Taiwan Bicycle Industry Standard

TBIS

4210-9

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Cycles — Safety requirements for bicycles —

Part 9:
Saddles and seat-post test methods

Reference number:
TBIS 4210-9:2015 (FDTS)

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Foreword

Taiwan Bicycle Industry Standard (TBIS) is approved and announced by Taiwan Bicycle Association (TBA). The preparatory work of "Taiwan Bicycle Industry Standard" is carried out by the technical expert committee from TBIS. When TBA members are interested in the related standard that has been announced, and after they are approved by the R&D and patent committee of TBA, they will become the member of the technical expert committee of TBIS. TBA and Cycling & Health Tech Industry R&D Center (CHC) are in close cooperation to handle all matters applied and established by TBIS.

The structure, establishing process and revising of this standard should be proposed to and get determined by the R&D and Patent Committee of TBA. This standard is implemented after the announcement of TBA. Please be aware, some part of this document may involve patent rights. TBIS has no legal obligation to mark out where all or part of the patent is involved.

Background description:

After 2015, The International Organization for Standardization 4210: 2014 (ISO 4210:2014) will be the most commonly used safety standard in global bicycle industry. Although ISO 4210 is not a mandatory inspection standard in various economic markets, they are still requesting their bicycle products suppliers to follow the basis of ISO 4210 safety requirements. However, this phenomenon represents that they are unable to differentiate the quality and grade differences between bicycles and spare parts. In order to keep up the competitiveness of our bicycle industry in the international market, the technical expert committee of TBIS uses ISO 4210 as their investigation basis and propose a higher level of product safety and standard service, to establish TBIS especially for this purpose. To highlight on the quality, performance and reliability of those components that has passed TBIS inspection, which have already exceeded the international standard. In the meantime, TBIS is developing on the safety standard and testing technology on those bicycle parts that are excluded in ISO 4210, to ensure the product and identify the differences between product performance, which has become an important reference to drive the improvement on Taiwan bicycle industry Research & Design units.

Establishment History

1st: [TBIS General Meeting (rev. NP) Discussion] Total 13 companies and 18 industry experts participate, 2015.06.25.

2nd: [TBIS Working Draft (rev. WD) Discussion] Total 13 companies and 18 industry experts participate, 2015.06.25.

3rd: [TBIS Committee Draft (rev.CD) Discussion] Total 14 companies and 22 industry experts participate, 2015.07.21.

4th: [TBIS Enquiry stage (rev. DTS) Discussion] Total 15 companies and 19 industry experts participate, 2015.09.02.

5th: [TBIS Approval Stage (rev. FDTS) Discussion] Total 17 companies and 19 industry experts participate, 2015.10.28.

6th: [TBIS Subject Meeting] Total 17 companies and 19 industry experts participate, 2015.10.28.

Introduction

The purpose of this TBIS is to build the world's leading bicycle industry standards and norms bicycle manufacturing process to ensure product safety and external benefits effectively (including announcing internationally, producing high-valued products, and leading the R&D of bicycle industry, etc.), highlighting the product inspected by TBIS is in compliance with a higher safety requirement. While riding the bicycle on public roads, the laws and regulations of the country will be applicable.

TBIS 4210 consists of the following parts, under the general title *Cycles — Safety requirements for bicycles*:

— *Part 1: Terms and definitions*

— *Part 2: Requirements for city and trekking, young adult, mountain and racing bicycles*

— *Part 3: Common test methods*

— *Part 4: Braking test methods*

— *Part 5: Steering test methods*

— *Part 6: Frame and fork test methods*

— *Part 7: Wheels and rims test methods*

— *Part 8: Pedals and drive system test methods*

— *Part 9: Saddles and seat-post test methods*

Reference

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 4210-1, *Cycles — Safety requirements for bicycles — Part 1: Terms and definitions*

ISO 4210-3:2014, *Cycles — Safety requirements for bicycles — Part 3: Common test methods*

ISO 4210-4:2014, *Cycles — Safety requirements for bicycles — Part 4: Braking test methods*

ISO 4210-5:2014, *Cycles — Safety requirements for bicycles — Part 5: Steering test methods*

