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**EXTREME MACHINES!:
MILITARY TRUCKS**

**Over-Design and
Over-Deliver PAGE 18**

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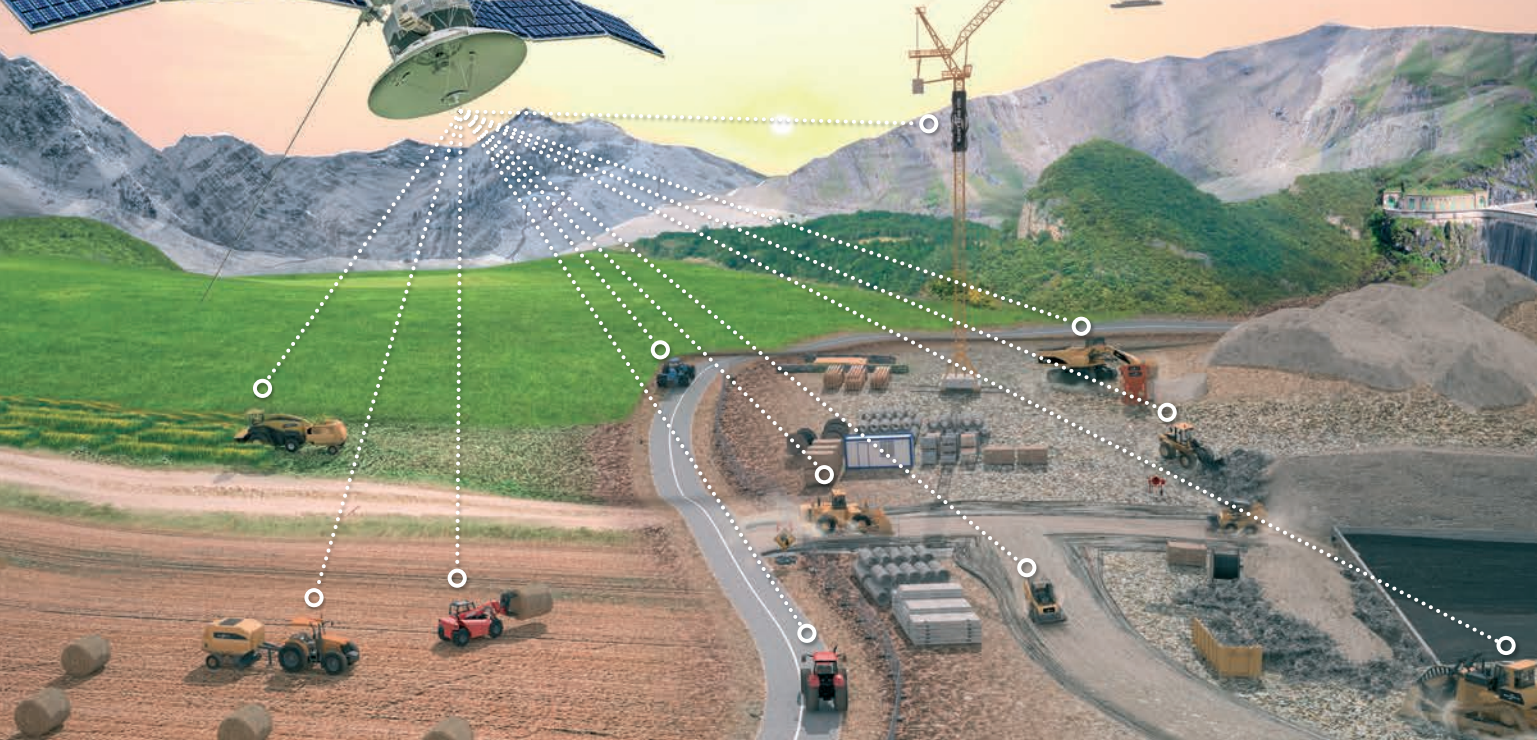
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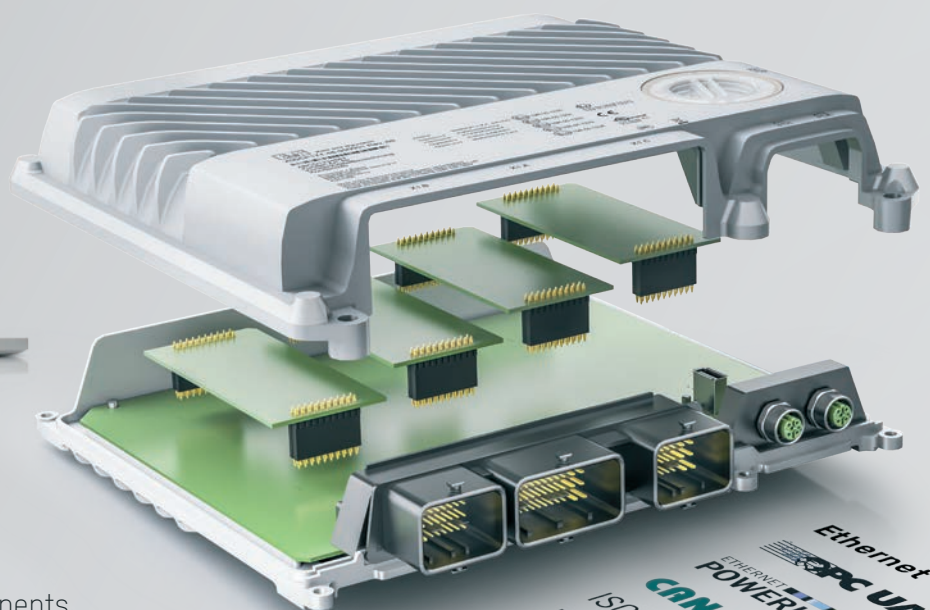


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Efforts to encourage design innovation offer the potential for industries to be further optimized and creative designs to be appreciated.

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(800) 538-5544 • www.ACBusinessMedia.com
www.OEMOffHighway.com

PRINT AND DIGITAL STAFF

Publisher **Sean Dunphy**
sdunphy@ACBusinessMedia.com

Associate Publisher/Editor **Michelle Kopier**
mkopier@ACBusinessMedia.com

Managing Editor **Sara Jensen**
sjensen@ACBusinessMedia.com

Senior Field Editor **Curt Bennink**
cbennink@ACBusinessMedia.com

Contributing Writer **Thomas Berry**

Senior Production Manager **Cindy Rusch**
crusch@ACBusinessMedia.com

Art Director **Dave Haglund**

Audience Development Director **Wendy Chady**
Audience Development Manager **Angela Kelty**

ADVERTISING SALES (800) 538-5544

Stacy Roberts.....sroberts@ACBusinessMedia.com

Al Bower.....abower@ACBusinessMedia.com

Sean Dunphy.....sdunphy@ACBusinessMedia.com

Erica Finger.....efinger@ACBusinessMedia.com

Kris Flitcroft.....kflitcroft@acbusinessmedia.com

Change of Address & Subscriptions — PO Box 3605
Northbrook, IL 60065-3605, Phone: (877) 201-3915
Fax: (847)-291-4816 • circ.OEMOff-Highway@omeda.com

List Rental — **Elizabeth Jackson**, Account Executive,
Merit Direct LLC, Phone: (847) 492-1350 ext. 18
Fax: (847) 492-0085 • ejackson@meritdirect.com

Reprints — For reprints and licensing please contact
Erica Finger at 920-542-1230
efinger@ACBusinessMedia.com.

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The Inevitable Greener, Smarter Future



I sit poised for yet another venture to Hanover, Germany for Agritechnica 2017. This year's show is themed "Green Future - Smart Technology" which is the only logical theme any show should really have for a while. Every industry has been moving toward more efficient, sustainable and smarter technologies and equipment for years.

OEM Off-Highway has been dedicated to covering this industry trend for over 10 years including the launch of our "Green Issue" back in 2007 (now our "E Issue").

If you're just now realizing that the industry deserves to be covered in a way that reflects its shift toward hybrid and electrification systems, that's some rock you've been living under.

The other great thing about Agritechnica is the international scope of the show. The 2017 show is slated to have over 2,900 companies showcasing their products and services, as well as over 450,000 visitors from 115 countries. A special conference at Agritechnica, the Ag Machinery International 2017 - Business Opportunities in Emerging Markets, will examine three core areas:

- Opportunities in new markets - will the prophecies hold true? Iran and Africa will be covered.
- Emerging markets in focus - positive outlook despite political uncertainties. The program will focus on Northern China, Russia and Ukraine.
- Southeast Asia in focus - Will Western brands find their place? The session will highlight Thailand and Myanmar.

I'm always intrigued by shifting emerging markets around the world and what influences are driving their potential growth. Brazil and India used to be prime areas of opportunity, but their government gridlock and corruption stalled their potential, although India was recently seen as finally making progress with its political structure to allow actual investment and growth to occur.

A show wrap-up of the technologies, equipment and market trends will be in our January/February 2018 issue.

Speaking of trends and technologies, be sure to check out the digital exclusive issue, the Year in Review 2017, which features the top 10 most popular articles and news of the year and what that says about the direction and interests of the industry. If you aren't already subscribed to receive the Year in Review, subscribe for it specifically at www.oemoffhighway.com/subscribe/email and make sure "Year in Review" is selected.

What predictions do you have for 2018? What topics of coverage are you most looking forward to reading in the coming year? Let me know!

Michelle

editor@oemoffhighway.com



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JAN/FEB ISSUE

- Compact Equipment Trends
- On-Highway Vehicle Announcements
- Drivetrain Electrification
- Lighting Product Launches
- Continued Market Consolidation: What does it mean for you?
- + Agritechnica Wrap-Up

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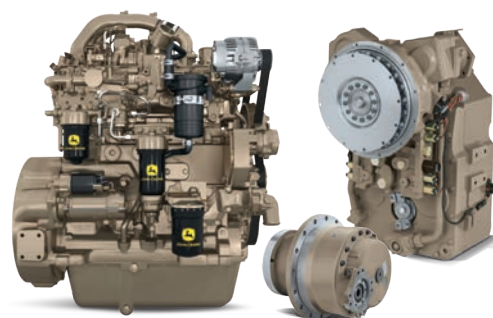
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RISING CONSTRUCTION Machinery Production in U.S., Europe



Agriculture Machinery Production in the U.S. and Europe is accelerating while China Agriculture Machinery Production contracts. U.S. Production is up 8.5% while Europe is 2.2% higher than a year ago.

