

# Hercule Operation & Maintenance Manual



# Hercule Enclosed Track System



## INTRODUCTION

Safesite's Hercule has been designed as a horizontal fall arrest/ goods carrying enclosed track system and has been tested to the requirements of BS EN 795: Protection against falls from a height - anchor devices - Requirements and testing class D. In many instances when operatives are carrying out operations on trains, lorries and aircraft with low ground clearances, conventional "fall arrest solutions would not work. This is due to the fact that the deflection of conventional horizontal cables, or the general take up of the system, means that the operative would hit the ground before the fall was arrested. With this in mind, Safesite developed an enclosed track system with the operative and maintenance of the system as key design features.

## APPLICATION

Unlike conventional beam and trolley systems, Hercule is an enclosed track system which eliminates excessive build up of debris from collecting on the main running track. In addition, the lightweight trolley with sealed bearings allows the operative to move completely "hands free" throughout the system. This ensures that, should the operative fall, the trolley will be immediately above so preventing the pendulum effect that is associated with conventional systems. The system can also be installed in low ground clearance situations or up to 60m between the operative and the track.

## DESIGN FLEXIBILITY

When it comes to lorry or aircraft maintenance, it is not always possible to position the vehicle in the same position every time. Hercule can be installed as a double track and trolley device with a further single track running in between so that all required positions over an area can be accommodated in complete safety with the operative trolley immediately above the operative at all times. The flexible design of the system means that it can cope with bends and changes in height within the run of the system. In addition to these features, a turntable and point system allows entry/exit to any number of systems within the building. The control of the number of operatives in an area can be accommodated by stops at predetermined positions. The system has four track sizes which are available in 3m lengths that are selected according to use, loadings and available centres of support. The track can be specified in galvanised, zinc coated or epoxy resin steel depending upon client's individual requirements.



# Hercule Enclosed Track System



## LEGAL REQUIREMENT

All fall arrest & PPE equipment needs regular inspection and recertification in accordance with BS EN 365: Personal Protective Equipment against falls from height - General requirements for instruction for use and marking. This can be carried out by Safesite as a service contract and included within the quotation for the system. The Work at Height Regulations require that the employer/building owner has a rescue plan and policy in place for all fall arrest systems. (See Rescue Section)



## INSTALLATION-HERCULE AT BMW

The Hercule horizontal fall arrest has been installed at Chandlers BMW dealership in Hailsham, to provide a permanent fall arrest system for window cleaners working at height. Constructed on two levels at a height of 7m, Hercule was specified as it was able to address the low ground clearance of the building, while also offering a hands free fall arrest solution.

The glass wall construction of the showroom meant that it required regular cleaning but the height of the building and the glass frontage posed the problem of how to ensure this could be done safely and efficiently. Hercule was installed to the outside of the building to provide a permanent fall arrest system for window cleaners while accessing ladders.

The system's design allows the window cleaners to move freely and operate totally hands free throughout the cleaning process. In addition to the ease of use, Hercule's trolley mechanism which prevents the pendulum effect associated with other systems, was of particular importance to the installation in catering for the concerns relating to the showroom's glass frontage.



## INSTALLATION - CLASSIC COUVERTURE

Hercule has also been installed at Classic Couverture's distribution plant in Liverpool to provide a permanent fall arrest system for operatives needing to access the top of tankers. Classic Couverture manufactures and processes chocolate in both liquid and solid forms for major retailers including M&S.

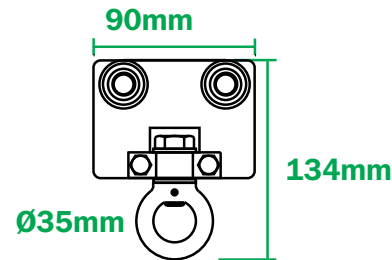
The company approached Safesite for advice on how to protect workers who needed to access the top of the tankers in order to fill them with liquid chocolate. Safe access to the vehicles was already provided by a gantry with guardrails, but the problem was how to allow the workers to safely walk along the top of the tankers without restricting movement. Hercule not only offered the perfect solution by providing hands free protection, but the flexibility of the system's design also meant that it was able to meet the specific installation requirements presented by Classic Couverture's distribution plant.

# Hercule Enclosed Track Components & Specification



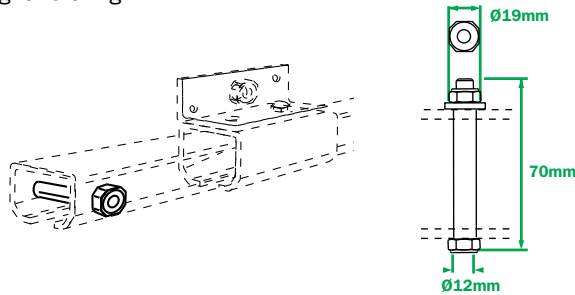
## TROLLEY - 424RI

Horizontal mobile anchorage point. Bichromate zinc-plated steel roller support. Galvanised steel anchorage point clamp. Anchorage zinc plated steel. Maximum load 136kg. Overall system strength 10kN minimum. Net weight : 0.94kg.



