL DE FERROCARRILES		
REUNION ADMINISTRATIVA DE INGENIEROS (R.A.I.)		
386 ^m x 760 ^m BRIDGE		
BAR ARRANGEMENT (sheet 2 of 2)		
Executing Enterprise		
Drawn by Date	Checked by Date	Approved by Date
Contracting Enterprise		
Checked by Date	Approved by Date	87

S=1:50

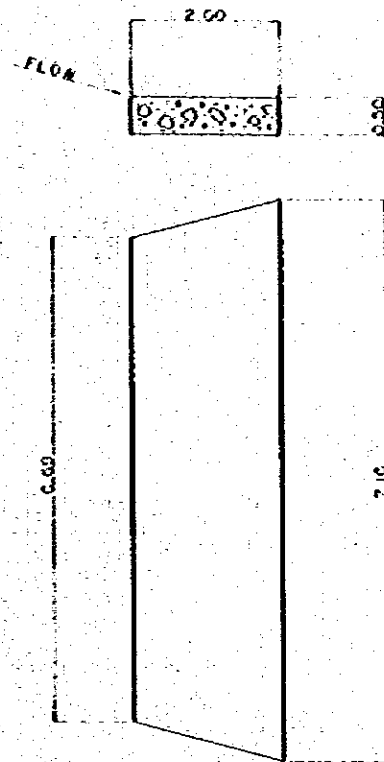
352^K + 284^M



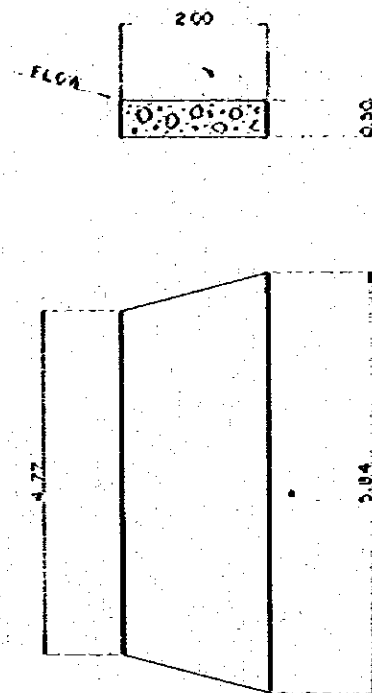
354^K + 430^M



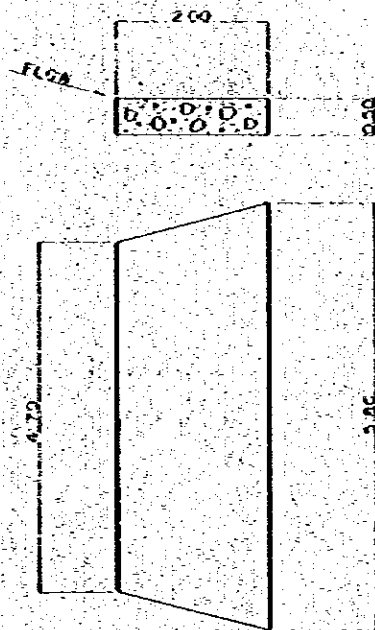
356^K + 907^M



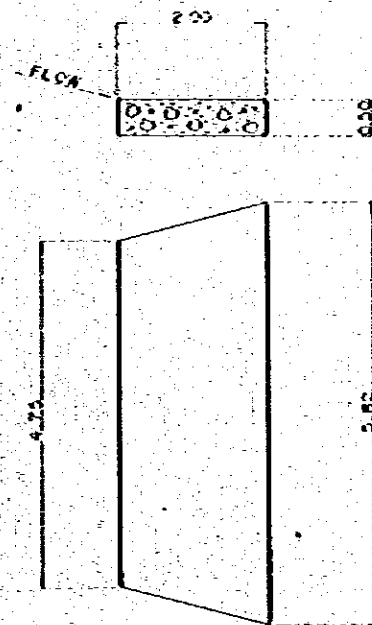
357^K + 536^M



358^K + 869^M



358^K + 980^M



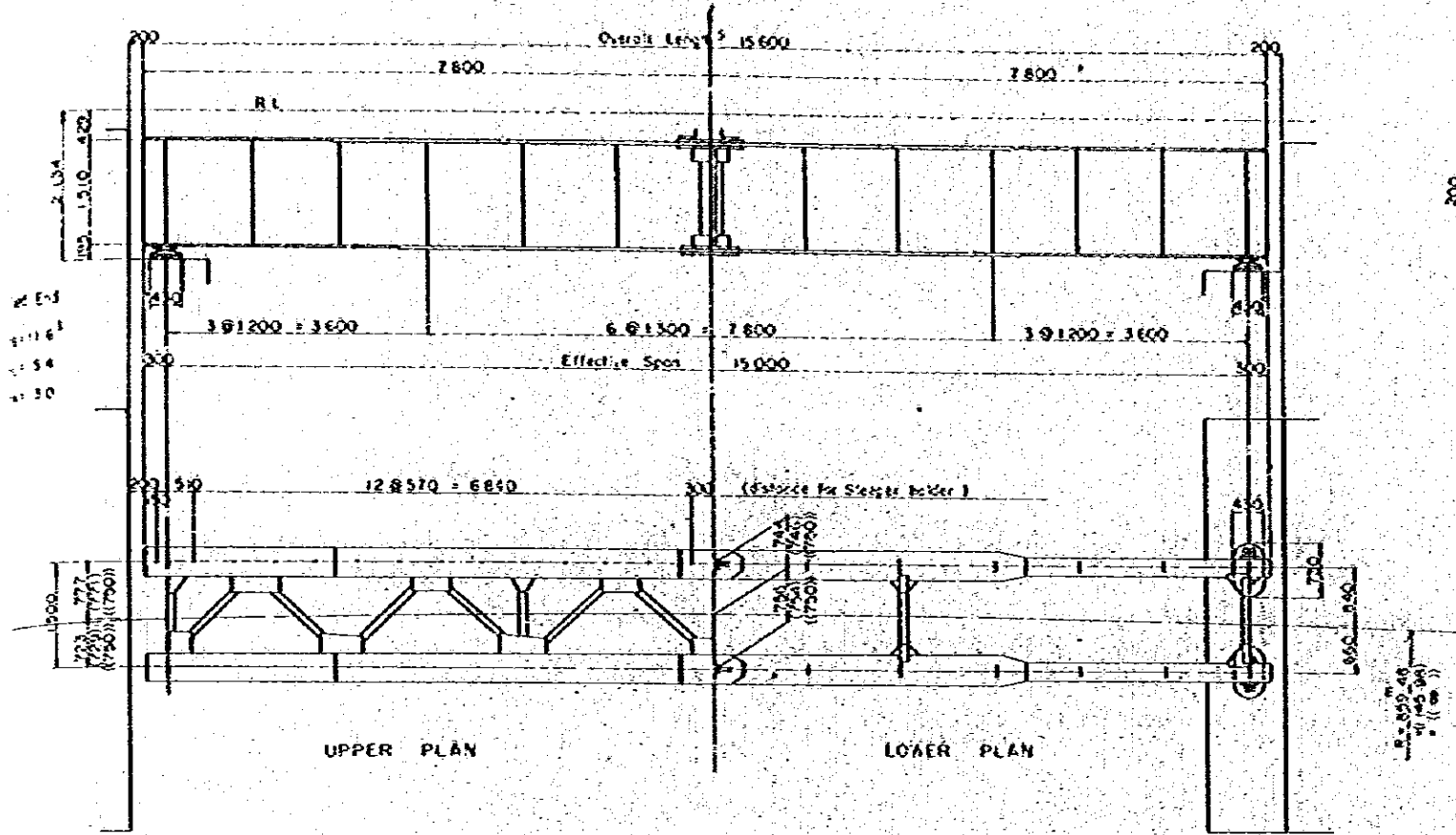
NOTE
CONCRETE TO BE SOURED
AT 28 DAYS

EMPRESA NACIONAL DE FERROCARRILES		
RAILWAY RENOVATION PROJECT (1974-2000)		
APRON FOR U SHAPED RETAINING WALL		
Executing Enterprise		
Drawn by Date	Checked by Date	Approved by Date
