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**NEW SERIES**

# PERFORMANCE TTS



# Harnessing safety

With the recent focus on anti-entrapment devices on boom lifts, you might be forgiven for overlooking the fact that falls from height are actually the most common cause of death in the work place - as they have always been. With this being the case why is it that the number of fatalities from falls remains so high? Is it down to a lack of understanding or inadequate training? Perhaps legislation and industry standards are unclear? Or are the dangers inherent with working at height taken for granted? In this introductory feature - the first of several articles covering harnesses and personal safety equipment - Ed Darwin takes a look at personal fall protection following the completion of an IPAF Harness Safety Course.

There are a number of standards and plenty of legislation around the world that outline the importance of working safely at height. One that is of particular significance in Europe is the 2005 Work at Height Regulations. Building on existing good practice it states that comprehensive safety measures need to be taken before beginning any work at height following - the "Avoidance, Prevention, Protection" hierarchy (see hierarchy below). It also eliminated the 'two metre rule' stating that work at any height needs to be taken under consideration - most take

precautions at heights of over 20 metres, while few consider it when working on a flatbed truck a metre off the ground.

Since its introduction in 2005 there have been 22,639 major fall related injuries in the UK alone with an average of 3,800 incidents a year. According to Health & Safety Executive's statistics there were 40 fall related fatalities last year and 3,466 major incidents. The bulk of these occurred in construction (19%), roofing (11.9%), carpentry (4.8%) and window cleaning (4.8%). IPAF's new accident reporting database supports these figures with 2012 results revealing that falls



Harness training participants putting on their harnesses in the practical session

accounted for 29 percent of all aerial lift fatalities. Sadly the numbers do not provide details of whether personal fall protection was needed or used. Even with legislations and safety procedures in place and dangers being well known, somehow deaths still continue to occur.

While by law the responsibility ultimately falls on the employer, the onus is also on the employee to be fully trained, responsible and safe. Another section of the Working at Height Regulations requires that anybody involved in working at height needs to be competent, which is achieved ultimately with adequate training. It is generally agreed that training is by far the most important factor in reducing accidents and a substantial increase in the numbers trained suggests we are heading in the right direction. However, the latest statistics combined with the number of 'Death Wishes' received by Vertikal.net indicates that many people working at height are just incompetent.

Using the right harness and lanyard could dramatically reduce the number of fatalities, yet the general consensus regarding harness training appears to be that it is an

issue so obvious that it is not worth the bother. It is not surprising then that biggest contributor towards deaths in the work place is ignorance...

## Harness training

With that in mind I travelled down to Nationwide Platform's West Thurrock branch to participate in an IPAF Safety Harness course led by Nationwide's training team leader Martin Ludkins. The course has been designed for users, operators, supervisors and managers - essentially anyone who is required to select, inspect and wear a harness while using aerial work platforms.

The objective of the half day course is to ensure users fully understand the relevant health and safety regulations, guidance and standards, to identify and select the right harness and lanyard for the job and to know how to check, use and maintain it. In order to 'pass' the course participants must score more than 80 percent on a multiple choice theory test. This is then followed by a practical session covering the correct use and adjustment of a harness and how to identify potential problems.

### Duty holders must

#### Avoidance

Work at heights should only be carried out if absolutely necessary.

#### Prevention

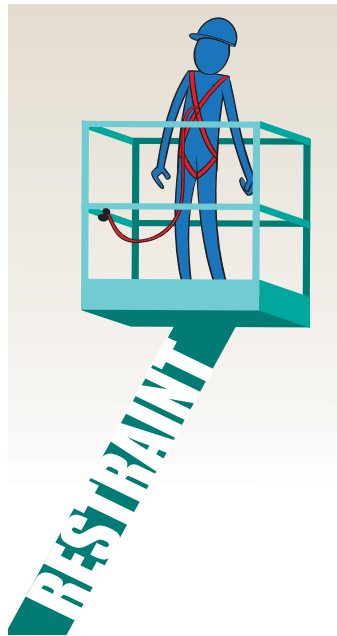
Suitable and sufficient measures need to be carried out to prevent fall hazards.

