# Overhead Fall Protection Systems Installation Manual

# Contents

# Introduction

This guide has been compiled to ensure the correct installation of Overhead Lifeline systems is adhered to at all times.

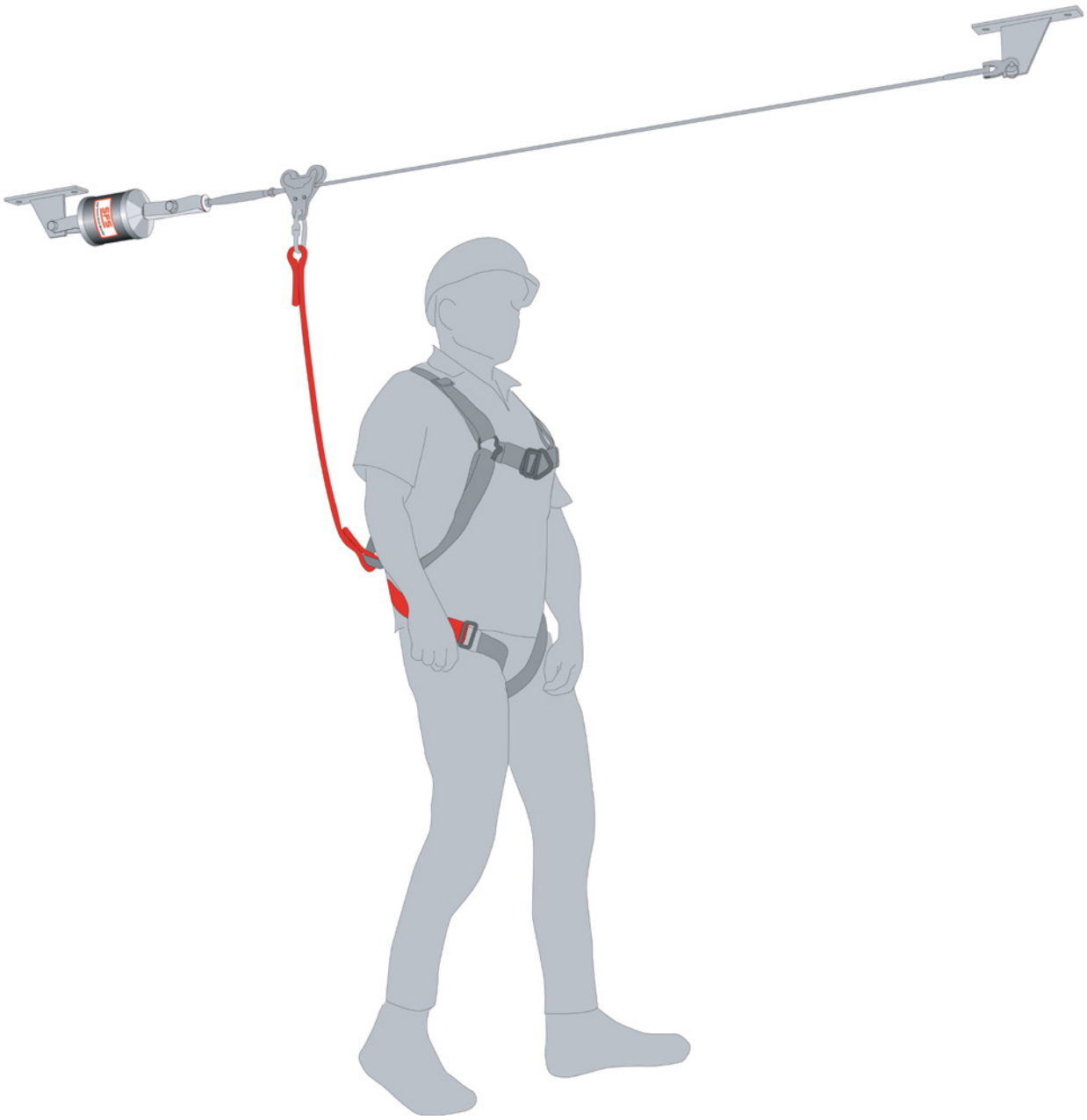
The installer should have previous Overhead Lifeline installation knowledge, design understanding and have taken part in SFS training.

