

## Lifeline Systems, Fact and Fiction

Many readers will be familiar with the term Mansafe™, and associate it with a catch all title for all lifeline systems, in much the same way that the Hoover™ became a by word for the vacuum cleaner.

The truth is that many different lifeline systems are available, from a variety of manufacturers, both in the U.K and elsewhere in the world.

Like the humble vacuum cleaner lifeline systems can vary enormously in design, aesthetics, cost and of far greater importance, safety. Effectively, '**you pay your money and you take your chance**', unwise though that may sometimes be.

In reality, choosing a lifeline system should involve a considerable amount of thought, as invariably it is a considerable cost and may literally be a '**once in a lifetime decision**' for the user.

**Fiction:** A lifeline is just a bit of wire stretched between two end connections.

**Fact:** It is a technically developed, pre engineered safety system, designed to arrest falls from height in a given manner, proven by a complex calculation of pre determined data, collected in testing.

**Fiction:** We can connect as many people to the cable as we need, can't we?

**Fact:** No, the systems will always be limited to a maximum number of users, and this should be clearly shown on the system tag, attached to each system. Maximum users will again be pre determined by calculation.

**Fiction:** The system doesn't require inspection on a regular basis, it has a 20 year life.

**Fact:** All safety systems, including Lifelines, require regular inspections, this includes pre use, and annual maintenance by an approved installer. This not only ensures that the system has not been damaged or misused, but also renews the manufacturers warranty.

**Fiction:** We can still use the system if we have a minor fall on it and it looks ok.

**Fact:** The system must be withdrawn from service following falls of even the most minor nature, until inspected by a competent person, such as an approved installer has been undertaken

**Fiction:** Installing a lifeline along the ridge of a roof, covers us under the requirements of CDM, and duty of care under the Health and Safety at Work Act 1974, section 2.

**Fact:** Not necessarily, the system should always be provided based upon the associated risks, and expert advise should always be sought, when any doubt exists. Remember that the provision should be appropriate for the risks, not only in the construction phase, but also for on going access and maintenance requirements

### HOW SAFE IS YOUR LIFE-LINE SYSTEM

Over the last 2 years the installed safety systems business ( more commonly and in some circumstances inappropriately referred to as 'Mansafe Systems') has seen a rapid growth in non penetrating, top fixed lifeline systems. A problem for the industry as a whole, is that legislation is lagging behind product developments and currently no formal, reliable standard exists for the testing of top fix roof anchors. This has meant that manufacturers of systems have had to develop their own testing methods and test houses try to varyify results against what standards do exist in order to issue a certificate of conformity to EN 795.

This inevitably means that end user customers are in some circumstances sold products which they believe are fit for purpose, but actually fall way short of what is required.

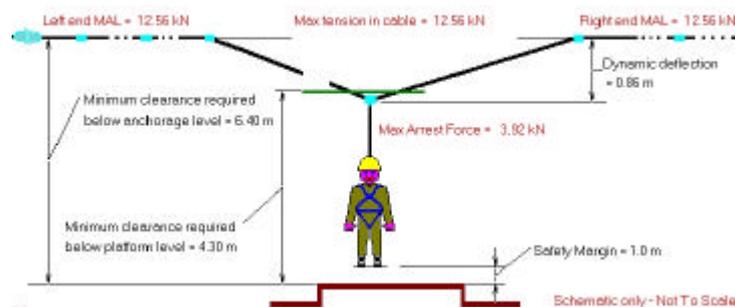
The fixing methods and lifeline support posts vary considerably.

Responsible manufacturers have, and do, continue to test the fixing methods and post designs on a variety of roof systems, in conjunction with the roof system manufacturer, in order to ensure that the performance of the combined system i.e. support post, fixings, lifeline and more importantly roof sheet, roof fixing system, liner tray, fixings, purlins etc. is capable of supporting dynamic loads, consistent with falls on lifeline systems. As insulation thicknesses increase due to Part L regulations, so do the distributed loads to the sub structure of the roof and its ability to resist dynamic loading is reduced.

In order to ensure safety, the assistance of roofing sheet manufacturers is not only welcome but essential to ensure design criteria, as top fix roof anchors distribute loadings to concentrated areas of the roof system. As such, properly tested anchors are only as good as the roof system to which they are fixed and everyone including the roofing manufacturer, the roofing contractor, the safety equipment manufacturer and the installer of the fall protection system have a duty of care to provide a product and system design which is fit for purpose.

