

SURVEY MAP

SCALE 1:25000

SMALL SCALE MAP OF

PLANNING, ENGINEERING WORK,

GRADIENT OF ROAD, SEWER PIPES

REGIONAL PLANNING

1:10000

ESTATE MANAGEMENT, WATER SUPPLY DESIGN
TOWN PLANNING

1:2500

HIGHLY DETAILED MAP

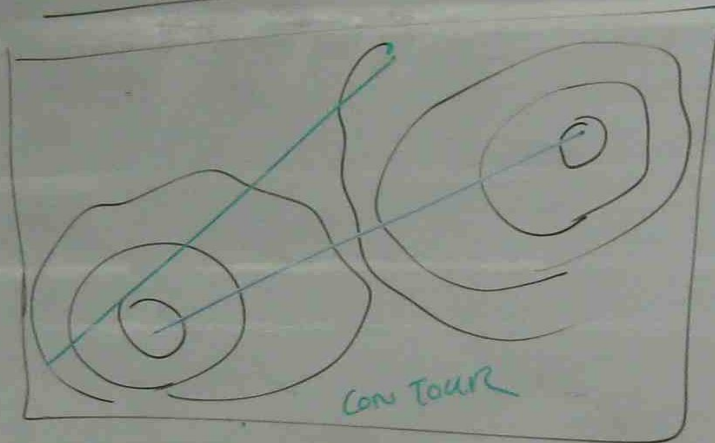
PROVIDE ACCURATE INFORMATION

1:1250

BLOCK PLAN, LOCATION PLAN,

POSITION OF POWER LINES.

LINE SURVEYING

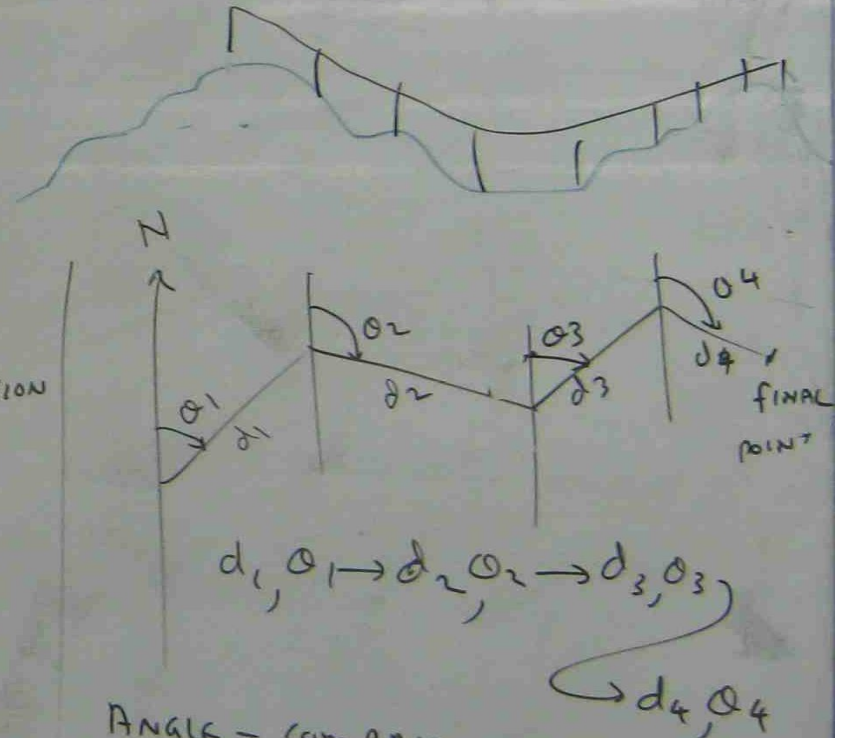
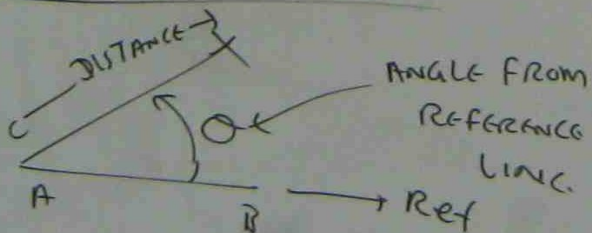