It is important that the installer fully understands this guide before commencement of installation on site.

Overhead Lifeline systems are designed to act as a fall prevention method, or as a means of minimising the consequences of a fall, should it occur.

Only trained personnel should be involved in the design, correct installation, and recertification of Overhead Lifeline systems. Failure to follow this guide could put people's lives at risk.

It is imperative that the correct components are used for the specific application, and any doubts should be resolved by seeking guidance from SFS Fall Protection.



# Recognised installers

Only competent installers trained by SFS are certified to carry out installation and recertification of the Overhead Lifeline system.

Recognised installers should ensure their personnel on site are competent and trained to the standards expected by SFS.


# Conformity

SFS Overhead Lifeline systems are a series of fabricated stainless steel anchor points and intermediate brackets secured to walls, beams and other structures, to create a system using either a 7x7x8mm or 1x19x8mm stainless steel wire cable. Tested by SATRA to EN795:2012 and CEN/TS16415:2013.

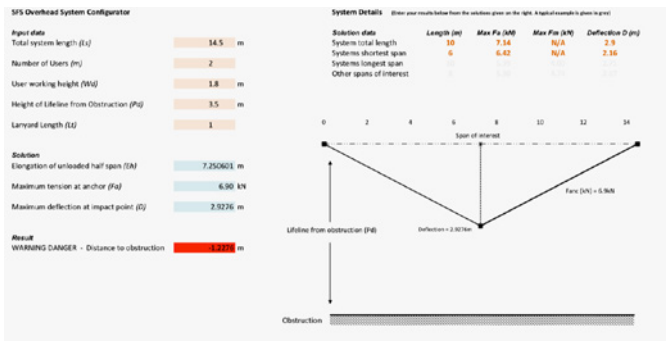
The 'system' refers to SFS Fall Protection components and wire, none of which should be substituted by non-approved components, modified or altered without the prior consent of SFS. Systems should not be dismantled or tampered with, as doing so could alter the performance of the system and invalidate its certification which could result in serious injury or death.

# Design and calculation

SFS Fall Protection comes complete with its own calculation package allowing for calculations to be made to give end loadings, system deflections and other detailed information assisting the system designer to propose a system that is fit for purpose.

The system requirement, together with the number of users, on-site conditions, free fall clearances, and structures to be fixed to, will all be considered by an SFS specialist or recognised installer who will run calculations and advise on a safe workable solution.

Structures and fixing methods should be capable of withstanding twice the loads generated by the calculation package to give 2:1 safety factor.



# System types

There are two SFS Overhead Lifeline system options to solve an array of work at height requirements.

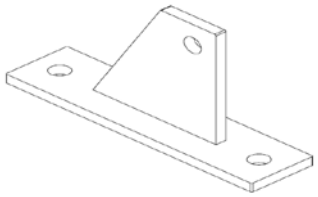
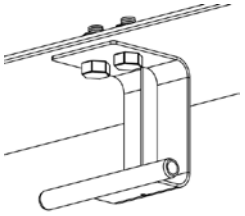
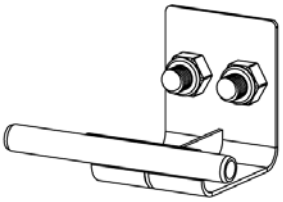
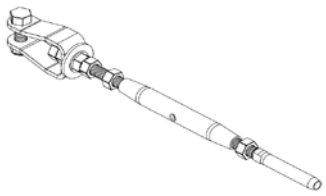
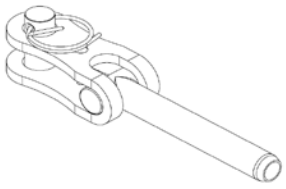
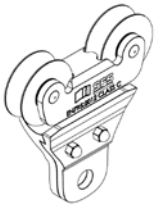
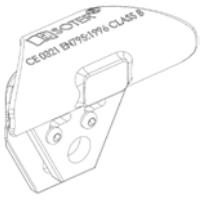
## Multi-span overhead system