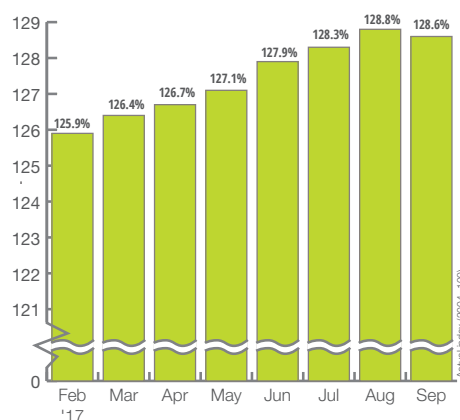
Construction Machinery Production is increasing in both the U.S. and Europe. Rising U.S. Machinery Production will extend into early 2018 while rising Europe Machinery Production will extend through 2018. Rising U.S. Mining Machinery Production will extend through the third quarter of 2018. |

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ECONOMIC NEWSLETTER!



U.S. Leading Indicator:

- The U.S. Leading Indicator transitioned to a tentative declining trend in September.
- The Indicator corroborates our expectation for slowing U.S. growth to categorize the majority of 2018.



Editor's Note: Please note that this chart has been modified on the Y-axis to show the trend more easily.



ITR Economics is an independent economic research and consulting firm with 60+ years of experience.

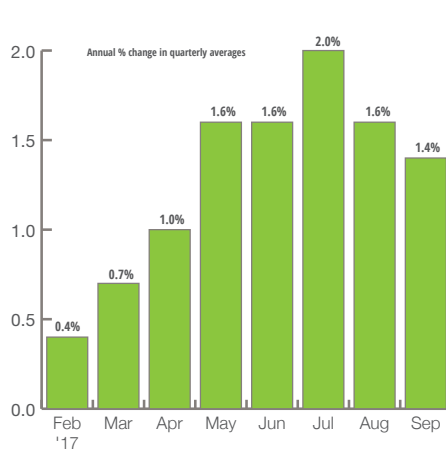
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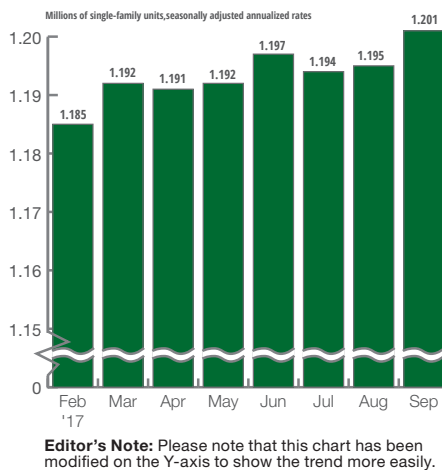
U.S. Total Industrial Production:

- Average U.S. Industrial Production during the 3 months through September was up 1.4% compared to the third quarter of 2016.
- Expect slowing growth to characterize Industrial Production through the majority of 2018.



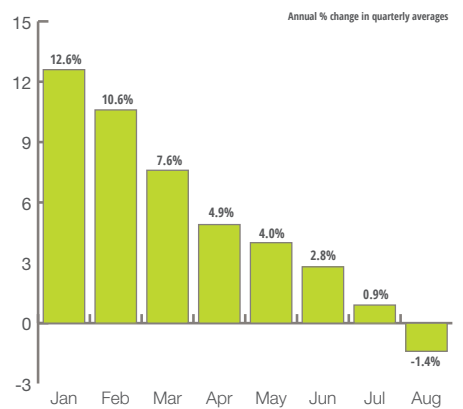
Housing Starts:

- U.S. Housing Starts totaled 1.201 million units in the 12 months through September.
- Strengthening consumer trends, such as rising wages and disposable personal income, will support rising Starts through late 2018.



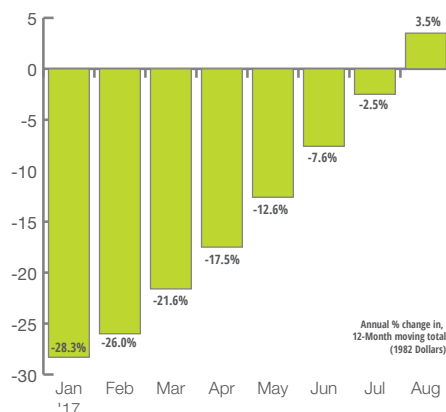
Private Nonresidential New Construction:

- Construction during the 3 months through August was down 1.4% compared to same 3 months in 2016.
- However, expect Construction to generally rise through 2018.



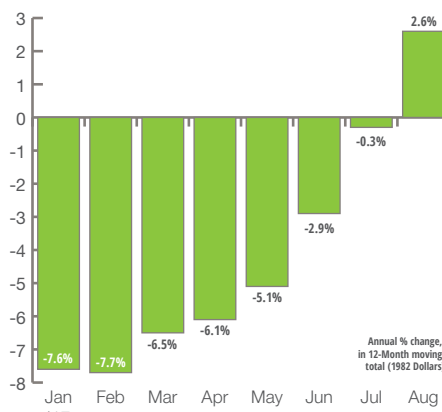
Construction Machinery, New Orders:

- New Orders transitioned to an accelerating growth trend in August.
- New Orders will rise into mid-2018 as business-to-business activity and Single Family Housing Starts increase.



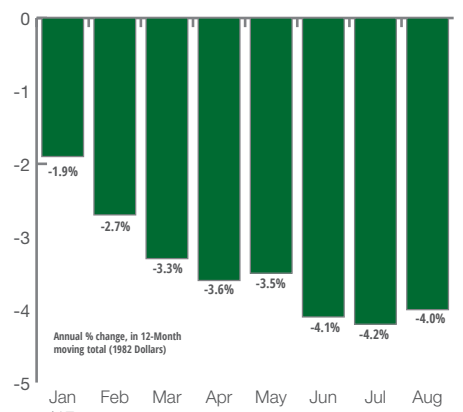
Farm Machinery & Equipment Shipments:

- U.S. Farm Machinery & Equipment Supplies transitioned to an accelerating growth trend in August, 2.6% above the year-ago level.
- U.S. Wholesale Trade of Farm Product Raw Materials indicates Shipments will rise into the second quarter of 2018.



Total Public New Construction:

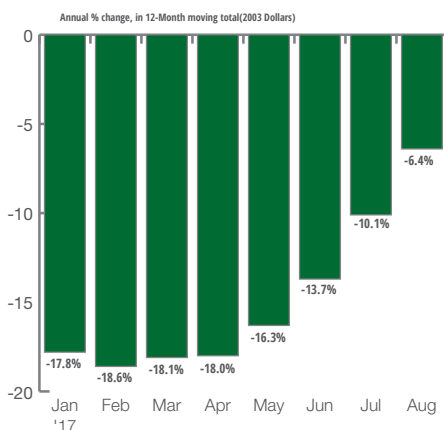
- U.S. Total Public New Construction during the 12 months through August was down 4.0% compared to the year-ago level.
- Construction will decline into the first half of 2018.





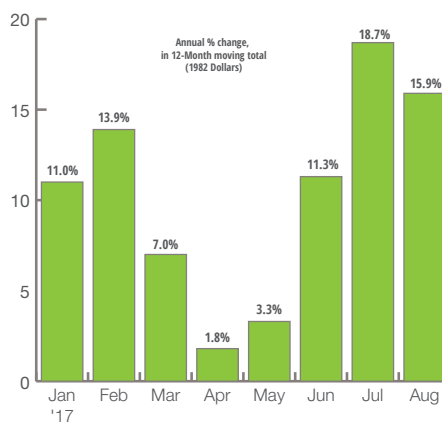
Heavy-Duty Truck Shipments:

- U.S. Heavy Duty Truck Shipments during the 12 months through August were down 6.4% compared to the year-ago level.
- Shipments are in a recovery trend and will rise into at least the first half of 2018.



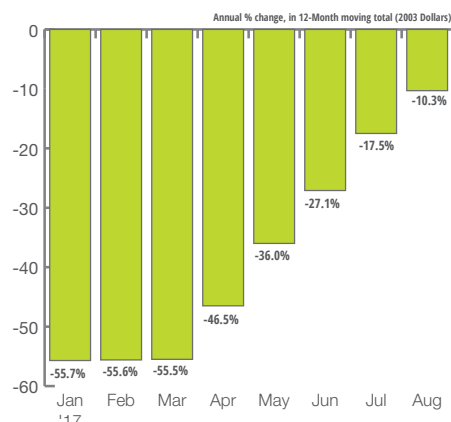
Defense Industry, New Orders:

- U.S. Defense Capital Goods New Orders are accelerating, 15.9% above the year-ago level on an annual basis.
- Plan for this segment to generally rise through 2018.



Mining, Oil & Gas Field Machinery New Orders:

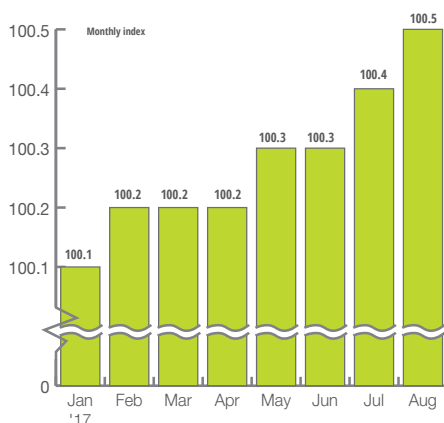
- U.S. Mining Machinery New Orders are recovering but are 10.3% below the year-ago level.
- Rising Oil Prices bode well for New Orders growth prospects next year.



