

The Work at Height Safety Association

Technical Guidance Note 2

“Guidance on the selection, use, maintenance and inspection of retractable type fall arresters”

A series of informative notes for all industries involved with
work at height or rescue.

The Work at Height Safety Association (WAHSA) is a UK trade association for manufacturers of equipment for work at height and rescue. This series of guidance notes is published by WAHSA to provide information on topical issues relating to work at height which may be a source of confusion, or where other information may be lacking. The information provided is only intended to apply within the UK.

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WAHSA technical guidance note no. 2

Guidance on the selection, use, maintenance and inspection of retractable type fall arresters.

Introduction

This information sheet gives guidance on the use of retractable type fall arresters for work at height. These products are commonly known as fall arrest blocks. Several safety issues have been raised with respect to these products, when used as follows:

- in the horizontal plane
- at their maximum extension
- where the lifeline may pass over an edge during arrest
- when connected via an energy absorbing lanyard to the harness
- when the users weight exceeds 100Kg

Although this leaflet cannot give definitive guidance on all aspects of the problems indicated above, it is hoped to clarify some misconception and to highlight safety critical aspects when possible.

Background

Retractable type fall arresters have been used for many years in a wide range of industries, but are being increasingly being used in applications for which they were not designed and which are not covered by the European Standard (EN360) test criteria.

In particular, these products have been subject to considerable misuse; by being used incorrectly in the horizontal plane, over a potential edge and / or connected to an energy absorbing lanyard.

Fall arrest blocks are often perceived to offer a safe fall protection system in such arrangements but recent research has identified that products can fail when used in these ways..

It is therefore critical that users always read the manufacturer's instructions to ensure that the product is in a proper condition for use, and that the chosen product is suitable for the intended application.

What are fall arrest blocks?

A fall arrest block comprises a retractable lifeline made of wire rope, webbing or synthetic fibre rope which is stored on a reel within a protective housing. The reel is spring-biased so as to wind the retractable lifeline in, which ensures that it is always under a light restraining tension and there is the shortest possible length between the housing and the user.

The reel incorporates an inertia brake mechanism which allows the lifeline to be slowly extracted and automatically retracted to accommodate the user's body movements..

In the event of a fall, the lifeline is rapidly pulled out of the housing until it reaches a critical velocity (the "lock-on speed") at which point the brake locks and a clutch mechanism decelerates the user over a short distance.

Simple versions of retractable type fall arresters are available which have a maximum working length of 2.4 m. These devices are sometimes known as mini-blocks. These devices work in the same way as normal fall arrest blocks and based around a car seat belt type mechanism, but they do not contain an integral energy absorbing capability.

Energy absorption in mini-blocks is achieved by incorporating an external tear-web type energy absorber into the lanyard part, which operates as a normal energy absorbing lanyard (see WAHSA guidance note reference TGN 04).

The working length of fall arrest blocks is usually up to 50 m, measured as the distance from the bearing point of the housing connector to the bearing point of the swivel hook when the lanyard is fully extended. Blocks offering longer working lengths are larger and heavier.

Retractable type fall arrester should conform to European standard EN 360, which requires an ultimate tensile strength of 15kN for devices with wire rope lifelines and 22kN for synthetic lifelines. There is no specification for resistance to abrasion or cutting.

The European Committee for Standardisation (CEN) specifies that products designed for fall arrest purposes within the European Union must limit the maximum impact force during the arrest of a fall to 6 KN on the User.

When should fall arrest blocks be used?

When used correctly, fall arrest blocks are particularly suitable for situations where there is limited clearance below the place of work. The lifeline is always at the optimum minimum length and the device reacts quickly to arrest the user in the event of a fall.

If fall arrest blocks are expected to be used with a person heavier than 100 kg, the manufacturer should be consulted for specific data about anticipated arrest forces and deployment lengths.

They are not suitable for situations where they would be required to operate at an angle greater than the vertical than specified by the manufacturer, or for use in situation where a falling user might not reach the speed necessary for the device to activate, on a sloping surface, for example where the user could stand or fall into unstable materials such as powder, grain, sludge etc.

A fall arrest lock may incorporate a recovery mechanism to allow immediate retrieval of a suspended casualty.

Pre-use Checks

There are a range of checks which should be done before any fall arrest block is used. One of the most straightforward is to check the service indicator although other checks are described below.

