

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. | <u>AAAC MOOSE</u> |
| 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 & 45 deg FW . | [CT1] = 4630 |
| 15. Tension of Coductor at 32 deg.C & NW . | [CT2] = 4074 |
| 16. Ground Wire Used. | <u>48F OPGW</u> |
| 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 & 45 deg FW . | [GT1] = 928 |
| 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]= 45 |
| 29. Angle of Wind Direction (θ) in radians | [THEETA]= 0.785398 |

I. RELIABILITY REQUIREMENT

A. TRANSEVERSE LOADS.

POWER CONDUCTOR

| | | |
|--|---|-------|
| a) Wind on conductor $[P_c \cdot \sin^2 \Omega \cdot W_{SNC} \cdot DC] \cdot N_c$ | = | 257 |
| b) Wind on Insulators $[P_i \cdot L_i \cdot D_i \cdot N_i \cdot 0.5] \cdot \cos(\theta)$ | = | 81 |
| c) Due to Deviation $[1 \cdot CT_1 \cdot \sin(\theta)] \cdot N_c$ | = | 1198 |
| | | ----- |
| | | 1536 |
| | | ----- |

GROUND WIRE.

| | | |
|--|---|-------|
| a) Wind on Ground wire $[P_{gw} \cdot \sin^2 \Omega \cdot W_{SNC} \cdot D_{gw}]$ | = | 123 |
| c) Due to Deviation $[1 \cdot GT_1 \cdot \sin(\theta)]$ | = | 240 |
| | | ----- |
| | | 363 |
| | | ----- |

B. LONGITUDINAL LOADS

| | | |
|--|---|-------|
| a) CONDUCTOR $[CT_1 \cdot \cos(0)]$ | = | 4630 |
| b) Wind on Insulators $[P_i \cdot L_i \cdot D_i \cdot N_i \cdot 0.5] \cdot \sin(\theta)$ | = | 81 |
| | | ----- |
| | | 4711 |
| | | ----- |

| | | |
|---|---|-----|
| a) GROUND WIRE $(1 \cdot GT_1 \cdot \cos(0))$ | = | 928 |
|---|---|-----|

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 |
| | | ----- | ----- |
| | | 1026 | -126 |
| | | ----- | ----- |

GROUND WIRE

| | | | |
|--|---|-----|------|
| a) Wght. of Ground Wire $[W_{gw} \cdot W_1, W_{gw} \cdot W_2]$ | = | 115 | -115 |
|--|---|-----|------|

LOADING TREES FOR 220 KV D/C MONOPOLE OF TYPE "2P3/DE (0 - 15deg)"

(ANGLE OF DEVIATION: 15 Deg & WIND ANGLE: 45 Deg)

1 - RELIABILITY CONDITION