Euro Area Leading Indicator:

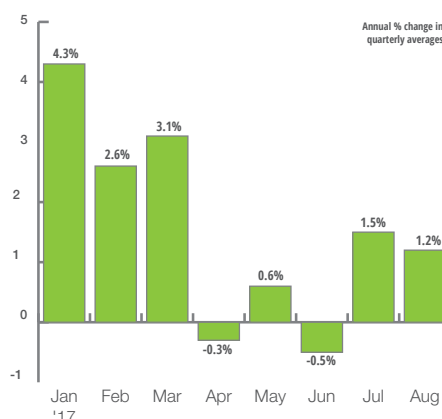
- The Europe Leading Indicator is rising.
- The accelerating Indicator signals there will be further growth within the European economy through at least the first quarter of 2018.

Editor's Note: Please note that this chart has been modified on the Y-axis to show the trend more easily.



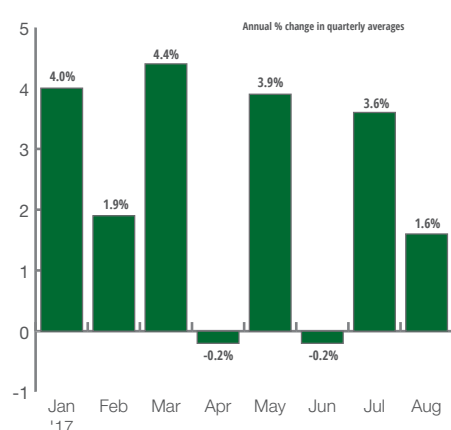
Industrial Production, United Kingdom:

- Average U.K. Industrial Production during the 3 months through August was 1.2% above the same time period in 2016.
- Rise in the U.K. Purchasing Managers Index indicates further rise in Production in 2018.



Industrial Production, Germany:

- Average Germany Industrial Production in the 3 months through August was 3.6% above the same 3 months 1 year earlier.
- Rise in the Germany Leading Indicator is a positive signal for Production growth into at least the first half of 2018.



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Michelin's EvoBIB features a central continuous tread band that is the only part which touches the ground during road transport to provide a smoother ride for operators.



FROM ROAD TO FIELD on a Single Tire

Creating a lighter footprint continues to be an area of development for tire manufacturers to reduce soil compaction, with the added need to allow road travel.

by Sara Jensen

Soil compaction continues to be an area of concern for the agricultural industry as machinery gets larger and field conditions become less predictable. In addition, farmers are having to travel farther between fields and more often. Sprayers in particular are challenged with this as the machines themselves, as well as their load carrying capacity has grown, and they

are often traveling from field to field.

Because of this, tire manufacturers have needed to develop tires which both reduce soil compaction and enable travel along roadways. During this year's Farm Progress Show (FPS, [learn more, 10207424](#)), tires designed for this purpose could be seen at many manufacturers' booths.

For the reduced soil compaction needs, many over the last sever-

al years have developed what are known as IF (increased flexion) or VF (very high flexion) tires which are capable of carrying a higher load than a traditional tire at the same pressure, or can carry the same load but at a lower inflation pressure in order to help reduce soil compaction.

Trelleborg, for instance, exhibited its VF1050/50R32 TM3000 tire with ProgressiveTraction technology ([learn more, 20856912](#)). The tire is the company's first VF tire standardized for spreader and sprayer applications. It features a D rated load index, enabling road speeds of 40 mph (65 km/h); the VF technology allows 40% more load to be carried at the same pressure as a traditional tire or to inflate the tire with up to 40% less pressure while carrying the

Sprayers spend about 50% of their time in the field and 50% on the road, requiring their tires to withstand heat buildup.

same load. This means that the tire can carry up to 29,100 lbs. (13,200 kg) at 52 psi (3.6 bar). “The new generation of spreader machines show an increasing need for carrying higher load while constantly reducing the contact pressure on the field to limit soil compaction during spreading operations,” said Lorenzo Ciferri, Marketing Director at Trelleborg Agricultural and Forestry Tires, in a press release announcing the launch of the new tire.

Meanwhile, the ProgressiveTraction technology features a double lug design to provide two bite points on the ground to ensure the tire gets as much traction as possible. There is also an interlug terracing which breaks up mud so the tire is always cleaning itself, further aiding traction.

It's all in the tread

According to James Crouch, Marketing Specialist at Alliance Tire Americas Inc., standard tractor tire treads have not changed much in 100 years, but the tractors themselves have. Because of this, Alliance Tire knew it needed to evolve its tire tread technology to meet the needs of today's farmers. The company did so with its new Agriflex 363 VF 380/90R46 row crop tire, a VF tire designed specifically for the North American sprayer market ([learn more, 20973235](#)).

Spayers spend about 50% of their time in the field and 50% on the road, requiring their tires to withstand the heat buildup that can occur when traveling down the road at high speeds while carrying heavy loads. To mitigate heat buildup, the tire features a large tread face to distribute heat over a larger area. It also has a longer footprint created by having a more flexible sidewall, as well as more rubber in the contact patch of the tire to dissipate heat. Steel belts inside the tire also help to reduce heat buildup. Crouch says steel belts serve two purposes—dissipate heat and protect against stubble damage, which is beneficial when the machine is working in the field.



ABOVE: To mitigate heat buildup, the Agriflex 363 features a large tread face to distribute heat over a larger area, as well as more rubber in the contact patch to dissipate heat.

BELOW: Michelin's prototype Loadster (left) is designed for high-speed, high-load capacity applications.



The tread pattern is also an important aspect. For field operations, Crouch says the perfect tire for forward traction is a zero-degree bar like that of a tank track while a straight up and down bar—similar to a two-wheel drive tire—is best for lateral traction, which is beneficial for keeping the tire between crop rows. Alliance's new 363 includes a blend of both patterns. An outside line along the edge of the tire provides more biting edges to ensure traction in the field while a solid center rib keeps the tire in line between the rows. "It's like a guide rib; it [performs] basically like a two-wheel drive tire [that stays] true to the row," says Crouch.

Domenic Mazzola, Vice President Engineering/OE Sales, Alliance Tire Americas Inc., says the 363 also has more lugs which are spaced close together. This helps with a condition called heel toe wear on the lug. He explains that when the lugs are spaced far apart, they can wear oddly on the leading edge of one and the trailing edge of the next as the machine travels down the road. However, having more lugs spaced close together eliminates this.

The tire's VF technology aids the high load capacity of the machine on which it's mounted. At FPS, it was exhibited on a 1,000 gal. (3,785.41 L)

capacity sprayer, with the tires inflated to about 45 psi (3.10 bar). Crouch says a standard, non-VF tire would be inflated to 64 psi. "There's a huge difference in pressure which contributes to better operator comfort," he says.

He also notes the North American sprayer market is the first to really adopt the use of VF technology because it has a higher demand for it, and more challenges which it is able to solve.

Laurent Le Dortz, Director of Marketing, Agricultural and Compact Product Line, Michelin North America Inc., says the reduced soil compaction VF technology provides can lead to increased yields for farmers. He says Michelin conducted a survey with a university in the U.K. and found on average fields in which VF tires were used had a 4% increase in crop yield.

During FPS, the company exhibited several VF tires including its Evo-



Trelleborg's TM3000 is a VF tire standardized for spreader and sprayer applications with a D rated load index for road speeds of up to 40 mph.

BIB "2-in-1" tire designed to work with central tire inflation systems (read more, [20974063](#)). This enables operators to easily adjust inflation pressures when going between fields and the road. When inflated to higher pressures for road travel, only the central continuous tread band grips the pavement, resulting in a smoother, vibration-free ride. In addition, Le Dortz says this reduces rolling resistance to help decrease fuel consumption as well as improve tread wear.

Once in the field, tire pressure is

TITAN TIRE CORP.



New Holland Agriculture is now offering Titan LSW tires on its T8 tractor line direct from the factory due to the reduced soil compaction benefits they offer.

TITAN TIRE CORP.



Titan's new Goodyear OPTITRAC LSW1100/35R32 and LSW1250/35R46 offer an approximate 25% improvement to footprint compared to a standard dual setup.

"The advantage of LSW, since we have about a 20% shorter sidewall, and 20% faster fill and deflate.... Even if the inflation systems come, we'll have an advantage because they can fill faster."

- Scott Sloan, Agricultural Product Manager for Titan and Goodyear Farm Tires

decreased which causes the tire shoulder to expand, increasing the tire footprint to aid traction. The tire's contact patch is increased 20%, helping reduce soil compaction. "It's a real versatile tire," says Le Dortz. "We call it '2-in-1' because it has the best performance on the road and in the field." Michelin expects to launch the tire to the North American market in mid-2018.

The company also exhibited its prototype "Loadster" tire designed for high-speed, high-load capacity applications such as floaters and other heavy equipment. Again, it includes the company's Ultraflex VF casing to provide reduced soil compaction when working in the field. Le Dortz says this is an important tire for Michelin as it is capable of carrying heavy loads at low inflation pressures—at maximum 14 psi (0.97 bar). The tire can carry 8.5-17 tons, and the goal is to achieve an E speed reading—up to 70 km/h (43.5 mph)—says Le Dortz. Michelin is still developing and testing the tire, and doesn't expect it to

hit the market until 2019.

To withstand high speed and loads

the Loadster will face on roadways, Michelin developed a double lug



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The North American sprayer market is the first to really adopt the use of VF technology because it has a higher demand for it, and more challenges which it is able to solve.

pattern to maximize traction. The lug size has been increased, as well, in areas where tread wear typically appears to help minimize it. The company also designed a block in the middle of the tread to improve stubble resistance. A smooth angle on the nose of the lug prevents stubble from sticking to the tire.

A change in tire shape and mindsets

Scott Sloan, Agricultural Product Manager for Titan and Goodyear

What about tracks?

