Roof Edge Fabrications

A KEE SAFETY COMPANY

O&M - CABLOC

Cabloc

INTRODUCTION

Cabloc has been designed to provide vertical fall arrest protection based upon a vertical tensioned cable system and arrester device. This system is extremely flexible in its application and will allow an operative complete hands free protection. Cabloc has been developed for use in areas where wind loading would inhibit the use of Railok or in instances where a track system would encumber the general use of the existing system.

SPECIFICATION

The system relies upon a tensioned galvanised or stainless steel 8mm cable (+o.4) with 19 solid core strands to prevent deformation under load. The cable is clamped to the top of the ladder with an impact indicating shock absorber and at intermediate points (10m) along the length of the stringer. These intermediate brackets allow the cable to be released as the arrester device passes through and the tensioned cable then simply springs back into the bracket. At the bottom of the ladder there is either a counterweight, or alternatively the cable is attached to a tensioner and clamped to the ladder.

An arrester device with a double cam-brake is connected to the cable and via a karabiner to the operative's harness. In order for the system to fail, the operative has to remove the karabiner connecting the lanyard to the device. Once this has been disconnected, the arrester device can be removed from the system, thus preventing misuse.

LEGAL REQUIREMENTS

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 Roof Edge Fabrications 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.

INSTALLATION CABLOC - KEMSLEY MILL

Cabloc has been installed at Kemsley Mill in Kent to provide safe access for maintenance purposes to the towers which house the Mill's CCTV cameras and lighting systems. As with many of today's modern sites, CCTV cameras and floodlighting are strategically placed around the mill to provide a safe working environment. However, the provision of the systems lead to a further health and safety issue - how to ensure safe maintenance of the equipment. The problem has been solved by the installation of a Cabloc system which provides total safety when access to the towers is required. The system's cable is clamped to the top of the tower with an impact shock absorber and then at regular intervals along the length of the system. Should an operative fall then the shock absorber will absorb the energy caused by the fall, preventing serious injury.

Roof Edge Fabrications Cabloc Specification - BS EN 353-1/353-2

PRODUCT SPECIFICATION

FEATURES :- A hands free vertical fall protection system.

GENERAL

A cable based fall arrest fall protection system for fixed structures.
The system provides hands free falls from height protection compliant to EN 353-1/353-2.
System incorporates an Anchor Bracket, Shock Absorber, Cable Guides and Tensioner/Counter Weight at the base of the structure. The Shock Absorber is designed to deploy at a minimum load of 2.4kN should an operative fall, thus reducing the loadings applied to operative and structure.

MATERIALS

Primary components connecting to the cable are fabricated from 316 Grade Stainless Steel. Secondary components are fabricated from steel to BS EN 10025 S275 Grade and S275JO Grade. All steel components are then hot dipped galvanised to BS EN ISO 1461. All fixings are A2 Grade Stainless Steel. The cable consists of an 8mm 316 grade stainless steel 7 x 7 structure with breaking resistance of >37kN. The system is pre-tensioned to 80daN.

DESIGN

When designed as fall arrest systems a rescue plan must be incorporated within the design.
The spacing between Cable Guides can be up to 10m.
The system can be installed on various structures using specifically designed brackets.

TRAVELLER

The traveller incorporates a further shock absorber and specific connector joined via a trace wire to the twist lock karabiner.
The system is designed to allow entry/exit at any point along the entire length of the system, thus permitting access to multiple levels using a secondary fall protection system.
This traveller has been engineered with a double action fail safe mechanism and has no mechanical/moving parts which reduces the potential for misuse and maintenance of the system.

TESTING

All systems have been tested to EN 353-1/353-2.

ANNUAL RECERTICATION

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

Roof Edge Fabrications Cabloc Specification - BS EN 353-1/353-2

BRACKET - AC 340
General purpose anchorage bracket designed to take the loads generated in the event of a fall occuring.
Designed to be adaptable for most ladder/mast designs.
Constructed from 316 grade stainless steel.
Net weight : 2.5 kg.

SHOCK ABSORBER - AC 325
Designed to operate with a minimum of 2.4kN loading.
Constructed from stainless steel AISI 304-303.
Maximum displacement 70mm.
Breaking strength >52kN.
Net weight : 1.1kg.

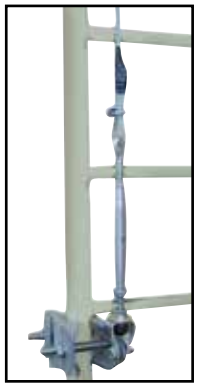
CABLE GUIDE - AC 320
General purpose cable guide fitted at 10m centres.
Constructed from stainless steel and rubber.
Net weight : 0.36kg.