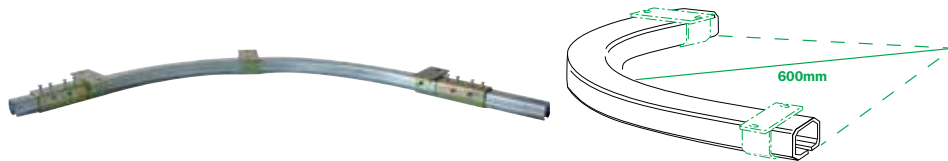
## END STOP - 1400P

This is used at the end of tracks. Material : zinc plated steel, alternative option stainless steel nut and bolt. Overall system strength 10kN minimum. Net weight : 0.07kg.



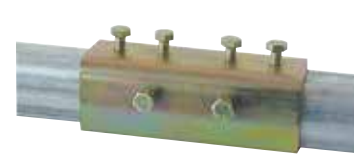
## THE TRACK - 400-3

This is the heart of the system and is supplied in 3m Lengths. Maximum distance between supports 1m. Material : steel to E315D. Galvanised to BS EN ISO 1461. Overall system strength 10kN minimum. Net weight : 11kg.



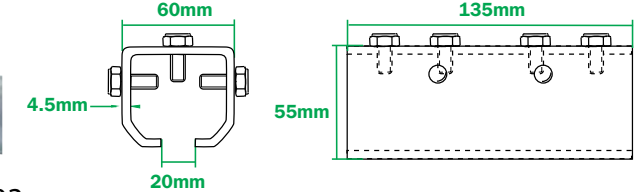
## CURVED GALVANISED TRACK - 400-R

Galvanised curved track in 1.3m sections. Curve radius 584.5mm. Material : galvanised steel E315D. Overall system strength 10kN minimum. Net weight : 9.1kg.



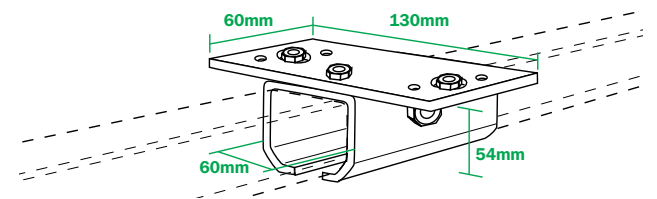
## CONNECTING SLEEVE - 1403

Utilised to connect AN 201 & AN 202 track sections. Supplied with locking hardware. Material : DD13 yellow bichromate zinc plated steel as per EN 10111. Overall system strength 10kN minimum. Net weight : 0.95kg.



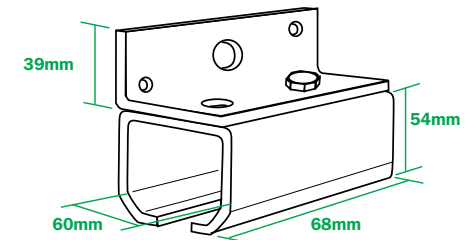
## CEILING BRACKET - 402

This support bracket is bolted to the track system and ceiling mounted. Supplied with locking hardware. Material : DD13 untreated steel as per EN 10111. Overall system strength 10kN minimum. Net weight : 0.752kg.



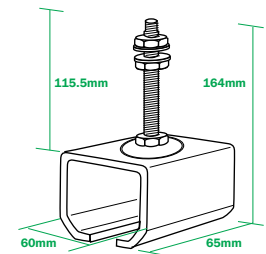
## WALL BRACKET - 401

This support bracket is bolted to the track and wall mounted. Supplied with locking hardware. Material : DD13 yellow bichromate zinc plated steel as per EN 10111. Overall strength of system 10kN. Net weight : 0.58kg.

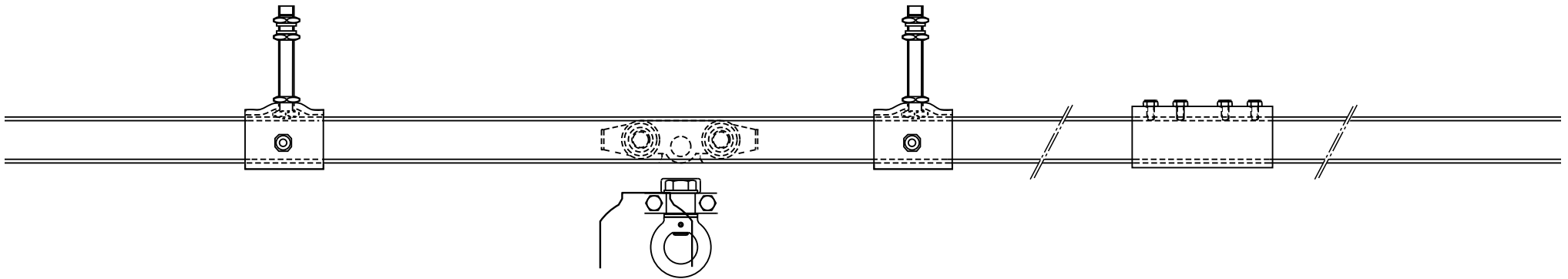


## HEIGHT ADJUSTABLE CEILING BRACKET - 404

This support bracket is bolted to the track and ceiling mounted. Supplied with locking hardware. Material : DD13 yellow bichromate zinc plated steel as per EN 10111. Overall system strength 10kN minimum. Net weight : 0.555kg.



# Complies with BS EN 795 Class D Anchorage Devices



## PRODUCT SPECIFICATION

**FEATURES** :- A hands free fall protection system.

## GENERAL

An enclosed track based fall arrest/restraint fall protection system for applications where there is low ground clearance. The system provides hands free falls from height protection compliant to EN 795 Class D.

