



AVANTI FALL PROTECTION SYSTEM

User's Manual and Installation Instructions

AVANTI Fall Protection System

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All safety statements, specifications, hazards, and inspections defined shall apply only to the version of product specified in this manual. The images and representations in this manual may vary slightly from the actual product you are using; please review your product label(s) to ensure a proper match.

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Installation manual

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Limited Warranty

Avanti Wind Systems A/S warrants that commencing from the date of shipment to the Customer, and continuing for a period of the longer of 365 days thereafter, or the period set forth in the standard Avanti warranty, the Fall Protection System (“Product”) described in this Manual will be free from defects in material and workmanship under normal use and service when installed and operated in accordance with the provisions of this Manual.

This warranty is made only to the original user of the Product. The sole and exclusive remedy and the entire liability of Avanti under this limited warranty, shall be, at the option of Avanti, a replacement of the Product (including incidental and freight charges paid by the Customer) with a similar new or reconditioned Product of equivalent value, or a refund of the purchase price if the Product is returned to Avanti, freight and insurance prepaid. The obligations of Avanti are expressly conditioned upon return of the Product in strict accordance with the return procedures of Avanti.

This warranty does not apply if the Product (i) has been altered without the authorization of Avanti or its authorized representative; (ii) has not been installed, operated, repaired, or maintained in accordance with this Manual or other instructions from Avanti; (iii) has been subjected to abuse, neglect, casualty, or negligence; (iv) has been furnished by Avanti to Customer without charge; or (v) has been sold on an “AS-IS” basis.

Except as specifically set forth in this Limited Warranty, ALL EXPRESS OR IMPLIED CONDITIONS, REPRESENTATIONS

AND WARRANTIES, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OR CONDITION OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, NON-INFRINGEMENT, SATISFACTORY QUALITY, COURSE OF DEALING, LAW, USAGE OR TRADE PRACTICE ARE HERBY EXCLUDED TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW AND ARE EXPRESSLY DISCLAIMED BY AVANTI. IF, PURSUANT TO ANY APPLICABLE LAW, TO THE EXTENT AN IMPLIED WARRANTY CANNOT BE EXCLUDED AS PROVIDED IN THIS LIMITED WARRANTY, ANY IMPLIED WARRANTY IS LIMITED IN TIME TO THE SAME DURATION AS THE EXPRESS WARRANTY PERIOD SET FORTH ABOVE. BECAUSE SOME STATES DO NOT PERMIT LIMITATIONS ON THE DURATION OF IMPLIED WARRANTIES, THIS MAY NOT APPLY TO A GIVEN CUSTOMER. THIS LIMITED WARRANTY GIVES CUSTOMER SPECIFIC LEGAL RIGHTS, AND CUSTOMER MAY HAVE OTHER LEGAL RIGHTS UNDER APPLICABLE LAWS. This disclaimer shall apply even if the express warranty fails of its essential purpose.

FORCE-Dantest CERT



EEC type examination certificate for personal protective equipment

Number: DK-0200- C.1553

Issued by FORCE-Dantest CERT
EEC-notified body number 0200

In accordance with the Directorate of National Labour Inspection's Regulation No. 1273 of December 18th 1996, which in Denmark implements The Councils directive No. 89/686, No. 93/68, No. 93/95 and No. 96/58, EEC type examination certificate is issued to:

	AVANTI Stigefabrik A/S Høgevej 19 DK-3400 Hillerød
for protective equipment:	Guided type fall arrester
type:	A system consisting of a guided type fall arrester, a textile damper, a safety hook and ladder sections mounted with slide bar - type 2002
designated:	Fall arrester type AVANTI Eagle System Textile damper type AFN 11
manufactured by:	AVANTI Stigefabrik A/S with sub-suppliers as stated in the appendix to the type examination certificate

The examined samples are found to fulfil the requirements in DS/EN 353-1:2002 as well as the relevant requirements in Appendix II in Regulation No. 1273.

The type examined model and the basis for the type approval are described in the appendix to the type examination certificate. The manufacturer must inform FORCE-Dantest CERT of any contemplated changes.

