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NATIONAL STANDARD OF THE  
PEOPLE'S REPUBLIC OF CHINA

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**GB 50206-2012**

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**Code for Acceptance of Construction  
Quality of Timber Structures**

木结构工程施工质量验收规范

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# Code for Acceptance of Construction Quality of Timber Structures

## 1 General Provisions

**1.0.1** This code is formulated with a view to strengthening the quality management of construction work, unifying the construction quality acceptance of timber work and guaranteeing the project quality.

**1.0.2** This code is applicable to the construction quality acceptance for timber structure works like rough sawn and round timber structure, glued-laminated timber structure and light wood frame construction.

**1.0.3** The construction quality acceptance of timber structure work shall be based on engineering design document. The requirements of construction quality acceptance in design document and engineering contracting contract shall not be lower than those specified in this code.

**1.0.4** This code shall be used together with the current national standard "Unified Standard for Constructional Quality Acceptance of Building Engineering" (GB 50300).

**1.0.5** The construction quality acceptance for timber structure work shall not only meet the requirements in this code, but also comply with those specified in the current relevant ones of the nation.

## 2 Terms

### 2.0.1 Rough sawn and round timber structure

Load bearing member structure manufactured from rough sawn timber (including slab) or log.

### 2.0.2 Glued-laminated timber structure

Load bearing member structure manufactured from glued-laminated timber.

### 2.0.3 Light wood frame construction

Wood structure composed of shear wall and tabula (floor system and roof) manufactured from dimension lumber and wood-based structural panel through nailed connection, generally used for 1~3F buildings.

### 2.0.4 Dimension lumber

A kind of wood product made through drying, polishing, grading and stamping on a series of log sawn timber with section width and height within certain limits.

### 2.0.5 Visually stress-graded dimension lumber

The dimension lumber for which the lumber and strength grade are divided according to the severity of various defects visible to naked eyes based on the specified standard.

### 2.0.6 Machine stress-graded dimension lumber

The dimension lumber for which nondestructive test is carried out with mechanical stress determination equipment, and the lumber grade and strength grade are divided according to the measured elasticity modulus or other physical and mechanical indexes based on the specified standard, hereinafter referred to as machine stress-graded dimension lumber.

### 2.0.7 Log

Cut down trunk, removing bark, branch and treetop.

### 2.0.8 Rough sawn timber

tension and shear force between members, and are mainly used for connection of timber truss nodes manufactured with dimension lumbars.

#### **2.0.16** Truss connected with truss plates

The truss made of dimension lumber together with truss plate, which is mainly used for the floor system and roof load bearing member of the light wood frame construction.

#### **2.0.17** Nailed connection

A pin connection type transmitting acting force between members through utilizing the bending resistance and shear capacity of the round nail and the pressure-bearing capacity of the nail hole wall.

#### **2.0.18** Bolted connection

A pin connection type transmitting acting force between members through utilizing the bending resistance and shear capacity of the bolt and the pressure-bearing capacity of the bolt hole wall.

#### **2.0.19** Step joint

A connection type transmitting acting force between members through utilizing the pressure-bearing and shear capacity where the wood member is grooved to bear another wood member.

#### **2.0.20** Stud

The vertical member in the wall of light wood frame construction, serving as the main compression member and guaranteeing the stability and integrity of the out-of-plane structural sheathing.

#### **2.0.21** Structural sheathing

Wood-based structural panel of light wood frame construction which is nailed on single side or both sides of the wall timber frame, or on the top surface of the floor joist or rafter, respectively referred to as wall panel, floor panel and roof panel.

#### **2.0.22** Joist

The bending wood member with relatively small section size (including wood I-joist) used for floor system or ceiling, which is respectively referred to as floor joist or ceiling joist.

The stamp pattern indicating the place of origin, manufacturer, quality grade, specification, executive standard, certification body etc. of the material, member and accessory.

**2.0.32** Inspection lot

The inspection body composed of a certain quantity of samples collected for inspection according to the same production condition or the specified mode.

**2.0.33** Product lot

The inspection scope divided due to the difference of material, manufacturing, approach time or production batch within the range of the specified inspection lot.

**2.0.34** On-site acceptance

The inspection carried out for the materials, members, accessories and equipment approaching the construction site according to relevant standard requirements so as to verify whether the product quality is acceptable or not.

**2.0.35** Handover inspection

The verification activity for the construction quality through mutual inspection by the undertaking party of the next procedure and the completing party of the previous procedure for the completed procedures.

**2.0.36** Evidential testing

The test carried out by the testing organization with corresponding qualification through field sampling by personnel concerned of the construction organization under the supervision of supervision organization or construction organization.

timber and the timber surface shall be polished with abrasive paper.

2 Grade B: structural member is exposed, the painting on appearance is mechanically polished; occasional skips-in-planting and tiny defect and gap are allowable on the surface but the hole on floppy node is unallowable.