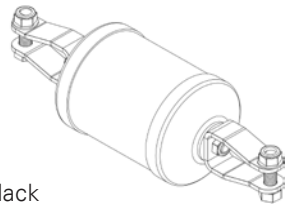
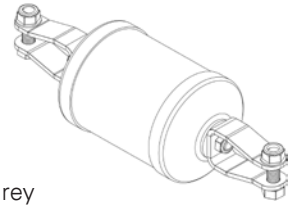
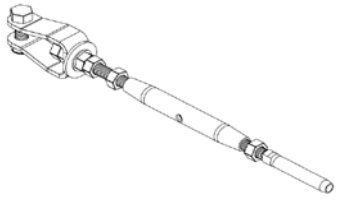
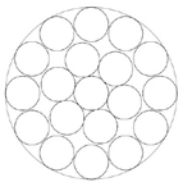
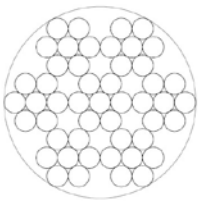
- Systems of multiple spans and deviations, of up to 250m in length
- System lengths drop to 175m with 1 corner, 150m with 2-4 corners, 125m with 5+ corners
- Up to 4 users
- Option of wall or overhead mounted componentry
- Internal and external corners can only be wall mounted
- Wall mounted corners can only be used with the SFS Slyder Device
- 7x7x8mm and 1x19x8mm stainless steel wire can be used
- Tensioned to 0.8kN with use of standard shock absorber
- SFS Slyder device can be used on systems which are within the user's direct reach
- Systems out of direct reach to be used with Overhead Trolley

## High tension single-span overhead system

- Single spans only up to 30m in length without intermediate brackets
- Straight lines only
- Up to 4 users
- 1x19x8mm wire
- Tensioned up to 5kN with use of high load shock absorber
- Option of wall or overhead mounted componentry
- Overhead Trolley to be used for high tension systems

# Component list

| SFS Code | Part # | Description | Image |
|---|---|---|---|
| FP-OS-SF | 1543658 | Heavy Duty Shark Fin End Anchor |  |
| FP-OS-IB | 1501246 | Overhead Intermediate Bracket |  |
| FP-OS-HIB | 1591639 | Horizontal Mounting Intermediate Bracket |  |
| FP-OS-LT-D5 | 1501248 | 5kN Combined Line Tensioner & Indicating Disc for 1x19x8mm wire, high tension single span systems |  |
| FP-AC-TF | 1520785 | Toggle Fork |  |
| FP-OS-TD | 1501245 | Overhead Traveller Device |  |
| FF-PP-LA | 1501268 | Slyder Line Attachment Device |  |

| SFS Code | Part # | Description | Image |
|---|---|---|---|
| FP-SA-HT | 1618716 | High Tension Shock Absorber |  Black |
| FP-SA-LT | 1625565 | Low Tension Shock Absorber |  Grey |
| FP-LT-D | 1501205 | 0.8Kn Combined Line Tensioner & Indicating Disc for 7x7x8mm, low tension systems |  |
| FP-AC-C-1198 | 1555100 | Stainless Steel 1x19x8mm High tension wire |  |
| FP-AC-C-778 | 1501253 | Stainless Steel 7x7x8mm Low tension wire |  |
| FP-CK-EXT | 1625333 | External Corner |  |
| FP-CK-INT | 1625335 | Internal Corner |  |

