# Risk aversion

**Several recent fatal incidents with cranes and aerial work platforms have highlighted the dangers of not using safety equipment correctly. We take a look at some of the problem areas and the developments aimed at reducing the number of serious incidents - but only when used appropriately.**

*One of the other major concerns when operating a platform or standing close to a crane counterweight is the risk of crushing*

**Heavy lifting and work at height are inherently dangerous, however through experience, training and using the correct equipment for the job the risks can almost be eliminated.**
**In recent years high profile campaigns such as Clunk-Click (the wearing of harnesses/ lanyards in booms) and 'Managing Ground Conditions' promoting the use of outrigger mats have highlighted these risks and how, by using and operating the equipment properly, they can be eliminated.**

We have said it before but it bears repeating, every item of lifting equipment - be it a crane, access platform, loader crane or telehandler - is perfectly safe and stable when set-up correctly and operated within its design parameters. If there is an incident, operator error is nearly always to blame.

## So what can increase the level of safety?

In the powered access sector IPAF figures for 2015 revealed there were 68 fatalities, up from 64 the year before, with the main causes being overturning, falls from height, electrocution and entrapment.

Increasing the level of safety can be done by using anything that allows work to be carried out more easily and efficiently which in turn reduces possible problems. This may range from a simple tool tray, offered by many manufacturers and third party suppliers - to keep tools and fixings in a contained area at a more convenient height while reducing trip hazards in the platform - to the outrigger systems which automatically calculate the maximum safe capacity and outreach possible with the actual outrigger configuration set up. The best systems also allow any configuration possible. Almost every product and machine development which makes the job more efficient and easier, aids safety by reducing potential operator error or the taking of unnecessary risks to get the job done.

Even the simplest incident - dropping a tool or a large bolt from a platform for example - can have fatal consequences. This sort of incident is rare and hard to combat without reducing the machine's practicality. However the more common types of fatal incident such as the operator being thrown out of a platform or equipment overturning due to incorrect outrigger set-up have been specifically identified in recent years resulting in the high-profile campaigns already mentioned.


Last month's comment in Cranes & Access highlighted how the use of safety equipment on its own is not enough, it must be the right equipment for the job at hand and must be used correctly. When wearing a harness while operating a boom lift it is also essential to attach it to a proper anchor point with a short lanyard, which prevents the operator from being ejected from the basket in the first place. All too often long lanyards are used that allow the operator to be catapulted from the basket, causing serious injury. The 'All the gear and no idea' brigade don't even bother to clip their lanyards onto the anchor point!

The industry has come a long way since the IPAF 'Clunk Click' campaign was launched 10 years ago, although there are still many who ignore the advice. As with car seat belt campaign of the 1970s, it will take time or legislation to make even the stubborn see sense.

## Anti-entrapment

One of the other major concerns when operating a platform or standing close to a crane counterweight is the risk of crushing. With platforms the main risk of crushing is against an overhead object such as a ceiling or beam as the basket suddenly rises due to the magnified effect of undulating ground or driving over a small object. This is a particular risk when driving at height with your back to the direction of travel.

In the UK, contractors increasingly demand that all boom lifts on site are fitted with specific anti-entrapment (now named secondary guarding) devices. This move, which began in 2012, was surprising in that overhead crushing injuries were and are relatively rare. While any incident involving a fatality or serious injury is unacceptable, incidents involving poor ground conditions and overhead power lines cause far more fatalities and serious injuries than crushing - a fact borne out by IPAF's growing accident statistics data.