3 Grade C: structural member is not exposed, and the member surface is not required to be processed or polished.

**3.0.6** Construction quality of timber structure project shall be controlled according to the following requirements:

1 Design document of this project shall be provided.

2 On-site acceptance shall be carried out for the timber, wood product, steel and connector used for the timber structure project. For materials or semi-finished products involved in structure safety and use function, evidential testing shall be carried out according to this code or corresponding professional engineering quality acceptance standard, and the sampling and delivery for inspection shall be carried out under the supervision of supervision engineer or the technical principal of the construction organization.

3 Quality control for each procedure shall be carried out according to the relevant requirements of this code; inspection shall be carried out on completion of each procedure.

4 Handover inspection shall be carried out for relevant disciplines, and shall be recorded. The construction of next procedure shall not be carried out without the inspection by the supervision engineer and the technical principal of construction organization.

5 Completion documents like completion drawing and written materials of timber structure project shall be provided.

**3.0.7** Where new technology (new material, new structure and new process) required for timber structure construction hasn't listed in current relevant national standard, the construction organization shall obtain the approval of the local competent administrative department of construction engineering quality, and organize expert panel to demonstrate together with the design, supervision and construction organizations; meanwhile, it shall determine the construction quality acceptance method and inspection standard, hereby determine the dominant item for the construction of relevant timber structure project.

**3.0.8** The lumber grade of the material, member and accessory adopted for the

round steel adopted for lower chord of wood-and-steel composite truss, not only the performance inspection for tensile yield strength, ultimate strength and elongation, but also the cold bending inspection shall be carried out. It shall also meet the round steel material standard specified in design document.

Inspection quantity: randomly take 2 pieces from each steel species in each inspection lot.

Inspection method: the sampling method, sample preparation and tensile test method shall respectively comply with the relevant requirements of the current national standards "Rules for Sampling in Mechanical and Technological Testing of Steel Products" (GB 2975) and "Metallic Materials - Test Pieces for Tensile Testing" (GB 6397) and "Metallic Materials - Tensile Testing at Ambient Temperature" (GB/T 228).

**4.2.7** Electrodes shall meet the requirements of the current national standard "Carbon Steel Covered Electrodes" (GB 5117) and "Low Alloy Steel Covered Electrodes" (GB 5118); their type shall be matched with the adopted steel and they shall have product quality certificate.

Inspection quantity: total number of inspection lot.

Inspection method: inspect by comparison between physical object and product quality certificate.

**4.2.8** The bolt and nut shall have product quality certificate, and their performance shall meet the requirements of the current national standard "Hexagon Head Bolts" (GB 5782) and "Hexagon Head Bolts - Product Grade C" (GB 5780).

Inspection quantity: total number of inspection lot.

Inspection method: inspect by comparison between physical object and product quality certificate.

**4.2.9** The round nail shall have product quality certificate, and its performance shall meet the relevant requirements of the current professional standard "Round Nails for General Uses" (YB/T 5002). Evidential testing for bending strength of nail shall be carried out where the bending yield strength of nail is specified in design document.

Inspection quantity: randomly take 10 round nails from each specification in each inspection lot.

Inspection method: inspect the product quality certificate and testing report. Strength evidential testing method shall meet those specified Appendix D of this code.

**4.2.10** Round steel tie bar shall meet the following requirements:

1 The round steel tie bar shall be straight and flat, and double-side splice welding shall be adopted for the joint. The splice diameter shall not be less than 75% of the tie bar diameter, and the length on one side of the joint shall not be less than 4 times of the tie bar diameter. The weld leg height and weld length shall meet the requirements of the design document.

2 The subplate under the nut shall meet the requirements of the design document and shall not be less than the requirements of Item 2 in Article 4.3.3 of this code.

3 Where the diameter of the lower chord round steel tie bar of wood-and-steel composite truss, the main tension web rod of truss and the pedal-type node tie bar and bolt is greater than 20mm, double-nut self-locking shall be adopted. The protruding length of screw rod from the nut shall not be less than 80% of the screw rod diameter.

Inspection quantity: total number of inspection lot.

Inspection method: measurement, inspection of handover inspection report.

**4.2.11** For the bearing steel member, the height of node weld leg shall not be less than the requirements of design document; unless otherwise stated in the design document, the weld quality shall not be less than Grade III while that of the tension member working below -30°C shall not be less than Grade II.

Inspection quantity: all stressed welds of the inspection lot.

Inspection method: inspect according to the relevant requirements of the current professional standard "Technical Specification for Welding of Steel Structure of Building" (JGJ 81), and inspect the handover inspection report.

**4.2.12** The specification and quantity of connectors (nails and bolts) used for nailed connection and bolted connection shall meet the requirements of the design document.

**Inspection quantity: total number of inspection lot.**

Inspection method: visual inspection and measurement.

**4.2.13** For the step joint of timber truss support node, the end timber shall be free from defects like rotting, cracking and diagonal grain, and the shear surface shall not be located on the pith side of timber; for bolted tension joint, the timber and connecting plate of connection segment shall be made of I<sub>a</sub> material and shall meet

4 The column and foundation shall be connected with pre-embedded angle steel, and shall be fixed with bolt.

5 For wooden roof building, the purline in node position shall be fixed on the horizontal beam embedded part of the gable and internal cross wall; the bearing length shall not be less than 120mm, and reliable bolt anchoring shall be provided.