LINEAR MEASUREMENT

← 3km →

ONLY DIMENSION

ANGULAR MEASUREMENT

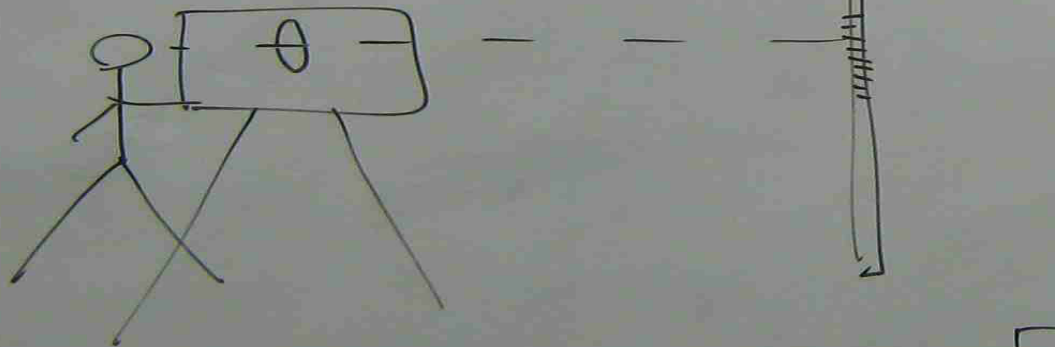
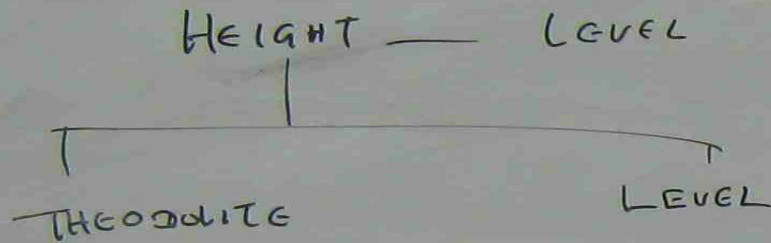


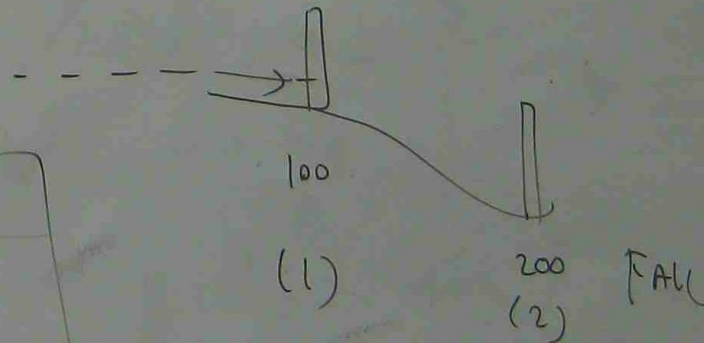
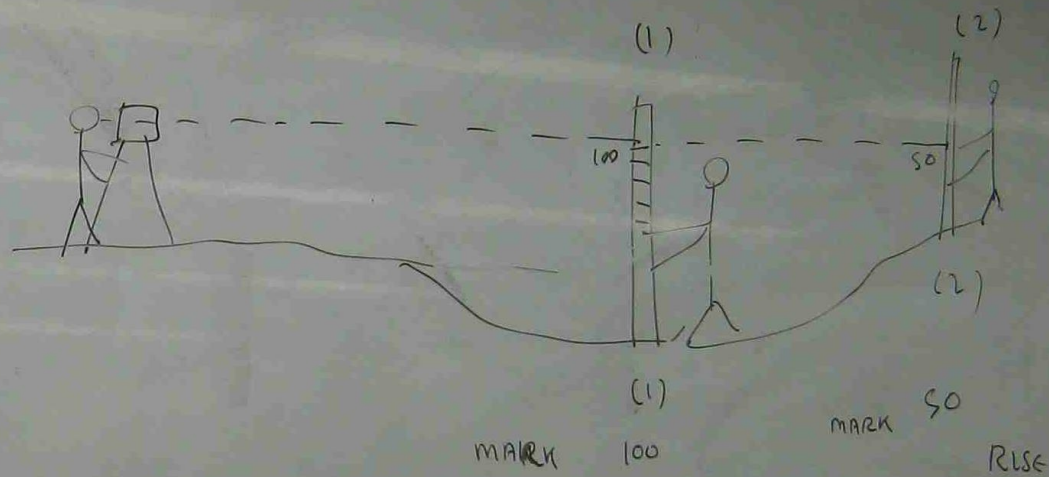
ANGLE - COMPASS

