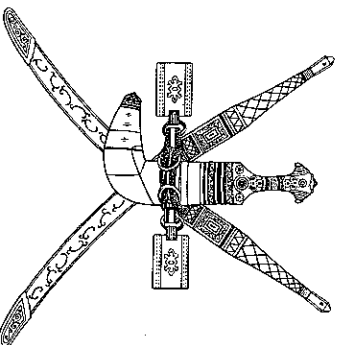


SULTANATE OF OMAN

MINISTRY OF ELECTRICITY & WATER



STANDARD - OES 1 33KV AND 11KV OVERHEAD LINES

Second Edition : January 1995

SULTANATE OF OMAN
MINISTRY OF ELECTRICITY & WATER

STANDARD - OES 1
33 AND 11KV OVERHEAD LINES

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STANDARD DRAWINGS
TABLE OF CONTENTS

S. NO.	DRAWING NUMBER	TITLE
01	MEW/OH/001 Rev. B	33KV line post insulator
02	MEW/OH/002 Rev. B	11KV line post insulator
03	MEW/OH/003 Rev. B	33KV tension insulator
04	MEW/OH/004 & 4A	Tension set hardware
05	MEW/OH/005 Rev. B	33KV intermediate cross arm and the bracket
06	MEW/OH/006 (Revised)	11KV single pole intermediate cross arm and the
07	MEW/OH/007 (Revised)	33KV "H" pole section/terminal cross arm
08	MEW/OH/008 (Revised)	11KV "H" pole section/terminal cross arm
09	MEW/OH/009 (Revised) Rev. A	33KV single pole section cross arm
10	MEW/OH/010 (Revised) Rev. A	11KV single pole section cross arm and the
11	MEW/OH/011 Rev. A	Transformer cross arm and gusset plate
12	MEW/OH/012 (Revised)	33KV "H" pole double circuit cross arm
13	MEW/OH/013 Rev. A	Trussing tackle
14	MEW/OH/014	Stay set - 11KV and 33KV
15	MEW/OH/015-A	33KV stay insulator
16	MEW/OH/015-B	11KV stay insulator
17	MEW/OH/-15-C	33KV stay insulator (Fibre glass rod type)
18	MEW/OH/016	Red light reflector
19	MEW/OH/017 Rev. A	Danger plate
20	MEW/OH/018 (Revised)	Number plate
21	MEW/OH/019	Single way cable cleat
22	MEW/OH/021	Pilot plate for "H" pole
23	MEW/OH/022	Mid span joint for "ACSR" conductor
24	MEW/OH/023 Rev. B	Square curved washer for wood pole
25	MEW/OH/024 Rev. A	Cable support channel
26	MEW/OH/025	Kicking block
27	MEW/OH/026 Rev. A	33KV mast head switch gear with load interrupter
28	MEW/OH/027 Rev. A	11KV mast head switch gear with load interrupter
29	MEW/OH/028 Rev. A	33KV ON LOAD vertical mounting disconnecter
30	MEW/OH/029 Rev. A	11KV vertical mounting switch unit

S. NO.	DRAWING NUMBER	TITLE
31	MEW/OH/030 Rev. A	11KV drop out fuse unit
32	MEW/OH/031 Rev. A	11KV Overhead line take off from intermediate pole
33	MEW/OH/032	33KV Overhead line take off from intermediate pole
34	MEW/OH/033	Stringing tension and sag chart for "DOG" ACSR conductor
35	MEW/OH/034	Stringing tension and sag chart for "PANTHER" ACSR conductor
36	MEW/OH/035	Stringing tension and sag chart for "WOLF" ACSR conductor
37	MEW/OH/036	Stringing tension and sag tables for "PANTHER" ACSR conductor
38	MEW/OH/037	Stringing tension and sag tables for "WOLF" ACSR conductor
39	MEW/OH/038	Stringing tension and sag tables for "DOG" ACSR conductor
40	MEW/OH/050 (Revised)	Adjustable arcing horn
41	MEW/OH/051	Stay hook
42	MEW/OH/052	Expanding rock anchor for stays
43	MEW/OH-GA/01 Rev. A	General intermediate single line pole - 33KV
44	MEW/OH-GA/02 Rev. B	33KV single circuit section pole
45	MEW/OH-GA/-03 (Revised)	33KV Single circuit terminal and angle double pole
46	MEW/OH-GA/05 (Revised)	33KV double circuit intermediate line pole
47	MEW/OH-GA/06 Rev. C	Terminal and section 33KV double circuit pole
48	MEW/OH-GA/07 Rev. A	11KV single circuit intermediate pole
49	MEW/OH-GA/09 Rev. A	11KV single circuit section pole
50	MEW/OH-GA/10 Rev. A	11KV terminal and angle "H" pole
51	MEW/OH-GA/11 Revised Rev. B	11KV terminal pole with pole mounted transformer
52	MEW/OH-GA/12 Rev. B	33KV terminal pole with pole mounted transformer
53	MEW/OH-GA/13 Rev. A	Strut stay H.V. installation
54	MEW/OH-GA/24 Rev. A	Substation eart pit details
55	MEW/OH-GA/24-A	Substation earthing with additional earth rods
56	MEW/OH-GA/24-B Rev. B	Substation earthing with additional earth copper mesh
57	MEW/OH-GA/27	General arrangement for 90° deviation structure - 11KV

S. NO.	DRAWING NUMBER	TITLE
58	MEW/OH-GA/28	General arrangement for 90° deviation structure - 33KV
59	MEW/OH-GA/30	General arrangement for Installation of 33KV and 11KV lightning arrestors
60	MEW/OH-GA/36	General arrangement for three pole structure for long span (33 & 11KV)
61	MEW/OH-GA/37	Anti Climbing Device
62	MEW/OH-GA/38	Arrangments of lightning arrestor on terminal pole
63	MEW/OH-GA-43	Details of handle earthing 33/11KV Switches
64	MEW/PL/CL/013	Special pole foundation in normal wadi (single pole)
65	MEW/PL/CL/014	- do - (double pole)
66	MEW/PL/CL/015	- do - (right angle three pole structure)
67	MEW/PL/CL/016	- do - (three pole structure)
68	MEW/PL/CL/017	Special pole foundation in wadi centre (single pole)
69	MEW/PL/CL/018	- do - (double pole structure)
70	MEW/PL/CL/019	- do - (three pole structure)
71	MEW/PL/CL/020	- do - (right angle three pole structure)
72	MEW/PL/CL/021	Special pole foundation in wadi bank (single pole)
73	MEW/PL/CL/022	- do - (double pole)
74	MEW/PL/CL/023	- do - (three pole structure)
75	MEW/PL/CL/024	- do - (right angle three pole structure)
76	MEW/PL/CL-B/07	Concrete foundation (normal) for single pole

SULTANATE OF OMAN
MINISTRY OF ELECTRICITY & WATER

STANDARD OES - 01

33 & 11KV OVERHEAD LINES

1.0 TYPE OF CONSTRUCTION

Overhead lines shall comprise ACSR conductors secured to solid core line post type insulators and Cap and pin type tension insulators on wood poles.

- a) Single "Medium" poles with line post insulators may be used for line deviations upto 5 Deg.
- b) Single "Stout" poles with tension insulators may be used with line deviations upto 15 Deg.
- c) 'H' poles with tension insulators to be used for line deviations above 15 Deg., and for terminal, switch/fuse, and transformer locations.
- d) Three pole structure with 13 metre stout pole to be used for wadi crossing.

2.0 WOOD POLES

Wood poles shall be Pinus Silvestris/Douglas Fir with minimum extreme fibre stress of 5.48 x 10 Kg/M² from regions north of latitude 60 Deg. N complying with BS 1990 and creosoting to BS 913 except for retention of 140 Kgs per Cubic Metre. Poles shall comply with OES 29.

	Length	Top Dia.	Dia 1.5M from
	Metres	min. mm.	Butt End-Min. mm.
Medium	11.0	150	240
Stout	11.0	190	295
Extra Long (for Special locations) (Stout)	13.0	195	320

3.0 CONDUCTORS

Conductors shall be ACSR of the following sizes :

Code Name	Area mm ²	Stranding mm Al. Steel	Overall Dia mm	Weight per KM	Ultimate Strength Kg.
PANTHER	261.20	30/3.0+7/3	21.00	976.00	9095.00
WOLF	195.00	30/2.59+7/2.59	18.13	727.00	6875.00
DOG	118.80	6/4.72+7/1.57	14.50	394.00	3310.00

Conductors shall comply with OES 29.

4.0 INSULATORS

Insulators shall be porcelain aerofoil self cleaning type with a minimum creepage of 40mm per KVA Of system voltage in accordance with following drawings :

- Drg. No. MEW/OH/001 Rev. "B" - 33KV line post insulator complying with OES 26.B.
- Drg. No. MEW/OH/002 Rev. "B" - 11KV line post insulator complying with OES 26-C.
- Drg. No. MEW/OH/003 Rev. "B" - 33/11KV tension insulator complying with OES 26-A.
- Drg. No. MEW/OH/004 and 4-A 2 sheets-Tension set hardware.

5.0 CROSS-ARMS, TRUSSING TACKLE, STAY SETS, ACCESSORIES

a) Cross Arms

Cross arms shall be of heavily galvanized mild steel to following drawings :

- Drg. No. MEW/OH/005 Rev. "B" - 33KV intermediate cross arm and the bracket.
- Drg. No. MEW/OH/006 (Revised) : Single pole intermediate cross arm and the - 11KV.
- Drg. No. MEW/OH/007 (Revised : 33KV "H" pole section/terminal cross arm.
- Drg. No. MEW/OH/008 (Revised) : 11KV "H" pole section/terminal cross arm.
- Drg. No. MEW/OH/009 (Revised) Rev. "A" : 33KV single pole section cross arm.
- Drg. No. MEW/OH/010 (Revised)Rev. "A" : single pole section cross arm - 11KV.
- Drg. No. MEW/OH/011 - Transformer cross arm and gusset plate.
- Drg. No. MEW/OH/012 (Revised) - 333KV "H" pole double circuit cross arm.

b) Trussing Tackle

Trussing Tackle shall be heavily galvanized mild steel in accordance with Drg. No. MEW/OH/013 Rev. "A".

c) Stay Sets

Stay sets shall comply with Drg. No. MEW/OH/014.

d) Stay Insulators

33KV stay insulators shall be permaili or glass fibre rod to Drg. No. MEW/OH/015-A and Drg. No. MEW/OH/015-C respectively.

11KV stay insulators shall be of porcelain to Drg. No. MEW/OH/015-B complying with OES 26-D.

e) Stay Wire

Stay wire shall be galvanized comprising 4.0 mm dia. steel wire 7 strands with ultimate tensile strength of 101 KN to BSS 183 grade 1150.

f) Accessories

The overhead line accessories shall include the following :

- | | |
|--------------------------------|-----------------------------------|
| Drg. No. MEW/OH/016 | Red light reflector |
| Drg. No. MEW/OH/017 (Rev. "A") | Danger plate |
| Drg. No. MEW/OH/018 (Revised) | Number plate |
| Drg. No. MEW/OH/019 | Cable cleat |
| Drg. No. MEW/OH/051 | Stay hook |
| Drg. No. MEW/OH/021 | Pilot plate |
| Drg. No. MEW/OH/022 | Mid span joint for ACSR conductor |
| Drg. No. MEW/OH/051 | Stay hook |
- Pole anti-climbing barbed wire comprising 3 ply 12 SWG galvanized steel wire with 4 point barbs spaced at 8 cm. intervals to BSS 1722.
 - Galvanized mild steel bolts and nuts with threads to BSS 4190 each complete with one full nut, one half lock nut one flat circular washer and one spring washer.
 - Drg. No. MEW/OH023 Rev. "B" - Square curved washer for wood pole.
 - Drg. No. MEW/OH/024 Rev. "A" - Cable support assembly.
 - Drg. NO. MEW/OH/025 - Kicking block.

6.0

SWITCH AND FUSE GEAR

The 33KV and 11KV switch and fuse-gear shall be in accordance with the following drawings and comply with the specification included in the drawings :

- Drg. No. MEW/OH/026 Rev. "A" - 33KV Mast head switchgear with load interrupter complying with OES 18.
- Drg. No. MEW/OH/027 Rev. "A" - 11KV Mast head switchgear with load interrupter complying with OES 17.
- Drg. No. MEW/OH/028 Rev. "A" - 33KV on load vertical mounting disconnecter complying with OES 18.
- Drg. No. MEW/OH/029 Rev. "A" - 11 KV Vertical mounting switch unit complying with OES 17.
- Drg. No. MEW/OH/030 Rev. "A" - 11KV Drop-out fuse unit complying with OES 8.
- Drg. No. MEW/OH/031 Rev. "A" - 11KV O/H line take off from intermediate pole.
- Drg. No. MEW/OH/032 33KV O/H Line take off from intermediate pole.

7.0

LIGHTNING ARRESTORS

33KV and 11KV Lightning Arrestors shall be station type complying with OES 9 and OEW 10 - 33 KV units suitable for system with neutral grounded through 12.5 ohms resistance and 11KV units for effectively grounded system. Creepage over porcelain will be 400mm per K V Lightning arrestors shall be of MEW approved make installed as per Drg. No. MEW/OH-GA/30.

8.0

CABLE TERMINATIONS

Cable terminations on poles shall be heat shrink dry type and exposed termination core insulation shall be protected against ultraviolet radiation by approved means.

9.0

GENERAL REQUIREMENTS APPLICABLE TO 33KV AND 11KV OVERHEAD LINES

9.1

LINE DESIGN PARAMETERS

- a) Wind load on poles and conductors : 99.2 Kgs/Sq.m.
- b) Temperature range :
 - Minimum temperature : 5 Deg. C
 - Maximum temperature : 85 Deg. C

c) Conductor Tension

Factor of safety at final maximum tension with maximum wind load at 5 Deg. C based on ultimate breaking strength : 4.

Minimum factor of safety in still air at final tension in every day temperature of 30 Deg. C based on ultimate breaking strength : 6.

d) Normal Span

Nominal span based on factor of safety of 2.5 for medium wood pole 11 metre :

-	ACSR 200 sq.mm (PANTHER)	70 Metres
-	ACSR 150 sq.mm (WOLF)	80 Metres
-	ACSR 100 sq.mm (DOG)	90 Metres

e) Normal Section

Normal section length
(distance between two section poles) 2 KM

f) Normal sectionalising length
(with load break switch) 5KM

g) Conductor Ground Clearance

Normal ground not accessible to vehicles 7 Mtrs.
Ground clearance in road crossings 10 Mtrs.

9.2 STRINGING SAGS AND TENSIONS

Stringing sags and tensions shall be as per charts MEW/OH/033, MEW/OH/034, MEW/OH/035 and Tables MEW/OH/036, MEW/OH/037 and MEW/OH/038.

9.3 CLEARANCES BETWEEN OVERHEAD LINES - 132KV, 33KV, 11KV & L.T.

The following minimum horizontal and vertical clearances shall be generally adopted between overhead lines.

1) Vertical Clearance (in Meters)

<u>Voltage Level</u>	<u>33KV</u>	<u>11KV</u>	<u>L.T.</u>
132KV	3.0	3.0	3.0
33KV	2.5	2.5	2.5
11KV	2.5	2.5	1.8
L.T.	1.8	1.8	1.0

2) Horizontal Clearance Minimum (in Meters)

<u>Voltage Level</u>	<u>132KV</u>	<u>33KV</u>	<u>11KV</u>	<u>L.T.</u>
132KV	15	15	15	15
33KV	15	10	10	10
11KV	15	10	8	8
L.T.	15	10	8	4

Note

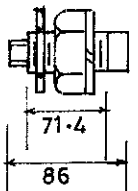
Where space restriction is encountered, depending upon site conditions, Engineer shall decide the clearance less than above, but as close to the above Standard.

9.4

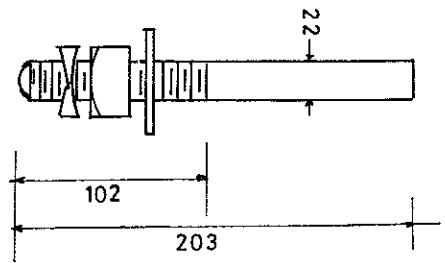
GENERAL ARRANGEMENT DRAWINGS

The assembly and erection of poles shall be in accordance with the following general arrangement drawings :

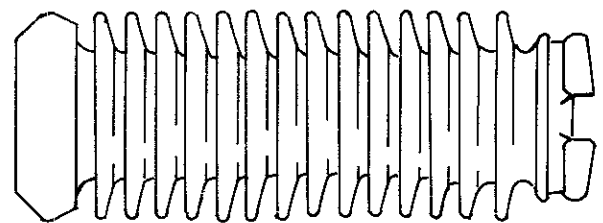
- Drg. No. MEW/OH-GA/01 Rev. "A" - General arrangement and fabrication of intermediate line pole - 33KV.
- Drg. No. MEW/OH-GA/02 Rev. "B" - 33KV single circuit section pole.
- Drg. No. MEW/OH-GA/03 (Revised) - 33KV single circuit terminal and angle double pole.
- Drg. No. MEW/OH-GA/05 (Revised) 33KV double circuit intermediate pole.
- Drg. No. MEW/OH-GA/06 Rev. "C" - 33KV double circuit "H" section pole.
- Drg. No. MEW/OH-GA/07 Rev. "A" - 11KV single circuit intermediate pole.
- Dr. No. MEW/OH-GA/09 Rev. "A" - 11KV single circuit section pole.
- Drg. No. MEW/OH-GA/10 Rev. "A" - 11KV terminal and angle "H" pole.
- Drg. No. MEW/OH-GA/11 (Revised) Rev. "B" - 11KV terminal pole with pole mounted transformer.
- Drg. No. MEW/OH-GA/12 Rev. "A" - 33KV terminal pole with pole mounted transformer.
- Drg. No. MEW/OH-GA/13 Rev. "A" - Strut stay HV installation.



PIN FOR FIXING ON
SUITABLE M.S. ANGLE



PIN FOR FIXING ON
50 x 50 x 100mm M.S. CHANNEL



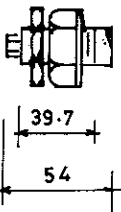
LINE POST INSULATOR

NOTE

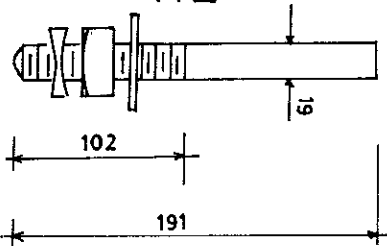
1. To Conform Generally To O.E.S 26 B
2. Creepage Distance. 1320mm Min.
3. Cantilever Strength. 11 kN
4. Glaze. Chocolate
5. All Ferrous Parts Are Hot Dipped Galvanised To B.S. 729 In Accordance With O.E.S.11 Minimum Thickness 127 Microns.
6. All Dimensions Are In Millimeters

MINISTRY OF ELECTRICITY & WATER	
TITLE: 33KV LINE POST INSULATOR	
DRAWN BY FRANCIS	CHECKED BY
APPROVED BY 	
DRG. NO. MEW/OH/001	DATE. 07_10_1985
SCALE N.T.S	

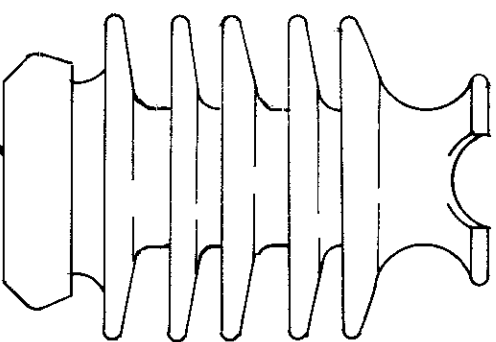
REV	DATE	DESCRIPTION	CKD	APD.
B	12-5-90	Notes added		
A	21-6-89	Check nut added		



PIN FOR FIXING ON
SUITABLE M.S. ANGLE



PIN FOR FIXING ON
M.S. CHANNEL 50x50x100

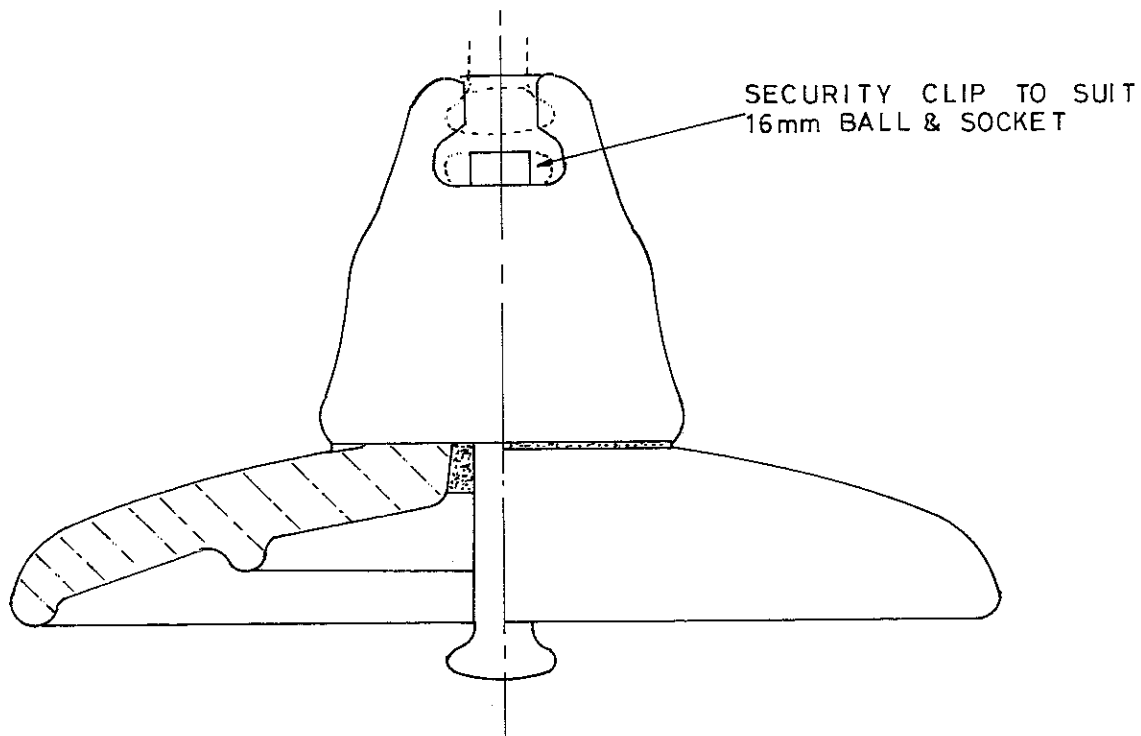


19mm TAPPED HOLE
POST INSULATOR

- NOTE
1. To Conform generally To OES 26 C
 2. Creepage Distance 440mm.Min.
 3. Cantilever Strength 11 KN
 4. Glaze Chocolate.
 5. All Ferrous Parts Are Hot Dipped Galvanised To B.S.729 In Accordance With O.E.S.11. Minimum Thickness of 127 Microns.
 6. All Dimensions Are In Millimeters.

REV	DATE	DESCRIPTION	CKD	APD
B	12-5-90	Notes added	<i>[Signature]</i>	<i>[Signature]</i>
A	21-6-89	Check nut added	<i>[Signature]</i>	<i>[Signature]</i>

MINISTRY OF ELECTRICITY & WATER			
TITLE			
11KV LINE POST INSULATOR			
DRAWN	CHECKED	APPROVED	
FRANCIS	<i>[Signature]</i>	<i>[Signature]</i>	
DRG. N.O.MEW/OH/002		DATE, 09-10-1985	
SCALE		N.T.S.	



SECURITY CLIP TO SUIT
16mm BALL & SOCKET

NOTE

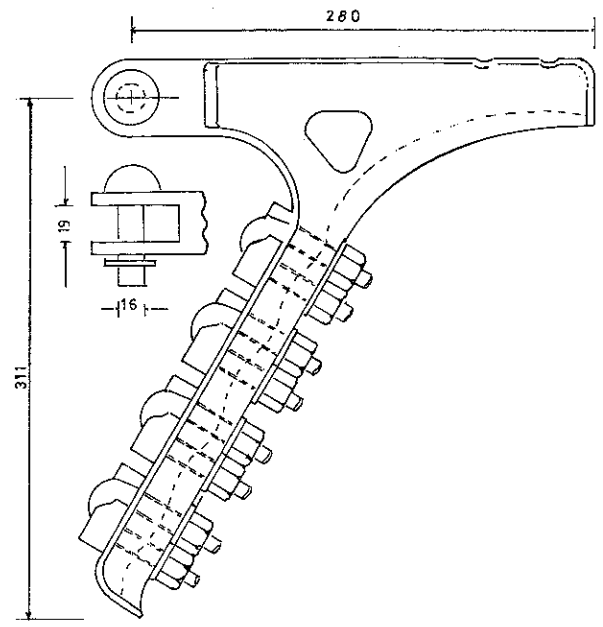
1. To Conform Generally To OES 26A
2. MIN FAILING LOAD = 80 KN
3. TOTAL CREEPAGE = 280mm. MIN.
4. Insulator to be of aero dynamic open profile self cleaning type
5. All ferrous parts to be galvanised to BS 729 in accordance with OES 11
Minimum thickness of 127microns

DISC INSULATOR
AERO DYNAMIC

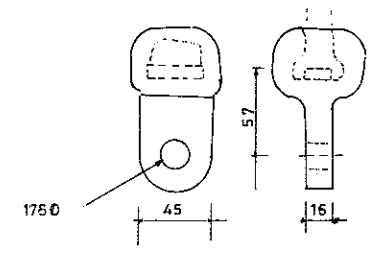
MINISTRY OF ELECTRICITY & WATER		
TITLE		
33/11KV TENSION INSULATOR		
DRAWN BY	CHECKED BY	APPROVED BY
FRANCIS	<i>[Signature]</i>	<i>[Signature]</i>
DRG.NO. MEW/OH/003		DATE : 07.10.1985
SCALE		N. T. S.

REV	DATE	DESCRIPTION	CKD	APD
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A	21-6-89	Notes added	<i>[Signature]</i>	<i>[Signature]</i>

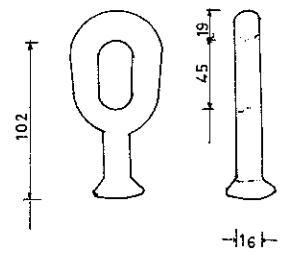
A
TENSION CLAMP BOLTED TYPE



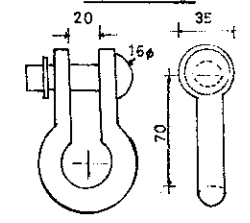
B
CONNECTOR



C
BALL EYE



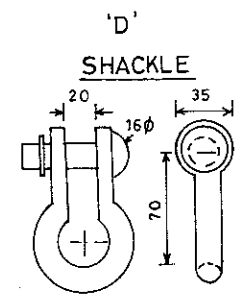
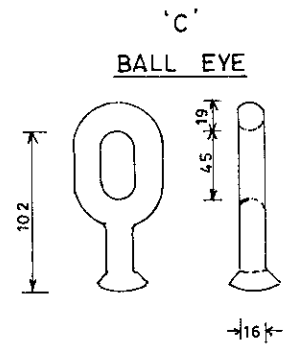
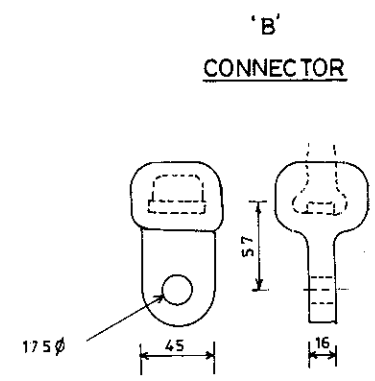
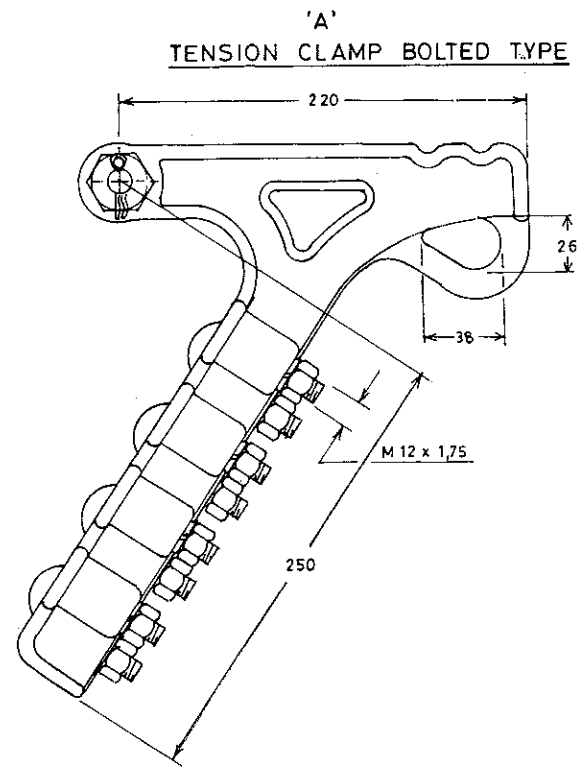
D
SHACKLE



NOTE

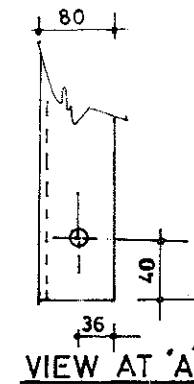
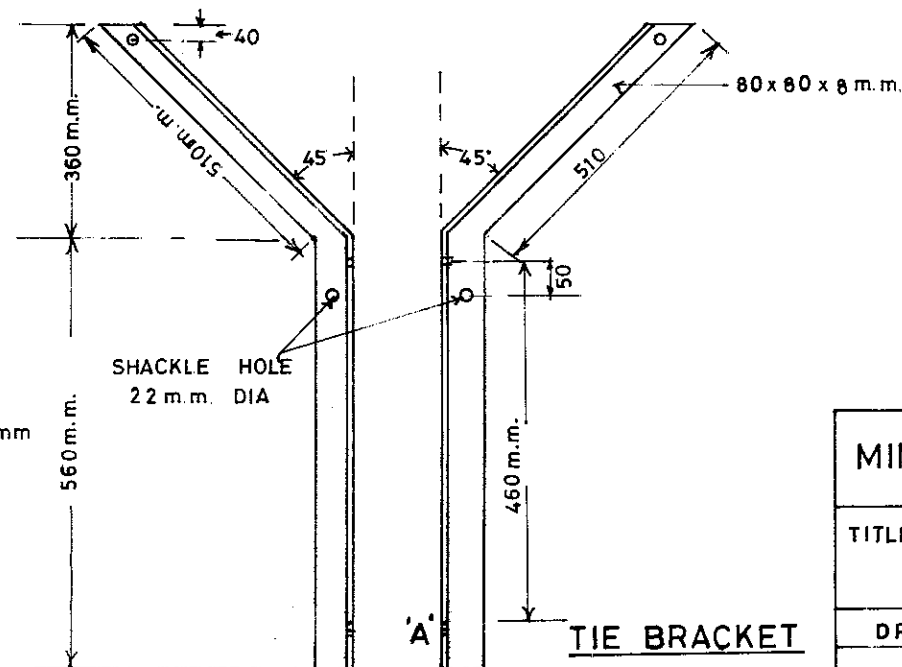
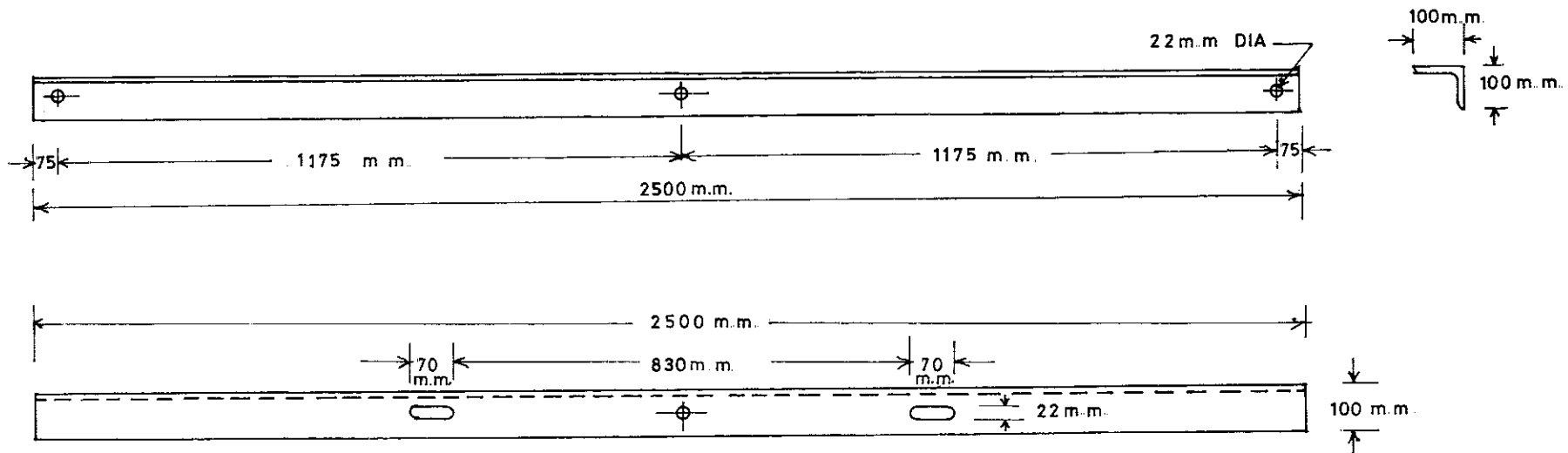
- 1a Four bolt tension clamp of galvanised malleable iron with aluminium liners/ aluminium alloy for conductors up to and including 200sq m m nominal aluminium section steel cored aluminium conductor (PANTHER) minimum failing load 80 KN complete with U bolts&nuts as per 'A'
- 2 Connector of galvanised malleable iron minimum failing load 80KN to B
- 3 Ball eye of galvanised malleable iron minimum failing load 80 KN to C
- 4 Shackle of galvanised malleable iron minimum failing load 80KN to D'
- 5 All dimensions are in millimeters
- 6 Galvanising of ferrous parts shall be in accordance with OES 11 to BS 729-127 micron minimum zinc thickness

		DRG. TITLE AMENDED		
A	28/1/89	ITEM 1A AMENDED		
		" 1B DELETED		
		" 6 ADDED		
REV	DATE	DESCRIPTION	CKD.	APPD.
MINISTRY OF ELECTRICITY & WATER				
TITLE				
TENSION SET HARDWARE ALTERNATIVE I				
DRAWN BY		CHECKED BY	APPROVED BY	
FRANCIS		<i>[Signature]</i>	<i>[Signature]</i>	
DRG.NO. MEW/OH/004			DATE . 08.10.1985	



1. FOURBOLT TENSION CLAMP OF GALVANISED MALLEABLE IRON WITH ALUMINIUM LINERS/ALUMINIUM ALLOY FOR CONDUCTORS UP TO AND INCLUDING 200 sq.m.m. NOMINAL ALUMINIUM SECTION STEEL CORED ALUMINIUM CONDUCTOR (PANTHER) MINIMUM FAILING LOAD 80KN COMPLETE WITH 'U' BOLTS&NUTS TO 'A'
2. CONNECTOR OF GALVANISED MALLEABLE IRON MINIMUM FAILING LOAD 80KN TO 'B'
3. BALL EYE OF GALVANISED MALLEABLE IRON MINIMUM FAILING LOAD 80KN TO 'C'
4. SHACKLE OF GALVANISED MALLEABLE IRON MINIMUM FAILING LOAD 80KN TO 'D'
5. ALL DIMENSIONS ARE IN MILLIMETERS
6. GALVANISING OF FERROUS PARTS SHALL BE IN ACCORDANCE WITH OES 11 TO BS 729-127 MICRON MINIMUM ZINC THICKNESS

MINISTRY OF ELECTRICITY & WATER		
TITLE: TENSION SET HARDWARE ALTERNATIVE II		
DRAWN BY JOSE	CHECKED BY <i>[Signature]</i>	APPROVED BY <i>[Signature]</i>
SCALE - N T.S.		DATE - 08-10-85
DRAWING NO. M E W / O H / 004 A		

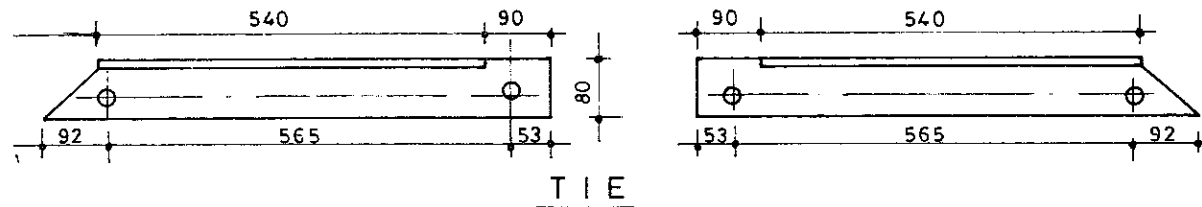
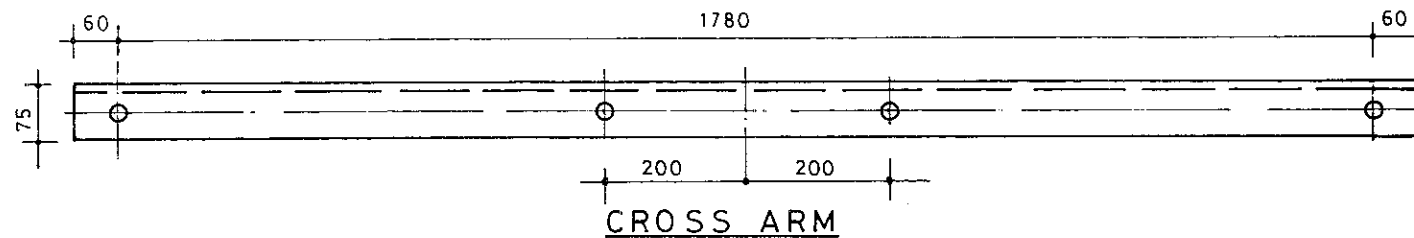
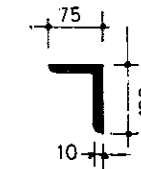
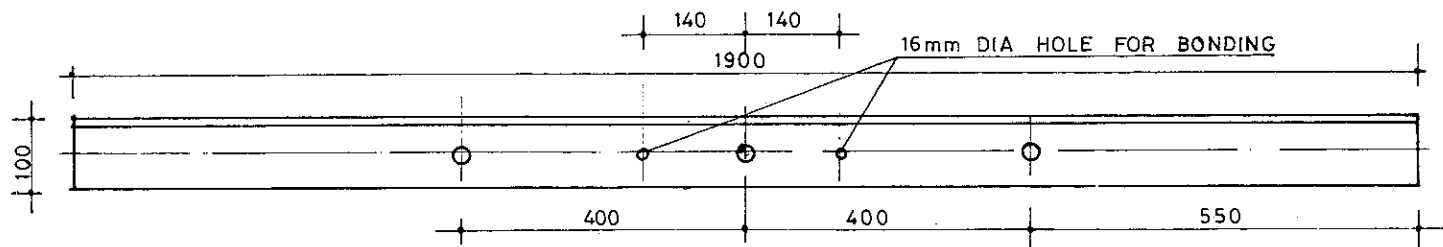


NOTE

1. ALL DIMENSIONS IN m.m.
2. CROSS ARM M.S. ANGLE 100 x 100 x 10mm AS PER B.S 4848 PART. 4
3. TIE BRACKET M.S. ANGLE 80 x 80 x 8 m.m. AS PER B.S. 4848 PART. 4
4. GALVANISED AS PER B.S 729 MINIMUM THICKNESS 127 MICRONS
5. ALL HOLES OF 22 m.m. DIA.

MINISTRY OF ELECTRICITY & WATER		
TITLE 33 K.V. INTERMEDIATE CROSS ARM AND TIE BRACKET		
DRAWN BY	CHECKED	APPROVED
JOSE		
DRG. NO. MEW/OH/005		DATE 19-12-1984
DATE 15-10-1989		REVISION - A

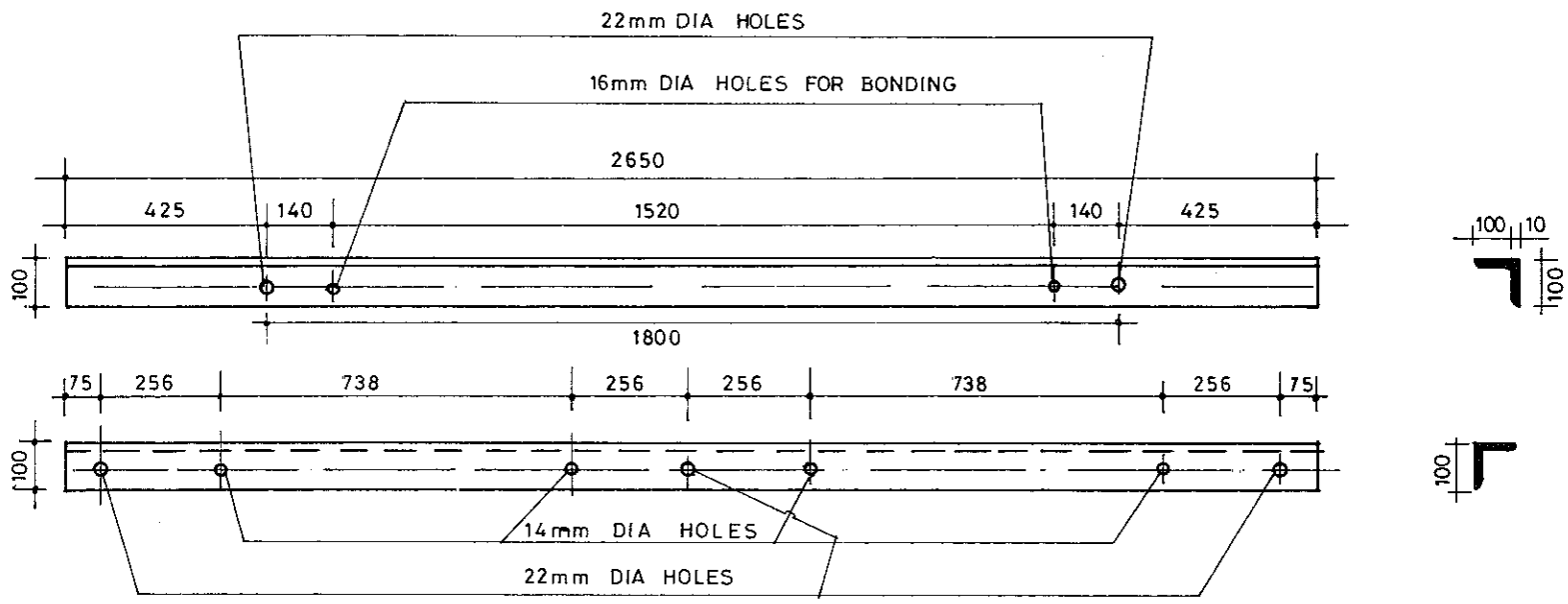
B	12 5 90			NOTES ADDED
A	15 10 89			DIMENSION CHANGED
REV	DATE	APD	CKD	DES.