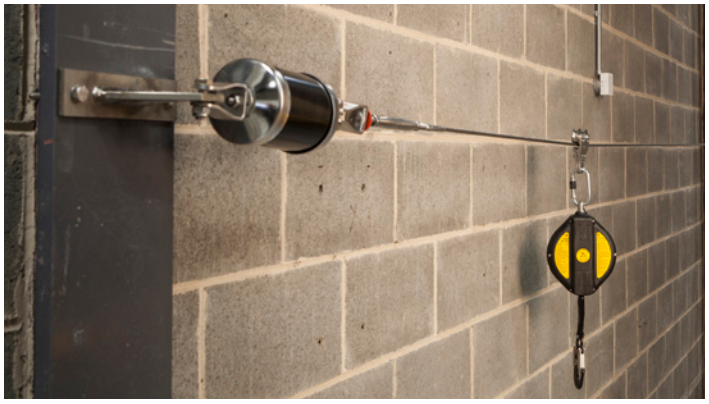
# PPE

The correct PPE will be dictated by the requirement and the system type proposed by SFS and/or the recognised installer.

This should be clearly shown on the system information tag, and specific user information supplied with the installed system.

**Lanyard**
Lanyards to be appropriate to the system design, where possible always use the shortest practicable. Conforming to EN355:2002.

**Fall arrest blocks**
Only devices supplied by SFS Fall Protection should be used on SFS Overhead Systems. All blocks supplied by SFS incorporate an internal braking mechanism to reduce the fall arrest force to less than 6kN.



**Full body harness**
Conforming to EN361.

# Installation

End terminations and intermediate components should be secured to the structure using a method proven to give loadings specified by SFS or recognised installer generated from the SFS calculation package.

**Tool list**
In addition to tools required to secure components to walls/ structures etc. the following will be required:

- 17mm spanner/wrench
- 19mm spanner/wrench
- 19mm extended socket with wrench
- 2 x pairs of mole/vice grips
- Marker pen
- Tape measure
- Knife
- Cembre 130kN Hydraulic swager/crimper
- Cembre Hydraulic wire cutters

## Specialist tools required

Hydraulic wire cutter for 8mm stainless wire

130kN Hydraulic swager for 8mm stainless wire

## Wire measure and cutting

1. Before any accurate measurement can be made, the wire must first be loosely pulled from the start of the system, through every component fitted to the end point.

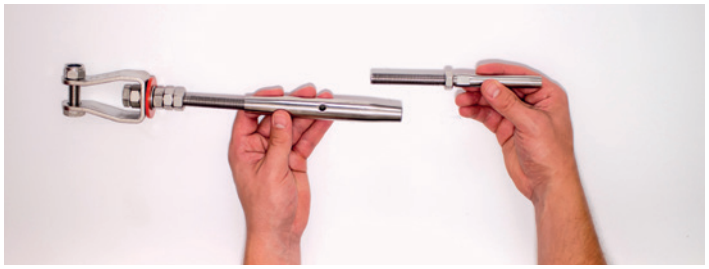
3. Working from an anchor point along the line, take up the tension to remove as much sag as possible. Clamp off at the last component.

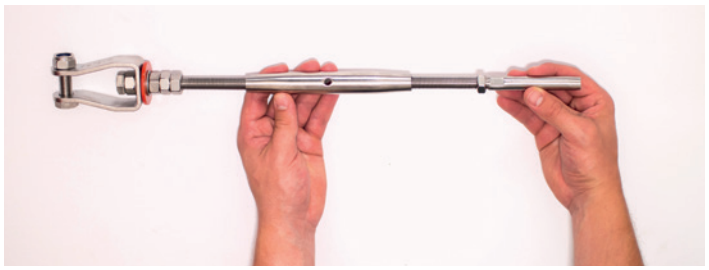
2. To gain the most accurate measurement it is advised to swage/crimp the end termination and fix to the end anchor points. If the end component is a line tensioner, ensure the tensioner is fully wound out prior to crimping.
See section on crimping/swaging for more details.

4. Crimp/swage the tensioner device and tension the line until the indicating disc spins freely, removing the sag from the system.