Over the last few years, use of tracks appeared to be increasing within the agricultural industry. Bradely J. Harris, Field Engineer, Agricultural Tire U.S. & Canada Commercial Tire Sales Division, Firestone, says they did grow in the last couple of years due in part to the tire shortage. In addition, farmers had extra income in order to try them out. However, he says Firestone has seen a slight shift back to tires coinciding with the downturn in the agricultural economy because tracks tend to be more expensive. "Some customers have seen the benefits of tracks and will always buy [them]," he explains, which is why Firestone, and other manufacturers, continue to provide both tire and track products to serve all customers' needs.

Farm Tires, says one of the drawbacks of IF and VF tires is that operators are required to manage the inflation pressure, which they are not always good at doing. Instead, the company has focused efforts on developing its Low Sidewall (LSW) tires which feature a larger rim diameter and shorter sidewall than a traditional tire to reduce road lope and power hop while maintaining the same inflation pressures, load capacities and outside tire diameter. "What's nice about this is we can bolt on the technology and they get the advantages of the LSW without having to manage the inflation pressures," says Sloan. All LSWs are designed for VF inflation pressures and can be adjusted if a farmer wants to get the benefits for reduced soil compaction from the tire.

He notes the company has had discussions with OEMs about automated tire inflation systems—which a few companies have developed and begun to deploy—but they can be pricey, adding an additional \$10,000-20,000 to the cost of a tractor. Soil compaction is still a difficult issue for many to get their heads around, and unless a concrete value can be placed on how much additional yield can be achieved, the added cost of the inflation system can be difficult for farmers to accept. While they can be helpful, he says the systems are more common in Europe currently. "Again, the advantage of LSW, since we have about a 20% shorter sidewall, and 20% faster fill and deflate, it saves time right off the cuff. Even



The Agriflex 363 features VF technology to allow high load capacity at lower tire inflation pressures.

if the inflation systems come, we'll have an advantage because they can fill faster, get more air out faster."

Titan is in the process of expanding its LSW line with additional sizes to fit more applications. Sloan says the conversation with customers has shifted in the last 2-3 years from being about what benefits the tire can provide to whether or not it can fit their machine, prompting the company to develop more sizes. At FPS it displayed its new Goodyear OPTITRAC LSW1100/35R32 and LSW1250/35R46 which offers an approximate 25% improvement to footprint compared to a standard dual setup ([learn more, 20974253](#)).

Shifting the industry from using duals has been a big push for the



company, as well. For many years farmers have thought it necessary to use narrow dual tires to straddle crop rows in order to reduce compaction. However, Titan participated in a study which found using super single LSW tires is capable of providing the desired reduction in soil compaction ([read more, 12272727](#)). Use of these tires also enables farmers to get into the fields sooner, as they are better able to travel through wetter conditions than traditional tires. Sloan says they also provide the benefit of improved ride comfort. It was announced at FPS that New Holland Agriculture will now offer super single LSW tires on its T8 tractor line direct from the factory due in part to seeing results of the field studies

([read more, 20974251](#)). Sloan says this helps legitimize the technology for farmers when they know it can be purchased from the OEM.

Reduced soil compaction is likely to remain an area of concern for tire manufacturers, and OEMs, as a farmer's need to get into the field sooner continues to grow due

to changing field conditions and increased crop production requirements. With the tire technologies already developed, and those underway, manufacturers will be better equipped to meet these needs, which will in turn better help farmers feed an ever-increasing world population. |



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Over-Design and Over-Deliver

Surplus military vehicles are a great foundation for off-road trucks operating in extreme environments like the oil sands of Alberta, Canada.

by Michelle Kopier

Around the world, in nearly every continent outside of North America, there are multiple variants of extreme-duty commercial trucks that were originally designed as military vehicles. While the primary design purpose of these trucks was military use, each manufacturer has seen the applicability for industries such as heavy construction, open surface mining, oil and gas, and utility.

"If you go to these other continents, you'll see this style of truck anywhere off-road commercial vehicles work, except North America. I don't know why," says Acela Truck Company President and CEO David Ronsen. "Perhaps it's

Originally part of the FMTV program, Acela's trucks are military-grade powerhouses able to work in the most rugged of applications.

ALL PHOTOS COURTESY OF
ACELA TRUCK COMPANY



EXTREME MACHINES!: MILITARY TRUCKS

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The Acela trucks feature highly over-engineered, military-grade components supplemented within a custom-updated operator environment on top of a chassis built to withstand the most extreme environments.

because of the low volume nature of this niche industry that many of the large commercial truck manufacturers in America have shied away from the opportunity.”

There was a short-lived exception of a truck company that worked with BAE Systems back in 2007 to build a commercial variant of the U.S. Army Family of Medium Tactical Vehicles (FMTVs), and it was successful, especially in the oil sands of Alberta where hundreds of the vehicles are still in operation. However, after only two short years into the venture, BAE Systems lost the FMTV contract with the U.S. military and the surplus military vehicle supply literally vanished overnight.

Acela Truck Company, at its core, is a chassis manufacturer, and saw an opportunity to fill a need within

extreme-duty applications where the standard, commercially available chassis just couldn't hold up to the elements and operational demands. “When we started to look at the Acela business model to purchase surplus military vehicles, put them on an assembly line, strip them down to the frame and completely rebuild them with over 650 new parts, it took us a while to determine if we could even get the parts to get the project started,” explains Ronsen.

The parts for the Acela trucks not only had to be military grade, but were ITAR controlled—International Traffic in Arms Regulations, a U.S. regulatory body that controls the export of defense and military related technologies. “We had to go through extensive ITAR background investigations and checks in order

to just have access to the parts,” says Ronsen. Acela's team, several of which were involved in the former project with BAE Systems, worked to successfully build and solidify relationships with the key tier one suppliers of the military-grade components and systems of the original project, including companies like Meritor, BAE Systems, Dana Corp., Caterpillar Inc. and Allison Transmission. “We were successful early on in our ability to partner with these companies and secure a steady stream of parts.

“The next step was heading to the oil sands of Alberta to see how the original trucks had fared over the past several years,” continues Ronsen. When the team arrived, they were stunned to find that every single truck that had been sold was still in service—an incredible feat

considering the severe conditions of the oil sands environment. "It was astonishing," says Ronsen. "These vehicles had been operating in terrible conditions for 7 years for almost 24 hours a day at times. For every vehicle to still be operational has never been accomplished before. Every truck owner we spoke to about our idea to start the military vehicle reset process up again said, 'Get us more trucks,' which was the major catalyst to get the project underway, and is the reason a majority of our business remains in Canada."

The oil sands are a difficult and extremely abrasive environment to work within for vehicles. The extraction process pulls out the oil suspended in sand 50 ft. (15.2 m) below the surface. Compared to a dough-like consistency, the excavated mixture called bitumen is put through a separation process and

the sand is returned to the excavation location. This oil-sand mixture, bitumen, especially in the summer when it becomes more viscous, coats and covers the trucks. "These vehicles are operating in a soup of oil, fine sand, dirt, mud and gravel. You can just imagine how damaging this abrasive mixture can be to the truck," Ronsen says. "That's why we were so surprised to find the vehicles still operating—and at upwards of 96% documented uptime—after 7 years."

When a truck needs to be serviced, it spends at least 8 hours in a pressure washing booth to remove the bitumen before a mechanic can or will work on it, which adds downtime for maintenance. "We received feedback from the fleet owners and operators to make a simple modification to the vehicle and cover the grease points under a module

to allow faster servicing. It's a little change but an important one to save the client time on maintenance and increase uptime even more," says Ronsen.

Design, development and modifications

Going into the project with years of previous knowledge, the Acela team knew the process of resetting the military FMTVs was going to be time consuming. While the trucks themselves generally have extremely low mileage and operating hours on them (on average trucks have about 900 hours or less on the engine), there is still the challenge of how long the vehicle has been sitting unused when Acela acquires them. "All of the wear parts crack and break including the seals, hoses, belts and gaskets. Our process starts with the removal and replacement of every

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The Acela trucks work in applications ranging from oil sands to utility work.

wear part on the vehicle—totaling around 650 parts, 100 of which are custom built for Acela. That's a standard process for every vehicle, plus any additional repair parts the truck may need. It's one of the most time consuming processes we do besides the paint process," explains Ronsen.

But, the Acela team had done their homework, and while they knew the teardown process would be time

tions and research, Acela was able to identify several parts that were in need of updating or re-engineering.

One such custom engineered solution was the vehicle's air conditioning system, which did not exist in the original military vehicle's design. "Basically the entire interior of the operator cab is custom designed by Acela and custom manufactured for this project," says Ronsen. "We

cab didn't even have insulation, but we've been able to create a completely custom cab environment that would compare to any commercially manufactured truck coming off an assembly line from any major OEM in North America," he continues.

All three of Acela's basic models of its Monterra family of extreme-duty trucks are equipped with a central tire inflation system to take the tires from 95 psi (6.6 bar) down to 17 psi (1.2 bar) for quick highway to off-road environments. The deflation increases the tire's footprint by almost four times to allow it to more closely mimic a tracked solution. For applications where actual tracks are better than wheels, Acela works with several solution providers including Mattracks Inc. (*learn more at www.mattracks.co*) for rubber track conversion systems for individual wheels, and Right Track Systems Intl. (*learn more at www.righttracksystemsinc.com*), a provider of track bands for placement around multiple wheels.