Contracting Enterprise		
Checked by Date	Approved by Date	No 88

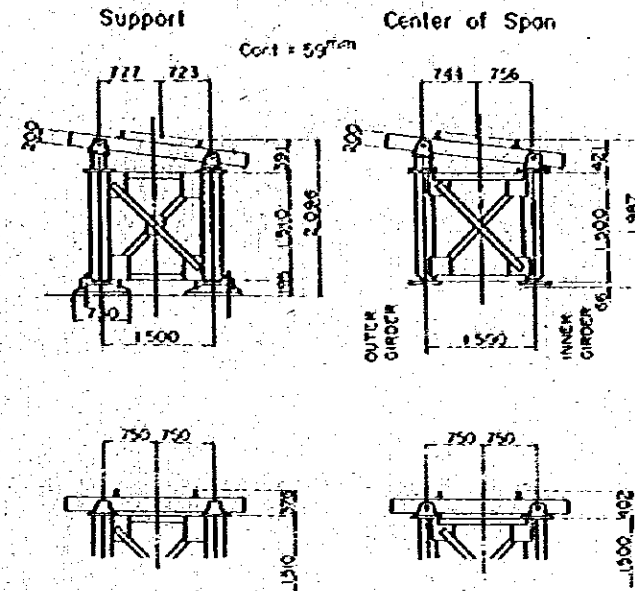
S=1.50

S=1:50

AT CURVED TRACK
IN CASE OF CANT 59mm



AT CURVED TRACK IN CASE OF CANT 59mm



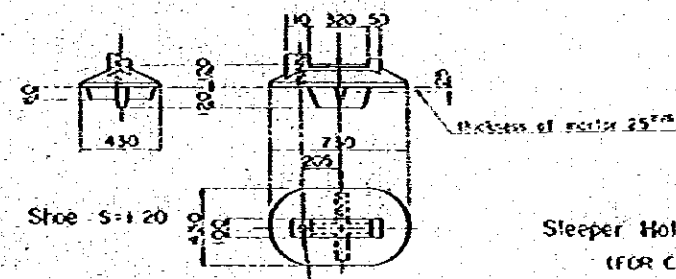
Rail level ~ Bottom of the main girder

Part	122	} 421
Thickness of Sleeper	200	
Incline and Wooden packing	39	
Sleeper holder	12	
Upper splice plate	16	
Upper flange plate	32	
Height of Web plate	1500	} 66
Lower flange plate	30	
Lower flange splice plate	16	
Head of M22, H.T Bolt	20	
Total distance	1967	

Rail level ~ Bearing Surface

Part	122	} 331
Thickness of Sleeper	200	
Incline and Wooden packing	35	
Sleeper holder	12	
Upper flange plate	22	
Height of Web plate	1510	
Lower flange plate	22	
Soil plate	28	
Thickness of Steel marker treatment	25	
Total distance	2086	

