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Given the amount of accidents involving lifts and electricity lines that we report on Vertikal.net, it is surprising the very small number of fully insulated booms working in Europe. It is true that most of the incidents occur across the Atlantic where platforms used on live line work are commonplace, but that is more likely related to fact that there are far more power lines in the streets there than anything else. We take a look at Europe and North America where totally opposite views appear to exist regarding high tension live line work. Perhaps a change in legislation will be a driver for change in Europe? In Ireland for example, any platform involved in electrical work including street lighting is required to be fully insulated, but at the moment this is not a requirement in the UK. Cranes & Access investigates...

When we first included this feature in our schedule we had big plans to delve into the depths of the use of insulated platforms and how North America and Australia compare with Europe, complete with trends and developments. However, once we got started we quickly realised that while there are plenty of aerial lifts equipped with fibreglass or composite bucket platforms - mostly one KVA - the number of fully insulated platforms at work in Europe is still relatively small, with possibly no more than a couple of hundred units sold each year on average for the whole of Europe. Yet travel to North America and live line work using fully insulated platforms is a normal everyday thing and numbers sold are huge. The size and type of insulated platform also reflects the individual market requirements - Europe tends to go for 4x4 off-road units with 10 to 15 metre platforms, while these are also highly popular in North America and the Middle East they also buy a good number of the larger, heavy road-going trucks for work on distribution grids and the taller pylons.

While utility companies in several European markets have toyed with the idea of high tension live line work and even launched pilot operations to trial the technology, it has never really caught on, with most companies preferring to shut down sections of the network wherever possible, before starting work. This is particularly true of the high tension power lines of the national grids, but also true for regional power lines. But why is this? We were unable to get a straight answer on the subject, but some put it down to rental companies or equipment suppliers not promoting the relevant equipment that is now available for live line work, including fully insulated work platforms of all sizes,

A 47 metre Bronto insulated lift on special tracked carrier can reach all but the most remote towers



c&a insulated booms

Live line work even on high voltages is common place in the USA but very rare in Europe



Oil&Steel's special 15 metre Scorpion 15e on a Unimog U20 with insulated/isolated cage has been highly popular with ENEL

mounted on a wide variety of chassis that allows them to reach all but the most remote power lines or transmission towers.

Jobs such as cleaning insulators are carried out in many parts of the world without shutting the sector down, although there seems to be a preference, at least in Europe, to use helicopters for such work, even though the cost per hour or per day is substantially higher than for an aerial lift. It is also true that reaching some towers can be too much of a challenge - in terms of terrain or distance - to be efficient for truck mounted platforms, however the vast majority of our towers would be more efficiently handled by lifts, saving both money and the environment.

Environmental concerns

The environment and efficiency is a growing concern for energy suppliers. Versalift - which leads the European market in the provision of fully insulated lifts - says that virtually all of its insulated units are now being shipped complete with the company's recently introduced semi-hybrid system which powers the platform with batteries. The system employs a lithium battery pack which can power the lift for a good working day, particularly in live line or other insulated work where platform movements are more limited. In the past the vehicle's engine would have been left running all day in order to power the PTO for the lift - as well as keeping the cab warm in winter of

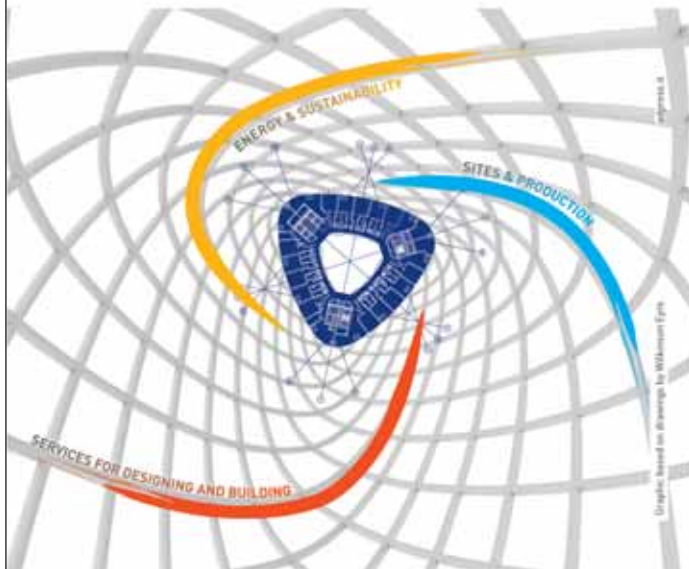
Most of Versalift's insulated platforms now go out with the company's semi hybrid battery pack power for the superstructure



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course. The hybrid saves all that wear and tear on what is an expensive power unit, while cutting the fuel consumption substantially - not to mention emissions - and a separate heater keeps the operators happy!

