SLOVENSKI STANDARD
SIST EN 380:1996

01-avgust-1996

Lesene konstrukcije - Preskusni postopki - Splošna načela za statično preskusno obtežbo

Timber structures - Test methods - General principles for static load testing

Holzbauwerke - Prüfverfahren - Allgemeine Grundsätze für die Prüfung unter statischen Belastungen

Structures en bois - Méthodes d'essais - Principes généraux d'essais par chargement statique

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91.080.20	Lesene konstrukcije	Timber structures

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Timber structures - Test methods - General principles for static load testing

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

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Contents list

Foreword

This European Standard was prepared by CEN/TC 124 "Timber structures". It was approved for the CEN final voting by the TC on 9th December 1991.

This standard is one of a series of standards for test methods for building materials and components. It was prepared by a working group under the convenorship of NSAI.

> NOTE: It is considered desirable to maintain the same clause numbers consistently throughout this series of standards. Consequently, some clauses are void in this edition of this standard, but it is envisaged that future editions may need to include a text in these clauses.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by January 1994, and conflicting national standards shall be withdrawn at the latest by January 1994.

The standard was approved and in accordance with the CEN/CENELEC Internal Regulations, the following countries are bound to implement this European Standard : Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom.

No existing European Standard is superseded.

1 Scope

This standard specifies the general principles to be adopted for static load testing of timber structures. It is intended for use where it is necessary to verify by test that a structure complies with stated criteria. Relevant parts may be used for proof loading or for the testing of structures in service.

This standard is not intended to be used for testing of individual pieces of timber, individual joints or structural scaled models.

2 Normative references

None.

3 Definitions

For the purposes of this standard, the following definitions apply:

3.1 maximum load: Load at failure; or load where substantial deformation continues without further increase in load; or the maximum load achieved up to a specified deformation or strain.

3.2 timber structure: Member or assembly of members forming the whole or a part of a load bearing element of construction (e.g. a joist or a truss or a floor panel or a wall panel).

4 Symbols

F	load, in newtons
F_{max}	maximum load, in newtons
$F_{max,est}$	estimated maximum load, in newtons
G_1	self weight of the structure, in newtons
G_2	applied permanent load, in newtons
Q	characteristic value of variable load, in newtons
T	loading time, in seconds
T_r	recovery time, in seconds
η	factor of less than unity modifying $F_{max,est}$

5 General requirements

Materials and workmanship in the structure shall be, as far as practicable, of the minimum quality and dimensions allowed by the relevant specification. The manufacture and assembly of the timber structure shall be representative of the production process likely to be used. The moisture and temperature conditions at the time of test shall be representative of the likely in-service conditions.
Deviations may, however, be required for structures composed of materials with different time-dependent properties to obtain the same failure mode as in practice.

6 Test methods for static loading

6.1 Principle

The principle of these test methods involves applying a stated regime of loading to a timber structure, over a stated period of time, and of observing the corresponding deformations and reporting the test results.

6.2 Number of tests

Wherever possible several identical structures of the same design shall be tested to permit the assessment of the variability of the test results.

NOTE: The number of structures to be tested and their method of selection will depend on the probable variability in manufacture, the required level of confidence and the number of loading conditions to be applied.

6.3 Apparatus

The accuracy of loading and of deflection and load measurement shall be within ± 3 %.

The test loading shall be both applied and resisted in a manner approximating to the actual service conditions. Eccentricities, other than those necessary to simulate service conditions, shall be avoided at points of loading and reaction, and care shall be taken to ensure that no inadvertent restraints are present.

6.4 Preparation

Determine the density and moisture content of the materials in the structure.

When testing is carried out in a laboratory it shall be normally maintained at a relative humidity of (65 ± 5)% and a tempurature of (20 ± 2) °C, unless required otherwise by the normal in-service condition of the test structure.

Departures from the required values shall be reported.

When testing is carried out other than in a laboratory e.g. in situ, the environmental conditions of temperature and relative humidity existing during the test shall be reported.

6.5 Procedures

6.5.1 Basic loading procedure. The basic loading procedure consists of the procedural steps (0 - 7) described in table 1. A diagrammatic representation of the loading procedure is given in figure 1.

Table 1: Basic loading procedure

Procedural step	Loading procedure	Time, in seconds
0	Only G_1 acting, and $F = 0$	
0 - 1	Apply $F = G_2$	
1 - 2	Maintain $F = G_2$	≥ 120
2 - 3	Apply $F = G_2 + 0{,}5\ Q$	≥ 120
3 - 4	Remove 0,5 Q	≥ 120
4 - 5	Apply $F = G_2 + Q$	≥ 240
5 - 6	Maintain $F = G_2 + Q$	≥ 1200
6 - 7*	Increase F until $\eta\ F_{max,est}$ is reached	≥ 600

* The maximum loading rate shall not exceed 0,25 Q per 60 s.

