SRI LANKA STANDARD 926 : PART 1 :1991

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SPECIFICATION FOR

BICYCLES
PART 1 - SAFETY AND PERFORMANCE REQUIREMENTS

SRI LANKA STANDARDS INSTITUTION

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PART 1 - SAFETY AND PERFORMANCE REQUIREMENTS

SLS 926 : Part 1 : 1991

Gr. 9

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Sri Lanka.

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This standard does not purport to include all the necessary provisions of a contract.

SRI LANKA STANDARD
SPECIFICATION FOR BICYCLES
PART 1 - SAFETY AND PERFORMANCE REQUIREMENTS

FOREWORD

This standard was authorized for adoption and publication as a Sri Lanka Standard by the Council of the Sri Lanka Standards Institution on 91-06-13, after the draft, finalized by the Drafting Committee on Bicycles, had been approved by the Mechanical Engineering Divisional Committee.

The standard on bicycles is presented in two parts; namely,

Part 1 Safety and performance requirements

Part 2 Test methods

For the purpose of deciding whether a particular requirement of this standard is complied with the final value observed or calculated, expressing the result of a test or an analysis shall be rounded off in accordance with SLS 102. The number of significant figures to be retained in the rounded off value shall be the same as that of the specified value in this standard.

The Sri Lanka Standard Institution gratefully acknowledges the use of relevant publications of the International Organization for Standardization, the Standards Australia,the British Standards Institution and the Bureau of Indian Standards in the preparation of this standard.

1 SCOPE

This Sri Lanka Standard specifies the safety and performance requirements for the design, manufacture and assembly of bicycles, and their sub-assemblies, and lays down guidelines for instructions on the use and care of bicycles.

It applies to all bicycles intended for use on public roads.

It does not apply to specialized types of bicycles such as toy bicycles and bicycles designed and equipped solely for use in sanctioned competitive events.

2 REFERENCES

SLS 102 Presentation of numerical values
SLS 926 Specification for bicycle
Part 2 Test methods

3 DEFINITIONS

For the purposes of this standard the following definitions shall apply.

3.1 bicycle : A two-wheeled pedal vehicle propelled solely by the muscular energy of the person riding it.

3.2 delivery bicycle : A bicycle designed for the primary purpose of carrying goods.

3.3 toy bicycle : A bicycle not intended to be ridden on public roads.

3.4 tandem : A bicycle with saddles handles and pedals for two or more riders, one behind the other.

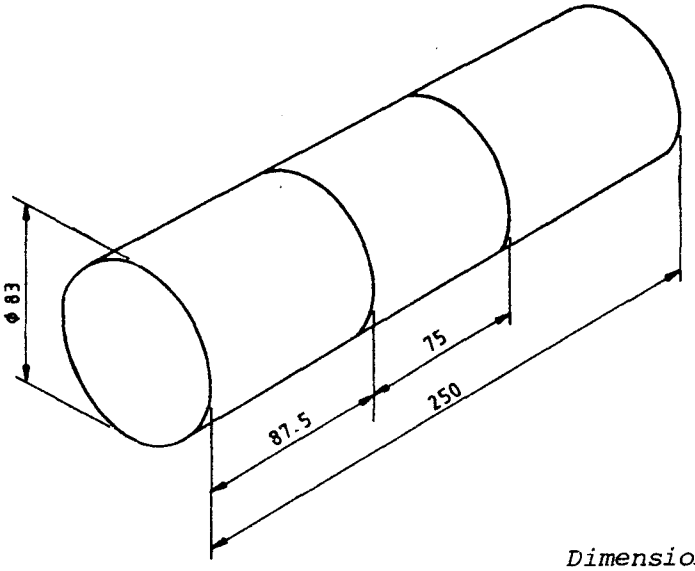
3.5 saddle height : The height from the ground plane to the top of the saddle, measured in the centre of the seating area normal to the ground plane when the bicycle is in the upright position.