This protective equipment is a category III equipment and therefore an agreement regarding control shall be arranged with a notified body according to the Regulation.

Date of issue: *2006-06-19*

Signature: 
Bent Larsen
Director


Niels Ovesen
Cert. Manager

FORCE-Dantest CERT
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1 Caution

- a) A competent is familiar with and is trained within the AVANTI Fall Protection System, and the following standards: EN 363, EN 353-1, ANSI-ASC A14.3-2008, ANSI/ASSE Z359.1-2007, CAN/CSA Z259.12-01 and CAN/CSA Z259.2.1-98. An AVANTI Fall Protection Technician has successfully participated in the AVANTI Fall Protection course and is considered competent. A user is familiar with the correct usage of the AVANTI Fall Protection System and have had an introduction to personal protection equipment.
- b) Assembly, maintenance and testing of the Fall Protection System may only be performed by a competent person.
- c) Users are obliged to read and understand this User's Manual.
- d) A copy of the User's Manual must be handed out to the fall protection users and must be available for reference.
- e) If more than one person is trusted with one of the above tasks, the employer shall appoint a supervisor in charge of operation.
- f) If the Fall Protection System is re-sold outside the original country of destination the reseller shall provide instructions for use, for maintenance, for periodic examination and for repair in the language of the country in which the product is to be used.
- g) Please insure the ladder system with the Fall protecting System is capable of supporting: for USA: not less than 5000 lb (22,6kN) static load, for Canada: not less than 27 kN / for EU: 15kN
- h) Always remove the runner from the rail when not in use; the runner is not intended to be parked on the rail when freely suspended.
- i) The system is only to be operated by users being proper trained in daily inspections, working in heights and practice operation of the system.
- j) For optimal operation, enhanced safety and better climbing ergonomics; the climber is recommended to maintain a distance of minimum 10 cm from torso to ladder during regular climb. A good climbing position is easily obtained by leaning the upper back against the tower.

2 Danger

- a) The Fall Protection System may not be used by persons under influence of alcohol or drugs that may jeopardize working safety.
- b) Only people instructed to the AVANTI Fall Protection System by a qualified trainer may use the system.
- c) The owner must ensure that a rescue plan that deal with any emergencies that could arise during work is in place and that the users are familiar with this.
- d) If any damager or faults are found during operation, or in case of circumstances which may jeopardise safety:
 - Immediately stop the work in progress
 - Contact the site responsible e.g. the turbine owner or the site foreman.
- e) No warranty is provided against damage resulting from reconstruction or modification of equipment or use of non-original parts which are not approved by the manufacturer.
- f) The Fall Protection System may not be used outside its limitations, or for any purpose other than that for which it is intended.
- g) The AVANTI fall protection runner should be handed out and treated as a personal protection equipment.
- h) Keep a distance of 6 meter between each user during ascend and descend. No more users may use the 2 x 6 meter rail simultaneously as this will jeopardize the system statics.
- i) The first two meters the user may not be protected against hitting the ground. Take precautions.
- j) Prior first use an expert must inspect the system.

- k) If oil, grease or the like has leaked onto the safety rail – wipe it of.
- l) If oil, grease, chemicals or the like has leaked onto the shock absorber or in any kind been in contact with the webbing, have an AVANTI fall protection technician replace the shock absorber.
- m) After 5 years of use replace the shock absorber. Date of expiration is printed on the shock absorber label.
- n) Operation temperature -35° / +60° Celsius.
- o) In connection with the Fall Protection System only full body harnesses approved according to EN 361, ANSI Z359.1 and CSA Z259.10 may be used.
- p) The complete Fall Protection System has been manufactured and approved according to EN 353-1, CAN/CSA Z259.2.1-98 and ANSI Z359.1.
- q) Ladders supplied by AVANTI comply with the requirements of EN 131, EN ISO 14122 and ANSI 14.3
- r) The Avanti supplied Carabiner is approved according to CSA , ANSI Z359.1-2007 and EN 362 requirements.
- s) All parts and units have been especially developed for the AVANTI Fall Protection System Type 2002 and as such cannot be used in other Fall Protection Systems.
- t) These instructions must be kept together with the Fall Protection System.
- u) When ever using the AVANTI Fall Protection System it's very important always to make sure, that the harness is connect ed by the D-ring complying with the demands for climbing in vertical fall arrest safety systems on ladders. This infomation shall be described in the user manual from your harness supplier.
- v) It's necessary to use alternative fall protection when stepping in or off the ladder. The runner must not be disconnected from the rail before establishing alternative fall protection. The runner must always be attached to the D-ring in the harness before connecting or disconnecting it to the rail.
- w) When working or resting at the ladder it's essential that the user uses alternative safety. The AVANTI Fall Protection System is only approved as fall arrest safety when ascending or descending the ladder.
- x) Don't ever twist the shock absorber, it may cause the system to fail.