Inspection quantity: total number of inspection lot.

Inspection method: visual inspection and measurement.

### 4.3 General Items

**4.3.1** The allowable deviation for the manufacturing of various log and rough sawn timber members shall not exceed the requirements of Table E.0.1 in this code.

Inspection quantity: total number of inspection lot.

Inspection method: see Table E.0.1 in this code.

**4.3.2** Step joint shall meet the following requirements:

1 The bearing surface shall not only meet the requirements of the design document, but also be vertical to the axis of compression rod. the axis of compression rod for single step joint shall pass through the center of bearing surface; for double step joint, the first tooth end shall be located in the intersection point of the top edges of upper and lower chord rods, and the second tooth end shall be located in the intersection point of the upper cord axis and the lower chord top edge; the second tooth bearing surface shall be deeper than the first tooth bearing surface by 20mm at least.

2 The bearing surface shall be flat and smooth, and the partial gap shall not exceed 1mm; about 5mm wedge-shaped gap shall be remained at the outer opening of the non-bearing surface.

3 The safety bolt at the step joint of truss support shall be vertical to the upper cord axis; the wood web rod and upper/lower chord rod shall be fastened with clincher.

4 For the center line of crosser of truss end support, the rough sawn timber truss shall pass the intersection point of the center lines in net sections of upper/lower chord rods; the log truss shall pass through the intersection point of the center lines in gross sections of upper/lower chord rods.

Inspection quantity: total number of inspection lot.

bearing surface vertical to member axis shall be adopted; the thickness of cover plate on both sides shall not be less than 50% of the butt joint member width, while the height shall be consistent with that of the butt member. The bearing surface shall be sawn flatly and mutually tightened, and the partial gap shall not exceed 1mm. The bolt diameter, quantity and arrangement shall meet the requirements of the design document.

Inspection quantity: total number of inspection lot.

Inspection method: visual inspection, measurement, inspection of handover inspection report.

**4.3.6** The allowable deviation for installation of timber truss, beam and column shall not exceed the requirements of Table E.0.2 in this code.

Inspection quantity: total number of inspection lot.

Inspection method: see Table E.0.2 in this code.

**4.3.7** The allowable deviation for installation of roof timber frame shall not exceed the requirements of Table E.0.3 in this code.

Inspection quantity: total number of inspection lot.

Inspection method: visual inspection and measurement.

**4.3.8** The integrity of roof structure support system shall meet those specified in design document.

Inspection quantity: total number of inspection lot.

Inspection method: contrast with design document, measurement of physical object and inspection of handover inspection report.

## 5 Glued-laminated Timber Structure

### 5.1 General Requirements

**5.1.1** This chapter is applicable to the acceptance of construction quality of timber structure with main load bearing member manufactured and installed with glued-laminated timber.

**5.1.2** The ordinary glued-laminated timber and visually-graded or mechanically-graded equivalent composite glued-laminated timber respectively glued with ordinary glued-laminated timber lamination and visually-graded or mechanically-graded lamination according to the specified member section combination of laminations, as well as the inequivalent composite symmetrical and asymmetrical composite glued-laminated timber may be adopted for the glued-laminated timber.

**5.1.3** Glued-laminated timber shall be manufactured by professional processing enterprise passing qualification certification.

**5.1.4** A building of glued-laminated timber structure shall be regarded as an inspection lot for the quality control of materials, members and accessories; a floor of a whole building or a floor between the deformation joints shall be regarded as an inspection lot for the quality control of member manufacturing and installation.

### 5.2 Dominant Items

**5.2.1 The structure type, structural arrangement and member section size shall meet the requirements of the design document.**

**Inspection quantity: total number of inspection lot.**

Inspection method: comparison between physical object and design document; measurement.

**5.2.2 The category, strength grade and combination of laminations of structural glued-laminated timber shall meet the requirements of the design document, and shall also have product quality certificate and product stamp; meanwhile, integrity inspection for glue line and strength test for lamination finger joint meeting the requirements of product standard shall be available.**

**Inspection quantity: total number of inspection lot.**

**5.2.7** The category, specification and quantity of connector in each connection node shall meet the requirements of the design document. The shear section on the end of glued-laminated timber at the step joint of truss end node and the bolt position in bolted connection shall not be overlapped with the leaked glue line.

**Inspection quantity: total number of inspection lot.**

Inspection method: visual inspection and measurement.

### **5.3 General Items**

**5.3.1** The construction and appearance of glued-laminated timber shall meet the following requirements:

1 The wood grain of each layer of wood board of glued-laminated timber shall be parallel to the length direction of the member. Each layer of wood board in length direction shall be of finger joint. The finger joint spacing on the same lamination within the range of 1/10 the section height of the tension area of tension member and bending member shall not be less than 1.5m; the finger joint position between the upper and lower laminations shall be staggered by not less than 10 times the thickness of wood board. Plain adapter may be adopted for lamination in width direction; however, the joint between the upper and lower laminations shall not be less than 40mm.