3.6 braking distance : The distance travelled in bringing a bicycle to rest from the moment of application of the brakes.

3.7 stopping distance : The sum of braking distance and the distance travelled during the rider's reaction time.

3.8 gear development : The distance travelled by a bicycle during one revolution of the pedal cranks.

3.9 exposed protrusion : A protrusion that can come in contact with the central 75 mm of the lateral surface of a cylinder 250 mm long and 83 mm in diameter (simulating a limb) (see Figure 1).



Dimensions in millimetres

FIGURE 1 - Exposed protrusion test cylinder

3.10 tread surface (pedal) : The surface of a pedal that comes in contact with the underside of the foot, the design of which incorporates a slip-resistant characteristic.

4 REQUIREMENTS FOR SUB-ASSEMBLIES

4.1 General

4.1.1 *Sharp edges*

Exposed edges that may come into contact with the rider's hands, legs, etc. during normal riding or handling and maintenance of the bicycle shall not be sharp.

4.1.2 *Protrusions*

4.1.2.1 Exposed protrusion

Except as specified in **4.1.2.2**, any exposed protrusion longer than 8 mm after assembly shall terminate in a radius of not less than 6.3 mm. Such a protrusion shall have a major end dimension of greater than 12.7 mm and a minor end dimension of greater than 3.2 mm.

4.1.2.2 Exemptions

The requirements of **4.1.2.1** do not apply to the following :

a) the front gear change mechanism;
b) the rear gear change mechanism below the chain stay;
c) the rim brake mechanisms at the front and rear wheels;
d) a lamp bracket fitted on the head tube;
e) reflectors; and
f) the clips and toe straps.

4.1.2.3 Protrusions on the frame

NOTE

On a circular member the transverse plane on the longitudinal axis is taken as the dividing line between the upper and the lower surfaces.

4.1.2.3 a) There shall be no protrusions on the upper surface or sides of the top bar within a zone bounded by the following

i) a vertical plane at the front tip of the saddle when the saddle is in its rearmost position;

ii) a vertical plane 300 mm ahead of the front tip of the saddle when the saddle is in its foremost position;

iii) a horizontal plane at the top of the crank when in an upright position, where applicable.

4.1.2.3 b) There shall be no adjacent fixed protrusions in the zone demarcated in 4.1.2.3 (a).

4.1.2.3 c) Protrusions situated on the underside of the top bar shall not project beyond the width of the bar.

4.1.2.3 d) Control cables no greater than 6.5 mm in diameter and cable clamps made from material no thicker than 5 mm may be attached to the top bar. Where cable clamps incorporate threaded components, these shall be situated on the underside of the bar.

4.1.2.4 Screw threads

A screw thread found as an exposed protrusion (see 3.9) shall be limited to a protrusion length of one major diameter of the screw beyond the internally threaded mating part.

4.2 Brakes

4.2.1 *Braking system*

A bicycle shall be equipped with a braking system, or systems, to ensure compliance with 4.2.4. where only one braking system is provided, this shall operate on the rear wheel; where two separate systems are provided, one shall operate on the front wheel and one on the rear wheel.

4.2.2 *Hand-operated brakes*

4.2.2.1 Brake lever positions

The brake lever for front brakes shall be positioned on the right side of the handlebar and that for the rear brakes on the left side of the handle bar.