ISO 4210-6:2014, *Cycles — Safety requirements for bicycles — Part 6: Frame and fork test methods*

ISO 4210-7:2014, *Cycles — Safety requirements for bicycles — Part 7: Wheel and rim test methods*

ISO 4210-8:2014, *Cycles — Safety requirements for bicycles — Part 8: Pedal and drive system test methods*

ISO 4210-9:2014, *Cycles — Safety requirements for bicycles — Part 9: Saddle and seat-post test methods*

ISO 5775-1, *Bicycle tyres and rims — Part 1: Tyre designations and dimensions*

ISO 5775-2, *Bicycle tyres and rims — Part 2: Rims*

Cycles — Safety requirements for bicycles —

Part 9:
Saddles and seat-post test methods

1 Scope

This part of TBIS 4210 specifies saddle and seat-post test methods for TBIS 4210-2.

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.

TBIS 4210-1:2016, *Cycles — Safety requirements for bicycles — Part 1: Terms and definitions*

TBIS 4210-2:2016, *Cycles — Safety requirements for bicycles — Part 2: Requirements for city and trekking, young adult, mountain and racing bicycles*

TBIS 4210-3:2016, *Cycles — Safety requirements for bicycles — Part 3: Common test methods*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in TBIS 4210-1 apply.

4 Test methods

4.1 General

If a suspension seat-post is involved, the test may be conducted with the suspension system either free to operate or locked. If it is locked, the pillar shall be at its maximum length.

4.2 Saddle/seat-post — Security test

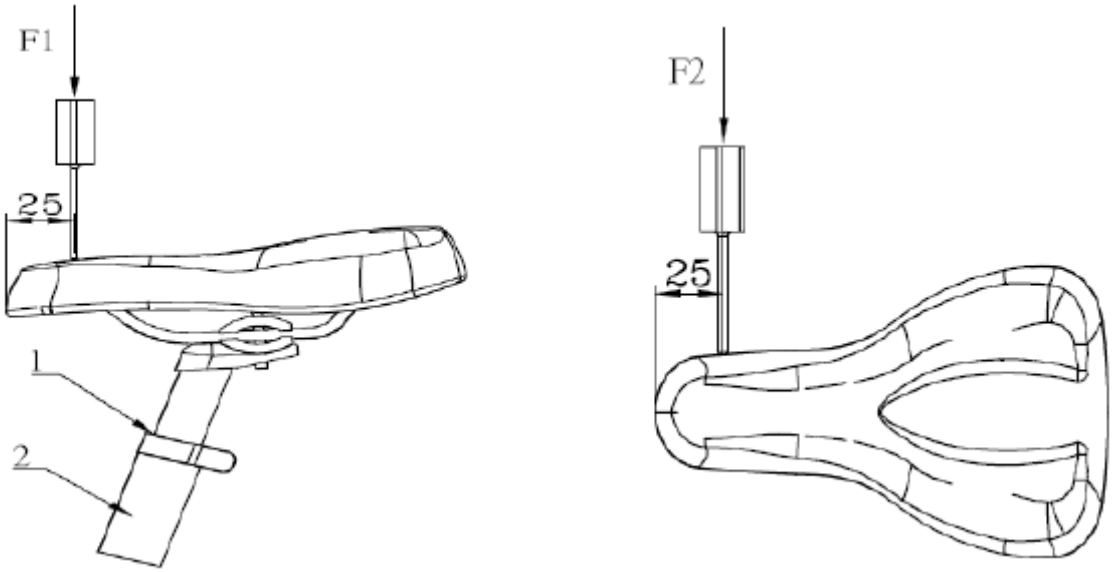
With the seat-post correctly assembled to the bicycle frame at minimum insertion depth of the seat-post (as specified in TBIS 4210-2:2016, 4.16.2), and the clamps tightened to the torque recommended by the bicycle manufacturer total three times, apply a force of F_1 vertically downwards at a point 25 mm from either the front or rear of the saddle, whichever produces the greater torque on the saddle clamp. The saddle shall be positioned in the seat-post clamp assembly as defined by the saddle manufacturer's rail markings or instructions. Maintain this force for 1 min. Remove this force and apply a lateral force of F_2 horizontally at a point 25 mm from either the front or rear of the saddle and maintain this force for 1 min, whichever produces the greater torque on the clamp (see Figure 1). The forces are given in Table 1. The fixture shall be such that it does not damage the surface of the saddle.

