AFS 2004:3

SWEDISH
WORK
ENVIRONMENT
AUTHORITY

Ladders and Trestles

Provisions of the Swedish Work Environment Authority on Ladders and Trestles, together with General Recommendations on the implementation of the Provisions

Amendments up to March 25, 2014 included.

Translation
In the event of disagreement concerning the interpretation and content of this text, the printed Swedish version shall have priority.

Contents

AFS 2004:3

Provisions of the Swedish Work Environment Authority on Ladders and Trestles

Adopted 18 May 2004 Published 15 July 2004

Amendments up to March 25, 2014 included.

Scope

Section 1
These Provisions apply to portable ladders and trestles. The provisions of Sections 10-18 concerning use of ladders apply, however, *mutatis mutandis*, to all ladders.

The provisions of Sections 4-8 apply solely to ladders and trestles of which more than 20 examples have been manufactured for sale.

The provisions of Sections 10 and 12 do not apply in connection with a rescue service for which the State or the municipalities are responsible under Section 2 of the Accident Prevention Act (2003:778). Nor do they apply to the exercises which need to be carried out to enable such a rescue service to be conducted in a safe manner.

The provisions of Sections 4-9 do not apply to ladders and trestles delivered by the manufacturer or importer before 1st January 1987.

Definitions

Section 2
The following meanings shall apply for the purpose of these Provisions.

Leaning ladder	A ladder raised and leaning against a wall or suchlike.
Standing step ladder	A ladder requiring no support when raised.
Trestle	A freestanding work platform with steps, the maximum height to the platform being 1,250 mm and the sides of the platform measuring at least 600 mm and 250 mm respectively.

Design and type examination

Section 3
Ladders and trestles shall be
- dimensioned so as to afford adequate safety at the maximum load for which they are intended,
- stable and as simple as possible to handle and move,
- designed so as not to slide apart or fold together while in use,
- made of material which is of good quality and sufficiently durable to or protected against corrosion and ageing, having regard to the intended use, and
- designed so that work from, and movement on, a ladder or trestle will not be unnecessarily tiring.

Section 4
Ladders and trestles may be used or delivered for taking into service only if they

1. are type-inspected pursuant to Section 5 by a third-party inspection body or a certification body accredited for this task under the Regulation (EC) No 765/2008 of the European Parliament and of the Council of 9 July 2008 setting out the requirements for accreditation and market surveillance relating to the marketing of products and repealing Regulation (EEC) No 339/93[1] and the Act (SFS 2011:791) concerning Accreditation and Conformity Assessment. *(AFS 2011:12)*
2. have thereby been shown to meet the stipulations in Section 5.

The stipulation of type inspection of ladders in subsection one, points 1 and 2, does not apply to ladders meeting the following conditions.

- The ladder is certified by a certification body accredited for such certification under the Regulation (EC) no 765/2008 of the European Parliament and of the Council of 9 July 2008 setting out the requirements for accreditation and market surveillance relating to the marketing of products and repealing Regulation (EEC) No 339/93 and the Act (SFS 2011:791) concerning Accreditation and Conformity Assessment. *(AFS 2011:12)*
- The certification shows the latter to meet the stipulations of Swedish Standard SS 2091 Portable ladders, 4th ed., the Norwegian standard NS-INSTA 650:1995, Stiger-bærbare stiger or another standard which has been shown to be equivalent to these from a safety viewpoint. *(AFS 2011:12)*

Certification under subsection two can also be carried out by a certification body in another country of the EEA which is

- accredited for the task with reference to the applicable standard in the EN 45 000 series by an accrediting body which can show itself to satisfy and implement the criteria of EN 45 010 or
- otherwise offers equivalent guarantees of technical and professional competence and guarantees of independence.

Those who deliver one or more ladders or trestles for taking into service without being able to show a type inspection certificate or a certification body certificate for each type of ladder or trestle (see section 6), shall pay a sanction charge, see Section 19.