4.2.2.2 Brake lever dimensions

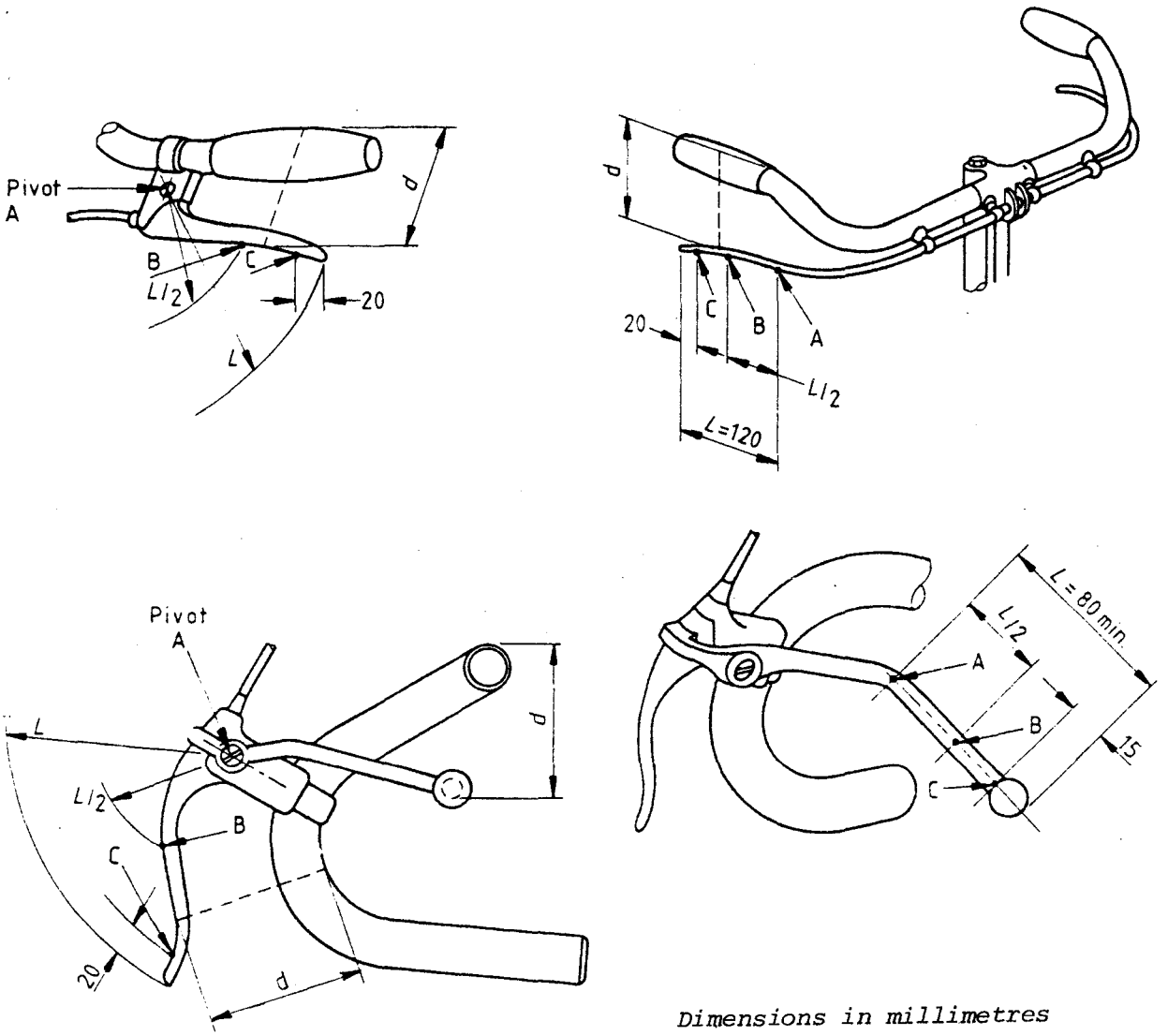
The maximum grip dimension, d, (see Fig. 2) measured between the outer surface of the brake lever and the handlebar, or the handlebar grip or any other covering where present, shall not exceed 90 mm between points A and B, and 100 mm between points B and C.

4.2.2.3 Cable-brake assembly

When a bicycle is equipped with cable brakes of any type, the screw for attaching to the frame or fork shall be provided with a suitable locking device, for example a lockwasher, a locknut or a stiffnut.

The brake system shall operate without binding.

The cable pinch-bolt shall not cut any of the cable strands, when assembled according to the manufacturer's instructions.



