

ICS 91.080.20
CCS P 23

LY

**INDUSTRY STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

LY/T 3140-2019

**Timber structures -- determination bending yield moment of
dowel-type fasteners**

木结构 销类紧固件屈服弯矩试验方法

(English Translation)

Issued on: October 23, 2019

Implemented on: April 1, 2020

Issued by: State Forestry and Grassland Administration

Table of Contents

Foreword	
1 Scope	
2 Normative references	
3 Terms and definitions	
4 Symbols	
5 Test equipment	
6 Test method	
6.1 Materials	
6.2 Sample preparation	
6.3 Dimensions	
6.4 Loader	
7 Test results	
7.1 Determination of yield load	
7.2 Yield Moment	
7.3 Results	
8 Test report	

Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009.

This standard was proposed and managed by the National Timber Standardization Technical Committee (SAC/TC41/SC4).

This standard was drafted. Institute of Wood Industry, Chinese Academy of Forestry, Xiamen Minghongtang Crafts Co., Ltd., Shanghai Wood Industry Industry Research Institute, Zhejiang Shiyong Wood Industry Co., Ltd., Zhejiang Woodcarving Redwood Furniture Product Quality Inspection Center, Chinese Academy of Forestry Forestry New Technology Institute, Hebei Agricultural University, Nanjing Forestry University, Anhui Agricultural University, Inner Mongolia Agricultural University, Anhui Forestry Survey Planning Institute, First Inspection (Beijing) Testing Technology Co., Ltd., Heilongjiang Wood Science Research Institute.

1 Scope

This standard specifies the test method for the yield bending moment of pin fasteners.

This standard applies to the testing and evaluation of the yield bending moment of pin-type fasteners for wooden structures when subjected to static bending loads.

2 Normative references

The following documents are essential for the application of this document. For dated references, only the dated version applies to this document.

For undated references, the latest version (including all amendments) applies to this document.

LY/T 2059-2012 steel nails for wood structures

3 Terms and definitions

The following terms and definitions apply to this document.

Dowel type fasteners Nails, code nails, bolts, screws and round pins, etc.

3.2.1

Fastener section dimension the diameter of the rod (smooth or contoured) of a round pin-type fastener other than the coating;

3.2.2

Fastener section dimension the length of the side of the square pin type fastener except the coating;

3.2.3

Fastener section dimension Oval or rectangular pin-type fasteners have the smallest cross-section except coating.

Yield moment

Bending moment of pin-type fasteners under yield load.

Note: In this standard, the yield load deviates from the intersection of the load-deflection curve and the initial tangent modulus line by 5% of the cross-sectional dimensions of pin fasteners.

The load representation.

4 Symbols

d- cross-section dimensions of pin fasteners, mm;

F- static bending load on pin fasteners, N;

F_y-yield load determined from the load deflection curve, N;

l-Length of pin fasteners, mm;

5 Test equipment

5.1

The accuracy of measuring load of the testing machine should reach 1%, and the curvature diameter of the support and indenter end of the testing device is 10 mm.

5.2

The cross-section dimension test gauge should be accurate to 0.02mm.

6.1 Materials

Pin-type fasteners should be the same as or similar to the nails, code nails, bolts, screws, and round pins used in actual wooden structures.

Steel nails should meet the requirements of LY/T 2059;

Code nails, bolts, screws and round pins should meet the requirements of the corresponding national or industry standards.

For coated pin fasteners, the coating shall be removed and the cross-sectional dimensions shall be measured, and subsequent tests shall be carried out.

6.2 Sample preparation

The choice of test specimens shall be representative, and the bending moment of the weakest axis of pin fasteners shall be tested.

6.3 Dimensions

Measure the cross-sectional dimension of each sample (accurate to 0.02 mm) at the middle position in the length direction.

6.4 Loader

6.4.1

The loading test is shown in Figure 1. Adjust the span according to the type and cross-section size of the pin-type fasteners. The span l_1 of the nail and the code nail should

not be less than $11d$;

The bolt span l_1 should not be less than $4d$. For nails, code nails and bolts, the requirement l_2 should be not less than $2d$ to prevent the fasteners from Slide off the stand. If the fastener is too short to meet this requirement, the largest possible span should be used and the span used should be described in the test report and test situations.

Explanation.

1--nail head;

2--the shank of the nail;

3--The tip of the nail.

Figure 1 Loading method of pin fasteners (taking nails as an example)

6.4.2

The static bending load is applied (see Figure 1) and the load is uniformly applied. The time to reach the maximum load shall not be less than 30s.

6.4.3

The load and deflection shall be recorded continuously until the load reaches its maximum and begins to fall. Draw the load-deflection curve. Load measurement it should be accurate to 1%, and the deflection measurement should be accurate to 0.02mm.

7.1 Determination of yield load

In the straight section (elastic stage) of the load-deflection curve obtained by the test, the fastener cross-section size is shifted to the right along the abscissa by 5%.

Draw a straight line parallel to it, and take the intersection of this line and the load-displacement curve as the yield load F_y (see Figure 2). If the line is not Intersect the load-displacement curve, then take the limit load as F_y .

7.2 Yield Moment

Yield bending moment is calculated according to formula (1).

In the formula.

M_y -Yield Moment

F_y -yield load determined from the load deflection curve, N;

l_1 -length between the fulcrum of the support, mm;