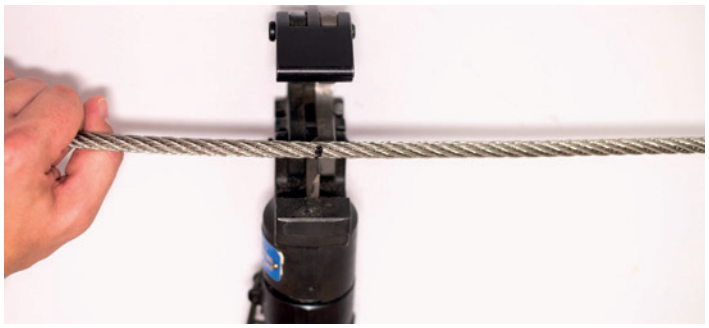
**Termination swaging/crimping**

1. Take the combined tensioner/line tensioner and fully unwind both ends from the central barrel first. Then wind both back in, two full turns. This maximises the amount of tension it can take up.





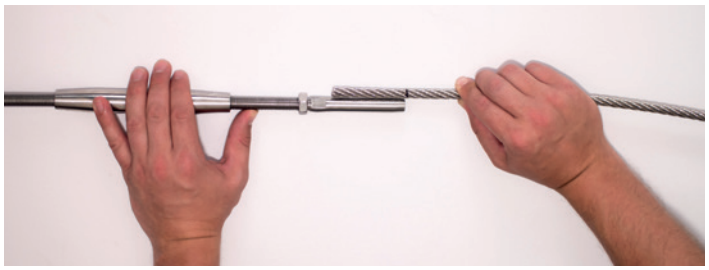
2. Fit the tensioner to the start component loosely, and whilst pulling the wire taught, mark the wire with a marker pen against the pressing on the tensioner. You can now cut the wire on the marking with the Cembre HT-TC026 hydraulic cutter. This will ensure the wire is cut correctly.



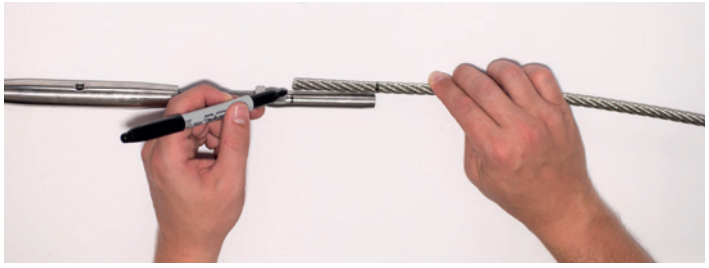
3. As the wire is now cut to the correct length, the tensioner can be removed from the start component ready for crimping/ swaging.

4. Insert the wire into the termination fully, and mark the wire at the end of the termination.

5. Remove the wire and place alongside the termination up to the point just marked.



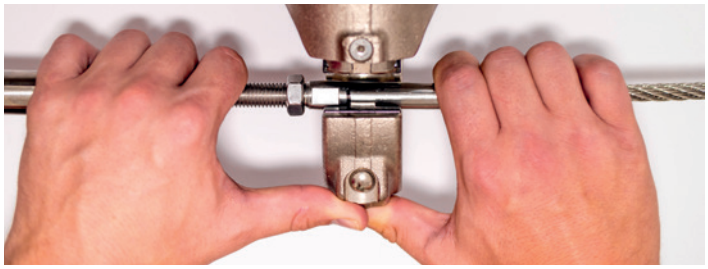
6. Now mark on the termination where the wire ends. This shows where the hollow part of the termination ends, and where the first crimp will be located. This needs to be done on all terminations - tensioners and toggle fork ends.