Dimensions in millimetres

FIGURE 2 - Brake lever grip dimensions

4.2.2.4 Brake pad assembly

The brake friction pad shall be securely attached to the backing plate or holder and there shall be no failure of the friction pad assembly when tested by the method specified in 3.1 of **SLS 926: Part 2 : 1991.** The brake system shall be capable of meeting the braking performance requirements of 4.2.4.1 and 4.2.4.2 after completion of the test specified in 3.1 of **SLS 926 : Part 2 : 1991.**

4.2.2.5 Brake adjustment

The brakes shall be capable of adjustment to an efficient operating position until the brake pads have worn to the point of requiring replacement as recommended in the literature provided by the manufacturer.
When correctly adjusted the brake pad shall not contact anything other than the intended braking surface.

4.2.3 *Strength of brake system*

4.2.3.1 Hand-operated brakes

When tested by the method described in 3.2.1 of **SLS 926 : Part 2 : 1991**, there shall be no failure of the brake system or of any component thereof.

4.2.4 *Braking performance*

4.2.4.1 Braking under dry conditions

When tested by the method described in 3.3 of **SLS 926 : Part 2 : 1991**

a) a bicycle having a gear development, in its highest gear,of 5 m or more shall be brought to a smooth safe stop within a distance of 5.5 m from a speed of 24 km/h;

b) a bicycle having a gear development, in its highest gear, of less than 5 m shall be brought to a smooth safe stop within a distance of 5.5 m from a speed of 16 km/h.

4.2.4.2 Braking under wet conditions

When tested by the method described in 3.3 of **SLS 926 : Part 2: 1991**, a bicycle shall be brought to a smooth, safe stop within a distance of 15 m from a speed of 16 km/h.

4.3 Steering

4.3.1 *Handlebars*

The handlebars shall have an overall width between 350 mm and 700 mm. The vertical distance between the top of the handlebar grips in their highest position and the seat surface of the saddle in its lowest position shall not exceed 400 mm.

The ends of the handlebars shall be fitted with handgrips or end plugs that will withstand a removal force of 70 N.

4.3.2 *Handlebar stem*

The handlebar stem shall contain a permanent mark that clearly indicates the minimum insertion depth of the handlebar stem into the fork stem, or alternatively a positive and permanent means of ensuring that the minimum insertion depth be provided. The insertion mark or insertion depth, shall not be less than 2.5 times the shaft diameter from the lower end of the stem, and there shall be at least one shaft diameter's length of contiguous circumferential shaft material below the mark. An insertion mark shall not reduce the strength of the handlebar stem.

4.3.3 *Expander bolt for handlebar stem*

The minimum failure torque of the bolt shall be at least 50 per cent greater than the manufacturer's maximum tightening torque.

4.3.4 *Steering stability*

The steering shall be free to turn through at least 60 degrees to either side of the straight-ahead position and shall exhibit no tight spots, stiffness or slackness in the bearings when correctly adjusted.

A minimum of 25 per cent of the total mass of the bicycle and rider shall act on the front wheel when the rider is holding the handlebar grips and sitting on the saddle, with the saddle and rider in their most rearward positions.

Recommendations for steering geometry are given in Appendix A

4.3.5 *Strength of steering assembly*

The handlebar stem shall be capable of withstanding without fracture the tests described in 3.4.1.1 and 3.4.1.2 of SLS 926 : Part 2 : 1991.

When tested by the method described in 3.4.2 of SLS 926:Part 2 : 1991, there shall be no movement of the handlebar relative to the stem.

When tested by the method described in 3.4.3 of SLS 926: Part 2 : 1991,there shall be no movement of the handlebar stem relative to the fork stem other than that movement required to take up tolerances before any locking faces abut. Such movement shall not exceed 5 degrees.

