The vast majority of self supporting towers in use today were installed from the mid 1960 to the present day. Over this period there have been enormous changes to the British Standards governing their design.

**TOWER ANALYSIS and DESIGN** specialise in the analysis of these structures. The following notes are intended to give guidance to Engineers involved with towers and their loading.

**HISTORICAL OVERVIEW.**

There are two basic documents required to determine the loading and design towers.

The first is concerned with the assessment of loading, predominately wind loading. These are:-

- Basic data for the design of buildings; Part 2 wind loading.
- Basic data for the design of buildings; Part 2 wind loading.
- BS 6399 Part 2 (1995)
  Loading for buildings; Part 2 wind loading.
- BS 6399 Part 2 (1997)
  Loading for buildings; Part 2 wind loading.
- BS 8100 parts 1 & 2 (1986)
  Lattice towers and masts.
  Eurocode 1. Actions on structures.
  General actions, Wind actions.

The second document is concerned with the design of structural members.

These are:-

  The use of structural steel in buildings.
- BS 5950 (1985)
  Structural use of steelwork in building.
- DD 133 (1986)
  Draft code of practice for strength assessment of members of lattice towers and masts.
- BS 8100 Part 3 (1999)
  Code of practice for strength assessment of members of lattice towers and masts.
  Towers, Masts and Chimneys. Towers and Masts.
INDIVIDUAL STANDARDS.

**BS 449.**
Up to 1985/6 when BS 8100 and BS 5950 were published the design of towers and masts was governed by BS 449 and CP3 Chapter V. Although regularly revised none of the amendments to BS 449 greatly altered the design of towers, the code became obsolete with the publication of BS 5950 in 1985.

**CP3 Chapter V part 2.**
This code underwent a major and very significant revision in 1972. The whole concept of the assessment of wind loading changed with the introduction of a new section specific to towers and masts; this resulted in an increase of approximately 25% in wind loading. Consequently a large proportion of the towers built in the 1960’s and before are found to be unstable when checked against current standards.

**BS 6399.**
CP3 Chapter V became obsolete with the publication of BS 6399 (1995), the specific references to towers and mast were removed in 1997.

**BS 8100 & DD 133.**
BS 8100 parts 1, 2 & 3 is a coded of practice for he design of self-supporting lattice towers. Parts 1 & 2 deal in a very sophisticated manor with the assessment of wind loading, generally reducing it by up to 15% on light to moderately exposed sites when compared to earlier standard. However, at severely exposed sites they can increase loading, sometimes quite dramatically particularly where hillslopes are involved. This is not always due to the stringent requirements of BS 8100 but often due to the poor application of earlier standards.

DD 133 was a draft code for the design of structural members in towers and has now been superseded by BS 8100 part 3 (1999) with amendments; these broadly simplified procedures without significantly effecting results.

BS 8100 part 4 (1995) deals with the assessment of loading for guyed masts.

**BS EN 1991-1-4:2005.**
Part 4 of Eurocode 1 was issued 31st March 2010 and deals with wind loading and updates the wind map data in BS 8100 part 1. The National Annex gives data specific to the United Kingdom.

**BS EN 1996-3-1:2006.**
Part 1 of Eurocode 3 was issued 31st March 2010 and deals with the design of self-supporting towers and guyed masts. The National Annex gives data specific to the United Kingdom.

**PD 6695-3-1 : (in preparation) **
Published Document 6695-1-3 was expected to be issued in about mid-2012 but is not yet available, this will give guidance on the calculation of the unity factor CsCd, until this is available it is not possible to fully implement the above Eurocodes.

**Summery.**
BS 449 and CP3 Chapter V are now both obsolete and no longer appropriate for use in the design of or the checking of self-supporting towers and guyed masts.
BS 5950 and BS 6399 will also be phased out by the Eurocodes. However, they are codes of practice for use in the general design of buildings and do not deal specifically with self-supporting towers and guyed masts.
BS 8100 is four codes of practice specifically intended for the assessment of loading and the design of self-supporting towers and guyed masts. Used in conjunction with the wind data in BS EN 1991-1-4 they will continue to be appropriate standards for the next few years.
Eurocodes 1991-1-4 and 1996-3-1 will eventually supersede BS 8100.