2 The glue line of glued-laminated timber shall be uniform, and the thickness shall be 0.1~0.3mm. The continuous length of the glue line with thickness exceeding 0.3mm shall not be greater than 300mm, and the thickness shall not exceed 1mm. The leakage length in the member position withstanding the plane shear force parallel to glue line shall not be greater than 75mm while that in other positions shall not be greater than 150mm. Under the Category 3 operating environment condition, the plain joint and in the width direction of lamination and the plate bottom groove shall be filled up with glue.

## 6 Light Wood Frame Construction

### 6.1 General Requirements

**6.1.1** This chapter is applicable to the acceptance of construction quality of timber structure manufactured and installed with main materials of dimension lumber and wood-based structural panel.

**6.1.2** For the quality control of material, member and accessory of light wood frame construction, the light wood frame construction building in the same development project and constructed at the same period, with each building area not exceeding 300m<sup>2</sup> and total building area not exceeding 3000m<sup>2</sup> are considered as an inspection lot; the one with total area less than 3000m<sup>2</sup> shall be considered as one inspection lot, while that with individual building area exceeding 300m<sup>2</sup> shall be separately considered as an inspection lot; for the quality control for manufacture and installation of light wood frame construction, one floor of one building shall be considered as an inspection lot.

### 6.2 Dominant Items

**6.2.1** The arrangement and anti-overturning measures of load bearing wall (including shear wall), column, floor system and roof of light wood frame construction, and anti-disengaging measures of roof shall meet the requirements of design document.

**Inspection quantity: total number of inspection lot.**

Inspection method: comparison between physical object and design document.

**6.2.2** Dimension lumber approaching the construction site shall be provided with product quality certificate and product stamp.

**Inspection quantity: total number of inspection lot.**

Inspection method: comparison between physical object and certificate.

**6.2.3** For each product lot of visually-graded dimension lumber approaching the construction site, visual grade evidential testing or bending strength evidential testing shall be carried out by qualified professional grading personnel; bending strength evidential testing shall be carried out for each product lot of machine rated dimension lumber approaching the construction site and requirements in Appendix G of this code shall be met.

report for plane-bending or edge-on bending performance specified in the design document.

Structural performance inspection shall be carried out for bending members of wood I-joint and structural composite lumber (SCL) approaching the construction site under the action of standard load effect combination; under the action of the inspection load, the member shall be free from damages like cracking; the maximum deflection shall not be greater than those specified in Table 5.2.3 and the average mid-span deflection shall not be greater than 1.13 times of the theoretical calculation value.

Inspection quantity: randomly take 3 sticks from each specification in each inspection lot.

Inspection method: inspect the product quality certificate, inspection report for material strength and elasticity modulus of structural composite lumber (SCL) as well as inspection report for member performance according to those specified in Appendix F of this code.

**6.2.8** Truss connected with truss plates shall be processed and manufactured by professional processing plant and be provided with product quality certificate.

Inspection quantity: total number of inspection lot.

Inspection method: inspect by comparison between physical object and product quality certificate.

**6.2.9** Steel, electrode, bolt and round nail shall meet those specified in Articles 4.2.6~4.2.9 of this code.

**6.2.10** Metal connector shall be molded through punching and be provided with product quality certificate and material qualification guarantee. The thickness of galvanized rust-proof layer shall not be less than 275g/m<sup>2</sup>.

Inspection quantity: total number of inspection lot.

Inspection method: inspect by comparison between physical object and product quality certificate.

**6.2.11** For light wood frame construction, the specification of metal connector connecting each member as well as specification and quantity of nail used for nailed connection shall meet the requirements of design document.

**Inspection quantity: total number of inspection lot.**

Inspection method: visual inspection and measurement.

**6.2.12** Where structure design is adopted, the nailed connection among each member shall not be lower than those specified in Appendix J of this code.

Inspection quantity: total number of inspection lot.

Inspection method: visual inspection and measurement.

### 6.3 General Items

**6.3.1** The following items of load bearing wall (including shear wall) shall meet the requirements of design document and shall not be lower than relevant structural requirements in current national standard "Code for Design of Timber Structures" (GB 50005).

- 1 Stud spacing.
- 2 Wall terminal, both sides of opening, wall corner and the junction; the arrangement and quantity of stud.
- 3 Size and position of stud slotting or opening.
- 4 Corrosion- and moisture- proof of ground beam plate and anchoring measures for foundation.
- 5 Number of stories of wall raising-plate dimension lumber, joint treatment and the arrangement of two-floor raising-plate at wall corner and the junction.
- 6 The grade, thickness and nailing arrangement mode of wall structural sheathing.
- 7 The spacing between wall structural sheathing and nail for stud nailed connection.
- 8 The specification, size and arrangement of connector between the wall and floor system or foundation.

Inspection quantity: total number of inspection lot.

Inspection method: visual inspection by comparison to physical object.

**6.3.2** The following items of floor system shall meet the requirements of design document and shall not be lower than relevant structural requirements in current national standard "Code for Design of Timber Structures" (GB 50005):

## 7 Protection of Timber Structure

### 7.1 General Requirements

**7.1.1** This chapter is applicable to the acceptance of construction quality of corrosion, insect and fire prevention of timber structure.