The minimum sanction charge is SEK 15 000 and the maximum sanction charge is SEK 150 000. For anyone with 500 or more people employed, the sanction charge is SEK 150 000. For anyone with fewer than 500 people employed, the sanction charge shall be calculated as follows:

Sanction charge = SEK 15 000 + (number of people employed – 1) x 271.

The total shall be rounded down to the nearest whole hundred. *(AFS 2014:17)*

Section 5
In connection with type inspection, a latter or trestle shall have been examined by the inspection body or certification body and found to meet the stipulations of Section 3. Furthermore, ladders or trestles shall have been tested by the inspection body which is accredited for such testing under Regulation (EC) no 765/2008 of the European Parliament and of the Council of 9 July 2008 setting out the requirements for accreditation and market surveillance relating to the marketing of products and repealing Regulation (EEC) No 339/93 and the Accreditation and Technical Conformity Assessment Act (SFS 2011:791). *(AFS 2011:12)*

- in the case of a ladder, pursuant to Swedish Standard SS 2091, Portable ladders, 4th ed., part E,
- in the case of a trestle as provided in the Annex to these Provisions, and when tested has been found to meet the criteria there defined.

[1] EUT L 218, 13.8.2008, s. 30 (Celex 32008R0765).

Section 6
An inspection body or a certification body which has carried out a type examination or certification and found the ladder or trestle to meet the stipulations of Section 5 shall issue a type inspection certificate or a certification body certificate respectively.

Type examination or certification under Section 4 is valid only for a ladder to trestle whose material, dimensions and design conform to those of the example tested. Type inspection or certification is also valid, however, for a ladder or trestle which is shorter or lower than the example tested but otherwise conforms to that example.

Section 7
Type inspection or certification under Section 4 is valid for five years with regard to the delivery of new ladders or trestles by a manufacturer or importer, after which time it must be repeated. Otherwise it is valid for an indefinite period.

Marking etc.

Section 8
Ladders and trestles shall when delivered for taking into service be clearly and durably marked with the name of the manufacturer or importer, the year of manufacture and the type designation.

Ladders certified as provided in Section 4 (1) or (2) shall in addition be marked with a reference to the standard applied. Other ladders and trestles shall be marked with a statement that they have been type-inspected pursuant to these Provisions and with the name of the inspection body or certification body and the number of the type-inspection certificate.

Section 9
Ladders and trestles shall if necessary be clearly and durably marked with assembly instructions when delivered for taking into use.

Use

Section 10
A ladder may only be used as an access route and for brief work from the ladder. Work from a ladder may only take place is the risks associated with using a ladder are so small that other and safer equipment is not justified.

Section 11
Ladders shall be used in such a way that a person can stand firmly and hold on securely. This applies particularly if the person has to carry anything in their hand.

Section 12
Only a light and manageable load may be handled on a ladder or trestle. A portable ladder may only be climbed by one person at a time.

When working from a ladder or trestle, only such tools and implements may be used as can be safely handled from the ladder or trestle.

Section 13
A ladder and trestle shall be of a length and height suitable for the purpose. When a ladder is used as an access route, access shall be possible in a safe manner. The ladder shall be sufficiently higher than the platform to be reached with the aid of the ladder, unless other devices already make it possible to hold on safely.

Section 14
A projecting ladder at the top of a standing step ladder may not be stepped on.

Section 15
Ladders shall be positioned in such a way as to secure their stability while in use. A ladder or trestle which cannot be erected securely shall be braced or anchored.

A ladder or trestle shall rest on a firm, strong and immobile underlay of suitable size, in such a way that the rungs or steps are horizontal.

A wheeled ladder or trestle shall be secured against any change of its position before use.

Section 16
Ladders made up of two or more parts shall be used in such a way as to ensure that the different parts cannot accidentally become displaced in relation to each other.

Suspended ladders shall be secured in a safe manner and, with the exception of rope ladders, in such a way that they cannot be moved or begin to oscillate.

Section 17
The following types of ladder may be used only if braced or anchored.
- A leaning ladder exceeding 5 m in length.
- A standing step ladder with a platform and knee rest, the platform height being more than 2 m.
- Any other stepladder exceeding 3 m in height.

