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The future and beyond...

In this our first feature focussing solely on 'technology' we take a look at the latest ideas and developments that will affect the future of cranes, access and telehandlers.

Whilst we constantly report on new technology used in the products we cover, there are plenty of new developments and technology emerging that while they may now only be ideas, prototypes or early version products could soon be the norm.

Even the youngest amongst us has seen the speed of development gather pace and quickly impact everyday tasks. The time taken from idea to prototype, production and finally adoption is now so fast it is hard to keep up. Look at how computers, mobile phones and the internet have taken over the way we live our lives in a relatively short time. New technology for construction and industrial equipment will not change the lives of everyone but will certainly change the way our industries work.

Future trends

At the recent Work at Height Forum hosted by Nationwide Platforms in the UK, the first speaker Guru Bandekar - vice president global engineering product development and management for JLG - outlined some of the work and projects that his company is working on as well as highlighting general trends and how he expects the powered access industry will evolve using the new technology.

He highlighted the microprocessor as the key component that has transformed the way we live, work, travel - everything around us now is driven by a microprocessor

- and yet the it was developed in the late 1960s and only commercially available in 1971. The microprocessor used in the new iPhone can process five trillion operations a second and this figure is expected to double every 18 months over the coming years.

"This is one technology that has transformed everything we do," he said, "JLG launched its first platform in 1969 - just 50 years ago next year. Compare the original machine with the current products and then imagine how they will look in five, 10, 15 or 50 years from now."

Mega trends

Bandekar highlighted several mega trends including the global marketplace, the sharing economy, the digital future and the urban world.

The 'global market place' is one where suppliers and users will find a way of connecting wherever they are on the planet. For data and ideas there are no trade barriers for example the merging of the ANSI and CE standards for aerial work platforms allows the same products to be able to be sold in more areas intensifying competition.

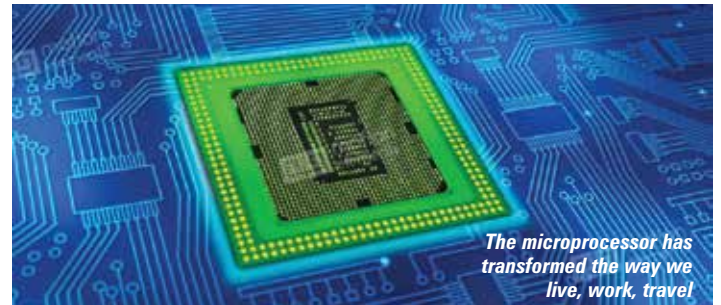
The sharing economy

Doing more with less - the sharing economy such as Uber and Airbnb - is also all around us and no different in our industry. The equipment rental industry is in a way an early a version of this, but it still has a way to go, both in terms of market penetration and radical change with



c&a

technology



The microprocessor has transformed the way we live, work, travel

new ideas and technology set to transform the industry, just as Uber has/is changing the taxi market.

All digital

The digital future is where we expect everything that happens in the physical world will be available in the digital world - on our smart phones, iPads/tablets and computers.

Urbanisation

It is estimated that about 50 percent of the seven billion people living on this planet live in urban centres - by 2050 this will increase to 66 percent or two thirds of the population. Cities are already densely populated and increasingly connected, while noise and air pollution are major factors driving the move towards electric/battery drive. At the same time traffic congestion will drive new ways of delivering equipment.

Adopting automotive technology

We now expect a new car to have a suite of cameras. This is rapidly becoming true for equipment such as telehandlers which could soon have cameras providing a 360 degree view in an easy to see format, improving both safety and productivity. The same is true when placing a load at height which can



Rental company Lynch has been installing 360° vision cameras on all machines over 10 tonnes

often be less than ideal in terms of safety and productivity. Cranes are using cameras to monitor an increasing range of items such as hoist spooling and tailswing as well as the load using hook block cameras complete with two way microphones. Aerial work platforms are likely to be fitted with similar systems to car reverse and proximity sensors in order to avoid overhead crushing etc.

At the same time it is rapidly becoming mainstream for actions to be recorded in the same way as a black box on aircraft. This will radically transform accident investigations, while providing manufacturers with a mass of useful data that will provide the background for even more rapid development.



The sharing economy



Architects and general contractors are now planning in a 'digital space'

The digital future?

“Architects and general contractors are now planning in a ‘digital space’,” he said. “We are currently developing an app that can place machines in the digital space to ensure the right machine is selected, that it will physically fit and have the performance to do the job helping improve productivity and profitability.”

“Building on the increasing use of the smart phone to control lights, door bells, cameras etc - we are also working on a remote control for loading and unloading machines and connecting to the machine via Bluetooth to drive and safely unload the platform, allowing rental customers and truck drivers to

delivery/receive it even though they cannot operate the machine. This has been trialled on scissor lifts in the USA with a few select customers, and we are now looking to commercialise it on a larger scale in the near future. We also expect to use this technology in other products.”