While Acela Truck is succeeding in Canada, its goal is to make more headway in the U.S. for applications that range from utility construction

These vehicles had been operating in the oil sands in terrible conditions for 7 years and were still operational.

consuming, early on they went back to their Canadian customers and asked about common weak points or wear points. In addition, Acela revisited the military to look at its cumulative operational data for the last several years. From those conversa-

have a digital instrumentation panel, a custom power distribution panel, custom ABS moldings, and every other surface the operator comes into contact with including the door handles, the dash switches and interface, and the seats. The original

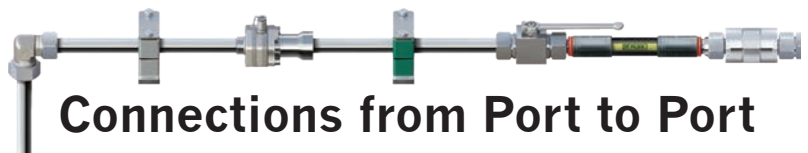
to fire trucks and logging equipment. "We will make or provide customization in a fleet situation or where we can additionally achieve a value, but our product already successfully spans the gap between current wheeled vehicle solutions and tracked

or articulated vehicles, which are more rugged but significantly more expensive to acquire and maintain." With a highly over-engineered set of military-grade components supplemented within a custom-updated operator environment, on top

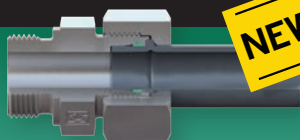
of a chassis built to withstand the most extreme environments, Acela is looking to continue to fill the void for an extreme-duty truck for severe off-road applications. *Learn more about the Acela Montero at www.acelatruck.com.*



The goal at Acela is to branch out from Canada and find applications in the U.S. ranging from fire trucks to construction equipment.



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TOP 10 NEW PRODUCTS

OEM Off-Highway

2017 Award Winners

Our Top Ten New Products list every year features the most visited products on OEMOffHighway.com in the past 12 months. With CONEXPO and IFPE 2017 lending a bounty of new product launches, there were hundreds of new products to search and find this year.

Engines continue to be the most popular product type sought out year after year, making up half of the top products this year. Each model is from a different company and has a different capacity, reminding us once again how vital diesel power is to our OEM readers.

1 78 L Tier 4 Final Engine

Caterpillar Inc. introduces the 3500E Series engine, the next generation of its industry-leading 3500 family of engines.

- Provides up to 20% greater power density, 10% greater fuel efficiency, enhanced durability, and longer life
- Designed to be remanufactured and key components are backwards compatible
- Power range of 507-3,015 bkW (679.9-4,043.2 hp)
- Achieves greater power from enhanced cast iron engine block and cylinder heads
- Displacement of 78 L (20.6 gal.) and rated speeds of 1,200-1,925 rpm
- New block and crankshaft design increases durability
- Features two available fuel systems—mechanical electronic unit injector or common rail—that are optimally applied by application and regulated markets
- Uses selective catalytic reduction (SCR) or exhaust gas recirculation (EGR) aftertreatment system, depending upon customer application
- Meets U.S. EPA Tier 4 Final and EU Stage IIIB emissions standards

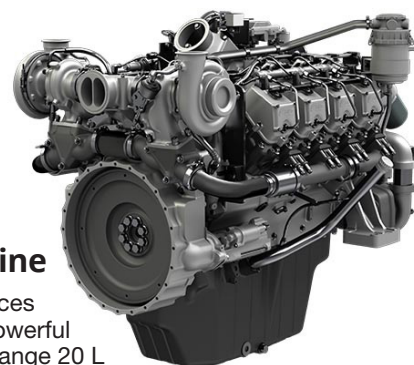
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2

20 L Engine

FPT introduces its V20, a powerful top-of-the-range 20 L (5.3 gal.) engine.



- Features 90 degree V8 (8 cylinder) architecture
- Performs at maximum power of up to 910 hp (678.6 kW) at 1,800 rpm and maximum torque of up to 3,024 lbs.-ft. (4,100 Nm) at 1,500 rpm
- Includes 2,200 bar (31,908.3 psi) Common Rail Injection system and ECU (Electronic Control Unit) for high system efficiency and low fluid consumption
- Lean V8 design with no-EGR, as well as single-stage WG turbocharging and high resistance materials, guarantee system reliability
- Power-to-weight ratio is 13% more than 12 cylinder competitors' average, delivering high performance while preserving vehicle stability and reducing load on axles
- Compact design, minimizing impact on vehicle dimensions and load capacity
- Permits up to 2% of savings on fuel compared to 12-cylinder engines due to lower friction and smaller displacement
- Includes HI-eSCR technology

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3

Customizable Displays

MTA has introduced its Giotto and Leonardo 8- and 12-in. (20.3 and 30.5 cm) customizable displays.

- Android-based platform allows users to easily adapt displays to specific needs of vehicle
- Android platform includes standard features such as graphics and reference algorithms that facilitate development of applications
- Can also be programmed with MTA Studio tool
- Designed to be like a real tablet with a TFT touchscreen
- Jacinto 6 multi-core microprocessor produced by Texas Instruments ensures state-of-the-art performance including activation times of less than 5 seconds
- Can be powered with 12 and 24V supplies
- Features IP66 protection

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Electric Motor

5

The HVH410 electric motor from BorgWarner provides high torque and power density for full hybrid and electric systems.



- Up to 700V
- Stator diameter is 410 mm (16.1 in.)
- Up to 300 kW (402.3 hp) of power
- Up to 2,000 Nm (1475.1 ft.-lbs.) of torque
- Offers an estimated 20-30% fuel savings and CO₂ reduction
- Patented high voltage hairpin (HVH) high efficiency stator
- Oil and WEG cooling options available
- Permanent magnet rotor
- Proven high durability design

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4-Cylinder Diesel Engine

DEUTZ introduces its TCD 9.0 4-cylinder diesel engine, the first in a new generation of engines the company is planning as part of an alliance with the Liebherr Group.



4

- Features 9 L (2.4 gal.) capacity
- Power rating of 300 kW (402.3 hp)
- Produces 1,700 Nm (1,253.9 ft.-lbs.) of torque
- Highly compact design makes for easy installation in wide range of applications
- For EU Stage V, U.S. Tier 4, China IV and EU Stage IIIA emissions standards
- Follows standardized concept with common customer interface and high proportion of shared parts
- Uses highly developed aftertreatment systems
- Emission downgrade versions will be available, enabling a single engine platform to be used both for Stage V markets and regions with more relaxed regulations

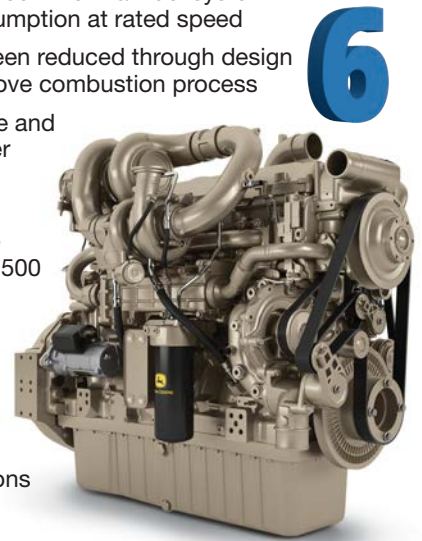
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13.6 L Engine

John Deere Power Systems has revealed its 13.6 L (3.6 gal.) engine, the first of its next generation engines.

- Designed to meet future needs of global markets
- Offers customers increased efficiency, installation flexibility and power in more compact package
- Integrated high-pressure common-rail fuel system reduces diesel fuel consumption at rated speed
- DEF consumption has been reduced through design enhancements that improve combustion process
- Provides reduction in size and weight compared to other engines in same power range
- Offers maximum variable speed power rating over 500 kW (684 hp)
- Employs full-authority electronic controls and cooled exhaust gas recirculation (EGR)
- Single and dual turbocharger configurations offer OEM customers improved packaging and greater application flexibility
- Equipped with a rear gear train to reduce noise

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6

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Heavy-Haul Planetary Axle

Meritor Inc. introduces its P600 Series Tridem Heavy-Haul Planetary Axle for heavy-duty, long-haul, oil field, mining and logging applications. Full production begins in June.



- Developed for global markets
- Compatible with industry-leading suspension options
- Offers gross axle weight rating (GAWR) of 126,000 lbs. (57,152.6 kg) and gross combination weight of 560,000 lbs. (25,401.2 kg)
- Proportioning inter-axle differential delivers even torque split between the three axles for improved traction, maximum load capacity and increased longevity of drivetrain
- Wide ratio coverage and standard anti-lock brakes deliver optimum safety and performance in extreme conditions
- Can be equipped with optional driver-controlled differential lock and hardware for central tire inflation systems (CTIS)

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9 Multi-Function Displays

In a market dominated by single-purpose monitors, ACTIA is deploying a new generation of Multi-Function Displays (MFDs).

- High performance HMI with 4.3-, 7- and 12-in. (10.9, 17.8 and 30.5 cm) WVGA TFT screen
- Dedicated graphics/video processor allows four channel real-time video display
- Sunlight readable luminosity (1,000nit/1,000:1)
- Multiple interface options and protocols with the vehicle/vessel or machine
- Multi-Touch PCAP Technology with optional capacitive or resistive touchscreens
- ACTI-GRAF ready
- Ruggedized to IP65/67
- Flexible Linux OS allows the OEM to autonomously design applications and integrate functional solutions on many platforms where the elements are of concern
- Designed to cost

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8 Air Conditioner for Kubota BX70 & BX80 Tractors

Curtis Industries LLC has announced the release of a compact air conditioning system for the Kubota BX2370-1 & BX2380 sub-compact tractors.

- Uses patent-pending "dynamic load control" software to precisely manage vehicle electrical power, allowing unit to operate on smaller vehicles with lower horsepower
- Features low-profile design integrated into vehicle roof
- Fully self-contained refrigeration components
- Comes pre-charged with refrigerant
- Custom overhead console features three-speed fan control, illuminated on/off switch

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Don't forget there are literally thousands more products on OEMOffHighway.com/Directory. Search by product category and subcategory if you know what you're looking for, or browse around and see the latest and greatest from leading industry technology and system suppliers.



5 L Engine

For the first time, Kubota is expanding its diesel lineup to include engines up to the 200 hp class. The first model in the Kubota 09 Series is the 5 L (1.3 gal.) V5009.