NOTE

- 1 All dimensions in mm
- 2 Cross arm. 30 Ton m.s angle 100x75x10mm as per BS 4848 part 4
- 3 Tie m.s angle 80x80x8mm as per BS 4848 part 4
- 4 Galvanised to BS 729 in accordance with OES 11 minimum thickness 127 microns
- 5 All holes 22mm dia except shown otherwise

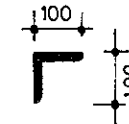
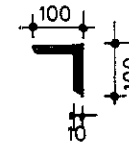
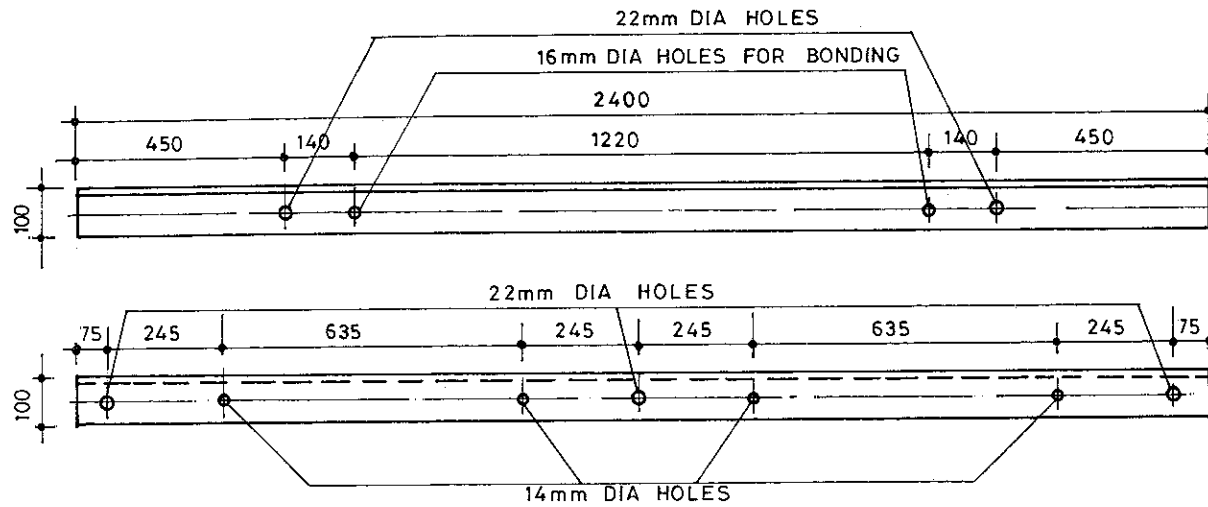
MINISTRY OF ELECTRICITY & WATER		
TITLE SINGLE POLE INTERMEDIATE CROSS ARM AND TIE - 11 KV		
DRAWN FRANCIS	CHECKED 	APPROVED
DRAWING NO: MEW/OH/006 REVISED		
SCALE : N.T.S.	DATE : 22-06-1989	



NOTE -

- 1 All dimensions in mm
- 2 Cross arm 30 Ton m s angle 100x100x10mm BS 4848 part 4
- 3 Galvanised to BS 729 in accordance with OES 11. Minimum thickness 127 microns

MINISTRY OF ELECTRICITY & WATER		
TITLE 33KV 'H' POLE SECTION / 'H' TERMINAL CROSS ARM		
DRAWN FRANCIS	CHECKED <i>[Signature]</i>	APPROVED <i>[Signature]</i>
DRAWING NO. MEW/OH/007 REVISED.		
SCALE - NTS	DATE - 24-06-1989	



NOTE:

- 1 All dimensions in mm
- 2 Cross arm 30 Ton m s angle 100x100x10mm BS.4848 part 4
- 3 Galvanised to BS 729 in accordance with OES 11 Minimum thickness 127 microns

MINISTRY OF ELECTRICITY & WATER

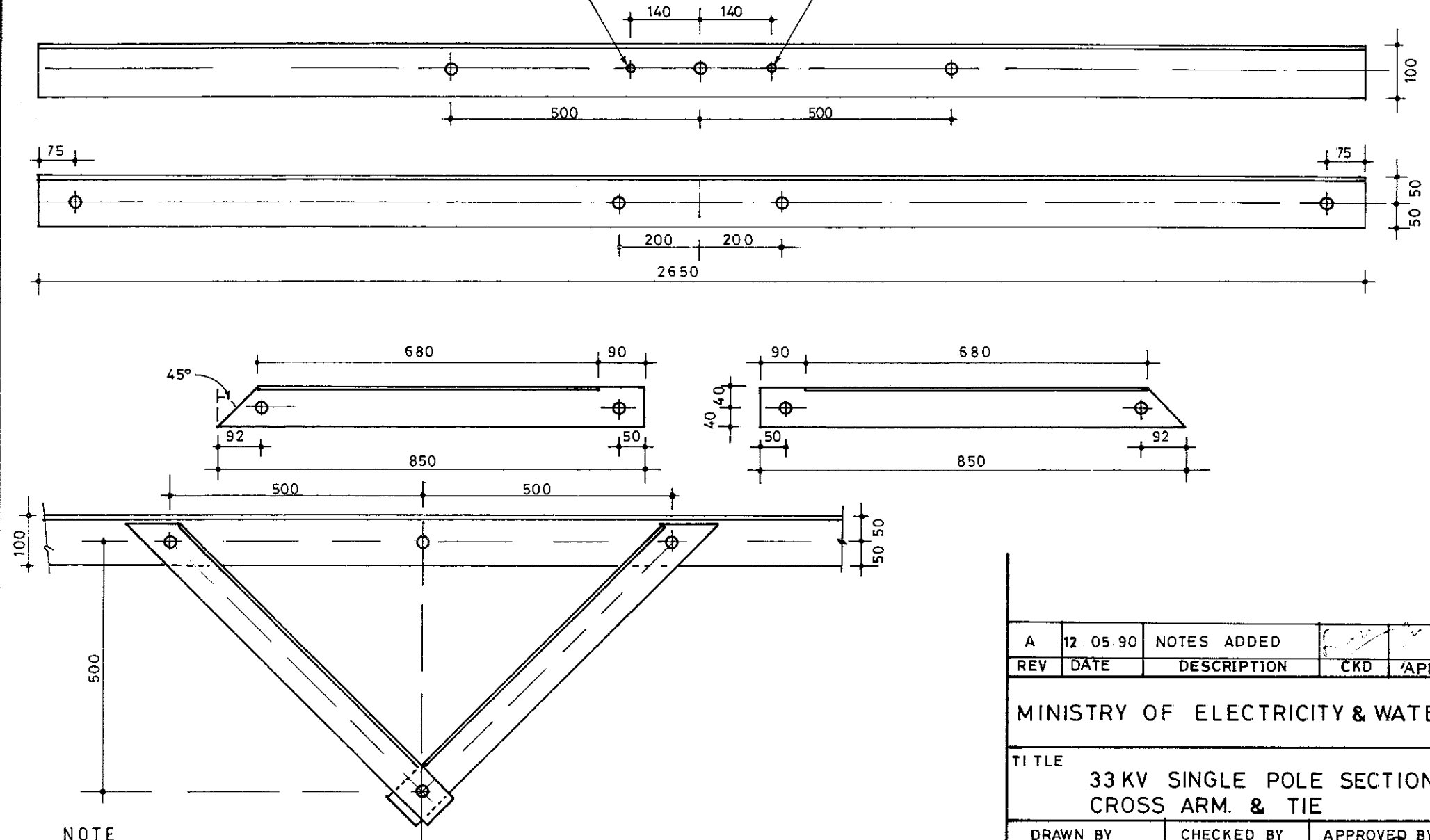
TITLE:
11KV H POLE SECTION /
H TERMINAL CROSS ARM

DRAWN	CHECKED	APPROVED
FRANCIS	<i>[Signature]</i>	<i>[Signature]</i>

DRAWING NO: MEW / OH / 008. REVISED.

SCALE	NTS	DATE	25 - 06 - 1989
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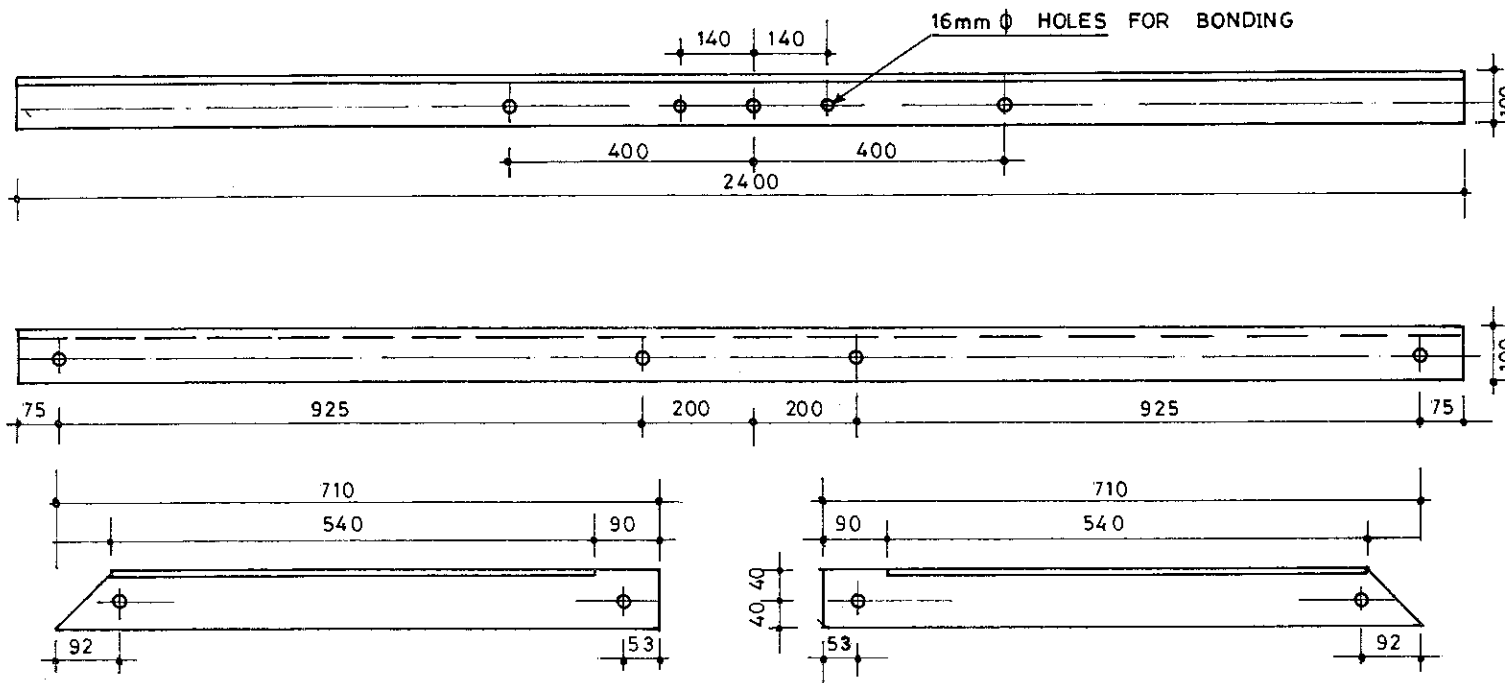
16mm DIA HOLES FOR BONDING



NOTE

- 1 CROSS ARM 100x100x10 AS PER B S 4848 PT 4
- 2 GALVANISED TO B.S 729 IN ACCORDANCE WITH OES 11 MINIMUM THICKNESS 127 MICRONS
- 3 ALL HOLES OF 22mm DIA EXCEPT THOSE SHOWN OTHERWISE
- 4 TIE 80x80x8 AS PER B S 4848 PT.4
- 5 ALL DIMENSIONS IN MILLIMETERS.

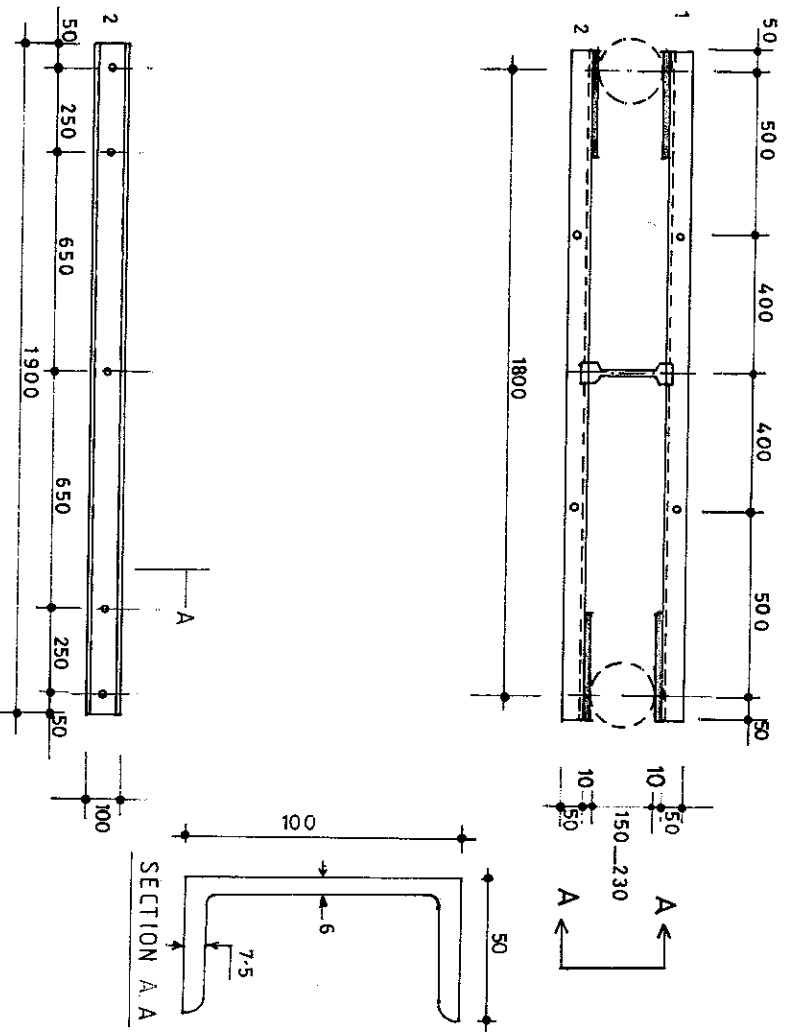
A	12.05.90	NOTES ADDED		
REV	DATE	DESCRIPTION	CKD	/APD
MINISTRY OF ELECTRICITY & WATER				
TITLE 33 KV SINGLE POLE SECTION CROSS ARM. & TIE				
DRAWN BY FRANCIS		CHECKED BY <i>[Signature]</i>	APPROVED BY <i>[Signature]</i>	
DRG NO. MEW / OH / 009			REVISED	
SCALE - 1 : 1000			DATE : 25 - 06 - 1989	



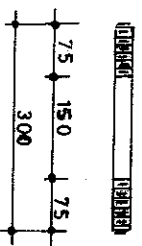
NOTE:

- 1 CROSS ARM 100x100x10mm AS PER BS 4848 PT 4
- 2 GALVANISED TO BS 729 IN ACCORDANCE WITH O.E.S 11 MINIMUM THICKNESS 127 MICRONS
- 3 ALL HOLES 22mm DIA EXCEPT THOSE SHOWN OTHERWISE
- 4 TIE 80x80x8mm AS PER BS 4848 PT 4
- 5 ALL DIMENSIONS IN MILLIMETRES

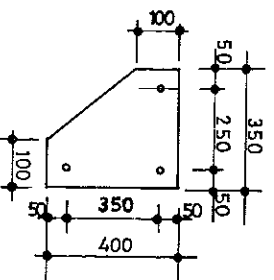
A	12.05.90	NOTES ADDED		
REV	DATE	DESCRIPTION	CKD	APD
MINISTRY OF ELECTRICITY & WATER				
TITLE 11 KV SINGLE POLE SECTION CROSS ARM. & TIE				
DRAWN FRANCIS		CHECKED	APPROVED <i>[Signature]</i>	
DRAWING NO: MEW/OH/010 REVISED.				
SCALE: NTS			DATE: 25-06-1989	



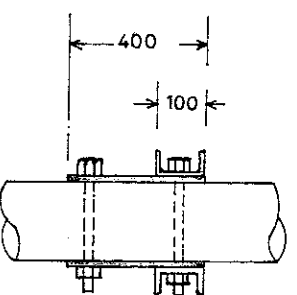
TRANSFORMER CROSSARM



M.S. BOLT



GUSSET PLATE



SIDE VIEW A A

NOTE:

1. ALL DIMENSIONS IN mm
2. CROSSARM. 30TON QUALITY M.S. CHANNEL 100x 50x 7.5mm AS PER B.S. 4848 PART III
3. GUSSET PLATE. 10mm THICK M.S. GUSSET PLATE AS PER B.S. 1499.
4. GALVANISED TO B.S. 729 IN ACCORDANCE WITH O.E.S.11 MINIMUM THICKNESS 127 MICRONS.
5. 19mm DIA M.S. BOLT WITH NUT & WASHERS
6. ALL HOLES ARE OF 22mm DIA

TITLE
TRANSFORMER CROSSARM & GUSSET PLATE

MINISTRY OF ELECTRICITY & WATER

REV.	DATE	DESCRIPTION	CKD	APD
A	10/11/92	Section added	<i>[Signature]</i>	

DRAWN BY

RA. QURESHI

CHECKED BY

[Signature]

APPROVED BY

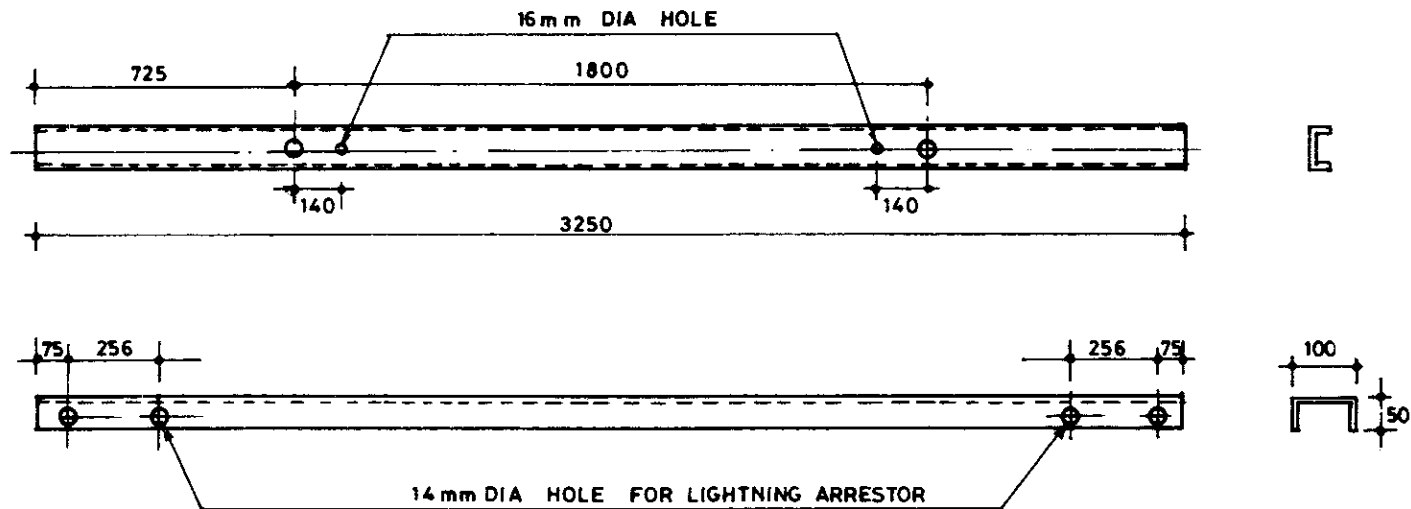
[Signature]

DRG. NO. MEW/OH/011

DATE

17/12/1984

SCALE



NOTE :

- 1 : CROSS ARM CHANNEL 100 x 50 x 10mm AS PER B.S 4848.
- 2 : GALVANISED TO B.S.729 IN ACCORDANCE WITH O.E.S.11 MINIMUM THICKNESS 127 MICRONS
- 3 : ALL HOLES OF 22mm DIA EXCEPT WHERE SHOWN OTHERWISE.

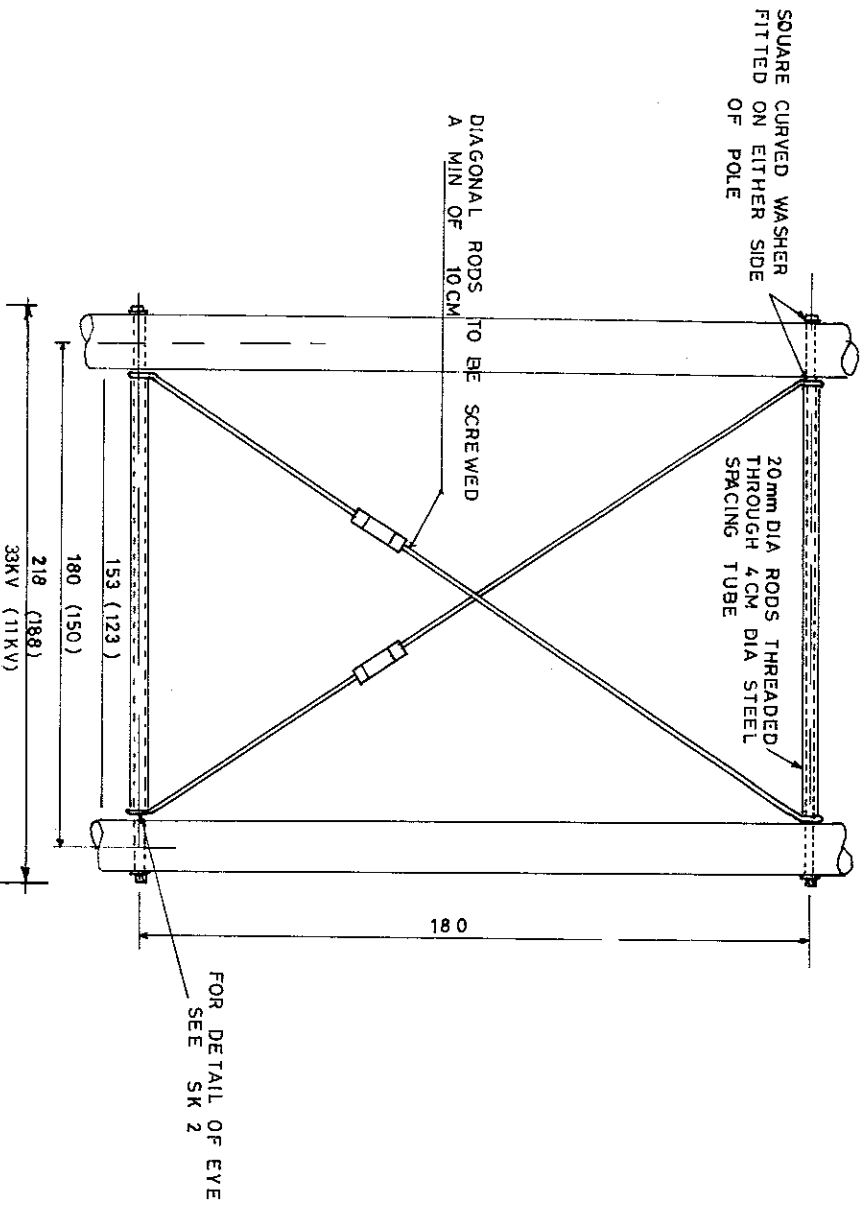
SULTANATE OF OMAN
MINISTRY OF ELECTRICITY & WATER

33KV DOUBLE CIRCUIT POLE
CROSS ARM ('H' POLE)

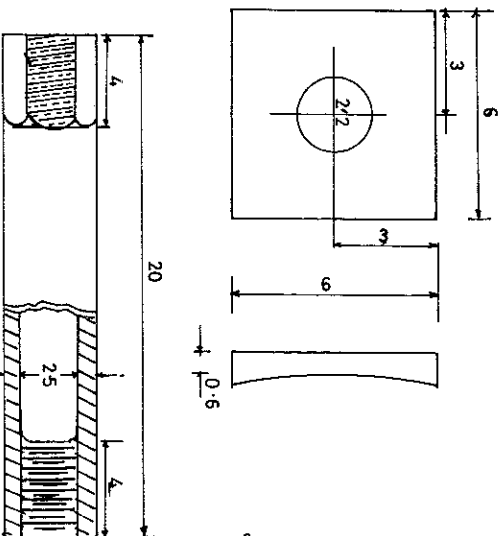
DRAWN	CHECKED	APPROVED
FRANCIS	<i>[Signature]</i>	<i>[Signature]</i>

DRAWING NO: MEW / OH / 012 REVISED.

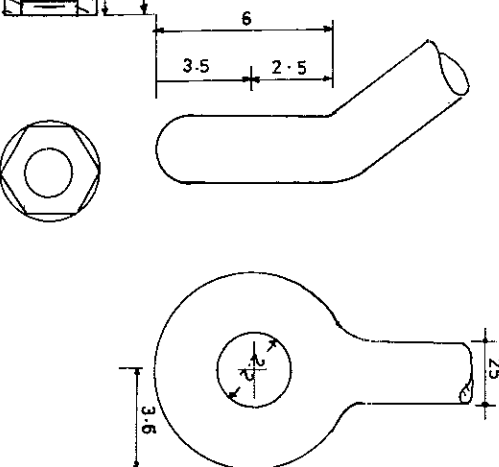
SCALE: NTS DATE: 31 - 07 - 1989



SQUARE CURVED WASHER
(MILD STEEL OR MALL CAST IRON)
SK. 1



DROP FORGED M.S. EYE
SK. 2

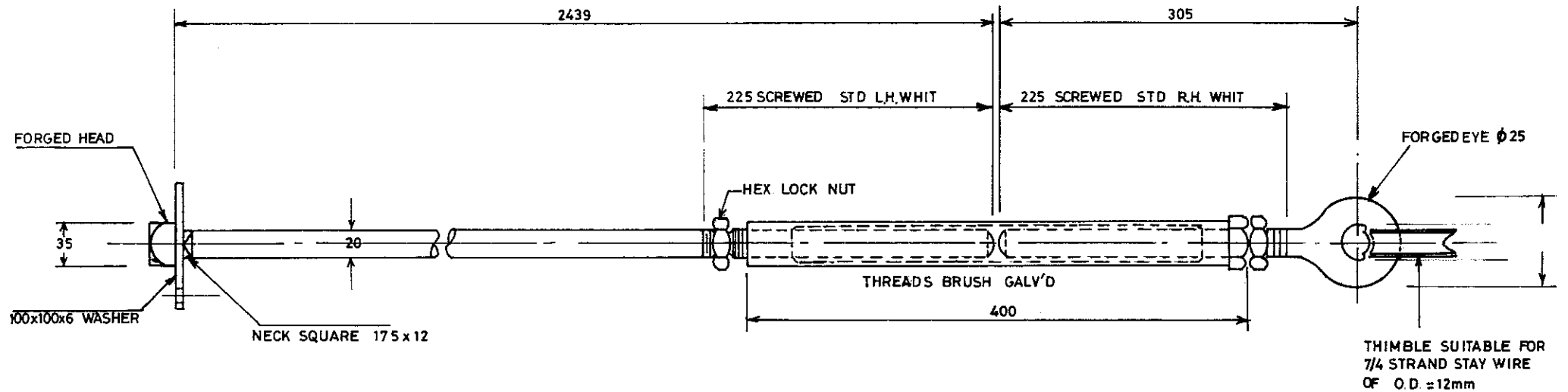


TUBULAR HEXAGON ENDED TURNBUCKLE
(TENSILE STRENGTH MUST BE THE SAME AS ROD)

NOTE

TRUSSING TACKLE TO BE SUPPLIED COMPLETE WITH NUTS AND WASHERS AS SHOWN
ALL TO BE GALVANISED TO B.S.S.729
GALVANISED TO B.S.729 IN ACCORDANCE WITH OES II MINIMUM THICKNESS 127 MICRONS.
ALL DIMENSIONS IN CENTIMETERS.

A		02/8/89	DETAILS ADDED	<i>[Signature]</i>	CKD	<i>[Signature]</i>	APD																																								
REV	DATE		DESCRIPTION																																												
<table border="1"> <tr> <td colspan="4">TITLE</td> <td colspan="4">MINISTRY OF ELECTRICITY & WATER</td> </tr> <tr> <td colspan="4">TRUSSING TACKLE</td> <td colspan="4"></td> </tr> <tr> <td colspan="2">DRAWN BY</td> <td colspan="2">CHECKED BY</td> <td colspan="2">APPROVED BY</td> <td colspan="2"></td> </tr> <tr> <td colspan="2">FRANCIS</td> <td colspan="2"><i>[Signature]</i></td> <td colspan="2"><i>[Signature]</i></td> <td colspan="2"></td> </tr> <tr> <td colspan="4">DRG. NO: MEW/OH/013</td> <td colspan="4">DATE: 08-10-1985</td> </tr> </table>								TITLE				MINISTRY OF ELECTRICITY & WATER				TRUSSING TACKLE								DRAWN BY		CHECKED BY		APPROVED BY				FRANCIS		<i>[Signature]</i>		<i>[Signature]</i>				DRG. NO: MEW/OH/013				DATE: 08-10-1985			
TITLE				MINISTRY OF ELECTRICITY & WATER																																											
TRUSSING TACKLE																																															
DRAWN BY		CHECKED BY		APPROVED BY																																											
FRANCIS		<i>[Signature]</i>		<i>[Signature]</i>																																											
DRG. NO: MEW/OH/013				DATE: 08-10-1985																																											



NOTE :

1. ALL DIMENSIONS IN mm.
2. STEEL 30 TON QUALITY.- TO BS 4848
3. GALVANISED TO BS 729 MINIMUM THICKNESS OF 127 MICRONS

MINISTRY OF ELECTRICITY & WATER

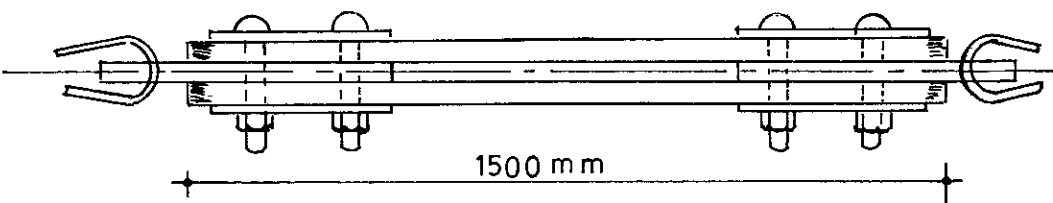
TITLE
STAY SET - 11 KV & 33 KV

DRAWN BY	CHECKED BY	APPROVED BY
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R.A. QURESHI	<i>[Signature]</i>	<i>[Signature]</i>
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DRG. NO. MEW/OH/014	DATE 26/6/85
---------------------	--------------

SCALE N.T.S.



IMPREGNATED LAMINATED WOOD OR
 FIBRE REINFORCED POLYESTER RESIN
 BREAKING STRENGTH=12000kg
 STEEL WORK TO B.S. 1449
 GALVANISING TO B.S. 729 IN ACCORDANCE WITH O.E.S.11
 MINIMUM THICKNESS 127 MICRONS.

MINISTRY OF ELECTRICITY & WATER

TITLE

33KV STAY INSULATOR

DRAWN

CHECKED

APPROVED

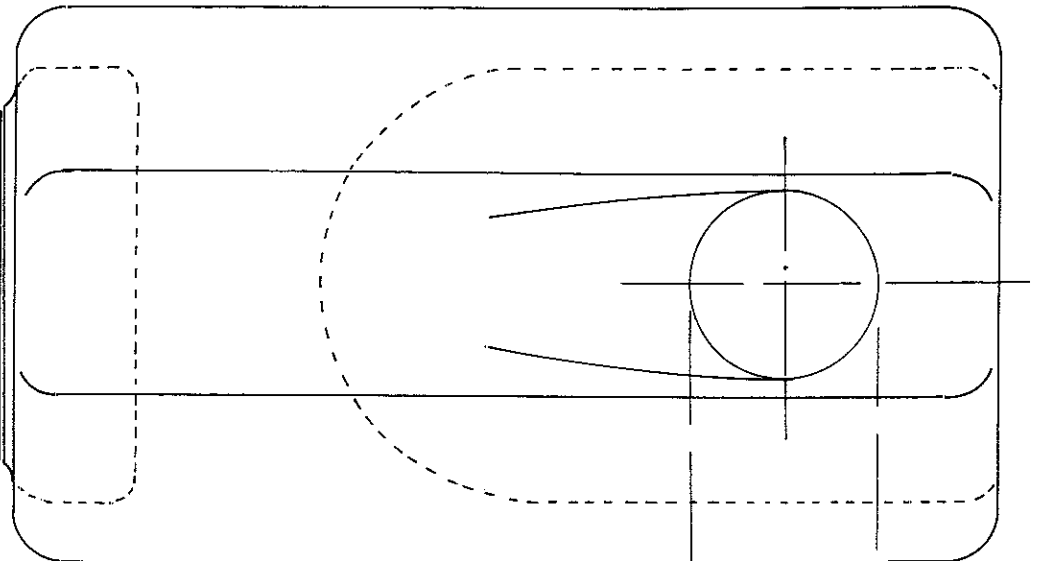
FRANCIS.

[Signature]

[Signature]

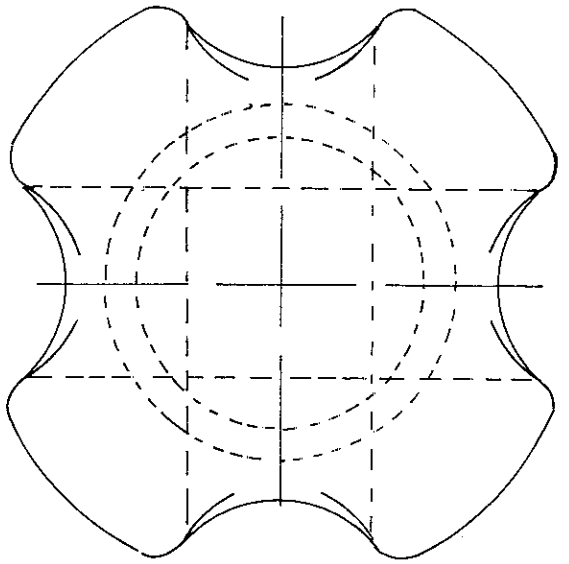
DRG. NO. MEW/OH/015A

DATE. 12.10.1985



25mm

- 1. LEAKAGE DISTANCE 80 mm
- 2. TENSILE STRENGTH 90 KN
- 3. LOW FREQUENCY DRY FLASHOVER .40KV
- 4. LOW FREQUENCY WET FLASHOVER 22 KV
- 5. MATERIAL: BROWN GLAZED PORCELAIN

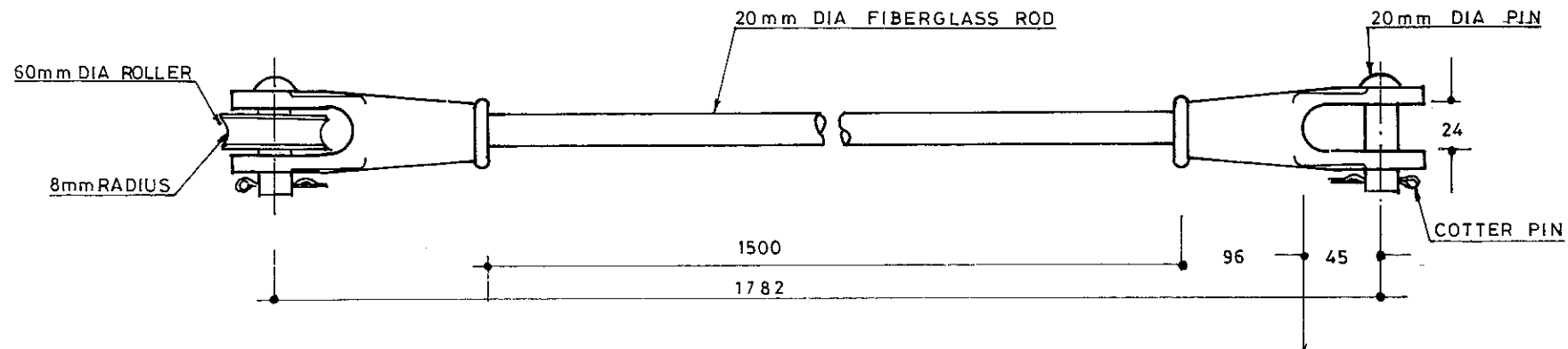


MINISTRY OF ELECTRICITY & WATER

TITLE

11KV STAY INSULATOR

DRAWN	CHECKED	APPROVED
FRANCIS	<i>[Signature]</i>	<i>[Signature]</i>
DRG.NO. MEW/OH/015 B		DATE . 12 . 10 . 1985



NOTE.

- 1 ROD : PULTRUDED SOLID FIBRE GLASS WITH ULTRA-VIOLET PROTECTIVE INHIBITORS.
- 2 COATING : NEMA BLUE - GRAY WITH ULTRA-VIOLET PROTECTIVE INHIBITORS
- 3 CASTING : MALLEABLE CAST IRON GALVANISED TO BS 729 INACCORDANCE WITH OES 11 MINIMUM THICKNESS 127 MICRONS.
- 4 BREAKING STRENGTH : 12000 Kgs
- 5 ALL DIMENSIONS IN MILLIMETRES

MINISTRY OF ELECTRICITY & WATER

TITLE

33 KV STAY INSULATOR
FIBRE GLASS ROD.

DRAWN

FRANCIS

CHECKED

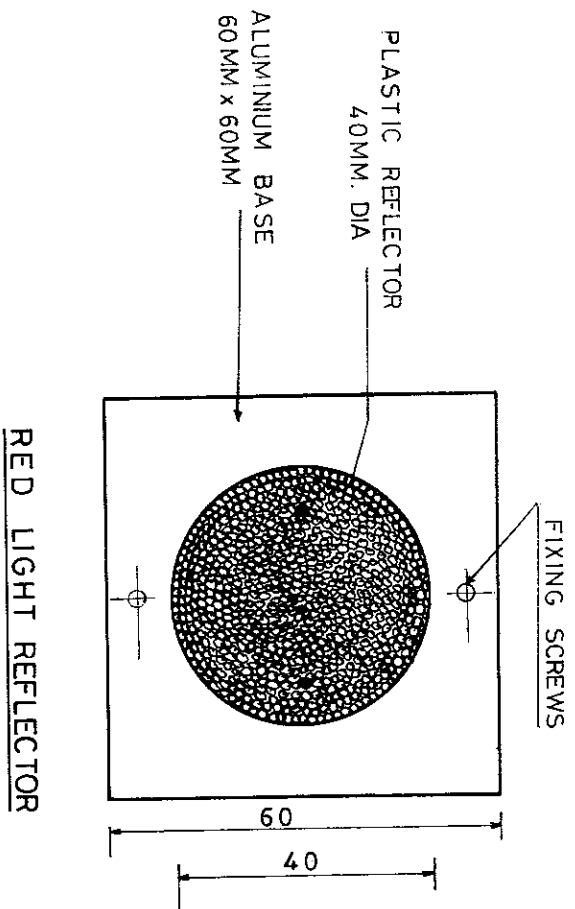
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DRAWING NO: MEW / OH / 015 C.

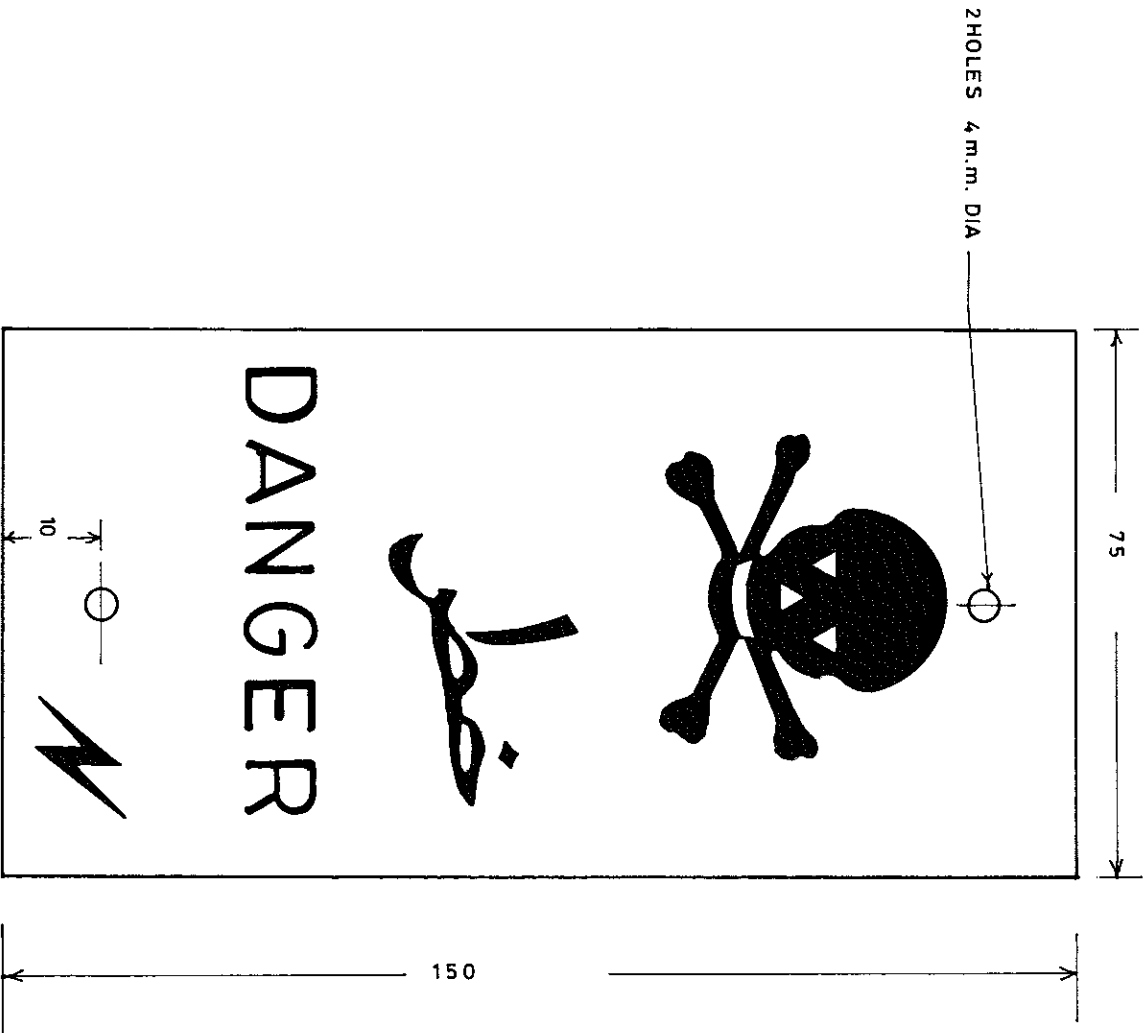
SCALE

N T S

DATE 10 . 07 . 1989



MINISTRY OF ELECTRICITY & WATER			
TITLE			
RED LIGHT REFLECTOR			
DRAWN BY	CHECKED BY	APPROVED BY	
FRANCIS	<i>[Signature]</i>	<i>[Signature]</i>	
DRG. NO. MEW/OH/016	DATE	19. 09. 1985	



NOTE —
 ALL DIMENSIONS IN MILLIMETRE
MATERIAL : ALUMINIUM 2mm THICK SHEET
 PLATE SHALL BE EMBOSSED WITH RED LUMINESCENT LETTERS ON WHITE BACKGROUND.