Section 18
Ladders and trestles shall be maintained well and continuously inspected. They may not be used if their mechanical strength or their safety in any other respect is impaired.

Provisions on sanction charges

Section 19
The provisions in Section 4 are provisions under Chapter 4 (1-2) of the Work Environment Act (1977:1160). Those who violate these provisions shall pay sanction charges according to Chapter 8 (5–10) of the Work Environment Act. The size of the sanction charge is calculated according to the grounds specified in Section 4. *(AFS 2014:17)*

Entry into force and transitional provisions

These Provisions enter into force on 1st January 2005. The Provisions of the National Board of Occupational Safety and Health on Ladders and Trestles (AFS 1999:10) are repealed with effect from the same date.

Type approval and type examination under earlier Provisions are valid as type examination under the present Provisions.

The Provisions on marking in Section 8 (2), second sentence, of AFS 1999:10 will continue to apply to ladders type-examined in compliance with those Provisions.

Included amendments of the Provisions:
- AFS 2011:12 which entered into force on 1 August 2011. Accreditation under older provisions are also regarded as accreditation under these provisions.
- AFS 2004:17 which entered into force on 1 July 2014.

Annex: Testing Provisions for trestles

General

For testing purpose, length shall be measured in mm, angles in degrees and test loads in Newton (N).

Measuring instruments used in testing shall have at least the following accuracy:
1 mm for length measurement,
1^{o} for angular measurement,
10% for test loads, but a maximum of 20 N.

1. Testing of the legs and platform of the trestle

A wheeled dolly shall be placed beneath each leg of the trestle.

A test load of 3,500 N shall be applied vertically in the middle of the platform for 1 minute. The load shall be applied over the full width of the platform and over a length of 100 mm.

After the test load has been removed there shall not be any remaining deformations in the trestle.

2. Testing of the steps of the trestle

A test load of 3,500 N shall be applied vertically in the middle of the longest unbraced step or on the longest step if all steps are braced (extra reinforced). The load shall be applied for a period of 1 minute. It shall be applied over the full width of the step and over a length of 100 mm.

After the test load has been removed there shall not be any remaining deformations in the connection between legs and step or in the step itself.

3. Torsion testing of steps

A torsional moment of 100 Nm shall be applied in the middle of the step with an 80 mm wide clamping device. The torsional moment shall be applied alternately in both directions, 10 times altogether in each direction and for 1 minute at a time.

The relative movement occurring between leg and step during the test may not exceed $\pm 1^{o}$.

After the test there shall not be any remaining deformations in the connection or in the step itself.

4. Stability testing (measurement of functional dimensions)

The external measurement at the base (b_2), the height (H) and the width of the platform (b_1) are to be measured. The following shall then apply: $b_2 \geq b_1 + 0.1\ H$. See figure A.

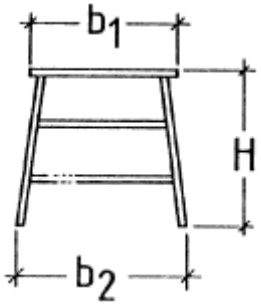


Figure A

The angle of inclination of step section and support section is to be measured. The angle of inclination shall be between 60–70º (α) for the step section and between (ß) for the support section. See figure B.

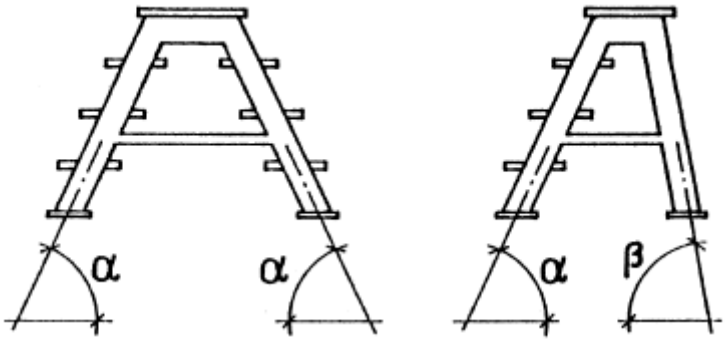


Figure B

General recommendations by the Swedish Work Environment Authority on implementation of the Provisions on Ladders and Trestles

The following Recommendations are issued by the Work Environment Authority concerning implementation of its Provisions (AFS 2004:3) on Ladders and Trestles.