4.4 **Frame/Fork assembly**

4.4.1 *Impact test (falling mass)*

When tested by the method described in 3.5.1 of SLS 926: Part 2 : 1991, there shall be no visible evidence of fracture, and the permanent deformation of the assembly, measured between the centre-lines of the two wheel axles, shall not exceed 40 mm.

4.4.2 *Impact test (falling frame/fork assembly)*

When tested by the method described in 3.5.2 of SLS 926: Part 2: 1991, there shall be no visible evidence of fracture.

4.5 **Front fork**

The slots or other means of location for the front axle within the front fork shall be such that when the axle is firmly abutting the top face of the slots, the front wheel remains central within the front fork.

4.6 Wheels

4.6.1 *Rotational trueness*

This is defined in terms of circular run-out tolerance (axial). The run-out tolerances given below represent the maximum permissible variation of position of rim (i.e. full indicator reading) of a fully assembled wheel during one complete revolution about the axle without axial movement.

4.6.1.1 Concentricity tolerance

For bicycles equipped with rim brakes, the run-out shall not exceed 2 mm when measured perpendicular to the axle at a suitable point along the rim.

For bicycles not equipped with rim brakes, the run-out shall not exceed 4 mm.

4.6.1.2 Squareness tolerance

For bicycles equipped with rim brakes, the run-out shall not exceed 2 mm when measured parallel to the axle at a suitable point along the rim.

For bicycles not equipped with rim brakes, the run-out shall not exceed 4 mm.

4.6.2 *Clearance*

Alignment of the wheel assembly in a bicycle shall allow not less than 2 mm clearance between the tyre and any frame or fork element.

4.6.3 *Static load test*

When a fully assembled wheel is tested by the method described in 3.6 of **SLS 926 : Part 2 : 1991** , there shall be no failure of any of the components of the wheel, and the permanent deformation, measured at the point of application of the force on the rim, shall not exceed 1.5 mm.

4.6.4 *Wheel retention*

Wheels shall be secured to the bicycle frame with a positive locking device and shall be tightened to the manufacture's specification.

4.6.4.1 Front wheel retention

There shall be no relative motion between the axle and the front fork when a force of 500 N is applied symmetrically to the axle for a period of 30 s in the direction of removal of the wheel.

4.6.4.2 Rear wheel retention
There shall be no relative motion between the axle and the frame when a force of 1780 N is applied symmetrically to the axle for a period of 30 s in the direction of removal of the wheel.

4.7 Tyers and tubes

4.7.1 *Inflation pressure*

The maximum inflation pressure recommended by the manufacturer shall be moulded on the sidewall of the tyre so as to be readily visible when the latter is assembled on the wheel.

Non-moulded tyres are excluded from this requirement.

4.7.2 *Compatibility*

The tyre and tube shall be compatible with the rim design. When inflated to 110 per cent of the recommended inflation pressure for a period of not less than 5 minute, the tyre shall remain intact on the rim.

4.8 Pedals and pedal/crank drive system

4.8.1 *Pedal tread*

4.8.1.1 The tread surface of a pedal shall be secured against movement within the pedal assembly.

4.8.1.2 Pedals intended to be used without toe-clips, or for optional use with toe-clips, shall have

a) tread surfaces on either side of the pedal,
or
b) a definite preferred position that automatically presents the tread surfaces to the rider's foot.

4.8.1.3 Pedal designed to be used only with toe-clips shall have toe-clip securely attached and need not comply with the requirement 4.8.1.2 **(a) and (b)**.

4.8.2 *Pedal clearance*

4.8.2.1 Ground clearance

With the bicycle unladen, the pedal at its lowest point and the tread surface of the pedal parallel to the ground and uppermost where it has only one tread surface, the bicycle shall be capable of being leaned over at an angle of 25 degrees from the vertical before any part of the pedal touches the ground.
When a bicycle is equipped with a sprung suspension, this measurement shall be taken with the suspension depressed position such as would be caused by a rider weighing 85 kg.