DISTANCE - SURVEY CHAIN

TAPE

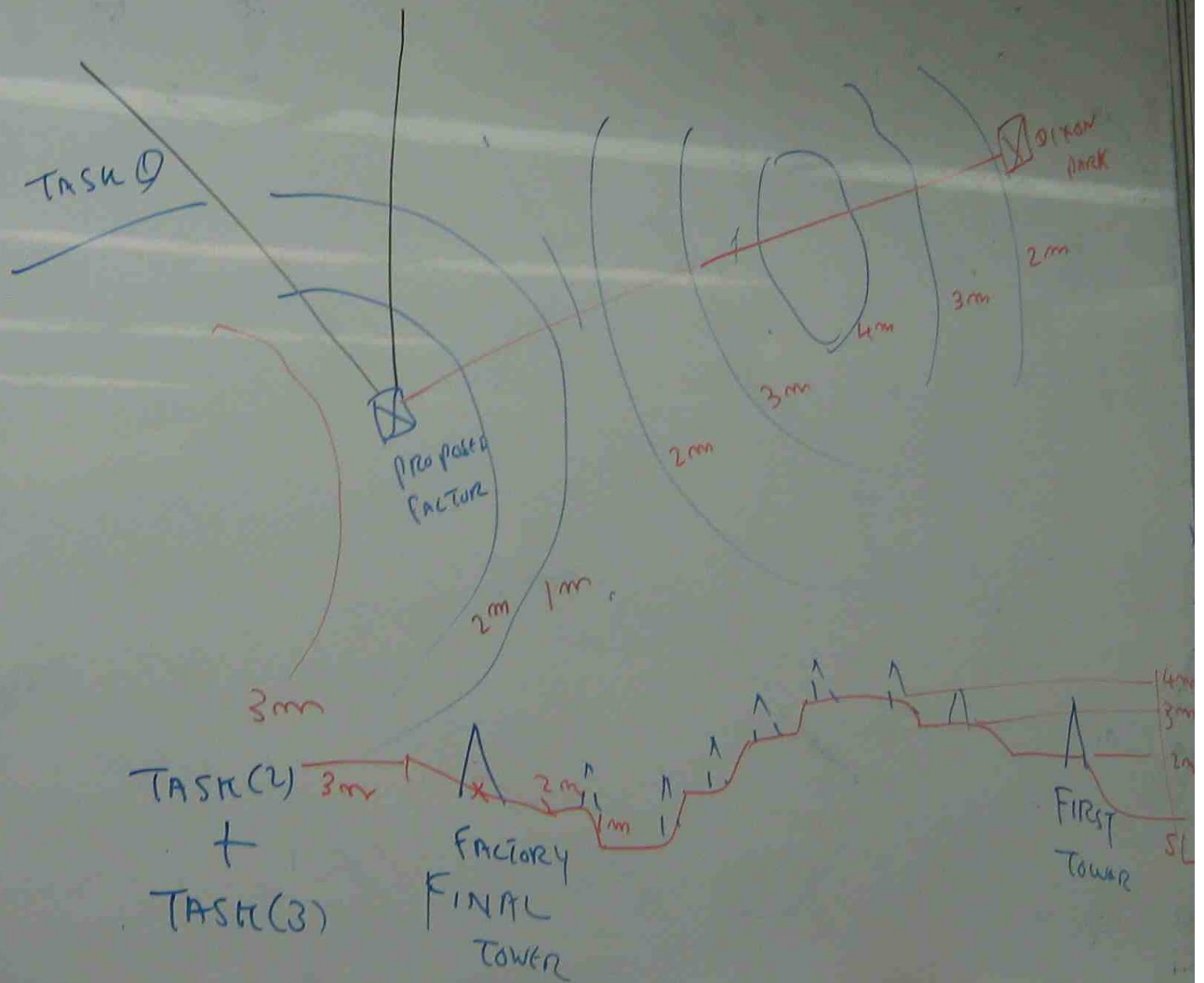
SITE SURVEYING / LEVELLING





point	
100) FALL
200	
150) RISE

LINE DESIGN



LINE SPAN = $\sqrt{\frac{SAG \times 8T}{w}}$

$$SAG = \frac{wL^2}{8T}$$

$$L = \sqrt{\frac{SAG \times 8T}{w}}$$

$$SAG = 1 \text{ m}$$

$$T = 6 \times 10^3 \text{ N}$$

$$W = \sqrt{w_w^2 + w_{AIR}^2}$$

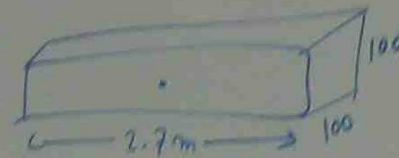
$$\text{NO. OF POLE} = \frac{\text{TOTAL LENGTH}}{\text{LINE SPAN}} + 1$$