ARRESTER SHUTTLE - AC 350
Easy connection & disconnection at any point.
Constructed from stainless steel AISI 304.
Breaking strength >25kN.
Net weight : 0.7kg.

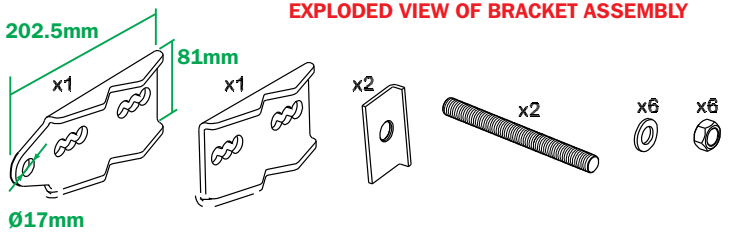
CABLE - AC 300
Stainless steel cable 8mm diameter.
Breaking strength >37kN.
Net weight : 0.246kg. per metre.
Alternative galvanised cable 8mm diameter.
Breaking strength >35kN.
Net weight : 0.21kg. per metre.

TENSIONER - AC 330
Utilised to tension the cable to the optimum requirement with built in indicator.
Material : stainless steel 316.
Breaking strength 59kN.
Net weight : 0.635kg.

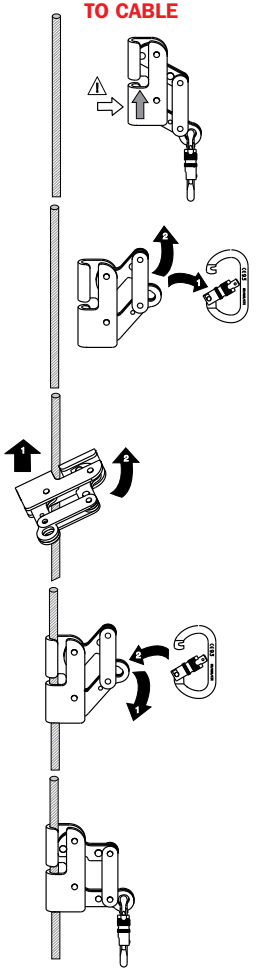
RECERTIFICATION
Annually in accordance to BS EN 365 and BS 7883.