4.8.2.2 Toe clearance

Bicycles not equipped with positive foot-retaining devices (such as toe clips) shall have at least 89 mm clearance between the pedal and the front tyre or mudguard (when turned to any position). The clearance shall be least distance measured forward and parallel to the longitudinal axis of the bicycle from pedal to front tyre or mudguard. See Fig. 3.

Where a bicycle front fork has features that are designed to permit the fitting of a front mudguard, the toe clearance shall be measured with a suitable mudguard so fitted.

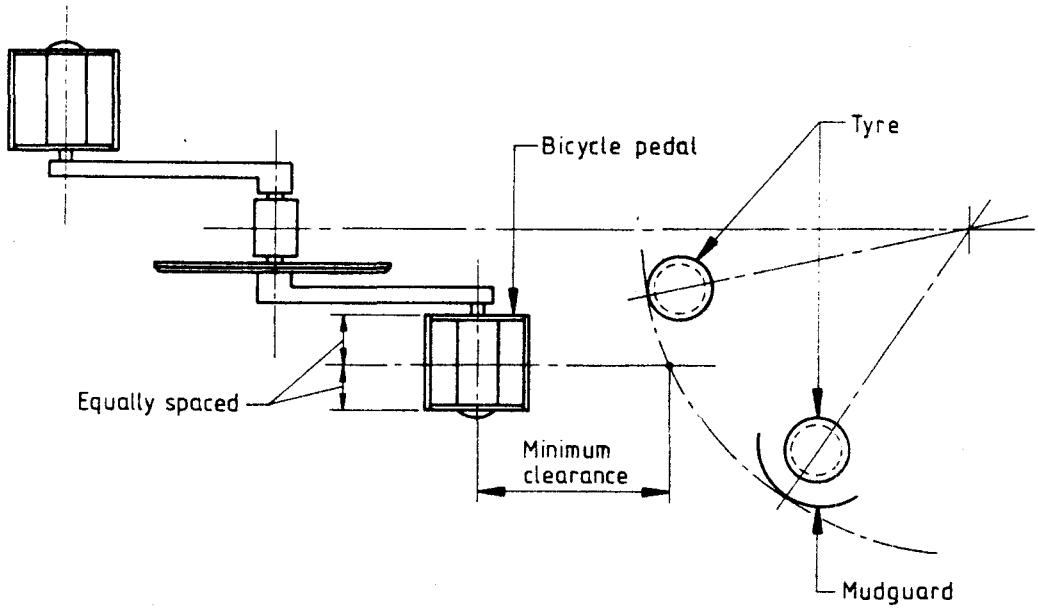


FIGURE 3 - Toe clearance

4.8.3 *Drive system static load test*

When tested by the method described in 3.7.1 of SLS 926: Part 2: 1991, there shall be no visible fracture of any component of the drive system, and drive capability shall not be lost.

4.8.4 *Pedal/crank system kinetic test*

When tested by the method described in 3.7.2 of SLS 926: Part 2: 1991, there shall be no visible fracture of any part of the pedal or of the crank threads.

4.9 Saddle

4.9.1 *Limiting dimensions*

No part of the saddle, saddle supports, or accessories attached to the saddle shall be more than 125 mm above the top surface of saddle at the point where the saddle surface is intersected by the seat post axis.

4.9.2 *Saddle pillar*

The saddle pillar shall contain a permanent mark that clearly indicates the minimum insertion depth of the pillar into the frame. The insertion mark shall not be less than two diameters of the pillar, measured from the bottom of the full diameter of the pillar, and it shall not reduce the strength of the pillar.

4.9.3 *Saddle adjustment clamps*

When tested by the method described in 3.8 of SLS 926 : Part 2: 1991, there shall be no movement of the saddle clamps in any direction with respect to the pillar, or of the pillar with respect to the frame.

Saddles which are not clamped, but are designed to pivot in a vertical plane with respect to the pillar, shall be allowed to move within the parameters of the design and shall withstand the test described in 3.8 of SLS 926 : Part 2 : 1991 , without failure.