#### Protection

Where prevention measures do not eliminate the risk of falling, provide sufficient equipment to minimise the distance and consequences of a fall.

The Work at Height regulations' simple hierarchy for managing and selecting equipment for work at height

Unlike many courses, the absence of safety harness training does not prevent you from using an aerial lift on site or working at height. The course is not one of those inconvenient necessities required to operate or rent machinery, it's not about waving a card saying "I am now qualified to do this or that" - it's about understanding and recognising potential dangers and knowing when to use a harness and what type. Many seasoned users would be surprised at how much they would gain from the course. One can't but help wondering if it should be incorporated into the standard PAL course? Those on my harness course had spent the day before training for their IPAF PAL cards...perhaps it should have been the other way round?



**Short fixed lanyard (Restraint):** A short fixed lanyard is ideal for use with boom lifts and standard platforms as it requires no input from the user and will keep them in the platform in the event of a 'catapult effect' which can arise from a number of causes. It will also prevent the user from climbing on the guardrails without having to consciously disconnecting the lanyard. The length may vary depending on the position of the anchor point and the height of the user.



**Adjustable restraint lanyard:** Adjustable lanyards require input from the user, but are more versatile to suit different anchor point locations and users. The downside is that it is likely to be left at full length, negating its effectiveness for restraint. It is crucial that the lanyard is adjusted to be as short as possible at ALL times, especially when driving boom lifts – which is when catapulting is most likely to occur.



**Fall arrest with shock absorber lanyard:** The purpose of a fall arrest system is to prevent a person from a basket. A built-in shock absorber will also cushion the impact caused by the sudden breaking of a fall. It is essential that a rescue plan is in place when using these lanyards. Everyone on site should know what to do should anyone be left hanging in their harness and the importance of rescuing them as quickly as possible. If the lanyard fails to prevent the user from hitting the ground or falling more than 1.8 metres, or if a rescue plan is not in place, then a fall arrest system should not be used and alternative protection is required. It is worth noting that the majority of machines anchor points are probably not suitable for fall arrest systems.



**Double-legged lanyard:** This type usually provides both a restraint and arrest lanyard often with a shock absorber. The shorter restraint lanyard is intended for use while operating a platform, while the fall arrest leg can be used for general work at height, ensuring that the user always has the right lanyard with him.



**Self-Retracting lanyard (Inertia Reel):** Similar in concept to a car seatbelt, self-retracting lanyards can be used for both fall restraint and fall arrest. Be sure to check its capabilities though as some are only designed for anchor points that are above the user, which will be a problem with work platforms. Note that many self-retracting lanyards need to be set in restraint mode when used as such.



## Lanyards

Although harnesses vary in shape, design and even concept, they all provide the same function. Lanyards, on the other hand, are not as straightforward and knowing which one is suitable for a particular job is vital. As little as two years ago the US Occupational Safety and Health Administration (OSHA) rescinded a letter of interpretation stating that shock absorbing lanyards should not be used with anchor points below 18.5ft / 5.6 metres, preventing their use with aerial work platforms. The ensuing confusion and debate highlighted the uncertainty regarding harness use with powered access.

As a result we thought it worth outlining the various alternatives. (See chart left)

### When is a harness required and which should I choose?

A harness with restraint lanyard should always be used in a boom type lift, whether self-propelled, trailer or vehicle mounted, all of which can be subject to the catapult effect. The machine's guardrails are the primary form of fall protection, the harness is only intended to prevent occupants from falling out of the basket ie catapult effect or for the rare case where a levelling system fails and the platform tips upside down. They should not be worn however when working over water, as it could trap users in the platform while underwater, following an overturn. In such cases a flotation device should be worn.