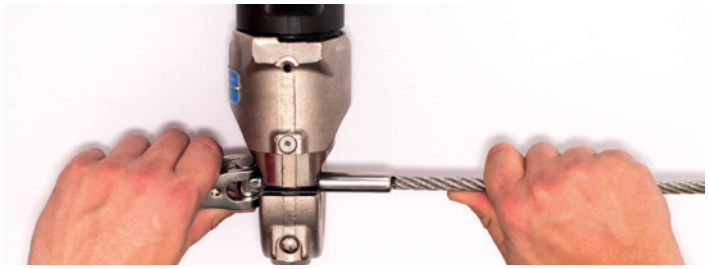
7. Re-insert the wire fully ensuring the wire is fully engaged in the termination up to the point marked.

8. Take the Cembre HT-131-C crimping tool and set the barrel to ‘close’.

9. Position the central section of the die so that the first crimp is made next to the line marked on the termination itself.



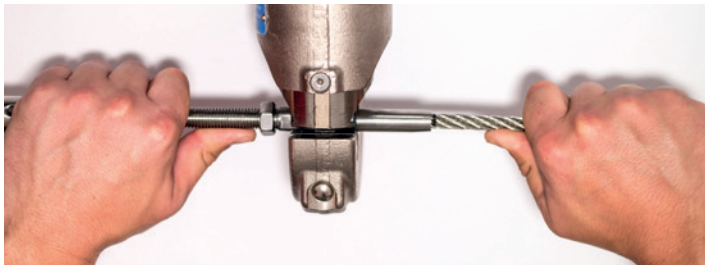
10. During the first crimp ensure that the wire is held into position so that it doesn’t slip. Pump the handle on the crimper until a distinctive ‘click’ is heard and pressure is released from the crimper.



11. Turn the crimper barrel to ‘open’, pump the handle once to release the jaws.

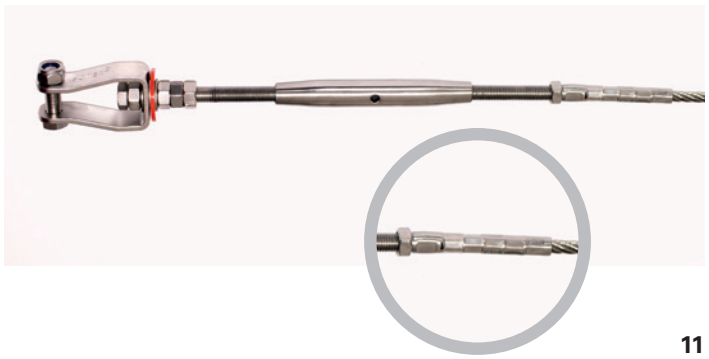
12. Remove the termination and check that the crimp has been fully pressed and is stamped A10. This shows that the crimp has been properly performed and the die itself is not worn.

13. Moving down the termination, four more crimps need to be performed, ensuring there is a 1mm gap between each. It is also advised to turn the termination after each crimp so that they are not pressed in the same plane which will prevent the termination from slightly bending.



14. All five crimps must be completed on the straight shank hollow section of the termination, and before the chamfered end. Each crimp should show the A10 stamp clearly and not overlap.

15. The termination has now been fully crimped and can be connected to the post by removing the pin/bolt and securing to the start/end post.



