

GUIDELINE NOTES – POLE AND MAST DESIGN

1. Bisector and inline stays to be 2.0m apart.
2. One stay - to be attached at the middle phase.
Two stays - to be attached at the top and bottom phases.
Three stays - to be attached at the top, middle and bottom phases.
3. For shielded structures, the top stay to be attached to the shield wire.
4. Stay wire 7/4.00 stay wire 1100MPa UTS of 96kN for MV lines.
Stay wire 19/2.35 stay wire 1100MPa for HC lines.
Stay rod to be 24mm diameter, 2.4m long, planted 2.2m deep for HC lines.
Stay rod to be 20mm diameter, 2.0m long for MV lines.
Stay plate to be a minimum of 450mm x 450mm x 6mm thick for HC lines.
Stay plate to be a minimum of 350mm x 350mm x 6mm thick for MV lines.
Stays to be planted at 45 degrees to vertical.
5. Shield wire assumed to be 7/3.35 shield wire 1100MPa.
6. Factor of safety used on concrete poles is 2.5 as per the OHS Act.
7. Use 10kN post insulators on intermediate structures.
Use 33kV 10kN post insulators for HC lines.
Use 22kV 4kN post insulators for MV lines.
8. Side ties for appropriate conductor size to be used.
9. Everyday tension 20% of UTS at 15 degrees celsius.
10. Bisector stays may be splayed 5 degrees of bi-sector.
11. Construction load on conductor max 40% UTS.
12. Use the smallest applicable span length.
13. With soil conditions differing, care must be taken when planting and compacting stays. Compaction around the pole and stays is to be done in 150mm layers with a hand-compactor weighing more than 13kg in weight.
14. 700Pa wind pressure was used in the design of the poles.
15. Weight span is the load of the conductor on the insulator.
16. Electrical clearance span is the phase spacing to prevent electrical clashing.
17. Wind span is the load of the wind on the conductors and pole.
18. All stays in types 1 and 2 soil to have six pockets of cement added to excavated soil, which is then thoroughly mixed and compacted in 200mm layers with an 11kg hand-compactor.
19. All poles in types 1 and 2 soil to have four pockets of cement added to excavated soil, which is then thoroughly mixed and compacted in 200mm layers with an 11kg hand compactor.
20. For types 3 and 4 soil, the pole foundations and stay sizes to be designed.
21. All pole foundations for types 1 and 2 soil to be 0.7 x 0.7 x planting depth.
22. All stays for types 1 and 2 soil to be 1.5 x 0.8 x 2.0m deep.
23. All strain structures carry one circuit, i.e. two poles are required for a double circuit.
24. For inline stays, stays indicated are on one side of the structure. Stays to be on both sides of the structure.
25. All hardware to be rated with a 2.5 FOS as per UTS of conductor.
26. For conductor data see Table 2 on page 6.
27. All soils to be checked by a professional engineer.
28. Conductor and earth wire to be separated by 600mm vertically intermediate and strain structures.
29. Strain inline structures not to be used as terminal structures; additional construction stays to be added, the number depending on the conductor used.
30. Terminal structure stays to be separated at least 2.0m apart.
31. For vertical clearance as per OHS Act, see Table 1 on page 14.
32. For transformer poles use 10m 8kN pole, max weight of transformer 900kg.
33. Baulking is required for free-standing poles and to be designed accordingly where necessary.

Typical soil types

m	Type '1'	Type '2'	Type '3'	Type '4'
Maximum soil-bearing pressure	300 kPa	150 kPa	100 kPa	50 kPa

Where soil that has a poor resistance to loads (sandy soil, clay, turf, etc.) the foundation will need to be redesigned. For each stay or pole planted, two pockets of cement are to be added to the excavated soil. This is to be thoroughly mixed, moistened, then layered in 150mm layers and compacted with a hand-compactor weighing no less than 13kg. Compaction is to continue until no further settlement occurs. Once complete, the next 150mm layer is to be laid and compacted. This is to continue until the hole is filled with the compacted sand/ cement mix. The soil condition must be approved by a professional engineer.