The tower owner must verify the need for 3rd party fall protection device inspections with the local authority and comply with the standards specified.

3 Description of equipment

3.1 Purpose

The Fall Protection Devices in this User's Manual serves the following purposes:

- The Fall Protection System is intended for use during ascent and decent on stationary ladders installed in towers, pylons, well shafts, manholes etc.
- The Fall Protection System is a safety device which prevents falling / reduces personal injuries if fall occur.
- The fall protection safety rail is designed for permanent installation in one place.

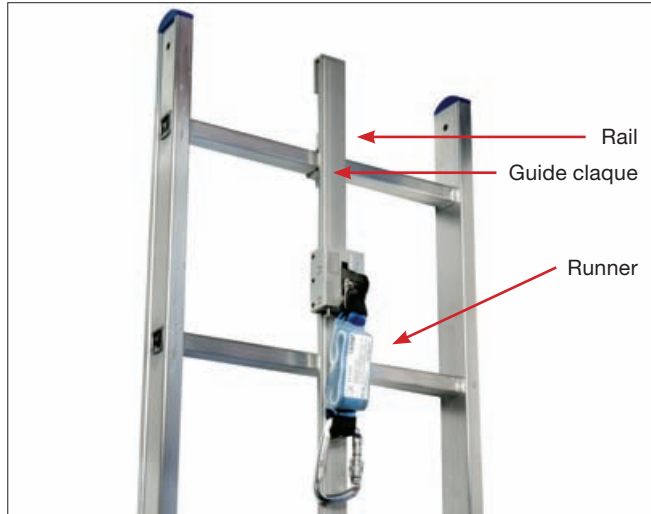
The Fall Protection Device is not designed for:

- For securing horizontally,
- For securing equipment,

3.2 Function

The Fall Protection Device comprises a safety rail mounted on a ladder and a runner who can be clicked onto the rail. The user attaches the runner to his harness by means of an integrated shock absorber and carabiner. When starting the climb he/she clicks the runner onto the safety rail. When climbing the runner glides upwards on the safety rail. In case of the user experiences a fall the runner will lock onto the safety rail and arrest the fall.

3.3 Component overview:



Rail and runner on ladder



Runner



Eagle runner

4 Daily inspection

- 1) Before any use the runner must be checked for visual damage, wear and tear, and other defects. Pay especially attention to the shock absorber.
- 2) During ascent look for visible damage and loose parts along with loose bolts on ladder, rail or joints.



3) Equipment with defects or equipment that leaves doubt concerning safe use must be checked by an expert.

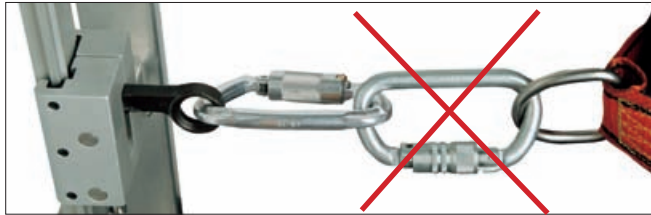
STOP if the runner looks defect / or parts are missing do not use it.

5 Directions for use



DANGER!