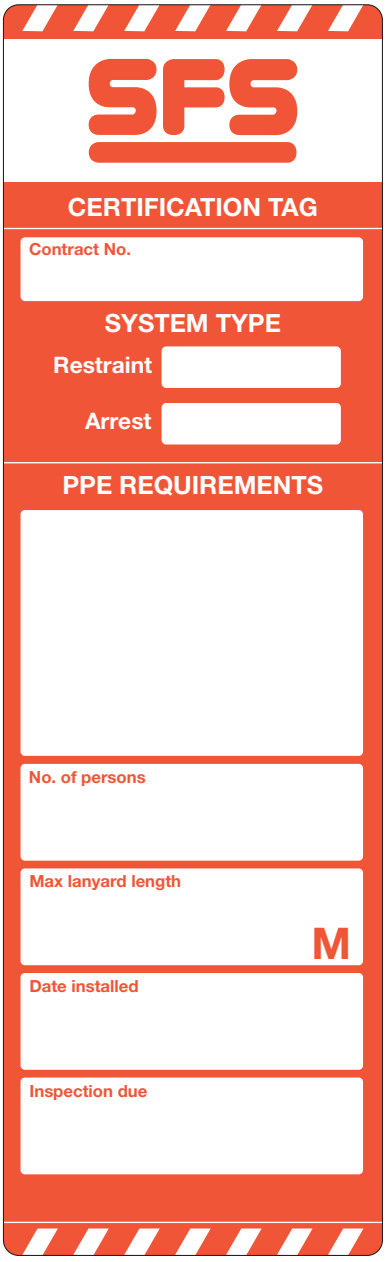
**System tagging**
It is important that all installed systems are fitted with a certification tag at the point of access, similar to the tag shown opposite, conforming to BS EN 365:2004.

The certification tag should include the following information to support the more detailed O&M Manual:

- Contract number/name so that the system can be identified
- System type - restraint/arrest
- PPE Requirements for the user to use the system safely & correctly
- No. of persons the system is designed for
- Maximum lanyard length - imperative in work restraint systems
- Installation date
- Recertification/inspection due by date

If the recertification date has lapsed, the system **should not be used** until a recognised installer has recertified the system as fit for use.

Systems are required under EN795 to be recertified annually.



# Annual maintenance and Recertification

**General Notes**
Safety line systems must be inspected and recertified at intervals not exceeding twelve months.

Vertical systems are affected by changes of temperature; this will result in expansion/contraction of the wire. Where systems are subject to significant seasonal temperature variations, these will require retensioning for summer and winter operation.

Only those components manufactured and supplied by SFS are permitted for use. The exceptions to this are bespoke fittings required to attach the system to particular structures. Wherever possible such bespoke fittings should be designed and manufactured by SFS, or their design approved. Where such bespoke fittings are provided from another source, it is the installer company's responsibility to ensure they are fit for the purpose intended and carry the necessary approvals.

Under no circumstances must a standard SFS component be modified or replaced by components from another source.

It is important that all devices will align themselves correctly through all componentry; and that there are no obstructions or structures that interfere with the device, or deflect the wires path.

The structure to which SFS Fall Protection systems are to be installed should be sufficiently strong to withstand the fall arrest/restraint loadings for which the system is designed. These loadings can be calculated by the installer or provided by SFS. If there is any doubt as to the structure's ability to withstand such loadings, then the system should not be installed without appropriate testing on the substrate.

**Inspection procedure**
**VISUAL INSPECTION OF COMPLETE SYSTEM**

- Check for obvious damage
- Chemical contamination
- Loose fittings
- Building modifications that have resulted in reduced free fall distance/clearance
- Cable damage, paying particular attention to wire passing through any bracketry
- Excessively loose cable

**CHECKING OF INDIVIDUAL COMPONENTS**

- Components should be secure and tightened to 42Nm.
- Damaged components should be replaced and a careful inspection of any wire passing through the damaged parts is required.

**Wire**
- 7x7x8mm Stainless Steel cable (minimum breaking load 38kN).
- SFS recommends that maximum in-line loads of 15kN should be targeted, this figure allows for a Factor of Safety of 2, based on the breaking strength of the cable.
- Visually examine cable, intermediate and end anchorages. The cable must be replaced if there are any signs of damage (kinks, fretting, etc.).
- All systems to be properly tensioned and as such must incorporate a SFS supplied line tensioner and tension disc indicator.
- Correct pretension is achieved when the line tensioner disc spins freely. **Never over tension a system.**

**Swaging**
- Cable swaging should be accomplished by use of 6mm hexagonal form dies using 5 continuous 'bites.'
- **Note:** the 6mm dimension refers to the width of each face. The across flat dimension, after swaging, is typically 11mm.
- Testing swage joints is possible with specialist equipment from Hydrajaws Ltd. www.hydrajaws.co.uk or Tel. 01675 430370.
- Fittings should be tested to 15kN for 7x7x8mm stainless wire.
- Maintain the applied load for 1 minute and then release.
- Thoroughly examine the following:
  - All swaged connections for 'slip'
  - All components for damage
  - End & Intermediate anchorages for damage/slip
  - The cable for damage
- Test all system terminations and in-line swaged joint.
- Care must be taken when using cable grip devices, that damage to the cable does not occur and that there are no loads transmitted to the intermediate anchorages.