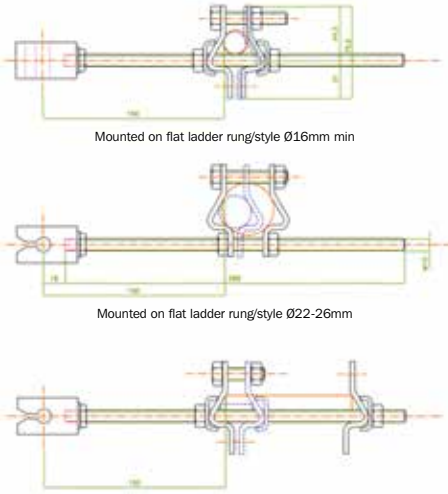
EXPLODED VIEW OF BRACKET ASSEMBLY

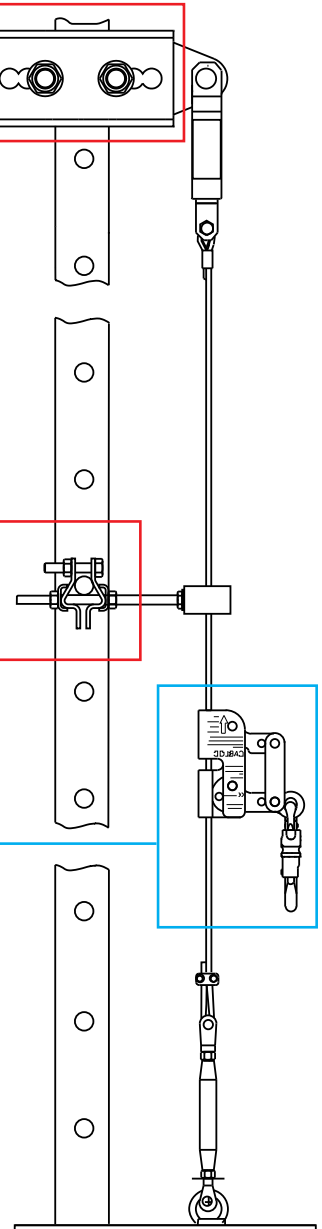


ATTACHMENT OF ARRESTER/SHUTTLE TO CABLE



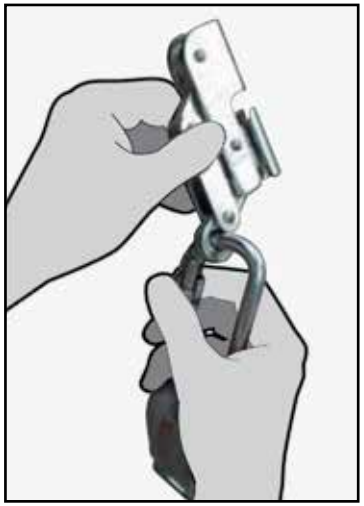
CABLE GUIDE BRACKET ATTACHMENT



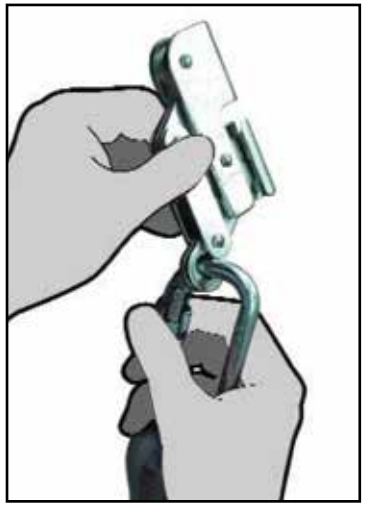


COMPLIES WITH - BS EN 353-1/353-2

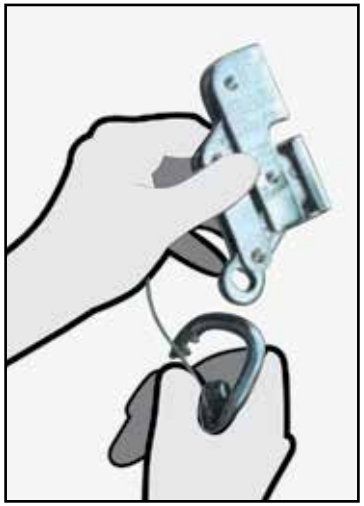
Shuttle Operation



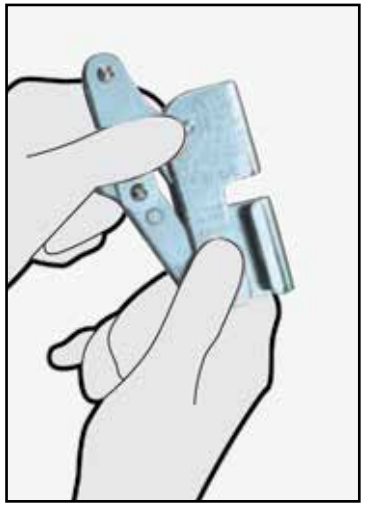
a. Take the shuttle and auto twist lock karabiner in two hands. Twist the safety clasp in a clockwise direction as shown.



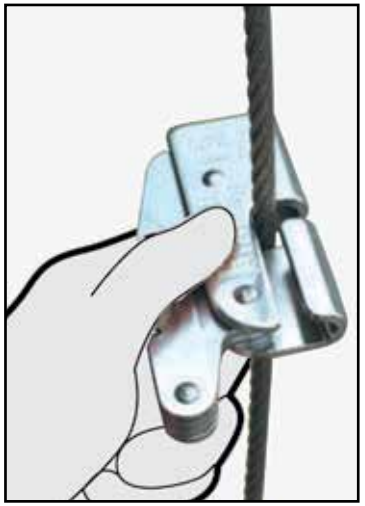
b. Whilst twisting the safety clasp push the karabiner together using your thumb as shown.



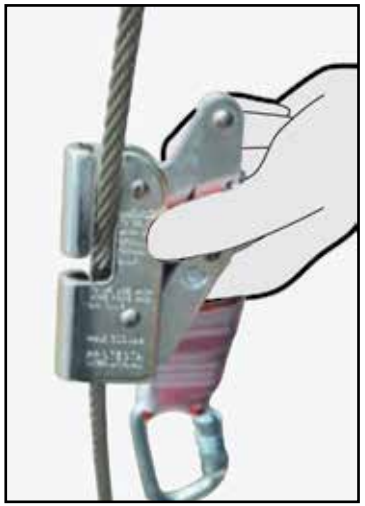
c. Now detach the karabiner from the shuttle.