AT TANGENT TRACK

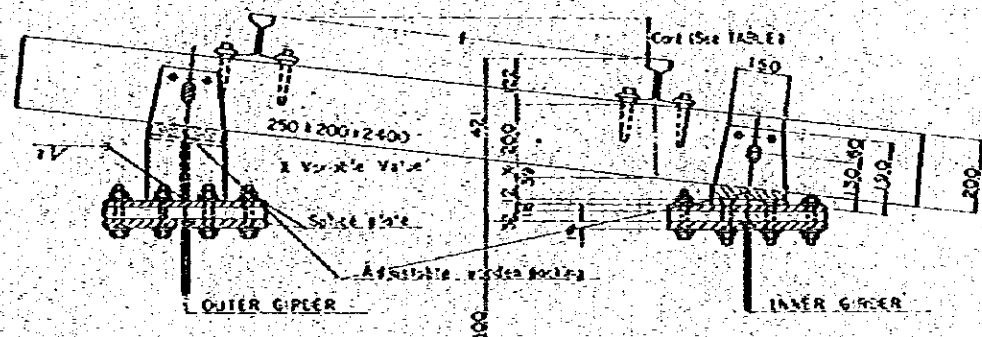


STRESS SHEET

MEMBER	MAIN GIRDER	
	OUTER GIRDER	INNER GIRDER
SPAN (m)	15.0	
RAVING	D 18.9 L 145.7	D 18.9 L 145.7
WEIGHT	I 93.8 C 11.4	I 93.8 C 11.4
AREA	269.8	247.0
NUMBER OF PERFORANCE	N1 = 233	Nc = 233
SECTION	D 5.0 L 44.1 I 28.4 C 14.7	D 5.0 L 45.9 I 29.6 C 14.7
WEIGHT	92.2	80.5
USED SECTION	Ix = 1666650 Iy = 72321 Iz = 8338	W = 2742
STRESS	σ _{cc} = -1011 (-159) σ _{tl} = 41349 σ _{bc} = 34	σ _{cc} = -1231 (-159) σ _{tl} = 11235 σ _{bc} = 29
ALLOWABLE STRESS	σ _{cc} = -1250 σ _{tl} = 11400 σ _{bc} = 40	σ _{cc} = -1250 σ _{tl} = 11400 σ _{bc} = 40

L 1 = Stress due to Upper Flange
Axial Force N1 or Nc

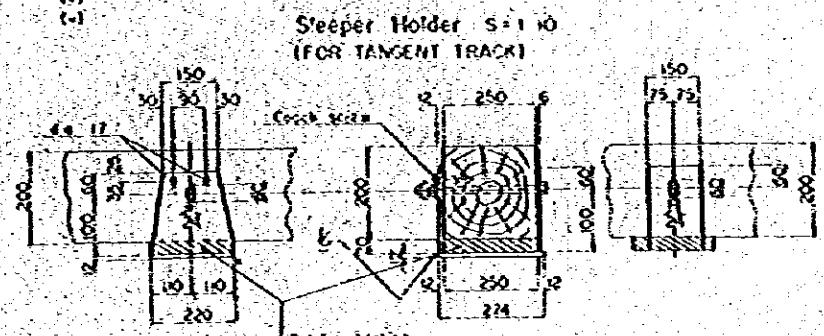
Example of Sleeper Holder S=1:10
(AT CURVED TRACK IN CASE OF CANT 59mm)



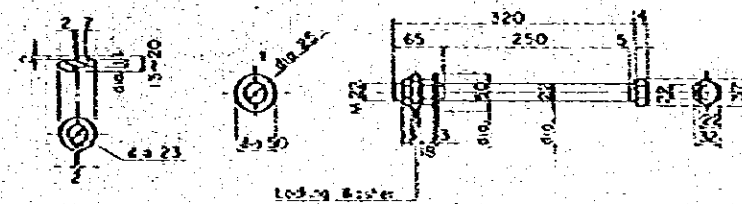
- NOTATION:
- T Tension
 - C Compression
 - D Stress, Reaction, & B.M. due to Dead Load (t.l.m.)
 - L Stress, Reaction, & B.M. due to Live Load (l.l.m.)
 - I Stress, Reaction, & B.M. due to Impact Load (i.l.m.)
 - C Centrifugal force due to Centrifugal load set to one wheel
 - H₁ Horizontal force due to Centrifugal load set to one wheel
 - H₂ Horizontal force due to Centrifugal load set to one wheel
 - H₃ Horizontal force due to Centrifugal load set to one wheel
 - A Allowable Compressive Stress (kg/cm²)
 - T₁ Tension (kg)
 - C₁ Compression (kg)
 - B₁ Bearing Stress on concrete (kg)
 - C₂ Allowable Compressive Stress (kg)
 - T₂ Tension (kg)
 - B₂ Bearing Stress on concrete (kg)
 - A₁ Gross Sectional Area (cm²)
 - B₃ Bearing Area (cm²)
 - L₁ Moment of Inertia about Neutral Axis (cm⁴)
 - T₃ Upper Fiber distance from Neutral Axis (cm)
 - L₂ Lower Fiber distance from Neutral Axis (cm)

TABLE

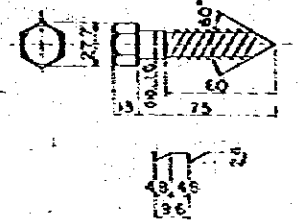
CURVE RADIUS (m)	Cent (mm)
R = 653.46	33
R = 1145.98	44