When the time comes to relocate the truck, the engine tops up the batteries, so by the time the lift gets back to the depot the batteries have been partly, if not fully, recharged reducing or eliminating the need to overnight charging time. There is also a safety argument with this system as well as the economic and environmental ones.

By eliminating the engine noise, communication between the man in the platform and a colleague on the ground is much improved. Some jobs also involve two men working together on hot-glove work from dual composite buckets. In such situations the absence of any engine noise can only be a benefit to their communication. The reaction in the field to the new semi-hybrid has been so positive that the Versalift has been busy retrofitting existing insulated lifts with the system, including 22 units for the ESB in Ireland.

Fully insulated

As mentioned earlier, with very little high tension live line work in Europe, the numbers of fully insulated platforms is very small. In the UK for example numbers may be as low as 20 to 30 units a year. With so few in utility fleets it is essential that these lifts can go literally anywhere, so most if not all these platforms are specified on the ultimate 4x4 chassis - a 13 to 15 tonne Unimog. Smaller 4x4 vehicles - such as the 3.5 tonne Land Rover and the 7.5 tonne Iveco - are of interest to some utility companies, but there are a limited number of insulated booms available to fit these smaller vehicles, while retaining a decent payload to carry all the kit required. In the USA companies such as Terex Utilities and others produce several models that are suitable for such vehicles



In Europe utilities like to be able to take their insulated booms almost anywhere

and that are fitted to pick-up trucks, but that may be related to the fact that there are far more high voltage overhead power lines in urban areas than in Europe. Perhaps if a European manufacturer were to enter the market with fully insulated booms specifically aimed at mounting on smaller vehicles there might be a better uptake? This of course depends on numbers and unless the market drastically changes - ie legislation - it is very unlikely to happen.



Two man insulated cages with central mounted davit and winch, used here as a support device

As well as the insulated booms, a large proportion are also fitted with a materials handling facility such as a small jib and winch mounted between twin bucket platforms - or on the back of a regular platform - that can lift between 500kg and 900kg allowing items to be lifted off the top of the poles. The small

Terex Utilities produce several fully insulated units on pick-up trucks, some with Hybrid power.





Here a crane with a hot stick lifting rod lifts an insulator



A closer view - shame about the man on the tower!

additional cost in relation to the whole machine makes this a very useful option.

Lower voltage protection

Moving away from the fully insulated machines for a moment, there has also been a great deal of activity in the lower voltage area where a properly isolated platform can be beneficial when working close to domestic electrical power lines.

Baskets and booms touching power lines - intentionally or by accident - is something that is not as uncommon as you might think. Arborists for example trimming heavily overgrown tree canopies can come into contact with power lines either that they were unaware

of, or have been told were deactivated. As a result, if there is a possibility of such incidents, companies can and do now specify isolated fibreglass or composite platforms. These have always been popular on van mounts because of their typical role working on street lighting and other urban street tasks. However there is currently much debate over how useful or effective a 1KVA bucket really is. The fact is that slapping on a commercially available fibreglass 'bucket' in place of the standard steel or aluminium platform, provides only marginal benefit. It must also be installed correctly with attention paid to the connection to the boom and the positioning and wiring of the controls etc.

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Van mounts generally have some form of insulated bucket although the quality of the insulation can vary enormously. These units are part of a 34 new Skyking/GSR units for Eircom on Fiat Ducato vans



Many suppliers still offer regular fibreglass/plastic cages but make little to no reference or claim as to how effective they are in protecting the occupants from an electric shock. Some however have stopped offering 1KVA cage options altogether, preferring instead to offer a 2,000 volt flash test certification for such baskets, a move which is increasingly appreciated.

Slips trips and fall protection

Another concern that is affecting all types of equipment that we cover is working at height and utility companies are understandably at the forefront when it comes to heeding HSE warnings on the risks of tripping, slipping or falling from the beds of the trucks to which platforms are mounted. Due to their design the platforms of most smaller fully insulated lifts are stowed well out of reach of the ground, requiring the user to climb up onto the truck in order to enter the cage. As a result most utility units are now specified with the ability, either through lower or remote controls to lower the platform to the ground, from the ground avoiding the need to climb on the vehicle all together.