Table 1 — Forces on saddle

Forces in newtons

Bicycle type	City and trekking bicycles	Young adult bicycles	Mountain bicycles	Racing bicycles
Vertical force, F_1	1000			
Horizontal force, F_2	450			

Dimensions in millimetres



a) Vertical force **b) Horizontal force**

Key

1 minimum insertion-depth mark

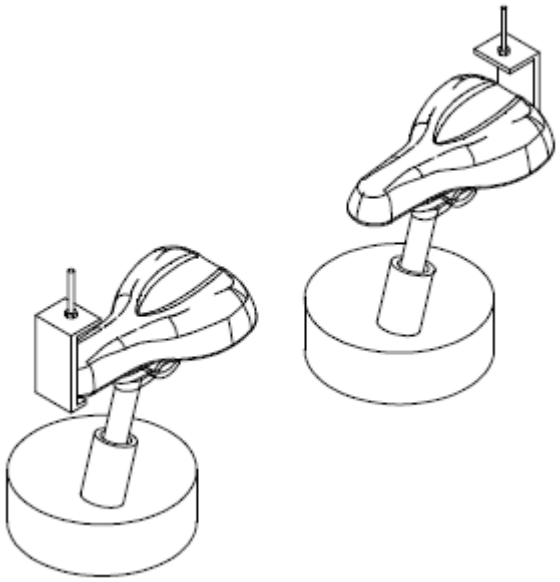
2 bicycle frame

Figure 1 — Saddle/seat-post — Security test

4.3 Saddle — Static strength test

Position the saddle in its maximum rearward direction as defined by the saddle manufacturer's rail markings or instructions, into a suitable fixture representative of a seat-post clamp assembly. Tighten the clamps to the torque recommended by the bicycle manufacturer, and apply forces of 440 N in turn under the rear and nose of the saddle cover, as shown in Figure 2, ensuring that the force is not applied to any part of the chassis of the saddle. The load application point is on the longitudinal plane of the saddle at 25 mm from the back (front) of the saddle. If the saddle design is such that it cannot accept a centreline

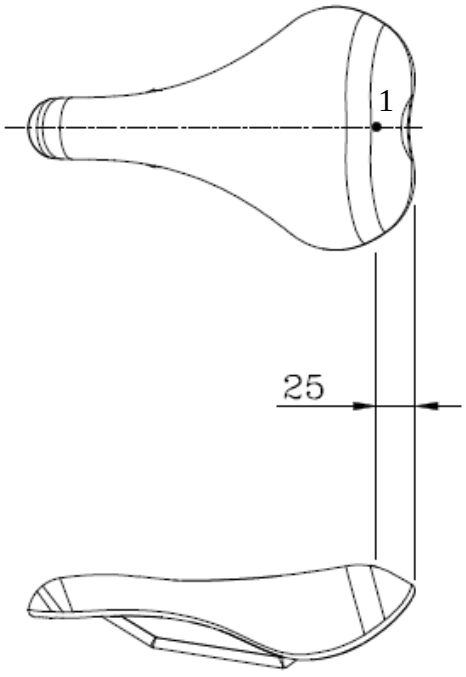
load application, the load shall be symmetrically applied at two points of the saddle. Loading on the rear of the saddle shall be symmetrical about its longitudinal axis, as shown in Figure 3.