4.10 Chain

Where a chain drive is used as a means of transmitting the motive force, the chain shall operate over the front and rear sprockets without binding.

The chain shall have a minimum breaking load of 8010 N.

4.11 Chainguard

A bicycle shall be equipped with a protective device shielding the upper junction of the chain and chain wheel (drive sprocket) against the entrapment of clothing or body parts. The device shall shield the chain for a distance of at least 25 mm measured prior to the point of engagement of the chain with the chain wheel.

4.12 Mudguard

A bicycle shall be fitted with a mudguard for each of wheel, front and rear and such mudguard shall be manufactured from mild steel strips not less than 0.45 mm thick and be not less than 50 mm wide and not less than 80 mm deep.

4.13 Lighting, reflectors and electrical power source

4.13.1 *Lighting*

When ridden during the night time there shall be a lamp fixed to the front centre of the bicycle so constructed as to throw a white light in the direction in which the bicycle is proceeding.

4.13.1.1 Wiring harness

In case an electric lamp is to be used and a wiring harness is fitted, it shall be so positioned to avoid damage by contact with moving parts or sharp edges. All connections shall withstand a tensile force in any direction of 10 N.

4.13.2 *Reflectors*

a bicycle shall be equipped with a white band on the rear mudguard to a length not less than 225 mm from the bottom of the mudguard and covering the entire width of the mudguard. Also at the centre of the white band should be fitted with a red colour, round reflector, of diameter not less than 35 mm.

4.13.3 *Electrical power source*

When an electrical power source is used, the nominal voltage shall not exceed 12 V.

4.14 Warning devices

A bicycle shall be fitted with a bell or any other suitable warning device at a location convenient for its operation.

4.15 Instructions

Each bicycle shall be provided with a set of instructions containing information on

a) preparation for riding - how to measure and adjust the seat height and handlebar height to suit the rider, with an explanation of the warning marks on seat pillar and handlebar stem;

b) recommended tightening of fasteners related to handlebar, handlebar stem saddle and pillar, and wheels

c) lubrication - where and how often to lubricate, and recommended lubricants;

d) correct chain tension and how to adjust it;

e) adjustment of brakes and recommendations for replacement of brake blocks;

f) adjustment of gears;

g) normal spares, i.e. tyres, tubes, brake-block holder assembly;

h) accessories - where these are offered as fitted, details should be included such as operation, maintenance required (if any) and relevant spares (i.e. light-bulbs);

i) recommendations of safe riding - regular checks on brakes, tyres, steering and lighting; caution concerning increased braking distance in wet weather.

Any other relevant information may be included at the discretion of the manufacturer.

4.16 Road test

When tested by the method described in 3.9 of SLS 926: Part 2 : 1991, there shall be no system or component failure and no loosening or misalignment of the seat, handlebars, control or reflectors.

The bicycle shall exhibit stable handling in turning and steering, and it shall be possible to ride with one hand removed from the handlebar (as when giving hand signals), without difficulty of operation or hazard to the rider.

5 MARKING

Bicycles shall be marked legibly and indelibly with the following

a) Name and address of the manufacturer and/or registered trade mark;

b) Country of manufacture; and

c) Identification number.

APPENDIX A

STEERING GEOMETRY

The steering geometry employed, as shown in Figure 4, will generally be dictated by the use for which the bicycle is intended but it is nevertheless recommended that :

a) the steering head angle be not more than 75^0 and not less than 65^0 in relation to the ground line;

b) the steering axis intersects a line perpendicular to the ground line, drawn through the wheel center, at a point not lower than 15 per cent and not higher than 60 per cent of the wheel radius when measured from the ground line