Inspecting and cleaning insulators

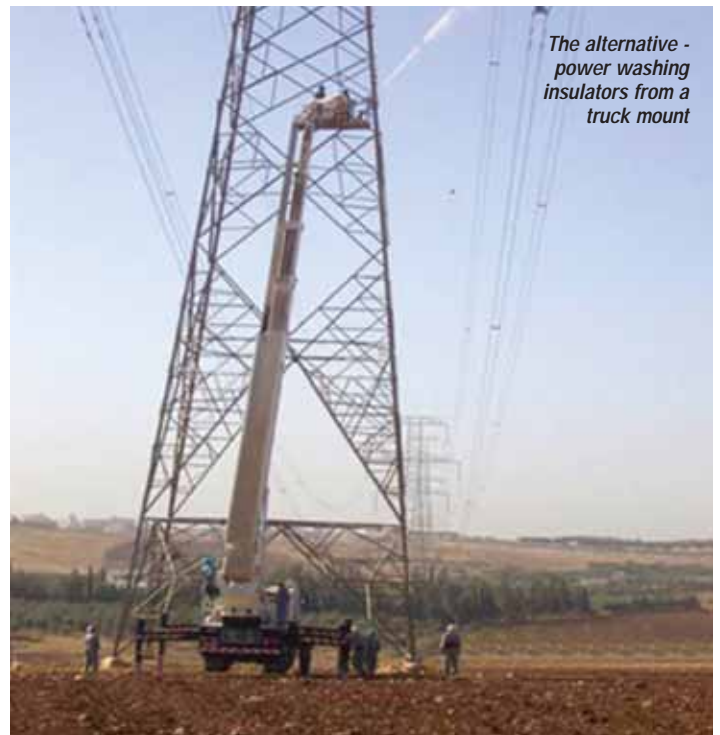
Moving back to the higher voltages - all high, (and many lower tension) towers and poles include ceramic insulators of one sort or another, to isolate the tower from the current. However over time these can and do gain a build-up of deposits from a wide variety of contaminants, including industrial air pollution and bird droppings. Depending on the

resistance values of the build-up, 'tracking' and in extreme circumstances arcing, can take place, usually during periods of light to moderate rainfall. The combination of contamination and moisture forms a bridge of conductive material over the insulator allowing the high voltage electricity to find a path to ground, resulting in a number of potential problems. These can range from insulator explosion, etching or cracking to transformer and breaker damage. The results can include unplanned downtime, staff injury and high repair costs – not to mention ground fires.

An insulator damaged from flash past



In order to avoid this, many if not all, distribution companies run routine inspection and cleaning programmes. Given the height - and in some cases the remoteness - of the towers, gaining suitable access for both inspection and cleaning is an issue. It seems that the two



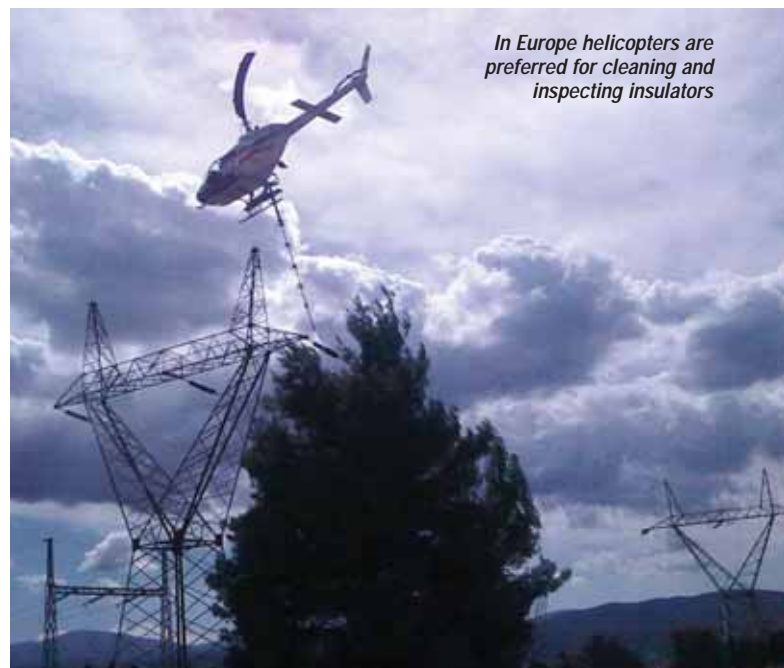
The alternative - power washing insulators from a truck mount

most popular methods are using helicopters and aerial lifts although the latter method tends to be in countries outside of Europe. Ideally both inspection and cleaning is carried out while the lines remain active. In North America, Australia, the Middle East and parts of Africa truck mounted lifts are used whenever possible due to the cost benefits and - some would argue - increased safety.

