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MARK ANKERS, VP OF PRODUCT MANAGEMENT AT CURTIS INSTRUMENTS, SHARES HIS THOUGHTS ABOUT THE INDUSTRY, FORKLIFT TECHNOLOGY AND THE CHALLENGES OF MATERIAL HANDLING TODAY

Mark Ankers, VP of product management for Curtis Instruments, directs the worldwide product development and marketing of its motor control systems and instrumentation for industrial electric vehicles. His career began in the UK with the installation and commissioning of industrial process control systems, and has gone on to encompass the full spectrum of applications engineering, technical sales and product marketing for the European, Asian and US industrial electric vehicle markets. In a recent interview at the Curtis world headquarters in New York, he shared his insights…

Mark, you travel the world serving the materials handling/EV industry. What overall trends have you observed?
The global OEMs are all about productivity. To differentiate themselves further from their smaller competitors, they are not just selling a truck; they want to provide the customer with a complete turn-key warehousing solution, where the truck is fully integrated with the customer's business systems.

And the smaller, regional OEMs?
The quality of trucks is improving globally. In China and Korea, for example, OEMs typically do not want to be early adopters of new technology – they want proven, reliable components that do exactly what's needed for the lowest possible price.

Here, the productivity improvement is often the initial step-up from manual labor to powered materials handling – for instance, the Chinese Class III OEMs have had huge success recently by offering very small powered pallet trucks as an upgrade over manual pallet trucks.

Japan is a unique market and domestically its trucks are subtly different. While the basic functionality is similar, you'll often find components in use that you won't see on trucks anywhere else in the world.

Any other factors in the push toward higher productivity at lower cost?
The truck operators are part of the equation – human error becomes a major issue. So there's a trend toward autonomous or semi-autonomous guided trucks that can pick the right pallet off the shelves with less, or even zero, driver involvement.

This was a strong trend at recent trade shows; it's what the tech leaders are showcasing. One of the US OEMs has a new remote 'smart glove' for low-level order picking. The operator is off the truck and he's picking goods; as he walks down the aisle he can tap the glove to remotely move the truck along the aisle.

So again, the basic truck hasn't really changed all that much, but the new technology enables higher productivity to be achieved.

How have all these advances affected safety standards?
The reliance on software in almost every aspect of industrial truck functionality started ringing alarm bells a few years back. This resulted in EN ISO 13849-1, a far better tool for determining the safety of a software-based control system than the previous standard. Curtis was one of the first companies to recognize the advantages of EN13849 and I've been personally championing it for some time. I believe the intent of the standard is what's important: to minimize risk of injury or death to those working on or around industrial vehicles. With our latest 'E' family of controllers, Curtis has fully embraced the intent.

Today's industrial electric vehicle systems are all about smart components, smart systems and smart networking

Because it's all about productivity, how can suppliers serving the truck OEMs help create new efficiencies?

Material handling vehicles are a mature product in a highly competitive market. Everyone is looking to lower costs to protect their margins, and this directly impacts component/integrated system suppliers. The challenge is simple – for every new product, such as a controller or instrument, the market expects it will do more for the same price, or accomplish the same functionality for a lower price. So for a new product to be a real winner, it has to do more for less.

The most effective way to achieve this is to integrate the function of other electronic components into the controller, eliminating the need for other 'black boxes'. At Curtis, we accomplish this with VCL – our Vehicle Control Language.

What are the capabilities of VCL in the mission to eliminate components?

VCL is a proprietary, highly programmable vehicle application software layer that resides in our AC motor controllers. It enables the industrial truck manufacturers to create 'virtual' vehicle managers inside our AC motor controllers. The motor controller is also the CAN system master. VCL is a big advantage in simplifying development when creating smart components and systems.

Eliminating other black boxes, such as a dedicated vehicle manager, is a huge win. It reduces the number of components and simplifies the wiring harness. This corresponds to lower manufacturing cost, simplified service and maintenance, and lower operating costs over the vehicle's lifetime, so it offers a steady stream of cost and productivity benefits.

How has wireless networking and cloud computing impacted the material handling/EV industry?

There is nothing more unproductive than a broken-down truck. Adding vehicle telemetry and remote diagnostics which advise when specific preventive maintenance tasks should be carried out makes breakdowns less likely. With lift-trucks operating in warehouse environments that are fully networked, it's now easy to dial up a truck and interrogate it remotely over the internet.

There's another interesting aspect here: the OEMs have 'cloud' access to this same information. The ability to collect and analyze this data is hugely valuable to the truck designers, who get to see exactly how the vehicles are used day in, day out. Once they have real data on how customers actually use their trucks, they can start optimizing them for the next generation. They can identify how to make cost savings, or performance and reliability improvements by right-sizing every component on the vehicle, and so make tomorrow's trucks even better.

Forklift drive systems are complicated. So can OEMs with a vertical business model realistically develop this expertise?

Vertical integration is a sound principle as long as you commit to a long-term strategy, can commit to the huge investments required, and are sure that the economies of scale will remain in your favor. For a highly complex product such as a controller or inverter, even the biggest truck OEMs can't practically develop fully optimized solutions for each and every vehicle in their range – there will always be lower volume, niche trucks for which 'buy, not make' is the right decision. For those cases, outsourcing to proven specialists in the technology will be a better solution.

What changes do you see ahead for industrial electric vehicle system technology?

It's all about smart components, smart systems and smart networking. The cost of equipping vehicles so they can exchange data with local networks and the cloud is dropping all the time.

The industry has been talking about improved battery chemistries for years. I believe we're still a long way from any mass migration away from lead acid, but there's a lot of work currently being done around the various types of lithium batteries. It's going to be very interesting to see what effect the automotive EV/hybrid market is going to have here.

It's a similar story for motor technology. AC induction is entrenched. For low-speed industrial truck applications, nothing can match its ruggedness and torque-speed characteristics at the price, and that won't change soon. However, PMACs – synchronous AC motors with permanent magnet rotors – have been around for a while. They offer several benefits, albeit for a premium price: a smaller physical size for a given kilowatt rating, lower rotor temperature and higher efficiencies over most of the speed range. Axial flux PMAC motors also offer a very different form-factor and are ideal if stack length is a problem.

What about motor speed controllers, one of your special interests?

The obvious advance is microprocessors. It's amazing how much capability you can get for a few dollars. Controllers such as Curtis's AC models can now run faster control loops using higher-resolution data, for tighter control of voltage, current and torque, which allows motors to run more efficiently. It also makes more microprocessor power available for use via VCL, to provide the extra 'vehicle manager' functionality. It's astonishing how many applications we do these days where our controllers are the 'CAN Master', managing all the interfacing between multiple CAN devices from several different vendors.

Even basic electronic components are still evolving. Improvements offered by the latest MOSFETs and advances in the chemistry for something as basic as an electrolytic capacitor have had a remarkable effect on how much power our motor controllers can provide for a given size – we keep making them smaller, but more powerful than ever.

The net effect of this continual component improvement is that, ultimately, we are very capable indeed of doing far more for less. **iVT**

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