

CREATION OF PLS TOWER MODELS

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PURPOSE AND SCOPE

This TGN gives guidance for the generation of PLS TOWER models for use when assessing National Grid overhead line towers for re-utilisation. The guidance is intended to ensure a consistent approach is taken by any tower model originator such that models may be accepted into the National Grid library of generic models for use by National Grid and their contractors and consultants.

This document applies to the PLS Tower modelling of all generic self-supporting steel lattice transmission towers owned and operated by National Grid within the UK. Once created the models can be used within PLS Cadd and PLS Tower to determine the tower's structural capacity under site specific conditions. This guidance does not however specify how loadings are to be calculated. For application of EN50431:3-9 or BS8100 loadings, reference should be made to TS 2.4. **Generic Design Principles for Overhead Lines**

The generic models based on this TGN will form a library of generic models held by National Grid and freely available to its contractors/consultants. However, the generic models may be modified to create individual towers with site specific characteristics. These might include for example: partial metrification; partial strengthening; addition of third party assets (aerials) etc.

This guidance is not applicable to temporary masts, gantries or pole type structures.

The originator and user of the PLS Tower model shall be an experienced overhead line or tower design engineer with knowledge and experience in steel lattice structures.

PART 1 –PROCEDURAL

1 TECHNICAL REQUIREMENTS

Unless specified otherwise the design code to be selected in PLS Tower shall be NGT-ECCS. Terrain category II shall also be adopted in the *Specific Values menu (Vector Load Cases sheet)* as applicable to the UK National Normative Aspects (NNA) of BSEN 50341.

1.1 Tower Model File Content

Completed tower model files shall include the geometry of tower top, panels, crossarms and extensions appropriate to the particular tower type and tower height considered. Files shall be created for each tower height and submitted in backup format. The file shall include, as a minimum, the following information:

1.1.1 Steel Material Information

This shall represent where possible the actual steel grade with the appropriate strength of the material used to build the existing tower. Where recent modifications have taken place e.g. to body extensions or other strengthening works, properties of the new steel shall only be applied to the new members.

1.1.2 Angle Section & Bolt Details

These shall be as shown on the drawings and section property tables used to compile the tower model. Equivalent properties of nearly similar sections shall not be used.

1.1.3 Insulator Details

PLS Tower program does not automatically calculate the Drag coefficient and Gust factors for insulators. These shall be allowed for in the wind area of the particular insulator being considered.

Where allowance has been made for the insulator weight and wind loads in the Point Load values, this shall be stated in the report.

The filename for a PLS TOWER model shall include:

- a) the Line Design
- b) the tower type
- c) the extension
- d) the tower manufacturer (where applicable)

Example: L6 BICC D30 E20. (use suffix 'M' for metricated or 'C' for converted eg, L8(C) D30 E3.7)

The originator shall include any model specific notes in the PLS Tower report window created within the model file. Where specific notes are required, this has been identified within this document. However, any other further attributes specific to the particular model shall also be included in the report file. The originator shall also include in the report a list of the drawings used to create the model.

1.2 Tower Geometry

The model geometry shall be in accordance with available tower general arrangement drawings for the relevant tower. Sufficient accuracy can be achieved by basing the geometry on the angle member "heel" (back to back) dimensions rather than the centroid. This aids model checking by other users and shall be the normal method of creating the geometry. However, some discretion may be applied in the case of particularly narrow structures. Where other than "heel" dimensions have been used this should be noted in the PLS report.

Where dimensions for the set-out of bracings are unavailable, the General Arrangement (GA) drawings may be scaled providing that reasonable confidence is held in the proportions of the drawing used. If scaling is necessary, then this shall be noted in the PLS report with details of the panel/section scaled.