6.5.2 Maximum load - procedure 1. Procedure 1 consists of the basic loading steps (0-7) concluding by increasing the load up to the maximum load F_{max} (step 7-8 in figure 1).

If considerable deformation occurs during the application of the load, reduce the rate of loading.

6.5.3 Proof loading - procedure 2. Procedure 2 consists of the basic loading steps (0-7); the load is removed after a prescribed load $\eta\ F_{max,est}$ ($\eta < 1$) has been reached and the test ended (step 7-9 in figure 1).

> NOTE: This procedure is intended for proof loading and the case when the capacity at more than one load combination is tested. The value of η depends on the confidence required in estimating the maximum load capacity.

6.5.4 Long-term deformation - procedure 3. Procedure 3 consists of the basic loading steps (0-7); the load $\eta\ F_{max,est}$ is kept constant for a chosen period of time T. The load is then removed and the recovery is measured during a chosen period T_r (steps 7-10-11-12 in figure 1).

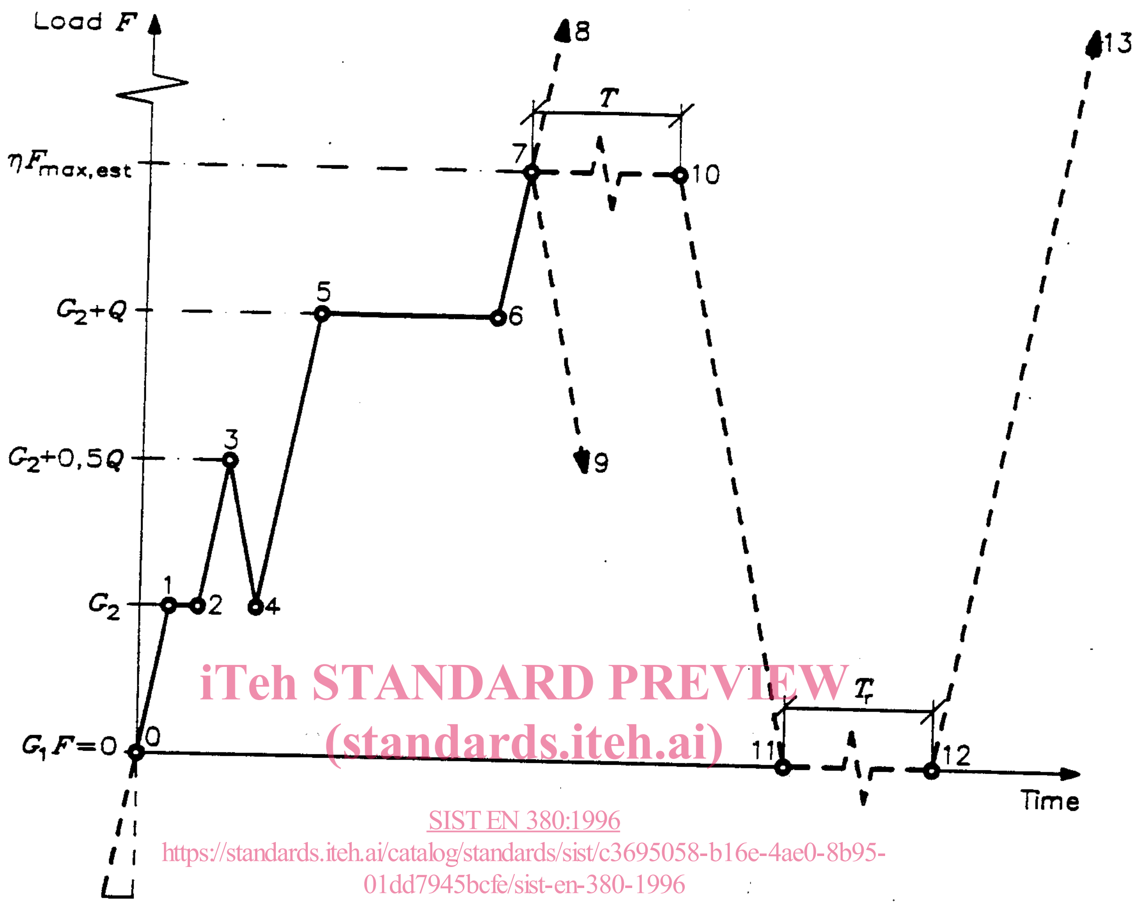

Figure 1: Schematic loading procedures

6.5.5 Capacity after long-term loading - procedure 4. This follows procedure 3 but in this case the structure is reloaded to failure (steps 7-10-11-12-13 in figure 1).

NOTE: Procedures 3 and 4 are intended for the study of deformation at long-term loading and maximum load capacity after long-term loading.

6.6 Results

The deformation (e.g. deflection) shall be measured at the number of points prescribed or as necessary to estimate the performance of the structure. A minimum requirement is that the deformation is measured at the point of expected maximum deformation.