Many countries employ an increasingly diverse workforce which does not necessarily speak or understand the native language. In English speaking markets, such as the USA and UK, but also throughout the Middle East, India and parts of Asia the decals are typically in English, so JLG is prototyping an app which simply and quickly translates decals into another language with



JLG's BIM library allows users to choose the right equipment every time with the complete set of 3D BIM compatible models



obvious safety advantages.

“We send many different service kits and parts to rental companies together with reams of printed instructions on how to carry out the installation,” says Bandekar. “We are developing another app with selected customers so that they can look on any device through virtual reality but without the VR hardware, where they go through the installation process step by step increasing productivity. These are being developed now and will change the way we work.

All phases of work can initially be planned in the virtual world, so it is easy to know and choose exactly the type of machine you would need, when it is required and for how long, improving the productivity and safety. The BIM (Building Information Modelling) 4D and 5D technology exists but our industry has not adopted it yet.”

“There is also potential for greater use of intelligent remote control, taking the operator away from the danger work zone. Robots and

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A drone survey of a large wind turbine may cost half that of a traditional survey



humans will coexist in the future. What if we were to develop controls that can tell the machines where loads are to be placed? This human assisted load placement can further increase safety on the worksite. The technology is available and the cost to adopt it are coming down. There are always times when you have raised the platform to the place of work but realise that you have forgotten something," he said. "But we can programme drones to supply the tools making it easier and safer to work by not having to carry all the tools in the platform all the time."

Drone revolution

As technology advances, drones are becoming increasingly popular, especially in the commercial environment. Estimates predict that the global drone market will be worth around £90 billion by 2020.

An example of this is the UK, which saw a 52 percent increase in commercial drone licenses granted by the Civil Aviation Authority (CAA) between 2016 and 2017.

Drones are already working in the agricultural, energy and construction markets, mostly for survey and inspection work, obvious applications given that drones can easily reach heights and areas to get close views that would be challenging and expensive with more traditional means. An increasing range of tools are also allowing them to take accurate and precise measurements or detect cracks or other discrepancies, quickly and extremely cost efficiently, compared to more traditional methods. For example an external survey of a large wind turbine costs around £1,500, while using a drone to do the same work can be half that.

Network Rail in the UK has already

implemented a 'drone first policy' in a bid to help reduce working at height hazards for both employees and contractors. Reducing the amount of work that involves higher risks, can have financial benefits with discounted insurance premiums and less need for training for such hazardous work.

Drone types

There are two types of drones currently employed in the construction industry. The first is the standard helicopter type blade model. While cheap and readily available they cannot carry a great deal of weight, which also impacts battery life. They are therefore best suited to surveillance and inspection work and shorter flights. The second type is the fixed wing drone, often used by the military although are increasingly employed in other industries. They require a runway to take off and are, as you might expect, much more expensive. They can however carry heavier loads and are therefore more suitable for surveying large areas as they are often powered by engines and can carry much heavier sensory equipment.

Changing laws

As drones become more popular, governments are increasingly regulating drone pilots and the devices themselves. In the UK for example it is currently illegal to fly a drone within a kilometre of an airport and any flight is limited to a height of 122 metres/400ft. Pilots must also register any device over 250g with the Civil Aviation Authority and any breaches can result in fines up to £1,000. These laws only came into effect this year as an amendment to the Air Navigation Order 2016. By November 2019, it will also be mandatory for pilots to take an online



A fixed wing industrial drone



The helicopter VTOL type drone.

safety test when registering their devices.

Mixed reality training

In the past year or two have seen a significant increase in the availability of Virtual Reality (VR) training software and equipment, particularly for equipment operators for cranes and aerial work platforms. However technology is moving forward so fast that no sooner is new equipment available it is made obsolete, with Artificial Reality and now holographic computing technology set to become cost effective and practical for mainstream applications.

Global testing, inspection and certification company Bureau Veritas has introduced a new training aid using mixed reality and holographic computing technology to allow trainees to experience inspecting large or difficult to reach industrial equipment such as tower cranes etc. Created in partnership with technology specialists SmartDS, the SDS Mixed Reality Platform is a holographic training solution designed to support inspector training using Microsoft's HoloLens MR technology via a head-mounted display unit.

The approach works by blending 3D holograms within a real world environment through the display unit, to allow the user to physically explore computer generated 3D models that are placed in their



The holographic SDS Mixed Reality Platform uses Microsoft's HoloLens MR technology via a head-mounted display unit.

immediate surroundings. The user can interact with the placed objects using hand gestures, voice control or button inputs. They can also move into the hologram, remove casings and switch numerous common and rare defects on and off. Crucially, this allows the trainee to have the experience of inspecting the large or difficult to access equipment at minimal risk and without potentially disrupting work on site.

