INTERNATIONAL STANDARD

ISO 13912

First edition
2005-07-15

Structural timber — Machine strength grading — Basic principles

Bois de structure — Classification mécanique selon la résistance — Principes de base

Reference number
ISO 13912:2005(E)

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Published in Switzerland

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

ISO 13912 was prepared by Technical Committee ISO/TC 165, *Timber structures*.

Introduction

The general principle of this International Standard is that any type of machine strength-grading procedure is acceptable, provided it is defined, controlled, and documented to the extent required to reflect the degree of reliability intended for the structural application of the product.

The body of this International Standard specifies the essential features common to all machine strength-grading operations. The requirements are minimal so as to ensure maximum scope and flexibility in the application of this International Standard to the machine strength-grading process as applied to timber.

Annex A provides a conformance standard reflecting the requirements of this International Standard.

Structural timber — Machine strength grading — Basic principles

1 Scope

This International Standard establishes the basic principles for rules and procedures governing the machine sorting of timber for use in structural applications.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 13910, *Structural timber — Characteristic values of strength-graded timber — Sampling, full-size testing and evaluation*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 13910 and in Annex A apply. The terms and definitions given in Annex A are representative of those in rules and procedures governing the machine sorting of timber for use in structural applications.

4 Symbols and abbreviated terms

For the purposes of this document, the symbols and abbreviated terms given in ISO 13910 and in Annex A apply. The symbols and abbreviated terms given in Annex A are representative of those in rules and procedures governing the machine sorting of timber for use in structural applications.

5 General

5.1 Machine strength-graded timber

Machine strength graded timber is sawn wood that has been machine sorted according to selected criteria allowing for classification into structural grades. The machine criteria identify mechanical and/or physical properties that reflect the timber strength and may affect the utility of the product.

5.2 Machine strength-grading operations

A typical machine strength-grading operation shall be comprised of a grading machine that sorts an input resource into one or more grades (see Figure 1). Some of the lumber may not meet the requirements of the minimum specified grade.

The grading machine comprises one or more devices that may measure properties along the length of a piece of timber as it passes through the machine. For some machines, properties along the length of a piece of timber are not measured, but rather properties are measured that relate to the piece of timber considered in total as a single unit. End portions of the timber may not be scanned [see Figure 2 a)].

The data recorded by the machine shall be processed so as to produce a sorting criterion, and this sorting criterion is used as a basis for assigning a grade of machine strength timber.

Visual requirements for the total piece of timber, the unscanned end portions, or both should be specified to supplement the information obtained by the machine.

NOTE 1 Within the context of this International Standard, the term “scanner” is used to denote the device used to measure a property of the timber, and the term “scanned length” is used to denote that portion of the timber for which measurements are made by the scanning device if it measures properties along the length of a piece of timber.

NOTE 2 In the use of the conventional bending type of strength-grading machine, the only parameter that is measured (mechanically) along the length of each piece of timber (except for the unscanned end lengths) is the local modulus of elasticity on flat.

NOTE 3 For a machine using single or multiple scanners, it may be common to use the data obtained to produce a prediction of strength along the length of a piece of timber [see Figure 2 b)]. For this case, the minimum predicted strength value within the piece is usually taken to be the grade control criterion.

5.3 Machine strength-grading principles of quality control

Machine grading is one element of quality control operations. This International Standard requires that the quality control related to the machine grading operation is undertaken by placing checks on the four components of the strength grading operation: 1) the resource and sawn timber inputs; 2) the machine operation; 3) the visual requirements (when specified); and 4) the graded timber output (see Figure 1).

In theory, it should be possible to control quality, either

a) by control on the resource input and the machine operation, or

b) by checks of the quality of the output grades.

However, in practice, additional monitoring is generally required.

For example,

— when using a), care must be taken to define and ensure that the resource is similar to that initially used to establish the machine settings;

— when using b), the initial evaluation (see 8.2) should involve sample sizes larger than those normally used for daily evaluation (see 8.3) to ensure that the 5-percentile strength requirements are met.