Service or fall indicators on fall arrest blocks

There are several mechanisms used to indicate a fall has occurred on these products, activation of which should result in immediate withdrawal from use and return to an authorised service centre:

- buttons - usually flush with the body but will protrude after a fall
- hook indicators - coloured bands visible at the top of the hook after a fall or shock load occur.
- sewn indicators - usually in the hook end of a webbing lanyard indicate if a fall has occurred
- window indicators - employ coloured warnings to indicate when a device has been used or should be returned for service

Do not use these devices if the indicator mechanism shows signs of having previously arrested a fall

NOTE: some devices may not contain an indicator mechanism

Carrying out a pre-use check

Connect the device to a suitable suspension point. Make sure the device is hanging vertically then carry out the following:

- extend cable/webbing fully and inspect for damage. Do NOT allow an extended cable/webbing to reel in unchecked. Allow it to retract slowly through gloved hands
- check shackle fixing, connecting hook and swaging of cable end and webbing stitching.
- check locking mechanism is operating by pulling cable/webbing end sharply. Cable must lock instantly with an audible 'click'.

Interpreting pre-use checks

The following information sets out the principal causes of deterioration in lifelines.

Wire Type Lifeline

- crushing - flattened or bent section of cable
- cutting - damaged strands and broken wires
- abrasion - localised wear, with outer strands appear flattened and with brighter appearance
- strand core protrusion - ("bird-caging") - the central core showing with the outer strands swelling out. (this is usually the result of a shock load)
- kinking – deformation of cable
- corrosion - roughness and pitting with broken wire propagating from cracks or pitting
- electric arcing or heat damage - bluing of surface, fusion of the wire, weld splatters
- damaged thimbles and ferrules - check secure and free from damage, ensuring other components, e.g. springs, stoppers, and balls are secure and undamaged.
- connector - ensure the bottom hook, if fitted, is free of excess wear, distortion, cracks, burrs, dents and sharp edges.

The gate on the hook must open and close smoothly and must engage the nose of the hook fully.

Webbing Type Lifelines

Inspect webbing by the same procedure that would be employed for a harness. See WAHSA TGN 03 on general requirements for inspection.

Using fall arrest blocks

The working length of the fall arrest block should allow the user to reach the whole of the intended work area without continually having to relocate the device. Manufacturer's user instructions should always be consulted to ensure that the intended work place is appropriate.

No matter what device is being used, the following critical safety measures must be observed:

- a suitable pre-use check has been carried out (see above)
- the terminating connector is suitable for the type of anchor
- a suitable anchor is being used (strength and type of connection)
- the position of the anchor is appropriate (above the user)
- sharp edges are avoided
- sufficient ground clearance has been allowed
- the lifeline is not kinked, knotted or twisted
- the user does not climb above the anchor point
- connecting hooks are fully closed and secured
- attach hook end to dorsal 'D' ring of user's harness (or extension strap).

It is important to ensure when using the retractable type fall arrester that the device is anchored above the user and users are able to fall into free space.

Specific examples of misuse

Use in a situation where a fall could take place over an edge.

Retractable fall arrest blocks are sometimes used in the horizontal plane to protect the user from a fall over an edge. In this situation the lifeline has the potential to fail over the edge as well as exceed the 6kN permissible arrest force on the user.

If it is intended to use fall arrest blocks in this manner you should contact the manufacturer who will be able to confirm their product can be so used. Ask to see evidence that additional testing has taken place. Tests should address the arrest force experienced by the user and the resistance of the line to being cut.

Currently this method of use is not covered by European Standards tests, although one test body has a test which includes a steel edge with a 0.5mm radius edge, a perpendicular drop over this edge and a pendulum swing fall of 1.5m along the edge.

Such a test may be useful for guidance, although there are different types of 'edges' and this may not be representative of the type of edge encountered in the workplace.

Users should be aware that fall arrest blocks do not act as a safe means of restraint and will not prevent a fall over an edge unless they are at their full extension. If using this technique, careful consideration should be given to the dimensions of the workplace so that a fall can not occur.

Misuse with an energy absorbing lanyard in the system

Users of retractable type fall arresters often connect to the safety harness via an energy absorbing lanyard which is often permanently attached to the safety harness. If the user connects in this manner they will increase the free fall distance before the lifeline of the fall arrester is extracted. This will massively increase the loading placed on the device and will very likely cause the device to fail completely.

