CHAPTER – 8

PROTECTION OF TOWER FOOTINGS

1.0 GENERAL:
1.1 Special measures for protection of foundations shall be taken in respect of locations close to in nallah, river beds, etc. Protection of foundations is also to be provided in the case of foundations located on the sloping ground of sand dunes or hills.

1.2 The above is to be done, based on site conditions, by employing any or a combination of the following three methods which are best suited for the site conditions.
   a) Benching.
   b) Protection against cutting of soil by flow of water.
   c) Rivetment.

1.3 A drawing showing the typical use of benching and rivetment for protection of tower footings is given at Appendix – A.

2.0 BENCHING:
2.1 This method is generally used if the soil is gently sloping and there is no significant difference in the levels of the soil around the foundation. The soil at the higher level is cut and spread in the lower level so that the soil near the foundation becomes level.

3.0 PROTECTION AGAINST CUTTING OF SOIL BY FLOW OF WATER:
3.1 This method is generally used where the tower foundation is located at a distance from the edge of river / nalla, etc. The foundation is protected by providing suitable crate of galvanized wire netting and meshing packed with boulders.

4.0 RIVETMENT:
4.1 This method is generally used where the ground surface is irregular or where there is significant difference in the levels of soil around the tower foundation. The rivetment protection is provided in the form of stone masonry walls around those sides of the foundation where such protection is required.

4.2 Depending on the site conditions, the following are to be decided:

   a) The side or sides on which the rivetment is to be provided.
   b) Height of the masonry wall.
   c) Length of the masonry wall.

4.3 The rivetment is got constructed generally as given in the typical drawing enclosed at Appendix – B. This drawing also shows a cross section of the masonry wall for the rivetment. The drawing is applicable only for a height of masonry wall not exceeding 5 metres.

4.4 The stone masonry wall is constructed at a distance from the tower legs which corresponds to the angle of repose of the soil. The stone masonry is constructed with 1:5 cement mortar. The size of stones used for masonry work shall be 300 × 150 × 150 mm or below. The dimensions are calculated as given in the drawing.

4.5 A base of height 200 mm is first provided. The remaining part of the masonry wall is constructed on this base to a height of 75 mm above the ground level at the center of the tower. The width of the masonry wall at the top is 600 mm. Coping of height 75 mm is provided on the top of the masonry wall with M – 15 concrete (1:2:4 nominal mix).
4.6 Weep holes, staggered horizontally and vertically, for draining of water from inside the rivetment are provided in the masonry at every 2 metres interval. These are generally in the form of 100 mm dia. A. C. pipes. These are given a fall of 1 in 8 from the back to the face of the masonry. The top most weep hole is at a minimum distance of 300 mm below the top. The lowest weep hole shall be 300 mm above the ground outside the masonry wall. A stone packing of size 1000 × 1000 × 1000 mm using river shingles or stones of size 75 mm to 150 mm is provided inside the masonry wall at the opening of each weep hole.

4.7 The inside of the rivetment is filled with earth upto the reference ground level. The earth is rammed to compaction in layers of 150 mm.

4.8 The pointing of the face of the stone masonry wall is done using 1:6 cement mortar.
APPENDIX – A

ELEVATION

Typical Use of Benching and Rivetment for Protection of Tower Footing
TYPICAL SKETCH SHOWING CROSS SECTION OF RIVETMENT OF TRANSMISSION LINE TOWER FOUNDATION

\[ \theta = \text{Angle of repose of soil} = 15^\circ \text{ to } 45^\circ \text{ depending on type of soil} \]

\[ B = 600 + H/3.846 \]

\[ B = 600 + H \tan \alpha (\alpha = 15^\circ) \]

Notes:
1. All dimensions in mm.
2. This drawing is valid for rivetment wall height H not exceeding 5.0 m.
3. Minimum depth of rivetment wall below ground level at outer face of rivetment wall shall be 600 mm.
4. Weep holes shall be of 150 mm dia. AC pipes in case of large rivetments.
5. Masonry work to be done in 1:5 cement mortar.
6. Size of stone for masonry work: 300 x 150 x 150 mm and below.
7. Size of stone for packing at weep hole: 75 to 150 mm.