## MATERIALS

The system comprises a number of components (Not all illustrated) to provide a horizontal fall arrest enclosed track system designed as required. Materials are of galvanised steel to BS EN ISO 1461 and Bichromate zinc plated to EN 10111. Minimum strength of components 10kN.

## DESIGN

All systems are designed, as far as possible, to be used as fall restraint systems. When designed as fall arrest systems a rescue plan must be incorporated within the design. The design can include curves, turn tables, point systems etc. The track can be supplied galvanised, zinc coated, or epoxy resin coated steel for aesthetic appearance.

## TROLLEY

The trolley suits multiple connectors and is attached to the track permanently during the installation.

## TESTING

All systems have been tested to EN 795 Class D Personal fall protection equipment - Anchor devices.

## ANNUAL RECERTIFICATION

Annual recertification in accordance with BS EN 365 and BS 7883 is required.



## SYSTEM PLAQUE - SL111/1

Provides details of the system and approvals. Material : plastic. Component weight : 0.085kg.



# Personal Fall Protection Systems

## PERSONAL FALL PROTECTION SYSTEMS

Personal fall protection systems are required when an operative is working at an elevated level with an unprotected side or edge, which can be at any height. The system must be designed in such a way to prevent the operative from free falling more than 2m or striking a lower level. There are two ways that a company can accomplish this task: Fall Restraint or Fall Arrest.

## FALL RESTRAINT SYSTEM

This system does exactly what it states. It is designed in such a way as to restrain the user from falling by not allowing the user to get to the leading edge. With this system the free fall distance is ZERO. Belts can be used with this type of system but a full body harness is recommended. If any possibility of a free fall exists then the user needs to use a Fall Arrest system.

## FALL ARREST SYSTEM

A fall arrest system consists of the following components: Anchor, Connector, Body support and Retrieval.

- Anchors need to have a minimum breaking strength of 10kN or be engineered for a specific system and have a safety factor of 2:1.
- Connectors can consist of one of several different means. A positioning lanyard, a deceleration lanyard, a self-retracting lanyard/life line or a climbing aid device.

- Body support is a full body harness. A full body harness distributes the fall impact throughout the body and allows the user to better absorb a fall.
- When working in a fall arrest situation it is a legal requirement for the employer/building owner to have a rescue policy and plan in place and not to rely solely on the emergency services. Anyone responsible for or working at height must be trained fully on correct rescue procedures including how to use the rescue kit provided. Should an emergency occur, a competent first aider should be present to assist with the casualty and to follow the standard UK first aid guidance for the recovery of a person.

## KEY COMPONENTS OF A FALL ARREST SYSTEM

There are a number of issues that need to be addressed when considering using a fall arrest system.

## IMPACT FORCE

The maximum impact force for a full body harness is 6kN and 10kN for the anchorage point. Calculating the impact force is difficult because there are so many variables. These variables include fall distance, person's weight, and attachment method (self retracting life line, shock-absorbing lanyards, etc.).

## EQUIPMENT COMPATIBILITY

It is important that the equipment being used is compatible with one another. The entire system needs to be measured by its weakest link. Conventional locking snap hooks need to be used with compatible D-ring connectors. It is a general recommendation that a user does not mix fall protection equipment from various manufacturers in order to avoid a compatibility issue and to ensure maximum manufacturer guarantee of quality and use.

## FREE FALL DISTANCE

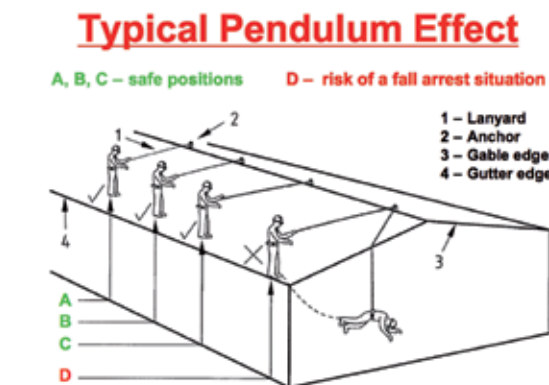
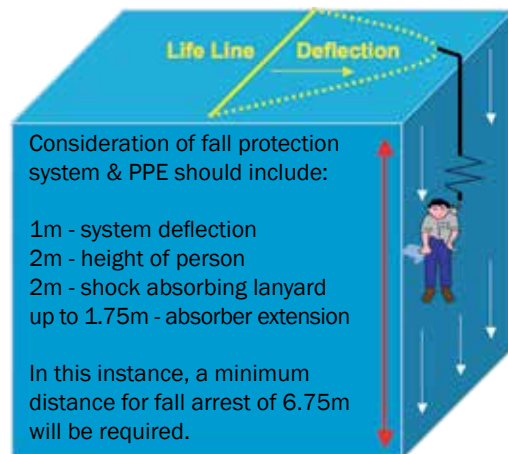
In layman's terms, it is the distance that a person falls before any part of the system starts to arrest the fall. Free fall is measured from the anchorage point to the point in which the system started to arrest the fall. This distance excludes deceleration distance and lanyard/harness elongation. Maximum free fall distance is 2m or striking a lower level.