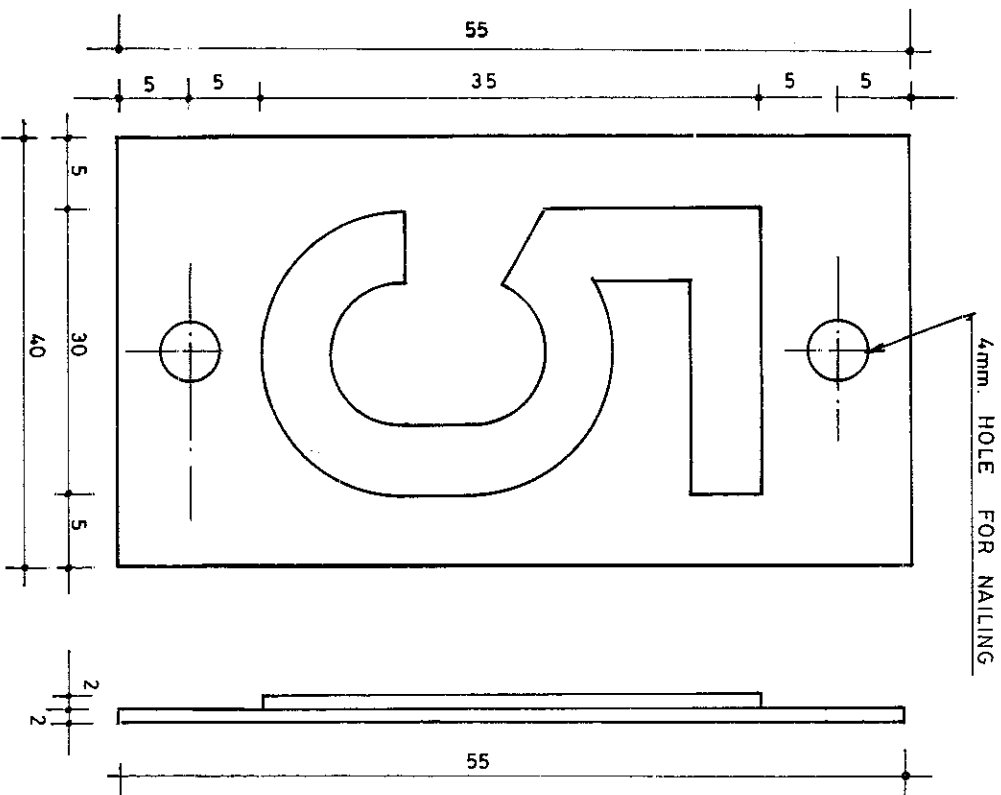
REV.	DATE	DESCRIPTION	CKD	APD
A	04-09-90	Note changed	<i>[Signature]</i>	<i>[Signature]</i>

MINISTRY OF ELECTRICITY & WATER

TITLE
 DANGER PLATE

DRAWN BY	CHECKED	APPROVED
JOS	<i>[Signature]</i>	<i>[Signature]</i>

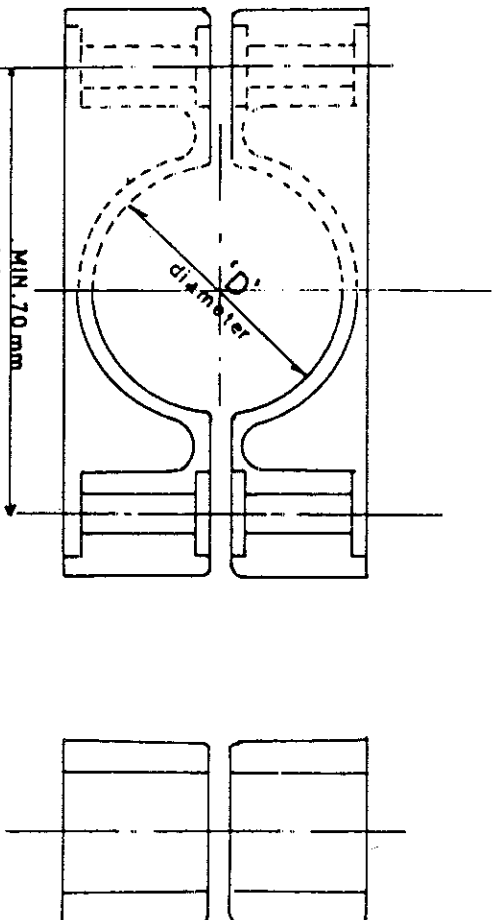
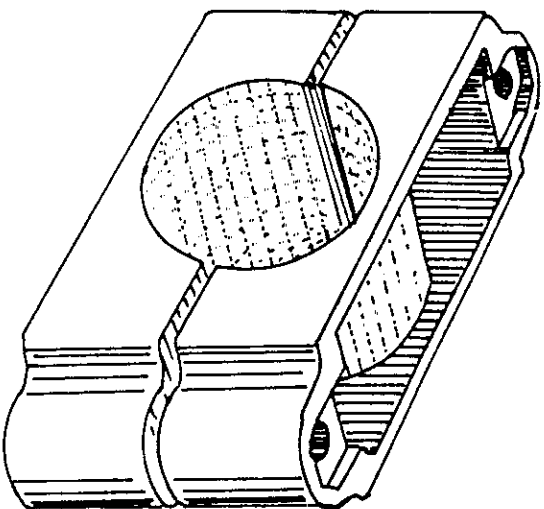
DRG. NO. MEW / OH / 017	DATE	16 / 1 / 1985
SCALE		



NOTE -
 ALL DIMENSIONS IN MILLIMETRE
 MATERIAL ALUMINIUM, 2mm THICK
 PLATE SHALL BE EMBOSSED WITH RED LUMINESCENT
 LETTERS ON WHITE BACKGROUND

SULTANATE OF OMAN
 MINISTRY OF ELECTRICITY AND WATER
 NUMBER PLATE

DRAWN	CHECKED	APPROVED
FRANCIS.	<i>[Signature]</i>	<i>[Signature]</i>
DRAWING NO: MEW / OH / 018 REVISED.		
SCALE	NTS.	DATE 02 - 09 - 1989.



NOTE - INTERNAL DIAMETER 'D' TO SUIT INDIVIDUAL CABLE SIZES.
 MATERIAL - ALUMINIUM ALLOY

VOLTAGE	SIZE OF CABLE	CABLE OVERALL DIAMETER
LV	120 Sq. mm	48 mm
LV	185 Sq. mm	57 mm
LV	240 Sq. mm	64 mm
11 KV	50 Sq. mm	63 mm
11 KV	185 Sq. mm	82 mm
11 KV	245 Sq. mm	86 mm
33KV	50 Sq. mm	86 mm
33KV	300 Sq. mm	118 mm



SULTANATE OF OMAN

MINISTRY OF ELECTRICITY & WATER

TITLE
 SINGLE WAY CABLE CLEAT
 TWO BOLT FIXING

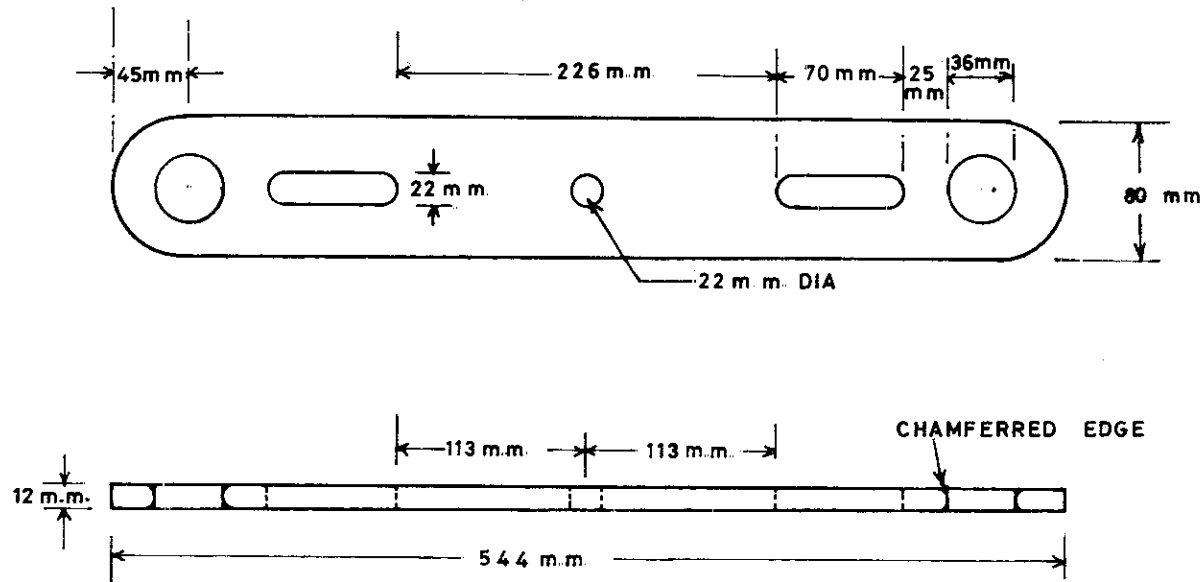
DRAWN
 FRANCIS

CHECKED

APPROVED


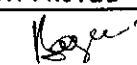
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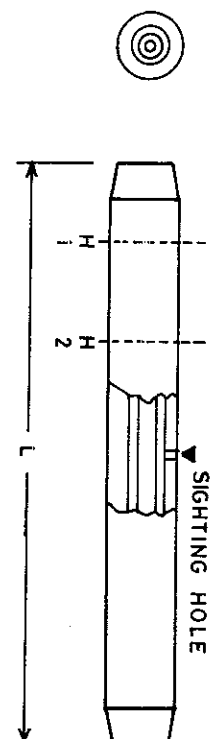
DATE . 09-10-1985



MATERIAL

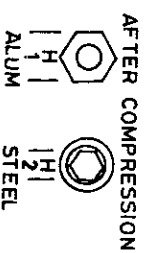
PILOT PLATE - HOT ROLLED STRIP AS PER B.S. 1449
 GALVANISING AS PER B.S. 729 MINIMUM THICKNESS
 OF 127 MICRONS

MINISTRY OF ELECTRICITY & WATER		
TITLE PILOT PLATE FOR H POLE		
DRAWN BY	CHECKED	APPROVED
JOSE		
DRG. NO. MEW/OH/021		
SCALE		



NOTE
 FOR THE JOINTING OF ACSR CONDUCTORS IN MIDSPAN LOCATIONS, THE COMPLETED JOINT SHALL TAKE THE FULL WORKING TENSION OF THE CONDUCTOR FOR ITS EXPECTED LIFE IN SERVICE.

THE BODY IS CONSTRUCTED OF PURE ALUMINIUM TUBE AND THE INTERNAL COMPONENT OF GALVANISED STEEL TUBE. A SIGHTING HOLE IS PROVIDED IN THE BODY FOR ACCURATE LOCATION OF THE INTERNAL COMPONENT.

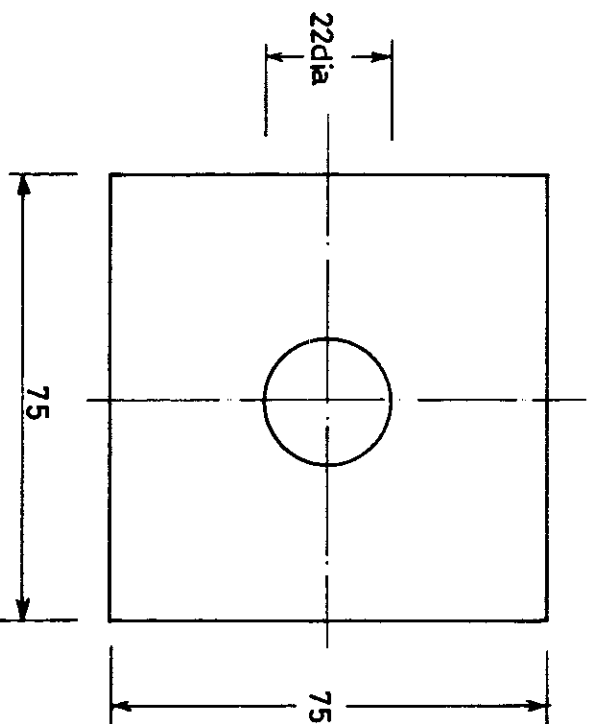
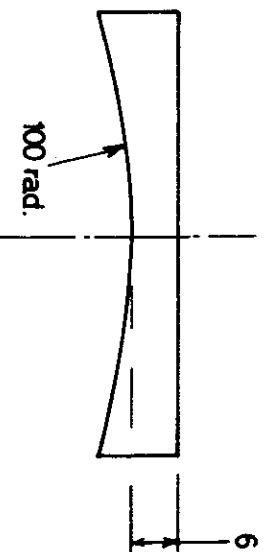


ACSR Conductor		DIMENSIONS (mm)			
Code Name	Stranding		L	H1 Alum	H2 Steel
	Alum	Steel			
DOG	6/4.72	7/1.57	500	24.2	7.6
Wolf	30/2.59	7/2.59	550	28.2	12.7
Panther	30/3.00	7/3.00	600	31.0	13.9

MINISTRY OF ELECTRICITY WATER
 TITLE MID SPAN JOINT
 FOR ACSR CONDUCTOR

DRAWN BY JOSE
 CHECKED [Signature]
 APPROVED [Signature]

DRG. NO. MEW/OH/022 DATE 30/7/1985
 SCALE



MAL. CAST IRON GALVANISED TO B.S.729 IN ACCORDANCE WITH
 O.E.S.11. MINIMUM THICKNESS 127 MICRONS.
 DIMENSIONS IN M.M.

CURVED SQUARE WASHER
SIZE M20.

MINISTRY OF ELECTRICITY & WATER

TITLE
**SQUARE CURVED WASHER
 FOR WOOD POLE**

DRAWN BY
RA. QURESHI

CHECKED BY

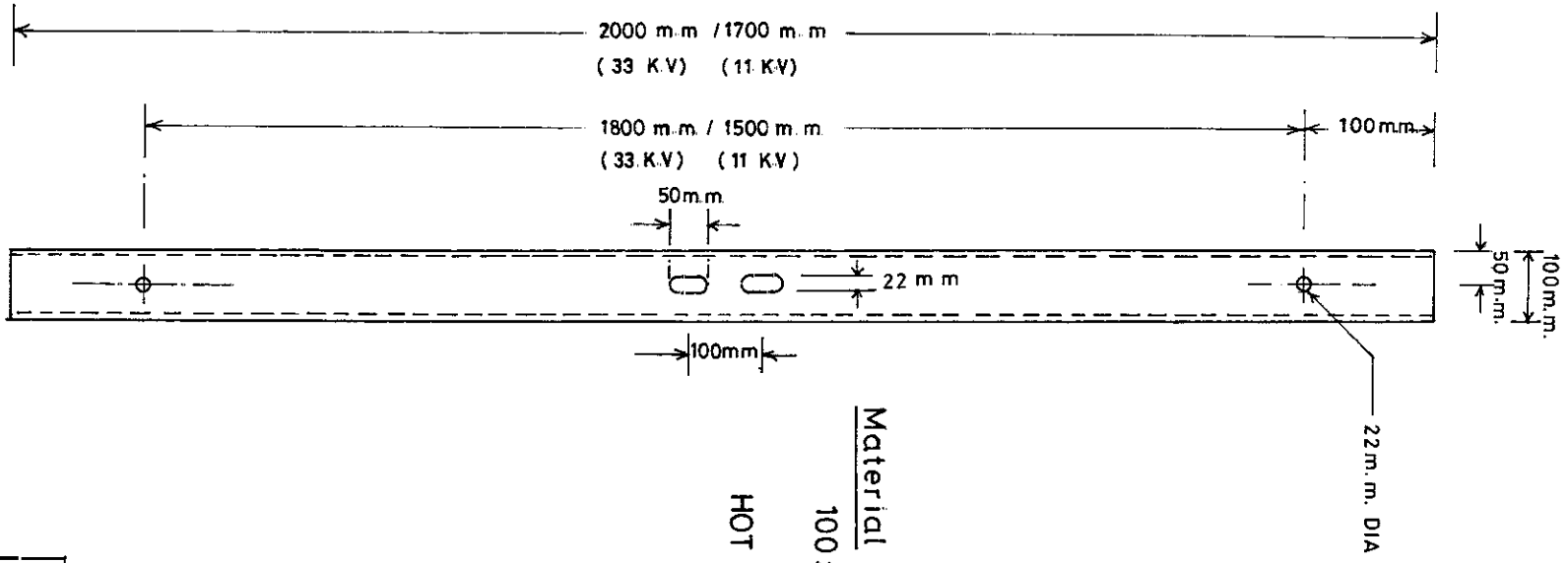
APPROVED BY

DRG. NO. MEW/OH/023

DATE 29/5/1985

SCALE N.T.S.

B	12-5-90	DIMENSION CHANGED	<i>[Signature]</i>		
A	06.08.89	DIMENSIONS CHANGED			
REV	DATE	DESCRIPTION	CKD	APD	



Material
 100 x 50 x 6 R.S.C. AS PER
 B.S. 4848 PART-3
 HOT DIPPED GALVANISED TO B.S. 729
 MINIMUM THICKNESS 127 MICRONS

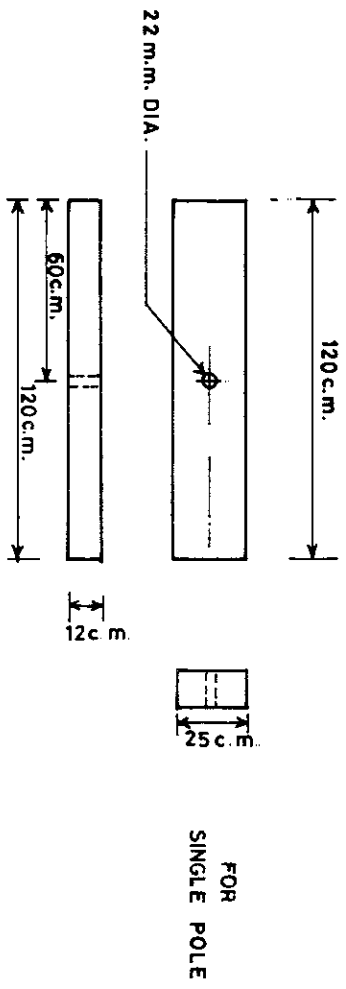
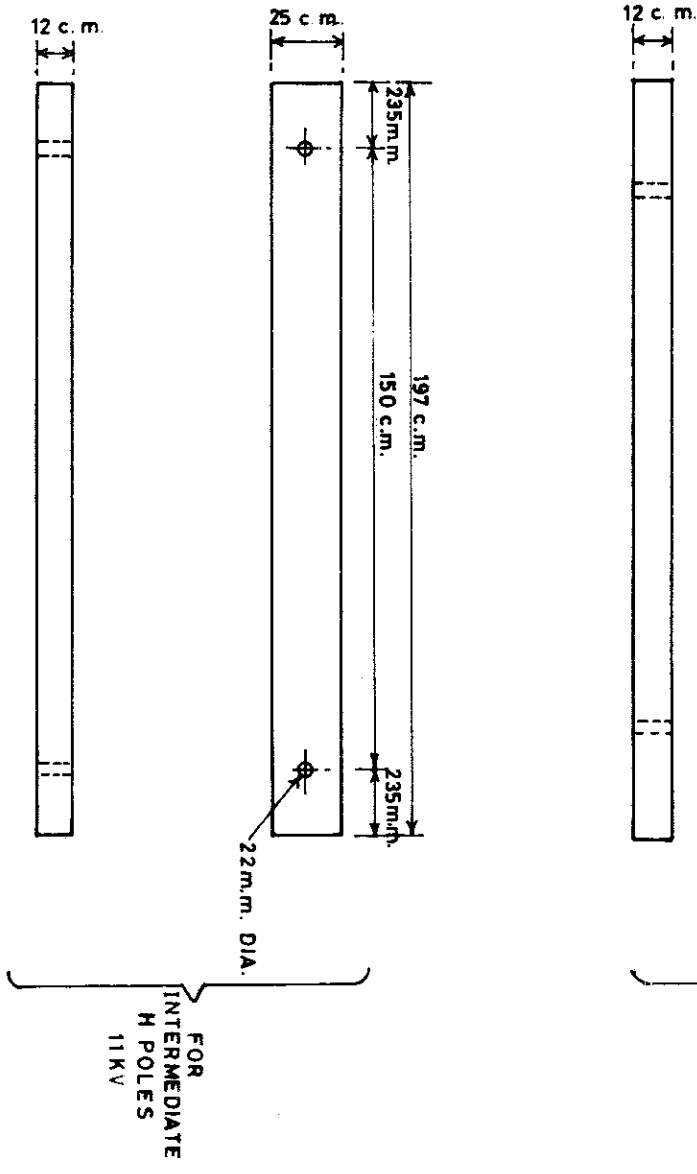
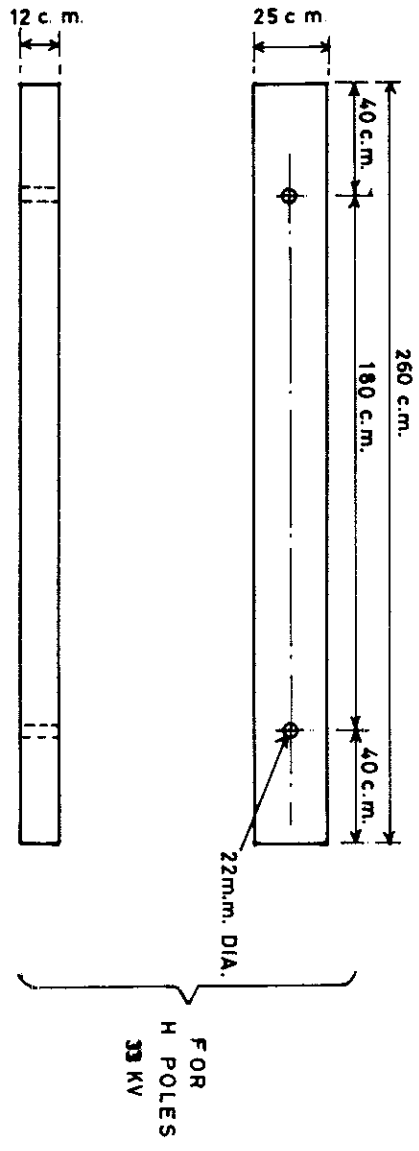
REV	DATE	DESCRIPTION	CKD	APPD
A	12-05-90	DIMENSION AND NOTES ADDED	<i>[Signature]</i>	<i>[Signature]</i>

MINISTRY OF ELECTRICITY WATER

TITLE
 CABLE SUPPORT CHANNEL

DRAWN BY	CHECKED	APPROVED
JOSE	<i>[Signature]</i>	<i>[Signature]</i>

DRG.NO. MEW/OH/024 DATE - 13/12/1984
 SCALE



MATERIAL WOOD. (SAME AS POLE MATERIAL)

MINISTRY OF ELECTRICITY & WATER

TITLE
KICKING BLOCK

DRAWN BY

JOSE

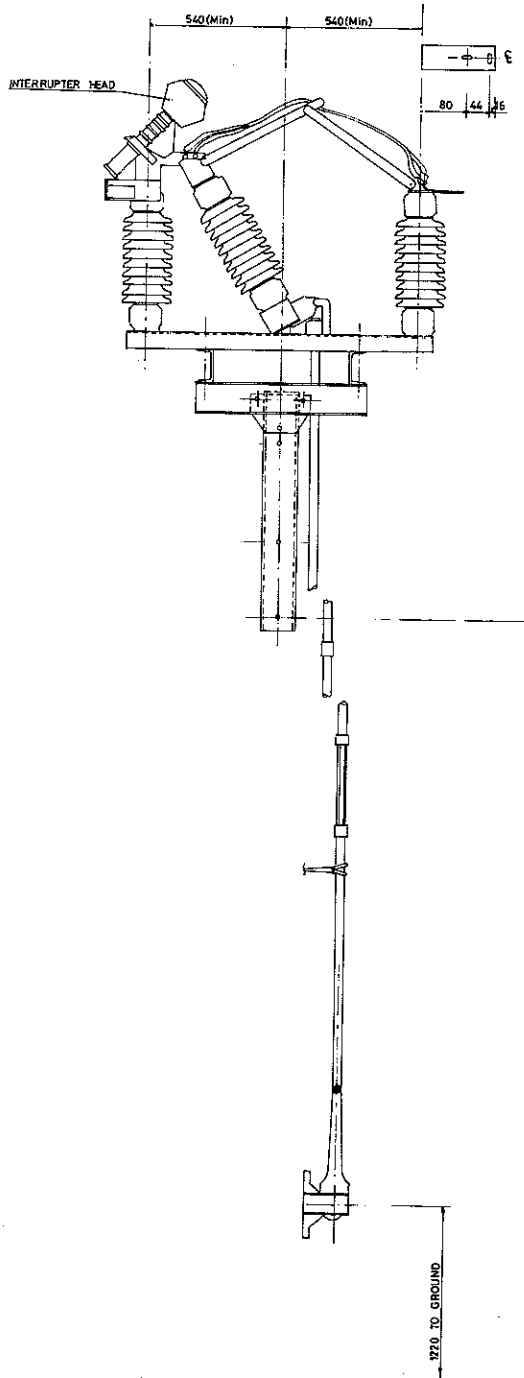
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APPROVED

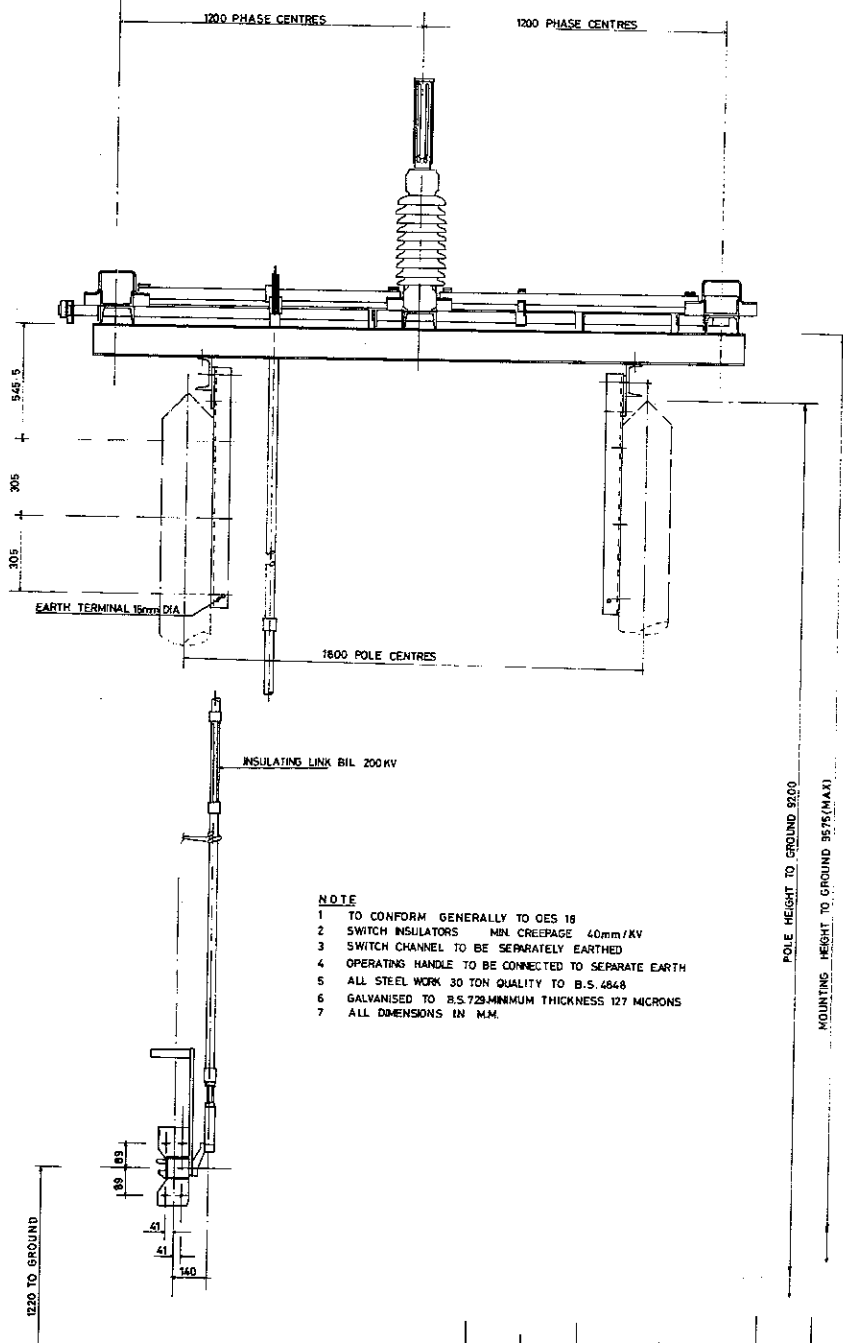
DRG NO. MEW/OH/025

DATE 13/12/1984

SCALE



2 SLOTS 145 x 205 LG



- NOTE**
- 1 TO CONFORM GENERALLY TO GES 18
 - 2 SWITCH INSULATORS MIN CREEPAGE 40mm/KV
 - 3 SWITCH CHANNEL TO BE SEPARATELY EARTHED
 - 4 OPERATING HANDLE TO BE CONNECTED TO SEPARATE EARTH
 - 5 ALL STEEL WORK 30 TON QUALITY TO B.S. 4848
 - 6 GALVANISED TO B.S. 729 MINIMUM THICKNESS 127 MICRONS
 - 7 ALL DIMENSIONS IN M.M.

MINISTRY OF ELECTRICITY & WATER

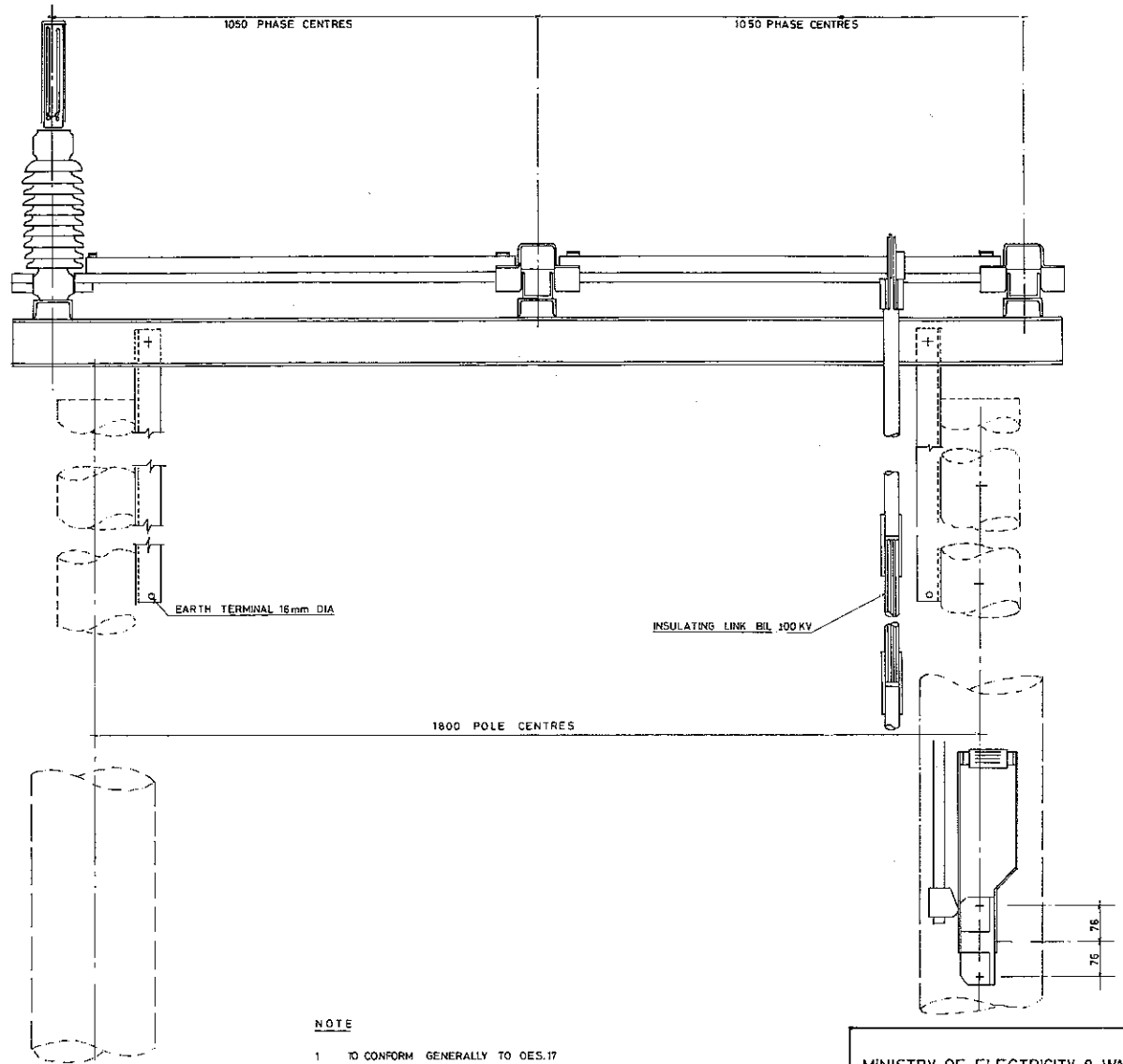
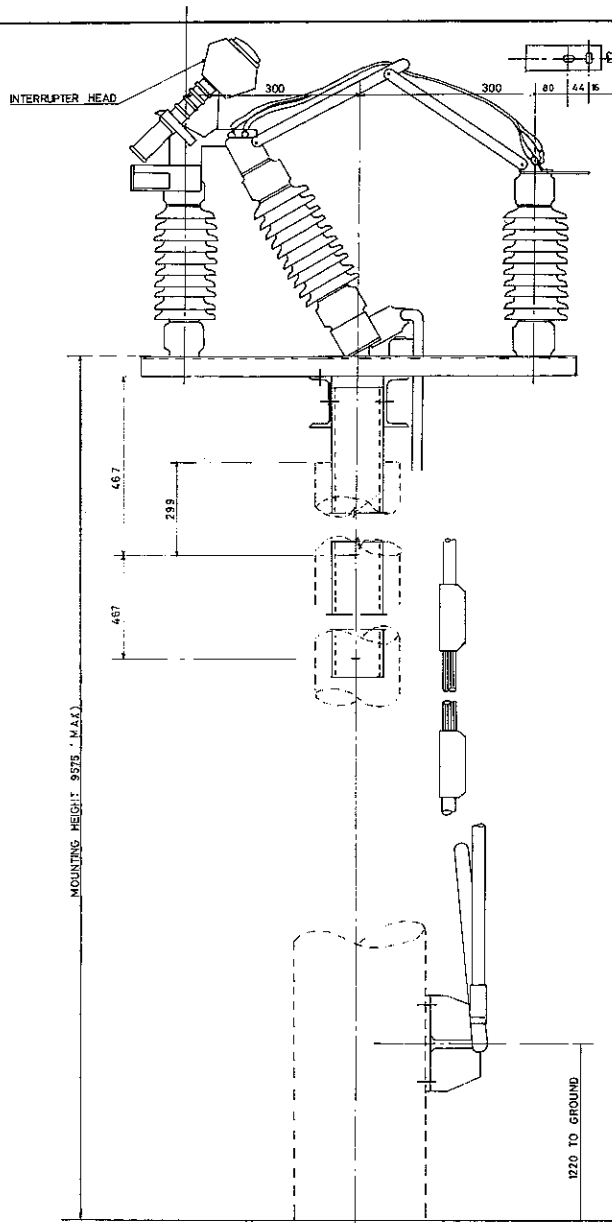
TITLE
33 KV MAST HEAD SWITCHGEAR
WITH LOAD INTERRUPTER

DRAWN BY	CHECKED BY	APPROVED BY
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R.A. QURESHI

DRG.NO. MEW/OH/026	DATE. 01-06-1985
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A	19-05-90	Notes added
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- NOTE**
- 1 TO CONFORM GENERALLY TO OES.17
 - 2 SWITCH INSULATORS MIN. CREEPAGE 40mm/Kv
 - 3 SWITCH CHANNEL TO BE SEPERATELY EARTHED
 - 4 OPERATING HANDLE TO BE CONNECTED TO SEPERATE EARTH
 - 5 ALL STEEL WORK 30 TON QUALITY TO BS. 4848
 - 6 GALVANISED TO B.S 729 MINIMUM THICKNESS 127 MICRONS
 - 7 ALL DIMENSIONS IN MM.

MINISTRY OF ELECTRICITY & WATER

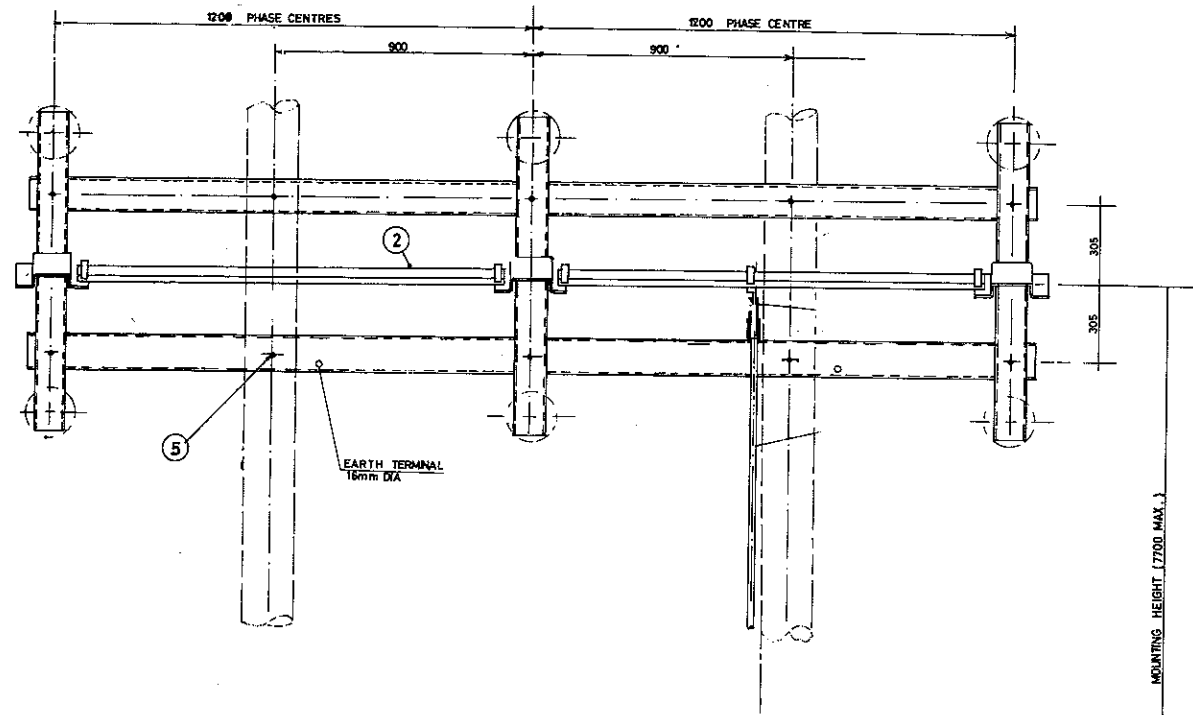
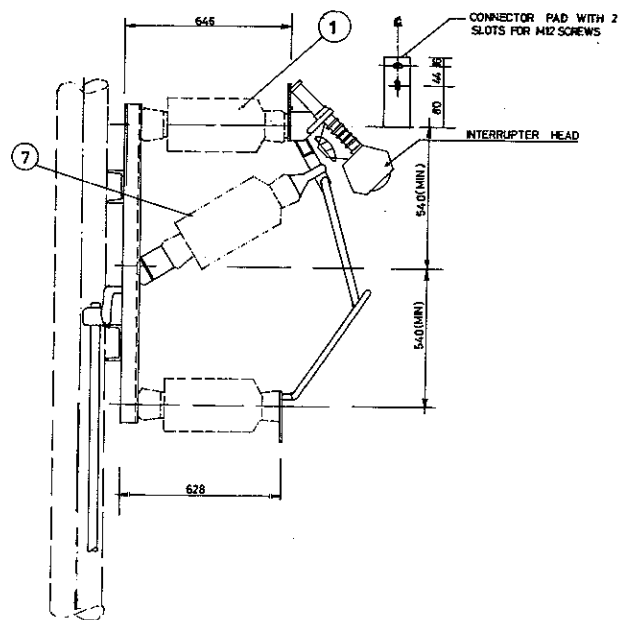
TITLE
11KV MAST HEAD SWITCH GEAR
WITH LOAD INTERRUPTER

DRAWN	CHECKED	APPROVED
FRANCIS		<i>Francis</i>

ORG. NO. MEW/OH/O27	DATE 16 10 1985
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A	19 05 90	Notes added	<i>Francis</i>	<i>APD</i>
REV	DATE	DESCRIPTION	CKD	APD

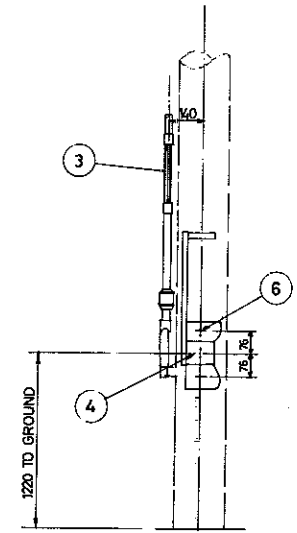
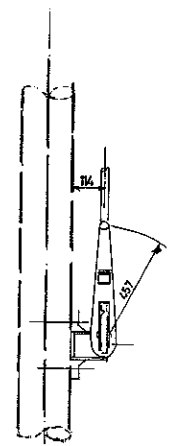





ITEM	NO./OFF	DESCRIPTION
1	3	S.P. ASSY 33 KV, 25 KA 400A ROCKING DISCONNECTOR
2	2	PHASE COUPLING TUBE SQUARE HOLLOW SECTION
3	1	INSULATING LINK ASSEMBLY
4	1	MANUAL OPERATING MECHANISM WITH EARTH LUG AND BLANK DESIGNATION LABEL
5	4	M16x300 LONG BOLT NUT SPRING AND PLAIN WASHER
6	2	M12x100 LONG COACH SCREWS
7	9	POST INSULATOR CREEPAGE 40 mm/KV

NOTE

- 1 TO CONFORM GENERALLY TO O.E.S. 18
- 2 ALL DIMENSIONS IN MM.
- 3 ALL STEEL WORK 30TON QUALITY TO B.S 4848
- 4 GALVANISED TO B.S 729 MINIMUM THICKNESS 127 MICRONS.