Locking washer S=1:5 Round washer S=1:5 Hexagonal Bolt and Nut S=1:5



Coch screw S=1:2



UNIT: cm

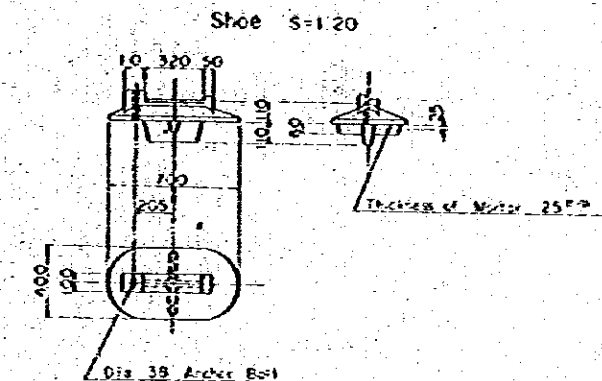
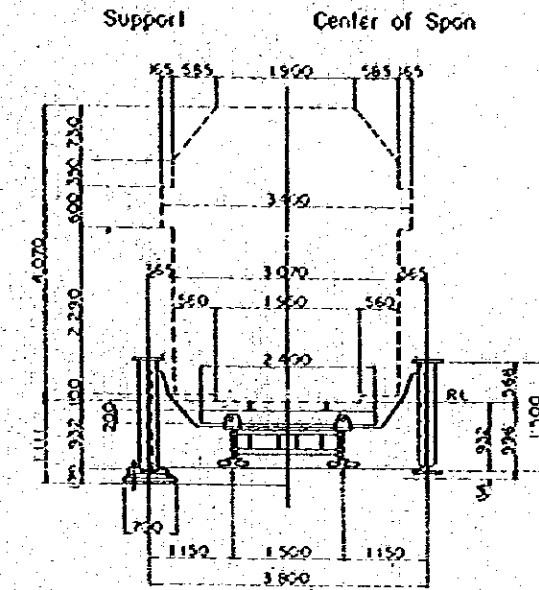
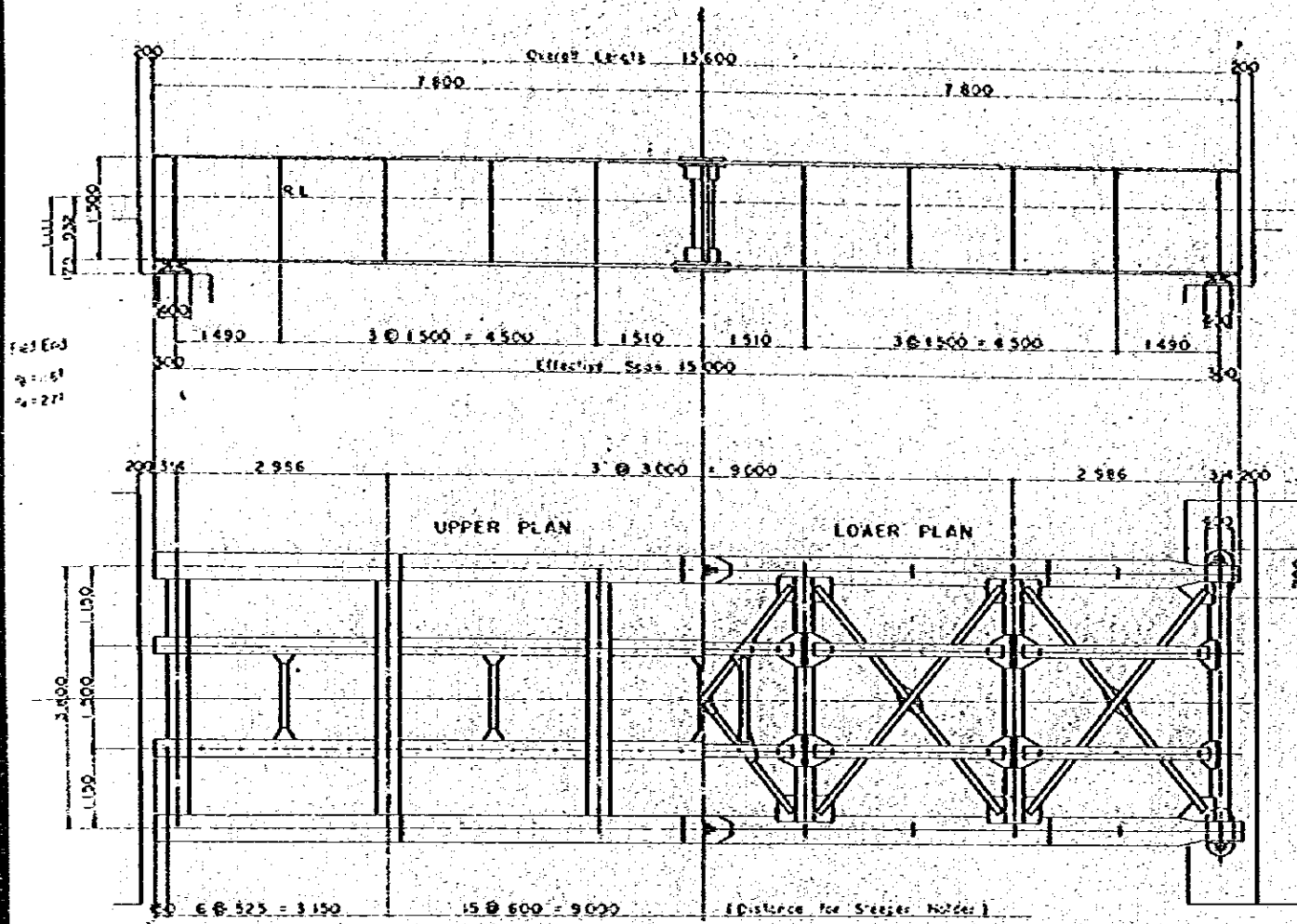
STEEL WEIGHT 13.4t
PAINTING AREA 198 m²

ENPRESA NACIONAL DE FERROCARRILES
PAUTAT ESTABILITACION FERROV (LIMAS 1955)

SKELETON OF DECK GIRDER
SPAN = 15M

Executing Enterprise		
Drawn by Date	Checked by Date	Approved by Date
Contracting Enterprise		
Checked by Date	Approved by Date	89

S=1:50

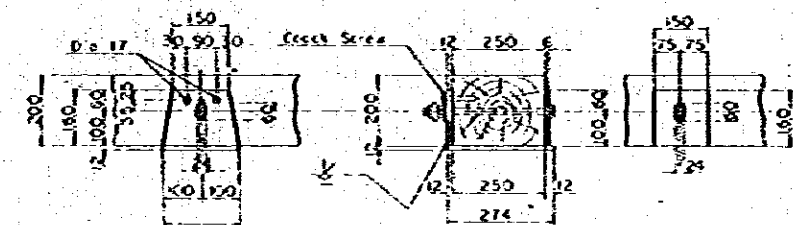


Rail level ~ Bottom of the main girder

Rail	122
Thickness of Sleeper	200
Sleeper Holder	12
Upper Flange Plate of Stringer	12
Upper Splice Plate	13
Height of Intermediate F.B.	564
Gusset Plate	9
Lower Flange Plate	28
Lower Flange Splice Plate	16
Head of M22 HT Bolt	20
Total distance	996