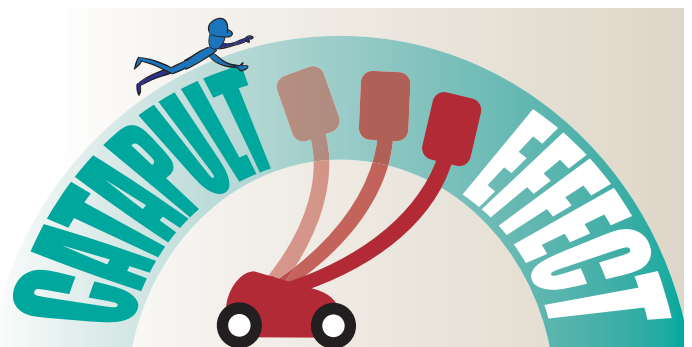


If the water is shallow of course - less than a metre deep - then normal rules apply. An individual risk assessment will determine the most suitable.

A harness is not usually required with scissor lifts and platforms where there is no risk of a catapult effect. If one of these lifts overturns the occupants have a better chance if they are free to jump clear as it goes down. A major difference between scissors and booms is that once a scissor starts to tip it will not recover, while a boom lift will usually bounce back – creating the catapult effect – or have its fall cushioned by an obstacle.

### Fall Arrest and Rescue Procedures

The problem with fall arrest systems is that they disregard the first two steps in the "Avoidance, Prevention, Protection" hierarchy mentioned above. They also alter risk assessments and rescue procedures. There is a lot of naivety surrounding the issue in which users wrongly assume that they have taken the necessary safety







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precautions to prevent an injury by wearing a fall arrest system. While it will prevent contact with the ground the user will still be subject to substantial impact forces that cause varying degrees of damage, depending on the fall, the quality of the harness and how well it is adjusted. There is also the issue of rescuing an injured and potentially unconscious person, and the added risks of suspension trauma for every minute the person is left dangling.



As a result it should be an absolute last resort solution to fall protection. The intention behind the Working at Height regulations is to eliminate the possibility of a fall, not to prevent a death/minimise damage after it has taken place...

An interesting motto unofficially used by the London Emergency Services is: "A lack of planning on your part should not constitute an emergency on my part".

**Harnesses**

The range and variety of harnesses is overwhelming and knowing which one is most suitable can be a challenge.

**Waist Belt** – When used as a restraint harness, the waist belt's simplicity and ease of use make it a convenient alternative to a full body harness if used with a short lanyard. Although frowned upon, it might be suitable choice for delivery drivers who should wear a harness while loading/unloading boom lifts and for short demonstrations. It certainly isn't suitable for fall arrest and the lower back/waist will take the full impact in any incident.

**Full Body** – A full body harness provides better distribution of impact forces making it suitable for a variety of applications, providing added comfort, more protection as well as the option for more attachment points. All harnesses must be certified as meeting relevant standards such as CE. Obviously some are better suited for specific applications and some are made with better quality materials, others provide additional features and others might be more user friendly. A risk assessment of the work being carried out will determine the most suitable one to use. The following is a brief look at

some of the harnesses currently on the market.

**Standard Safety Harnesses**

For those that rarely need a harness and begrudge spending a lot of money for a top of the range model, a standard harness will appeal. But be warned you get what you pay for! While they comply with minimum standards and should save your life in the eventuality of a fall or catapult incident, they offer less protection against injuries. Their simple design and inexpensive materials, minimal padding, single attachment point and universal sizing often result in a poor fit.



**Midrange Safety Harnesses**

This harness will suit those who work intermittently at height throughout the year. A step up from the standard harnesses, the main differences will include improved comfort and more features, such as extra support pads, easier to use tangle free design as well as better quality materials and attachments. They may also offer more attachment points and quick



release buckles etc...