ALLOCATE THE POLE

INSULATOR SIDE OF POLE

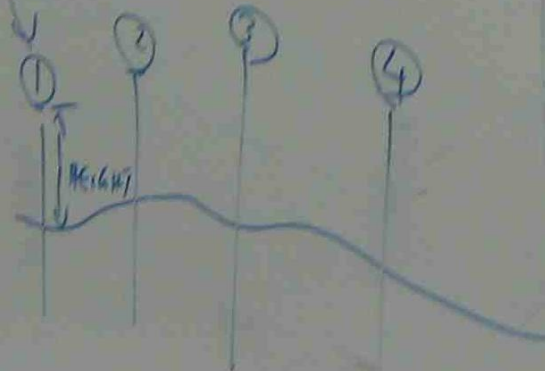
CROSS ARM

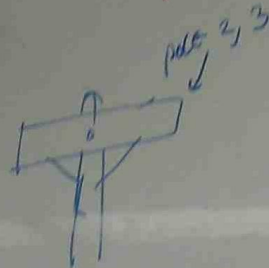
$$2.7 \text{ P} / 16 / 100 \times 100$$



P/16 = 4 PIN INSULATOR
16 mm PIN
DIAMETER

CROSS ARM DIMENSION





2.7/P/16/100 X 100
 pole (1), pole (4) DISC
 INSULATOR

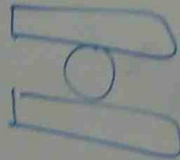
E A 3/D

pole (2), pole (3)

PIN INSULATOR

SLP 33/180

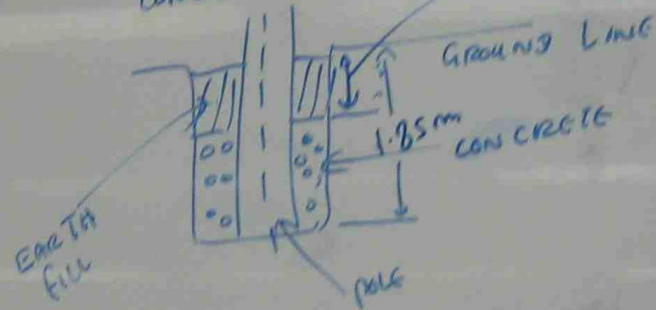
pole (1), pole (4)