# Operation and maintenance/ User instructions

It is imperative that any safety line system, once installed, is accompanied by a full O&M, and user instruction manual. This manual should be given to the building owner.

Any operative who is to use the system should have access to this document, allowing them to understand how it can be used safely, but also kept in good condition, and recertified at correct intervals.

O&M Manual should detail the following:

- Site location, building name, and reference/location of line
- Installation certificate including installation date and recertification due date
- Contact details of approved company who installed the line
- System layouts
- The purpose or areas in which the system will allow access to
- Recommended PPE to be worn
- User equipment detailed ensuring safe use
- Rescue plan in event of a fall
- Number of persons the system is designed for
- Usage/record card
- General safe use and good practice
- Connection of travelling device
- Inspection and maintenance records

# Warranty

All Fall Protection products sold within the SFS group carry a standard 12 month 'fit for purpose' product warranty*

In cases where customers seek additional comfort, an extended warranty can be applied for*. This should be done by the system installer within the first 3 months of installation.

Warranty terms maybe 1-24 years, or even longer than this, subject to conditions and project specification.

A pre-contract questionnaire, covering building use & proximity to chemicals or coastal environments will be required.

All warranties are subject to the frequency of inspections and system recertification by a recognised SFS Fall Protection system installer.

The Fall Protection range is made from non-ferrous and stainless-steel components, it carries a design life which goes beyond that of the actual building.

Standard terms and conditions covered by our insurers is available on request.

*terms and conditions apply

# Testing standards

All SFS Fall Protection products are tested to, and pass, all the relevant and recognised industry standards for each type.

The Overhead Lifeline system passes EN795:2012 Type C and CEN/TS 16415:2013 Type C for up to 4 users. The Slyder traveller device (wall mounted systems/systems incorporating corners) and the Overhead traveller device (trolley type for high tension single span systems) conform and meet the requirements of EN795:2012 & TS16415:2013.

All tests have been witnessed and certified by independent testing body SATRA. These tests have been carried out both at SFS's testing facility, and at SATRA's own facility.

# References

| | |
|---|---|
| BS EN 795:2012 Type A | Anchor device with one or more stationary anchor points while in use, and with the need for a structural anchor(s) or fixing element(s) to fix to the structure |
| BS EN 795:2012 Type C | Protection against falls from height Single User (anchor devices employing a flexible anchor line which deviates from the horizontal by not more than 15°) |
| PD CEN/TS 16415:2013 Type C | Protection against falls from height multi-user HLL (anchor devices employing a flexible anchor line which deviates from the horizontal by not more than 15°) |
| BS 7883: 2005 | Code of practice for the design, selection, installation, use and maintenance of anchor devices conforming to BS EN 795 |
| BS 8610:2016 | Personal Fall Protection equipment anchor systems |
| CE 0321 EN 795:1996 Class B | Travelling device CE marking |
| EN ISO 9227 | Salt Spray Corrosion Test for CE |
| EN 361:2002 | Full Body Safety Harness |
| EN 362:2002 | Karabiners/connectors |
| EN 355:2002 | Lanyard Shock Absorbers |
| EN 354:2002 | Fall Arrest Lanyards |
| BS EN 365:2004 | Instructions for marking products with user instructions, inspection periods and re-testing |
| ISO 9001 | International standard that specifies requirements for a quality management system (QMS) |

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