- The runner, the shock absorber, and the karabiner comprise a safety system. Never adapt, extend, or in any way change this system.
- The runner may only be used if the bottom left steel tap lock has popped out in lock position.
- The arrow on the runner must point upwards – otherwise it will not block a fall.



Instructions:

- a) Before using this Fall Protection System make sure to wear an approved harness worn in accordance to the producer's prescriptions.
- b) Fasten the runner karabiner in the D-ring of the full body harness. Remember to choose connection in the chest D-ring for fall arrest according to the description in the user manual of the harness. When runner is mounted, it's important that the shock absorber isn't twisted – it shall be mounted straight between the runner and the karabiner.

Always make sure that the runner is connected to the D-ring of the full body harness when mounting/ dismantling the runner.

- c) With the arrow on the plate pointing upwards the runner is clicked onto the safety rail. (see picture 1)

Open runner by pushing bottom left steel tap lock and pull left and right runner side apart.

Place one of the runner sides on its respective safety rail side with the runner arrow pointing upward (1).

1



2



While lifting the break lever, tilt the runner so both runner sides are round each side of the safety rail (2).

3



Push the two runner body parts together until the bottom left steel tap lock pops back in position and locks the runner body. Make sure it is locked correctly (3).

Remove runner by pushing the bottom left steel tap and pull the runner sides apart.

Before dismounting assure you are safe or use another fall protection device.

DANGER!

- If the fall protection device has blocked a fall take the ladder out of use. Contact a Fall Protection Technician so he can replace the affected ladder/rail section.



- When ever using the AVANTI Fall Protection System it's very important always to make sure, that the harness is connected by the D-ring complying with the demands for climbing in vertical fall arrest safety systems on ladders. This information shall be described in the user manual from your harness supplier.
- In order to be safest possible it's very important that the runner is mounted in the directed D-ring of the harness before entering the ladder – Furthermore it's important that the runner is attached in the direct D-ring when exiting the ladder. Don't dismantle the runner from the harness before being at safe support. This way the user can't drop the runner.
- When working or resting at the ladder it's essential that the user uses alternative safety. The AVANTI Fall Protection System is only approved as fall arrest safety when ascending or descending the ladder.



Instructions for AVANTI Eagle:

- a) Before using this Fall Protection System make sure to wear an approved harness worn in accordance to the producer's precriptions
- b) Fasten the runner karabiner in the D-ring of the full body harness. Remember to choose connection in the chest D-ring for fall arrest according to the description in the user manual of the harness. When runner is mounted, it's important that the shock absorber isn't twisted – it shall be mounted straight between the runner and the karabiner.

Always make sure that the runner is connected to the D-ring of the full body harness when mounting/dismounting the runner.

5.1 Directions for use of AVANTI Eagle

DANGER!

- The runner, the shock absorber, and the carabiner comprise a safety system. Never adapt, extend, or in any way change this system.
- The arrow on the runner must point upwards – otherwise it will block a fall.
- If the runner looks defect / or parts are missing do not use it.



Opening the AVANTI Eagle

Must always be done without load and when there is no risk of falling.

- 1) Turn the thumbscrew clockwise until it is fully inserted (photo 1 A)



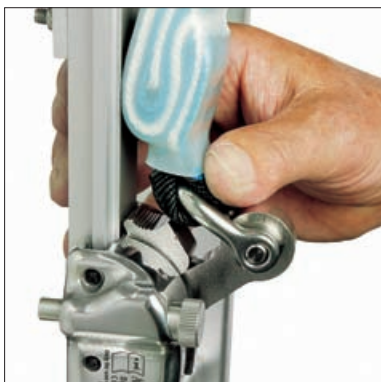
1A

- 2) Push first the lock pawl and then the brake lever upwards – both in the direction of the arrow – and hold them in position (photos 1B and 1BB).

1B



1BB



- 3) Open the Eagle Runner by pulling at the right side at right angles to the rail (photo 1C).