DOUBLE
 CROSS
 ARM

TASK 10 FOOTING

CONCRETE FOOTING D. 45mm



TASK 6 CALCULATING THE SIZE OF CONDUCTOR

$$\text{CURRENT} = \frac{\text{MW} \times 10^3}{\sqrt{3} \times \text{LINE VOLTAGE}} = \frac{2 \times 10^3}{1.732 \times 33} = 34.99 \text{ AMP}$$

AS 3008 TABLE 20

CONDUCTOR SIZE	BARE CONDUCTOR			PVC INSULATED SINGLE CORE	PVC TWIN CORE	PVC 3 CORE
	STILL AIR	1 m/s	2 m/s			
7/1.00	37 AMP	74				
6 mm ²	38					
7/1.25	49					
10	53					
16	71					
7/1.75	76					
7/2.00	89					
25	96					
35	117					
7/2.75	132					
50	142					
19/1.75	143					

$$\frac{\pi D^2}{4} = \text{CSA} \quad D = \sqrt{\frac{\text{C.S.A}}{\pi}}$$

$$= \sqrt{\frac{63}{3}}$$

CT 6mm^2 CONDUCTOR SIZE

$$\begin{aligned}\text{WEIGHT OF CONDUCTOR} &= \frac{\text{C.S.A} \times \text{DENSITY} \times 9.81}{1000} \\ \text{N/m} &= \frac{6\text{mm}^2 \times 8.89 \times 9.81}{1000} = 0.523 \text{ N/m}\end{aligned}$$

$$\text{DENSITY} = \text{COPPER} = 8.89 \text{ gm/cm}^3$$

$$\text{ALUMINIUM} = 2.703 \text{ gm/cm}^3$$

$$\text{CSA} = (\text{mm}^2) \quad (\text{CROSS SECTIONAL AREA OF CONDUCTOR})$$

$$W_C = 0.523 \text{ N/m}$$

$$W_{\text{AIR}} = \text{WIND PRESSURE} \times \text{DIAMETER OF CONDUCTOR} \times \text{LENGTH}$$

$$= 500 \text{ N/m}^2 \times \frac{2.76}{1000} \times 1 \text{ m}$$

$$= \sqrt{7.639} = 2.76 \text{ mm} = 1.38 \text{ N/m}$$

$$W = \sqrt{W_L^2 + W_{AIR}^2}$$

$$= \sqrt{0.523^2 + 1.38^2} = 1.476$$

$$SAG = \frac{W L^2}{8 T}$$

LINE SPAN = 30m (SELECT)

$$SAG = \frac{1.476 \times 30^2}{8 \times 8000}$$

SAFETY FACTOR = 2

$$= \frac{1.476 \times 900}{8 \times 4000}$$

$$= 0.415 \text{ m}$$

$$\text{No. of pole} = \frac{\text{DISTANCE MEASURED} \times \text{SCALE (2500)}}{30 \text{ m}} + 1$$