General Recommendations have a different legal status from Provisions. They are not mandatory. Instead they serve to elucidate the meaning of the Provisions (e.g. by explaining suitable ways of meeting the requirements, instancing practical solutions and procedures) and to provide recommendations, background information and references.

Background

These Provisions are a revision of the Provisions of the National Board of Occupational Safety and Health on Ladders and Trestles (AFS 1999:10). Ladders and trestles are used in all branches of working life. Surveys in Sweden and abroad have shown accidents connected with the use of ladders to be very common. The commonest causes of accidents are the ladder tipping over, sliding on the underlay or collapse while in use. For trestles, material or design defects are a common cause of accidents.

As a member of the European Union (EU), Sweden is required to transpose EC Directives to Swedish provisions. The EU rules on workers' safety and health are set forth in a framework directive (89/391/EEG) stating the basic rules of safety in the workplace. A number of special directives contain minimum requirements which may not be fallen short of in the EU Member States. The second individual directive (89/655/EEC), amended by directives 95/63/EC and 2001/45/EC, contains stipulations for the safe use of work equipment by workers at work. General Provisions on the use of work equipment, based on the second individual directive, are contained in the Provisions of the National Board of Occupational Safety and Health on Use of Work Equipment.

This revision of the Provisions on Ladders and Trestles is based on Directive 2001/45/EEC. That Directive deals with further criteria for the use of work equipment intended for temporary work at levels above ground or floor level. The criteria of the Directive concerning use of other such work equipment than ladders are reiterated in other Provisions of the Swedish Work Environment Authority.

In connection with EC harmonisation, certain other changes have also been made. The scope of the Provisions has been made clearer and has also been enlarged, so that parts of the Provisions now also apply to ladders other than portable ones. The General Recommendations have been added to and the references have been updated.

Guidance on certain sections

Section 1

A portable ladder is defined in Swedish Standard SS 2091, 4th ed., as a ladder which can be moved and positioned without assistive devices. A ladder is usually considered portable if it can be handled by two persons. Non-portable ladders include, for example, fixed ladders and ladders moved with assistive devices.

A fixed ladder is used, for example, for climbing roofs or chimneys, descending into manholes etc. Provisions on fixed ladders are contained, for example, in the Provisions of the National Board of Occupational Safety and Health on Workplace Design and on Building and Civil Engineering Work and in the Building Regulations of the National Board of Housing, Building and Planning (BBR). Standards for fixed ladders are contained in Swedish Standard 831340, 3rd ed., Roof safety - Ladders for vertical fixing - Functional requirements and in SS 831336, 2nd ed., Roof safety - Chimney ladder - Functional

requirements. In addition, a machinery access standard, SS-EN-ISO 14122-4, Safety of machinery - Permanent means of access to machinery - Part 4: Fixed ladders, is in preparation.

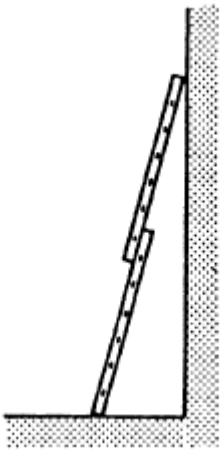


Figure 1 Extending ladder

Figure 2 Standing step ladder

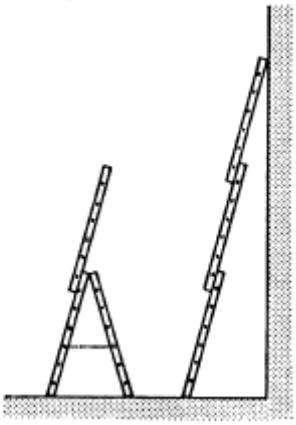


Figure 3 Combination ladder (freestanding with an extension ladder part at the top, and extension ladder)