However in Europe there are very few, large fully-insulated work platforms in operation. Several years ago EDF in France commissioned a few units from Egi and some utilities companies in Eastern Europe have looked seriously at it but it does not appear to have taken off at all. We

understand that the European distribution companies prefer to either use helicopters of shut down sections of the grid to carry out inspection and maintenance either with non-insulated boom lifts or by climbing the towers even though the work at height directives indicate that climbing should only be used when no alternative exists - this in spite of the higher costs and associated inefficiencies of such practices.

The largest supplier of large, fully insulated platforms is unquestionably Bronto Skylift. It offers fully insulated truck or track mounted lifts from 38 to 60 metres, equipped with 500KV of insulation allowing bare hand work on high tension power lines. The units



In Europe helicopters are preferred for cleaning and inspecting insulators



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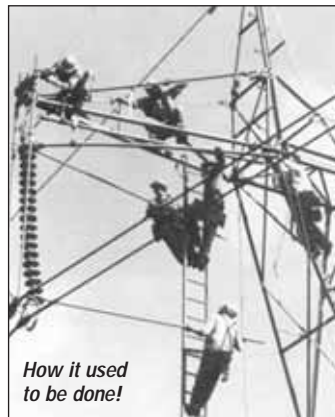


A larger, fully insulated Bronto being tested for its insulation and electrical leakage

feature a highly rigid five metre long filament wound fibreglass boom or jib that boasts less than 50mm deflection under a 500kg applied load. The boom is also sealed with desiccants to prevent internal contamination or condensation that might act as a conductor. A sharp-edge corona ring around the boom/jib provides consistent voltage gradient along its length. Controls are all fibre optic, including the communication system with the base machine.

Bronto says that while it offers a wide range of working heights, the vast majority of the units it sells are between 50 and 60 metres. This allows users to stand back from the towers as well as gain access from both sides and even from over the top. The vast majority of the units it sells are delivered to the USA, where the market for such devices is larger than all the other countries put together. Why? One can only guess - but the fact that the distribution grids have always been privately owned may be a factor, combined with the fact that there is not the same spare capacity to have the luxury of shutting down sectors for routine tasks?

Proponents of live line work argue that it avoids inductive loading, the installation of grounding, the loss of generation/distribution revenue and perhaps most importantly the elimination of any confusion for the crew or mistakes over whether the power is actually shut off or not when it was supposed to have been.



How it used to be done!

Water or dry

When it comes to cleaning contaminated insulators the most common method is a high pressure water canon - yes mixing water and electricity! Bronto offers a range of such devices on its insulated machines including a simple manual canon combined with hot sticks to provide extra distance and insulation, cage mounted automatic units monitored by a man in the platform and completely remote controlled ones that replace the platform and are operated from the ground via remote controller with camera and screen.



A fully remote controlled insulator cleaning cannon on a Bronto boom.



A standard Bronto insulator cleaning gun - or cannon.

While researching this article we came across a company producing a dry alternative to wet washing. Petronol says that it introduced the first live-line insulator cleaners more than fifty years ago with its Air-Mat method, which uses compressed air and pulverized limestone or maize corn-cobs. The material is used in the same way as sand blasting, but the limestone or corn is softer than the insulator surface so while it is tough enough to remove the build-up and deposits, it does not



C&a insulated booms

interest in this subject our plan is to do a follow-on article in the New Year where we can take any comments and contributions on board and follow up with a great deal more research with those responsible for maintaining our national grids and power lines, both here and in North America. So please do send us your feedback.

Using the Air-Mat dry cleaning method with a hot-stick applicator

Will this sort of high voltage ground based work ever become popular in Europe?

damage the glaze on the insulators. The dry abrasive is blown against the insulator in a stream of air by the operator using an insulated five metre hot-stick. The company says the particles of the abrasive are so fine that no noticeable traces are left on the insulators or structures after the cleaning process. The method is ideally suited to be used from a fully insulated platform.

An opportunity or a cultural divide?

The question is will or should the

European utilities and distribution companies/grid operators change over to live line working? Is there an opportunity for an entrepreneurial crane rental or specialist access company here? In Australia companies like LinCon have certainly exploited the opportunity and now offer a turnkey service, or is this one of those historically derived differences that is so culturally ingrained that they will never change?

If you, our readers, express an



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