- Meets Tier 4 Final and impending Stage V emissions regulations
- Compact, 4-cylinder design
- Output of 157.3 kW (210.9 hp)
- Aftertreatment devices include DPF and SCR
- Features variety of power take off options

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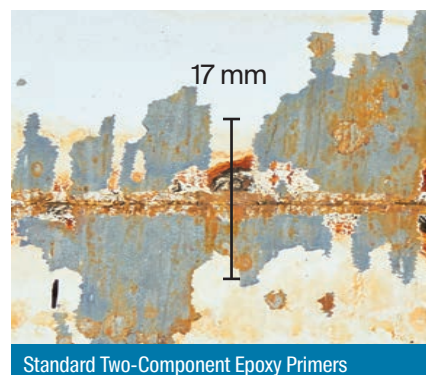
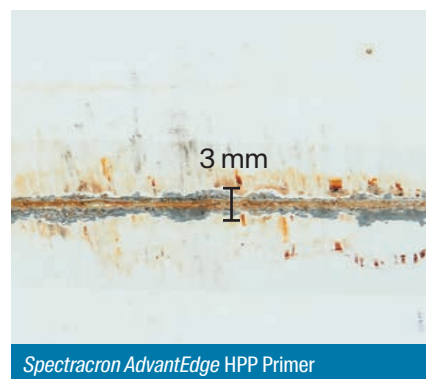
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The World of INNOVATION

Efforts to encourage design innovation offer the potential for industries to be further optimized and creative designs to be appreciated.

compiled by Sara Jensen

Innovation is at the heart of what engineering is about. Every day new ideas and designs are being developed which bring about changes—whether big or small—that can have impacts on the intended industry, typically geared towards bringing about further efficiency and optimization.

While some may never make it to market, and are purely conceptual, design innovations can lend insight into the needs of an industry and the direction manufacturers are taking to provide a solution to those requirements, as well as inspiration for other product designs. There are several design competitions and efforts at manufacturers to foster innovation within the engineering community, a sampling of which follows.

RED DOT AWARDS

Since the 1950s, the Red Dot Design Award has been celebrating good design in a variety of areas, and has become one of the largest and most prestigious design awards in the world. The award is divided into three disciplines—the Red Dot Award: Product Design, Red Dot Award: Communication Design, and Red Dot Award: Design Concept.

The jury evaluates entries “blindly,” wherein information of the participant is hidden to prevent any potential bias, and the winners are chosen on the merit of their design alone. Entries are accepted from all levels of the design profession, from companies to design students.

Thousands of applications are submitted each year; following is a compilation of the most recent winners related to the heavy-duty equipment industry.

IMAGES IN THIS SECTION COURTESY OF RED DOT

RED DOT AWARD: Design Concept

Product: Wind Messenger

Designer: Professor Cheng Xufeng, Zhang Zhanshuo

The Wind Messenger is an innovative sweeper with an in-

built Unmanned Aerial Vehicle (UAV) to better program its routes and techniques with a more cost-efficient blowing and suction mechanism.

Traditional automated sweepers have a slow operating speed, high wear rate due to contact with the ground, causing friction on the brushed disc, and high fuel consumption. The Wind Messenger tackles these problems by avoiding direct contact with the ground, increasing the efficiency of the fan system to reduce fuel consumption and improves the effectiveness of cleaning by using a wind sweep technique.

The chassis and suspension system adapts quickly to changing terrain. It is able to sweep ores, cement blocks and bricks of 2-3 cm (0.79-1.2 in.) in diameter and clean objects of 3-8 cm (1.2-3.1 in.) in diameter. Both the cleaning device and the blowing and suction sweeping mechanism are patented.

Product: Fuelcell Towing Tractor

Designer: Toyota Industries Corporation,

Yakushi Tadayuki

Fuelcell Towing Tractor is a concept model designed for the future of transporting airport cargo.



Fuelcell Towing Tractor is a concept model that shows the future of towing tractors that are becoming increasingly vital at airports, especially in the face of advancing internationalization and increasing air cargo volumes. Hydrogen fuel is used to generate the electricity required to drive the vehicle with motors. Only water is emitted, making this an incredibly environmentally-friendly truck. Filling time is minimal, facilitating efficient operation.

Harnessing the features of fuel cells not only benefits the environment but also leads to a more streamlined process by enabling long periods of operation with minimal filling time. Furthermore, the use of information technology allows appropriate information to be displayed. This facilitates automation, which in turn reduces the operator load, resulting in further streamlining. The result is a reduction in operator load and improved efficiency and safety, helping paint a brighter future for the logistics business.

An advanced fuel cell unit is enclosed in a thick plate capable of withstanding heavy-duty operating environments, and its design helps the operator anticipate vehicle movements. This simple design that takes operator workability into consideration has been applied to the vehicle interior.

RED DOT AWARD: Product Design

Product: RM 120GO! mobile impact crusher

Manufacturer: Rubble Master HMM GmbH

The mobile impact crusher RM 120GO! crushes construction and demolition waste, asphalt, concrete and natural stone. Its compact external dimensions enable easy transport even in urban areas. Weighing in at only 35 tonnes while producing an output of up to 350 tonnes per hour, the machine is the most compact impact crusher of



its kind. A diesel-electric drive concept enables the direct drive of the crusher. High efficiency is achieved through optimized crusher geometry. The drive and crush functions are operated securely via remote control.

Product: Easy & Safe industrial plug and connector

Manufacturer: ABB

The Easy & Safe industrial plug and connector meet high standards of reliability and safety. They are IP67-certified, which guarantees that electrical contacts are protected from dust and water. This reduces downtime and maintenance costs. The contact components of the connectors are manufactured from solid brass. The innovative design enables the contacts to self-clean and protects the contact areas from arcing.



Product: Brava

Actra Plus armrest

Manufacturer:

Gebrüder Frei

The Brava armrest is designed as equipment for mobile working devices. The product consists of three elements: operating unit, arm-



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rest and height adjustment unit. Thanks to this modularity, OEMs can configure the armrest accurately; allocation and shape of the operating elements are variable. The design is based on an ergonomic analysis of the operating sequences. Characteristic for the design is the combination of clear lines, faceted surfaces and soft forms. The coloring and the formal language emphasize the industrial character of the armrest.



Product: Valtra Smart Touch multifunctional control armrest

Manufacturer: Valtra Inc., AGCO Corp.

The multifunctional control armrest Valtra Smart Touch combines digital and physical interfaces, which makes the operation of a modern tractor significantly easier. All important controls are easily accessible. The tractor plus multiple implements can be controlled from the same location, namely the ergonomically positioned drive lever. This means less stress and strain on the driver's arm. Individual components in the armrest can be quickly exchanged in field conditions without damaging the electronics inside.

Product: TopTurn X4500 compost turner

Manufacturer: Komptech GmbH

The Topturn X4500 is a compost turner for triangular windrows which turns and aerates while driving by means of a centrally located, generously dimensioned rotor and



assures high performance in all work situations. Particular design features are the robust, triangular frame and the centrally located cabin which can be lowered hydraulically for transport and maintenance. The cabin is spacious; operation of the information system is intuitive, thanks to a large color display.



Product: VDL Citea SLFA Electric fully electric articulated bus

Manufacturer: VDL Bus & Coach,

When designing this bus, great importance was laid on its social acceptability while at the same time its innovative, futuristic character was meant to be visible. The result is an elegant, friendly-looking bus with covered wheels and soft, flowing forms. Large glass surfaces give the driver good visibility, while the TFT monitor screen on the dashboard provides the prioritized necessary information. The passenger flow was analyzed exactly and optimized.

Product: Jungheinrich EKX 516 high-rack stacker

Manufacturer: Jungheinrich AG

Clarity of forms and defined surfaces characterize the appearance of the EKX 516. For high productivity, it combines new technology and intelligent solutions. Newly developed drive technologies provide great energy efficiency, while an innovative vibration damping technology ensures good driving properties and safety. In addition, the vehicle is fitted with RFID technology for easy system integration. From an ergonomic aspect, the EKX 516 offers more room in the cabin, intelligent assistance systems and a specially developed operating system.





Product: ARBOS 5130 tractor

Manufacturer: Lovol Arbos Group S.p.A.

A distinctive feature of the Arbos 5130 is its monolithic bonnet with integrated headlight strips which, together with the pearlescent white side panels, form a successful contrast to the green bodywork. Lateral "shark gill" slits emphasize the aggressive overall look and also optimize ventilation. The bonnet lines extend without a break as far as the cabin. The cabin design is based on an innovative engineering approach which distributes the stress over all surfaces, making the cabin even safer.

Product: Hidromek HMK 640 WL wheel loader

Manufacturer: Hidromek

Recipient of the Red Dot: Best of the Best award

Wheel loaders are often at the center of action on building sites since they have to move around heavy loads like soil or stones. The Hidromek HMK 640 WL is based on a careful evaluation of the extreme working conditions in mines and quarries, also taking into account the demands of the site operators. This innovative wheel loader has been designed with balanced lines that go beyond the classic forms. Its powerful appearance is mainly characterized by the bold design of the bonnet. This was implemented in the form of a mono-block engine hood, since it facilitates better service and maintenance. The spaciouly designed driver's cabin offers a high degree of comfort as well as sophisticated ergonomics. The cabin is equipped with fully electronic joysticks and allows intuitive navi-

gation from within a pleasant work environment. The console also allows easy adjustment to meet individual user needs. In addition, all settings and information can be displayed on an LED screen, which is



conductive to smooth operation. The search for a new design identity for a

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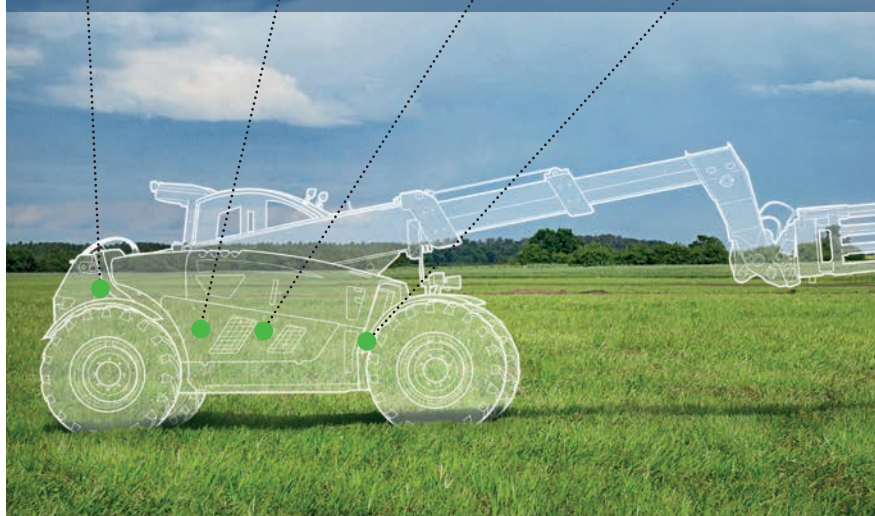
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vehicle of this type has made the Hidromek HMK 640 WL emerge as a wheel loader with an impressively dynamic style – it aestheticizes the work environment by setting new standards.