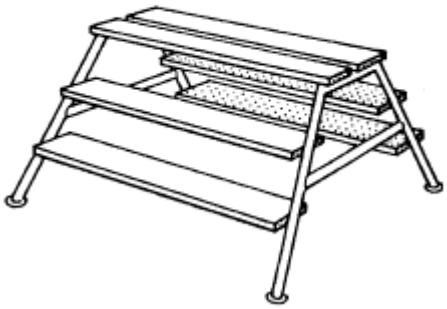


Figure 4 Trestle

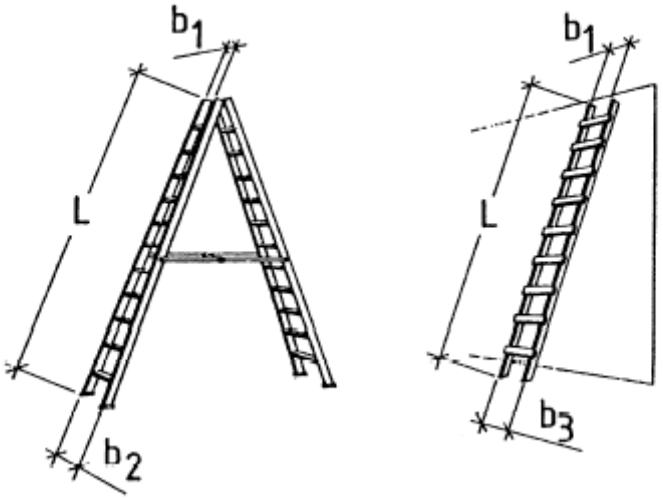
Section 2
Examples of ladders and trestles are shown in figures 1-4.

Designations applying to different types of ladder and ladder part are also contained in part A of Swedish Standard SS 2091, Portable ladders, 4th ed.

Section 3
Ladders conforming to Swedish Standard SS 2091, 4th ed., are examples of ladders meeting the stipulations of this section concerning materials and design.

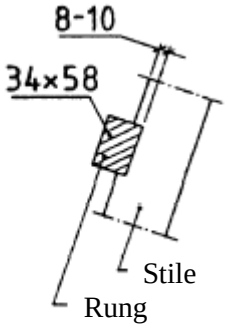
When designing ladders, one can assume that they are to be subjected to a load equalling at least one person carrying a load. For trestles one can assume a load of two persons and load. This corresponds to the criteria in the testing provisions for ladders and trestles in Swedish Standard 2091, 4th ed., and in the Annex to these Provisions respectively.

Ladders and trestles constructed of wood at the worksite can normally be assumed to meet the stipulations if they conform to the examples in figures 5 and 6 and the wood is of strength class K24 structural timber (measurements in mm).



Ladder length L	- 4,000	4,000-5,000
Stiles	34 x 70	45 x 95
Rungs	34 x 58 or 22 x 70	

Internal width at uppermost rung (b_1) greater than 300
External width at foot of ladder (b_2) greater than 300 + L/10
External width at foot of ladder (b_3) greater than 400



Examples of suitable manner of securing rung to stile.

Figure 5

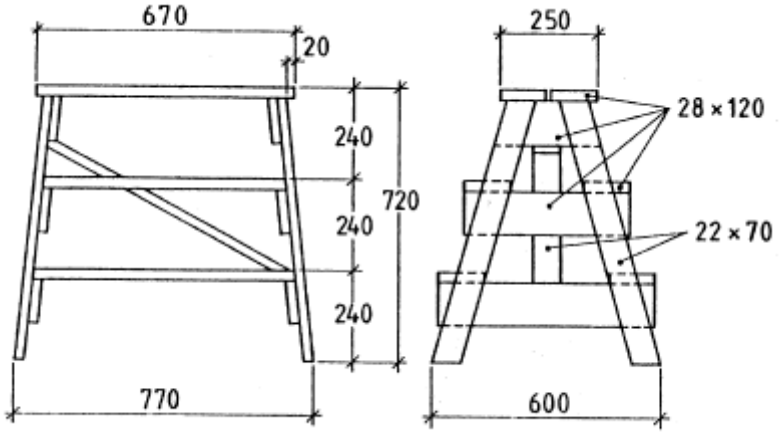


Figure 6

Over and above the stipulations of this section, additional properties are required of ladders and trestles for certain types of work. For example, in which involves a risk of contact with a live installation part, it is important to use insulated ladders. Work of this kind includes, for example, fault diagnosis, connection to an existing installation and industrial cleaning of electrical plant components. The assembly of electrical installations involves many tasks which are done when the installation is not energised. Work of this kind can be done using a metal ladder, for example, without any risk being involved.

