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.

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WAHSA technical guidance note no. 2

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

Introduction

This guidance note gives guidance on the selection, use, maintenance and inspection of retractable type fall arresters for work at height. These products are commonly known as ‘fall arrest blocks’ in Europe and ‘self retracting lifelines’ (SRLs) in North America. Another term often used is ‘inertia reels’.

Fall arrest blocks have been used for many years in a wide range of industries and are sometimes used in applications which are not covered by the European Standard (EN360) test criteria. This type of use raises safety issues (see 3.0).

1.0 What are fall arrest blocks?

A fall arrest block comprises of a retractable lifeline made from synthetic fibre rope, webbing or wire rope that is stored on a reel within a protective housing. The reel is spring-biased so as to wind the retractable lifeline in. This ensures that the lifeline is always under light tension to give the shortest possible length between the housing and the user. The lifeline tension allows the user to move freely around the work area.

The working length of fall arrest blocks is usually in the range of 2m to 50m and is measured as the distance from the bearing point of the housing connector to the bearing point of the hook when the lifeline is fully extended. 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 mechanism engages and the clutch mechanism decelerates the user over a short distance (maximum 2.0m total – EN360).

Simple versions of fall arrest blocks are available with a working length of approx. 2.5 m. These devices are sometimes known as ‘mini-blocks’ or ‘retractable lanyards’ and work in the same way as normal fall arrest blocks but may not contain an internal energy absorbing capability. In these cases, energy absorption is achieved by the manufacturer incorporating an external tear-web type energy absorber.

Fall arrest blocks incorporate a swivel feature. This can be located either on the housing or incorporated into the hook at the end of the lifeline. The swivel prevents twisting and untwisting of the lifeline as a result of the user turning repeatedly during the work.

Fall arrest blocks must conform to European Standard EN 360, which requires a minimum static load of 12kN for devices with wire rope lifelines and 15kN for synthetic lifelines. There is no specification for the degree of resistance to abrasion or cutting. The maximum permissible impact force during the arrest of a fall is 6kN on the user and the anchor point.

There are several mechanisms which may be used to indicate a fall has occurred. Activation of these requires immediate withdrawal of the item from use and the item should be destroyed or returned to an authorised service centre. These indicators include:

- Hook Indicator – a coloured band visible at the top of the hook after a fall or shock load occurs
- Stitching indicator - sewn into the hook end of a webbing lanyard. To indicate a fall, the thread (usually red) will tear apart
- Window indicator - has two visible colour zones, located in a small window on the block: Safe Zone (blue/green): suitable for continued use

Danger Zone (red): immediately remove from use and return to manufacturer /service agent to repair and recertify

- Button indicator - usually red in colour. Can be flush with casing or slightly recessed, but will protrude from the casing after a fall.

Note: Some blocks may not contain an indicator mechanism and this list is not exhaustive.

2.0 When should fall arrest blocks be used?

Fall arrest blocks are for single person use only and should ideally be anchored above the user. The user may then work within a prescribed area, as defined within the user instructions.

Fall arrest blocks are intended to offer the user simple hands-free automatic protection, whilst the working length of the block should allow the user to reach the whole of the intended work area without continually having to relocate the device. They are not recommended for work restraint unless approved by the manufacturer.

Fall arrest blocks are not suitable for use in a situation where a falling person might not reach the speed necessary for the device to activate. Examples may include a sloping surface or where the user could stand or fall into unstable materials which could partially support their weight such as powder, grain, sludge, etc.

3.0 Safety Issues

Several safety issues have been raised with respect to these products. They are:

- use in the horizontal plane
- use where the lifeline may pass over an edge during arrest
- use of an energy absorbing lanyard with a fall arrest block
- users weight exceeding 100kg
- use as restraint
- use with a flexible anchor line.

Although this guidance note cannot give definitive guidance on all aspects of the issues associated with the above, it is intended to clarify some misconceptions and to highlight safety critical aspects.

3.1 Use in the horizontal plane

The user should consult the manufacturers' instructions or the manufacturer to ascertain whether the fall arrest block can be used in the horizontal plane.

3.2 Use where the lifeline may pass over an edge during arrest

The Work at Height Regulations 2005 state, *"A fall arrest system shall not be used in a manner which involves the risk of a line being cut"* (Schedule 5, Part 3). There is a risk of the lifeline snapping or cutting when it runs along (a 'pendulum fall') or over an edge and the load from a fall arrest is applied. Performance of the lifeline when used over an edge will vary dependant on the construction and material of the lifeline and the nature of the edge. For example, steel edges cause more damage to the lifeline than concrete edges and on comparable diameters of lifelines, a stainless steel lifeline is weaker when used over edges than a galvanised steel lifeline.

Note: Ferrules on stainless steel lifelines are copper in colour, which can assist in identification.

The user should be aware of these hazards and must take steps to eliminate this risk.

3.3 Use of an energy absorbing lanyard with a fall arrest block

An energy absorbing mechanism is built into the fall arrest block. The user must not attach an additional energy absorber or lanyard between the anchor point and the fall arrest block **or** between the user and the fall arrest block as it is unnecessary and would generate unpredictable results.

