SECTION-IVE

EMPLOYER DESIGN FOUNDATIONS

(Applicable for Transmission Lines wherein Foundation Design is in Employer's scope)

TECHNICAL SPECIFICATIONS

SECTION-IV E

EMPLOYER DESIGN FOUNDATIONS

Revision History

Revision No.	Date	Clause Ref	Description
Rev-0	June'2021		First Release
Rev-1	Sept'2021		First Revision
Rev-2	Jan'2022		Second Revision

TECHNICAL SPECIFICATIONS

SECTION-IV E

EMPLOYER DESIGN FOUNDATIONS

CONTENTS

Clause No.	Description	Page No.
1.1	Foundations	1
1.2	Type of Foundations	1
1.3	Classifications of Foundations	1
1.4	Design of Foundations	3
1.5	Soil Investigation	4
1.6	Properties of concrete	4
1.7	Construction of Tower Foundation, Stub Setting and Earthing	6
1.8	Unit Rates and Measurement for Foundation	8
1.9	Setting of Stubs	9
1.10	Mixing, Placing and Compacting of Concrete	10
1.11	Curing	12
1.12	Backfilling and Removal of Stub Templates	12
1.13	Benching	13
1.14	Protection of Tower and Tower Footing	13

or disposed-off. At locations, where borrowed earth is required for backfilling, Contractor shall bear the cost of the borrowed earth irrespective of leads & lift.

1.12.2 The backfilling materials shall be clean and free from organic or other foreign materials. The earth shall be deposited in various layers, levelled, wetted if necessary and shall be fully compacted. All excavated earth shall be placed over the filled in pit to allow further settlement, if any, by gravity**.**

1.12.3 The backfilling and grading shall be carried to an elevation of about 75 mm above the finished ground level to drain out water. After backfilling 50 mm high, earthen embankment (band) will be made along the sides of excavation pits and sufficient water will be poured in the backfilling earth for at least 24 hours. After the pits have been backfilled to full depth the stub template can be removed.

1.13 **Benching**

When the line passes through hilly/ undulated terrain, levelling the ground may be required for casting of tower footings. All such activities shall be termed benching and shall include cutting of excess earth and removing the same to a suitable point of disposal as required by Employer. Benching shall be resorted to only after approval from Employer. Volume of the earth to be cut shall be measured before cutting and approved by Employer for payment purposes. Further, to minimise benching, unequal leg extensions/ raised chimney shall be considered and provided if found economical. The proposal shall be submitted by the Contractor with detailed justification to the Employer.

1.14 Protection of Tower and Tower Footing

1.14.1 Tower shall be spotted such that the quantities of revetment are optimum. For tower locations in undulated terrain such as hill/ mountain slopes, options like use of unequal leg extensions for towers, unequal chimney extensions etc. shall be explored by the contractor for optimizing the need for revetment & benching.

1.14.2 The work shall include all necessary stone revetments, concreting and earth filling above ground level, the clearing from site of all surplus excavated soil, special measures for protection of foundation close to or in nalas, river bank / bed, undulated terrain, protection of uphill/ downhill slopes required for protection of tower etc., including suitable revetment or galvanised wire netting and meshing packed with boulders. The top cover of stone revetment shall be sealed with 1:2:4 nominal mix concrete. Contractor shall recommend protection at such locations wherever required. Details of protection of tower/ tower footing are given in drawing enclosed with these specifications for reference purpose only.

1.14.3 Tower footings shall generally be backfilled using soil excavated at site unless unsuitable for backfilling. In the latter case, backfilling shall be done with borrowed earth of suitable quality irrespective of leads and lift. The unit rate for backfilling quoted in BPS shall include the required lead and consolidation and leveling of earth after backfilling.

1.14.4 The provisional quantities for protection work of foundations are furnished in BPS. The unit rates shall also be applicable for any quantity variations during execution. The same unit rates shall hold good for protection work carried out on down hills or up hills slopes applicable for the tower locations.

1.14.5 The unit rates for random rubble masonry revetment quoted in price schedule shall also include excavation & (1:5) random masonry and unit rate for top sealing with M15 concrete. For payment purposes the volume of random rubble masonry revetment shall be measured from bottom to top sealing coat and paid at the unit rates indicated in the Contract.

No extra payment shall be made for allied works such as excavation for revetment, packed stone at head of weep holes etc. However, no deduction shall be made for the volume enclosed by weep holes.

1.14.6 For some of the locations in nalas, river bed or undulated terrain etc., boulders of minimum. 150mm size bounded and packed in galvanised wire net/ mesh of 8 SWG wire and 152 square mm (maximum) mesh are to be provided. These stones shall be provided in crates size of 2.0 m x 2.0 m or as deemed suitable for a particular location. Measurement shall be taken in cubic meters and 15% deduction will be made for void from cage/ stack measurements.

1.15 After completion of foundation, stub levels, back to back dimensions, diagonal dimensions etc. shall be measured jointly by the Engineer of Contractor and Employer before taking up erection of tower and same shall be recorded for future reference. In case of any deviations beyond permissible limits as per IS 5613, the foundation shall be rectified or re-casted by the contractor at his own cost.