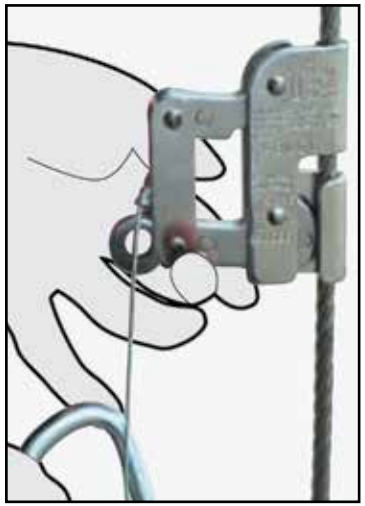
d. Having removed the karabiner push up the latch as shown.



e. Holding the shuttle horizontally, position on the cable as shown and rotate the whole shuttle anticlockwise.

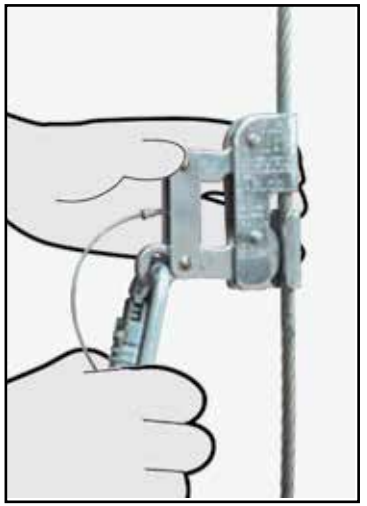


f. Ensuring the cable is positioned on both the top and bottom cable guides as shown.



g. Ensure the arrow on the shuttle is pointing in an upwards direction and release the latch so the shuttle is held on the cable.

h. Take the karabiner and twist the safety clasp in a clockwise direction. Whilst twisting the safety clasp push the karabiner together utilising your thumb as shown.



i. Thread the karabiner through the hole in the shuttle and release the karabiner so that it closes and is locked into place.

j. The shuttle is now ready for the appropriate PPE to be connected to the auto twist locking karabiner as shown above.

Roof Edge Fabrications Cabloc 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.
- Climb the complete system and check the intermediate brackets for wear & tear. Check the system still serves the client's needs.
- Establish if any modifications, additional products are required to reflect any refurbishment or additional plant and equipment that has been installed and requires access.
- Inspect shock absorber.
- Inspect cable for damage / kinks / signs of wear.
- 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.
- Re-tension cable if required to allow smooth operation of the system, (where required).
- Clean entire cable run with white spirit.
- Any part of the installation or fixings that may need additional attention including shock absorber - 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.

Fixed Ladder

INTRODUCTION

Employers have a duty under the Health & Safety at Work etc Act to provide a safe means of access and egress to the workplace. There is also an obligation to ensure that work equipment is safe, properly installed and maintained.
Additional guidance on fixed ladders can be found in BS4211 which specifies the requirements for ladders with single bar rungs which are fixed permanently to structures to provide a means of access. This includes usage on high structures such as chimneys, silos and bins.

MAINTENANCE & RECERTIFICATION

Each time a ladder is used, a visual inspection must be carried out by a competent person to check for wear and abrasion. Regular checks to certify that the fittings, hinges, anchor points, supports and mounting points are rigid and stable enough to ensure the safety of users must also be carried out.

Periodic inspections by a competent person are required under Regulation 5 of the Workplace (Health, Safety & Welfare) Regulations, the Work at Height Regulations 2005 and BS 4211.

When inspecting or recertifying a ladder, a risk rating must be determined by considering its physical compliance and factors such as lighting levels, environment, housekeeping, proximity of adjacent services etc.

FALL PROTECTION

Fall protection must be provided when the ladders is more than 2m high or if there is a risk of falling more than 2m, for example if there is an unprotected side to the access platform (or similar structure) or if radius from the centreline of the ladder is less than 3m.

For new installations a risk assessment must be carried out when considering the removal of traditional hoops and installation of a vertical fall arrest solution. The height of the ladder, frequency of use, level of training and availability of PPE will need to be considered.
In instances where a ladder is fitted with both hoops and a vertical fall arrest system the responsible person will need to contact the manufacturer to establish the suitability of this combination. During the recertification process this needs to be addressed.

Fall arrest systems should be fitted in accordance with BS EN 363 . If a guided type of fall arrester is fitted then this must be in accordance with BS EN 353-1 or BS EN 353-2.

Any unauthorised access must be prevented through the use of suitable safeguards such as locking devices.

Fixed Ladder

RISK RATINGS

Each ladder should be assessed and assigned a risk rating to enable further actions to be prioritised using the following risk level indicator based on BS8800:2004.