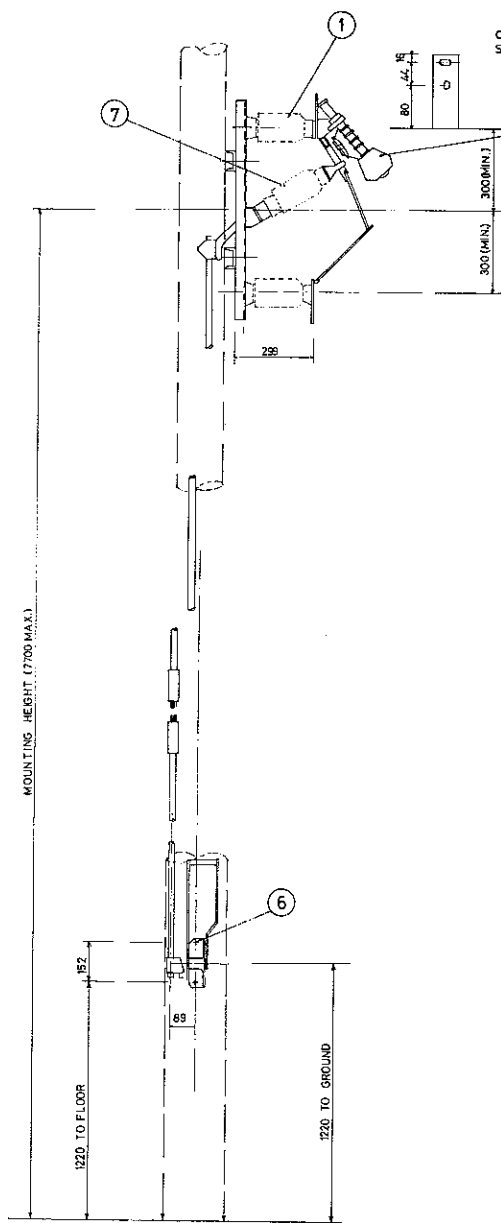

SULTANATE OF OMAN

MINISTRY OF ELECTRICITY & WATER

TITLE 33KV ON LOAD VERTICAL MOUNTING DISCONNECTOR

DRAWN BY	CHECKED BY	APPROVED BY
RAQURESHI		<i>hst</i>
DRG. NO. MEW/OH/02B	DATE 11.6.1995	
SCALE		

REV	DATE	DESCRIPTION	CKD	APD
A	19 05 90	Notes added		<i>hst</i>

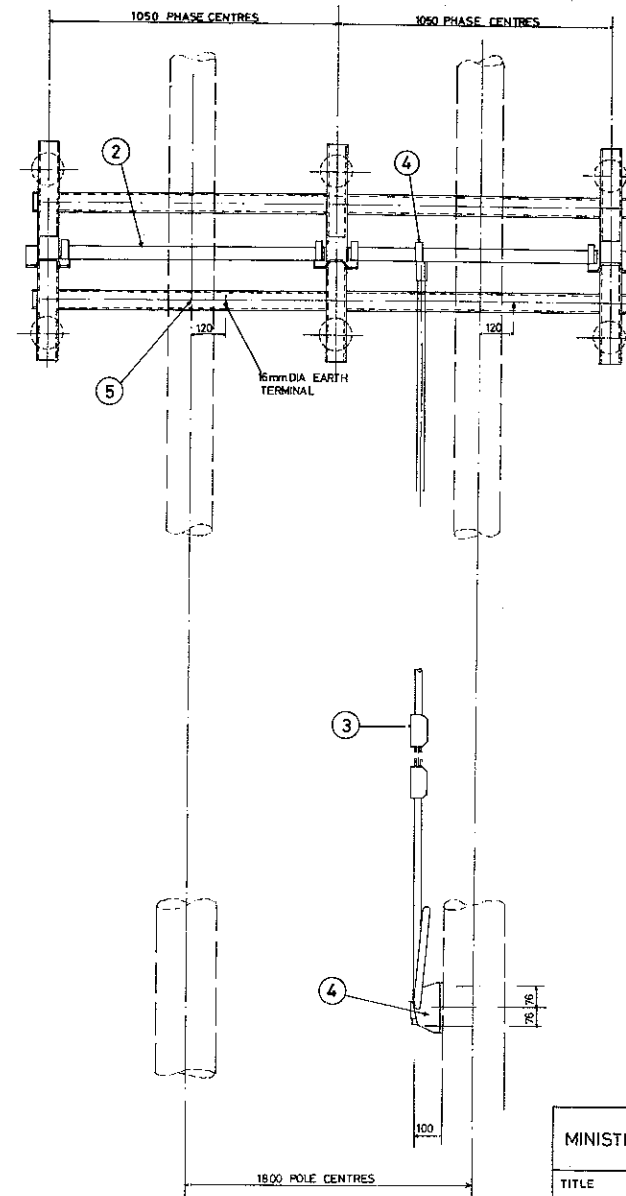


CONNECTING PAD WITH 2 SLOT
SUITABLE FOR M12 BOLT

INTERRUPTER HEAD

ITEM NO	NO OFF	DESCRIPTION
1	3	SPASSY 11KV 18KA 400A ROCKING DISCONNECTOR
2	2	PHASE COUPLING TUBE SQUARE HOLLOW SECTION
3	1	INSULATING LINK ASSEMBLY 100 KV BILL
4	1	MANUAL OPERATING MECHANISM WITH EARTH LUG AND BLANK DESIGNATION LABEL
5	4	M16x300 LONG BOLT NUT SPRING AND PLAIN WASHER
6	2	M12x100 LONG COACH SCREWS
7	9	POST INSULATOR CREEPAGE 440 mm
8		

NOTE: 1 TO CONFORM GENERALLY TO OES 17
2 ALL STEEL WORK 30 TON DUALITY TO B.S.S 4848 AND GALVANISED TO BS.729
3 ALL DIMENSIONS IN MM

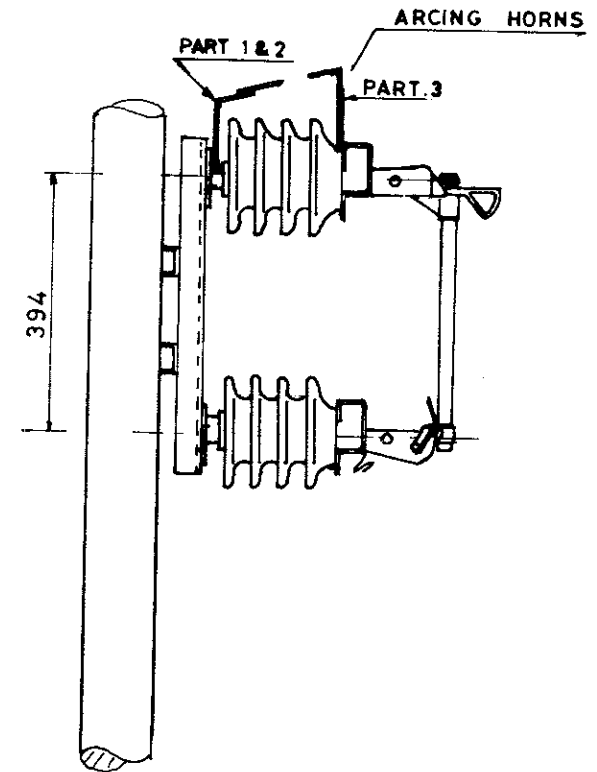
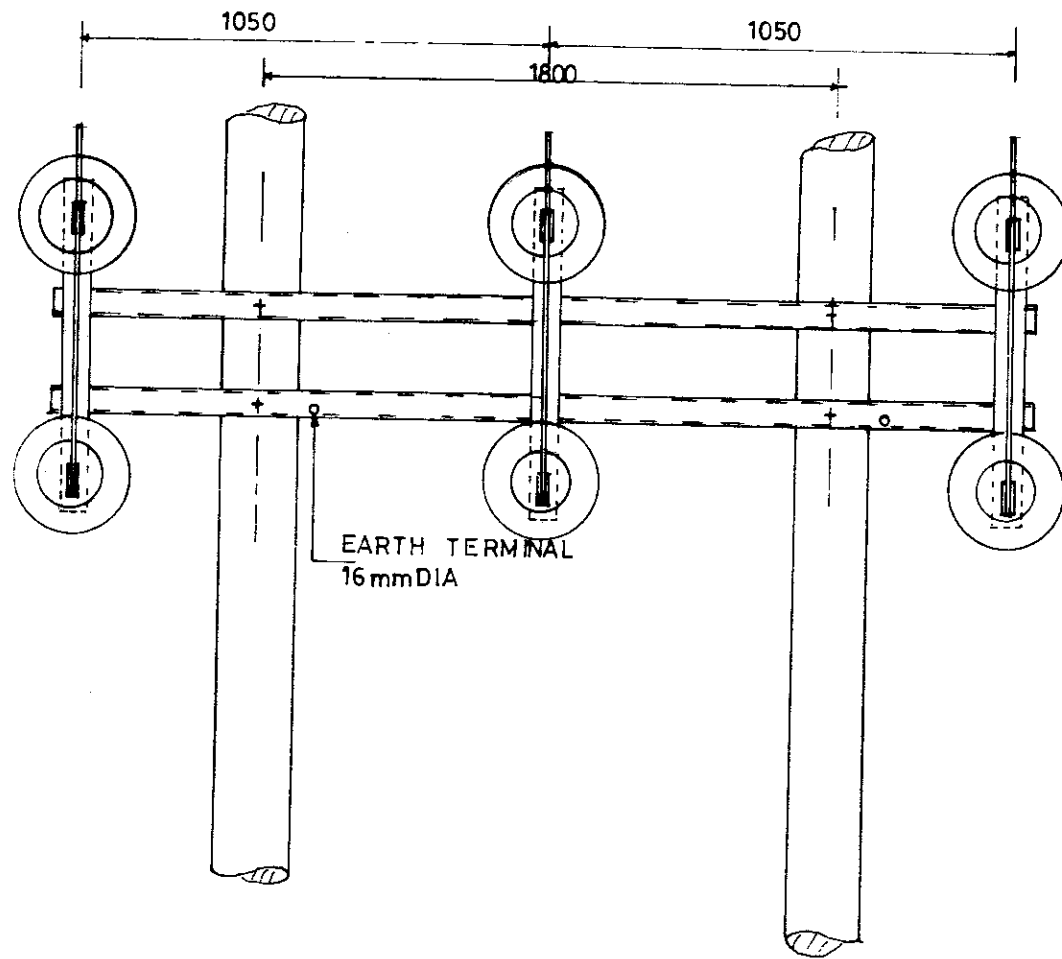


REV	DATE	DESCRIPTION	CKD	APD
A	19 05 90	Notes added		



SULTANATE OF OMAN

MINISTRY OF ELECTRICITY & WATER		
TITLE 11 KV VERTICAL MOUNTING SWITCH UNIT		
DRAWN BY R A QURESHI	CHECKED BY <i>[Signature]</i>	APPROVED BY <i>[Signature]</i>
DRG. NO. MEW/OH/029	DATE 03-07-1985	
SCALE		



NOTE.

- 1 ALL DIMENSIONS IN MM
- 2 ALL STEEL WORK 30 TON QUALITY TO B.S 4848
- 3 GALVANISED TO B S 729 WITH MINIMUM THICKNESS OF 127 MICRONS
- 4 INSULATOR CREEPAGE 440mm MIN
- 5 ARCING HORNS ADJUSTABLE 5cm TO 8cm AND CLEARANCE OF 6cm FROM INSULATOR SHED AS PER DRG. No: MEW/OH/050

REV.	DATE	DESCRIPTION	DRAWN
A	03-05-89	Arcing horns added	francis

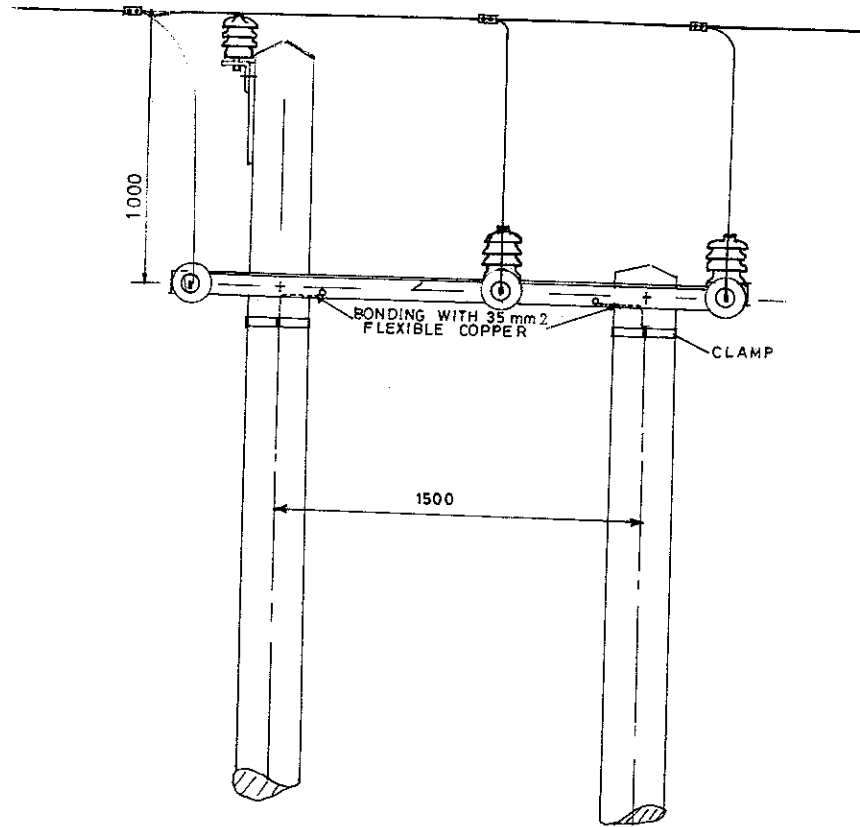
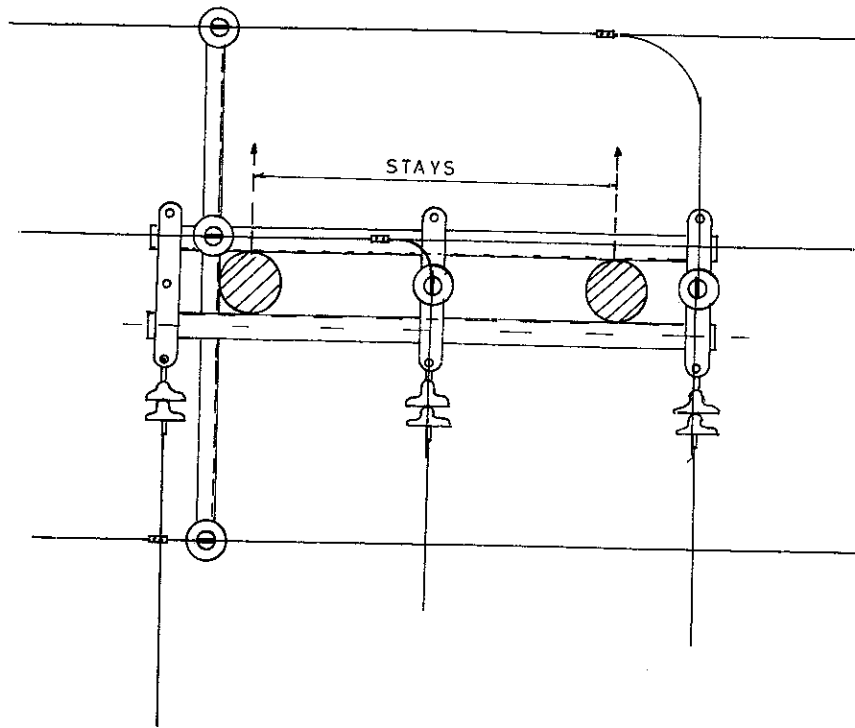
MINISTRY OF ELECTRICITY & WATER

TITLE

11KV DROP-OUT FUSE UNIT

DRAWN BY	CHECKED BY	APPROVED BY
FRANCIS	<i>[Signature]</i>	<i>[Signature]</i>

DRG. NO. MEW/OH/030 DATE 21/09/1985



NOTE

1. ALL DIMENSIONS IN MM
2. ALL STEEL WORK TO B.S. 4848
3. GALVANISED TO BS 729 IN ACCORDANCE WITH OES 11.
4. SIMILAR ARRANGEMENTS SHALL APPLY TO U/G CABLE TAP-OFF ALSO TO POLE MOUNTED TRANSFORMER SUB-STATION (OTHER DETAILS AS PER DRG NO. MEW/OH-GA/11)
5. POST TOP INSULATOR AS PER DRG NO: MEW/OH/002 REVISED

MINISTRY OF ELECTRICITY & WATER

TITLE
11KV.O/H LINE TAKE OFF
FROM INTERMEDIATE POLE

DRAWN BY CHECKED BY APPROVED BY

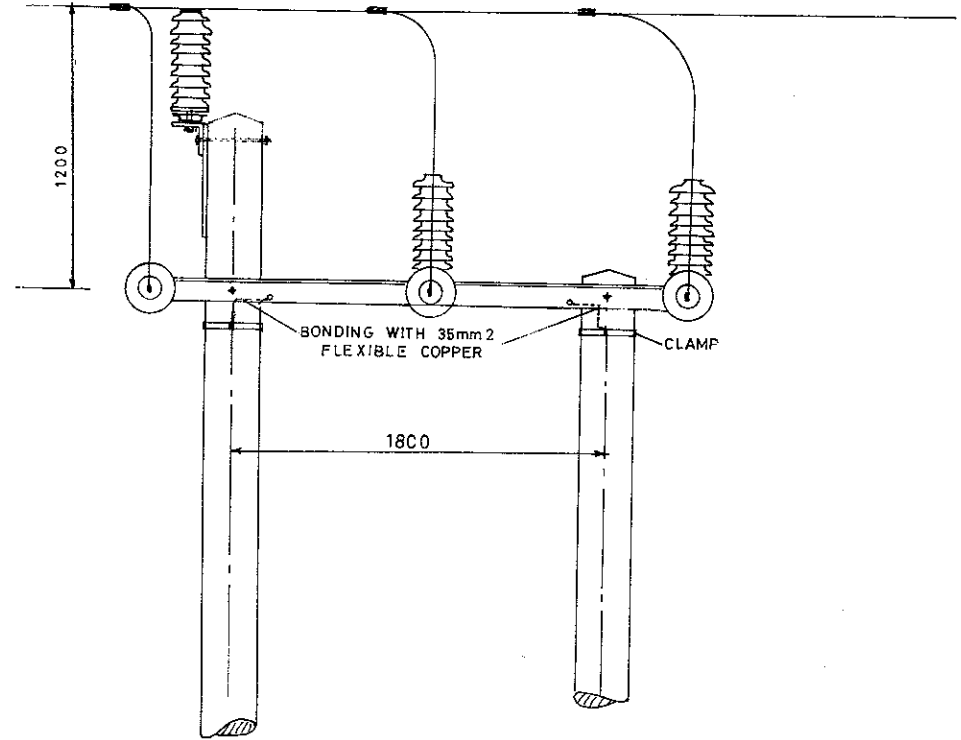
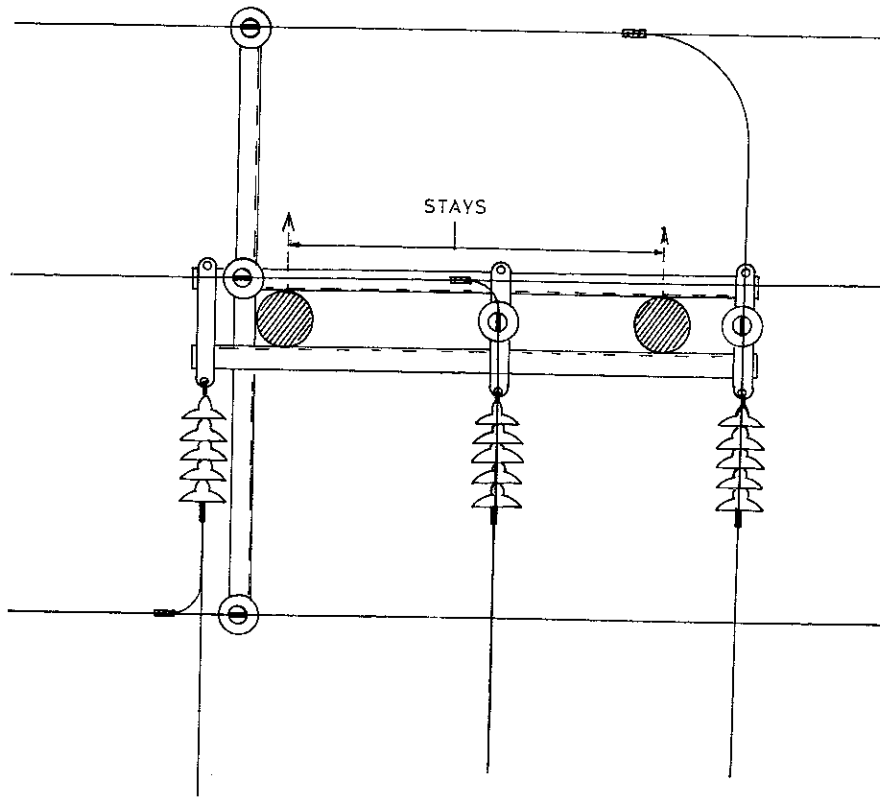
FRANCIS *[Signature]* *[Signature]*

DRG. NO. MEW/OH/031 DATE. 25/09/1985

SCALE N T S

REV.	DATE	DESCRIPTION	CKD	APD.
A	02.7.89	POST TOP INSULAOR ADDED		<i>[Signature]</i>

34



NOTE

- 1 ALL DIMENSIONS IN M M
- 2 ALL STEEL WORK 30 TON QUALITY TO BS 4848
- 3 GALVANISED TO B.S 729 IN ACCORDANCE WITH O.E.S.11 MINIMUM THICKNESS 127 MICRONS
- 4 SIMILAR ARRANGEMENTS SHALL APPLY TO U/G CABLE TAP-OFF, ALSO TO POLE MOUNTING TRANSFORMER SUB STATIONS (OTHER DETAILS AS PER DRG NO. MEW/OH-GA/12)

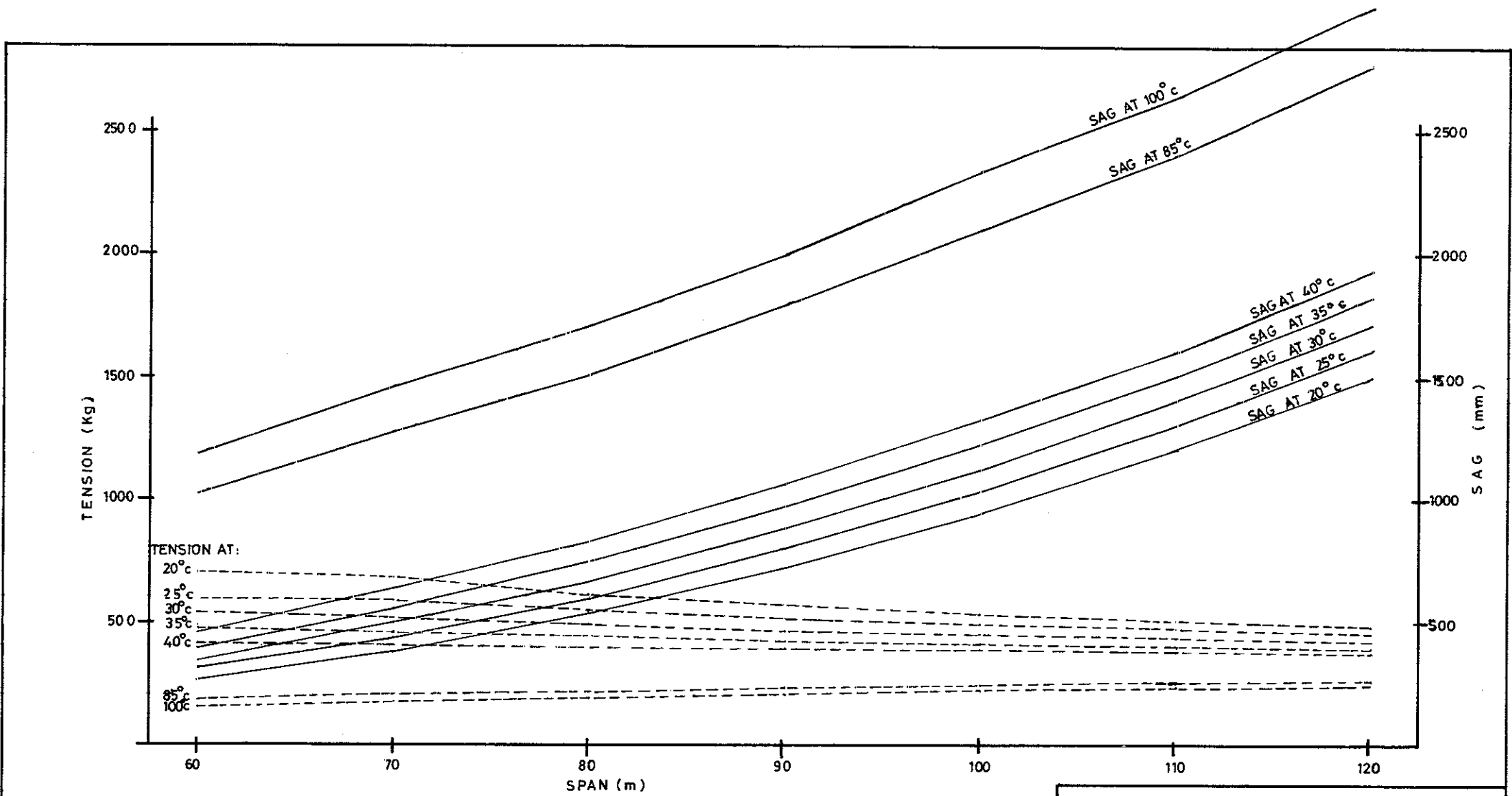
MINISTRY OF ELECTRICITY & WATER

TITLE
33KV O/H LINE TAKE OFF -
FROM INTERMEDIATE POLE

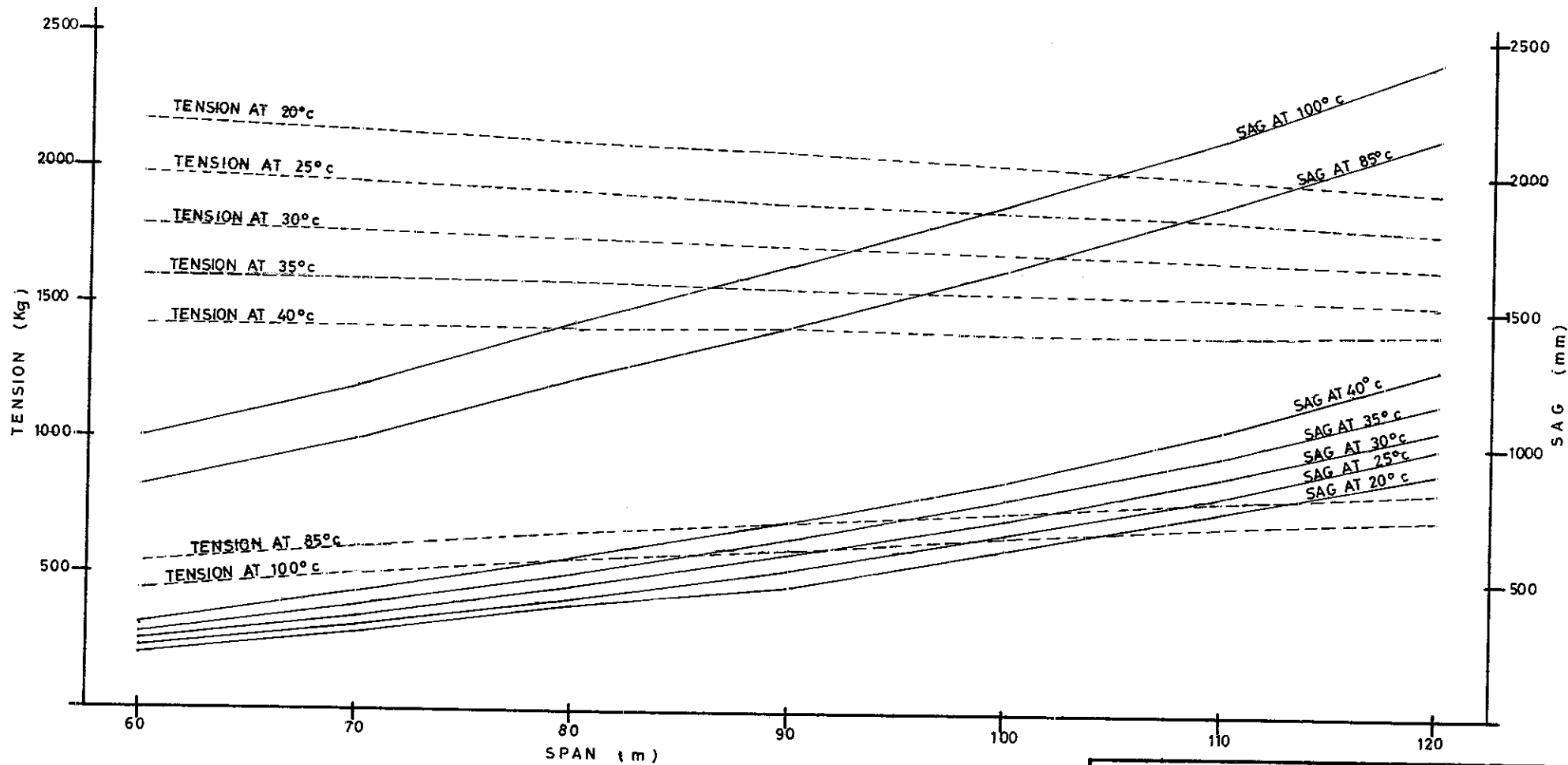
DRAWN BY FRANCIS	CHECKED BY	APPROVED BY <i>[Signature]</i>
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DRG. NO. MEW/OH/032	DATE. 25. 09. 1985
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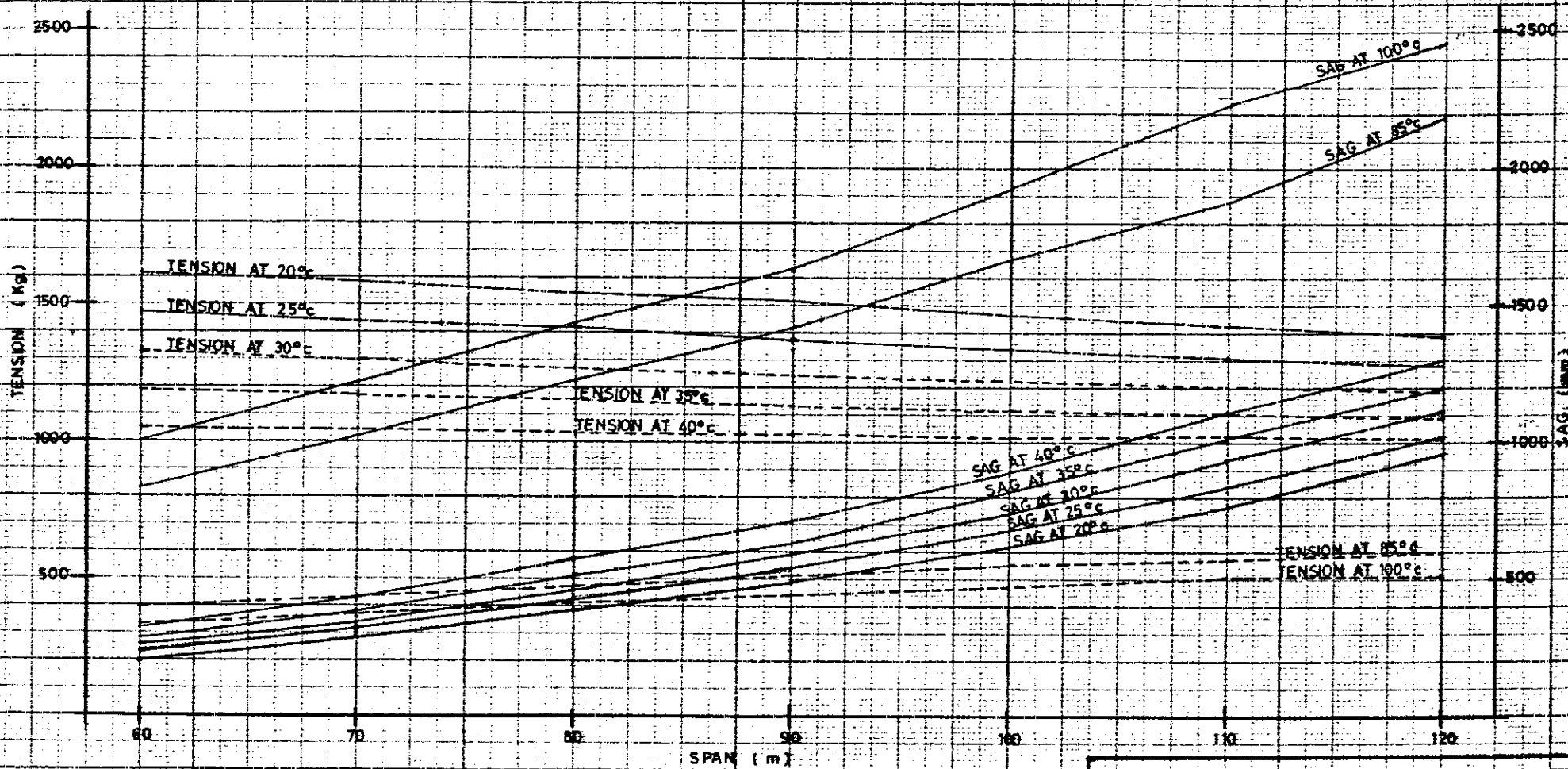
SCALE: N T S.



MINISTRY OF ELECTRICITY & WATER		
TITLE STRINGING TENSION AND SAG CHART for "DOG" ACSR CONDUCTORS		
DRAWN BY R.A. QURESHI	CHECKED BY	APPROVED BY <i>[Signature]</i>
DRG NO. MEW/OH/033		DATE 15.01.1985
SCALE		



MINISTRY OF ELECTRICITY & WATER		
TITLE STRINGING TENSION AND SAG CHART for "PANTHER" ACSR CONDUCTOR		
DRAWN BY	CHECKED BY	APPROVED BY
R.A. QURESHI		
DRG. NO. MEW/OH/034	DATE 14_01_85	
SCALE		



MINISTRY OF ELECTRICITY & WATER		
TITLE STRINGING TENSION AND SAG CHART FOR "WOLF" ACSR CONDUCTOR		
DRAWN BY R.A. QURESHI	CHECKED BY <i>[Signature]</i>	APPROVED BY <i>[Signature]</i>
DRG. NO. MEW/OH/035		DATE 13.01.1985
SCALE		

SPAN = 60 Mtr

Sr. No.	TEMPERATURE C°	TENSION Kg.	SAG Mtr.
1	20	2127	.20
2	25	1975	.23
3	30	1784	.25
4	35	1600	.28
5	40	1422	.31
6	85	537	.82
7	100	443	1.00

SPAN = 70 Mtr

Sr. No.	TEMPERATURE C°	TENSION Kg.	SAG Mtr.
1	20	2140	.28
2	25	1950	.31
3	30	1765	.34
4	35	1588	.38
5	40	1419	.43
6	85	597	1.00
7	100	502	1.19

SPAN = 80 Mtr.

Sr. No.	TEMPERATURE C°	TENSION Kg.	SAG Mtr.
1	20	2102	.38
2	25	1918	.41
3	30	1746	.45
4	35	1581	.50
5	40	1418	.56
6	85	651	1.22
7	100	554	1.43

MINISTRY OF ELECTRICITY & WATER

STRINGING TENSION AND SAG TABLES

FOR 'PANTHER' ACSR CONDUCTOR

PREPARED BY S. M. ASWATHULLA	CHECKED BY <i>[Signature]</i>	APPROVED BY <i>[Signature]</i>
Drg. No. MEW/OH/036		Date
Sheet No. 1		14.1.1985

SPAN = 90 Mtr

Sr. No.	TEMPERATURE C°	TENSION Kg.	SAG Mtr.
1	20	2064	0.46
2	25	1886	.53
3	35	1721	.58
4	35	1562	.64
5	40	699	1.42
6	85	603	1.65
7	100		

SPAN = 100 Mtr

Sr. No.	TEMPERATURE C°	TENSION Kg.	SAG Mtr.
1	20	2026	61
2	25	1854	.66
3	35	1696	.72
4	35	1550	.79
5	40	1416	.86
6	85	743	1.64
7	100	649	1.88

SPAN = 110 Mtr

Sr. No.	TEMPERATURE C°	TENSION Kg.	SAG Mtr.
1	20	1981	.75
2	25	1826	.81
3	35	1677	.88
4	35	1543	.96
5	40	1416	1.05
6	85	787	1.88
7	100	696	2.13

MINISTRY OF ELECTRICITY & WATER

STRINGING TENSION AND SAG TABLES

FOR 'PANTHER' ACSR CONDUCTOR

PREPARED BY
S. M. ASWATHULLA

CHECKED BY
Aswathulla

APPROVED BY
Aswathulla

Drg. No. MEW/OH/036
Sheet No. 2

Date 14.1.1985

SPAN = 120 Mtr

Sr. No.	TEMPERATURE C°	TENSION Kg.	SAG Mtr.
1	20	1943	.91
2	25	1971	.99
3	30	1658	1.06
4	35	1524	1.16
5	40	1412.5	1.25
6	85	826	2.14
7	100	730	2.42

Sr. No.	TEMPERATURE C°	TENSION Kg.	SAG Mtr.
1			
2			
3			
4			
5			
6			
7			

Sr. No.	TEMPERATURE C°	TENSION Kg.	SAG Mtr.
1			
2			
3			
4			
5			
6			
7			

MINISTRY OF ELECTRICITY & WATER

STRINGING TENSION AND SAG TABLES
FOR 'PANTHER' ACSR CONDUCTOR

PREPARED BY
S.M.ASMATHULLA

CHECKED BY
S.M. Asmathulla

APPROVED BY
S.M. Asmathulla

Drg. No. MEW/OH/036
Sheet No. 3

Date
14.1.1985

SPAN = 60 Mtr

Sr. No.	TEMPERATURE C°	TENSION Kg.	SAG Mtr.
1	20	1615	.20
2	25	1467	.23
3	30	1324	.25
4	35	1186	.28
5	40	1053	.32
6	85	396	.83
7	100	328	1.00

SPAN = 70 Mtr

Sr. No.	TEMPERATURE C°	TENSION Kg.	SAG Mtr.
1	20	1581	.28
2	25	1438	.31
3	30	1300	.34
4	35	1167	.38
5	40	1043	.43
6	85	438	1.02
7	100	369	1.22

SPAN = 80 Mtr.

Sr. No.	TEMPERATURE C°	TENSION Kg.	SAG Mtr.
1	20	1543	.38
2	23	1415	.41
3	25	1276	.46
4	28	1160	.51
5	32	1038	.57
6	83	476	1.23
7	100	407	1.44

MINISTRY OF ELECTRICITY & WATER

STRINGING TENSION AND SAG TABLES

FOR 'WOLF' ACSR CONDUCTOR

PREPARED BY S.M.ASMATHULLA	CHECKED BY <i>[Signature]</i>	APPROVED BY <i>[Signature]</i>
Drg. No. MEW/OH/037 Sheet No. 1		Date 14.1.1985

SPAN = 90 Mtr

Sr. No.	TEMPERATURE C°	TENSION Kg.	SAG Mtr.
1	20	1515	.49
2	25	1372	.54
3	30	1253	.59
4	35	1136	.64
5	40	1029	.71
6	85	513	1.42
7	100	443	1.64

SPAN = 100 Mtr

Sr. No.	TEMPERATURE C°	TENSION Kg.	SAG Mtr.
1	20	1467	.62
2	25	1343	.68
3	30	1228	.74
4	35	1120	.82
5	40	1024	.89
6	85	548	1.67
7	100	475	1.93

SPAN = 110 Mtr

Sr. No.	TEMPERATURE C°	TENSION Kg.	SAG Mtr.
1	20	1429	.77
2	25	1310	.84
3	30	1205	.94
4	35	1105	1.02
5	40	1017	1.11
6	85	572	1.88
7	100	505	2.24

MINISTRY OF ELECTRICITY & WATER

STRINGING TENSION AND SAG TABLES

FOR 'WOLF' ACSR CONDUCTOR

PREPARED BY S. M. ASWATHULLA	CHECKED BY <i>[Signature]</i>	APPROVED BY <i>[Signature]</i>
Drg. No. MEW/OH/037 Sheet No. 2		Date 14.1.1985

SPAN = 120 Mtr.

Sr. No.	TEMPERATURE C°	TENSION Kg.	SAG Mtr.
1	20	1391	0.95
2	25	1281	1.02
3	30	1181	1.11
4	35	1091	1.20
5	40	1010	1.30
6	85	599	2.19
7	100	508	2.46

Sr. No.	TEMPERATURE C°	TENSION Kg.	SAG Mtr.
1			
2			
3			
4			
5			
6			
7			

Sr. No.	TEMPERATURE C°	TENSION Kg.	SAG Mtr.
1			
2			
3			
4			
5			
6			
7			

MINISTRY OF ELECTRICITY & WATER

STRINGING TENSION AND SAG TABLES

FOR 'WOLF' ACSR CONDUCTOR

PREPARED BY
S.M.ASWATHULLA

CHECKED BY
[Signature]

APPROVED BY
[Signature]

Dwg. No. MEW/OH/037
Sheet No. 3

Date
14.1.19 85

SPAN = 60 Mtr

Sr. No.	TEMPERATURE C°	TENSION Kg.	SAG Mtr.
1	20	695	.26
2	25	587	.31
3	30	534	.34
4	35	467	.39
5	40	408	.45
6	85	433	1.02
7	100	379	1.18

SPAN = 70 Mtr

Sr. No.	TEMPERATURE C°	TENSION Kg.	SAG Mtr.
1	20	668	.37
2	25	575	.43
3	30	508	.49
4	35	405	.55
5	40	398	.63
6	85	196	1.27
7	100	172	1.45

SPAN = 80 Mtr.

