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Timber structures — Test method — Static load tests for horizontal diaphragms including floors and roofs

Structures en bois — Méthode d'essai — Essais de chargement statique pour les diaphragmes horizontaux incluant planchers et toitures

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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.

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT), see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 165, *Timber structures*, based on ASTM E 455.

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Introduction

Horizontal diaphragms including floors and roofs are integral parts of light-frame timber buildings to show resistance against horizontal forces such as winds and earthquakes. Their characteristics such as ultimate shear strength have great effects on the behaviour of timber buildings including horizontal diaphragms as floors and/or roofs under winds or seismic loads.

Horizontal diaphragms are those structures which are widely used for timber buildings to form floors and/or roofs. They behave as a simple beam or cantilever beams under horizontal loads caused by wind or earthquake to transmit forces to the structures or structural members supporting them. Horizontal diaphragms should have enough stiffness and strength that they do not undergo large deflection or failures in parts of the structure.

The purpose of this International Standard is to measure the shear stiffness and strength of horizontal diaphragms as one of the basic parameters to interpret the behaviour of diaphragms under horizontal loads such as winds and earthquakes. The requirements are necessary to replicate the same conditions as those for timber structures in the field. Loads can be applied to the specimen either by compression or tension whichever is relevant.

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Timber structures — Test method — Static load tests for horizontal diaphragms including floors and roofs

1 Scope

This International Standard defines the test method for horizontal diaphragms including floors and horizontal and sloped roofs under static loads. This test method is designated to evaluate the static shear capacity of a typical segment of a diaphragm under applied static loads, and to evaluate the stiffness of the diaphragm assembly.

2 Normative references

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

ISO 13061-2, *Physical and mechanical properties of wood — Test methods for small clear wood specimens — Part 2: Determination of density for physical and mechanical tests*[1)]

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
diaphragm
horizontal and sloped assembly of materials designated to transmit lateral forces to vertical resisting elements or foundations through shear resistances in the plane of the construction

Note 1 to entry: A diaphragm is analogous to a horizontal deep beam composed of interconnected membrane elements such as panels, sheathings, or claddings acting as the deep beam web, intermediate elements such as joists or rafters acting as web stiffeners, and perimeter boundary elements such as girders or header joists acting as deep beam chords.

4 Symbols

E modulus of elasticity of flange or web material, depending upon which material is held constant in a transformed section analysis (MPa)

G' apparent shear stiffness, which is shear stiffness of the diaphragm obtained from test (N/mm)

I moment of inertia of the transformed section of the diaphragm based on webs or flanges (mm^4)

L total span of a simply supported diaphragm (mm)

P concentrated load (N)

R_u maximum diaphragm reaction (N)

S_u ultimate shear strength of the diaphragm (N/m)

a span length of cantilever diaphragm (mm)

1) Replaces ISO 3131:1975.

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