Rail level ~ Bearing Surface

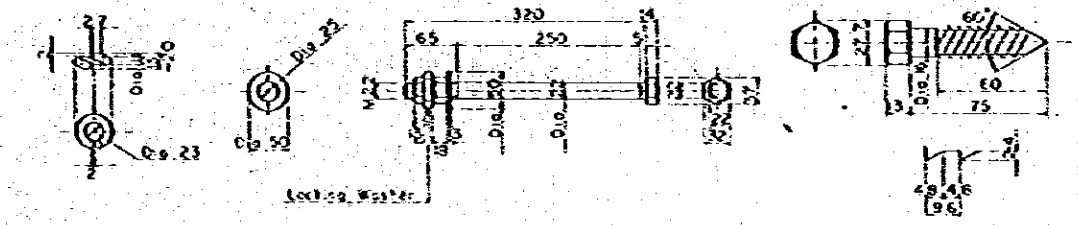
Rail	122
Thickness of Sleeper	200
Sleeper Holder	12
Upper Flange Plate of Stringer	12
Upper Splice Plate	9
Height of End Floor Beam	568
Gusset Plate	9
Lower Flange Plate	16
Side Plate	28
Thickness of Steel	110
Water Treatment	25
Total distance	1111



STRESS SHEET

USER	MAIN GIRDER	STRINGER		FLOOR BEAM	
		END STRINGER	INTERMEDIATE S.	END FLOOR BEAM	INTERMEDIATE F.B.
150	150	300	300	380	380
D	0 1560	0 0.42	0 0.34	0 1.10	0 1.64
L	99.40	L 8.44	L 6.75	L 19.10	L 23.00
I	63.37	I 5.89	I 4.71	I 13.33	I 15.89
Σ	177.37	14.75	11.80	33.53	40.53
D	0 678	0 0.56	0 0.56	0 1.02	0 1.43
L	45.03	L 15.00	L 15.00	L 16.61	L 20.00
I	29.60	I 10.47	I 10.47	I 11.59	I 13.82
Σ	80.81	26.03	26.03	29.22	35.31
Ag	1575.550	24.470	23.545	84.678	108.659
Xc	75.17	19.23	18.74	28.4	34.282
Ab	2457	2257	2335		
σc	1.224	1.159	0.939	1.125	1.052
σt	1.335	1.179	1.171	1.125	1.052
σb	33				
σca	1.250	1.250	1.250	1.250	1.250
σta	1.400	1.400	1.400	1.400	1.400
σb	40				

Locking washer S=15 Round washer S=15 Hexagonal Bolt and Nut S=15



- NOTATION:
- + Tension
 - Compression
 - D Stress, Reaction, B.M. & shear due to Dead Load (1, 6, 11)
 - L do do Live Load (1 = 1)
 - I do do Imp. Load (1 = 1)
 - H-B Horizontal force due to Brake Load on the wheel (1)
 - H-W do do Wind Load do (1)
 - σc Actual Compressive Stress (N/mm²)
 - σt do Tensile do (1)
 - σcb do Bearing Stress on concrete (1)
 - σca Actual Compressive Stress (1)
 - σta do Tensile do (1)
 - σcb do Bearing Stress on concrete (1)
 - Ag Gross Section Area (cm²)
 - Ac Bearing Area (1)
 - Ix Moment of Inertia about Neutral Axis (cm⁴)
 - Xc Under fiber distance from Neutral Axis (cm)
 - Y Lower Fiber do (1)

STEEL WEIGHT 19.71
PAINTING AREA 285 m²

UNIT mm

EMPRESA NACIONAL DE FERROCARRILES
RAILWAY REHABILITATION PROJECT (IPLUS-RODRI)