a) Force under nose **b) Force under rear**

Figure 2 — Saddle — Static strength test

Dimensions in millimetres



Key
1 loading point

Figure 3 — Saddle — Load application point of static strength test

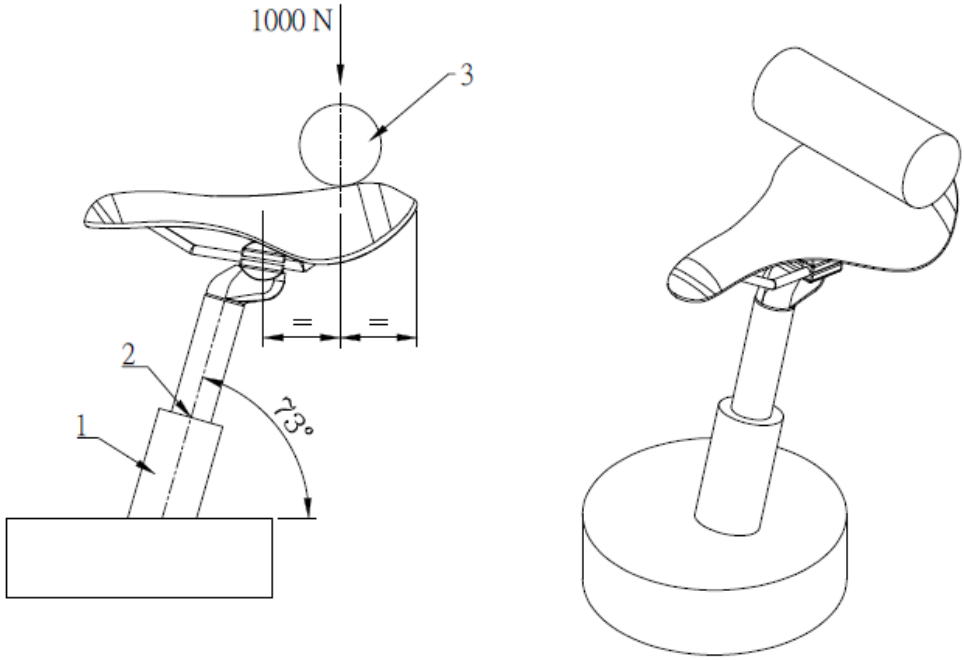
4.4 Saddle and seat-post clamp — Fatigue test

4.4.1 General

Seat-posts can influence test failures of saddles. For this reason, a saddle shall be tested in combination with a seat-post as recommended by the saddle manufacturer.

4.4.2 Test method

Insert the seat-post to its minimum insertion depth (as specified in TBIS 4210-2:2016, 4.16.2) in a rigid mount representative of that on the bicycle and with its axis at 73° to the horizontal. The saddle shall be positioned in the seat-post clamp assembly in a maximum rearward direction as defined by the saddle manufacturer's rail markings or instructions. Adjust the saddle to have its upper surface in a horizontal plane and tighten the clamp to the torque recommended by the bicycle manufacturer. Apply a repeated, vertically-downward force of 1 000 N for 200 000 cycles, in the position shown in Figure 4, by means of a pad 300 mm long × 80 mm diameter to prevent localized damage of the saddle cover. The maximum test frequency shall be maintained as specified in TBIS 4210-3:2016, 4.5.



Key

1 rigid mount

2 minimum insertion-depth mark

3 pad (length = 300 mm, diameter = 80 mm)

Figure 4 — Saddle and seat-post clamp fatigue test

4.5 Seat-post — Fatigue test and static strength test

4.5.1 General

In the following test, if a suspension seat-post is involved, the test shall be conducted with the suspension system adjusted to give maximum resistance.

4.5.2 Test method for stage 1 (fatigue test)

A seat-post shall be inserted to the minimum insertion depth (as specified in TBIS 4210-2:2016, 4.16.2) in a suitable fixture with a representative seat collar and clamped to the manufacturer's recommended torque. The seat-post shall be fixed at an angle of 73° from horizontal, as shown in Figure 5.

Secure an extension-bar to the saddle attachment point by the appropriate attachment fitting such that the bar extends rearwards and downwards at an angle of 10° below the horizontal to permit the application of a vertical test force at a distance of 70 mm from the centre of the saddle clamp where the centreline of the clamp intersects the axis of the bar, as shown in Figure 5.

4.5.2.1 Fatigue test stage 1

Apply a repeated, vertically downward, dynamic force of stage 1 F_3 to the point described above and shown in Figure 5 for 120 000 cycles. The forces are given in Table 2. The maximum test frequency shall be maintained as specified in TBIS 4210-3:2016, 4.5.