**7.1.2** For wood member requiring flame retardant treatment specified by the design document, flame retardant and protective process shall be selected according to relevant requirements of "Code of Design on Building Fire Protection and Prevention" (GB 50016) and fire endurance and section size of members in different types, and it shall be executed by enterprises with professional qualification. For wood member exposed in humid environment for a long term, measures preventing flame retardant loss shall also be taken.

**7.1.3** For corrosion-proof treatment of timber, its service environment type shall be determined and preservative be selected according to those specified in Article 3.0.4 of this code based on the usage and corrosion-proof requirements of each wood member specified in the design document. Corrosion-proof treatment should be executed with pressurization method by enterprises with professional qualification. Sawing and planing processes should not be carried out to the wood member after being treated with preservative. Where the timber soaked with agent is exposed caused by the required local processing, corrosion-proof repair shall be carried out for timber at this position.

**7.1.4** Flame retardant, fire-retardant coating as well as corrosion-proof and insect-proof agent shall not jeopardize human and animal safety and shall not pollute the environment.

**7.1.5** Inspection lot of wood structure protection project may be divided according to corresponding inspection lot of rough sawn and round timber structure, glued-laminated timber structure or light wood frame construction in Chapters 4~6.

### 7.2 Dominant Items

**7.2.1** The utilized corrosion-proof, insect-proof, fire prevention and flame retardants shall be in accordance with the service environment type and fire resistance rating of wood member (including glued-laminated timber member) indicated in the design document, and shall be provided with certification documents for quality certificate. Each lot of wood member (including finished preservative-treated wood) after preservative treatment of chemical agent shall be provided with the qualification test report on retention and penetration of effective composition of drugs specified in

between insulation layer top and lower truss chord shall not be less than 100mm.

5 Inner drainage gutter of roof system shall not be directly supported on load bearing members like truss and roof beam.

Inspection quantity: total number of inspection lot.

Inspection method: inspect item by item by comparison between physical object.

**7.2.4** Flame retardant treatment shall be carried out to wood member, it shall be completed by professional factory and the utilized flame retardant shall be provided with validity inspection report and quality certificate and shall be executed with pressure impregnation method. Wood members with dipping flame retardant treatment shall be provided with inspection report of drug absorption dry weight complying with those specified in the design document. The thickness of fire retardant coating executed with spray method shall be uniform and the average thickness for evidential testing shall not be less than the specified value in drug instructions.

Inspection quantity: randomly take 20 places from each inspection lot for coating thickness measurement.

Inspection method: caliper measurement, inspect the quality certificate.

**7.2.5** Where the outside of wood member is required to be wrapped with fire-proof gypsum board, the fire-proof performance of clad material shall be provided with quality certificate and its thickness shall meet the requirements of design document.

Inspection quantity: total number of inspection lot.

Inspection method: caliper measurement, inspect the product qualification certificate.

**7.2.6** The flue and chimney adopted for cooking and heating shall be manufactured with incombustible material and be sealed; the wall thickness of brick chimney shall not be less than 240mm and it shall be provided with mortar plaster, while the metal chimney shall be externally wrapped with mineral wool protective layer and fire-proof plate with fire endurance not lower than 1.00h and thickness not less than 70mm, the distance from its outer edge to the wood member shall not be less than 120mm and favorable ventilation shall be provided. The gap at roof protruding place of chimney shall be blocked with incombustible material.

Inspection quantity: total number of inspection lot.

Inspection method: comparison between physical object.

**7.2.7** The thermal insulation, heat insulation and sound absorption materials filled in cavities of wall, floor system and roof system on site shall meet the requirements of design document; the fire-proof performance shall not be lower than flame retardancy Class B<sub>1</sub>.

Inspection quantity: total number of inspection lot.

Inspection method: comparison between physical object and design document; inspection for product qualification certificate.

**7.2.8** Power line laying shall meet the following requirements:

- 1 Flame retardant plastic pipe wrapped with metal pipeline or passing the inspection shall be adopted for power lines laid in the wall or floor system.
- 2 Where the power line is laid in an exposed way, metal wire slot may be used or it may be wrapped with metal pipeline.
- 3 Mineral insulated cables may be laid with the support or along the wall in an exposed way.

Inspection quantity: total number of inspection lot.

Inspection method: comparison between physical object; inspect handover inspection report.

**7.2.9** The laying of all kinds of pipeline burying or crossing the timber structure shall meet the following requirements:

- 1 Where the temperature of outer wall of pipeline reaches 120°C or above, incombustible materials passing the inspection shall be adopted for pipeline and its clad material as well as the adhesive during construction.
- 2 Where the temperature of outer wall of pipeline is under 120°C, materials passing the inspection with flame retardancy not lower than B<sub>1</sub> shall be adopted for pipeline and its clad material.

Inspection quantity: total number of inspection lot.

Inspection method: comparison between physical object; inspection for handover inspection report.

**7.2.10** Rust-proof measures shall be taken for the exposed steel member in timber structure and the metal connector without galvanized treatment according to the

## **8 Acceptance of Sub-subsection Project of Timber Structure**

**8.0.1** The procedure and composite for acceptance of construction quality of sub-subsection project of timber structure shall meet the relevant requirements of current national standard "Unified Standard for Constructional Quality Acceptance of Building Engineering" (GB 50300).