Section 4
The Nordic standard INSTA 650:1993 for portable ladders has been transposed as a national standard through Swedish Standard SS 2091, 4th ed., and Norwegian Standard NS-INSTA 650:1995.

The stipulations in this section, regarding sanction charges, apply to those who deliver ladders or trestles for taking into service.

Delivering for taking into service means for example sale, letting for hire and lending.

Number of people employed, regardless of whether they work full-time or part-time, means:
- Employees employed.
- Hired labour (cf. Chap. 3, Section 12 (2) of the Work Environment Act).

As regards enterprises without employees employed (cf. Chap. 3, Section 5 of the Work Environment Act), number of people employed, regardless of whether they work full-time or part-time, means:
- The people who run the enterprise.
- Hired labour.

The corporate registration number of the relevant physical or legal entity determines which persons are to be considered to be included in the enterprise. The number of people employed includes persons at all of the enterprise's work sites.

The number of people employed shall be calculated on the basis of information relating to the date on which the breach of the sanction stipulation was found. *(AFS 2014:17)*

Section 6
Ladders and trestles of one and the same type are often manufactured in different lengths and heights. If the manufacturer chooses the same material, dimensions and construction for different sizes, testing in connection with type examination or certification only needs to be performed on, respectively, the longest ladder and the highest trestle, which is normally the most critical type from a testing viewpoint, If these ladders and trestles satisfy the test criteria, then obviously shorter ladders or lower trestles of the same type will do the same.

Section 7
This section implies that type-examined ladders and trestles or certified ladders delivered by a manufacturer or importer and kept in storage or taken into service at a worksite may be used for an indefinite period.

Section 9
It follows from Chap. 3, Section 8 of the Work Environment Act that a ladder or trestle shall when delivered be accompanied by adequate instructions concerning its assembly, use and maintenance.

Ladders for which assembly instructions are normally needed under this section include, for example, a sectional ladder, an extending ladder and a combination ladder.

Sections 10-12

Access

The provisions of the National Board of Occupational Safety and Health on Use of Work Equipment include general Provisions on the procedure for choosing the most suitable manner of access to a temporary worksite at levels above ground or floor level. Provisions on the way in which communication routes and access routes are to be designed are also contained in the Provisions of the National Board of Occupational Safety and Health on Workplace Design and the Provisions of the National Board of Occupational Safety and Health on Building and Civil Engineering Work. A ladder is generally unsuitable as an access route, partly because many serious fall accidents occur when ladders are used. Application of the Provisions which have now been mentioned indicates in the majority of cases that a mode of access other than by ladder must be used.

Work from a ladder

The Provisions on Use of Work Equipment also include general Provisions concerning the work equipment to be chosen for temporary work at levels above ground or floor level. Those Provisions concern the conditions on which use of such equipment is permissible, choice of equipment, measures to minimise risks etc. For the purposes of Sections 10-12, the above mentioned Provisions also apply.

Work from a ladder is often unsuitable and associated with risks of accidents and ill-health due to ergonomically incorrect work postures. The assessments to be made under Section 10 and under the Provisions of the National Board of Occupational Safety and Health on Use of Work Equipment have been found in the majority of instances to indicate use of other and safer equipment than a ladder, e.g. scaffolding.

The work of brief duration which Section 10 can refer to includes, for example, cleaning, replacement of light bulbs, basic lubrication, occasional assembly jobs and replacements, adjustments etc. But assembly work, for example, is sometimes so extensive that it cannot be counted as being of brief duration.