**Premium Safety Harnesses**

If you wear a harness for extended periods and as part of your job it is worth investing in a premium harness. It will not only be more comfortable, but is also more likely to prevent injuries in a fall. Although costing significantly more than a basic harness, it is a wise investment for regular users. A premium harness provides maximum comfort, functionality and freedom, while incorporating the latest innovations found on the market. Expect breathable padding, an array of attachment points, impact indicators, superior construction as well as a tailored fit.



**Specialist Safety Harnesses**

Specialist safety harnesses have been designed with specific applications in mind. Most manufacturers are capable of custom designing harnesses around the customer's exact requirements, but this obviously comes at a substantial premium. It might be worth looking through the standard ranges on offer to see if the harness you require isn't already on the market. Some of the harnesses have been designed for high visibility, flame retardant or non-conductive, or



*Harnesses should not be worn when working over water*





A ZT Safety Systems harness



An example of a specialist harness from ZT Safety Systems ideal for fall arrest

with a greater capacity in order for a user to carry more tools. Others have been designed for boom delivery drivers, which as well as being user friendly and high visibility, are comfortable enough to wear while driving long distances, eliminating the need to get in and out of harnesses at every stop. There are also models aimed specifically at female users.

### Inspections

Regulations require fall arrest equipment to be in good repair and be subject to routine major inspections - usually every six or 12 months after first use, however

many manufacturers recommend more frequent inspections. The results should be recorded along with any observations in the inspection log which should be kept with the harness. Before putting on a harness it is essential that you know its history: where has it come from, how has it been used, when was it last inspected? If you are unable to answer any of these questions it should not be used. When buying a new harness it is important to keep records of when and where it was purchased, the date first used, the ID numbers, certificates of conformity and disposal procedure. An easy thing to overlook is the harness capacity as it will be of no use if it cannot support the users weight. It should be obvious, but if a harness is ever subjected to a fall it must be destroyed as per the manufacturer's instructions.

### Pre-use Checks

Even with the correct documentation and six monthly/annual safety inspections it is paramount that a harness is checked before each use and never just thrown on. Here are some of the things you need to look out for:

**Webbing:** Check for cuts, tears, abrasions and discolouration. Although abrasions look fairly minor



they compromise the strength of the harness the most.

**Stitching:** The stitching is a different colour to the webbing to ensure missing, incomplete, damaged or frayed stitching is easily identifiable - it has nothing to do with decoration.

**Labels:** Traceability of the product is a legal requirement - all relevant information must be presented and legible.

**Buckles, Connectors, Attachments:** Look and feel for cracks, corrosion or any deformation and be sure that they are fully functional before use.



Checks for cuts and tears etc.

### Adjust or suffer

An incorrectly worn or badly adjusted harness can cause as much damage as not wearing one at all, so ensure it has been fitted in the correct manner. Remember to put on a harness like a coat rather than dropping it to the ground and wiggling into it because any mud or dirt on the harness will cause damage. Once fitted there should be enough space for one or two fingers to fit between the webbing - always remember to fasten it across your chest. Use the keepers to prevent the webbing from sliding through the buckles and hold any excess. Any straps left dangling could get caught up in machinery. The same checks apply to lanyards. There is no defined life span separating lanyards that are safe from those that are not, and a cut as small as a millimetre can result in a loss of capacity of between five and 40 percent depending on the lanyard.

### Causes of degradation

As already mentioned abrasions are the worst offender in terms of loss of strength, other factors include: age, mould, algae, moisture, dirt, grit, chemical contaminations - marking it with a pen, burns and

ultra violet light. With this in mind it is important to store harnesses in a dry, clean environment, away from heat and sunlight - not the back seat of a car! And be sure to clean after use in accordance to the manufacturer's instructions.

Finally if you are struggling to determine whether the level of damage is acceptable or not - the fact that you think there IS an acceptable level of damage - suggests it will be worth taking a harness safety course!

Working at height carries greater risks than when working at ground level, but if the proper equipment is used, precautions taken and appropriate fall protection measures adopted, the extra risk can be infinitesimal. There is absolutely no reason why the current number of fatalities and major injuries cannot be substantially reduced.