## TOTAL FALL DISTANCE

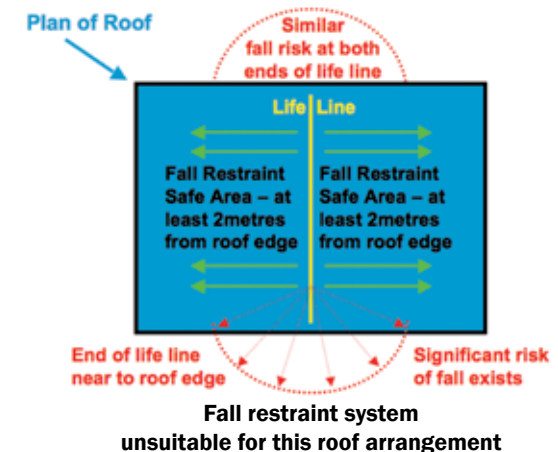
Is measured as the distance the operative fell from the point at which they were standing to the position of their feet after the fall. Free fall and deceleration distances are included in the measure. An example of the 6m rule which shows falling distances can be seen in the diagram.

## ANCHORAGE POINTS

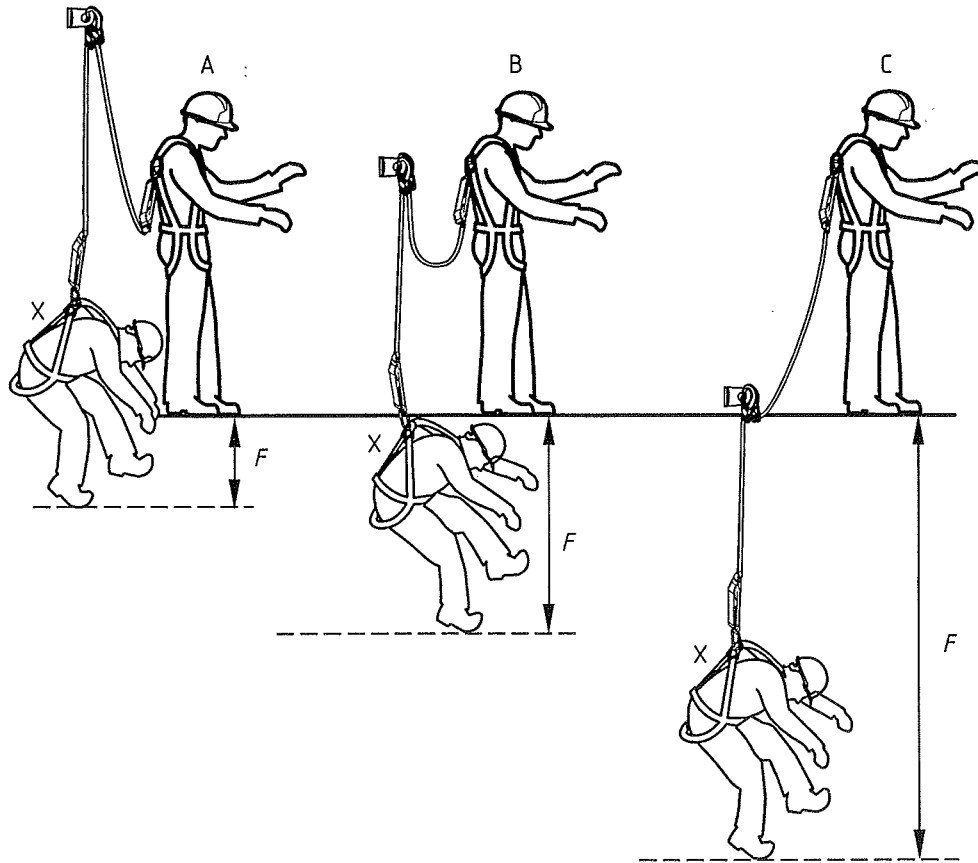
Need to be rated at a minimum of 10kN per person. If engineered, they need to have a 2:1 safety factor.



Limitations and dangers of using a restraint system on a sloping roof



# Minimum Height Requirements



The above diagram shows three fall arrest situations. In each case the fall arrest system is based on a 1.5m long energy absorbing lanyard and a distance between the attachment point on the user's harness and their feet of 1.5m. The free fall distance is the vertical distance between the position of the user's feet immediately before the fall, and the position of the user's feet at the point at which the lanyard has become taut and started to arrest the fall. (Figure F in the diagram)

# Work at Height Rescue

Before commencing any work at height activity please ensure you are adequately trained and competent to carry out the task and able to use the safety equipment provided by your employer/building owner.

In situations where a work at height activity involves a “fall arrest” situation, it is a legal requirement for your employer/building owner to provide the anchorage point, rescue plan, policy, training and equipment to complete a rescue. It is not the responsibility of the emergency services to conduct such a rescue.

Should a rescue become necessary it is extremely important that the procedures detailed in the “roof permit to work,” rescue policy and plan are followed.

Try to make contact with the casualty to establish if they are conscious or unconscious. If they are unconscious then time is of the essence.

Contact the emergency services and request an ambulance and fire/rescue support. Inform them of the exact address, location and site contact details of where you are working (This should be contained within the “permit to work”). Confirm that you are trained and competent to commence the rescue procedure.

Call your site contact and inform them of the situation and that you have already contacted the emergency services. Request they bring a competent First Aider to assist you at ground level by receiving the casualty.