## Secondary guarding

The move behind the change in terminology from 'Anti- Entrapment' to 'Secondary Guarding' is based on the fact that they generally do not prevent entrapment, but rather offer a secondary guarding option to help reduce the risk of serious injury from lifting into an overhead hazard. Some secondary guarding systems - such as the AFI Sanctuary Zone or Genie Operator Protective Structure - include physical guards similar to roll bars, which do tend to make the platform bulkier. Electrically

*Some secondary guarding systems include physical guards similar to roll bars*

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*Skyjack SG-E*

activated systems initiated by Niftylift's SiOPs system and Lavendon's SkySiren which do not have this problem have gained in popularity with most manufacturers offering their own systems such as JLG's Sky Guard, Haulotte's ACTIV'Shield Bar, Skyjack's SG-E system and several others. The usage of secondary guarding is still a predominantly UK phenomena, however some manufacturers - such as JLG and Snorkel - have made their systems standard equipment worldwide on most of their boom models. It should be pointed out however that Niftylift did this from the start, making the SiOPs system an integral part of the machine. Today all but its smallest models have it built in.

UK-based Nationwide Platforms, which once hoped to corner the market for such devices, has subsequently developed a secondary guarding system which

*Nationwide Platforms SkySiren PCS claims to offer double protection*

claims to double the protection against trapping and crushing incidents. SkySiren PCS (Pre Crushing Sensor) combines the original SkySiren device with ultrasound sensors to detect potential hazards before reaching them, to create what it calls 'intelligent secondary guarding'. The system uses three sensor units - two at the back of the basket and one over the control panel incorporating eight individual ultrasonic sensors, which generate high frequency sound waves to scan the space behind and above the operator - in a similar way to reversing sensors on a car warning of objects as they are approached. The company says it is working on another system which should be announced shortly.

## Secondary guarding for scissors?

Secondary guarding for scissor lifts has been developed in response to demands from some particularly safety conscious contractors. While crushing incidents can and do occur with scissor lifts, they are quite rare as some of the operational factors found on boom lifts - such as boom bounce/amplified basket movement during drive and operating with your back to the direction of travel - are not usual in the normal operation of a scissor lift.

Changes to scissor lift controller design - already made by most if not all manufacturers - ought to prevent serious crushing incidents on their own. However - the argument goes - if a device can prevent even one fatality, then it is worth installing, particularly if it does not cause any inconvenience to the operator.

The first such system - SkySecure - was introduced last October by UK-based rental company Kimberly Rentals. The device is activated if the operator's forearm is pushed down onto a spring loaded wrist rest on the controller. Pressure on the rest will stop the machine, sound a siren and flash a blue emergency beacon. The company has also installed a proximity device that can be fitted to scissor lift

*AFI Sanctuary Zone*

controllers, which automatically cuts the travel speed to slow when the controller is outside the platform, such as when the operator walks alongside the machine for loading or passing through a doorway etc…

Earlier this year, Italian aerial lift manufacturer Airo and its UK distributor Aerial and Handling Solutions (AHS) announced a dual secondary guarding system. After carrying research into the types of frequency of entrapment injuries they concluded that the majority of injuries are not from upward, overhead impact but from shear type impacts, caused when the operator was looking at the ground when driving at height, rather than straight ahead. These injuries also tend to far more serious.

As a result the new telematics compatible system provides preventative and physical protection and involves the operator in setting them up. Called S.A.F.E (Self-Adjustment From Entrapment) it allows the operator to pre-set a lift cut-out height to protect against lifting into an obstacle, while shear protection is handled by a physical crash-bar type structure that folds out from a stowed position on the guardrails. The two can be used separately or together, depending on the job and associated risks.

Ian Harding of AHS said: "When the platform extension is fully extended it is very easy to demonstrate why injuries can occur. On some scissor lifts it can extend 1.5 metres or more, meaning the steering wheels

*Airo has the S.A.F.E system and shear protection which can be used separately or together depending on the job and associated risks*


Rescue from the cab of a tower crane is very difficult

are almost the same distance behind the operator and possibly more than 16 metres below. If the steering wheels have been left on full lock at 90 degrees to the chassis and you simply grab the joystick and move it fully in either direction - even at the low elevated drive speed - your first movement is sideways by up to 300mm. That is a serious unplanned change of direction."