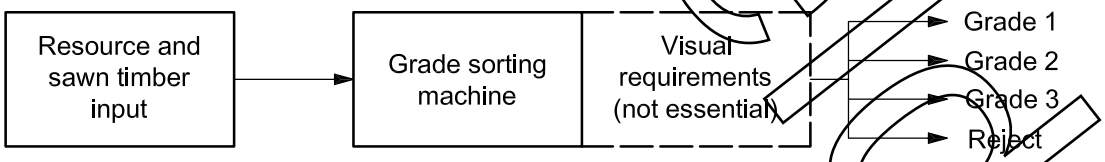
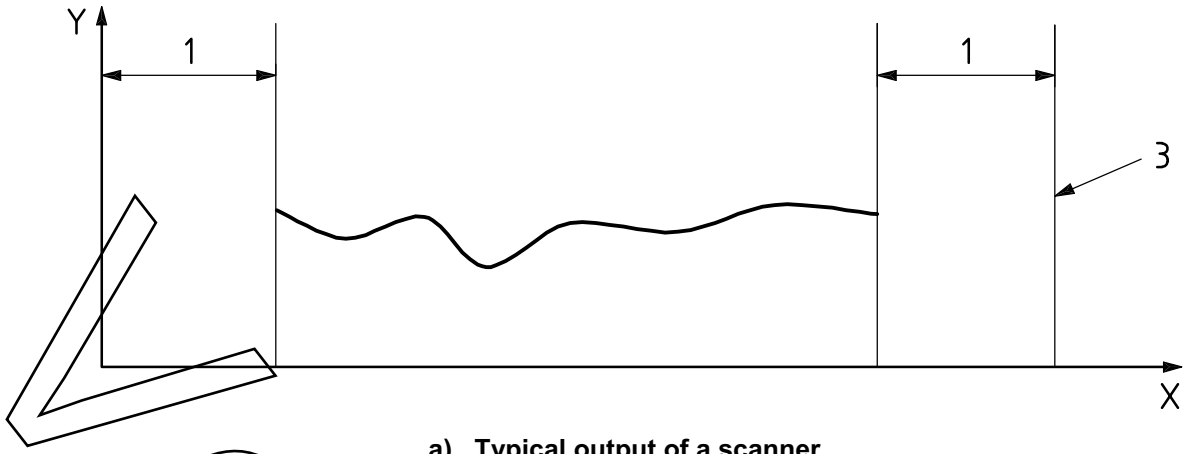
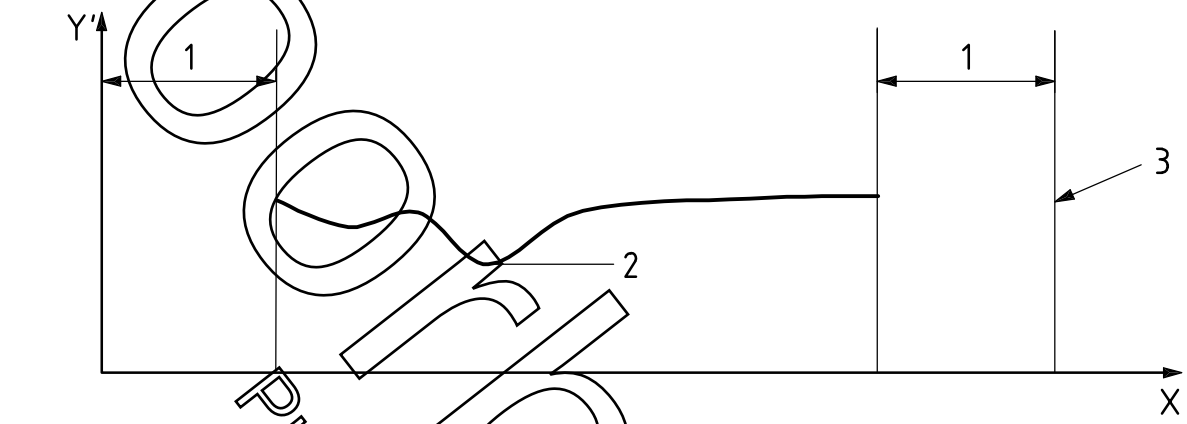


Figure 1 — Schematic of machine strength-grading operation



a) Typical output of a scanner



b) Typical form of processed output

Key

X distance from start of piece
Y scanner output
Y′ predicted strength
1 unscanned length
2 minimum predicted strength
3 end of piece

Figure 2 — Measurements made by a typical strength-grading machine

6 Resource and sawn timber input requirements

6.1 General

The input resources shall be identified in terms of all parameters that may affect the output of the machine grade sorting operation.

6.2 Input requirements

6.2.1 Resource

The parameter that shall be identified is the timber species or mixture of species.

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