Standing on a leaning ladder and working with both hands can be a hazardous undertaking. If possible, therefore, one should work with one hand and hold on with the other, in which case it is important that tools and suchlike should be of such a kind that they can be used with the free hand alone.

A person who is to carry materials or tools is normally expected to use a transport route, e.g. a hoist, stairway or suchlike.

Section 13

It is normally appropriate to choose a ladder which is long enough for the work to be done standing on the fourth rung from the top as the highest. Work from a stepladder with a platform and knee rest may, however, need to be done from all steps, including the platform.

Figure 7 shows examples of how access can be arranged.

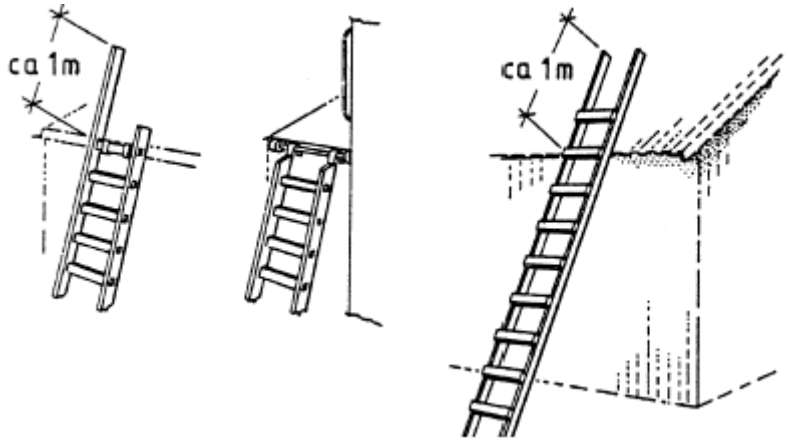


Figure 7

Section 14
Figure 3 (left-hand picture) in the guidance on Section 2 shows examples of a ladder with an extendable section at the top.

Section 15
The risk of the ladder slipping or turning over during use depends on the type of ladder used. See figure 11.

For a leaning ladder the greatest risk is of its sliding straight out at the base, followed by the risk of the leaning ladder slipping sideways at the top. In the case of a stepladder the greatest risk is that of it overturning sideways.

A leaning ladder, as a rule, is safest at a gradient of about 4:1 (75º). One way of checking that a leaning ladder has a suitable gradient is by doing as shown in figure 9. Another way is, for example, to fit the ladder with marking tape to indicate when it is aligned correctly.

Figure 8

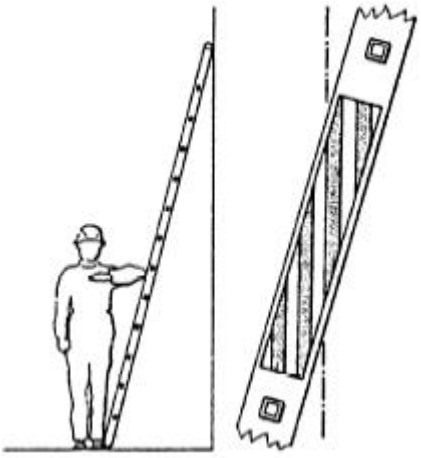


Figure 9

To prevent the ladder slipping on the underlay, it is important to choose the right sort of anti-skid devices. Examples of different types of anti-skid devices for different surfaces are shown in figure 10.

1) Slippery surfaces 2) Soft surfaces 3) Rough surfaces

Figure 10

SP, the Technical Research Institute of Sweden, has investigated various types of anti-skid devices for ladders (Teknisk rapport SP-RAPP 1983:49). In that study, comparisons were made between various types of anti-skid devices on commonly occurring surfaces. On the basis of the test findings, a suitable method for testing anti-skid devices has since been indicated.