Type of use which should be avoided

The following list gives examples of what should be avoided when using fall arrest blocks. Users should not:

- use in the horizontal plane, unless the manufacturer has tested in this orientation and their instructions specifically permit this.
- use where the lifeline of the device passes over a roof edge or any other "corner", unless the manufacturer has tested in this orientation and their instructions specifically permit this.
- use on a flexible horizontal lifeline, unless the manufacturer has tested this configuration and their user instructions specifically permit this.
- attach a lanyard between inertia reel lifeline and harness which might increase the fall distance
- allow rapid retraction of the lifeline
- allow connectors to load across a gate
- tie or hitch any part of a webbing or rope lifeline
- join more than one device together
- tamper with or attempt to adjust any part of the fall arrest device
- attempt to extend lifeline beyond its normal working length
- use a device for more than one person at a time

The weight of users of retractable type fall arresters

Retractable type fall arresters tested against EN360 are tested with a 100Kg mass and have to produce an arrest force of less than 6kN therefore users greater than 100Kg should refer to the manufacturer's instruction for use and if not covered within the instruction should contact the manufacturer for information on users greater than 100Kg.

Inspection:

For general information about inspecting fall protection equipment see WAHSA TGN03. This indicates several types of inspection, pre-use check, intermittent inspection and detailed inspection (sometimes known as thorough examination).

The requirements for periodic examination of fall arresting retractable anchor devices for fall arrest have been revised in BS 8437:2005. Section 13 inspection, care and maintenance of equipment. This code of practice adds to the requirements of BS EN 360 and BS EN 365.

Pre-use check has been described above.

Competent persons check

Fall arrest blocks should be serviced and re-certified by a competent person of an approved service company as specified by the manufacture at least every 12 months or less if deemed necessary during a risk assessment.

Longevity and obsolescence of fall arrest blocks

The frequency and conditions of use together with the quality of cleaning and storage will determine the safe and effective working life of all personal fall protection equipment

Such equipment will continue to afford safety protection until routine inspection determines that it shall be withdrawn from service and/or refurbished. Webbing should be protected from sharp or abrasive objects and chemical contact.

Check manufacturer's instructions for life expectancy

Cleaning and maintenance

If necessary, wash webbing with a mild soap solution (maximum temperature 40°C) and remove excess moisture with a clean cloth.

Wiping with a mild solution of sterile disinfectant may disinfect the webbing. Allow drying naturally. Clean metallic items when required, with a non-caustic solution.

Storage

Store the fall arrest device in a dry, ventilated area.

Servicing

Users should be aware that fall arrest blocks are not normally serviceable by users and should only be serviced by an competent person, who has received appropriate training from the manufacturer..

Training

WAHSA strongly recommend that all users of fall protection equipment are trained by a competent organisation. Training should include information on the selection of the correct products for intended work situation and pre-use checks for specific equipment.

Useful References

WAHSA Technical Guidance Notes (available from www.wahsa.org.uk)

TGN 01	10 points for the use of fall protection equipment
TGN 02	Guidance on the selection, use, maintenance and inspection of retractable type fall arresters.
TGN 03	Guidance on inspecting personal fall protection equipment
TGN 04	Guidance on the use of single and twin energy absorbing lanyards.
TGN 05	Guidance on rescue after a fall from height
TGN 06	Guidance on inspecting eyebolts used for personal fall protection purposes
TGN 07	Sources of information relating to work at height

Regulations

The Work at Height Regulations 2005

The Lifting Equipment and Lifting Operations Regulations 1997

Product standards

BS EN 354, *Personal protective equipment against falls from a height — Lanyards.*

BS EN 355, *Personal protective equipment against falls from a height — Energy absorbers.*

BS EN 358, *Personal protective equipment for work positioning and prevention of falls from a height — Belts for work positioning and restraint and work positioning lanyards.*

BS EN 361, *Personal protective equipment against falls from a height — Full body harnesses.*

BS EN 362, *Personal protective equipment against falls from a height — Connectors.*

BS EN 363, *Personal protective equipment against falls from a height — Fall arrest systems.*

BS EN 364, *Personal protective equipment against falls from a height — Test methods.*

BS EN 365, *Personal protective equipment against falls from a height — General requirements for instructions for use, maintenance, periodic examination, repair marking and packaging.*

BS EN 795:1997, *Protection against falls from a height – Anchor devices - Requirements and testing*

Codes of practice

BS 7883:2005, *Code of practice for the design, selection, installation, use and maintenance of anchor devices conforming to BS EN 795.*

BS 8437:2005, *Code of Practice for selection, use and maintenance of personal fall protection systems and equipment for use in the workplace.*

BS 8454:2006, *Code of Practice for delivery of training and education for work at height and rescue*