Likelihood of Harm	Severity of Harm		
	Slightly Harmful	Harmful	Extremely Harmful
Very Unlikely	Very low risk	Very low risk	High risk
Unlikely	Very low risk	Medium risk	Very high risk
Likely	Low risk	High risk	Very high risk
Very Likely	Low risk	Very high risk	Very high risk

Based on the risk level estimations, recommendations are made using the following control plan:

Risk Level	Tolerability: Action Guidance
Very low	Considered acceptable, maintain existing controls May be upgraded when other works are done
Low	Considered acceptable, maintain existing controls Consideration should be given to whether the risk can be reduced but the associated costs should be take into account Action within 2 years
Medium	The possibility of a fall can not be ruled out Remedial works or changes to working practices may be appropriate A full risk assessment of all work activities involving the equipment should be undertaken Action within 1 year
High	Significant risk of a fall occurring Remedial works may be required Action required within 3 months Immediate control measures may be required until the risk can be reduced to an acceptable level
Very high	A substantial and unacceptable risk that a fall could occur Remedial works are very likely to be required Action recommended within 6 weeks Immediate control measures should be put in place until the risk has been reduced A full risk assessment of all work activities involving the equipment should be undertaken

Fixed Ladder

COMPLIANCE CRITERIA

As stipulated in the Workplace (Health, Safety and Welfare) Regulations, ACOP and BS4211, the following principle criteria should be used when assessing the compliance of each ladder.

- Fixed ladders should not be used where it would be practical to install a conventional staircase
- The ladder should be of sound construction, properly maintained and securely fixed
- Assembly should be sufficiently rigid and stable to ensure safety of the user under normal conditions
- Handrails should extend at least 1100mm above landing
- Stiles should extend to the height of guarding
- The ladder should not exceed 6m without an intermediate landing
- Hoops should be fixed if the ladder exceeds 2.5m
- Fall protection should be provided if there is a risk of falling more than 2m
- Hoops should be a maximum of 900mm apart
- Hoops should not exceed 1500m apart with uprights not more than 300mm apart
- The width between the strings should be between 300mm (400mm preferred) and 600mm
- Handrails should open out to between 600mm & 700mm above the landing
- Rungs must withstand 1.5kN and have a diameter of 20-35 mm
- The top rung should be level with the platform
- Rise between rungs should be 225mm to 300mm
- A minimum of 200mm clear space should be behind each rung
- Clear space on the user side should be 600mm

EXAMPLE DATA SHEET

Once the Risk Ratings and Compliance Criteria have been determined, a typical ladder date sheet would be as follows:

Dimension	Observed	Criteria	Compliance
Height between rungs	220	225-300	x
Width between strings	305	300-600	x
Clear toe space	400	>200	√
Partial toe space	400	>150	√
Diameter of rungs	15	20-35	x
Height of ladder	2860	6000 landings	√
Fall protection provided	No	Fall >2000	x
Height to cage	N/A	2200-3000	√
Cage diameter	N/A	650-800	√
Sq cage depth	N/A	700-800	√
Sq cage width	N/A	650-700	√
Distance between cage rails	N/A	<300	√
Height between cage hoops	N/A	<1500	√
Top cage hoop at handrail	N/A	Level	√
Height of handrail at top	550 partial	>1100	x
Width of strings at top	220	600-700	x
Top rung level with landing	Yes	Level	√
Clear distance behind user	1000+	>600	√
Secure fixings	Yes	Secure	√
Sufficient fixings	Yes	Varies	√
Rigid strings	Yes	Stiff	√
Clear of traffic routes	Yes	No hazard	√
Clear of services	Yes	No hazard	√
Lighting level	Yes	Adequate	√
Floor surfaces clean/clear	Yes	Avoid slips/trips	√
Is ladder appropriate	No	Stairs practical?	x

Comments: This ladder appears to be fabricated locally and does not meet a number of the design criteria. For example, the hand holds and rails at high level are poor and transfer down onto the ladder is not easy. There is space available to install a proper staircase if access is required on a regular basis. The roof to which access is gained is also poorly organised and may not be strong enough to support a person's weight throughout and there are no delineated routes or guardrails.

HEAD OFFICE
Roof Edge Fabrications Limited
144-146 Dalsetter Avenue
Drumchapel
Glasgow G15 8TE

t +44 (0)141 949 1014
f +44 (0)141 949 0998
e anchors@roofedge.co.uk
w www.roofedge.co.uk