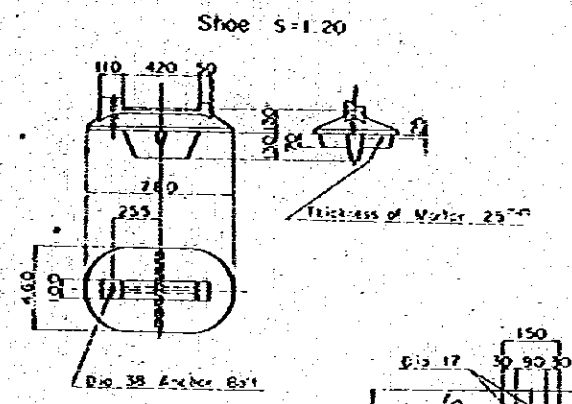
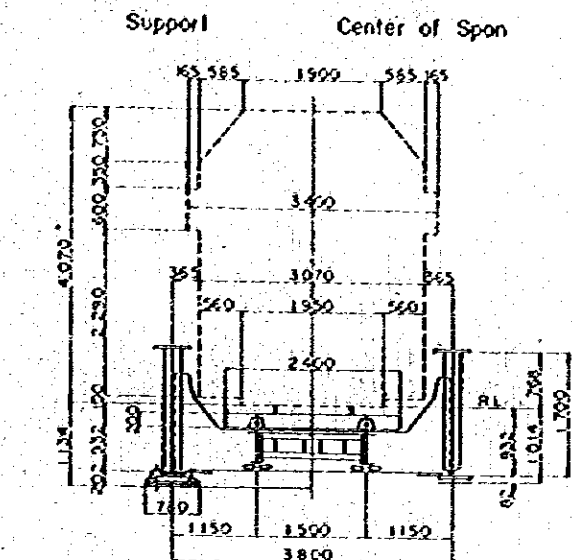
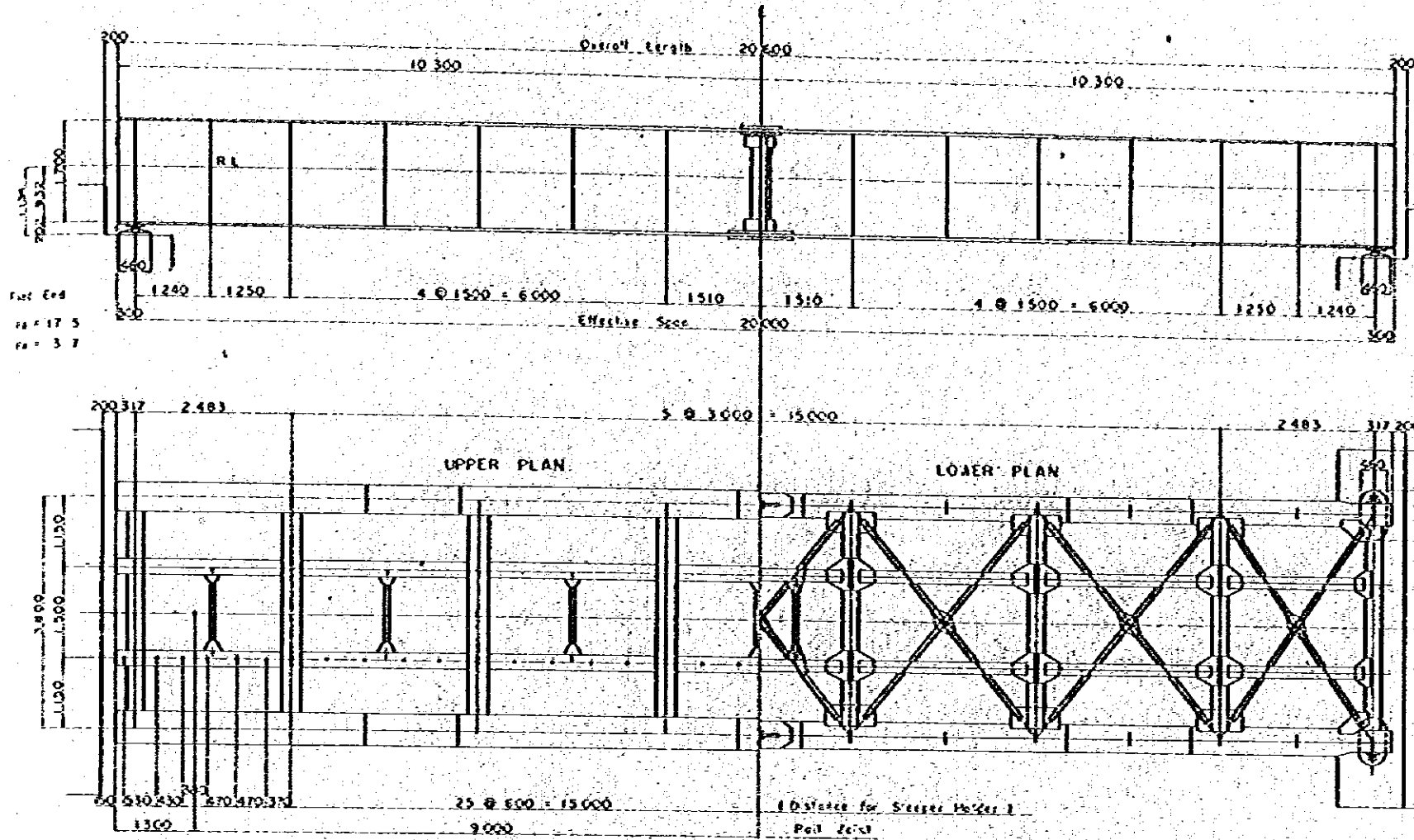
SKELETON OF THROUGH GIRDER
SPAN = 15M

Executing Enterprise

Drawn by Date Checked by Date Approved by Date
Contracting Enterprise

Checked by Date Approved by Date No 90

S=1 50

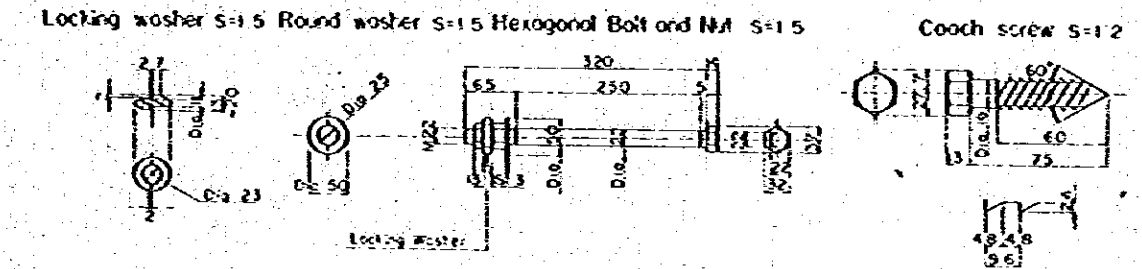
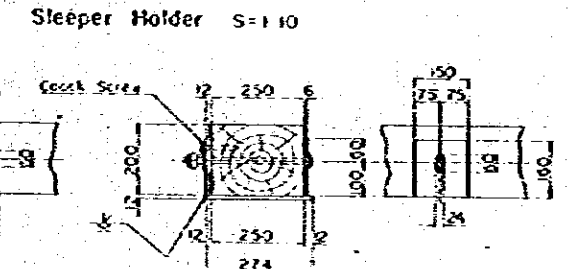