The collection and analysis of the data produced from repeated and continued testing on a variety of roofing materials is essential to ensure that an accurate assessment of acceptable loads on both structure and user are achieved. Systems designed and installed in this way are determined to be **pre-engineered**.

The more dynamic tests carried out and the more accurate the data, the safer the installed system will be.



Sample provided by Uniline Safety Systems.

As the fall protection industry has seen near vertical growth, it has attracted companies that supply products, which sadly lack in proper product development and which are often sold as compliance products, based primarily on price. In order to properly protect yourself from selecting products which are not fit for purpose, there are a few things that you can ask to see.

The basis of any system is a certificate of conformity to EN795, provided by an Approved Test House, supported by a CE Certificate of Conformity to European Council Directive 89/686/EEC. Typically the lifeline system itself should have this as a minimum and whilst this standard only offers vague testing advice on roof anchors, a test certificate for the roof anchor, will provide a degree of reassurance. To support the system design, a simulation of the performance of the system should also be provided. Many installation companies, sell fall restraint systems to avoid the need to provide these simulations, however, it is debateable that many roof mounted systems can be classified as fall restraint, as it is impossible to know the nature of the work that may be required in the future and who might be doing it. Computer simulations, should be performed on a job by job basis and be specific to your particular system design.

In addition to this, you should question what the limitations of the roof anchors being proposed are, in relation to the system design. What is the maximum load that they can take in conjunction with the testing programme they have been subjected to and does the simulation concur with that limitation. Does the manufacturer have any approvals from roofing manufacturers or supporting evidence which demonstrate a more comprehensive testing programme, that accurately reflects the structure to which the system is intended to be used upon? Is the product supported by a guarantee and is the guarantee supported by product liability insurance.

When aligning yourself with a fall protection system, which you are selling to your customer, why should you not go to the same care and attention that you might give the roof system to which it is going to be attached. After all, if there is a problem in the future, it may be your reputation on the line.

### **A comprehensive testing programme will provide you with the reassurance you seek**

Tests by their nature require to be conducted under test facility conditions and as such it is extremely difficult provide realistic test results. In test it is often the case that support posts are fixed to single section roof sheets, which are fastened down to maximise rigidity. This helps to determine if the roof anchor can be physically removed from the external roof sheet or causes damage to it, but does not enable us to measure the performance of anchors with the full roof system. Responsible manufacturers, with faith in their products capabilities will welcome the opportunity of testing on an entire built up roof system and will be able to demonstrate a clear understanding of how their product impacts on it.

Conducting this type of testing requires significant commitment from the safety equipment manufacturer, but ensures that the end customer is provided with a safety product that will perform when it is required to do so, without catastrophic failure of the roof system. A good system should be able to reduce the overturning moment on the roof system and reduce the loading to an acceptable level.



**Standing Seam Clamp Fixing Pre Test**



**After A Dynamic Performance Test**

In order to accurately predict the performance of the fall arrest system, dynamic performance analysis software should be used in conjunction with the results of testing and an understanding of the limitation of the roof structure to which the system is to be fixed. This should include an understanding of how the load distributed by the roof anchor will affect the entire structure of the roof, not just the top sheet.

The reality is that lifeline systems are installed on many different roof types, under varied conditions, on new and not so new buildings. Roof fixings that are missed out, or that have not been correctly installed and structure that has corroded will impact on the performance of the system.

If we then add to these complexities the clients requirements, particularly on new build construction, when installers are often asked for the minimum provision, to satisfy legislation, potential for failure in the future vastly increases. Systems become unavoidably fall arrest and not fall restraint.

Responsible manufacturers and installers will advise on the correct, most appropriate and safest installation and responsible designers and architects will heed the advice and ensure that safe standards are implemented at the construction stage. If the entire supply chain is vigilant in the specification and selection of fall protection systems, then they will ensure that safety is not compromised for purely budgetary reasons.

With Lifeline systems in danger of becoming a commodity, with minimum requirement and lowest price determining the system to be installed, and not safety, ask yourself, would you feel safe attaching to your lifeline system?

If you have any questions regarding lifeline systems or other aspects of height related safety, please address them to