1C



Mounting the Eagle Runner

- 1) Turn the arrow on the body upwards.
- 2) The Eagle Runner must be open before it can be mounted on the rail (see page 10 and 11).
- 3) Press the Eagle Runner around the rail with the brake lever raised (photo 2A).
- 4) Release the brake lever when the runner have been pressed together. The lock pawl jumps back against the brake lever and locks it (photo 2B).

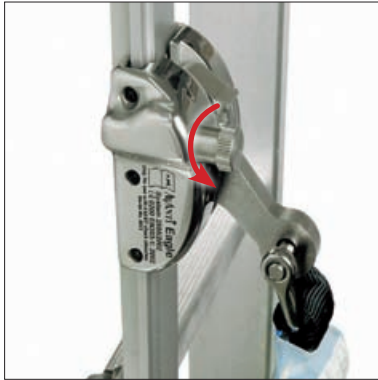
2A



2B



2D



- 5) Turn the thumbscrew anti-clockwise to the end stop (photo 2D).
- 6) The thumbscrew must always be fully screwed out to the stop during use.
- 7) Test the Eagle Runner without load before use. This is done by lifting the closed runner upwards and then pulling downwards – it should then lock.

During use of the Eagle Runner

Before dismantling assure you are safe or use another fall protection device.

- When the Eagle Runner is in use, the thumbscrew must always be fully screwed out (counterclockwise) to the end stop, so that the lock pawl cannot be lifted.
- Use only undamaged and correctly mounted runner and rail.

6 Maintenance

- a) Dry runner and rail with a cloth.
- b) Keep all parts free of oil, grease, and chemicals.
- c) Never place liquids or sharp objects in the vicinity of the Fall Protection System as these may damage the equipment.
- d) The harness can be cleaned using a weak sulpho-solution and a soft

brush. Subsequently, rinse with pure water.

- e) If the equipment gets wet air-dry naturally. Do not use any kind of heating.
- f) Store runner out of direct sunlight and protected from heat and dust.

At least every 12 months an inspection by an AVANTI fall protection expert shall be carried out.

7 Yearly inspection

Once a year an expert must inspect the Fall Protection System paying special attention to the safety rail and the runner. If not - this will void the warranty.

Are the yearly tests not performed the warranty is void, and AVANTI renounce all liability and claims that may appear.

AVANTI runs “fall protection technician classes” on regular basis. If interested contact AVANTI.

8 Ordering spare parts

When parts are found to be missing stop working.

Rail and ladder: Contact an expert and let him/her replace/repair the missing parts and carry through a Fall Protection System inspection.

Runner: Contact an expert and let him/her replace/repair the missing parts and carry through a runner inspection.

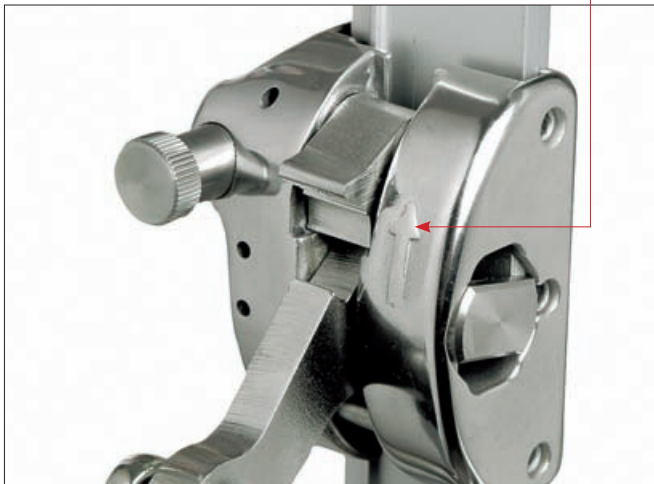
9 Marking

Read instruction before use
 AVANTI Eagle production no.
 EC Standard no.
 Product name
 EEC-notified body no.



Runner marking

Upward direction when mounted on rail



Runner marking

Upward direction when mounted on rail
 Read instructions before use
 Runner production no.
 EEC-notified body no.
 AVANTI product name
 Standard no.