**8.0.2** Quality acceptance of inspection lot and sub-item project of timber structure shall meet the following requirements:

- 1 Inspection results for all dominant item of inspection lot shall be acceptable.
- 2 Inspection results for more than 80% of the inspection points for general items in inspection lot shall be acceptable and the maximum deviation shall not exceed 1.2 times of the allowable deviation.
- 3 Inspection results for all inspection lots included in the sub-item project of timber structure shall be acceptable and complete records for acceptance of quality of each inspection lot shall be provided.

**8.0.3** Quality acceptance of sub-subsection project of timber structure shall meet the following requirements:

- 1 Quality acceptance of all sub-item projects included in sub-subsection project shall be acceptable.
- 2 Quality information and acceptance record of sub-item projects included in sub-subsection project shall be complete.
- 3 Information for safety function inspection items shall be complete and all the randomly inspected items shall be acceptable.
- 4 Appearance quality acceptance shall meet those specified in Article 3.0.5 of this code.

**8.0.4** Where the construction quality of timber structures is rejected, it shall be treated according to current national standard "Unified Standard for Constructional Quality Acceptance of Building Engineering" (GB 50300).

## Appendix A Timber Strength Grade Inspection Method

### A.1 General Requirements

**A.1.1** This inspection method is applicable to the timber strength grade inspection for tree species like round timber, rough sawn timber and panel which have been listed in current national standard "Code for Design of Timber Structures" (GB 50005).

**A.1.2** While inspecting the timber strength grade of a certain tree species, it shall be judged according to the test result of its chordwise static bending strength.

### A.2 Sampling and Test Method

**A.2.1** 3 pieces of timbers shall be randomly taken from each tree species in each inspection lot as test timbers, and 3 pieces of flawless chordwise static bending strength test pieces shall be cut from outside of pith of each piece of test timber as a group; the test piece size and moisture content shall meet relevant requirements of current national standard "Method of Testing in Bending Strength of Wood" (GB/T 1936.1).

**A.2.2** Chordwise static bending strength test and actually measured strength calculation method shall be carried out according to relevant requirements in current national standard "Method of Testing in Bending Strength of Wood" (GB/T 1936.1), the test result shall be converted to the value where the moisture content of wood is 12%.

**A.2.3** Where the minimum value of average of static bending strength test result for each group is not lower than the specified value in Table 4.2.3 of this code, it shall be acceptable.

## **Appendix C Inspection Method for Moisture Content of Timber**

### **C.1 General Requirements**

**C.1.1** This inspection method is applicable to the determination of moisture content of the timber before processing after approaching the construction site and the manufactured wood member.

**C.1.2** Log, rough sawn timber (including panel) and lamination should be determined with oven drying method (gravimetric method), while wood members like dimension lumber and glued-laminated timber may also be determined with electrometric method.

### **C.2 Sampling and Determination Method**

**C.2.1** While determining the moisture content with oven drying method, 5 timbers shall be randomly taken from trees with the same tree species and the same dimension lumber from each inspection lot as test timbers; for each test timber, 5 samples with size of 20mm×20mm×20mm shall be uniformly cut along the section with 200mm to the end, and the moisture content of each test piece shall be determined according to relevant requirements of current national standard "Method for Determination of the Moisture Content of Wood" (GB/T 1931).

**C.2.2** While determining the moisture content with electrometric method, 5 pieces shall be randomly taken from dimension lumber, glued-laminated timber or other wood member with the same tree species and specification of the inspection lot as test timbers; three sections shall be taken from each test timber with 200mm to both ends and distributed uniformly along the length. For dimension lumber or other wood member, the moisture content for central sections of four surfaces of each section shall be determined respectively; for glued-laminated timber, the moisture content for each layer of lamination shall be determined on its both sides.

**C.2.3** Electric measuring instrument shall be calibrated and certified by local measurement administration. The determination shall be operated in strict accordance with instrument operating requirements and parameters like density and temperature of timber shall be selected correctly, the determined depth shall not be less than 20mm and reliable method for adjusting the measured value to average moisture content of the section shall be provided.

### **C.3 Judgment Rules**

## Appendix F Test Method for Mechanical Property of Bending

### Wood Members

#### F.1 General Requirements

**F.1.1** This method is applicable to the inspection of mechanical property of bending member (beam and wood I-joist) made of glued-laminated timber and structural composite lumber, it may be judged according to the intactness of bending member under the action of standard load effect combination specified in the design and the measured value of mid-span deflection.

**F.1.2** The acceptable sample may also be used as engineering material.

#### F.2 Sampling Method, Quantity and Geometric Parameter

**F.2.1** 3 on-site bending members of the same type manufactured in the same lot and same technology shall be randomly taken as sample. Where the size specification of member of the same type is different, sample shall be sampled from those with unfavorable load-bearing condition or with larger span.

**F.2.2** The moisture content of timber sample shall not be larger than 15%.

**F.2.3** Measure the section height and width at mid-span of bending member and 500mm away from the two supports with an accuracy of  $\pm 1.0\text{mm}$  and calculate the inertia moment of member section according to the average height and width of section; wood I-joist shall be calculated based on the nominal inertia moment of product.