Sr. No.	TEMPERATURE C°	TENSION Kg.	SAG Mtr.
1	20	607	.53
2	25	543	.59
3	30	485	.66
4	35	435	.74
5	40	392	.82
6	85	213	1.5
7	100	189	1.7

MINISTRY OF ELECTRICITY & WATER

STRINGING TENSION AND SAG TABLES

FOR 'DOG' ACSR CONDUCTOR

PREPARED BY
S.M.ASMATHULLA

CHECKED BY
Bozda

APPROVED BY
Bozda

Drg. No. MEW/OH/038

Date

Sheet No. 1

14.1.1985

SPAN = 90 Mtr

Sr. No.	TEMPERATURE C°	TENSION Kg.	SAG Mtr.
1	20	569	.72
2	25	513	.80
3	30	465	.88
4	35	422	0.97
5	40	386	1.06
6	85	228	1.79
7	100	204	2.00

SPAN = 100 Mtr

Sr. No.	TEMPERATURE C°	TENSION Kg.	SAG Mtr.
1	20	534	.94
2	25	487	1.03
3	30	447	1.12
4	35	411	1.22
5	40	381	1.32
6	85	241	2.09
7	100	216	2.33

SPAN = 110 Mtr

Sr. No.	TEMPERATURE C°	TENSION Kg.	SAG Mtr.
1	20	505	1.20
2	25	469	1.30
3	30	433	1.40
4	35	404	1.50
5	40	377	1.60
6	85	253	2.40
7	100	230	2.64

MINISTRY OF ELECTRICITY & WATER

STRINGING TENSION AND SAG TABLES

FOR 'DOG' ACSR CONDUCTOR

PREPARED BY

S.M.ASMATHULLA

CHECKED BY

[Signature]

APPROVED BY

[Signature]

Drg. No. MEW/OH/038

Sheet No. 2

Date

14.1.1985

SPAN = 120 Mtr

Sr. No.	TEMPERATURE C°	TENSION Kg.	SAG Mtr.
1	20	481	1.50
2	25	449	1.61
3	30	421	1.71
4	35	396	1.82
5	40	375	1.93
6	85	261	2.76
7	100	240	3.00

Sr. No.	TEMPERATURE C°	TENSION Kg.	SAG Mtr.
1			
2			
3			
4			
5			
6			
7			

Sr. No.	TEMPERATURE C°	TENSION Kg.	SAG Mtr.
1			
2			
3			
4			
5			
6			
7			

MINISTRY OF ELECTRICITY & WATER

STRINGING TENSION AND SAG TABLES

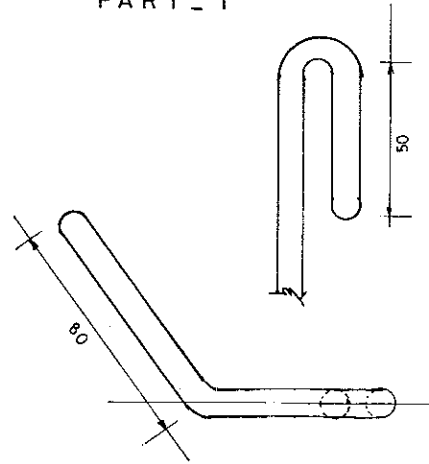
FOR 'DOG' ACSR CONDUCTOR

PREPARED BY **S.M.ASMATHULLA** CHECKED BY *[Signature]* APPROVED BY *[Signature]*

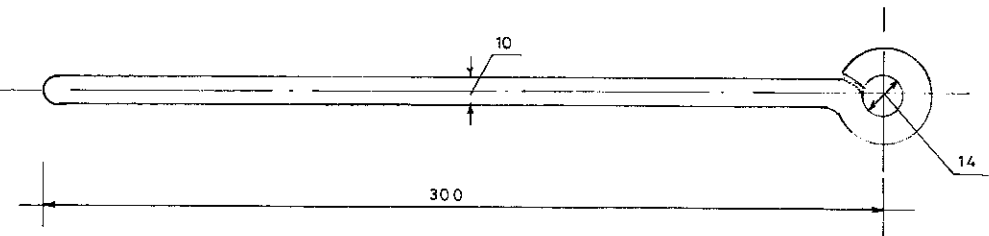
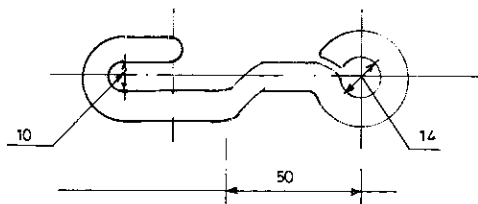
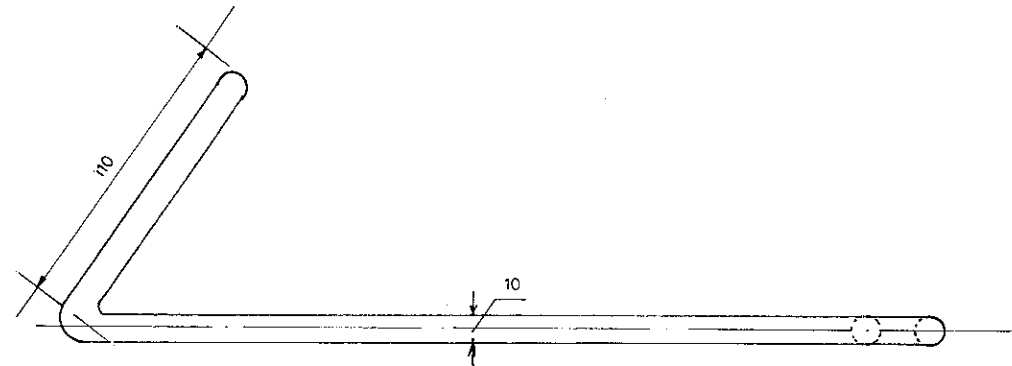
Drg. No. MEW/OH/038
Sheet No. 3

Date 14.1.1985

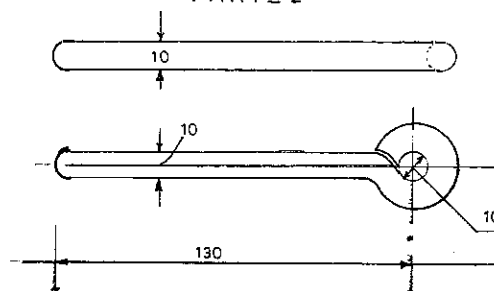
PART_1



PART_3



PART_2



NOTE

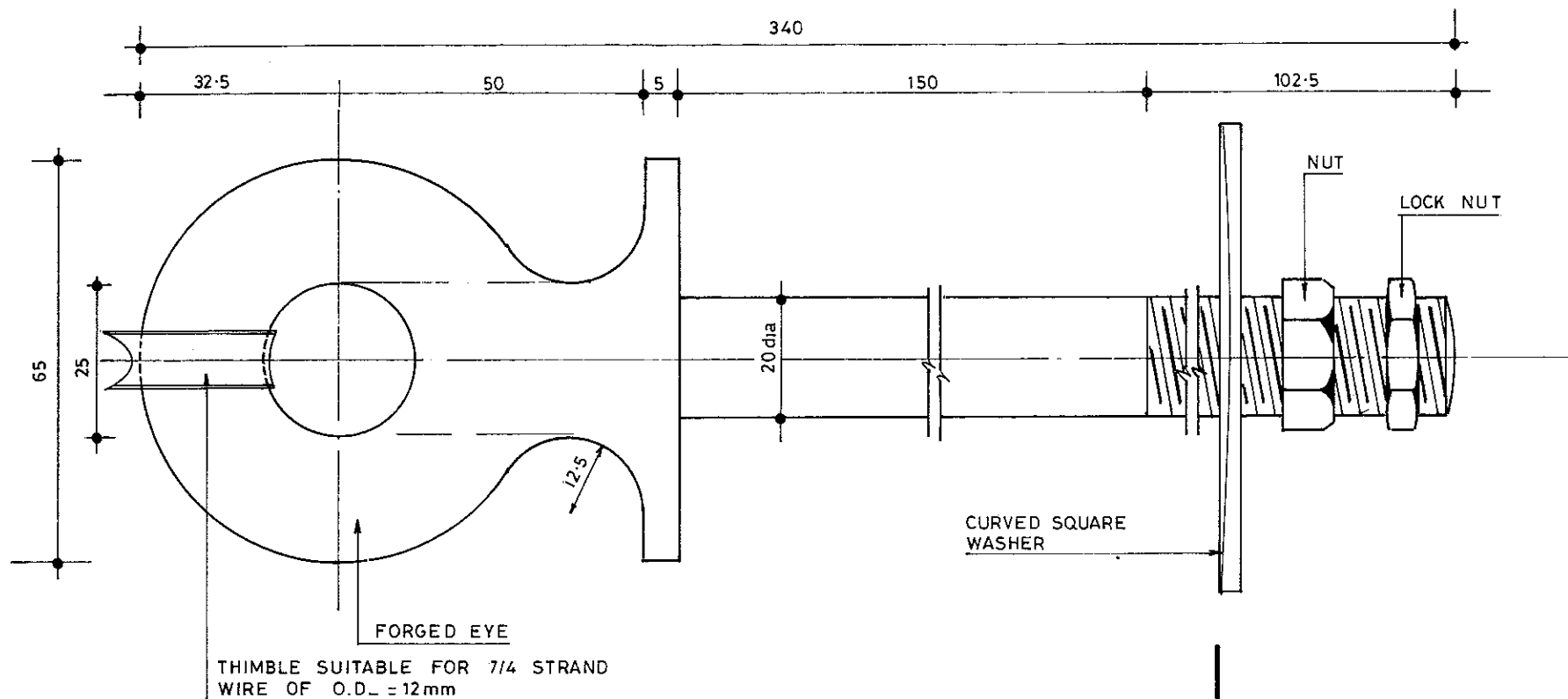
GALVANISED TO B.S.729 IN ACCORDANCE WITH
OES 11 MINIMUM THICKNESS 127 MICRON

ALL DIMENSIONS ARE IN MILLIMETERS

SULTANATE OF OMAN
MINISTRY OF ELECTRICITY & WATER

ADJUSTABLE ARC-HORN

DRAWN	CHECKED	APPROVED
FRANCIS		
DRAWING NO: MEW/OU/SEA/DEV/001	SCALE 1:20	DATE 20-00-00



NOTE

- 1 ALL DIMENSIONS IN MM
- 2 STEEL 30 TON QUALITY TO BS 4848
- 3 GALVANISED TO B.S. 729 IN ACCORDANCE WITH O.E.S 11
MINIMUM THICKNESS 127 MICRONS
- 4 CURVED SQUARE WASHER AS PER DRG N6 MEW/OH/023 REV:A DATED 06.08.89

SULTANATE OF OMAN
MINISTRY OF ELECTRICITY AND WATER

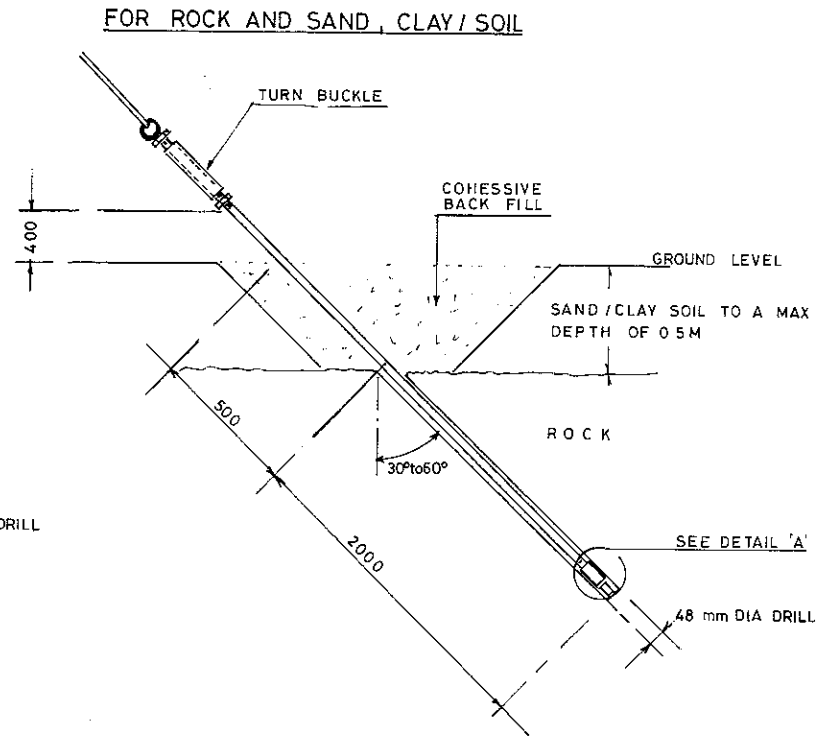
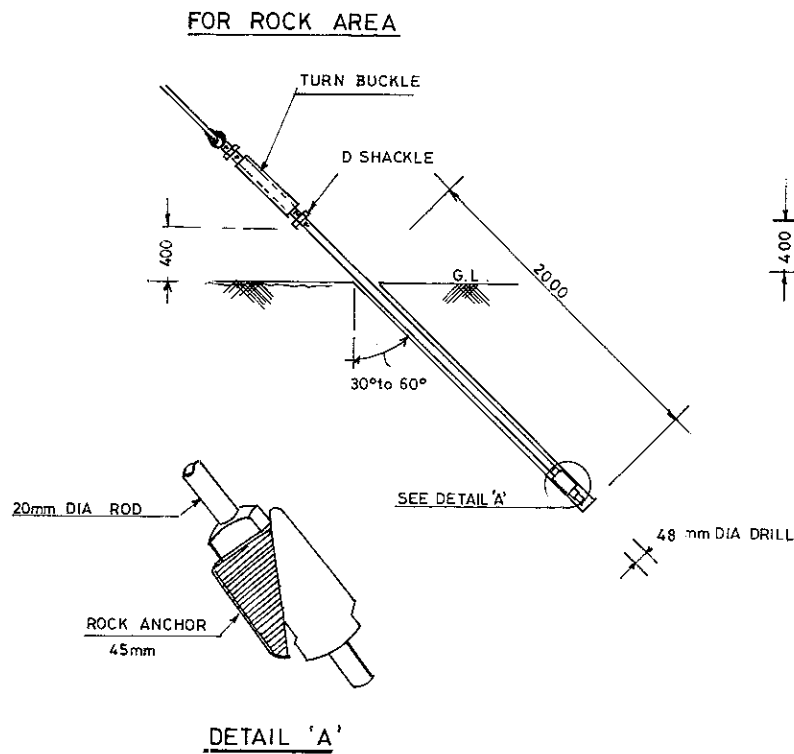
STAY HOOK

DRAWN	CHECKED	APPROVED
FRANCIS		<i>[Signature]</i>

DRAWING NO: MEW / OH / 051

SCALE :

DATE : 16 - 10 - 1989



NOTE:
MATERIAL MALLEABLE CAST IRON, DIPPED IN RUST RESISTING BLACK PAINT
MINIMUM ULTIMATE STRENGTH : 12000 KGS
ALL DIMENSIONS IN MILLIMETRE

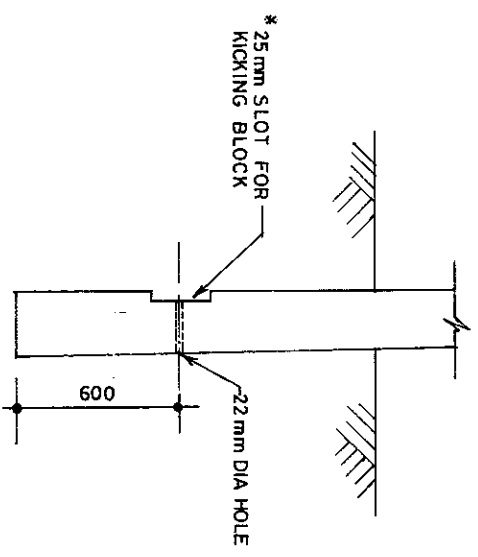
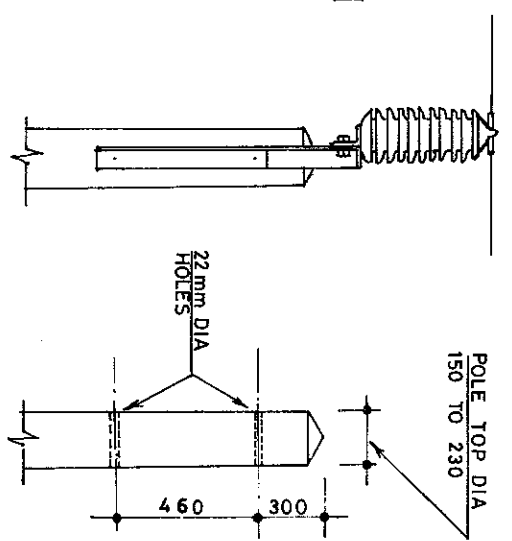
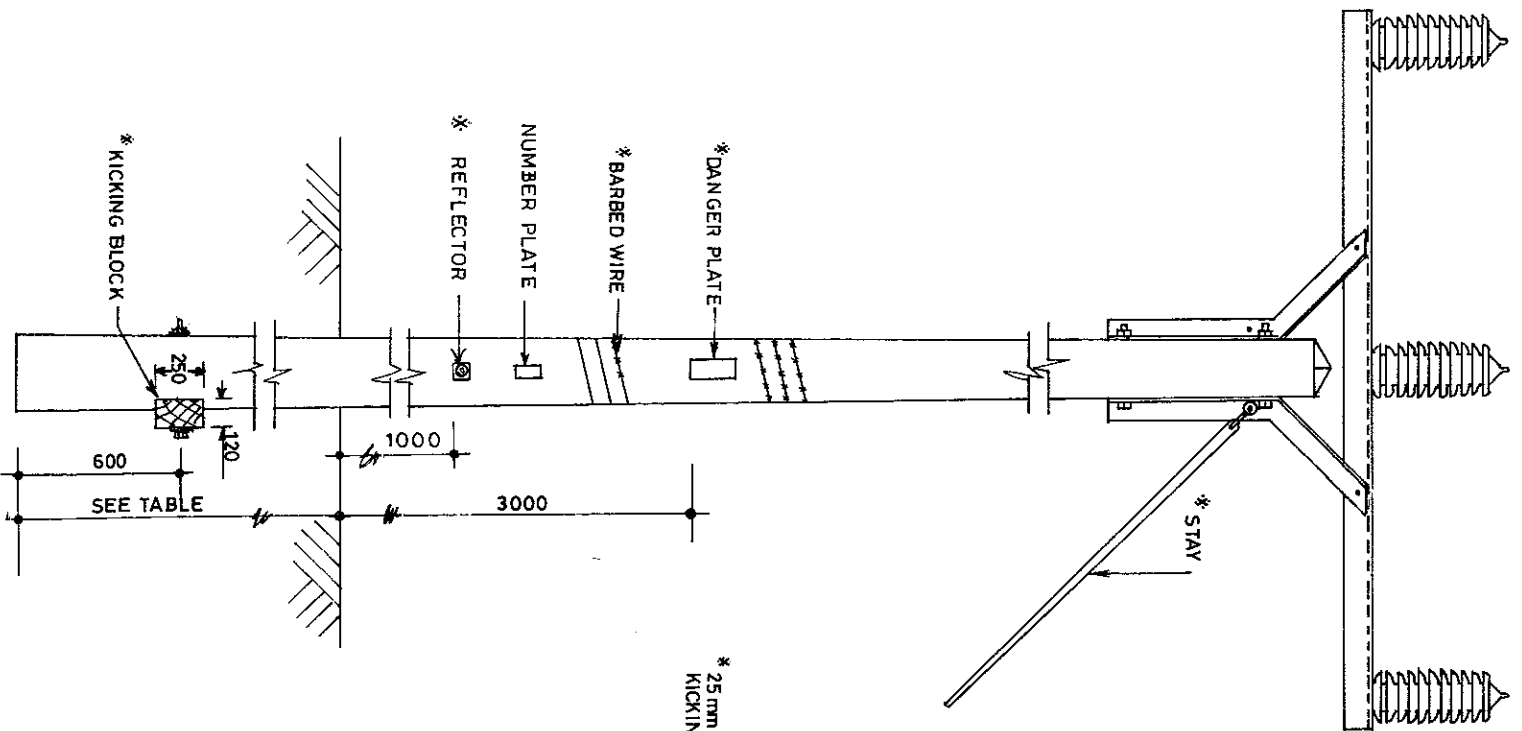
SULTANATE OF OMAN
MINISTRY OF ELECTRICITY AND WATER

EXPANDING ROCK ANCHOR
FOR STAYS

DRAWN	CHECKED	APPROVED
FRANCIS.		

DRAWING NO : MEW/OH/052

SCALE : NTS DATE : 04 - 09 - 1989



POLE SIZE	PLANTING DEPTH
11000	800
13000	1800
MAXIMUM ANGLE OF DEVIATION = 5°	

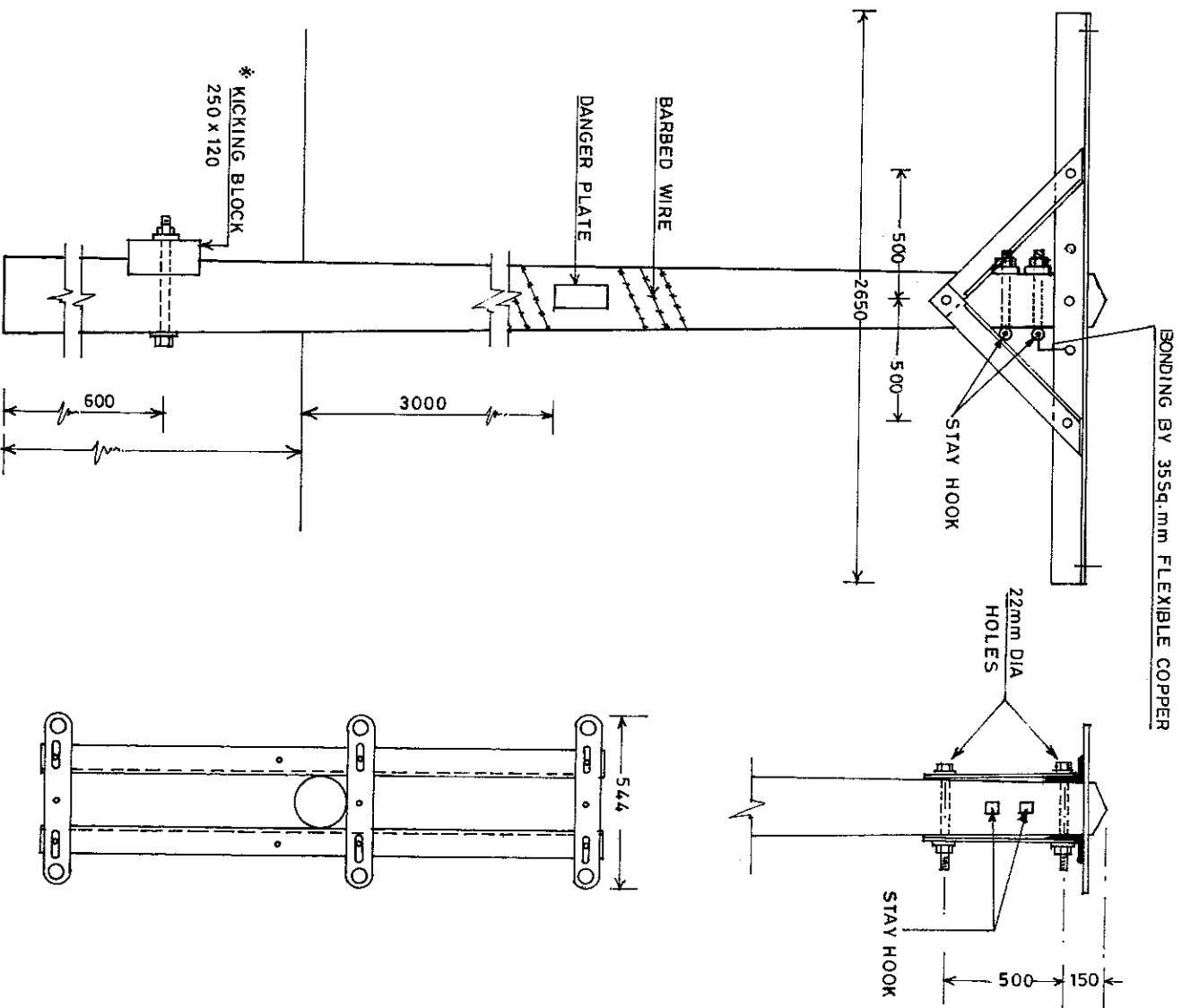
- * : WHERE REQUIRED
1. REFLECTOR AS PER DRG.NO. MEW/OH/016
 2. CROSS ARM & BRACKET AS PER DRG.NO. MEW/OH/005.REV.
 3. KICKING BLOCK AS PER DRG. NO. MEW/OH/025
 4. DANGER PLATE AS PER DRG. NO. MEW/OH/017REV. 'A'
 5. POST INSULATORS OF CREEPAGE DISTANCE MINIMUM 40mm/Kv.

MINISTRY OF ELECTRICITY & WATER

TITLE GENERAL ARRANGEMENT & FABRICATION FOR INTERMEDIATE SINGLE LINE POLE (33KV)

REV	DATE	DESCRIPTION	CKD	APPD.
A	23.5.90	NOTES&DIMENSION ADDED STAY CLAMP REMOVED		

DRAWN BY	CHECKED	APPROVED
R.A. QURESHI	<i>[Signature]</i>	<i>[Signature]</i>
DRG. NO. MEW/OH/GA/01	DATE	20/1/1985
SCALE		



* WHERS REQUIRED

NOTE

1. ALL DIMENSIONS IN mm.
2. CROSSARM AS PER DRG. NO. MEW/OH/009 REVISED
3. STAY HOOK AS PER DRG. NO. MEW/OH/051
4. PILOT PLATE AS PER DRG. NO. MEW/OH/021
5. KICKING BLOCK AS PER DRG. NO. MEW/OH/025
6. STAYS, 2 IN LINE
7. LIMIT OF ANGLE 15°
8. 11M STOUT POLE TO BE USED.
9. PROVIDE NUMBER PLATE AND REFLECTOR, DANGER PLATE

POLE LENGTH (m)	PLANTING DEPTH (m)
11.0	1.8
13.0	1.8

REV	DATE	DESCRIPTION	CKD	APD
B	12.05.90	NOTE CHANGED STAY CLAMP DELETED STAY HOOK ADDED		
A	06.03.90	NOTE CHANGED		

MINISTRY OF ELECTRICITY & WATER

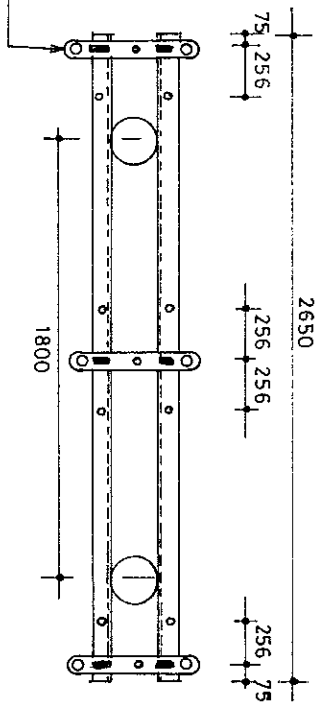
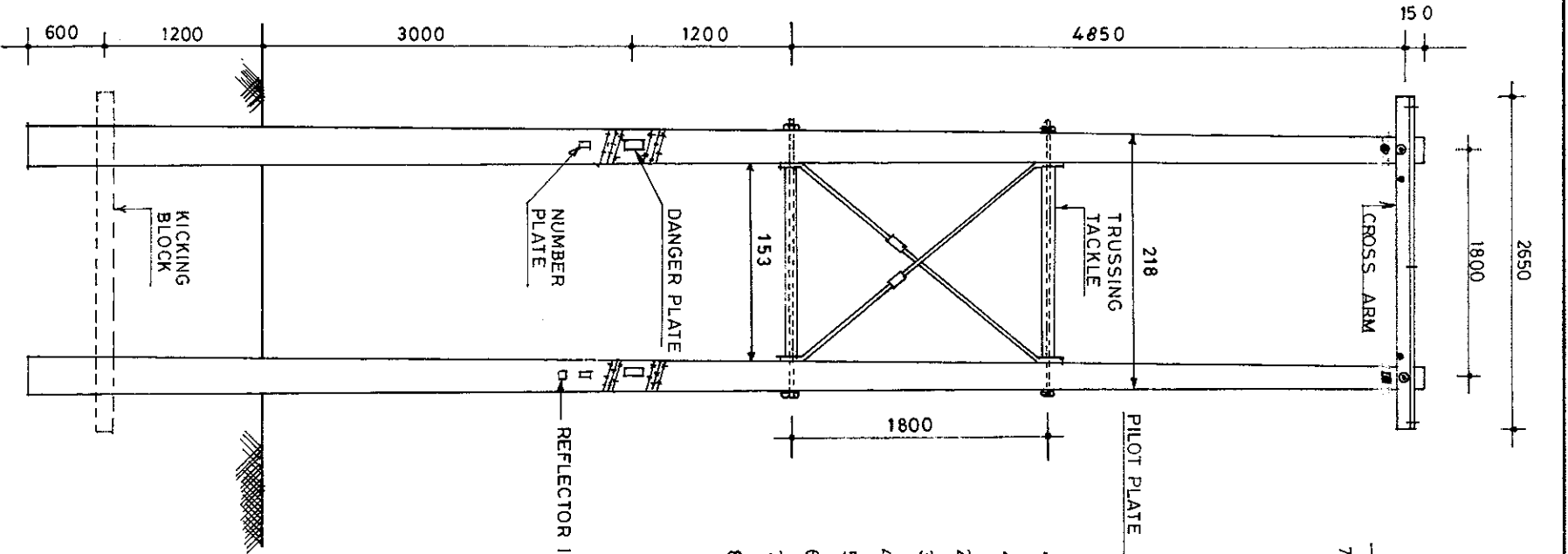
TITLE 33 K.V. SINGLE CIRCUIT
SECTION POLE

DRAWN BY CHECKED BY APPROVED BY

JOSE

DRG. NO. MEW/OH/GA/02 DATE. 29/12/1984

SCALE



N O T E

1. ALL DIMENSIONS ARE IN M.M.
2. CROSS ARM AS PER DRG. NO. MEW/OH/007/REVISED
3. PILOT PLATE AS PER DRG. NO. MEW/OH/021
4. TRUSSING TACKLE AS PER DRG. NO. MEW/OH/013 REV. 'A'
5. KICKING BLOCK AS PER DRG. NO. MEW/OH/025
6. DANGER PLATE AS PER DRG. NO. MEW/OH/017 Rev. 'A'
7. NUMBER PLATE AS PER DRG. NO. MEW/OH/018 REVISED
8. LIMIT OF ANGLE = 45°

REFLECTOR IF REQUIRED

REV	DATE	DESCRIPTION	CKD	APD

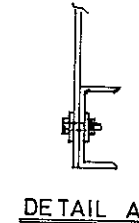
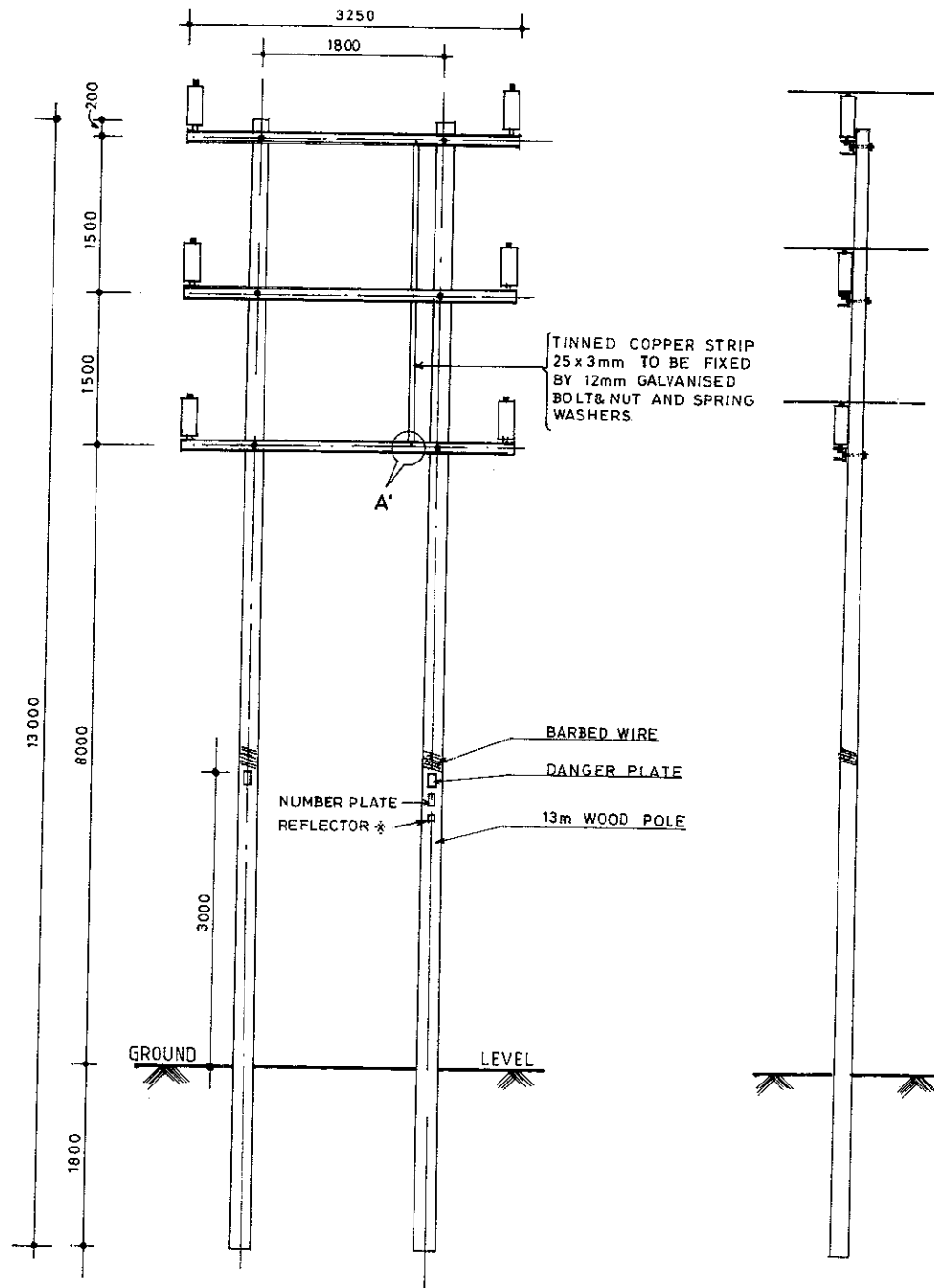
SULTANATE OF OMAN
MINISTRY OF ELECTRICITY AND WATER

33KV SINGLE CIRCUIT TERMINAL
AND ANGLE DOUBLE POLE

DRAWN **FRANCIS.** CHECKED *[Signature]* APPROVED *[Signature]*

DRAWING NO: MEW/OH-GA/03 REVISED

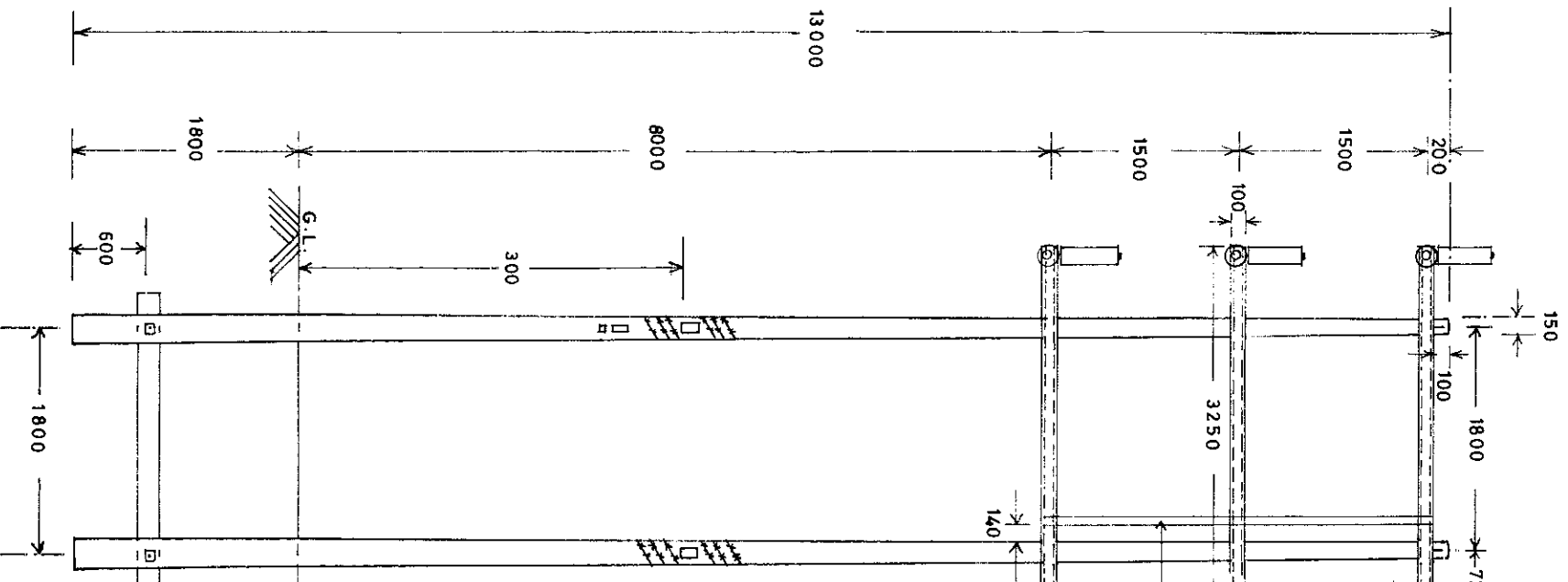
SCALE N T S. DATE : 03 - 09 - 1989



NOTE

- 1 CROSS ARM AS PER MEW/OH/012 REVISED
- 2 POST TOP INSULATOR AS PER MEW/OH/001 REV A
- 3 DANGER PLATE AS PER MEW/OH/017
- 4 NUMBER PLATE AS PER MEW/OH/018 REVISED
- 5 REFLECTOR AS PER MEW/OH/016
- * WHERE REQUIRED

MINISTRY OF ELECTRICITY AND WATER		
TITLE 33KV DOUBLE CIRCUIT INTERMEDIATE POLE		
DRAWN FRANCIS.	CHECKED	APPROVED <i>[Signature]</i>
DRAWING NO: MEW/OH - GA/05, REVISED		
SCALE: N.T.S.	DATE: 08-08-1989	



POST TOP INSULATOR
 2 CHANNELS OF 100 x 50 x 10mm
 DISC INSULATOR
 TINNED COPPER STRIP $1\frac{1}{8}$ " TO BE FIXED
 BY 12mm GALVANISED BOLT WITH NUTS
 AND SPRING WASHER

NOTE

1. No. OF STAYS 6 IN LINE
2. LIMIT OF ANGLE 30°
3. STAY HOOKS ON ONE SIDE TO BE BONDED BY DRILLING SUITABLE HOLE IN COPPER STRIP AND ON THE OTHER SIDE WITH 16m.m. DIA HOLE IN CROSS ARM

MATERIALS

ALL DIMENSIONS IN M.M.

1. CROSS ARM AS PER DRG. No. MEW/OH/012REVISED
2. KICKING BLOCK AS PER DRG. No. MEW/OH/025
3. DANGER PLATE AS PER DRG. No. MEW/OH/017
4. STAY HOOKS (NOT SHOWN) TO BE AS PER DRG. NO. MEW/OH/051

REV	DATE	DESCRIPTION	CKD	APPD
C	25.05.92	DISC & POST TOP INSULATOR ADDED		
'B'	16.03.91	DIMENSIONS CHANGED.		
A	26-05-90	NOTE AND MATERIAL CHANGED		

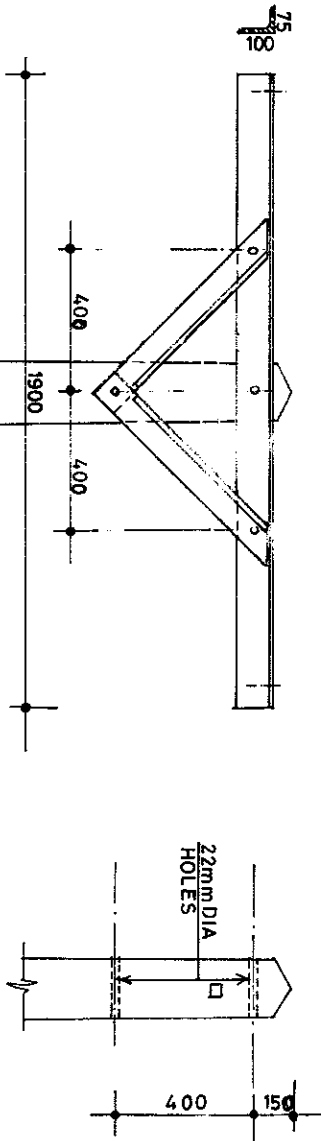
MINISTRY OF ELECTRICITY WATER

TITLE **TERMINAL & SECTION**
33K.V. DOUBLE CIRCUIT POLE

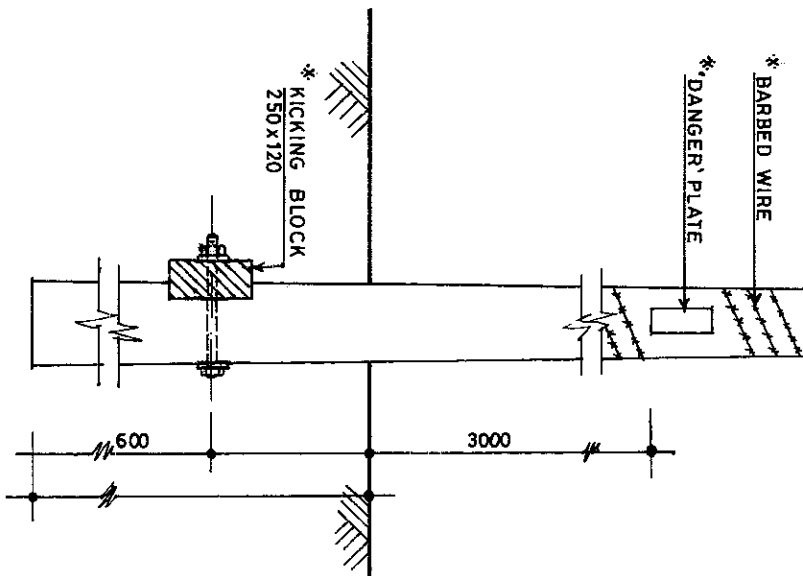
DRAWN BY **JOSE** CHECKED *[Signature]* APPROVED *[Signature]*

DRG NO. MEW/OH-GA/06 DATE 15/7/1985

SCALE



POLE LENGTH (m)	PLANTING DEPTH (m)
11.0	1.8
13.0	1.8



*-WHERE REQUIRED

NOTE

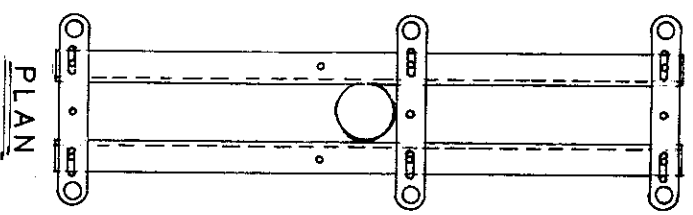
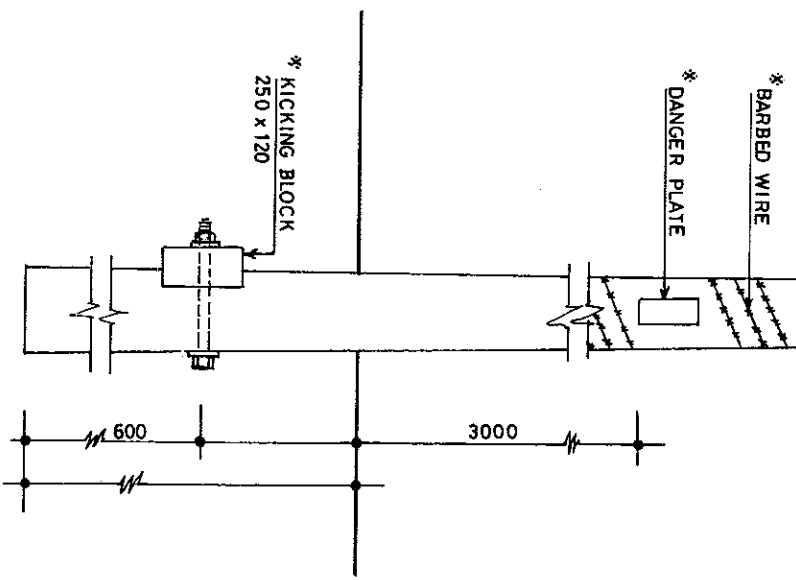
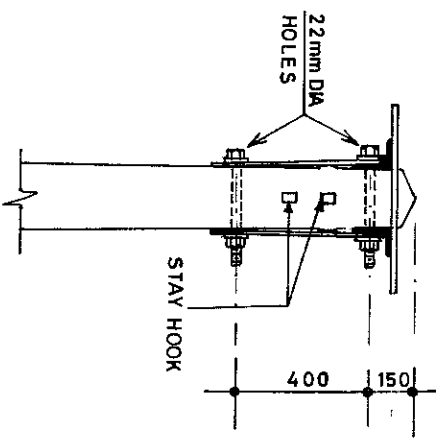
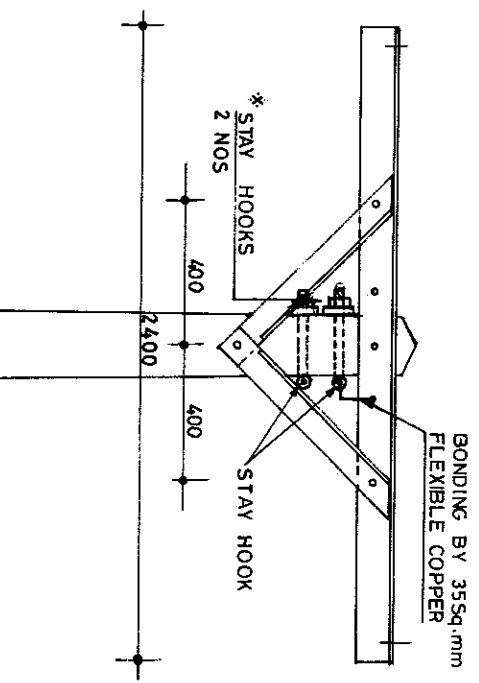
1. CROSSARM - AS PER DRG. NO. MEW/OH/006 REVISED
2. KICKING BLOCK - AS PER DRG. NO. MEW/OH/025
3. ALL DIMENSIONS ARE IN MM.
4. PROVIDE NUMMR PLATE AND RED LIGHT REFLECTOR

REV	DATE	DESCRIPTION	CKD	APPD
A	12.05.90	STAY CLAMP REMOVED NOTE CHANGED		

MINISTRY OF ELECTRICITY & WATER

TITLE
11 KV SINGLE CIRCUIT
INTERMEDIATE POLE

DRAWN BY RAQURESHI	CHECKED BY <i>[Signature]</i>	APPROVED BY <i>[Signature]</i>
DRG. NO. MEW/OH/GA/07	DATE 18/12/1984	SCALE



POLE LENGTH (m)	PLANTING DEPTH (m)
11.0	1.8
13.0	1.8

* WHERE REQUIRED

NOTE

1. ALL DIMENSIONS IN mm
2. CROSSARM AS PER DRG. NO. MEW/OH/008 REVISED
3. STAY HOOK AS PER DRG. NO. MEW/OH/051
4. PILOT PLATE AS PER DRG. NO. MEW/OH/021
5. KICKING BLOCK AS PER DRG. NO. MEW/OH/025
6. STAYS - 2 IN LINE
1 BISECTION
7. LIMIT OF ANGLE 15°
8. 11M STOUT POLE TO BE USED.

