

Visual grading of large cross section structural timber of *Pinus sylvestris* L. according to UNE 56544:2007 standard

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Abstract Large cross section structural timber have been used in many structures over long periods of time and still make up an important part of the market due to its mechanical properties. Furthermore, it is frequent its employment in new construction site. It involves the need for a visual grading standard for timber used in construction according to the quality assessment. The material has to satisfy the requirements according to the currently regulations. UNE 56544 is the Spanish visual grading standard for coniferous structural timber. The 2007 version defined a new visual grade in the standard for large section termed Structural Large Timber (MEG). This research checks the new visual grading and consists of 116 structural size specimens of sawn coniferous timber of Scotch pine (*Pinus sylvestris* L.) from Segovia, Spain. The pieces had a cross section of 150 by 200 mm. They were visually graded according to UNE 56544:2007. Also, mechanical properties have been obtained according to standard EN 408. The results show very low output with an excessive percentage of rejected pieces (33%). The main reasons for the rejection of pieces are fissures and twist.

Keywords visual grading, *Pinus sylvestris* L., structural timber, large cross section

1. INTRODUCTION

Non-destructive evaluation is the science of identifying physical and mechanical properties of a material without altering its final application capabilities (Ross et al. 1998). It is an important tool and it can be used in the industry.

It is completely accepted that structural sawn timber should be strength graded before use. For this purpose a major range of standards has been developed, and much research on the grading and sources has been carried out to evaluate timber quality.

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The visual grading technique for wood quality assessment is based on measurement of the singularities and characteristics present in timber pieces, such as: knot size, slope of grain, presence of pith, bark and resin pockets, fissures, distortions, etc. Their limits define the different visual grades.

UNE 56544:2007 is the in force Spanish visual grading standard for coniferous structural sawn timber. It covers, among others, Scotch pine (*Pinus Sylvestris* L.) It defines a new visual grade in the standard for large section termed Structural Large Timber (MEG).

This standard is the result of several research projects (Martinez 1992, Hermoso 2001, Conde 2003, Íñiguez 2007). Samplings tests were carried out according to European standards EN 408:2003 and EN 384:2004, and they have been validated by the CEN TC 124 Committee to be added to the European standard EN 1912 (2010).

The main goal of this paper is to evaluate this standard and propose other non-destructive methods for grading the structural timber.

2. MATERIAL TESTED

The sample studied consisted of 116 structural size specimens of sawn coniferous timber of Scotch pine (*Pinus sylvestris* L.) from Segovia, Spain. The pieces had a cross section of 150 by 200 mm. They were selected and graded when its moisture content was > 20%, and its visual grading was Structural Large Timber (MEG).

The test material was selected to evaluate the drying effect on the visual grading of structural large timber (MEG). The sample represents the timber source and sizes that will be graded in production.

3. CONCLUSIONS

Mechanical and physical properties values of the tested sample graded as MEG are congruent with the C22 Strength Class assigned on the current version of the EN 1912:2010 standard.

Drying effects are the reject reason of the 25 % of the pieces previously graded as MEG when green.

There are no significant differences between mechanical properties of the visual graded pieces attending to the criteria of fissures and deflections related to the drying process, among the rest of the visual criteria, or graded without attending to these criteria.