$$\text{POLE PLANTING DEPTH} = 0.6 + 0.1(12.7 + SAG)$$

$$= 0.6 + 0.1(12.7 + 0.415)$$

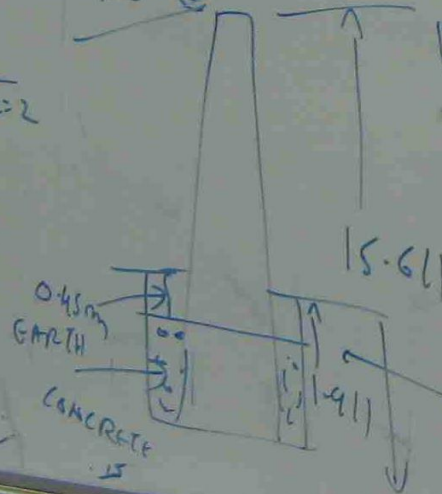
$$= 1.911 \text{ m}$$

$$\text{TOTAL POLE LENGTH} = 1.911 \text{ m} + 1 \text{ m} + 12.7 \text{ m}$$

m MAXIMUM SAG GROUND CLEARANCE

$$= 15.611 \text{ m}$$

TASK 8



CROSS ARM

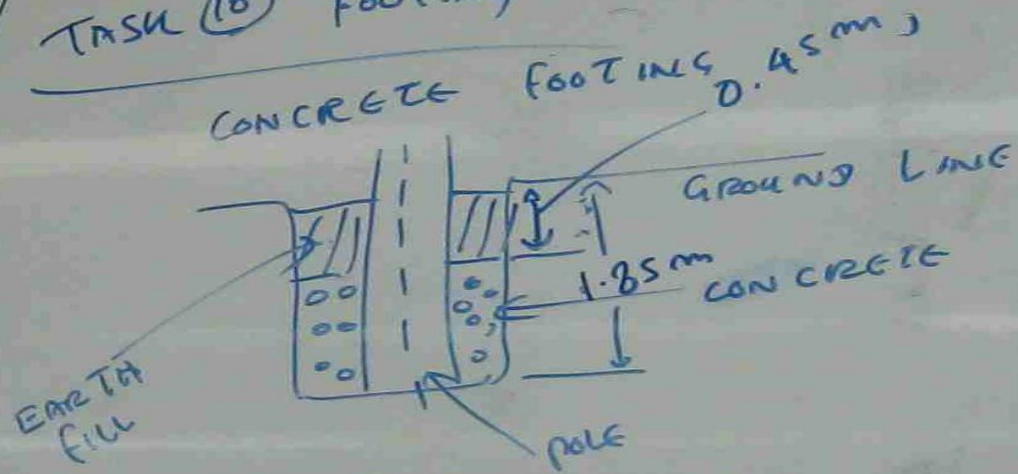
2.7 P | 16 | 100X100

DRAW MORE DETAILLY FOR CROSS ARM

TASK 10

TASK 11

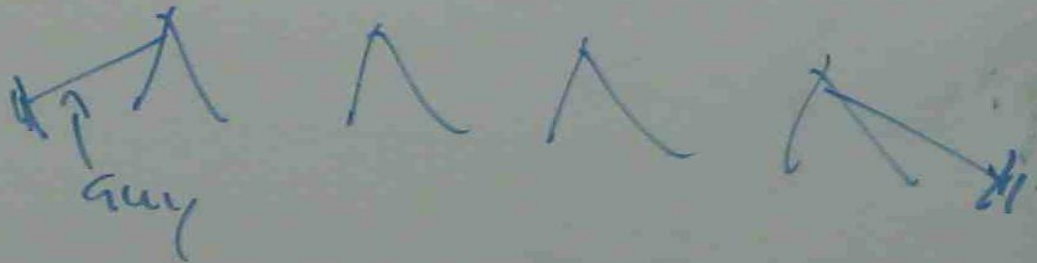
TASK ⑩ FOOTING



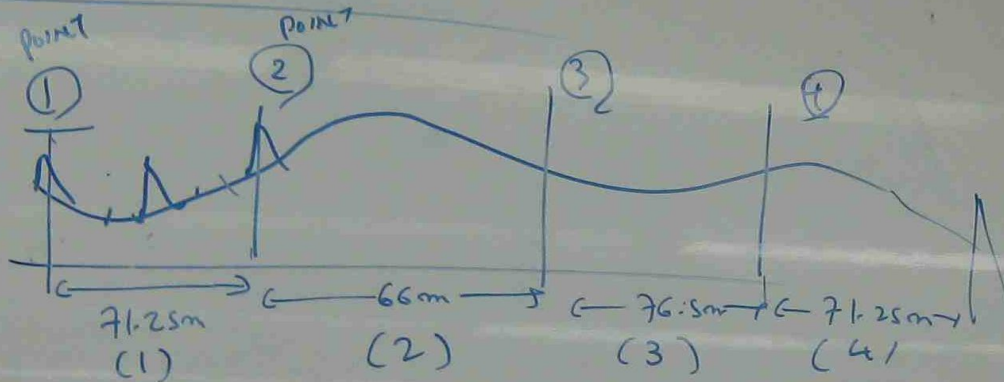
TASK ⑨ VIBRATION DAMPER

GUY WIRE

↑
LINE LINE



TASK (12) MATERIAL LIST

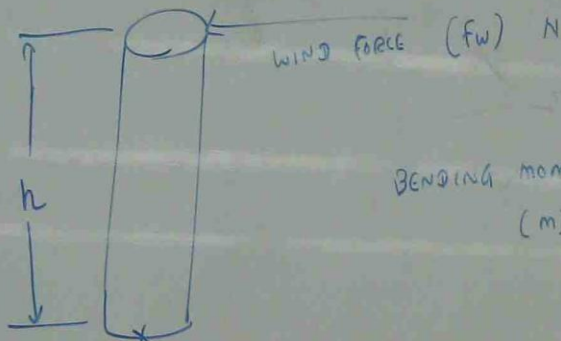


DIVIDE THE LINE INTO SECTIONS

	SECTION	SPAN	INSULATION			STAY	FOOTING
			DIA	DEPTH			
-	1 → 2	71.25	GSD				
TERMINATION TWIN X ARM		END	DISC GSD	1.35	12.5/6	C44	C
THROUGH PINS SINGLE X ARM		THROUGH 71.25m	PIN SLP33/920			-	-
THROUGH PINS - SINGLE X ARM	(2) → (3)	THROUGH 66m					

TERMINATION STRAIN TWIN X ARM	1 → 2 71.25 (END)	EA 3/0 ON TWIN 2.7 P/16 / 100 X 190	650	1.85	12.5/6	AY4	C