Roof level ~ Bottom of the main girder

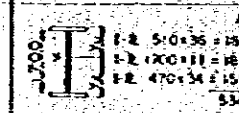
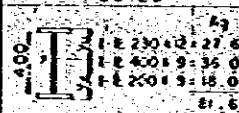
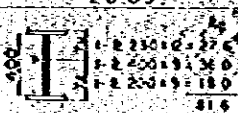
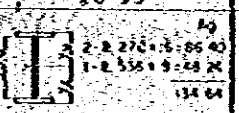
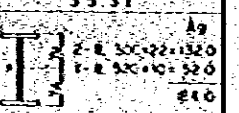
Part	122	
Thickness of Sleeper	200	
Sleeper Holder	12	932
Upper Flange Plate of Stringer	12	
Upper Splice Plate	13	
Height of Intermediate F.B	564	
Gusset Plate	9	
Lower Flange Plate	40	62
Lower Flange Splice Plate	22	
Feet of M22 HT Bolt	20	
Total Distance	1014	

Roof level ~ Bearing Surface

Part	122	
Thickness of Sleeper	200	
Sleeper Holder	12	932
Upper Flange Plate of Stringer	12	
Upper Splice Plate	9	
Height of End Floor Beam	568	
Gusset Plate	9	
Lower Flange Plate	19	202
Seal Plate	28	
Thickness of Steel	130	
Welder Treatment	25	
Total Distance	1134	



STRESS SHEET

MEMBER	MAIN GIRDER	STRINGER		FLOOR BEAM	
		END STRINGER	INTERMEDIATE S	END FLOOR BEAM	INTERMEDIATE F.B
SPAN (m)	20.0	2.50	3.00	3.80	3.60
LOADING MOVEMENT (T)	D 51.57	D 0.29	D 0.34	D 0.99	D 1.64
	L 238.29	L 6.25	L 6.75	L 17.62	L 23.00
	I 142.97	I 4.36	I 4.77	I 12.30	I 15.89
	432.83	10.90	11.80	30.91	40.53
REACTION OR SHEAR (T)	D 10.81	D 0.46	D 0.56	D 0.92	D 1.49
	L 55.05	L 11.67	L 15.00	L 15.32	L 20.00
	I 33.03	I 8.15	I 10.47	I 10.69	I 13.82
	98.89	20.28	26.03	26.93	35.31
USED SECTION					
	$I_x = 3,026,000$ $I_y = 64,68$ $I_z = 92,32$ $A_b = 3134$	$I_x = 23,545$ $I_y = 18,76$ $I_z = 23,36$	$I_x = 23,545$ $I_y = 18,74$ $I_z = 23,36$	$I_x = 77,365$ $I_y = 71,284$	$I_x = 108,659$ $I_y = 71,282$
	$f_c = -1,211$ $f_t = 1,135$ $f_b = 32$	$f_c = -868$ $f_t = 1,081$	$f_c = -939$ $f_t = 1,171$	$f_c = -1,135$ $f_t = 1,135$	$f_c = -1,052$ $f_t = 1,052$
ALLOWABLE STRESS (T)	$f_{c0} = -1,250$ $f_{t0} = 1,400$ $f_b = 40$	$f_{c0} = -1,250$ $f_{t0} = 1,400$	$f_{c0} = -1,250$ $f_{t0} = 1,400$	$f_{c0} = -1,250$ $f_{t0} = 1,400$	$f_{c0} = -1,250$ $f_{t0} = 1,400$

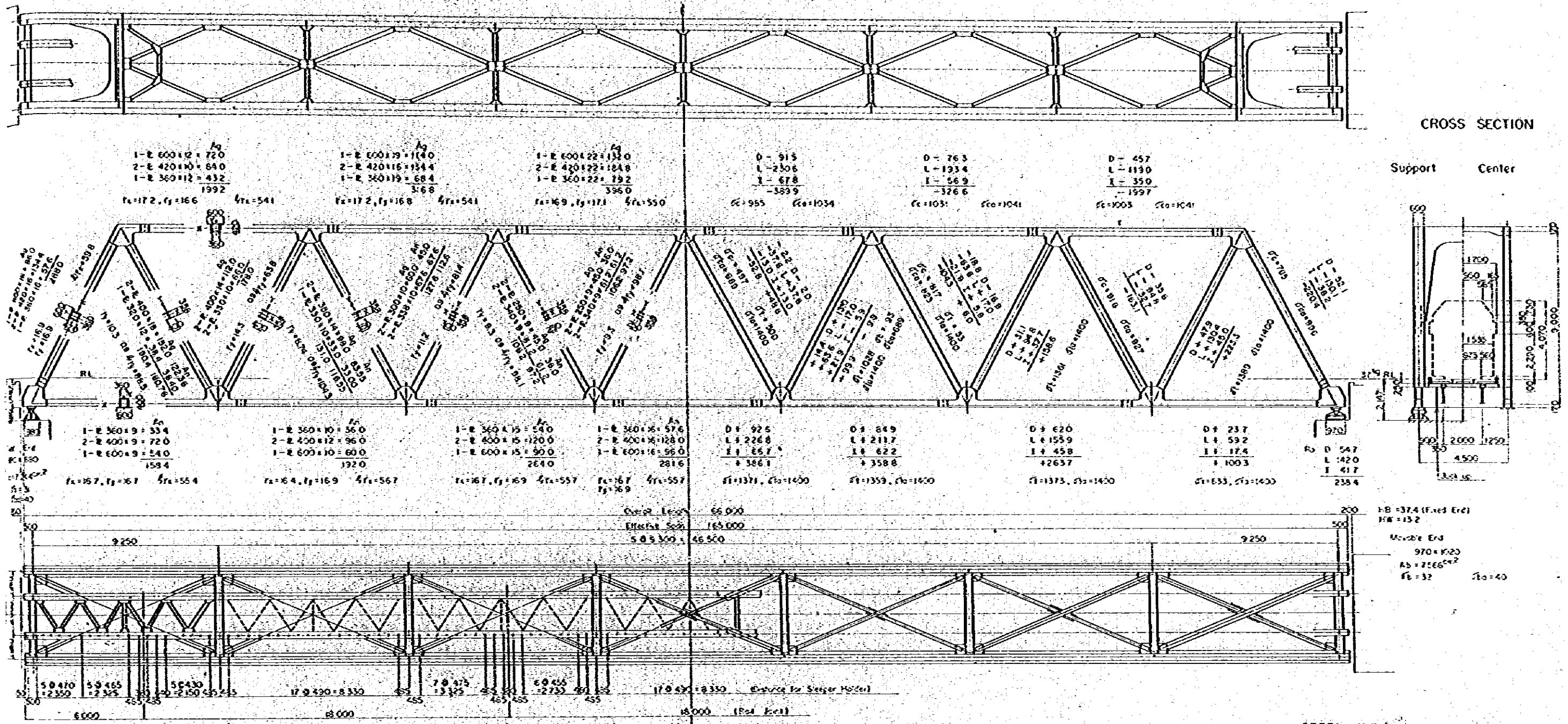
NOTATION:

- T Tension
- C Compression
- S Shear, Reaction, B.M. B shear due to Dead load (T, C, I)
- L Live Load (T, C, I)
- I Imped Load (T, C, I)
- H Horizontal Force due to Brake Load on to one side (T, C, I)
- W Vertical Force due to Wind Load (T, C, I)
- f_c Actual Compressive Stress (N/mm²)
- f_t do Tensile do (T, C, I)
- f_b do Bearing Stress in concrete (T, C, I)
- f_{c0} Allowable Compressive Stress (T, C, I)
- f_{t0} do Tensile do (T, C, I)
- f_{b0} do Bearing Stress in concrete (T, C, I)
- A_g Gross Sectional Area (cm²)
- A_t Tensile Area (cm²)
- I_x Moment of Inertia about Neutral Axis (cm⁴)
- I_y Upper Flange distance from Neutral Axis (cm)
- I_z Lower Flange do do (T, C, I)

STEEL WEIGHT 30.81
PAINTING AREA 447 m²

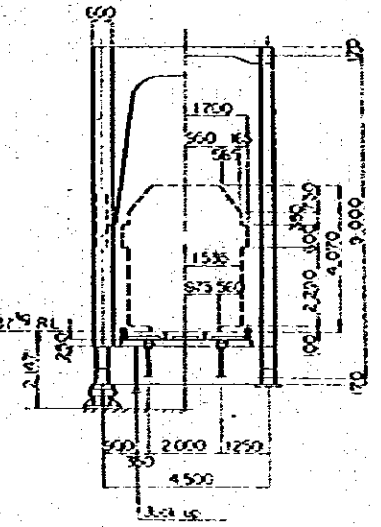
UNIT m.m.

ENTRADA NACIONAL DE FERROCARRILES		
RAILWAY REGULATION PROJECT (T.M.S. RO-80)		
SKELETON OF THROUGH GIRDER		
SPAN = 20 ^m		
Executing Empresa		
Drawn by Date	Checked by Date	Approved by Date
Contracting Empresa		
Checked by Date	Approved by Date	91



CROSS SECTION

Support Center



1-B 374 (Fixed End)
 1-B 132
 970 x 120
 AS = 2566 cm²
 IB = 32
 IB = 40

STEEL WEIGHT 165.0t
 PAINTING AREA 2250 m²

STRESS SHEET OF FLOOR SYSTEM

SPAN (m)	BENDING MOMENT (t-m)		USED SECTION	ACTUAL STRESS (kg/cm ²)	ALLOWABLE STRESS (kg/cm ²)	SPAN (m)	BENDING MOMENT (t-m)		USED SECTION	ACTUAL STRESS (kg/cm ²)	ALLOWABLE STRESS (kg/cm ²)	
	(I)	(II)					(I)	(II)				
325	END STRINGER											
	7.75	0	335	0	1-E 350x128x95.0	60	600	537	0	436	0	
	64.38	L	3238	L	1-E 300x119x81.0	1177	1250	4308	L	3446	L	
	43.71	I	2193	I	1-E 350x125x87.5	2865	610	2917	I	2333	I	
335	INTERMEDIATE STRINGER											
	6.10	0	328	0	1-E 350x122x77.0	60	600	905	0	731	0	
	51.55	L	3250	L	1-E 300x119x81.0	1174	1250	5648	L	4518	L	
	35.22	I	2204	I	1-E 350x119x86.5	2245	610	3468	I	2774	I	
325	END FLOOR BEAM											
					2-E 340x116x108.8	60	600					
					1-E 300x119x100.2	1097	1250					
					1-E 365x100	61	610					
335	INTERMEDIATE FLOOR BEAM											
					2-E 350x121x154.0	60	600					
					1-E 380x112x117.6	1067	1250					
					1-E 450x60	61	610					

NOTATION:
 + Tension
 - Compression
 D Stress, Reaction, BM & shear due to Dead Load (t, m, t)
 L Live Load (t, m, t)
 I Impact Load (t, m, t)
 HB Horizontal force due to Brake Load on to one side (t)
 HR Horizontal force due to Brake Load on to one side (t)
 Cc Actual Compressive Stress (kg/cm²)
 Ct do Tension do (t = 1)
 Cc Actual Compressive Stress on concrete (t = 1)
 Ct do Tension do (t = 1)
 Ccdo Bearing Stress on concrete (t = 1)
 Ct do Bearing Stress on concrete (t = 1)
 Ag Gross Sectional Area (cm²)
 An Net do (t = 1)
 Ab Bearing Area (t = 1)
 L Length of Member (cm)
 r Radius of Gyration of Area (cm)
 n Number of rivets along Neutral Axis (cm)
 Ye Upper flange distance from Neutral Axis (cm)
 Yc Lower flange do (t = 1)

UNIT: mm

ENTRESA NACIONAL DE FERROCARRILES
 RAILWAY REHABILITATION PROJECT (IMPUS-ROBRES)

SKELETON OF THROUGH TRUSS
 SPAN = 65M

Executing Enterprise

Drawn by Date	Checked by Date	Approved by Date
Contracting Enterprise		
Checked by Date	Approved by Date	94