Product: Hidromek HMK 600 MG motor grader

Manufacturer: Hidromek

HMK 600 MG is an 18-tonne motor grader with a blade 4.3 m (14.1 ft.) long and a powerful turbo-diesel engine. The engine, electro-hydraulic control valve, joysticks and

the automatic transmission are connected via a CANbus system and provide high efficiency for all working operations. The motor grader has fully electronic joysticks, with which all work operations are easily controlled; however, control of the vehicle by using the steering wheel is possible if necessary. Thanks to the design of the cabin with specially calculated angles, the driver has a good view of the blade.

Product: MAP III sprayer

Manufacturer: PLA

Recipient of the Red Dot: Best of the Best award

Sprayers are used regularly in agriculture, where both the vehicles and drivers are often confronted with difficult work conditions. The MAP III is a self-propelled sprayer that merges a highly advanced functionality with a new aesthetic. It captivates users with its balanced proportions as well as a futuristic look. All components were designed according to the maxim of a new design language called “Dynamic Force”, which redefines the robustness and dynamism of the company’s entire product portfolio. The driver’s cab incorporates a key design element and was well integrated into the overall shape. Perfectly matched in ergonomics for the work area, it offers the



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user an excellent panoramic view. All user controls were integrated coherently into a multifunctional armrest console and are intuitive to operate. The MAP III boasts a huge capacity range from 2,900-4,100 L (766.1-1,083.1 gal.). In addition, it

features several design innovations such as modular solution tanks as well as walkable fuel and oil tanks. Featuring durable carbon fiber booms, this sprayer is a versatile, agile and fuel-efficient representative of its product group – a highly inspired design lends it a new identity.

Product: T46-7 telescopic handlers

Manufacturer: Liebherr-Werk Telfs GmbH

The new telescopic handlers impress with their stability during loading and lifting. High performing working hydraulics and the trusted hydrostatic travel drive on the telescopic handlers facilitate purposeful and fast operations. The generously dimensioned cabin is characterized by high comfort and safety. Large



window panes, an uninterrupted windscreen, the new design with falling edges, a sloping bonnet following the line of site, and a low articulation point of the boom guarantee very good all-round visibility.

Product: L 580 LogHandler

XPower wheel loader

Manufacturer: Liebherr-Werk Bischofshofen GmbH

The L 580 LogHandler XPow is a specialized machine for timber handling, whereby the design and technology are correspondingly optimized. With its distinctive lines, compact silhouette and powerful lift arm it conveys strength and dynamic driving performance. The tapered engine cowl and large windows of the cab offer good visibility and increase safety. Productivity is increased thanks to



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Product: Valtra N4 tractor interior

Manufacturer: Valtra Inc., AGCO Corporation

Honorable Mention award recipient

When designing the interior of the Valtra N4, a high-performance tractor capable of autonomous driving, great importance was attached to ergonomics, comfort and panoramic vision. The convex-formed cabin thus offers more room and a good overview with almost 7 sq. m (75.3 sq. ft.) of window surface. Furthermore, a well-conceived

layout and design of the operating elements make the interior quiet and pleasant for the driver. The possibility of visual distraction in the cabin has been reduced so that the driver can easily concentrate on his work.

Product: ERE 120/125/225 electric pallet truck

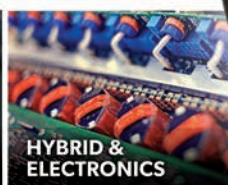
Manufacturer: Jungheinrich Landsberg AG & Co. KG

The ERE is designed as a modular system with over 4,000 configuration options. The ergonomic user interfaces as well as the access and storage systems are always located in the same place. A large, foldable stand-on platform and a restraint system allow for a wide spectrum of applications. Thanks to the sturdy construction with exposed fin, the interior is well protected. Optional features such as curve-CONTROL and daytime running lights increase safety. New engine and drive components assure long-lasting and energy-saving handling operation.



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Product: CSSE shotcrete machine

Manufacturer: CIFA S.p.A.

CSSE is a shotcrete machine for use underground and belongs to the Energya series of the manufacturer, whereby the utility vehicles are equipped with new hybrid drive technology. For the CSSE tunnel machine, all electrical and electronic components have been specifically chosen for their efficiency. In electro mode, it can be driven for all operations emissions-free and without fuel consumption, and with a simultaneous increase in efficiency. From an aesthetic aspect, the CSSE features a streamlined design.



Product: E800 | E1200 road sweeper

Manufacturer: Kugelmann Maschinenbau e.K.

The E 800 | E 1200 is an adaptive brush and suction combination which makes an advantage of the supposed disadvantages of a not fully integrated but laterally running suction hose: the hose is easily accessible and thereby makes it possible for use also as a powerful, hand-held suction tool.



The front consists of a broom and an aerodynamically optimized suction mouth, asymmetrically mounted and directed to the right. The intuitive steering is integrated into the existing vehicle joystick.

Product: Tornado Pro 9118 XWS 4WD lawn tractor

Manufacturer: Global Garden Products Italy S.p.A.

The lawn tractor Tornado Pro 9118 XWS 4WD is versatile, robust and powerful. Due to its four-wheel drive, it is suitable for demanding gardens and for difficult terrain.



Thanks to a lateral eject function, it mows high grass quickly and easily. The cutting deck is equipped with three blades and six wheels. The 15-L (3.9 gal.) tank and a 2-cylinder 725 cc Kawasaki motor ensure high performance. The large wheels offer secure grip. A display shows all important data. Charger, mulch kit and tow coupling are included.

PROMOTING STUDENT INNOVATION

On May 10, CNH Industrial held a joint event with the Royal College of Art to award students participating in a project to design innovative and sustainable machinery for emerging markets. Students were challenged to develop innovative industrial products and services to match local needs and existing infrastructure in developing nations, with the aim of creating a concept that would succeed in low capital, low income and low skills environments.

CNH is involved with the project as a means of promoting growth and development opportunities for young talent and investing in product innovation, and research and development projects to work towards a sustainable future.

Designs competed in four categories:



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The overall winning design in CNH's student design contest was a wet and dry season transport vehicle.

- Urban Flow - explore basic passenger and goods journey needs, and design a vehicle that will improve the quality of life for local people
- Service Design - recognize opportunities to enhance efficiency within the markets and develop an easy and sustainable solution to help users

A winner was selected for each of the four categories, as well as an overall winner among all the designs. The overall winner was Austin Dewees for his wet and dry season transport vehicle.

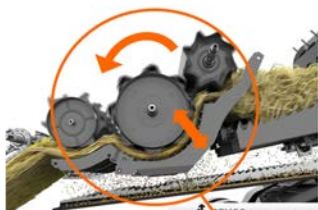
Visit oemoffhighway.com/20861216 to see images of the other winners.

AGRICULTURAL ADVANCEMENTS

Winners of this year's Agritechnica Innovation Awards were announced in September, with many of them focusing on the industry trends of Big Data, connectivity and digitization, as well as making the operator's job easier. Two innovations received the Agritechnica Gold Innovation Award 2017, while 29 others received the Silver Innovation Award 2017.

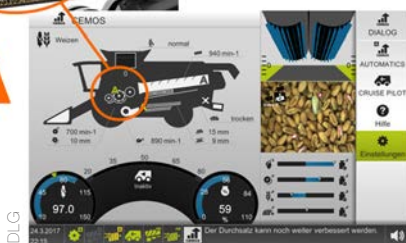
The award winners are chosen by an independent expert committee appointed by the DLG (German Agricultural Society)—organizers of Agritechnica; this year 320 applications were submitted.

Gold Innovation Award winners



Cemos Auto Threshing - the autonomous threshing system for CLAAS straw-walker and hybrid combine harvesters developed by Claas-Vertriebsgesellschaft mbH, Germany

A



The Cemos Auto Threshing system automatically sets the tangential threshing

system, optimizing the quality of work and performance of the machine. Based on input entered by the operator, the system sets the drum speed and concave gap to ensure optimal results in current harvest conditions, eliminating the need for operators to do so manually which could often be complex and not achieve the desired results.



StalkBuster developed jointly by Kemper Maschinenfabrik GmbH & Co. KG and John Deere GmbH & Co. KG

The StalkBuster is a stubble-destroying technology designed as part of a maize header. It destroys all the maize (corn) stubble before it is driven over by a piece of equipment, which is necessary to prevent the spread of corn borer.

Visit oemoffhighway.com/20975258 to see the full list of winners.

TESTING TECHNOLOGIES OF THE FUTURE, TODAY

During this year's CONEXPO-CON/AGG, Volvo Construction Equipment debuted its HX2 concept battery-electric, fully autonomous load carrier. It was developed as part of an electric site research project the company has been conducting to demonstrate potential efficiency and emissions-reduction technologies.

The HX2 is one of several electric vehicles operating on the site, and communicates autonomously with the other vehicles. Knowledge gained from the project will be transferred to future development projects.