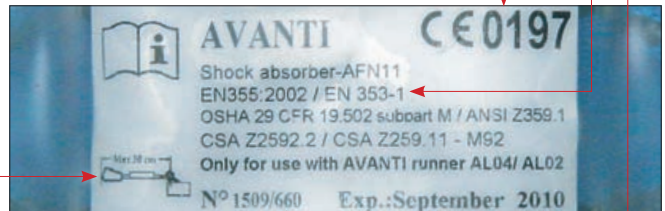
Runner rating plate

EEC-notified body no.
 Standard no.
 Production batch no.
 Read instructions before use



Rail rating plate

Max distance between safety rail and harness 0,3 m
 Shock absorber expiration month
 Batch no.
 Standard EN no. for shock absorber
 EEC-notified body no.



Shock absorber lable

10 Fitting instructions

- a) An expert must be in charge of the Fall Protection System fitting. The expert takes full responsibility for the fitting and guarantee that the installation is done in accordance to these instructions.
- b) Prior to mounting the system, ensure that the tower involved will be able to carry the load.
- c) Ensure that the ladder intended for mounting the AVANTI Fall Protection System comply with the requirements of EN 131, EN ISO 14122 and ANSI 14.3. E.g. internal rung width must be minimum 340mm (All AVANTI ladders do)
- d) Ladder with rung geometries that differs from AVANTI's may call for special rung fittings. These must be approved by AVANTI.
- e) Before installing the fall protection rail ensure that all parts are present. Refer to parts list delivered along with the Fall Protection System.

Installing the AVANTI Fall Protection System you will need the following parts.



Rung fitting



Rung fitting mounted on a Safety rail.



AVANTI Eagle Runner



Hammerhead bolt



Two rails and fish joint



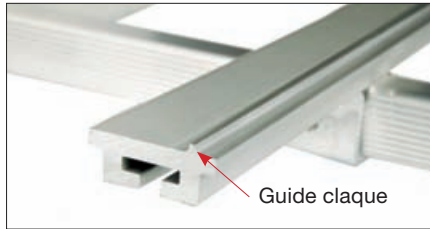
Top and button stopper



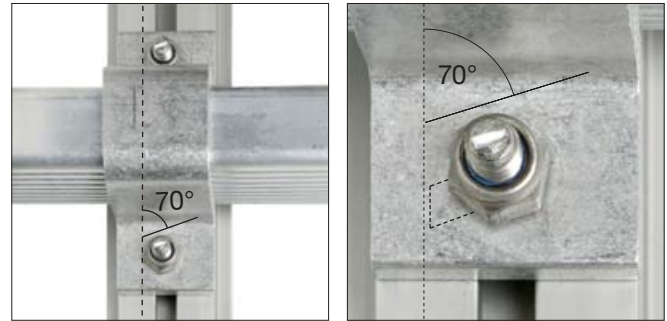
Runner

Mounting of rail on ladder:

1. Place the safety rail in the centre of the ladder with **the guide claque situated in the left side.**



2. Mount the fall protection rung fittings with hammerhead bolts as follows:
 - a) At the top rung of the safety rail ladder.
 - b) At min. every 3rd rung never allowing more than 2 rungs in a row without rung fitting.
 - c) At the bottom or second last rung of the safety rail ladder.
3. Each rail system (6,0 m length) must be fastened with at least 6 fittings.
4. Each rail must be fastened with at least 3 fittings. The bottom end rail must though have 3 fittings.
5. When joining more ladder sections use profile fish joints or U-profile. Assure that 2 hammerhead bolts are used for each rail end - that is 4 per fish joint. Max distance between rails is **4 mm**.
6. The indicator mark on the hammerhead bolt must be positioned in an angle of 70° to the safety rail. (see fig below)



7. Tighten the hammerhead nut with 8 Nm.
8. Self-locking nuts must be used at all times, ensure that:
 - The bolt extends from the nut by at least half of the thread diameter.
 - If it has become possible to loosen the nut by hand replace the nut.
9. At the top and bottom of the safety rail mount a stopper.



