ABSTRACT

The present thesis concerns the study of a steel transmission tower. Structures of this kind are met nowadays very often worldwide, as the section of communications earns continually ground and its establishments, that constitute the foundation for further development, are necessary even in the most inaccessible places.

The aim of this thesis is to search through the importance of a row of parameters that are involved in design, influencing not only the final selection of the elements and consequently the economy of the construction, but also all these variables that depend on this choice, like stress results, deflections, periods and modes. On their values will rely the right function of the equipment, that lies upon the tower and the avoidance of unpleasant phenomena, like signal perdition.

In Part A there is an introductory reference on stresses and design loads, as well as the cases that are to be analyzed.

In Part B that follows, initially the tower is solved according to EC3. Afterwards, the tower is resolved with three different design policies. The difference of each one is due to the choice of the *buckling length* and the corresponding radius of gyration for two element groups: the X-bracings of the vertical section and the Λ-bracings of the inclined section. In the first element group is studied the influence of the application of DIN188000, while for the second, acceptances are made that are further analyzed in the chapters that follow. Also, another parameter that is examined, is the upper slenderness limit according to which, the selection of the elements is done. So, for each design policy three sub-cases are distinguished: design with upper slenderness limit equal to *180*, *250* and *300*. The main target here is to define the factor of exhaustion and through it, the economy of the structure.

In the analysis of Part B, the compressibility of the ground has been ignored. However, a complete analysis of a structure that is based on the ground must also take into consideration the influence of the foundation and the ground. So, in Part C the sensitivity of the results of the analysis in alterations of the parameters involved is examined. For this purpose, a parametric research of the tower is made. The parameters used are the upper slenderness limit, the dimensions of the foundation, and the compressibility of the ground. The soil-structure interaction is taken into account by using vertical *Winkler springs*.

To the pages that follow, an attempt is made to cover these issues as sufficiently as possible, but certainly there is a wide field for further research.