REV	DATE	DESCRIPTION	CKD	APD
A	26-05-90	STAY CLAMP DELETED STAY HOOK ADDED NOTES CHANGED	<i>[Signature]</i>	<i>[Signature]</i>

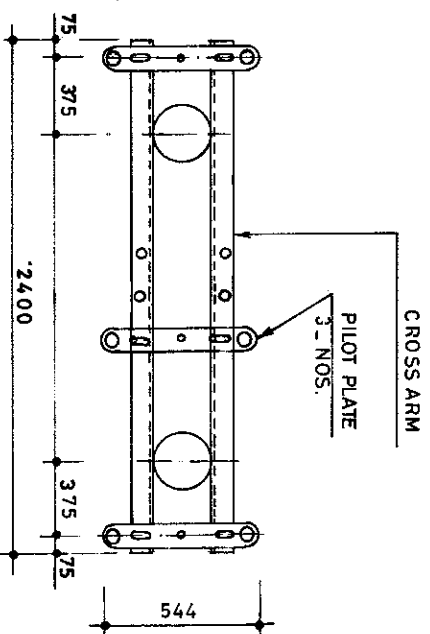
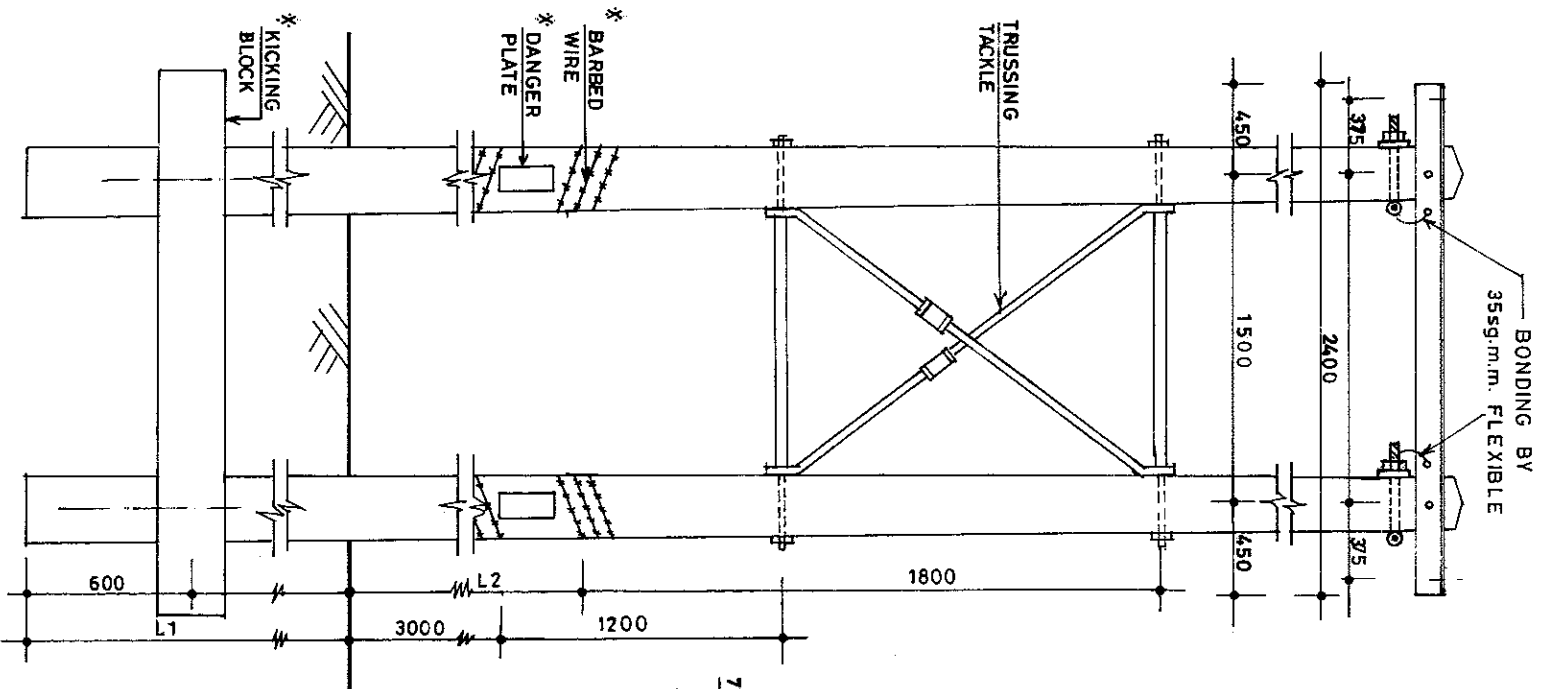
MINISTRY OF ELECTRICITY & WATER

TITLE 11 KV SINGLE CIRCUIT SECTION POLE

DRAWN BY RA. QURESHI CHECKED BY *[Signature]* APPROVED BY *[Signature]*

DRG. NO. MEW/OH/GA/09 DATE 23/12/1996

SCALE



POLE LENGTH - L1 (m)	PLANTING DEPTH L1 (m)	GROUND TO TRUSSING - L2 (m)
11.0	1.8	4.2
13.0	1.8	4.8

NOTE

- *-WHERE REQUIRED
- 1. ALL DIMENSIONS IN mm
- 2. CROSSARM AS PER DRG. NO. MEW/OH/008 REVISED
- 3. PILOT PLATE AS PER DRG. NO. MEW/OH/021
- 4. TRUSSING TACKLE AS PER DRG. NO. MEW/OH/013REV. 'A'
- 5. KICKING BLOCK AS PER DRG. NO. MEW/OH/025
- 6 STAYS 4 IN LINE 2
- 1 BISECTION
- 7. LIMIT OF ANGLE 45°
- 8. STAY HOOK AS PER DRG. NO. MEW/OH/051
- 9. PROVIDE NUMBER PLATE AND RED LIGHT REFLECTOR IF REQUIRED.

REV	DATE	DESCRIPTION	CKD	APD
A	26-05-90	STAY CLAMP DELETED STAY HOOK ADDED NOTES AND DIMENSION CHANGED	<i>[Signature]</i>	

MINISTRY OF ELECTRICITY & WATER

TITLE 11 KV TERMINAL & ANGLE
'H' POLE

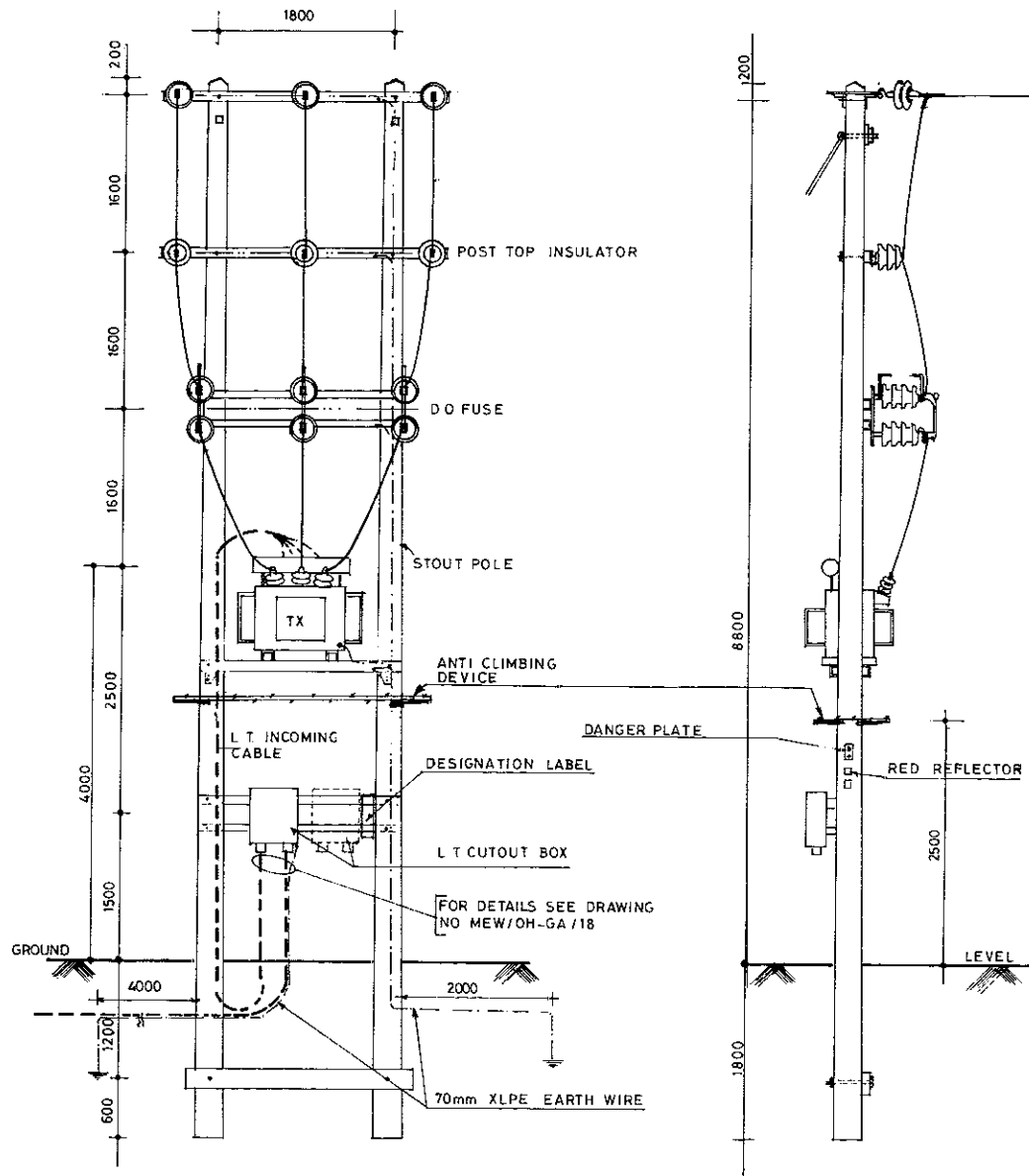
DRAWN BY CHECKED BY APPROVED BY

R.A. QURESHI

[Signature] *[Signature]*

DRG. NO. MEW OH. GA/10 DATE 24/12/84

SCALE



NOTE :

- 1 ALL DIMENSIONS IN MM
- 2 CROSS ARM AS PER DRAWING NO MEW/OH/007 REVISED
- 3 GALVANISED TO BS 729 IN ACCORDANCE WITH OES 11 MINIMUM THICKNESS 127 MICRONS
- 4 DROP OUT FUSE AS PER DRAWING NO: MEW/OH/030 REV A
- 5 TRANSFORMER FIXING CHANNEL & GUSSET PLATE AS PER DRAWING NO MEW/OH/011
- 6 DANGER PLATE AS PER DRAWING NO: MEW/OH/017 Rev A
- 7 POST TOP INSULATOR AS PER DRAWING NO: MEW/OH/002 REV A WITH LONG STUD
- 8 STAY HOOK AS PER DRG. NO: MEW/OH/051
- 9 NEUTRAL AND EARTH TERMINAL OF CUTOUT BOX TO BE BONDED
- 10 H T STRUCTURE EARTH AND NEUTRAL EARTH TO BE IN OPPOSITE SIDE ATLEAST 6M APART
- 11 EARTHPIITS SHOULD BE 2M AWAY FROM ANY FENCING AND DEPTH OF TOP ELECTRODE SHOULD BE MINIMUM 500 MM BELOW THE GROUND
- 12 EARTHPIIT SHALL BE AS PER DRG NO: MEW/OH-GA/24 - REV A
- 13 ANTI CLIMBING DEVICE AS PER DRG NO: MEW/OH-GA/37

B	03.09.90	ANTI CLIMBING DEVICE ADDED	<i>[Signature]</i>	<i>[Signature]</i>
A	26.05.90	STAY HOOK ADDED NOTES CHANGED	<i>[Signature]</i>	
REV	DATE	DESCRIPTION	CKD	APD

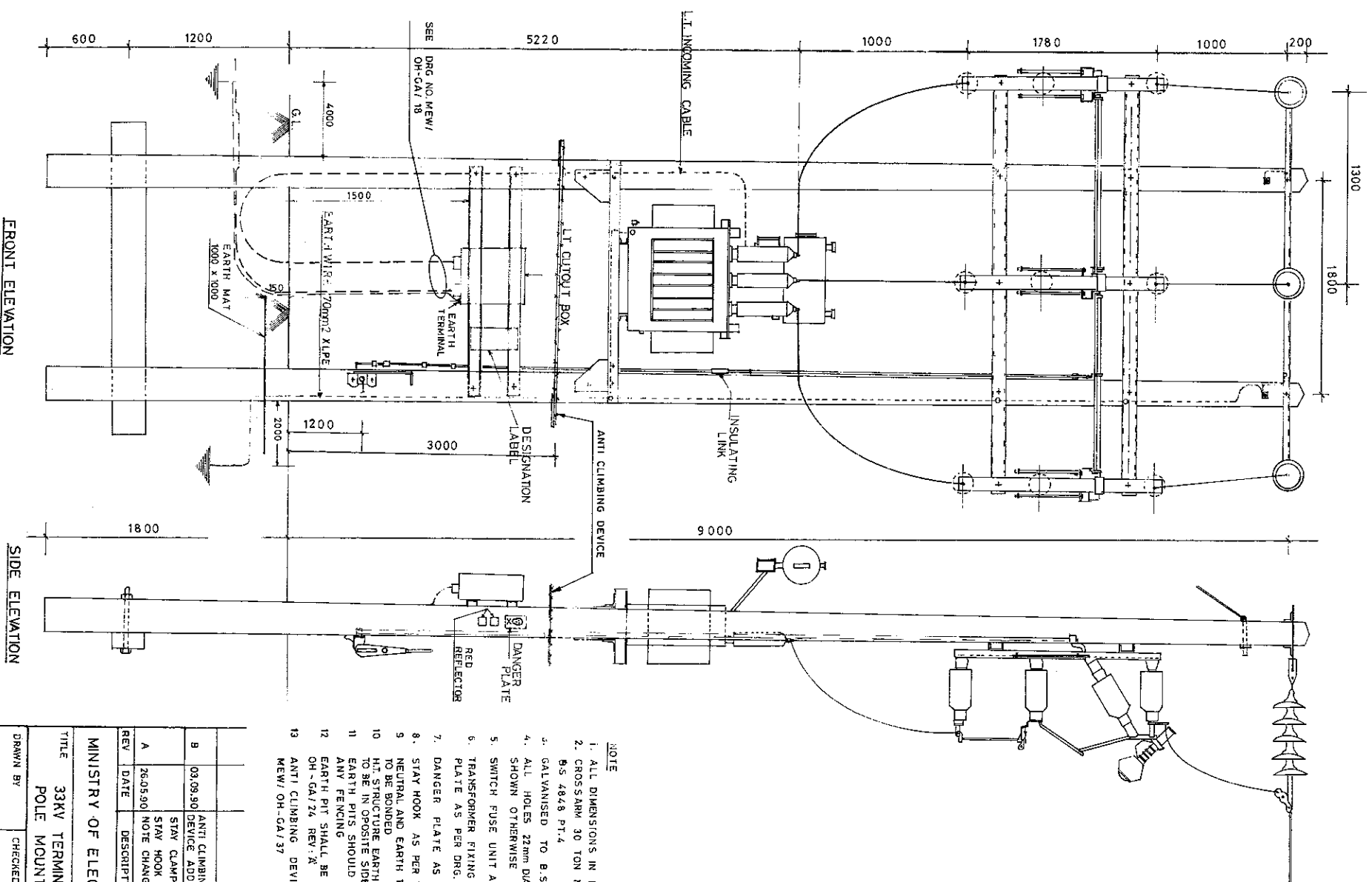
MINISTRY OF ELECTRICITY & WATER

TITLE
11KV TERMINAL POLE WITH
POLE MOUNTED TRANSFORMER

DRAWN	CHECKED	APPROVED
FRANCIS.		

DRAWING NO: MEW/OH-GA/11 REVISED

SCALE - 1:50 DATE - 02-07-1989



- NOTE**
1. ALL DIMENSIONS IN M.M.
 2. CROSS ARM 30 TON M.S. ANGLE 100 x 100 x 10mm BS 4848 PT.4
 3. GALVANISED TO B.S. 729
 4. ALL HOLES 22mm DIA CLEAR EXCEPT THOSE SHOWN OTHERWISE
 5. SWITCH FUSE UNIT AS PER DRG. NEW/OH/028; PLATE AS PER DRG. NO. NEW/OH/011
 6. TRANSFORMER FIXING CHANNEL & GUSSET PLATE AS PER DRG. NO. NEW/OH/017
 7. DANGER PLATE AS PER DRG. NO. NEW/OH/051
 8. STAY HOOK AS PER DRG. NO. NEW/OH/051
 9. NEUTRAL AND EARTH TERMINAL OF CUTOUT BOX TO BE BONDED
 10. HT STRUCTURE EARTH AND NEUTRAL EARTH TO BE IN OPPOSITE SIDE AT LEAST 5M. APART.
 11. EARTH PITS SHOULD BE 2m. AWAY FROM ANY FENCING
 12. EARTH PIT SHALL BE AS PER DRG. NO. NEW/OH-GA/24. REV. A
 13. ANTI CLIMBING DEVICE AS PER DRG. NO. NEW/OH-GA/37

REV	DATE	DESCRIPTION	CKD	APD
B	03.09.90	ANTI CLIMBING DEVICE ADDED		
A	26.05.90	STAY CLAMP DELETED STAY HOOK ADDED NOTE CHANGED		

MINISTRY OF ELECTRICITY & WATER

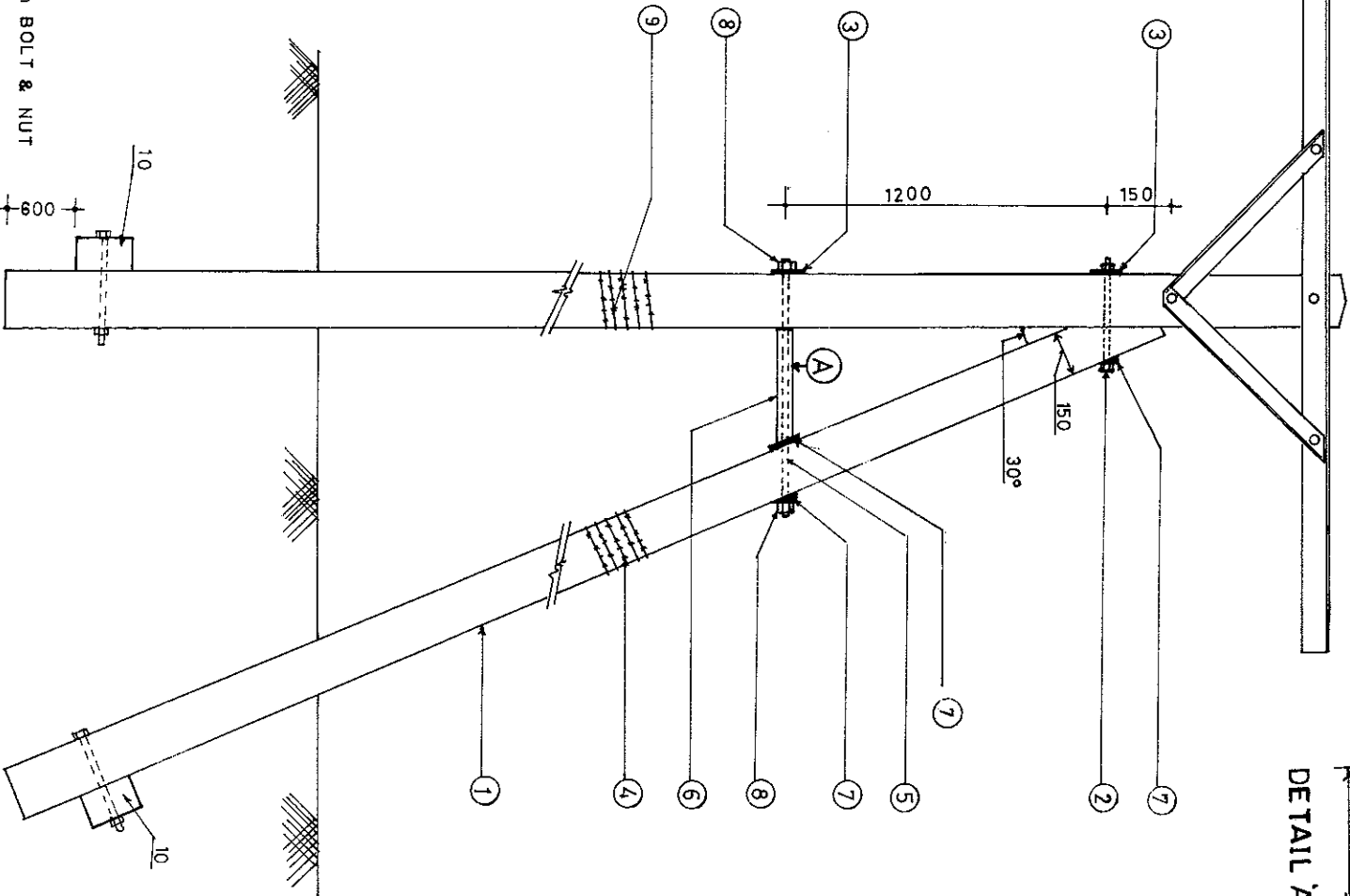
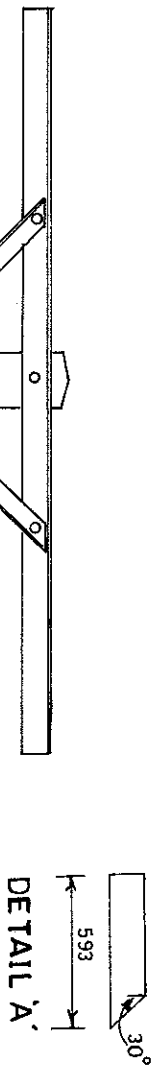
TITLE
33KV TERMINAL POLE WITH
POLE MOUNTED TRANSFORMER

DRAWN BY FRANCIS
CHECKED
APPROVED

DRG. NO. NEW/OH-GA/12
DATE 11-09-1985
SCALE - N.T.S.

FRONT ELEVATION

SIDE ELEVATION



- MATERIAL**
- 11M. POLE
 - M 20x 400mm BOLT & NUT
 - 3" CURVED WASHER
 - BARBED WIRE
 - TIE ROD 20mm DIA 1100MM LONG, THREADED 150MM. ON BOTH ENDS
 - SPACER TUBE 25MM DIA
 - CURVED TAPERED WASHER
 - M20 NUTS
 - STAPLES
 - KICKING BLOCK (DRG. NO. MEW/OH/025)

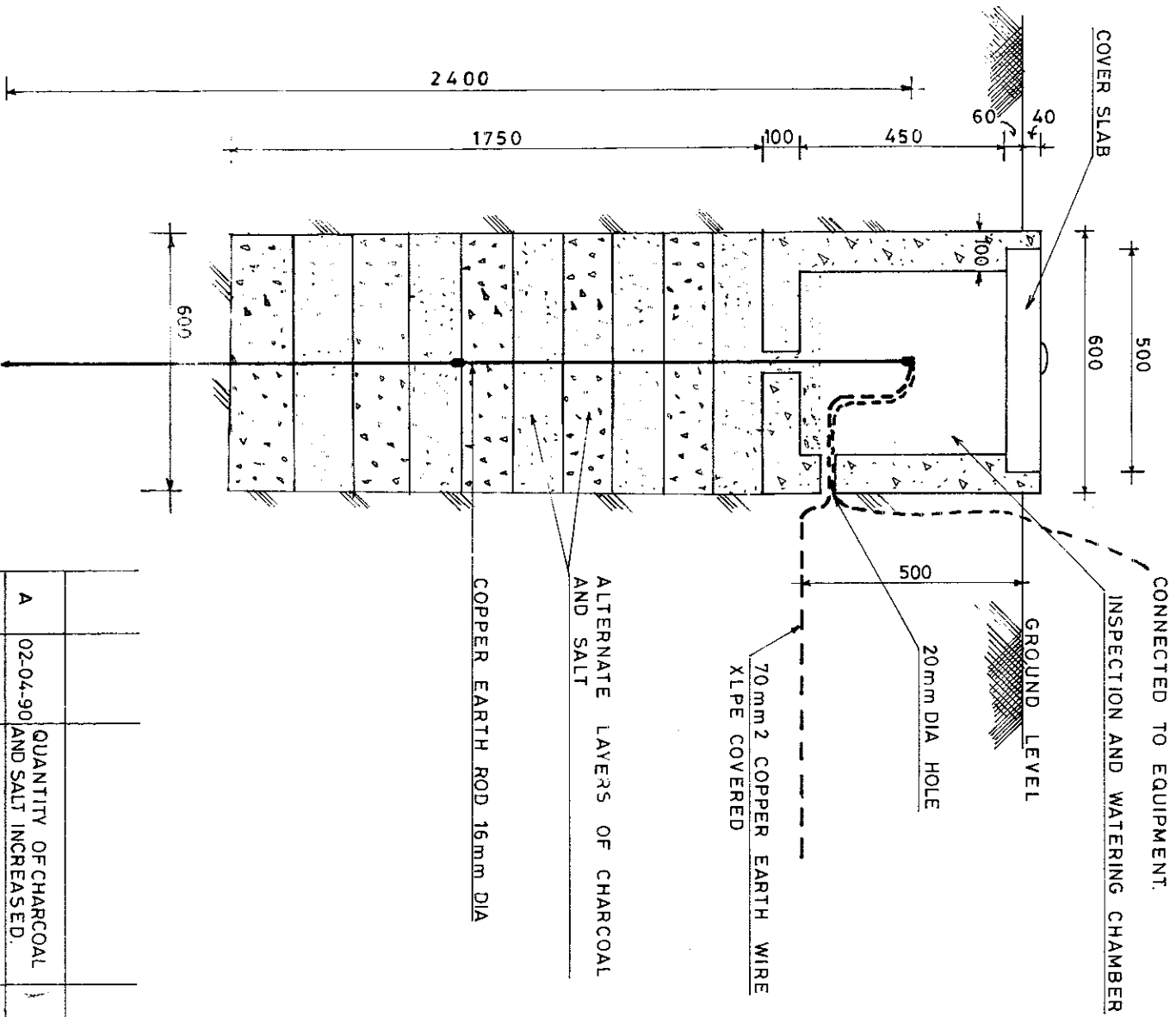
NOTE ALL DIMENSIONS IN M.M.
ALL MS.MATERIALS GALVANISED TO B.S.729

MINISTRY OF ELECTRICITY & WATER

TITLE:
STRUT STAY H.V. INSTALLATION

DRAWN BY: FRANCIS
CHECKED BY: [Signature]
APPROVED BY: [Signature]

A	28.05.90	MATERIAL ADDED	CKD	APD	DRG. NO. MEW/OH/GA/13	DATE. 27.09.1985
REV	DATE	DESCRIPTION	CKD	APD	SCALE: N.T.S.	



NOTE

COPPER EARTH ROD COMPRISING:

- 2 - 5/8" (16mm approx.) DIAMETER RODS EACH
- 4 FEET (120cm approx.) LONG EXTENSIBLE THREADED FOR COUPLING TOGETHER
- 1. DRIVING TIP
- 1. DRIVING HEAD
- 1. BRASS OR COPPER CONNECTOR CLAMP FOR CONNECTING AND BONDING COPPER EARTH WIRE TO THE EARTH ROD

REV	DATE	DESCRIPTION	CKD	APD
A	02-04-90	QUANTITY OF CHARCOAL AND SALT INCREASED.		<i>WJ</i>

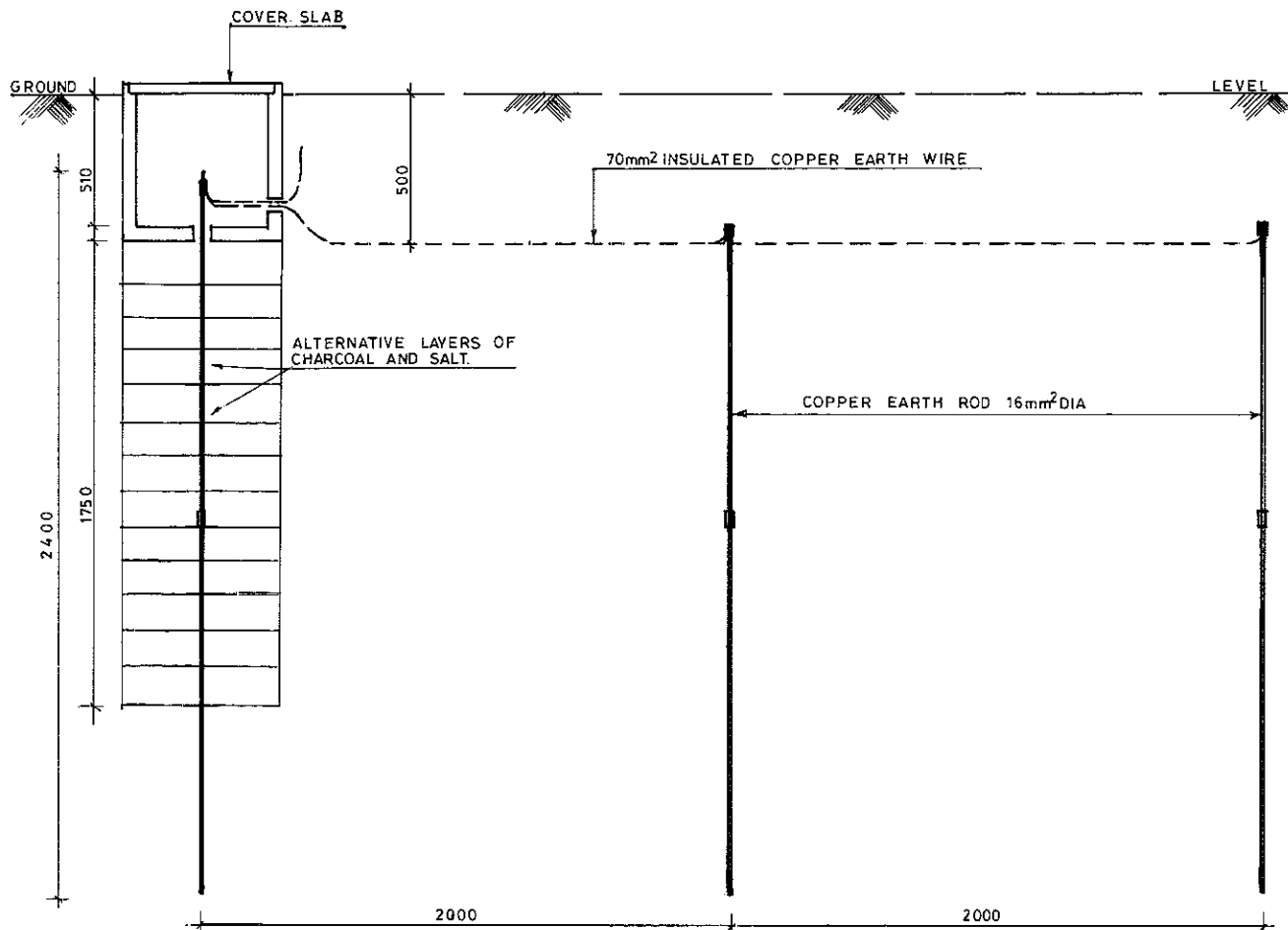
MINISTRY OF ELECTRICITY & WATER
 DIRECTORATE GENERAL OF ELECTRICITY
 PLANNING DEPARTMENT

SUBSTATION EARTH PIT DETAILS

DRAWN	CHECKED	APPROVED
FRANCIS	<i>[Signature]</i>	<i>[Signature]</i>

DRAWING NO: MEW / OH - GA / 24

SCALE - N.T.S. DATE. 15 - 02 - 1987



NOTE
 FOR EARTH PIT DETAILS REFER DRAWING
 NO: MEW / OH_GA / 24 REV_A
 ALL DIMENSIONS ARE IN M.M

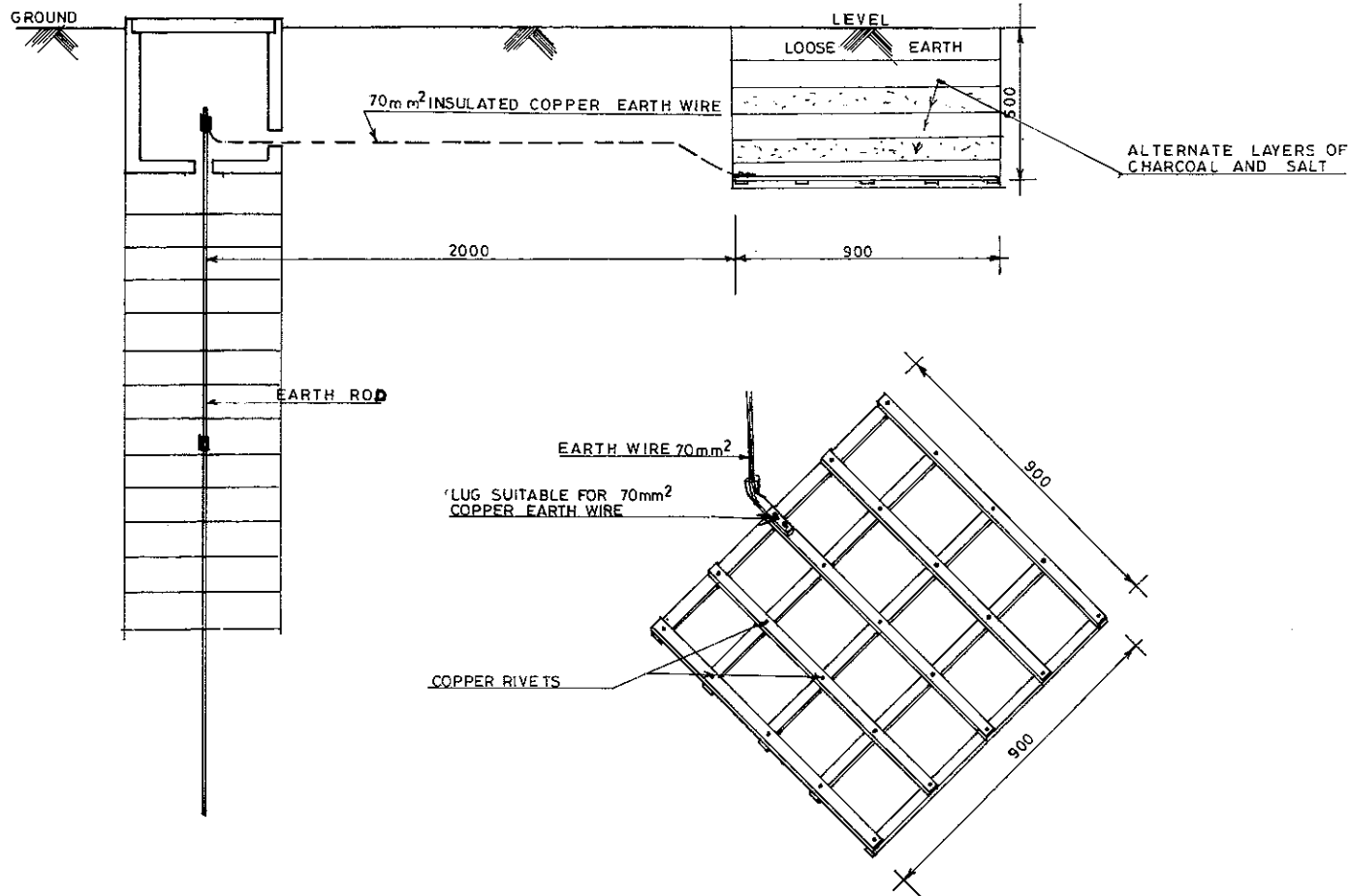
SULTANATE OF OMAN
 MINISTRY OF ELECTRICITY & WATER
 DIRECTORATE GENERAL OF ELECTRICITY
 PLANNING DEPARTMENT

SUBSTATION EARTING WITH
 ADDITIONAL EARTH RODS

DRAWN	CHECKED	APPROVED
FRANCIS		

DRAWING NO: MEW / OH-GA / 24_A.

SCALE: N.I.S. DATE: 20-03-1990



NOTE:

ALL DIMENSIONS ARE IN MM

FOR EARTH PIT DETAILS REFER DRAWING NO: MEW/OH-GA/24 REV.A

EARTH MESH CONSIST OF 10 Nos COPPER STRIPS 35mm x 3mm SIZE

REV	DATE	DESCRIPTION	CKD	APD
B	17.02.91	MEASUREMENTS OF CU. STRIPS ADDED.		
A	27.11.90	CHARCOAL AND SALT ADDED		

SULTANATE OF OMAN
 MINISTRY OF ELECTRICITY & WATER
 DIRECTORATE GENERAL OF ELECTRICITY
 PLANNING DEPARTMENT

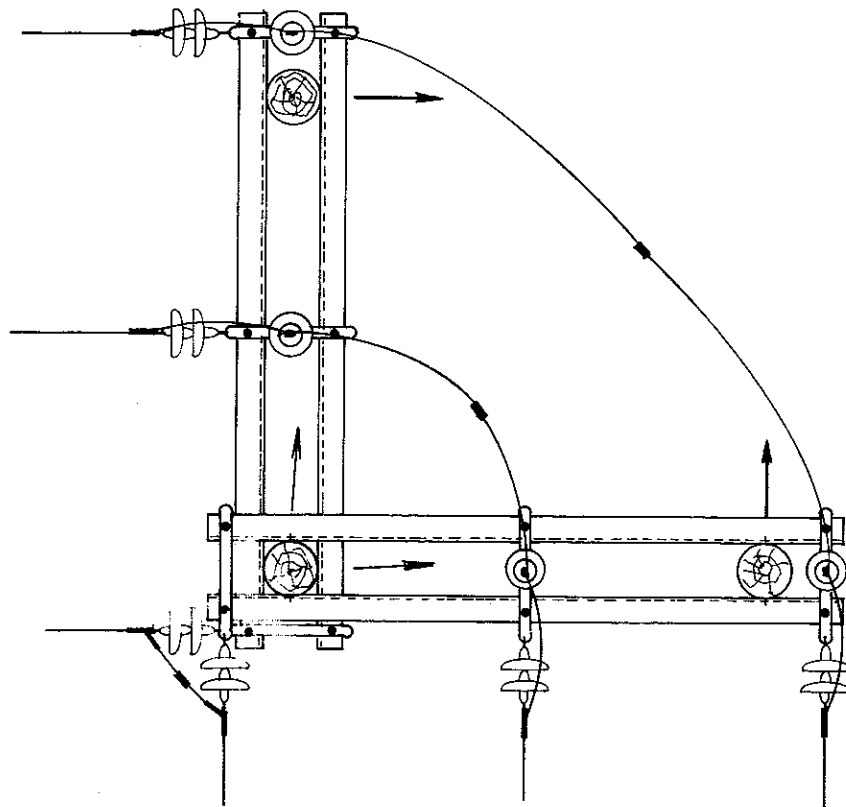
SUBSTATION EARTHING WITH
 ADDITIONAL EARTH COPPER MESH

DRAWN	CHECKED	APPROVED
FRANCIS.		

DRAWING NO: MEW/OH-GA/24-B

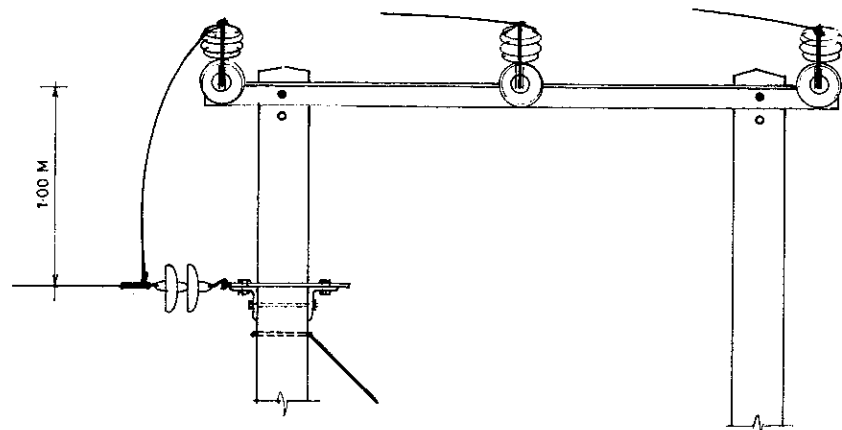
SCALE: N.T.S.