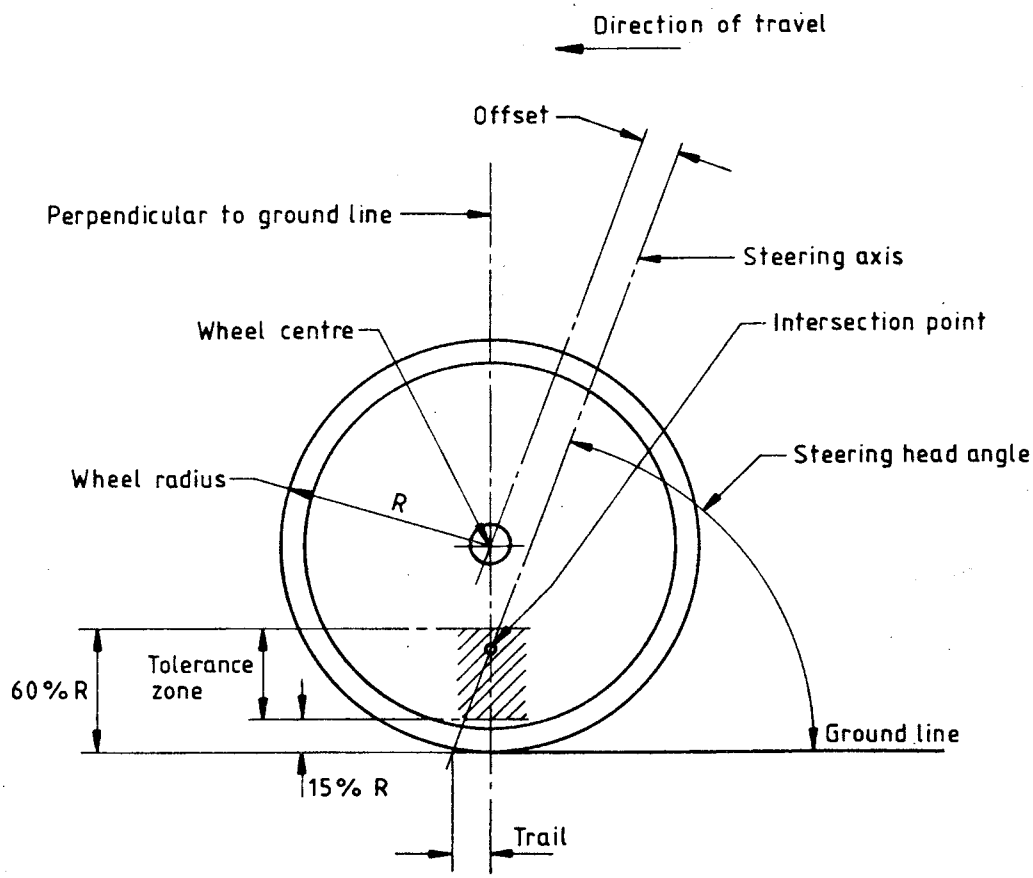


FIGURE 4 - Steering geometry

SRI LANKA STANDARDS INSTITUTION

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The principal objects of the Institution as set out in the Act are to prepare standards and promote their adoption, to provide facilities for examination and testing of products, to operate a Certification Marks Scheme, to certify the quality of products meant for local consumption or exports and to promote standardization and quality control by educational, consultancy and research activity.

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The development and formulation of National Standards is carried out by Technical Experts and representatives of other interest groups, assisted by the permanent officers of the Institution. These Technical Committees are appointed under the purview of the Sectoral Committees which in turn are appointed by the Council. The Sectoral Committees give the final Technical approval for the Draft National Standards prior to the approval by the Council of the SLSI.

All members of the Technical and Sectoral Committees render their services in an honorary capacity. In this process the Institution endeavours to ensure adequate representation of all view points.

In the International field the Institution represents Sri Lanka in the International Organization for Standardization (ISO), and participates in such fields of standardization as are of special interest to Sri Lanka.

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Further particulars of the terms and conditions of the permit may be obtained from the Sri *Lanka Standards Institution, 17, Victoria Place, Elvitigala Mawatha, Colombo 08.*

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