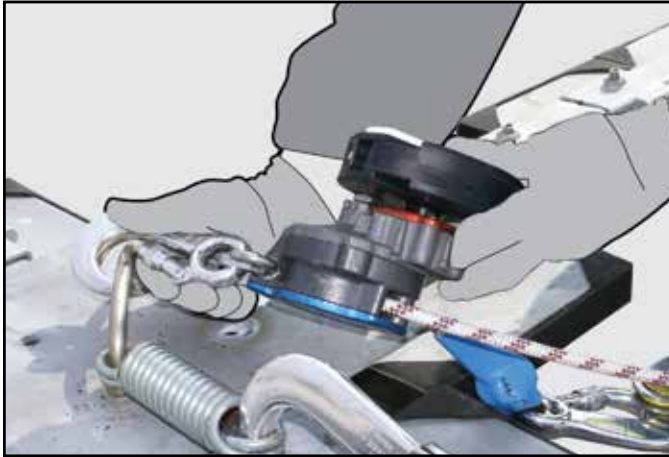


Before commencing the actual rescue, ensure that you are safely connected to an alternative suitable anchorage point (where possible). Ensure you work in “fall restraint” at all times whilst conducting the rescue procedure. **Check you have all the Rescue Kit components as shown in the diagram above.**

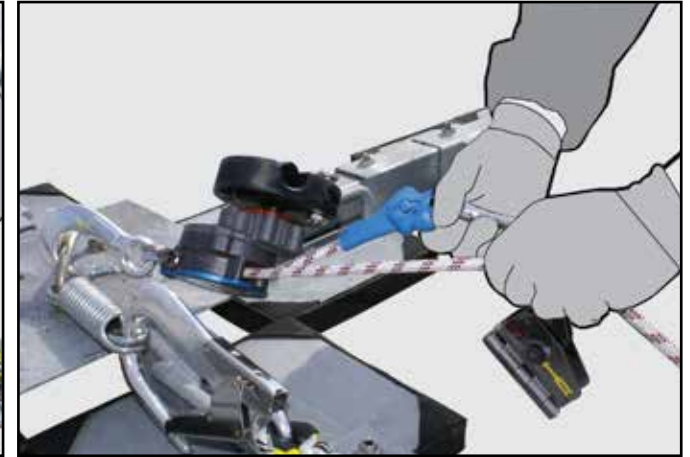
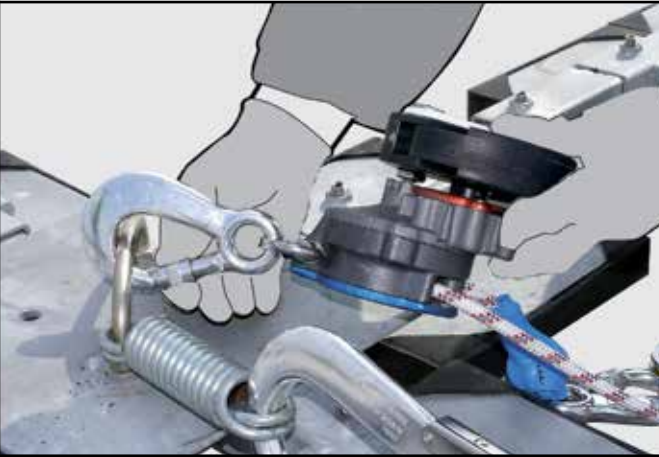




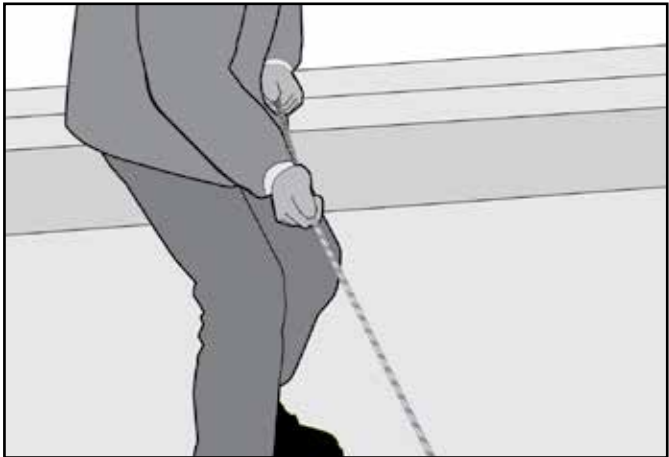
# Rescue Kit Operation



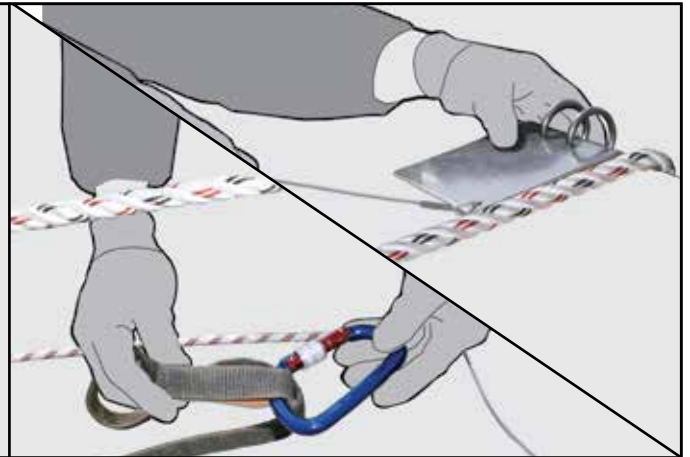
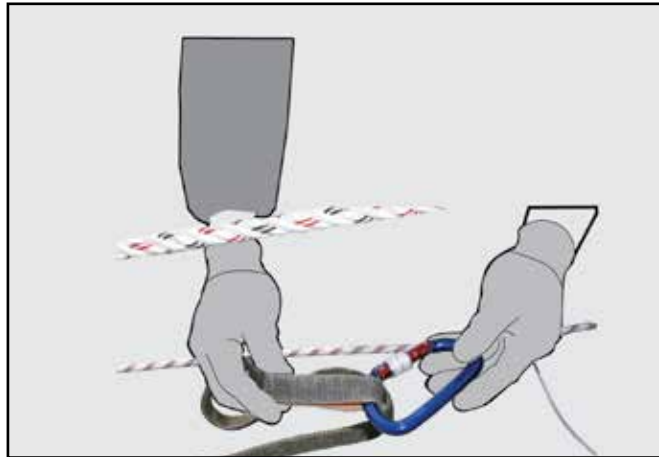
**a.** Connecting to the same or an alternative suitable anchorage point. Connect the Safesite Rescue Hub device using the Screw Gate Karabiner fitted directly to the Safesite Rescue Hub. Ensure the Screw Gate is tightened once connected to the anchorage point.