DATE: 20-03-1990

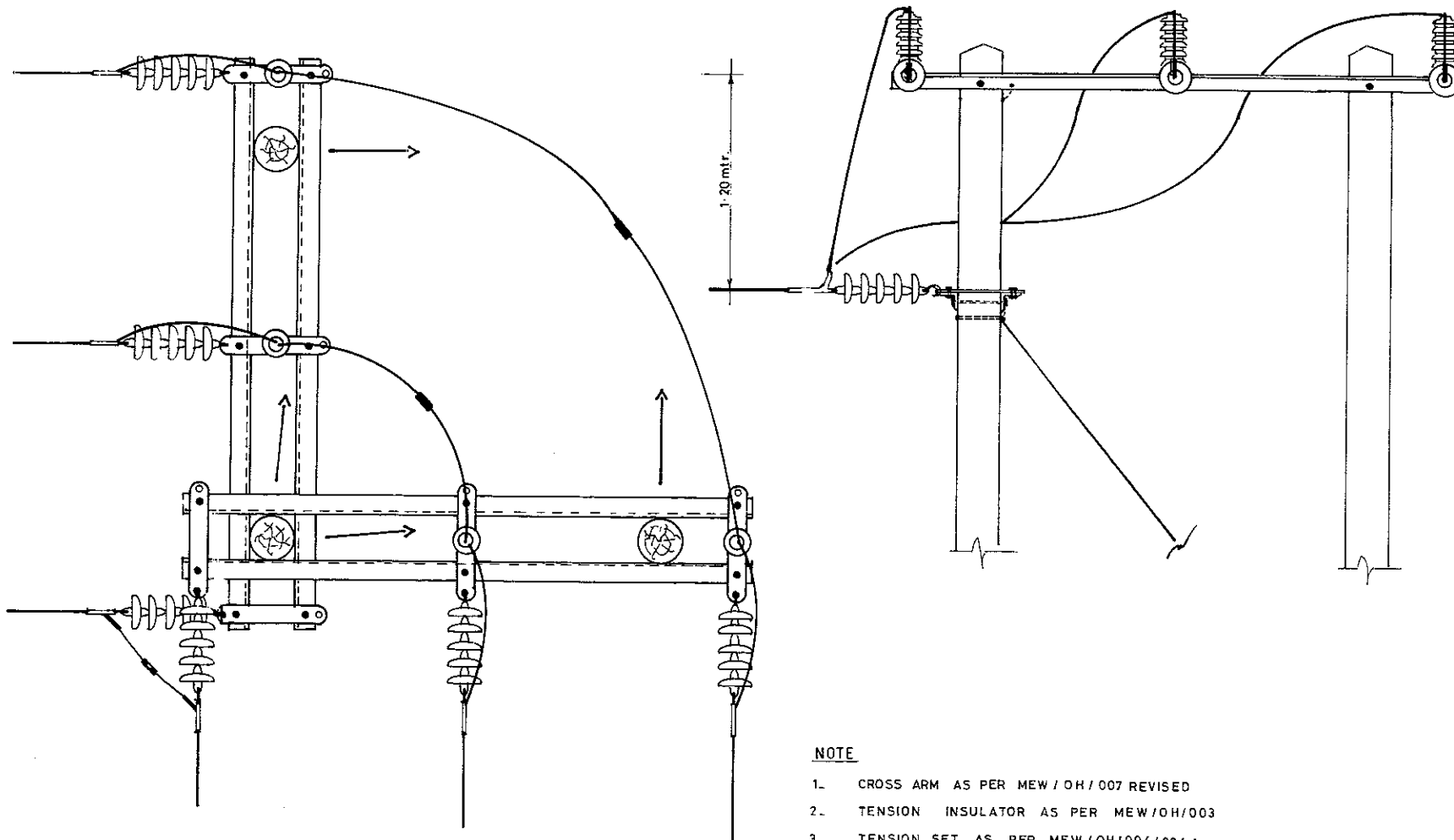


NOTE :

- 1 CROSS ARM AS PER MEW/OH/008 REVISED
- 2 TENSION INSULATOR AS PER MEW/OH/003
- 3 TENSION SET AS PER MEW/OH/004/004A
- 4 PILOT PLATE AS PER MEW/OH/021
- 5 POST TOP INSULATOR AS PER MEW/OH/002 REV. A
- 6 STAYS AS PER MEW/OH/014/MEW/OH/015B AND MEW/OH/020



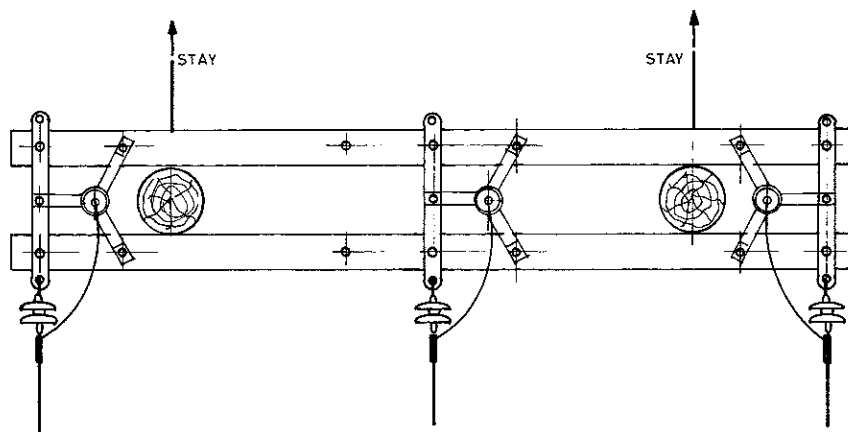
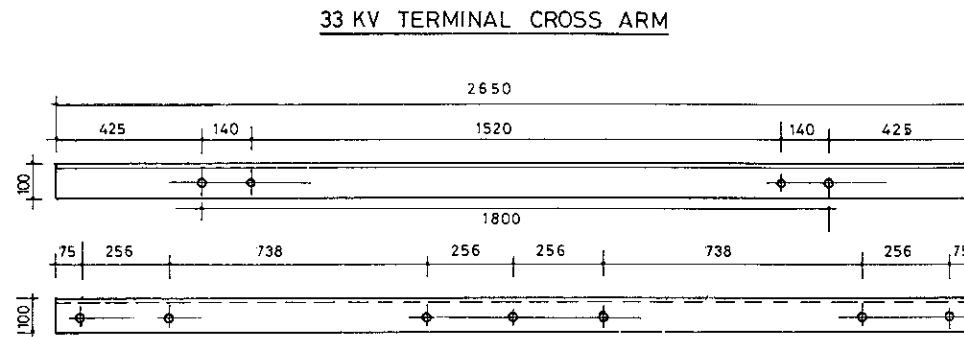
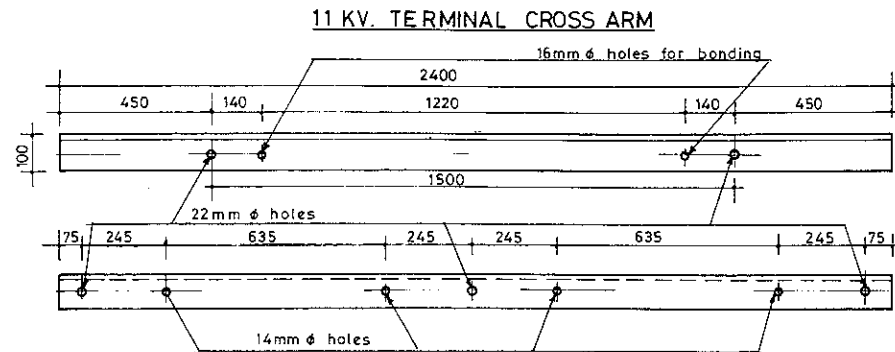
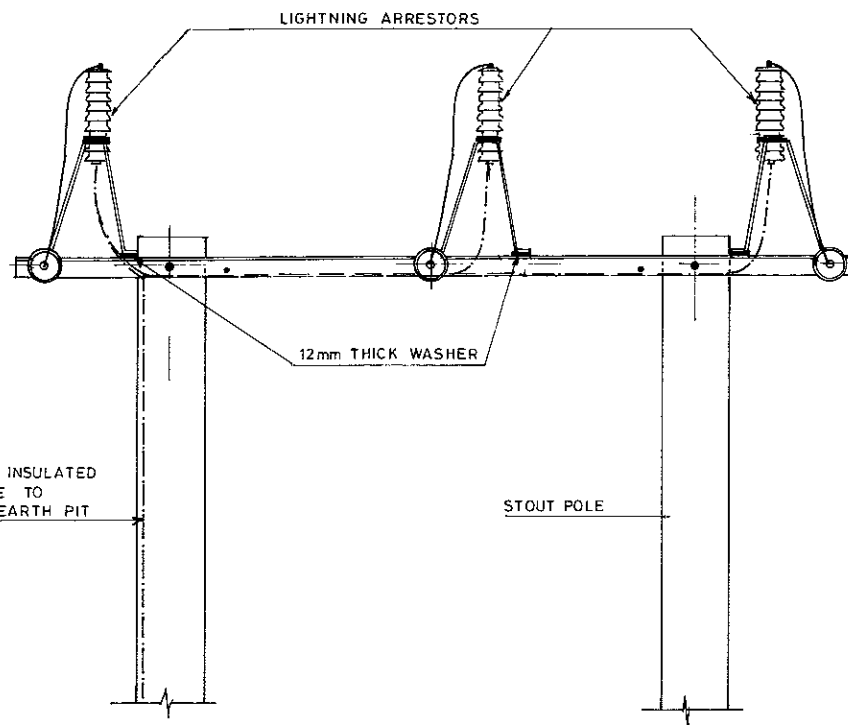
SULTANATE OF OMAN MINISTRY OF ELECTRICITY & WATER		
TITLE_ GENERAL ARRANGEMENT FOR 90° DEVIATION STRUCTURE (11 KV)		
DRAWN FRANCIS	CHECKED	APPROVED 
DRG. NO: MEW/OH-GA/27		DATE _ 20 - 12 - 1988
SCALE _		



NOTE

1. CROSS ARM AS PER MEW/OH/007 REVISED
2. TENSION INSULATOR AS PER MEW/OH/003
3. TENSION SET AS PER MEW/OH/004/004 A
4. PILOT PLATE AS PER MEW/OH/021
5. POST TOP INSULATOR AS PER MEW/OH/001 REV. A
6. STAY AS PER MEW/OH/014 MEW/OH/015A & MEW/OH/051 OR MEW/OH/015C

SULTANATE OF OMAN MINISTRY OF ELECTRICITY & WATER		
TITLE: GENERAL ARRANGEMENT FOR 90° DEVIATION STRUCTURE 33 KV.		
DRAWN FRANCIS	CHECKED	APPROVED <i>[Signature]</i>
DRG NO: MEW/OH-GA/28		DATE - 26 - 12 - 1988
SCALE -		



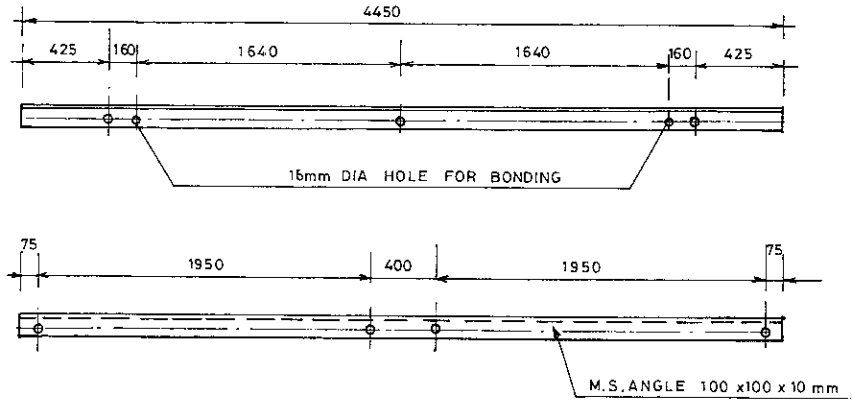
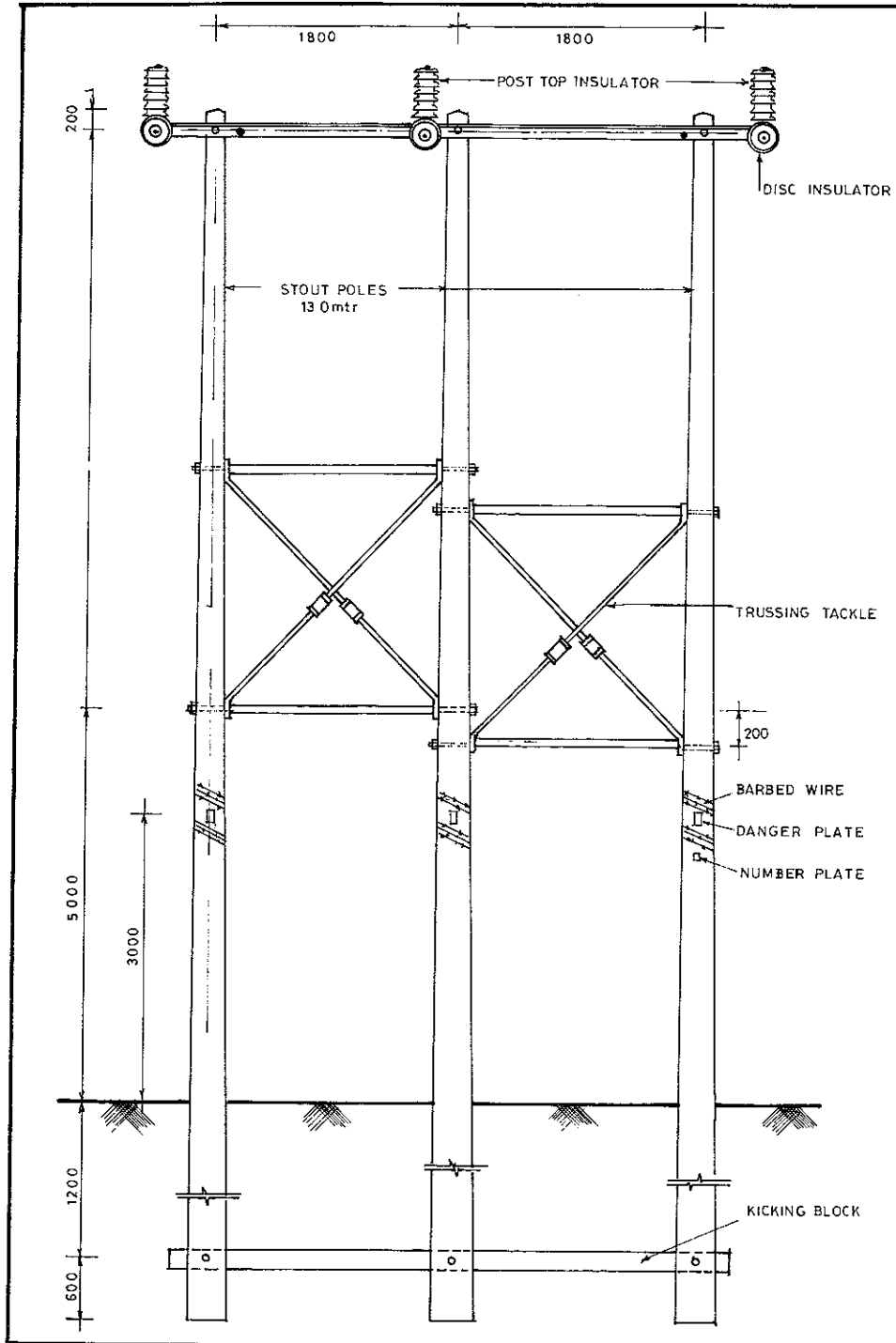
NOTE

- 1 Lightning arrestors to be connected to separate earth pit Earth resistance should be below 10 Ohms
- 2 In addition to above earth of lightning arrestor to be connected to station earth by bonding to armour of the cable connected to the equipment
- 3 Crossarms used shall be terminal cross arm as per drawing no MEW/OH/007 and MEW/OH/008 by providing additional holes
- 4 All metal parts galvanised to BS 729 in accordance with the OES 11 with minimum thickness of 127 microns

SULTANATE OF OMAN
MINISTRY OF ELECTRICITY AND WATER

GENERAL ARRANGEMENTS OF 33KV
AND 11KV LIGHTNING ARRESTORS
ON 'H' TERMINAL POLES

DRAWN	CHECKED	APPROVED
FRANCIS		
DRAWING No. MEW/OH-GA/30		
SCALE: N.T.S.	DATE 15_05_1989.	



THREE POLE CROSS ARM

NOTE :

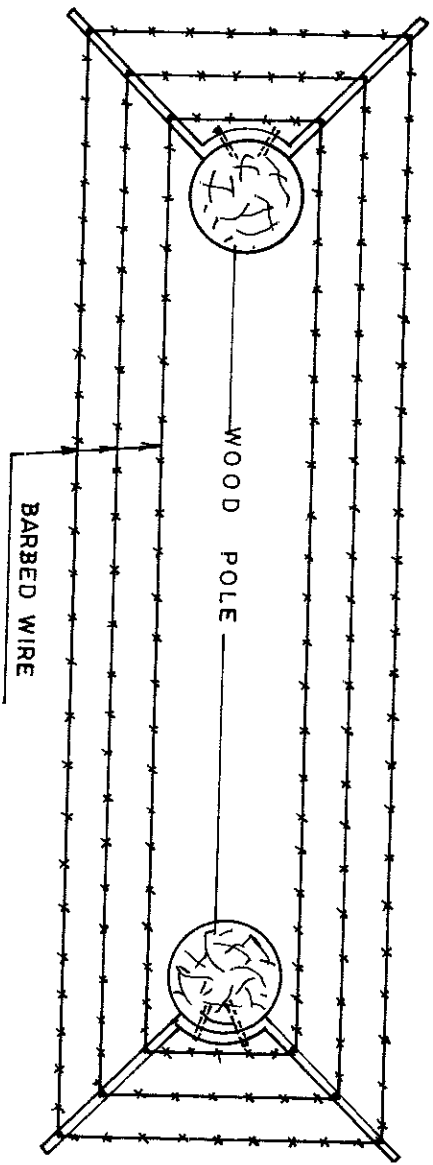
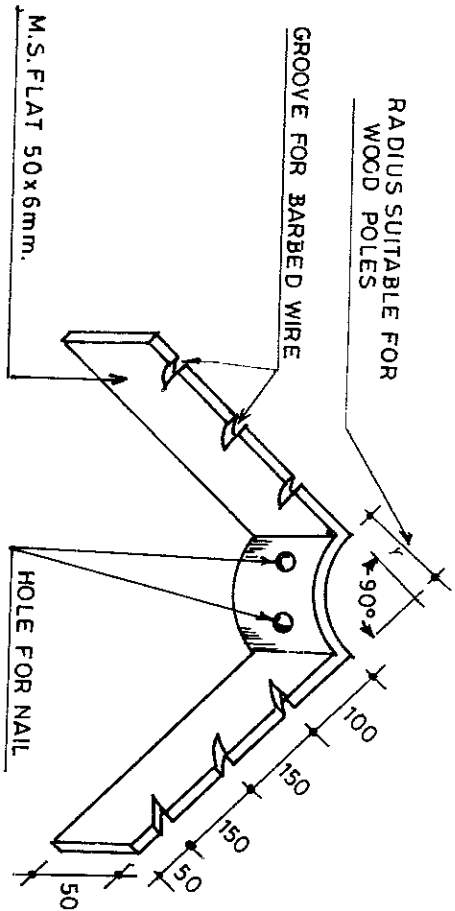
ALL DIMENSIONS IN M M
 CROSS ARM 30 TON M S ANGLE 100 x 100 x 10 mm BS. 484.8
 GALVANISED TO B.S 729 IN ACCORDANCE WITH CES 11 MINIMUM THICKNESS 127 MICRONS
 ALL HOLES 22mm DIA CLEAR EXCEPT THOSE SHOWN OTHERWISE

CONDUCTOR	MAX. SPAN LENGTH
DOG	200 mtr
WOLF	160 mtr
PANTHER	140 mtr

SULTANATE OF OMAN
 MINISTRY OF ELECTRICITY AND WATER

**General arrangements of
 Three pole structure for
 Long spans (33kv & 11kv)**

DRAWN FRANCIS	CHECKED	APPROVED <i>[Signature]</i>
DRAWING NO: MEW / OH - GA / 36		
SCALE: NTS	DATE : 18-10-1989	

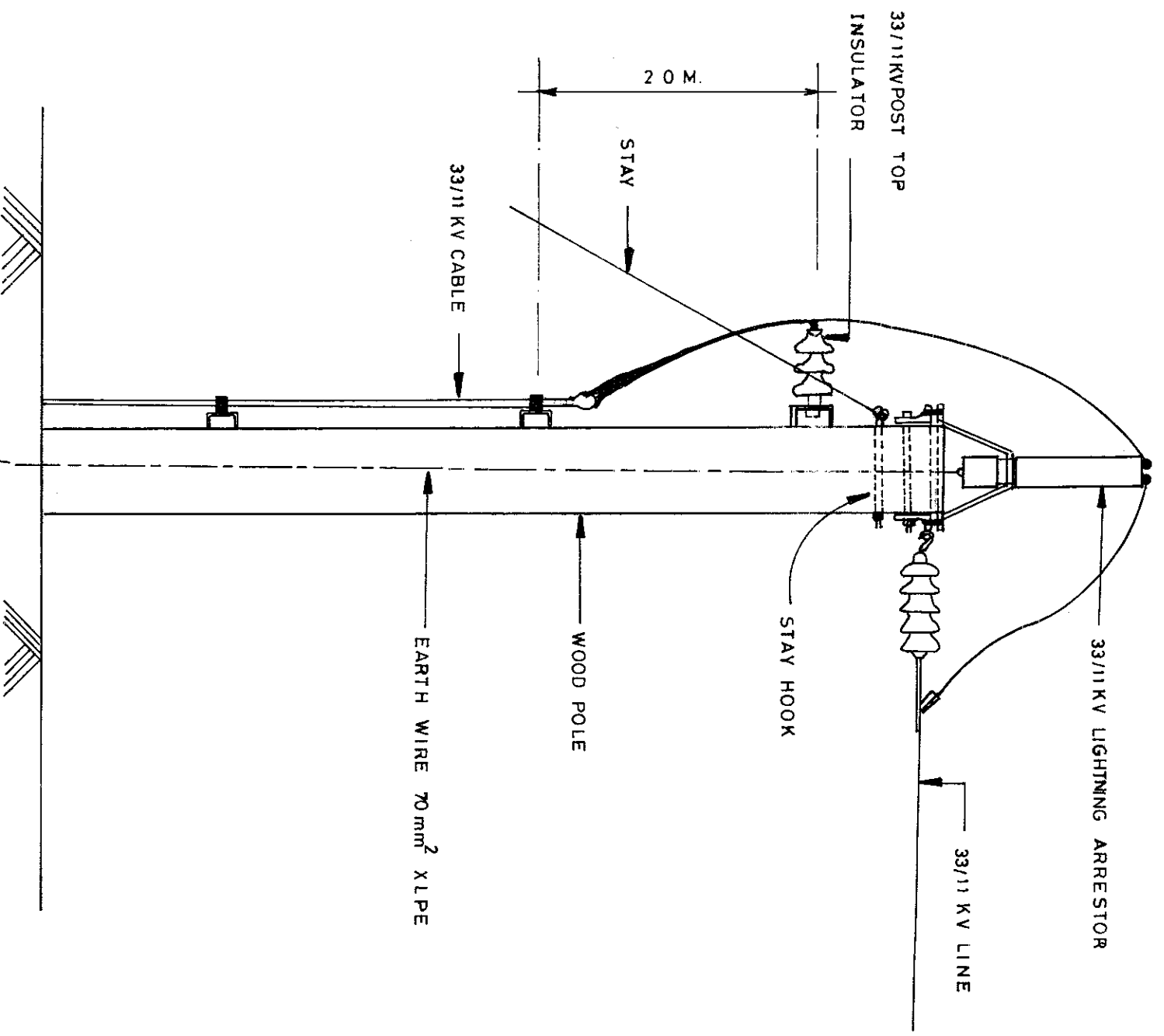


NOTE:

ALL DIMENSIONS ARE IN MM.
 ALL MATERIALS GALVANISED TO B.S. 729
 IN ACCORDANCE WITH O.E.S. 11 THE
 MINIMUM THICKNESS 127 MICRONS.

SULTANATE OF OMAN
 MINISTRY OF ELECTRICITY & WATER
 ANTI CLIMBING DEVICE

DRAWN	CHECKED	APPROVED
FRANCIS	<i>Francis</i>	<i>[Signature]</i>
DRAWING NO: MEW/0H-GA/37		
SCALE	N.T.S.	DATE: 14-08-1990



NOTE -
FOR DETAILS REFER DRG NO
MEW / OH - GH / 30

SULTANATE OF OMAN
MINISTRY OF ELECTRICITY & WATER
TITLE ARRANGEMENTS OF LIGHTNING
ARRESTOR ON TERMINAL POLE

DRAWN MUNA	CHECKED <i>[Signature]</i>	APPROVED <i>[Signature]</i>
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DRG NO MEW/OH.GA/38	DATE 05 .09 .1990
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SCALE - N.T.S

33/11KV 'H' FOLE

SWITCH OPERATING ROD

HANDLE

70mm INSULATED COPPER EARTH WIRE

STRUCTURE EARTH WIRE

GROUND

COPPER EARTH MESH

LEVEL

1000 (min)

900

500

900

END VIEW

FRONT VIEW

NOTE :

1. All dimensions are in mm
2. Switch handle should be earthed separately using copper earth mesh
3. Earth mesh should be lattice copper strips 900x 900 in size
4. Structure earth should be minimum 1mtr. away from the edge of the copper mesh and opposite side
5. For details of earth mesh and pit refer drawing no:MEW/OH-GA/24 B. Rev. 'B'

SULTANATE OF OMAN
MINISTRY OF ELECTRICITY AND WATER

DETAILS OF HANDLE EARTHING
OF 33/11KV A.B. SWITCHES.

DRAWN

CHECKED

APPROVED

FRANCIS.

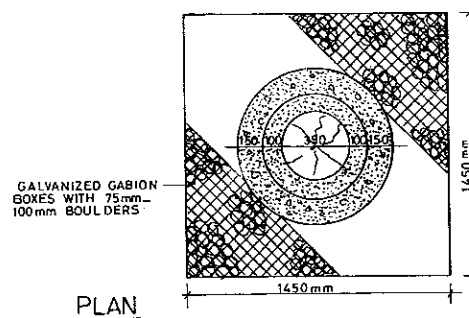
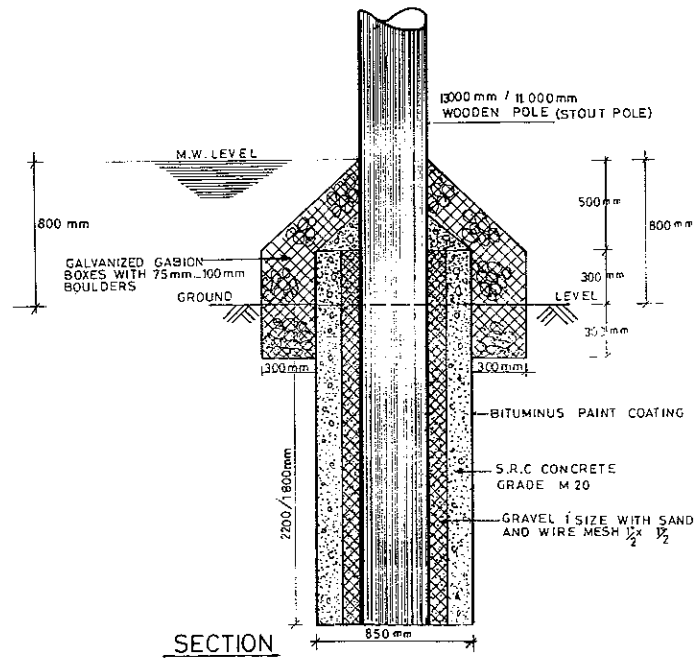
DRAWING NO: MEW /OH - GA/43

SCALE

NTS

DATE

27 - 07 - 1992.



SPECIFICATION

- 1 ALL THE DIMENSIONS ARE IN MILLI METERS
- 2 ALL THE MATERIALS USED SHALL BE OF APPROVED QUALITY
- 3 ANY DISCREPANCY IN DRAWING SHALL BE BROUGHT TO THE NOTICE OF M.E.W. AUTHORITIES BEFORE EXECUTING THE WORK
- 4 EXCAVATION SHALL BE CARRIED OUT BY ANY APPROVED METHOD.
- 5 CONCRETE GRADE M20 HAVING CEMENT CONCRETE 320 KG/M³ IN SRC TO BE USED
- 6 ALL THE CONCRETE FACE IN DIRECT CONTACT WITH SOIL SHALL BE PAINTED WITH 2 COATS BITUMASTIC PAINT
- 7 GALVANIZED GABION MESH SIZE TO BE 50x50mm AND STONES MUST NOT BE LESS THAN MESH SIZE WIRE DIAMETER OF GABION TO BE 300mm
- 8 FILLING GRAVEL 1 SIZE WITH SAND AND WIRE MESH $\frac{1}{2} \times \frac{1}{2}$ IS TO BE USED

FILLING OF GABIONS:-

GABION BASKETS AND LIDS SHOULD BE FILLED WITH HARD NATURAL STONES. STONES ARE PACKED TIGHTLY WITH MINIMISING VOIDS. CARE IS TAKEN TO LEVEL STONES AT DIFFERENT STAGES MINIMISING EMPTY SPACING. THEN THE TOP TO BE LEVELLED BEFORE THE LID IS SECURED. CONNECTING WELDS ARE USED TO BE TAIN ORIGINAL SHAPE AND PREVENT BILGING AT THE GABION BASKET AT DIFFERENT STAGES

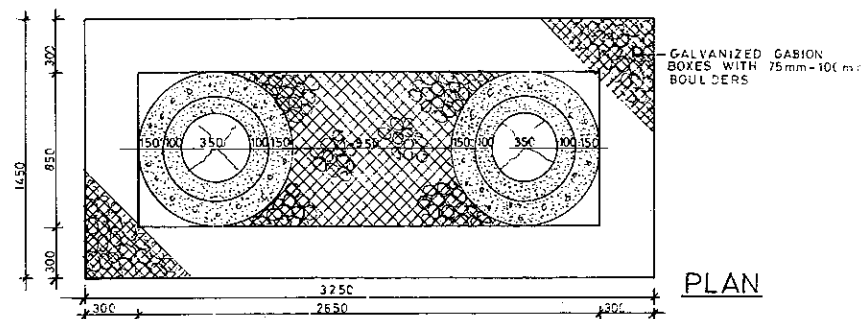
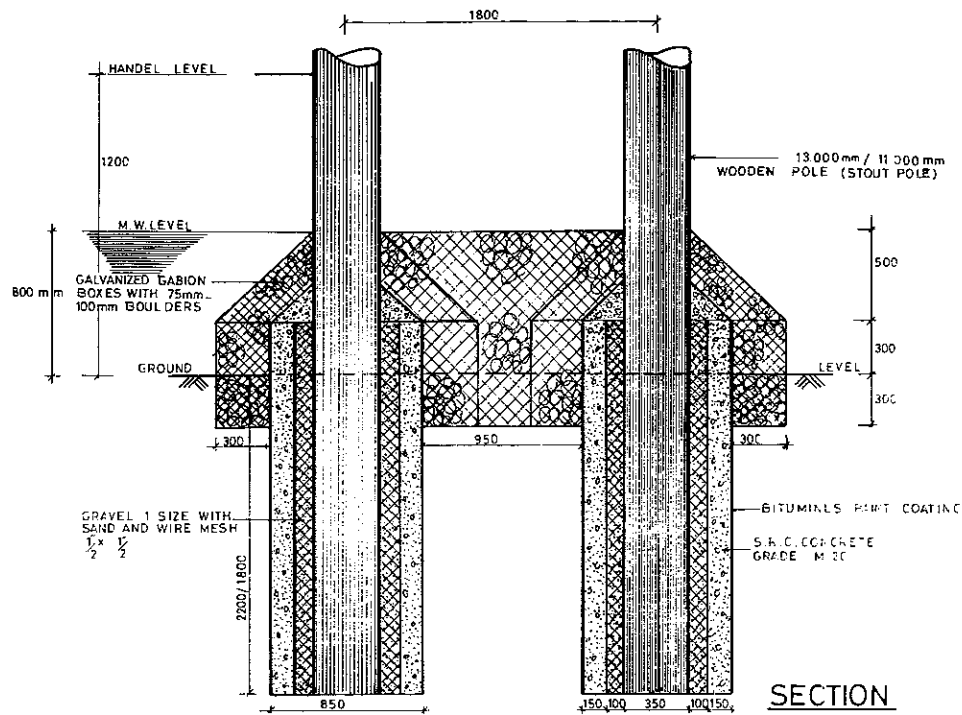
NOTE:

- MINIMUM GRIP LENGTH FOR 13000 mm POLE = 2200 mm
- MINIMUM GRIP LENGTH FOR 11000 mm POLE = 1800 mm

MINISTRY OF ELECTRICITY & WATER
SULTANATE OF OMAN

SPECIAL POLE FOUNDATION
IN NORMAL WADI
(SINGLE POLE)

DESIGNER G SELVARAJ	DRAWN SALEM	CHECKED KHALIFA	APPROVED
DRAWING NO. M.E.W / PL / CL / 013		SCALE 1:100	DATE 19-1-1991



SPECIFICATION

- 1 ALL THE DIMENSIONS ARE IN MILLI METERS
- 2 ALL THE MATERIALS USED SHALL BE OF APPROVED QUALITY
- 3 ANY DISCREPANCY IN DRAWING SHALL BE BROUGHT TO THE NOTICE OF M.E.W AUTHORITIES BEFORE EXECUTING THE WORK
- 4 EXCAVATION SHALL BE CARRIED OUT BY ANY APPROVED METHOD.
- 5 CONCRETE GRADE M20 HAVING CEMENT CONCRETE 320 KG/M³ IN SRC TO BE USED
- 6 ALL THE CONCRETE FACE IN DIRECT CONTACT WITH SOIL SHALL BE PAINTED WITH 2 COATS BITUMASTIC PAINT
- 7 GALVANISHED GABION MESH SIZE TO BE 50x50mm AND STONE MUST NOT BE LESS THAN MESH SIZE WIRE DIAMETER OF GABION TO BE 300mm
- 8 FILLING, GRAVEL SIZE WITH SAND AND WIRE MESH $\frac{1}{2} \times \frac{1}{2}$ IS TO BE USED

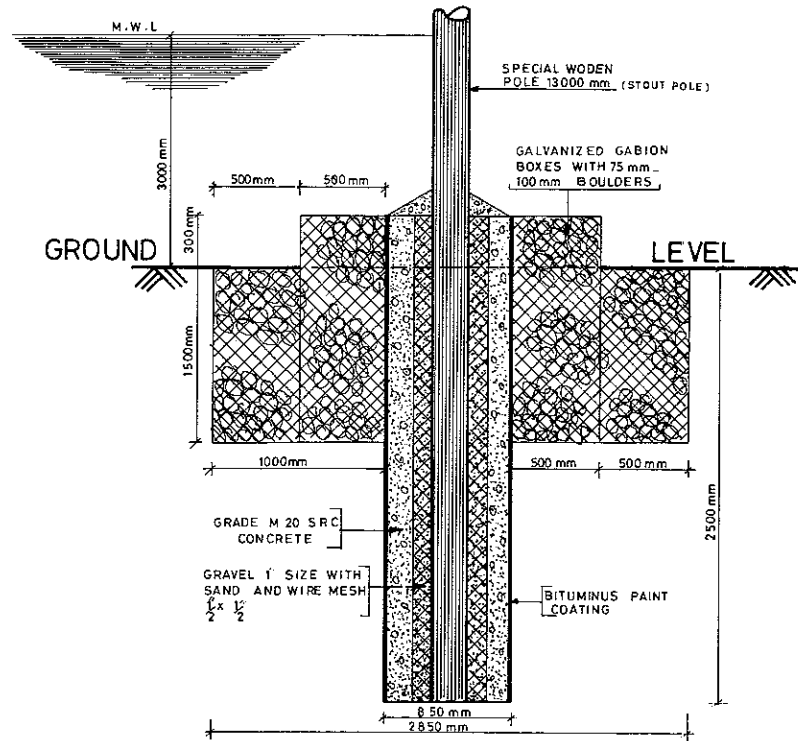
9 FILLING OF GABIONS -

GABION BASKETS AND MATTRESSES SHOULD BE FILLED WITH HARD NATURAL STONES. STONES ARE PACKED TIGHTLY WITH MINIMISING VOIDS. CARE IS TAKEN TO LEVEL STONES AT DIFFERENT STAGES MINIMISING EMPTY SPACING THEN THE TOP TO BE LEVELLED BEFORE THE LID IS SECURED. CONNECTING WIRES ARE USED TO BE TAIN ORIGINAL SHAPE AND PREVENT BULGING OF THE GABION BASKET AT DIFFERENT STAGES

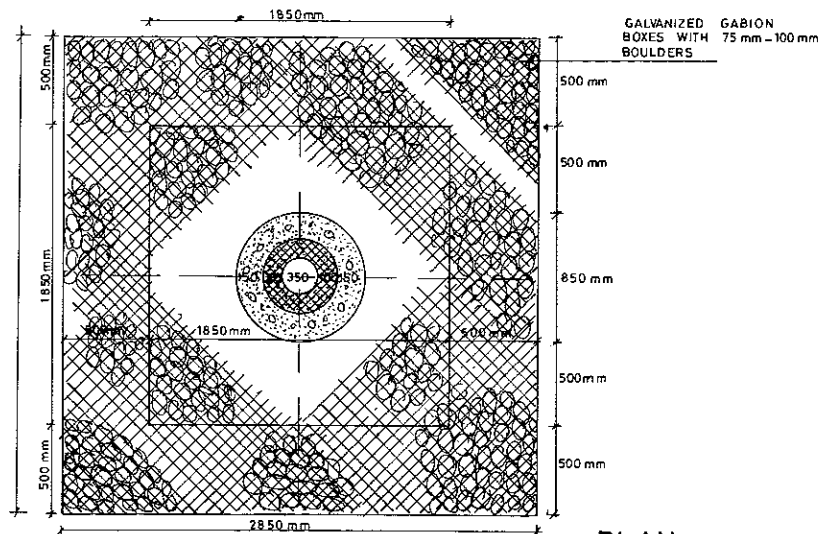
NOTE:

MINIMUM GRIP LENGTH FOR 13000 mm POLE = 2200 mm
 MINIMUM GRIP LENGTH FOR 11000 mm POLE = 1800 mm

MINISTRY OF ELECTRICITY & WATER SULTANATE OF OMAN			
SPECIAL POLE FOUNDATION IN NORMAL WADI (DOUBLE POLE)			
DESIGNED G SELVARAJ	DRAWN SALEM	CHECKED KHALIFA	APPROVED
DRAWING NO. MEW / PL / CL / 014		SCALE 1:200	DATE 19-1-199...



SECTION



PLAN

SPECIFICATION

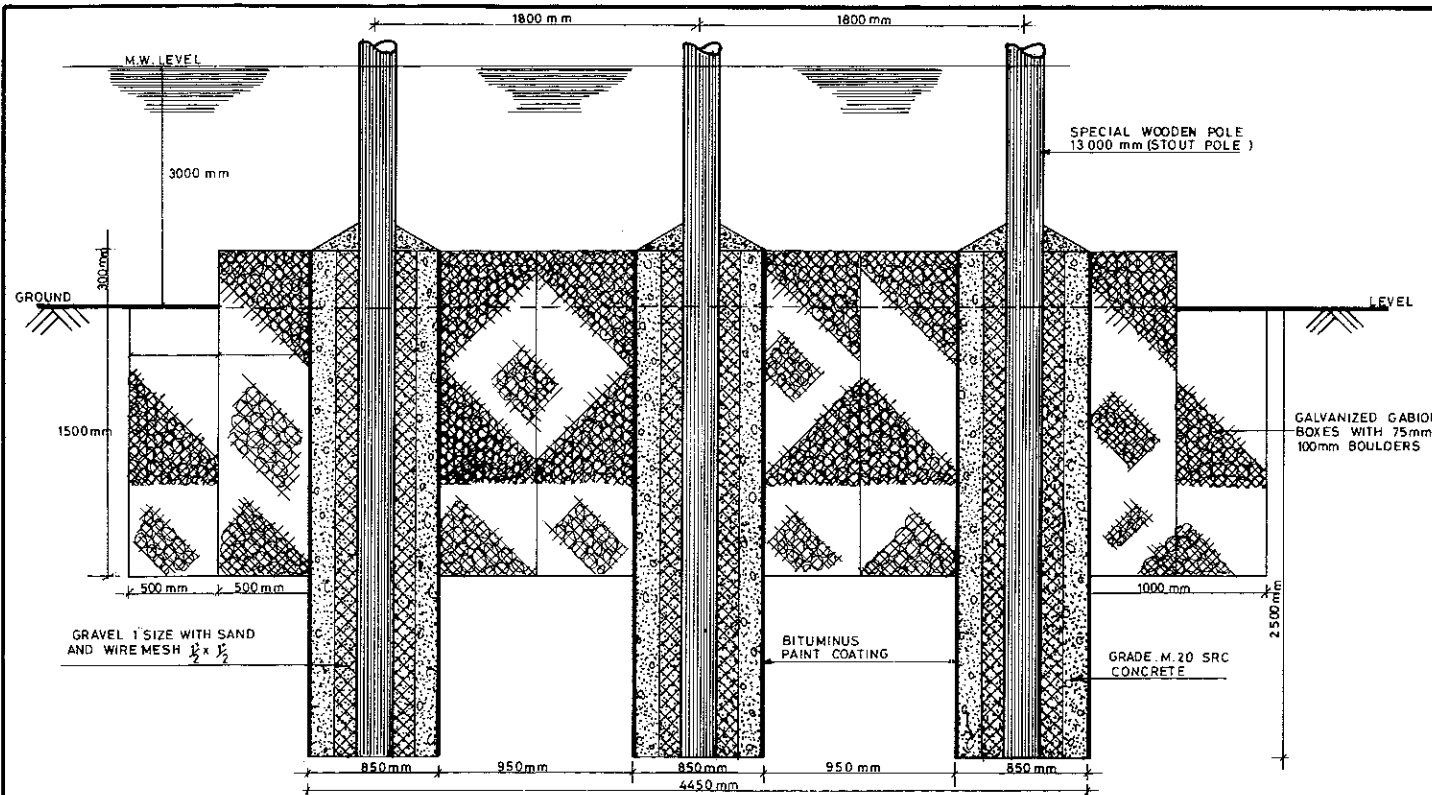
DESIGNE PRINCIPALS:

1. MINIMUM GRIP LENGTH OF POLE IS 2500 mm FROM G.L.
2. SPECIAL POLES ARE TO BE USED FOR WADI CENTERS (STOUT POLE)
3. MAXIMUM DISCHARGE IN THE WADI SHOULD NOT EXCEED 1900 CUMES.
4. NATURE OF BED STARTS IS SAND AND MIXED BOULDERS.
5. LACY'S SILT FACTOR CONSIDERED IS 65.
6. MAXIMUM SCOUR DEPTH IS TWICE OF NORMAL SCOUR DEPTH.
7. MEAN VELOCITY OF WATER SHOULD NOT EXCEED 480 m / SEC.
8. FOR MINIMUM GRIP LENGTH OF POLE IN CASE OF BED ROCK, SPECIAL APPROVAL IS REQUIRED.

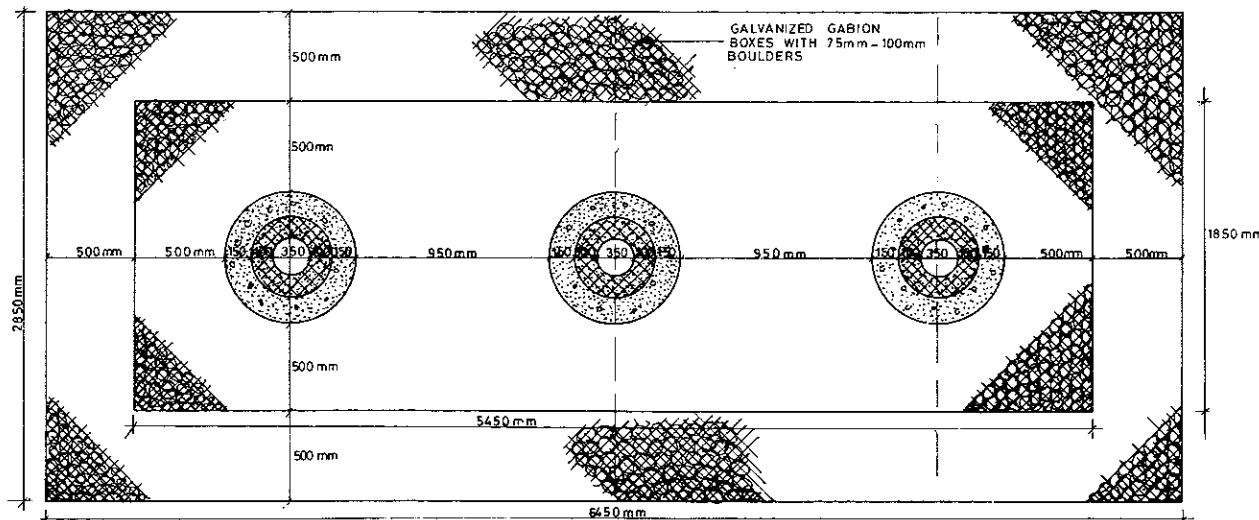
NO	MAX DISCHARGE	NATURE OF BED SAND AND MIXED BOULDERS	NORMAL SCOUR DEPTH	MAX SCOUR DEPTH	MINIMUM GRIP LENGTH	REMARKS
2	1500 000 m ³	2 980 m	5 960 m	2 500 m	GALVANISED	
3	1200 000 m ³	2 770 m	5 540 m	2 500 m	GABION BOXES	
4	1000 000 m ³	2 610 m	5 220 m	2 500 m	WITH BOULDERS ARE TO BE PROVIDED	

1. ALL THE DIMENSIONS ARE IN MILLIMETERS
2. FINE AND COURSE AGGREGATES FOR CONCRETE SHALL COMPLY WITH IS 882 AND OMAN STANDARD OS 2/1982.
3. FOR FILLING THE SIDES OF POLES, FINE AGGREGATE SHALL CONSIST OF CLEAN SAND HAVING 1/2 SIZE WITH GI WIRE MESH.
4. CONCRETE MIX SHALL BE M 20 IN SRC.
5. CONCRETE SURFACE SHOULD BE FAIR FACE.
6. 2 COATS OF BITUMEN PAINT TO BE GIVEN FOR CONCRETE SURFACE.
7. GABION MESH SIZE TO BE 50mmx50mm AND STONES MUST NOT BE LESS THAN MESH SIZE WIRE DIAMETER OF GABION TO BE 270 mm Ø GALVANISED.
8. ANY DISCREPANCY IN THE DRAWING SHOULD BE BROUGHT TO THE NOTICE OF THE CIVIL ENGINEER / M.E.W.
9. FILLING OF GABION
10. GABION BASKETS AND MATTRESSES SHOULD BE FILLED WITH HARD NATURAL STONES. STONES ARE BACKED TIGHTLY WITH MINIMISING VOIDS. CARE TO BE TAKEN TO LEVEL STONES AT DIFFERENT STAGES MINIMISING EMPTY SPACES. THE TOP TO BE LEVELLED BEFORE THE LID IS SECURED. CONNECTING WIRES ARE USED TO RETAIN ORIGINAL SHAPE AND PREVENT SQUEEZING OF THE GABION BASKET AT DIFFERENT STAGES.