10. During installation in wind turbine towers mount a stopper on the rail top of each individual tower section.

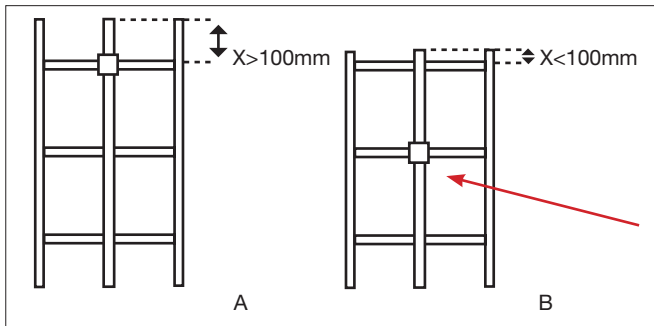
Connection of ladder and rail in flange connections.

In case the rail and ladder is installed in a wind turbine tower before the tower is assembled the ladder and rail may need adjustment during tower assembly. Please follow the cutting and fitting instructions below.

Ladder Top:

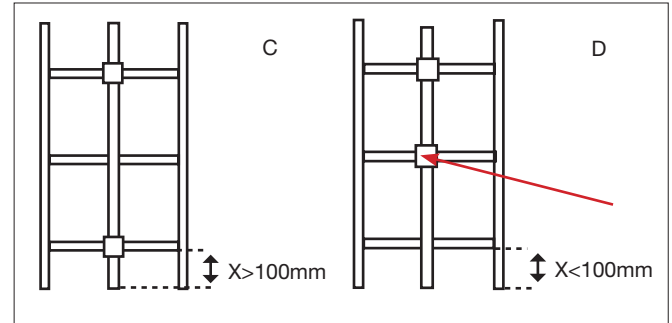
A rung fitting is always mounted on the top rung of each tower section.

1. After cutting-off the safety rail above the step, the safety rail must extend minimum 55mm **above** the step.
2. If the rail is cut to less than 100 mm **above** the step ($x < 100$ mm) the fitting must be moved down one step (See fig. B below).



Ladder Bottom:

3. After cutting-off of the safety rail **below** the rung, the safety rail must extend minimum 55mm below the rung.
4. If the rail is cut to less than 100 mm **below** the rung ($x < 100$ mm), the rung fitting - if any, must be moved up one rung (See fig. D below).



5. If it is not a bottom tower section there must always be a rung fitting on one of the two lower rungs. If this is not the case this must be retro fitted.

General fitting instructions:

- The anti-fall system shall only be fitted with original system parts.
- All system elements must be checked on site, even if the ladders are supplied with the rails already fitted.
- The ladder joints are to absorb the vibrations and torsional stress. Not the safety rail.

11 Inspection before initial use

Before first use an expert must inspect the Fall Protection System. The result of the inspection must be entered in the enclosed test journal and filed for later reference.

Ladder rung:

- Ensure that no dents, holes, or cracks have any influence on the step stability.
- Dents may not exceed 10 mm in diameter or be more than 1 mm deep.
- If dents are found on the rung edges or corners the step stability can no longer be guaranteed. Replace step.

Ladder style

- Ensure that no dents, holes, or cracks have any influence on the style stability.
- Dents may not exceed 20mm in diameter or be more than 1 mm deep.
- If dents are found on the style edges or corners the style stability can no longer be guaranteed. Replace the ladder section.

Ladder connections

- Connecting two ladder sections the gap between the two parts may not exceed 30 mm.

Ladder end

- On the top end and bottom end of the ladder a protection guard such as the AVANTI rubber feet or end cap must be in place. During construction of wind turbine towers a top stopper must be mounted on each individual tower section.

Safety rail

- Ensure that the safety rail fittings are mounted according to the installation manual above.
- Ensure that no sharp edges are present.
- Check the legibility of the product marking. If marking is not present have an expert replace them.
- Ensure that a top stop is mounted.

Safety rail connections

- Ensure that profile fish joints are mounted using two hammerhead bolts, 4 in total, on each safety rail section leaving max **4 mm** between each safety rail, and that the indicator mark on the hammerhead bolt is turned 70°