## Tower crane rescue

One of the major safety issues with tower cranes is how to rescue the operator if they are incapacitated whilst in the cab - following a heart attack for instance. Each site using a tower crane must have a rescue plan in place, however the height of the cab and the lack of space makes rescue a difficult and drawn-out affair at a time when speed is of the essence.

Over the years several companies have come up with rescue systems but they have not been universally accepted. The main problem is that even when the operator has been removed from the cab - and this can be very difficult with smaller cabs and may involve lifting through the roof - the operator still has to get down to the ground.

Swedish articulated tower crane manufacturer Artic Crane and UK crane rental company City Lifting have developed a new rescue system, dubbed the iRaptor DRS (Driver Rescue System).

The new Davit arm system solves the problem of getting the crane operator down to the ground and is said to be easily fitted to most crane platforms. It has an overall height of 3.1 metres and working radius of one metre with a 250kg maximum capacity. The system uses an electric hoist, with frequency invertor which gives a smooth, controlled descent for the patient. Rope length is 70 metres and hoist speed 25 metres a minute. Should the power fail during a rescue situation, a battery back-up system allows the descent to continue. The iRaptor is also fitted with a top-run over switch and overload system.

## Overturning problems

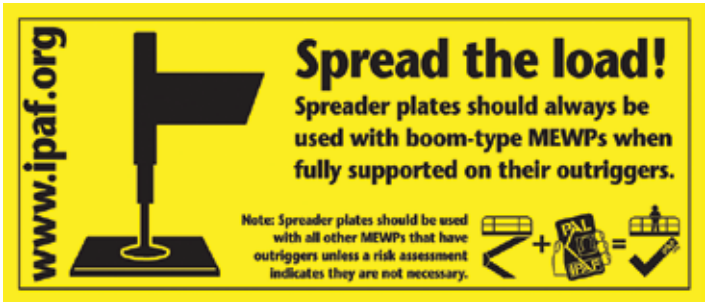
Equipment overturning is probably the main cause of fatalities in both the crane and access sectors. In 2013 16 fatalities in the powered access sector were reported to IPAF. This figure increased to 17 in 2014 and in spite of the growing awareness for the need to ensure that ground conditions can support outrigger or wheel loadings, there appears to be more overturning incidents due to the lack of preparation than ever although this may simply relate to more awareness and reporting of such incidents.

At Cranes & Access we have highlighted this fundamental problem for the past decade and promoted the need to use outrigger mats and spreader plates, which would almost eliminate the problem - even when working on soft ground or near hidden voids. Although all operators in the western world are supposed to be adequately trained, incidents appear to be common place. Is this reflecting a lack of sufficient training or lack of experience? Training - particularly over a short period of time - does not equate to competency. Grasping the basics and operating most equipment is relatively easy however experience, skill and familiarity takes time.


Equipment overturning is probably the main cause of fatalities in both the crane and access sectors

The main problem appears to be the lack of understanding of the potential risks - both above and below ground level - when setting up equipment that utilises outriggers. To combat the high incidence of overturns the UK's Strategic Forum Plant Safety Group published one of the most substantial best practice guides to this problem available anywhere. The Ground Conditions good practice guide was produced in conjunction with national associations such as the HSE, the CPA and CITB, and thankfully, a four-page summary is also available.

In the loader crane sector, an increasing number of products are now being fitted with sensors which monitor chassis tilt and weight on the outriggers which can stop the crane's operation should one side show signs of lifting.




## Which spreader plates?

Depending on the type of equipment there is a mat or system to suit. Manufacturers are now working more closely with customers to ensure that outrigger mats can be carried on a machine and stowed in a position where they are easy to reach. Some of the larger truck mounted platform and crane manufacturers have incorporated outrigger pad storage areas low down on the machine and also use circular outrigger mats to facilitate manual handling. The aim is to encourage usage by eliminating excuses.

We have seen many soft ground overturns, where outriggers are not even deployed and some where a set of decent mats are still stowed on the deck of the overturned machine, rather than in place doing their job. Another case of an incident caused by not using the safety equipment correctly.


Check ground conditions are suitable for the type and weight of equipment