SULTANATE OF OMAN MINISTRY OF ELECTRICITY & WATER			
SPECIAL POLE FOUNDATION IN WADI CENTRE (SINGLE POLE)			
DESIGNED G SELVARAJ	DRAWN SALEM	CHECKED KHALIFA	APPROVED
DRAWING NO MEW / PL / CL / 017		SCALE 1:200	DATE 9-1-1991



SECTION



PLAN

SPECIFICATION

DESIGN PRINCIPALS:

- 1 MINIMUM GRIP LENGTH OF POLE IS 2.5m FROM G.L
- 2 SPECIAL POLES ARE TO BE USED FOR WADI CENTERS
- 3 MAXIMUM DISCHARGE IN THE WADI SHOULD NOT EXCEED 1900 CUMES
- 4 NATURE OF BED STARTS IS SAND AND MIXED BOULDERS ARE CONSIDERED
- 5 LACVS SILT FACTOR CONSIDERED IS 6.5.
- 6 MAXIMUM SCOUR DEPTH IS TWICE OF NORMAL SCOUR DEPTH
- 7 MEAN VELOCITY OF WATER SHOULD NOT EXCEED 490m / SEC.
- 8 FOR MINIMUM GRIP LENGTH OF POLE IN CASE OF BED ROCK M.E.W. SPECIAL APPROVAL IS REQUIRED

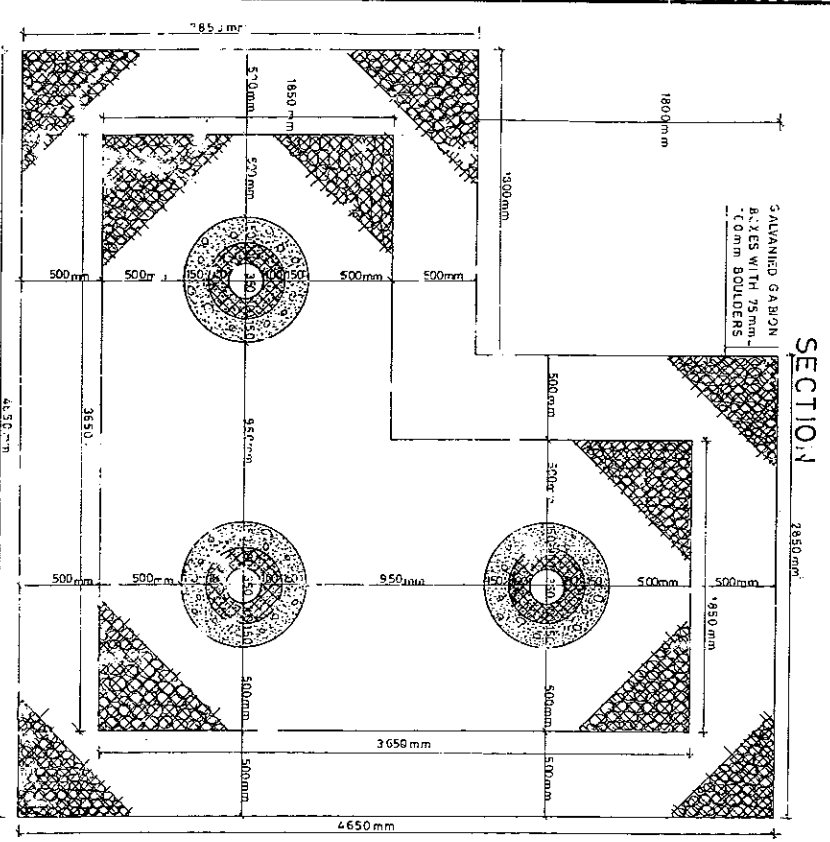
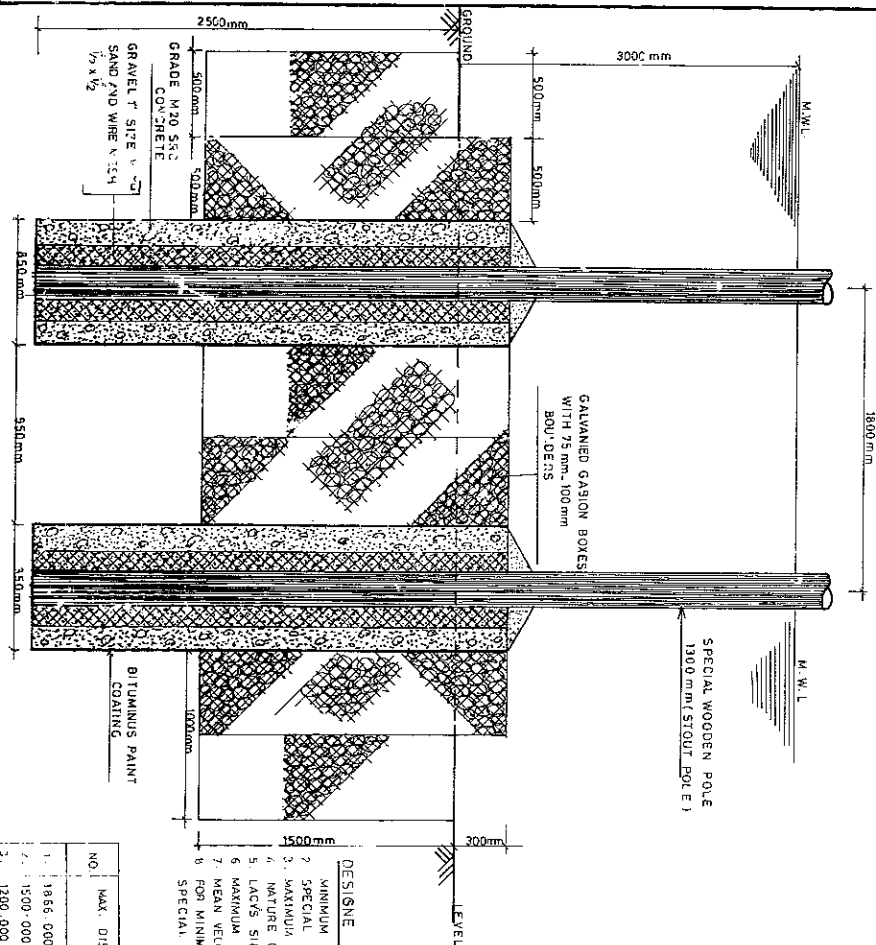
NO	MAX DISCHARGE	NATURE OF BED SAND AND MIXED BOULDERS.	NORMAL SCOUR DEPTH		REMARKS
			MAX SCOUR DEPTH	MINIMUM GRIP LENGTH	
1	1866 000 m ³	3 120 m	6 240 m	2 500 m	ALL THE CASES GALVANISED GABION BOXES WITH BOULDERS ARE TO BE PROVIDED
2	1500 000 m ³	2 980 m	5 960 m	2 500 m	
3	1200 000 m ³	2 770 m	5 540 m	2 500 m	
4	1000 000 m ³	2 610 m	5 220 m	2 500 m	

- 1 ALL THE DIMENSIONS ARE IN MILLIMETERS
- 2
- 3 FINE AND COURSE AGGREGATES FOR CONCRETE SHALL COMPLY WITH OS 802 AND OMAN STANDARD OS 2/1982.
- 4 FOR FILLING THE SIDES OF POLES, FINE AGGREGATE SHALL CONSIST OF CLEAN SAND HAVING 1/2 SIZE WITH 6% WIRE MESH
- 5 CONCRETE MIX SHALL BE M 20 IN SRC.
- 6 CONCRETE SURFACE SHOULD BE FAIR FACE.
- 7 2 COATS OF BITUMEN PAINT TO BE GIVEN FOR CONCRETE SURFACE
- 8 GABION MESH SIZE TO BE 50mm X 50mm AND STONES MUST NOT BE LESS THAN MESH SIZE WIRE DIAMETER OF GABION TO BE 2.70 mm / GALVANISED
- 9 ANY DISCREPANCY IN THE DRAWING SHOULD BE BROUGHT TO THE NOTICE OF THE CIVIL ENGINEER / M.E.W

FILLING OF GABION

GABION BASKETS AND MATTRESSES SHOULD BE FILLED WITH HARD NATURAL STONES. STONES ARE BACKED TIGHTLY WITH MINIMISING VOIDS. CARE TO BE TAKEN TO LEVEL STONES AT DIFFERENT STAGES MINIMISING EMPTY SPACING THEN THE TOP TO BE LEVELLED BEFORE THE LID IS SECURED. CONNECTING WIRES ARE USED TO RETAIN ORIGINAL SHAPE AND PREVENT BULGING OF THE GABION BASKET AT DIFFERENT STAGES

SULTANATE OF OMAN MINISTRY OF ELECTRICITY & WATER			
SPECIAL POLE FOUNDATION IN WADI CENTRE (THREE POLES STRUCTURED)			
DESIGNED G SELVARAJ	DRAWN KHAUFA	CHECKED SALEM	APPROVED
DRAWING NO. MEW / PL / CL / 019		SCALE 1: 200	DATE 19 - 1 - 1991



SECTION

PLAN

- DESIGN PRINCIPALS:**
1. MINIMUM GRIP LENGTH OF POLE IS 2800mm FROM C.L.
 2. SPECIAL POLES ARE TO BE USED FOR WADI CENTRE (STOUT POLE)
 3. MAXIMUM DISCHARGE IN THE WADI SHOULD NOT EXCEED 1700 CUMES
 4. NATURE OF BED STRATA IS SAND AND MIXED BOULDERS ARE CONSIDERED.
 5. LACS SILT FACTOR CONSIDERED IS 6.5.
 6. MAXIMUM SCOUR DEPTH IS TWICE OF NORMAL SCOUR DEPTH.
 7. MEAN VELOCITY OF WATER SHOULD NOT EXCEED 480m / SEC.
 8. FOR MINIMUM GRIP LENGTH OF POLE IN CASE OF BED ROCK, M.E.W SPECIAL APPROVAL IS REQUIRED.

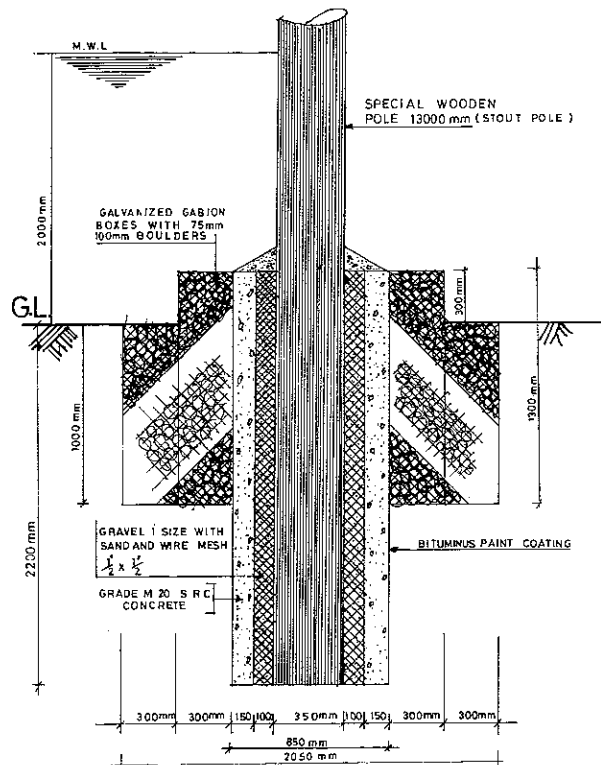
SPECIFICATION

NO.	MAX. DISCHARGE	NATURE OF BED SAND AND MIXED BOULDERS.	NORMAL SCOUR		REMARKS
			DEPTH	MINIMUM GRIP LENGTH	
1.	1866,000 m ³	1. 120 m	6. 24.0 m	7. 500 m	ALL THE CASES GALVANISED GABION BOXES WITH BOULDERS ARE TO BE PROVIDED
2.	1500,000 m ³	1. 980 m	5. 9.60 m	6. 500m	
3.	1200,000 m ³	1. 770 m	5. 54.0 m	7. 500 m	
4.	1000,000 m ³	2. 610 m	5. 27.0 m	7. 500 m	

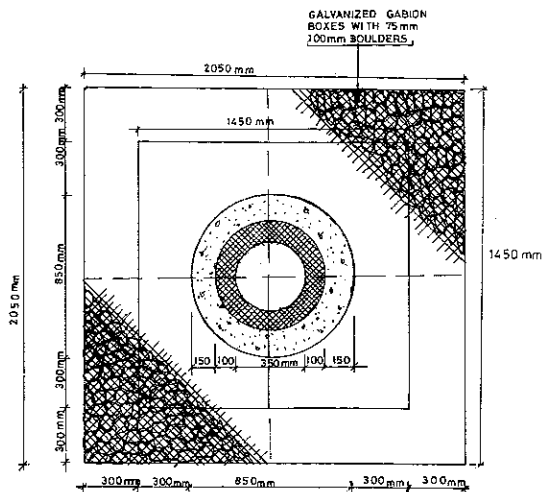
1. ALL THE DIMENSIONS ARE IN MILLIMETERS.
 2. FINE AND COURSE AGGREGATES FOR CONCRETE SHALL COMPLY WITH BS 882 AND OMAN STANDARD BS 2174X3 FINE AGGREGATE SHALL CONSIST OF CLEAN SAND HAVING MAX. SIZE WITH 6.3mm WIRE MESH
 3. CONCRETE MIX SHALL BE M 20 IN S&C.
 4. CONCRETE SURFACE SHOULD BE FIN FALC.
 5. 2 COATS OF BITUMEN PAINT TO BE GIVEN FOR CONCRETE SURFACE.
 6. GABION MESH SIZE TO BE 90mmx90mm AND STONES MUST NOT BE LESS THAN MESH SIZE WIRE DIAMETER OF GABION TO BE 270mm Ø GALVANISED
 7. ANY DISCREPANCY IN THE DRAWING SHOULD BE BROUGHT TO THE NOTICE OF THE CIVIL ENGINEER/M.E.W.
- FILLING OF GABION**
- GABION BAGNETS AND MATRESSES SHOULD BE FILLED WITH II AND NATURAL STONES. STONES ARE BACKED TIGHTLY WITH MINIMUM VIDS. CARE SHOULD BE TAKEN TO LEVEL STONES AT DIFFERENT STAGES MINIMISING EMPTY SPACING. THEN THE TOP BELLETTED BEFORE THE JOB IS SECURED. CONNECTING WIRES ARE USED TO RETAIN ORIGINAL SHAPE AND PREVENT BULGING OF THE GABION BAGNET AT DIFFERENT STAGES.

SULTANATE OF OMAN
 MINISTRY OF ELECTRICITY & WATER
 SPECIAL POLE FOUNDATION
 IN WADI CENTRE
 (RIGHT ANGLE THREE POLES STRUCTURE)

DESIGNED G.SELVANA	DRAWN SAHEB	CHECKED KHALUFA	APPROVED
DRAWING NO MEW / P.L / CL/020	SCALE 1:200	DATE 19-11-1991	



SECTION



PLAN

SPECIFICATION

DESIGNE PRINCIPALS:

1. MINIMUM GRIP LENGTH OF POLE IS $\frac{1}{10}$ OF POLE HEIGHT
2. SPECIAL POLES ARE TO BE USED FOR WADI BANK (STOUT POLE)
3. MAXIMUM DISCHARGE IN THE WADI SHOULD NOT EXCEED 900 CUMS
4. NATURE OF BED STARTA IS SAND AND MIXED BOULDERS ARE CONSIDERED.
5. LACYS SILT FACTOR CONSIDERED IS 6.3
6. MAXIMUM SCOUR DEPTH IS TWICE OF NORMAL SCOUR DEPTH
7. MEAN VELOCITY OF WATER SHOULD NOT EXCEED 2.5 m / SEC.
8. FOR MINIMUM GRIP LENGTH OF POLE IN CASE OF BED ROCK M.E.W SPECIAL APPROVAL IS REQUIRED

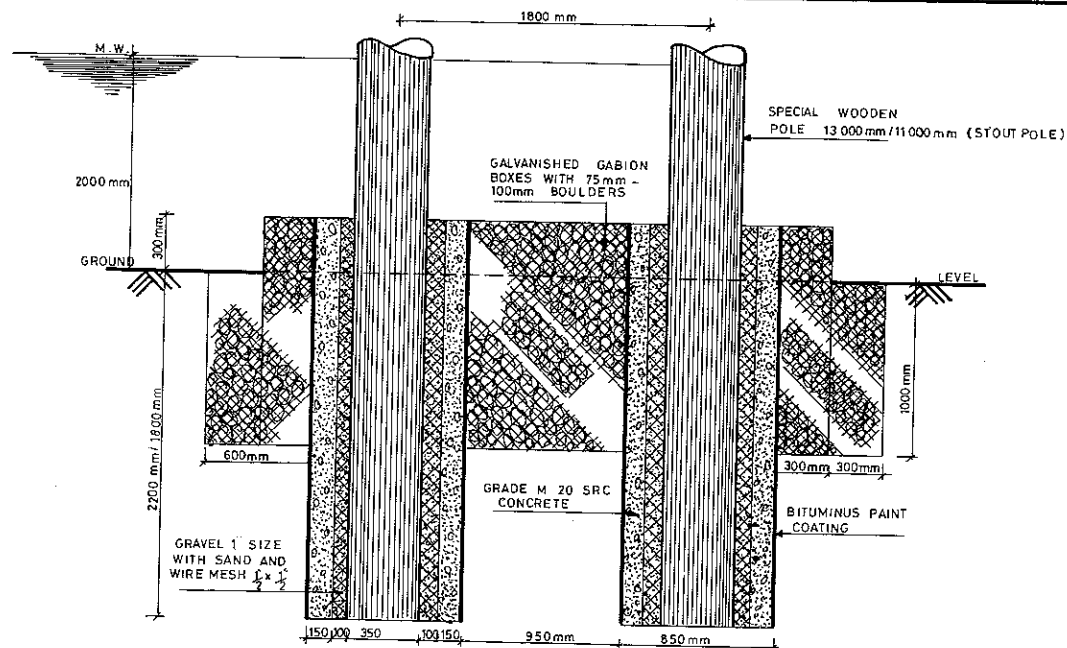
NO	MAX DISCHARGE	NORMAL SCOUR DEPTH		MINIMUM GRIP LENGTH	REMARKS
		NATURE OF BED SAND AND MIXED BOULDERS.	MAX SCOUR DEPTH		
1.	900 000 m ³	2 510 m	5 020 m	2 000 m	ALL THE CASES GALVANIZED GABION BOXES WITH BOULDERS ARE TO BE PROVIDED
2	800 000 m ³	2 420 m	4 840 m	2 000 m	
3	600 000 m ³	2 200 m	4 400 m	2 000 m	

1. ALL THE DIMENSIONS ARE IN MILLIMETERS.
2. MINIMUM DEPTH OF EXCAVATION 2200 mm FROM GROUND LEVEL.
3. FINE AND COURSE AGGREGATES FOR CONCRETE SHALL COMPLY WITH BS 882 AND OMANI STANDARD OS 2/1982.
4. FOR FILLING THE SIDES OF POLES, FINE AGGREGATE SHALL CONSIST OF CLEAN SAND HAVING 1/2 SIZE WITH 6.1 WIRE MESH
5. CONCRETE MIX SHALL BE M 20 IN S R C.
6. CONCRETE SURFACE SHOULD BE FAIR FACE
7. 2 COATS OF BITUMEN PAINT TO BE GIVEN FOR CONCRETE SURFACE
8. GABION MESH SIZE TO BE 50mm x 50mm AND STONES MUST NOT BE LESS THAN MESH SIZE WIRE DIAMETER OF GABION TO BE 2.70 mm & GALVANISEC.
9. ANY DISCREPANCY IN THE DRAWING SHOULD BE BROUGHT TO THE NOTICE OF THE CIVIL ENGINEER / M.E.W

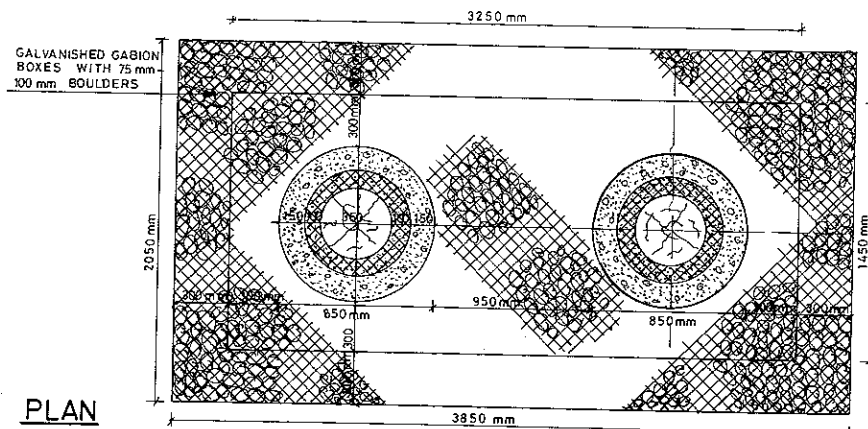
FILLING OF GABION

GABION BASKETS AND MATTRESSES SHOULD BE FILLED WITH HARD NATURAL STONES. STONES ARE BACKED TIGHTLY WITH MINIMISING VOIDS. CARE TO BE TAKEN TO LEVEL STONES AT DIFFERENT STAGES MINIMISING EMPTY SPACING. THEN THE TOP TO BE LEVELLED BEFORE THE LID IS SECURED. CONNECTING WIRES ARE USED TO RETAIN ORIGINAL SHAPE AND PREVENT BULGING OF THE GABION BASKET AT DIFFERENT STAGES

SULTANATE OF OMAN MINISTRY OF ELECTRICITY & WATER			
SPECIAL POLE FOUNDATION IN WADI BANK (SINGLE POLE)			
DESIGNED G SELVARAJ	DRAWN KHALIFA	CHECKED SALEM	APPROVED OKJ
DRAWING NO. MEW / PL / CL / 021	SCALE 1 : 200	DATE 19 - 1 - 1991	



SECTION



PLAN

SPECIFICATION

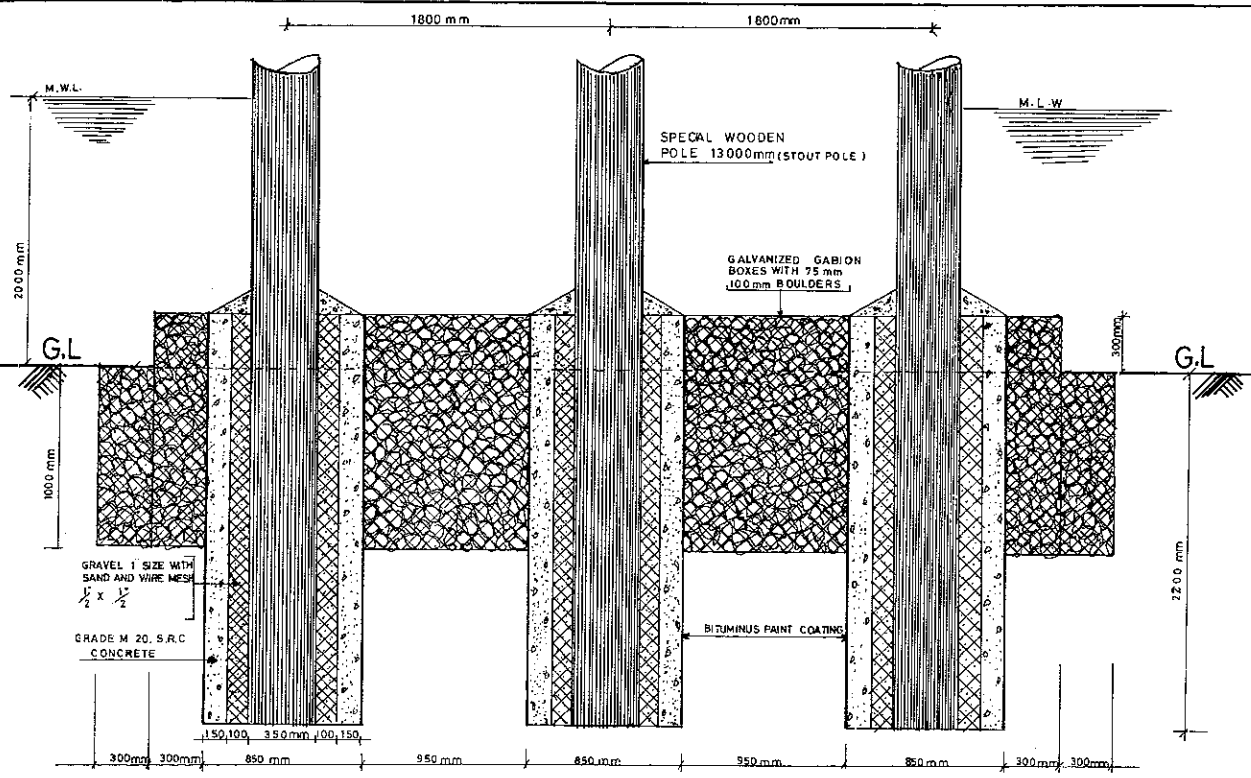
DESIGN PRINCIPALS:

- 1 MINIMUM GRIP LENGTH OF POLE IS $\frac{1}{10}$ OF POLE HEIGHT
- 2 SPECIAL POLES ARE TO BE USED FOR WADI BANK (STOUT POLE)
- 3 MAXIMUM DISCHARGE IN THE WADI SHOULD NOT EXCEED 900 CUMES
- 4 NATURE OF BED STARTA IS SAND AND MIXED BOULDERS ARE CONSIDERED
- 5 LACY'S SILT FACTOR CONSIDERED IS 65.
- 6 MAXIMUM SCOUR DEPTH IS TWICE OF NORMAL SCOUR DEPTH
- 7 MEAN VELOCITY OF WATER SHOULD NOT EXCEED 2.5 m / SEC.
- 8 FOR MINIMUM GRIP LENGTH OF POLE IN CASE OF BED ROCK M.E.W SPECIAL APPROVAL IS REQUIRED

NO	MAX DISCHARGE	NORMAL SCOUR DEPTH		MINIMUM GRIP LENGTH	REMARKS
		NATURE OF BED SAND AND MIXED BOULDERS.	MAX SCOUR DEPTH		
1	900 000 m ³	2 510 m	5 020 m	2 000 m	ALL THE CASES GALVANISED GABION BOXES WITH BOULDERS ARE TO BE PROVIDED
2	800 000 m ³	2 420 m	4 840 m	2 000 m	
3	600 000 m ³	2 200 m	4 400 m	2 000 m	

- 1 ALL THE DIMENSIONS ARE IN MILLIMETERS.
 - 2 MINIMUM DEPTH OF EXCAVATION 2200 mm FROM GROUND LEVEL.
 - 3 FINE AND COURSE AGGREGATES FOR CONCRETE SHALL COMPLY WITH BS 802 AND OMANI STANDARD OS 2/1982.
 - 4 FOR FILLING THE SIDES OF POLES, FINE AGGREGATE SHALL CONSIST OF CLEAN SAND HAVING $\frac{1}{2}$ SIZE WITH G.I. WIRE MESH
 - 5 CONCRETE MIX SHALL BE M 20 IN SRC.
 - 6 CONCRETE SURFACE SHOULD BE FAIR FACE.
 - 7 2 COATS OF BITUMEN PAINT TO BE GIVEN FOR CONCRETE SURFACE
 - 8 GABION MESH SIZE TO BE 50mm X 50mm AND STONES MUST NOT BE LESS THAN MESH SIZE WIRE DIAMETER OF GABION TO BE 70 mm Ø GALVANISED COATED
 - 9 ANY DISCREPANCY IN THE DRAWING SHOULD BE BROUGHT TO THE NOTICE OF THE CIVIL ENGINEER M.E.W
- FILLING OF GABION**
 GABION BASKETS AND MATTRESSES SHOULD BE FILLED WITH HARD NATURAL STONES. STONES ARE SACKED TIGHTLY WITH MINIMISING VOIDS. CARE TO BE TAKEN TO LEVEL STONES AT DIFFERENT STAGES MINIMISING EMPTY SPACING. THEN THE TOP TO BE LEVELLED BEFORE THE LID IS SECURED. CONNECTING WIRES ARE USED TO RETAIN ORIGINAL SHAPE AND PREVENT BULGING OF THE GABION BASKET AT DIFFERENT STAGES

SULTANATE OF OMAN MINISTRY OF ELECTRICITY & WATER			
SPECIAL POLE FOUNDATION IN WADI BANK (DOUBLE POLE)			
DESIGNED: G SELVARAJ	DRAWN SALEM	CHECKED KHALIFA	APPROVED <i>[Signature]</i>
DRAWING NO. MEW / PL / CL / 022	SCALE 1: 200	DATE 19-1-1991	



SECTION

DESIGNE PRINCIPALS SPECIFICATION

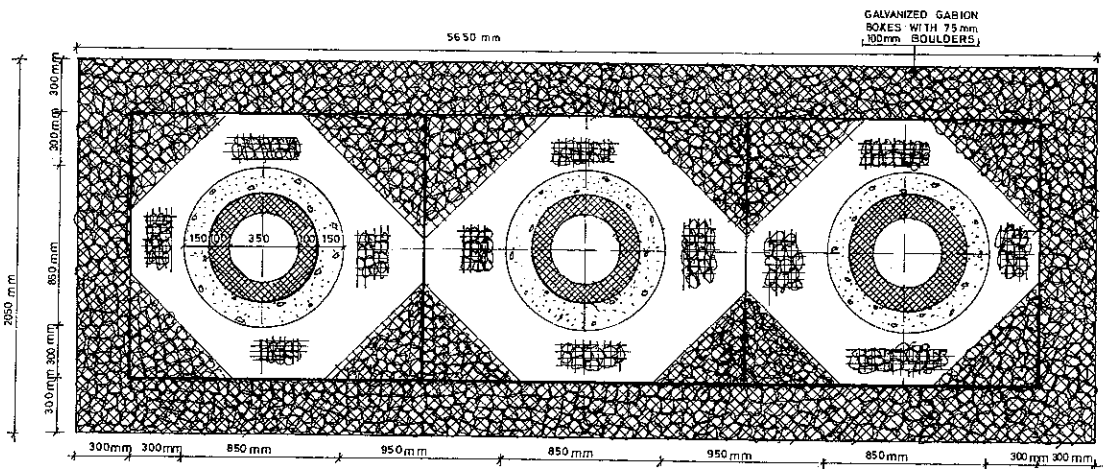
- 1 MINIMUM GRIP LENGTH OF POLE IS $\frac{1}{16}$ OF POLE HEIGHT.
- 2 SPECIAL POLES ARE TO BE USED FOR WADI BANK (STOUT POLE)
- 3 MAXIMUM DISCHARGE IN THE WADI SHOULD NOT EXCEED 900 CUM'S
- 4 NATURE OF BED STARTA IS SAND AND MIXED BOULDERS ARE CONSIDERED
- 5 LACYS SILT FACTOR CONSIDERED IS 6.5.
- 6 MAXIMUM SCOUR DEPTH IS TWICE OF NORMAL SCOUR DEPTH
- 7 MEAN VELOCITY OF WATER SHOULD NOT EXCEED 2.5 m / SEC.
- 8 FOR MINIMUM GRIP LENGTH OF POLE IN CASE OF BED ROCK M E W SPECIAL APPROVAL IS REQUIRED

NO	MAX DISCHARGE	NORMAL SCOUR DEPTH		MINIMUM GRIP LENGTH	REMARKS
		NATURE OF BED SAND AND MIXED BOULDERS.	MAX SCOUR DEPTH		
1	900 000 m ³	2 510 m	5 020 m	2 000 m	ALL THE CASES GALVANISED GABION BOXES WITH BOULDERS ARE TO BE PROVIDED
2	800 000 m ³	2 420 m	4 840 m	2 000 m	
3	600 000 m ³	2 200 m	4 400 m	2 000 m	

- 1 ALL THE DIMENSIONS ARE IN MILLIMETERS.
- 2 MINIMUM DEPTH OF EXCAVATION 2200 mm FROM GROUND LEVEL.
- 3 FINE AND COURSE AGGREGATES FOR CONCRETE SHALL COMPLY WITH BS 882 AND OMAN STANDARD OS 2/18 & 2.
- 4 FOR FILLING THE SIDES OF POLES FINE AGGREGATE SHALL CONSIST OF CLEAN SAND HAVING $\frac{1}{2}$ SIZE WITH 0.1 WIRE MESH.
- 5 CONCRETE MIX SHALL BE M 20 IN S.R.C.
- 6 CONCRETE SURFACE SHOULD BE FAIR FACE.
- 7 2 COATS OF BITUMEN PAINTING TO BE GIVEN FOR CONCRETE SURFACE.
- 8 GABION MESH SIZE TO BE 50mm x 50mm AND STONES MUST NOT BE LESS THAN MESH SIZE WIRE DIAMETER OF GABION TO BE 2.70 mm Ø GALVANISED COATED
- 9 ANY DISCREPANCY IN THE DRAWING SHOULD BE BROUGHT TO THE NOTICE OF THE CIVIL ENGINEER M E W

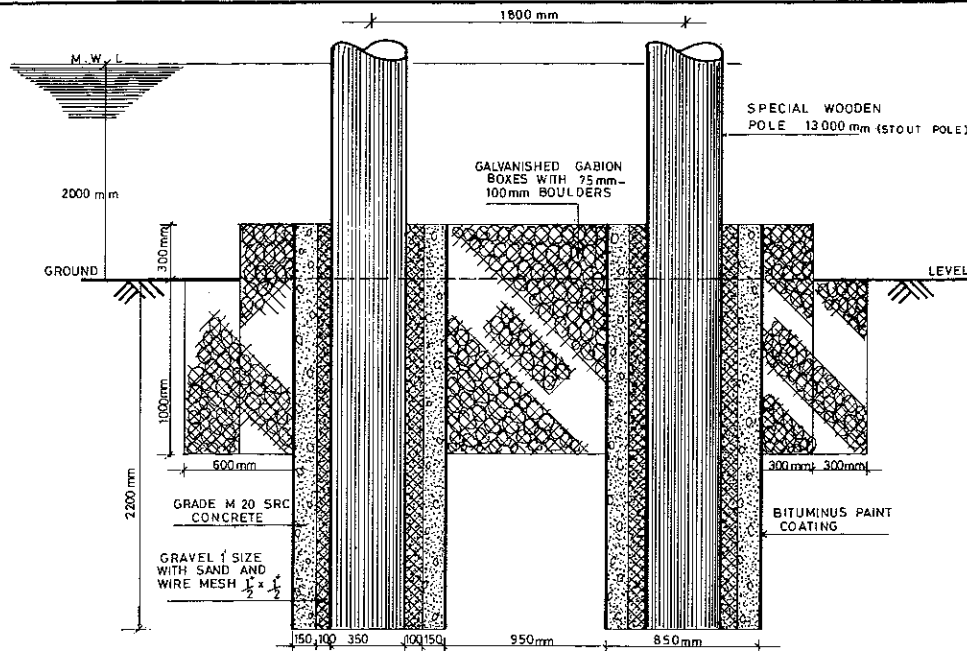
FILLING OF GABION

GABION BASKETS AND MATTRESSES SHOULD BE FILLED WITH HARD NATURAL STONES. STONES ARE BACKED TIGHTLY WITH MINIMISING VOIDS. CARE TO BE TAKEN TO LEVEL STONES AT DIFFERENT STAGES MINIMISING EMPTY SPACING. THEN THE TOP TO BE LEVELLED BEFORE THE LID IS SECURED. CONNECTING WIRES ARE USED TO RETAIN ORIGINAL SHAPE AND PREVENT BULGING OF THE GABION BASKET AT DIFFERENT STAGES

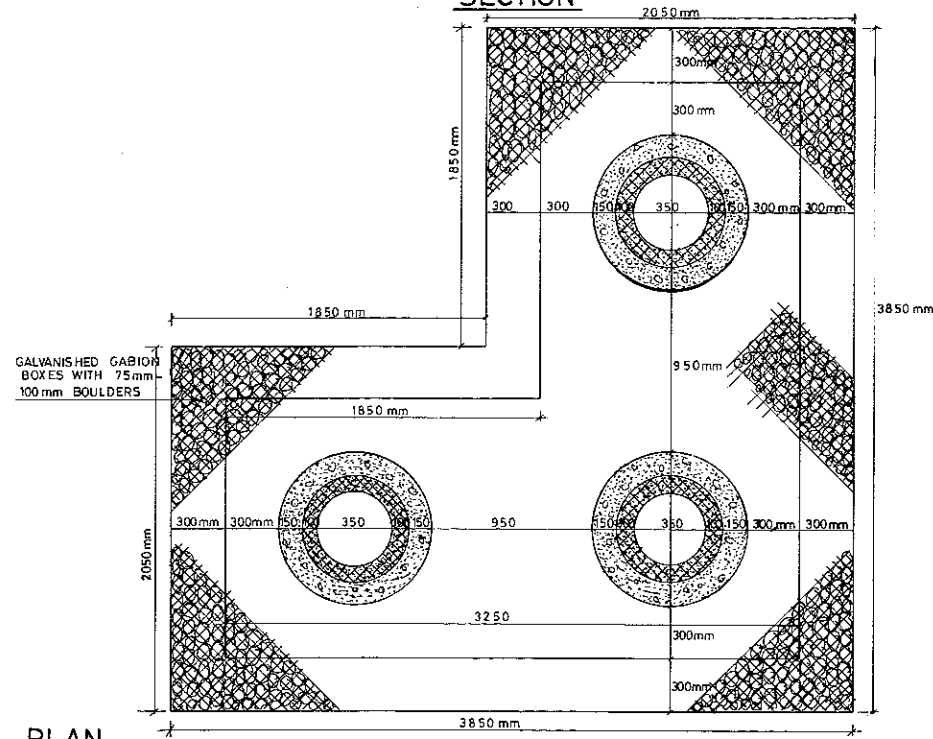


PLAN

SULTANATE OF OMAN MINISTRY OF ELECTRICITY & WATER			
SPECIAL POLE FOUNDATION IN WADI BANK (THREE POLE STRUCTURE)			
DESIGNED G SELVARAJ	DRAWN KHALIFA	CHECKED SALEM	APPROVED WJ
DRAWING NO MEW / PL / CL / 023		SCALE 1: 200	DATE 19-1-1991



SECTION



PLAN

SPECIFICATION

DESIGN PRINCIPALS:

1. MINIMUM GRIP LENGTH OF POLE IS 1/6 TH OF POLE HEIGHT
2. SPECIAL POLES ARE TO BE USED FOR WADI BANK (STOUT POLE)
3. MAXIMUM DISCHARGE IN THE WADI SHOULD NOT EXCEED 900 M³
4. NATURE OF BED STARTA IS SAND AND MIXED BOULDERS ARE CONSIDERED
5. LACY'S SILT FACTOR CONSIDERED IS 6.5.
6. MAXIMUM SCOUR DEPTH IS TWICE OF NORMAL SCOUR DEPTH
7. MEAN VELOCITY OF WATER SHOULD NOT EXCEED 2.5 m / SEC.
8. FOR MINIMUM GRIP LENGTH OF POLE IN CASE OF BED ROCK M.E.W. SPECIAL APPROVAL IS REQUIRED

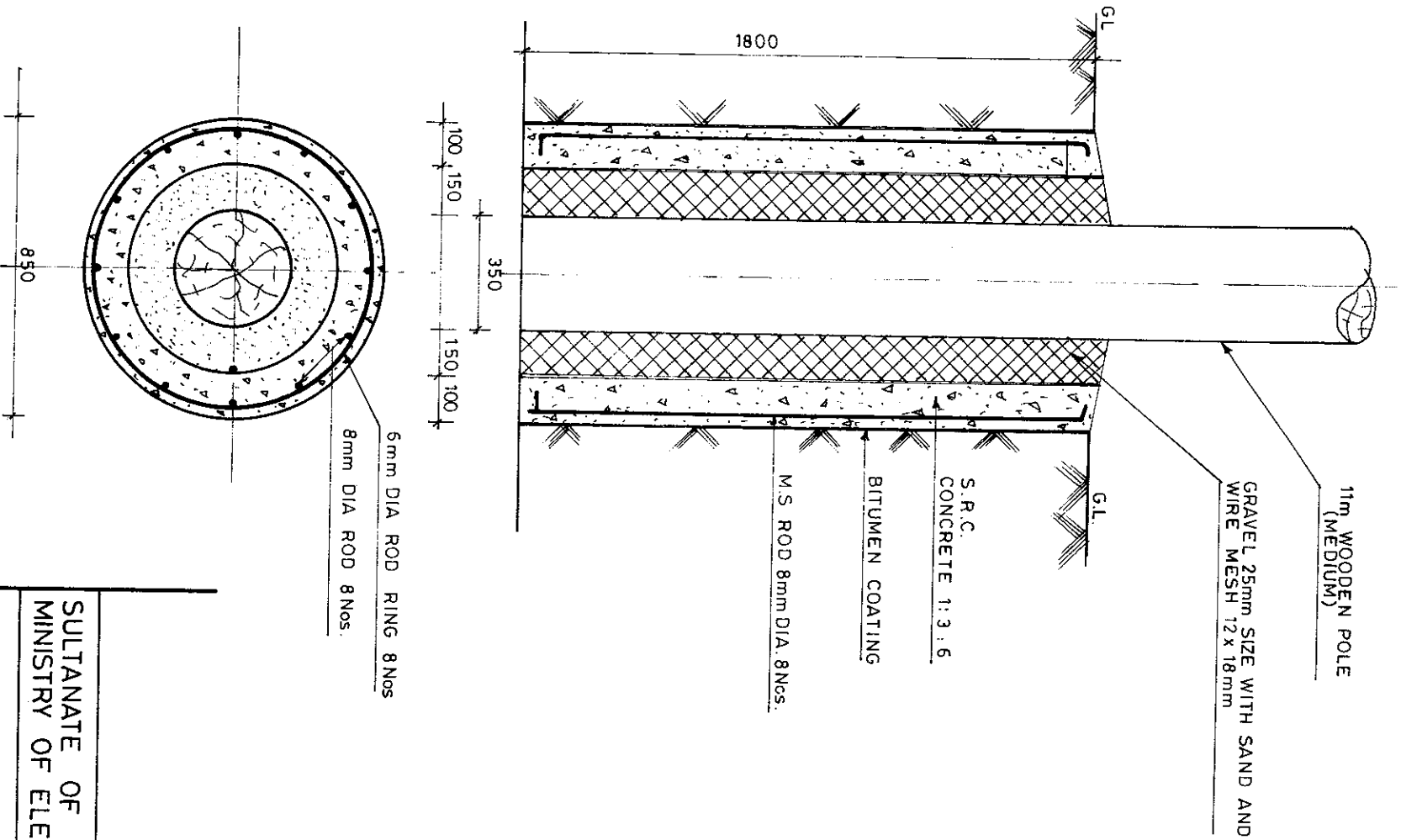
NO	MAX DISCHARGE	NATURE OF BED SAND AND MIXED BOULDERS.	NORMAL SCOUR DEPTH		REMARKS
			MAX SCOUR DEPTH	MINIMUM GRIP LENGTH	
1	900 000 m ³	2 510 m	5 020 m	2 000 m	ALL THE CASES GALVANISED GABION BOXES ARE TO BE PROVIDED
2	800 000 m ³	2 420 m	4 840 m	2 000 m	
3	600 000 m ³	2 200 m	4 400 m	2 000 m	

1. ALL THE DIMENSIONS ARE IN MILLIMETERS.
2. MINIMUM DEPTH OF EXCAVATION 2200 mm FROM GROUND LEVEL.
3. FINE AND COURSE AGGREGATES FOR CONCRETE SHALL COMPLY WITH BS 882 AND OMANI STANDARD OS 2/1982.
4. FOR FILLING THE SIDES OF POLES, FINE AGGREGATE SHALL CONSIST OF CLEAN SAND HAVING 1/2 SIZE WITH 61 WIRE MESH
5. CONCRETE MIX SHALL BE M 20 IN SRC.
6. CONCRETE SURFACE SHOULD BE FAIR FACE.
7. 2 COATS OF BITUMEN PAINT TO BE GIVEN FOR CONCRETE SURFACE
8. GABION MESH SIZE TO BE 90mm x 50mm AND STONES MUST NOT BE LARGER THAN MESH SIZE WIRE DIAMETER OF GABION TO BE 75 mm Ø GALVANISED
9. ANY DISCREPANCY IN THE DRAWING SHOULD BE BROUGHT TO THE NOTICE OF THE CIVIL ENGINEER/M.E.W

FILLING OF GABION

GABION BASKETS AND MATTRESSES SHOULD BE FILLED WITH HARD NATURAL STONES. STONES ARE BACKED TIGHTLY WITH MINIMISING VOIDS. CARE TO BE TAKEN TO LEVEL STONES AT DIFFERENT STAGES MINIMISING EMPTY SPACING. THEN THE TOP TO BE BELLEVILLED BEFORE THE LID IS SECURED. CONNECTING WIRES ARE USED TO RETAIN ORIGINAL SHAPE AND PREVENT BULGING OF THE GABION BASKET AT DIFFERENT STAGES

SULTANATE OF OMAN MINISTRY OF ELECTRICITY & WATER			
SPECIAL POLE FOUNDATION IN WADI BANK (RIGHT ANGLE THREE POLES STRUCTURE.)			
DESIGNED G SELVARAJ	DRAWN SALEM	CHECKED KHALIFA	APPROVED [Signature]
DRAWING NO. MEW / PL / CL / 024	SCALE 1: 200	DATE 19-1-1991	



SULTANATE OF OMAN
 MINISTRY OF ELECTRICITY AND WATER
 CONCRETE FOUNDATION
 (NORMAL) FOR SINGLE POLE

DRAWN	CHECKED	APPROVED
FRANCIS		
DRG. No	SCALE	DATE
PL /CL-B/07	N.T.S.	13-07-1992.