4.5.2.2 Fatigue test stage 2

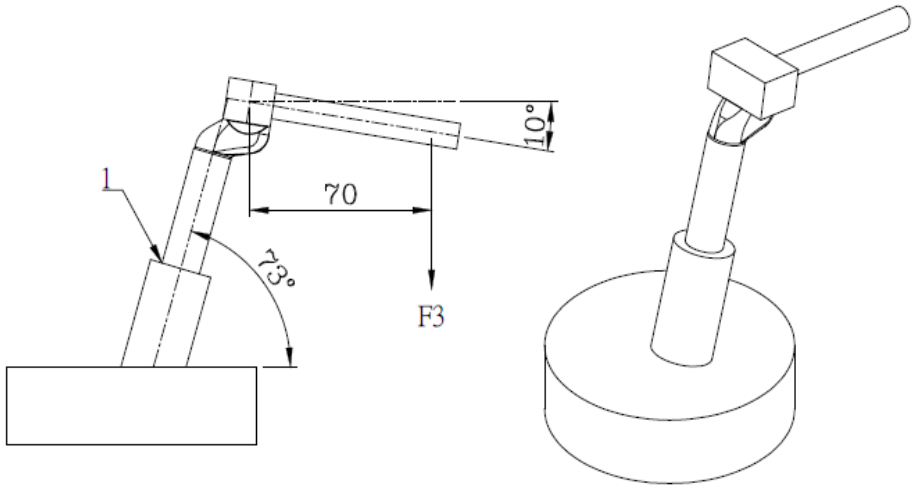
Apply a repeated, vertically downward, dynamic force of stage 2 F_3 to the point described above and shown in Figure 5 for 100 000 cycles. The forces are given in Table 2. The maximum test frequency shall be maintained as specified in TBIS 4210-3:2016, 4.5.

Table 2 — Forces on seat-post

Forces in newtons

Bicycle type	City and trekking bicycles	Young adult bicycles	Mountain bicycles	Racing bicycles
Fatigue stage 1, F_3	1 000	1 000	1 200	1 200
Fatigue stage 2, F_3	1 100	1 100	1 300	1 300

Dimensions in millimetres



Key

1 minimum insertion-depth mark

Figure 5 — Seat-post — Fatigue test

4.5.3 Test method for stage 2 (static strength test)

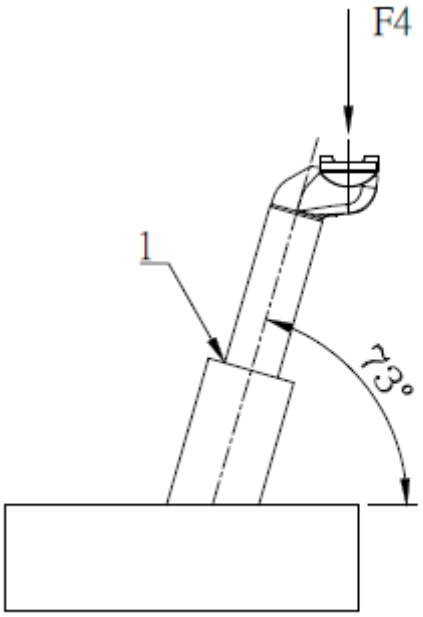
A seat-post shall be inserted to the minimum insertion-depth (as specified in TBIS 4210-2:2016, 4.16.2) in a suitable fixture with a representative seat collar and clamped to the manufacturer's recommended torque. The seat-post shall be fixed at an angle of 73° from the horizontal, as shown in Figure 6.

A force of F_4 shall be exerted vertically on the saddle clamp for aduration of 1 min. The displacement at the loading point shall be constantly monitored during testing. The forces are given in Table 3.

Table 3 — Forces on seat-post

Forces in newtons

Bicycle type	City and trekking bicycles	Young adult bicycles	Mountain bicycles	Racing bicycles
Force, F_4	2 000	1 500	2 000	2 000



Key

1 minimum insertion-depth mark

Figure 6 — Seat-post — Static strength test