#### F.3 Test Device and Test Method

**F.3.1** The sample shall be simply installed on the buttress (Figure F.3.1) according to the calculated span ( $l_0$ ) in design. The diameter of hinged support roller shall not be less than 60mm, the subplate width shall be consistent with the member section width, the subplate length shall be determined by the bearing strength of local cross grain on timber, the subplate thickness shall be determined by the bending capacity of steel plate but shall not be less than 8mm.

$\omega_3$  - the mid-span deflection under Grade 3 load effect;

$P_3$  - the total external load for Grade 3 load (Grade 3 external load at each loading point);

$P_0$  - the load at loading point by converting the member deadweight and loading equipment deadweight in bending moment equivalence principle;

$\eta$  - the formal correction coefficient of load, where the design load diagram is subject to uniformly distributed load,  $\eta=0.91$  for two concentrated forces loading scheme and 1.0 for four concentrated forces loading scheme; in case of other design load diagram, it is converted according to the deflection calculation formula for equivalent mid-span bending moment according to mechanics of material.

## F.5 Judgment Rules

**F.5.1** During loading process, the sample shall be free from new damage; the average of actually measured mid-span deflection of 3 samples shall be compared with the theoretical deflection and the maximum of actually measured mid-span deflection of 3 samples is compared with the allowable deflection specified in this code, if it meets the requirements, it is acceptable. Where the actual member span is not taken as the test span  $l_0$ , the comparison result between the average of actually measured deflection and the theoretical calculation value shall be adopted as the assessment basis.

**F.5.2** The theoretical calculation value of deflection of bending member shall be determined according to the member section size obtained in Article F.2.3 of this code, the adopted test load diagram, the external load (sample and equipment deadweight is not included in  $P_{smax}$ ) and the elasticity modulus of material indicated in design document in the calculation principle of engineering mechanics; the average of actually measured deflection shall be calculated according to the Formula (F.4.1) of this code.

No.	Defect name <sup>[2]</sup>	Material grade			
		VI <sub>c</sub>		VII <sub>c</sub>	
	65	19	16	25	19
	90	32	19	38	25
	115	38	25	51	32
	140	—	—	—	—
	185	—	—	—	—
	235	—	—	—	—
	285	—	—	—	—

Notes:

- 1 All surfaces and both ends shall be included in visual grading. *b* is the member width, *h* is the member thickness and *L* is the member length.
- 2 Beside those described in the note, see national standard "Defects in Sawn Timber" (GB/T 4823-1995) for details of the defect definition.
- 3 Refer to a group of skips-in-plantings not deeper than 1.6mm and the surface between skips-in-plantings is planned.
- 4 Heavy skips-in-planting refers to the 3.2mm deep skips-in-planting in full length on wide surface.
- 5 Partial or complete skips-in-planting or overall rough surface.
- 6 Wane occupies the lumber surface wholly or partially, where the requirements of surface meet the requirements for allowable skips-in-planting and the requirements of damage on narrow surface meet the requirements for allowable knothole (length not exceeding two times the maximum diameter of knothole of same grade), the wane length may be 300mm and one such wane is allowed for each member. The quantity of members containing such defects shall not exceed 5% of total.
- 7 Allowable value of bowing is 2 times that of transversal bending.
- 8 Indrawn knag refers to the knag surrounded by resin or bark and free of adhesion with the surrounding timber; evenly-distributed knag refers that the total size of all knags on member for any 150mm length must be less than two times the allowable maximum size of knag.
- 9 There is one or more small knothole for every 1.2m length and the sum of small knothole diameter is equal to the single knothole diameter.
- 10 There are one or more small knotholes for every 0.9m length and the sum of small knothole diameter is equal to the single knothole diameter.
- 11 There are one or more small knotholes for every 0.6m length and the sum of small knothole diameter is equal to the single knothole diameter.
- 12 There are one or more small knotholes for every 0.3m length and the sum of small knothole diameter is equal to the single knothole diameter.

## Appendix H Mechanical Properties Index of Wood-based Structural Panel

**H.0.1** The mechanical property of wood-based structural panel under concentrated static load and impact load shall not be lower than the requirements specified in Table H.0.1.

**Table H.0.1 -- Mechanical Property Index<sup>[1]</sup> of Wood-Based Structural Panel under Concentrated Static Load and Impact Load**

Purpose	Standard span (Maximum allowable span) (mm)	Test conditions	Impact load (N·m)	Minimum limited load <sup>[2]</sup> (kN)		Maximum deflection <sup>[3]</sup> under 0.89kN concentrated static load (mm)
				Concentrated static load	Concentrated static load after impact	
Floor plate	400(410)	Re-dry at dry and wet state	102	1.78	1.78	4.8
	500(500)	Re-dry at dry and wet state	102	1.78	1.78	5.6
	600(610)	Re-dry at dry and wet state	102	1.78	1.78	6.4
	800(820)	Re-dry at dry and wet state	122	2.45	1.78	5.3
	1200(1220)	Re-dry at dry and wet state	203	2.45	1.78	8.0
Roof plate	400(410)	Dry and wet state	102	1.78	1.33	11.1
	500(500)	Dry and wet state	102	1.78	1.33	11.9
	600(610)	Dry and wet state	102	1.78	1.33	12.7
	800(820)	Dry and wet state	122	1.78	1.33	12.7
	1200(1220)	Dry and wet state	203	1.78	1.33	12.7