**b.** Pull the end of the Kernmantel Rope which has the Rescue Rope Grab attached. The Kernmantel Rope will start to feed out of the rescue bag and run through the Safesite Rescue Hub.

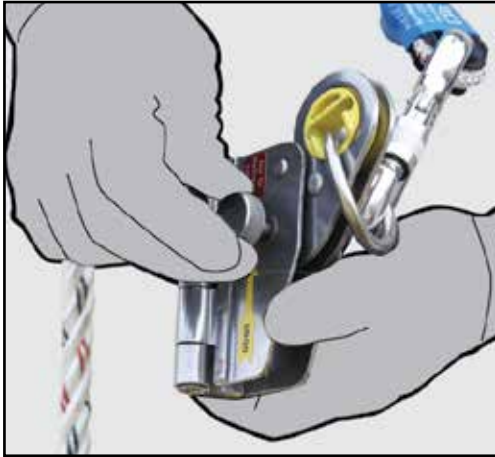


**c.** Start walking towards the area where the casualty has fallen whilst still holding the Rescue Rope Grab. When you reach this area, kneel down and continue to pull out sufficient rope to reach the "D" ring on the casualty's harness.



**d.** Ensure the Edge Protector is connected to the anchorage point, this may need to be extended in some cases via a webbing or rope sling. Place the Edge Protector over the edge ready for the rescue operation.

# Rescue Kit Operation



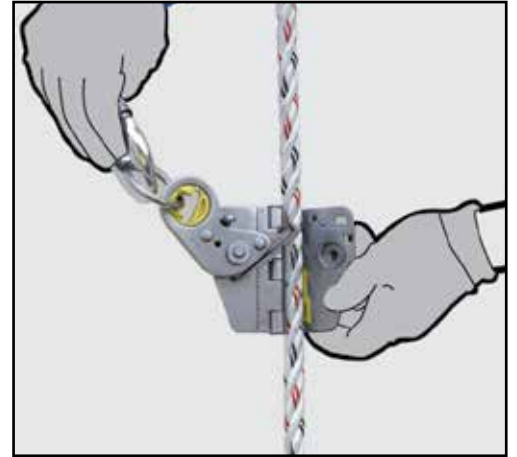
**e.** Whilst holding the Rescue Rope Grab unscrew the Screw Gate as shown above.



**f.** Turn the Rescue Rope Grab over and push the lever in an upwards direction.



**g.** The Rescue Rope Grab will now open.



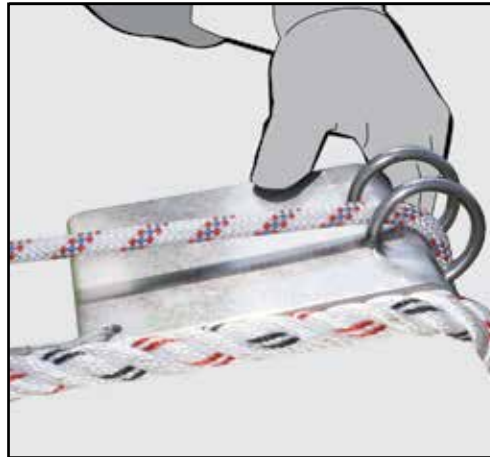
**h.** Ensure you have adopted a “fall restraint” position. Carefully lean over the leading edge and pass the open Rescue Rope Grab (with the arrow in the up direction) around the back of the casualty’s rope. (cont)



**i.** (cont) Ensure the casualty’s rope is correctly positioned inside the Rescue Rope Grab. Close the Rescue Rope Grab.



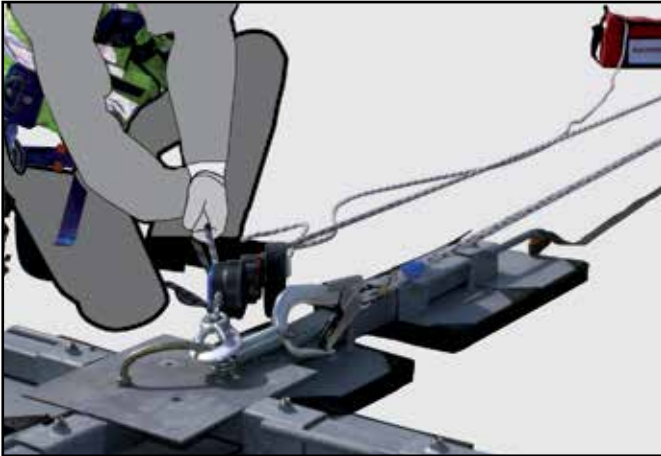
**j.** Once the Rescue Rope Grab is closed ensure the Screw Gate is then tightened into position.