Bureau Veritas formed a partnership with SmartDS on the research and development of this technology, in a bid to integrate advanced technologies within existing training techniques. In order to create a tailored solution for Bureau Veritas' needs, SmartDS created a bespoke platform - the SDS Mixed Reality Platform - which utilises Microsoft's HoloLens technology with Enterprise Infrastructure Solutions for use in blended training environments, allowing it to be integrated within Bureau Veritas' existing software.

To-date, the team has estimated that this approach can reduce overall training time in this specialism from six days on site to a single day



on site, plus a day using the SDS Mixed Reality Platform.

Rachel Rawlings, accreditation manager at Bureau Veritas explains: "Typically, trainees in the pressure specialist discipline would be required to inspect large assets such as industrial boilers in order to complete their training. However it can be difficult to arrange access, as it requires shutting it down for a period of time which can be costly and disruptive. Often it can also be difficult to physically gain access



The holographic based approach means the trainee can get 'hands on' and have visibility off a myriad of potential defects conveniently, efficiently and safely



Blending 3D holograms within a real world environment through the display unit, allows users to physically explore computer generated 3D models



Anti-collision drone for indoor work



due to its size and location, as well as it being potentially dangerous. A real life asset may also be in good working order, so often the trainer will have to point out potential defects without the trainee actually being able to see them first hand. These factors often hinder the

training process, whereas the holographic based approach cuts out all the inconvenience and means the trainee can get 'hands on' and have visibility off a myriad of potential defects conveniently, efficiently and safely."



"We are already seeing the distinct advantages of this approach and the possibilities for adopting MR and holographic technology are endless. It is an industry game changer and we are really excited to see how the roll-out of this technology evolves moving forward."

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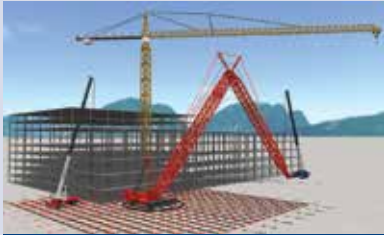
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Other developments

A1A Software expands 3D Lift Plan

A1A Software has improved the interface and features of its crane 3D Lift Plan, making it easier for customers to use the programme as a sales tool, for bid proposals, crane selection, setup, lift planning and documentation.



A1A Software has improved the interface and features of its crane 3D Lift

President Tawnia Weiss said:

"We have utilised WebGL technologies to enable the display of 3D content in Chrome, Firefox, and Microsoft Edge web browsers to improve the interface for customers no matter their preferred browser. This flexibility is important because 3D Lift Plan is a cloud-based program, eliminating the need to download and update software to individual computers. When using one of these browsers, users simply select the WebGL version."

New features expand the options for users as they plan which type of crane pads or mats are best for the ground conditions. Ground bearing calculations can now be made for steel mats with an option for layering steel mats over timber for better distribution of outrigger loads. This is in addition to the previous ability to select wood mats or engineered outrigger mats. Printouts of the crane mats in the lift plan now display corresponding images of steel mats instead of wood when steel mats are selected as part of the plan.

Other improvements provide users greater control of planning for unique lifting scenarios. Examples include the flexibility to override the boom angle when using a load chart with fixed boom angles, establish one crane in setup mode while simultaneously putting other cranes in normal operation mode for the creation of erection and dismantling plans and knife jack a lattice boom with luffer to verify procedures for lowering long lattice/luffer combos into stowed position.

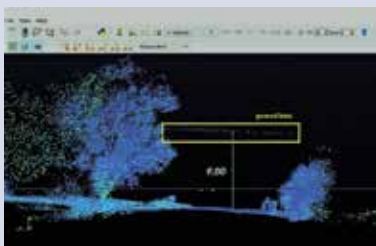
Finally, a new rigging configuration has been added to the standard options in the Advanced Rigging Design portion of the programme. The new configuration features two spreader bars and four roll-blocks. When this configuration is selected, 3D Lift Plan will calculate the sling angles and tension.

ALE upgrades Route Survey Tools

Transport and heavy lift company ALE's has upgraded its revolutionary surveying tool Route Survey Tools which automatically logs accurate route data such as height and width limitations, road inclines and cambers on digital maps while on the move. The initial system was launched last November and can measure critical sections of a route as well as generating photos and video footage for more in depth analysis and processing of the route survey report.



Upgrades include a protective casing for the camera as well as technological enhancements to make the tool more efficient for processing the route survey report. Following a rise in demand for route survey services both internally and externally ALE has manufactured a further seven units.



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