THROUGH PIN SINGLE X ARM	71.25 1 → 2	SLP 33 / 180 ON SINGLE 2.7 P/16 / 100 X 190	650	1.85	12.5/6	—	—
END ② TERMINATION STRAIN TWIN X ARM	④ → ⑤	EA 3/0 ON TWIN 2.7 P/16 / 100 X 190	650	1.85	12.5/6	AY4	C
SPAN	CROSS ARM	HOLE DIAMETER	HOLE DEPTH	TYPE	STRAY WIRE	FOOTING	

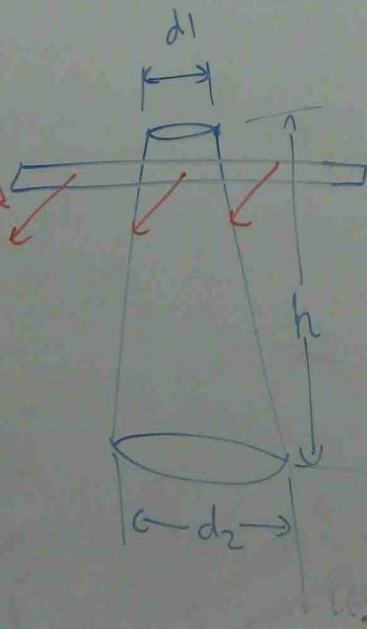
OVER HEAD LINE MECHANICAL DESIGN



$$\text{BENDING MOMENT (m)} = F_w \times h \quad (\text{N-m})$$

$h = \text{HEIGHT OF POLE}$

CONDUCTOR WEIGHT



CROSS ARM

$$\text{TOTAL BENDING MOMENT (m)} = \text{BENDING MOMENT CAUSED BY WIND ON POLE} + \text{BENDING MOMENT CAUSED BY WIND ON CONDUCTORS}$$

$$\text{BENDING MOMENT CAUSED BY WIND ON POLE} = \text{WIND PRESSURE} \times h^2 \left(\frac{d_1}{6} + \frac{d_2}{3} \right)$$

$$\text{BENDING MOMENT CAUSED BY WIND ON CONDUCTORS} = \text{WIND PRESSURE} \times \text{THE AREA OF CONDUCTORS SUBJECT TO WIND FOR THE WHOLE SPAN}$$

THE AREA OF CONDUCTORS SUBJECT TO WIND FOR THE WHOLE SPAN

NO. OF CONDUCTOR $\times h$