**k.** Position the Safesite Rescue Kernmantel Rope over the Edge Protector. Now carefully lower the Rescue Rope Grab down towards the casualty. The Rescue Rope Grab device will descend easily under gravity to the “D” ring of the casualty’s harness.



# Rescue Kit Operation



**l.** Return to the anchorage point where the Safesite Rescue Hub is connected. Pull any excess Kernmantel Rope through the Safesite Rescue Hub by pulling the free end of the rope which is stored in the bag.



**m.** Once the Safesite Rescue Hub Kernmantel Rope is taught, rotate & lower the locking pin so that it engages with the body of the hub. When in place correctly, the hub cannot turn.



**n.** Lift up the black handle as shown above.



**o.** With the black handle in position push in the silver ball bearing positioned in the centre of the white plate as shown above.



**p.** Now open the top third of the Safesite Rescue Hub and it will automatically lock into place.



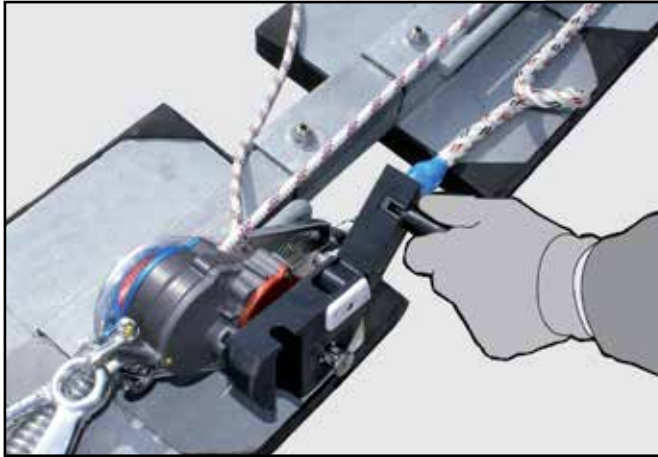
**q.** Detach the pin.



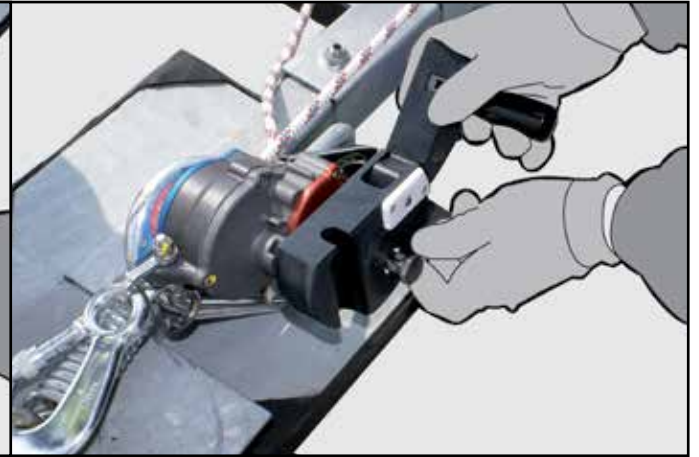
# Rescue Kit Operation



**r.** Start winding the Safesite Rescue Hub in a clockwise direction so that the Kernmantle Rope passes through the hub. If the rope does not move through the hub, pull on the free end of the rope. Continue to wind until the casualty's primary rope becomes slack.



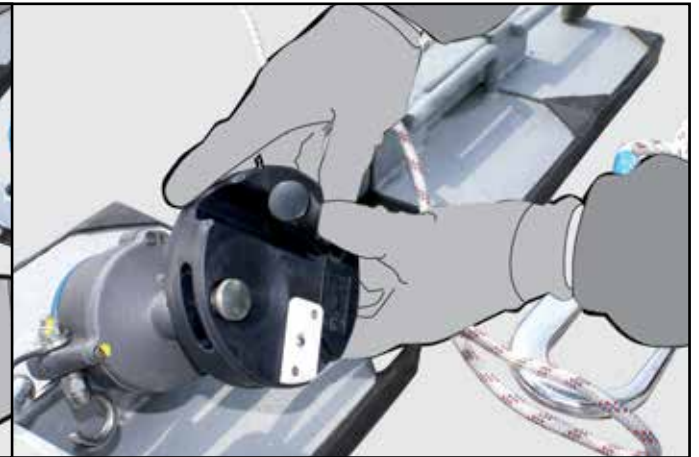
**s.** Once the casualty's primary rope is slack enough to detach their primary hook/karabiner from the anchorage point, stop winding and engage the locking pin by lifting, rotating & then lowering it. Ensure the pin is engaged against the body of the Safesite Rescue Hub. When in place correctly the Hub cannot turn.