3.4 Users weight exceeds 100kg

Testing in Europe is based upon a 100kg solid steel mass. For situations where the user and the equipment they carry is in excess of 100kg, contact the manufacturer for further advice.

3.5 Use as restraint

Fall arrest blocks are not designed to be used as part of a work restraint system. However if the length of lifeline is appropriate to the requirements of the system a fall arrest block may be used for work restraint.

3.6 Use with a flexible anchor line

Fall arrest blocks should not be anchored to a horizontal flexible anchor line unless the particular block has been proven by the manufacturer to be suitable for use with the particular type of horizontal flexible anchor line

4.0 Using fall arrest blocks

It is very important that users always read the manufacturer's instructions to ensure that the product is suitable for its intended purpose. The following critical safety measures must be addressed prior to use:

- a suitable pre-use check has been carried out (see 5.1)
- the block attachment point is suitable for the type of anchorage
- a suitable anchor is being used (strength and type of connection)
- the position of the anchor is appropriate
- sharp edges that can act on the lifeline are being avoided
- sufficient clear fall distance has been allowed
- area of fall is free from obstruction
- connector between the lifeline and the harness is fully closed and secured
- connector is secured to a suitable fall arrest attachment point on the user's harness

5.0 Inspections and checks

For general information about inspecting fall protection equipment see WAHSA TGN03. This indicates several types of inspection, such as pre-use checks (carried out by the user), detailed inspection (sometimes referred to as 'periodic examination') and, where required, interim inspection (see also INDG367 – HSE).

5.1 Pre-use checks

Before a fall arrest block is used, hang the device to a suitable anchor point. Make sure it is hanging vertically. Then carry out the following:

- If there is an indicator present, check to see it has not been activated. **Do not** use a fall arrest block if the indicator mechanism shows signs of having previously arrested a fall
- Extend the lifeline fully and inspect it for damage. **Do not** allow the lifeline to retract into the block unrestrained as this may lead to the brake mechanism locking. If the block locks consult the manufacturer. Allow it to retract slowly through gloved hands, inspecting it as you go
- Check connector between the block and the anchor point, the connection to the harness and swaging of the cable end or the webbing stitching for signs of damage

- Check the locking mechanism is operating correctly by pulling the lifeline end sharply. The lifeline must lock instantly
- Check the hook/karabiner gate opens and closes smoothly and fully engages
- Check the fall arrest block is within its inspection interval.

5.1.1 Fibre rope, webbing and wire rope checks

The following lists the principal causes of deterioration in fibre rope, webbing and wire ropes. The block should be immediately withdrawn from use should any of these be evident.

Fibre rope

- crushing – flattened or bent section of fibre rope
- abrasion – localised wear

Webbing

- abrasion – localised wear
- chemical attack
- contamination
- nicks and cuts
- damaged stitching
- UV degradation (e.g. fading)

Wire rope

- crushing - flattened or bent section of wire rope
- cutting - damaged strands and broken wires
- abrasion - localised wear; where outer strands appear flattened and with brighter appearance
- strand core protrusion (“bird-caging”) - the central core showing with the outer strands swelling out
- kinking - deformation of wire rope
- 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 spatters
- damaged thimbles and ferrules - check secure and free from damage
- damaged connector - worn, distorted, cracked, burred, dented and has sharp edges

5.2 Detailed Inspection

These are the same as the pre-use checks carried out by a competent person at a set period (WAHSA recommends every 3 months). These checks must be documented and the documents kept.

5.3 Interim Inspection

These are additional detailed inspections. The need for and frequency of interim inspections will depend on the use and the environment. Examples of situations where they may be appropriate include: arduous working environments involving paints, chemicals, grit blasting operations and acidic or alkaline environments. The results of interim inspections should be recorded and kept.

5.4 Servicing

Fall arrest blocks must be serviced, inspected and re-certified by the manufacturer or an approved service company (as specified by the manufacturer) at least every 12 months, or less if deemed necessary.

Note: Ensure that a service company is approved by contacting the manufacturer.

6.0 Longevity and obsolescence of fall arrest blocks

Advice on obsolescence will be contained within the manufacturer's user instructions. The frequency and conditions of use together with the quality of cleaning and storage will determine the safe and effective working life of personal protection equipment (PPE).

7.0 Cleaning and maintenance

When 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 to dry naturally.

Clean metallic items when required, with a non-caustic solution.

8.0 Storage

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

9.0 Rescue

A rescue plan should be formulated for the rescue of a person with the required equipment and trained personnel to carry it out. (See WAHSA TGN05).

10.0 Training

Users should be trained in the proper use and practical / physical limitations of fall arrest blocks. This includes pre use checks and compatibility with other items of PPE. (See WAHSA TGN01).

11.0 Useful References

The Work at Height Regulations 2005

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

BS EN 360 *Personal protective equipment against falls from a height - Retractable type fall arresters*

BS EN 362 *Personal protective equipment against falls from a height - Connectors*

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*

INDG 367 *Inspecting fall arrest equipment made from webbing or rope (HSE)*