

### **CALCULATION OF LOADS FOR 220 KV D/C MONOPOLE OF TYPE "2P3/DE (0 - 15deg)"**

#### **INPUT DATA:**

1. Wind pressure on Conductors in Kg/Sq.m .	[ Pc ] = 106.5
2. Wind pressure on Ground wire in Kg/Sq.m	[ Pgw ] = 133
3. Wind pressure on Insulator Kg/Sq.m	[ Pi ] = 133.5
4. Wind span in mtrs for NC	[ WSNC ] = 120
5. Wind span in mtrs for BWC	[ WSBWC ] = 100
6. Weight Span in mtrs for NC (max).	[ W1 ] = 256
7. Weight Span in mtrs for NC (min).	[ W2 ] = -256
8. Weight Span in mtrs for BWC (max).	[ W3 ] = 154
9. Weight Span in mtrs for BWC (min) .	[ W4 ] = -154
10. Power Conductor Used.	<b><u>AAAC MOOSE</u></b>
11. Diameter of Conductor in mtrs.	[ Dc ] = 0.03195
12. Weight of Conductor in Kg/m .	[ Wc ] = 1.666
13. Number of Conductor.	[ Nc ] = 1
14. Tension of Coductor at 32 deg.C & 30 deg FW .	[ CT1 ] = 4975
15. Tension of Coductor at 32 deg.C & NW .	[ CT2 ] = 4074
16. Ground Wire Used.	<b><u>48F OPGW</u></b>
17. Diameter of Ground Wire in mtrs.	[ Dgw ] = 0.0122
18. Weight of Ground wire in Kg/m.	[ Wgw ] = 0.451
19. Tension of Ground Wirer at 32 deg.C & 30 deg FW .	[ GT1 ] = 1134
20. Tension of Ground Wirer at 32 deg.C & NW.	[ GT2 ] = 456
21. No.of Insulator Strings.	[ NI ] = 2
22. Length of Insulator String in Mtrs.	[ LI ] = 3.35
22. Diameter of the Insulator in Mtrs.	[ DI ] = 0.255
23. Weight of Insulator String in Kg. (Max).	[ Wimax ] = 300
25. Weight of Insulator String in Kg. (Min).	[ Wimin ] = 150
26. Angle of Deviation in degrees.	[ THETA ] = 15
27. Angle of Deviation in Radians.	[ THETA ] = 0.261799
28. Angle of Wind Direction (θ) in deg	[THEETA]= 30
29. Angle of Wind Direction (θ) in radians	[THEETA]= 0.523599

## I. RELIABILITY REQUIREMENT

### A. TRANSEVERSE LOADS.

#### POWER CONDUCTOR

a) Wind on conductor $[P_c \cdot \sin^2 \Omega \cdot W_{SNC} \cdot DC] \cdot N_c$	=	349
b) Wind on Insulators $[P_i \cdot L_i \cdot D_i \cdot N_i \cdot 0.5] \cdot \cos(\theta)$	=	99
c) Due to Deviation $[1 \cdot CT_1 \cdot \sin(\theta)] \cdot N_c$	=	1288
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		1735
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#### GROUND WIRE.

a) Wind on Ground wire $[P_{gw} \cdot \sin^2 \Omega \cdot W_{SNC} \cdot D_{gw}]$	=	166
c) Due to Deviation $[1 \cdot GT_1 \cdot \sin(\theta)]$	=	294
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		460
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### B. LONGITUDINAL LOADS

a) CONDUCTOR $[CT_1 \cdot \cos(0)]$	=	4975
b) Wind on Insulators $[P_i \cdot L_i \cdot D_i \cdot N_i \cdot 0.5] \cdot \sin(\theta)$	=	57
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		5032
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a) GROUND WIRE $(1 \cdot GT_1 \cdot \cos(0))$	=	1134
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### C. VERTICAL LOADS.

#### CONDUCTOR

		<u>Max.</u>	<u>Min.</u>
a) Weight of Conductor $[W_c \cdot W_1, W_c \cdot W_2] \cdot N_c$	=	426	-426
b) Weight of Insulator string $[W_{lmax}, W_{lmin}] \cdot N_i$	=	600	300
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		1026	-126
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#### GROUND WIRE

a) Wght. of Ground Wire $[W_{gw} \cdot W_1, W_{gw} \cdot W_2]$	=	115	-115
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**LOADING TREES FOR 220 KV D/C MONOPOLE OF TYPE "2P3/DE (0 - 15deg)"**

**(ANGLE OF DEVIATION: 15 Deg & WIND ANGLE: 30 Deg)**

**1 - RELIABILITY CONDITION**