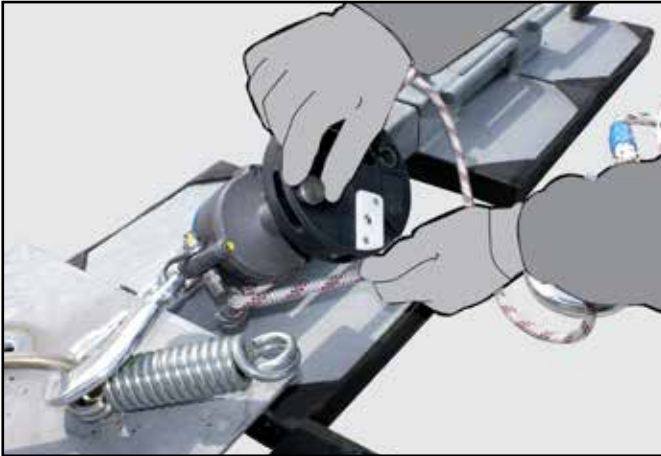
**t.** You can now remove the casualty's slack primary rope from the anchorage point as shown above.



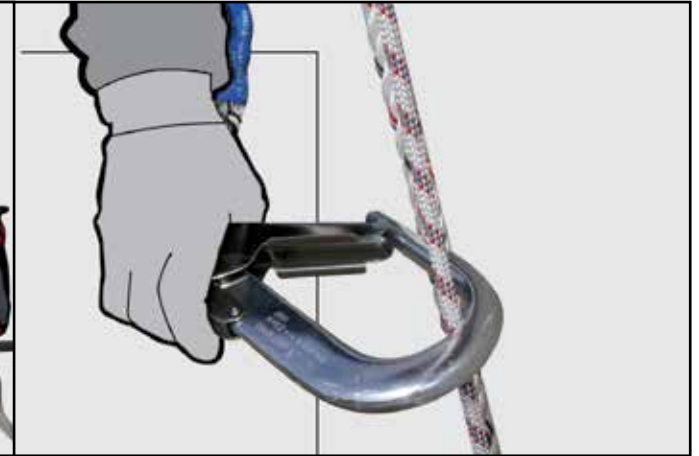
**u.** Close the Safesite Rescue Hub by pressing in the silver ball bearing in the centre of the white plate. Once closed fold down the plastic handle.



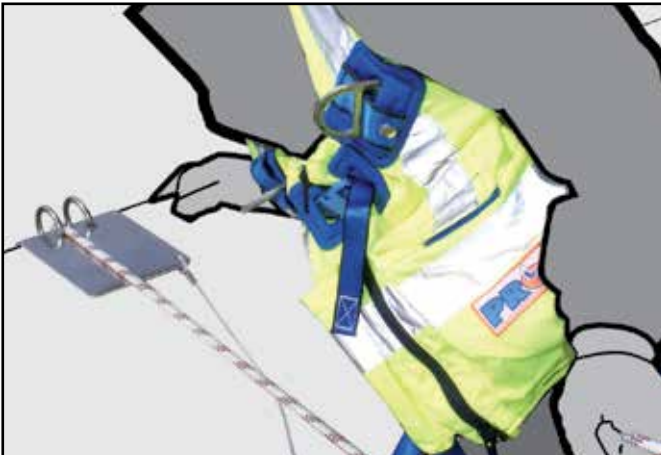
# Rescue Kit Operation



**V.** Pass the loose end of the Kernmantel Rope around the pig tail of the Safesite Rescue Hub. Hold the rope firmly in one hand. To take the load off the casualty, simply rotate and pull the Locking Pin upwards and rotate sufficiently so that the pin is disengaged from the Safesite Rescue Hub. Whilst holding the Kernmantel Rope you can move back towards the area where the casualty fell.



**W.** Once you are in a comfortable position and able to hold the casualty with one hand, take the casualty's primary rope which you previously disconnected from the anchorage point. When ready, carefully position yourself so you are able to attach this primary rope to the Safesite Rescue Hub Rope (Kernmantel Rope) as shown above. Ensure that you keep holding the Safesite Rescue Hub Kernmantel Rope at all times. Gradually lower the casualty's primary rope until the hook reaches the casualty's "D" ring. Ensure you are still holding the Safesite Rescue Hub Kernmantel Rope. You can now let the casualty's primary rope fall to the ground so that it can be used as a guy rope by those at ground level who are ready to assist/receive the casualty.



**X.** Begin to lower the casualty gradually, continually observing them and communicating with both the casualty and those at ground level who are receiving/assisting the casualty. The competent first aider must then follow the standard UK first aid guidance for the recovery of a person. The casualty must then be seen by the ambulance crew, even if they appear to have recovered.







# Hercule Recertification

- Periodic inspections by a competent person are required under Regulation 5 of the Workplace (Health Safety & Welfare) Regulations, BS EN 365 & BS 7883. The frequency will depend upon environment, location and utilisation, but should be at least every 12 months.
- Check structural connection of system.
- Walk the complete system and check the smooth running of the system and that it still serves client needs. Establish if any modifications or additional products are required to reflect any refurbishment or additional plant and equipment that has been installed and requires access.
- Inspect trolley including all moving parts, where access permits.
- Inspect track for damage/signs of wear/bending.
- Check and tighten all visible/accessible fixings.
- Any galvanised components showing signs of corrosion, wire brush thoroughly and apply galvanised spray/paint as appropriate. If rusted significantly take digital photographs and include in inspection report.
- Pull test visible end fixings to concrete / brickwork / structure (where possible) 6kN - 15 secs.
- Clean entire track run with white spirit.
- Any part of the installation or fixings that may need additional attention take digital photographs and include in the inspection report.
- Any major components i.e. other than nuts/ bolts/ washers etc which may need replacing report to client and establish costing so it can be repaired whilst on site, if possible.
- Check system plaque position & mark up to reflect date of the next required inspection. Establish if additional plaques are required due to any refurbishment works.



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