Notes:

- 1 Index in this table is based on single test.
- 2 100% sample shall be able to bear the minimum limited load specified in this table.
- 3 Deflection of at least 90% sample is not larger than the value specified in this table. Under test conditions of re-dry at dry and wet state, the deflection of roof plate under static load shall be inspected only and the deflection of roof plate under wet test conditions is not inspected.

**H.0.2** The mechanical property of wood-based structural panel under evenly-distributed load shall not be lower than the requirements specified in Table H.0.2.

## Appendix J Requirements for Nailed Connection of Light Wood Frame Construction Designed Based on Structure

**J.0.1** The requirements for nailed connection of light wood frame construction designed based on structure shall be in accordance with those specified in Table J.0.1.

**Table J.0.1 -- Requirements for Nailed Connection of Light Wood Frame Construction Designed Based on Structure**

No.	Connecting member name	Minimum length of nail (mm)	Minimum quantity or maximum spacing of nail
1	Floor joist and raising-plate or bottom plate of wall body - slant nailed connection	80	2
2	Frame beam or edge-banding plate and raising-plate or bottom plate of wall body - slant nailed connection	60	150mm
3	Floor joist bottom bracing or flat steel bottom bracing and floor joist	60	2
4	Inter-joist diagonal bracing	60	2 on each end
5	Double-layer edge-banding beam or double-layer strengthening joist surrounding open hole	80	300mm
6	Both sides of beam attached with pillow and beam	80	2 on each joist
7	Joist and joist connecting plate	80	2 on each end
8	Connection between cut joist and end banding joist with open hole (vertical nailed connection along opening surrounding)	80	5
		100	3
9	Connection between each end-banding joist at open hole and edge-banding joist (vertical nailed connection along opening surrounding)	80	5
		100	3
10	Stud and raising-plate or bottom plate of wall body, adopting slant nailed connection or vertical nailed connection	60	4
		100	2
11	Double pieces of stud column at both sides of open hole or stud point for wall body intersection or at corner	80	750mm
12	Double-layer raising-plate	80	600mm
13	Bottom plate or ground beam plate or wall body and joist or end banding block (used for external wall)	80	400mm
14	Internal partition wall and frame or floor plate	80	600mm
15	Each end of horizontal member at top of nonbearing wall open hole	80	2
16	Lintel and stud	80	2 on each end
17	Ceiling joist and raising-plate of wall body - adopting slant nailed connection on each side	80	2
18	Roof rafter, truss or roof joist and raising-plate of wall body - slant	80	3

## Appendix K Requirements for Retention and Penetration of Various Protective-treated Wood Members

### K.1 Member with Rough Sawn and Round Timber Structure and Light Wood Frame Construction

**K.1.1** The minimum retention inspection result of preservative, insect prevention agent and active ingredient adopted by member with rough sawn and round timber structure and light wood frame construction shall be in accordance with those specified in Table K.1.1. Water soluble or oil soluble protectant with volatile hydrocarbon as solvent should be used for wood member required to be painted.

**K.1.2** Protection construction shall be carried out on completion of manufacture of wood member and correct treatment process shall be selected. Normal pressure impregnation method may be used for protective treatment of wood member at a status of Category C1 environmental conditions; pressure impregnation method shall be used for other environmental conditions; cold and hot bath impregnation method may be adopted under special circumstances; as for the tree species difficult of agent absorption, before impregnation, the timber may be nicked along grain but the depth of nick should not be greater than 16mm. The inspection result of agent penetration on completion of impregnation shall not be less than those specified in Table K.1.2. Spraying method and brush method shall only be used for protective restoration of wood member which has been subject to protective treatment but some part without absorbing agent is exposed because of drilling hole or slotting.

**Table K.1.1 -- Minimum Retention for Preservative-treated Wood and its Product Used under Different Use Conditions**

Preservative		Active ingredient	Composition proportion (%)	Minimum retention (kg/m <sup>3</sup> )				
Category	Name			Use environment				
				C1	C2	C3	C4A	
Water-solubility	Boron compound <sup>[1]</sup>		Boron trioxide	100	2.8	2.8 <sup>[2]</sup>	NR <sup>[3]</sup>	NR
	Ammoniacal copper quaternary (ACQ)	ACQ-2	Cupric oxide	66.7	4.0	4.0	4.0	6.4
			Didecyl dimethyl ammonium chloride (DDAC)	33.3				
Water-solubility	Ammoniacal copper quaternary (ACQ)	ACQ-3	Cupric oxide	66.7	4.0	4.0	4.0	6.4
			Dodecyl benzyl dimethyl ammonium chloride (BAC)	33.3				
	ACQ-4	Cupric oxide	66.7	4.0	4.0	4.0	6.4	

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