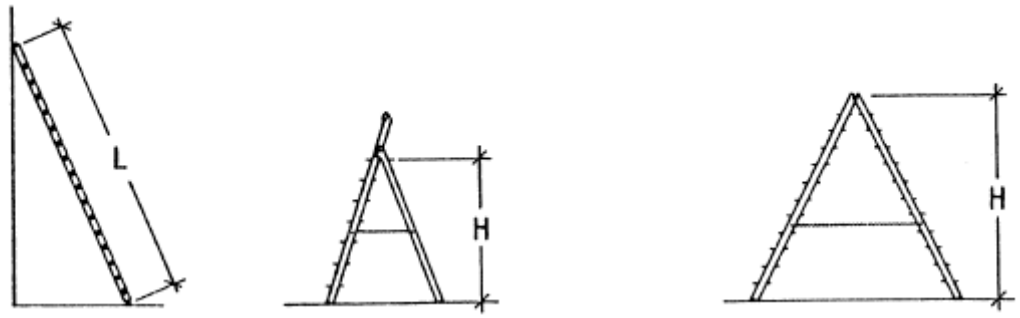
SP has also published the report “Glidskydd på stegar – Provning och utvärdering av funktion” (SP-AR 2000:33).

For work on a sloping surface, extension legs can be recommended as a means of equalising differences of level. For examples, see figure 8.

Section 16
The ladders referred to in subsection one of this section include, for example, extending ladders and sectional ladders.

Section 17
The difference between the stipulations for different types of standing stepladder is due to work from a ladder with no platform normally being done from at most the fourth rung from the top, whereas work from a standing stepladder can be done from its platform.

The length (L) and height (H) of ladders are usually measured as shown in figure 11.



Leaning ladder Standing step ladder with with platform and knee rest Other standing step ladder

Figure 11

For examples of bracing or anchorage, see figure 12.

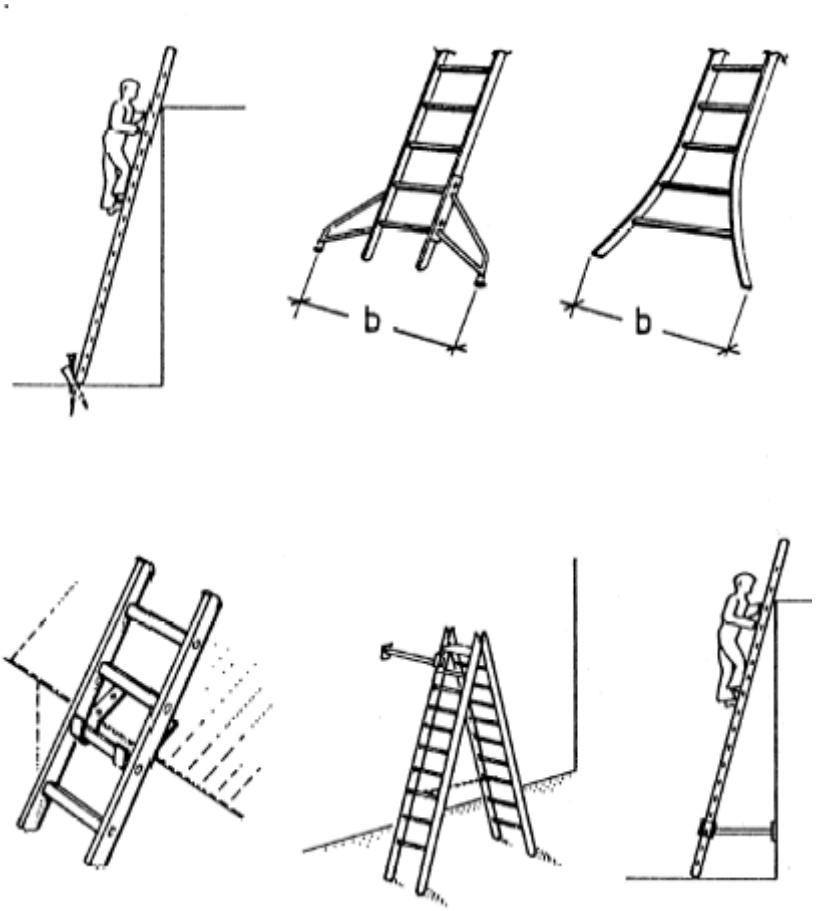


Figure 12. Bracing or anchorage

Section 18
Damage can, for example, take the form of broken rungs, cracks or heavy denting in the stiles or defective catches.