Read the full article at oemoffhighway.com/20849703.



Volvo
Concept
Lab

VOLVO CONSTRUCTION EQUIPMENT



COMBINED MACHINE PLATFORMS IMPROVE EQUIPMENT UTILIZATION

CASE Construction Equipment also introduced a concept vehicle at CONEXPO-CON/AGG 2017, the DL450 Compact Dozer Loader. It is a combination of a large-frame compact track loader and a bulldozer. The goal of the machine design was to provide contractors with the ability to get more out of their equipment.

The DL450 provides the power and performance of a small dozer in a platform which also serves as a loader, and is able to run all attachments contractors might own for their skid steer and compact track loaders. Though not yet available in the market, CASE has been getting feedback on the concept machine from contractors, and believes there could be a place for it in its product lineup.

Read the full article at oemoffhighway.com/20853922.

NURTURING INNOVATION IN THE U.K.

Submissions Still Being Accepted

In October, Bosch Rexroth launched its Innovation Award in an effort to nurture innovation within the U.K. engineering sector ([learn more, 20977749](http://oemoffhighway.com/20977749)).

The competition is focused on mobile applications, and requires the company's BODAS control system to be implemented into the design. Entries will be evaluated on creativity, practicality and complexity. The winner will receive a complete BODAS control system and 100 hours of design support to help turn the design into reality. Hardware, software and product training for up to five people will also be provided to the winner. Prizes will be given for second and third place winners, as well.

The Innovation Award is open to engineers aged 18 and over and resident in the United Kingdom or the Republic of Ireland who are working for manufacturers of, or suppliers to, the construction, agricultural, materials handling or on/off-highway vehicles industry.

All entries must be submitted before the closing date on December 22, 2017 and the winners will be announced in January 2018. |



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Hall-Effect Thumbwheel Roller

Curtiss-Wright Industrial division has announced the launch of the JC050, designed by the Penny & Giles brand, a Hall-effect thumbwheel roller that is suitable for integration within joystick hand-grips and other in-cab human-machine interfaces (HMI) in specialty off-highway vehicles.



- Features low under-panel depth of 23 mm (0.9 in.)
- Return-to-center functionality over range of ± 37 degrees roller travel
- Rated for 3 million operating cycles due to use of non-contacting, Hall-effect sensing technology
- 'Pass through' design protects against liquid or dust contamination
- Electronic robustness is assured by sealing of internal electronics to rating of IP67
- Dual-redundant electronic architecture is constructed using two power supplies and two sensing circuits, outputs of which can be set to positive ramps, combination of positive and negative ramps, or full voltage range over half travel from each sensor with constant output in other half travel
- Operating temperature from -40-85 C (-40-185 F)

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Multifunctional Sunlight Readable 12-in. Display

CrossControl widens its display portfolio with CCpilot VS, a 12 in. (30.48 cm) display computer with a powerful i.MX 6 quad core CPU.

- Delivers state-of-the-art user experience achieved through optically bonded, truly sunlight readable widescreen display with PCAP touchscreen
- Includes hardware accelerated 2D, 3D and vector graphics to enable fast design of premium user interfaces
- Multifunctional capability allows several functions to be performed in parallel
- Can be used as instrumentation display, machine control HMI, video monitor, electronic manual and more
- Comes with LinX software platform, which offers choice of powerful tools for application development
- Design modules include UX Designer for developing premium graphics in Qt Creator

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Safety Camera System for Forklifts with 5 in. Display

Rear View Safety announces the release of its RVS-77F6033 Safety Camera System for Forklifts with 5 in. Display.

- Features 5 in. (12.7 cm) TFT LCD digital color display equipped with back-lit buttons that illuminate in the dark
- Includes three mounting options – flushmount, U-bracket, or traditional mount, all included with the system
- Heavy-duty waterproof camera can be drilled into fork or affixed with included adhesive
- Camera features precise 45 degree viewing angle for examining pallets

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ISOBUS Terminal

The SMART430 from Mueller-Elektronik supports the ISOBUS Universal Terminal (UT) and Auxiliary Control (AUX-N) – both AEF certified.



- Small and compact design
- Compliant with environmental protection class IP66 (according to DIN EN 60529)
- Operates within extended temperature range of -20-70 C (-4-158 F)
- Controls simple ISOBUS implements
- Suitable for displaying ISOBUS applications such as weather station or fertilizer spreader
- Features 4.3 in. (10.9 cm) color display with resolution of 480 x 272 pixels
- 32-bit processor with 180 MHz
- Operated using softkeys and menu buttons arranged around perimeter
- Two M12 plugs located on back of display for connecting CANbus and sensor inputs

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Programmable Display

The DSEM840 from DSE is a programmable display developed for use within off-highway machinery and mobile applications.

- Robust, optically bonded, 4.3 in. (10.9 cm) color screen and button fascia
- Two independent CAN interfaces

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Joystick with Center Pushbutton

Grayhill Inc. introduces the Series 04JT Discrete Joystick with center push-button, which features direct tactile feedback, a rugged design, and reliable functionality.

- Single pole, four-way toggle switch design
- Meets military standards for immersion, mechanical shock, vibration, and moisture seal
- Well suited for harsh applications where vibration or contamination are a concern
- Sealed against contamination to IP67
- Suites use for military weapons sights/goggles, display navigation, and equipment motion control via handgrip or panel mounting
- Short behind-the-panel depth, requiring less than 0.7 in. (17.8 mm)
- Features momentary contact with tactile feedback, self-return to center where the contact is open
- RoHS (Restriction of Hazardous Substances) compliant
- Tested to MIL Standard Environmental Requirements

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- Memory height adjustment customizable
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- Fore/aft isolator (with lock) dramatically reduces horizontal vibrations and prevents jolts from jarring the back
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Component Interchangeability Among Tractors and Scrapers

In an effort to simplify parts inventory and maintenance, modularity and standardization became integral to project success.

by Thomas Berry, Archivist, Historical Construction Assn.



LETOURNEAU-WESTINGHOUSE BRO-CHURE D-B-TP483, DEC 1964

A LeTourneau-Westinghouse C-500 prime mover with two unpowered scrapers.

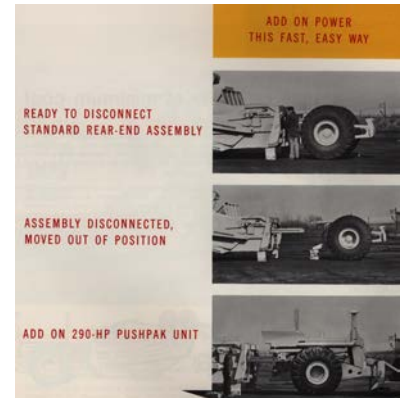
The idea of having major components be interchangeable across different machines makes sense on several levels.

An example of standardization in the construction industry is Mangla Dam Contractors. This American joint venture, sponsored by Guy F. Atkinson Company, was awarded the contract to build one of the world's largest embankment dams in remote western Pakistan in the mid-1960s. To hold down the costs of supporting several machines in such a remote location, the venture purchased equipment of the fewest brands and models it could so as to keep parts and maintenance costs to a minimum. Almost all major equipment was powered by as few models of Cat and Detroit

diesel engines as possible.

Two equipment manufacturers, Allis-Chalmers ([learn more at 20976812](#)) and LeTourneau-Westinghouse, took notable steps in the early 1960s to incorporate principles of standardization and component interchangeability across different types of machines. Both companies explored the same concept – using interchangeable powertrain components on both the tractor and scraper in different combinations for the needs of different applications.

Allis-Chalmers' 555 tractor and 44-yd. (40.2 m) 562 scraper were marketed under its Modular Concept. The idea was being able to mix and match components as needed. The owner could use the prime mover by itself to pull other



LETOURNEAU-WESTINGHOUSE BRO-CHURE TP470, MAY 1962

Illustrating the process of changing an unpowered C500 scraper rear end for a Pushpak.

equipment, or yoke two prime movers together to form a 555 tractor. In scraper service, the prime mover could pull one or two scrapers, with or without a power module on the scraper axle.

LeTourneau-Westinghouse's approach was on a smaller scale and didn't include a push tractor. Its C-500 system consisted of a variant of its famous C prime mover with a Detroit 8V-71 engine, pulling one or two 21 yd. (19.2 m), 24-ton scrapers. One or both scrapers could be equipped with a 4V-71 or 8V-71 engine.

Only 74 C500 prime movers were sold, and many were scrapped after trade-in or recall. Production ended in 1967. The 555 was an outright failure, and perhaps a couple of hundred 562s were sold. **I**

The Historical Construction Equipment Assn. (HCEA) is a 501(c)3 non-profit organization dedicated to preserving the history of the construction, dredging and surface mining equipment industries. With over 4,000 members in 25 countries, its activities include publication of a quarterly educational magazine, Equipment Echoes; operation of National Construction Equipment Museum and archives in Bowling Green, OH; and hosting an annual working exhibition of restored construction equipment. The 2017 show took place Nov. 3-5. Individual memberships are \$35.00 within the USA and Canada, and \$45.00 U.S. elsewhere. HCEA seeks to develop relationships in the equipment manufacturing industry, and offers a college scholarship for engineering and construction management students. Information is available at www.hcea.net, by calling 419-352-5616 or e-mailing info@hcea.net.

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Empower YOUR CUSTOMERS

Our next-generation, core software and hardware is designed to empower tractor and farm equipment manufacturers to deliver their own agriculture solutions to their customers

Flexible SCALABILITY

Customize your needs: From single-box auto-steering solutions with ISOBUS and definable CAN messaging to application software and compatible ruggedized GNSS hardware components, we offer everything you need to create full system OEM positioning solution toolkits for your customers

Advanced TECHNOLOGY FEATURES

Atlas® delivers accurate and versatile global L-band corrections

Atlas Basic offers instant global sub-meter accuracy

AutoSeed™ allows you to suspend Atlas use and rapidly re-converge to a high-accuracy position

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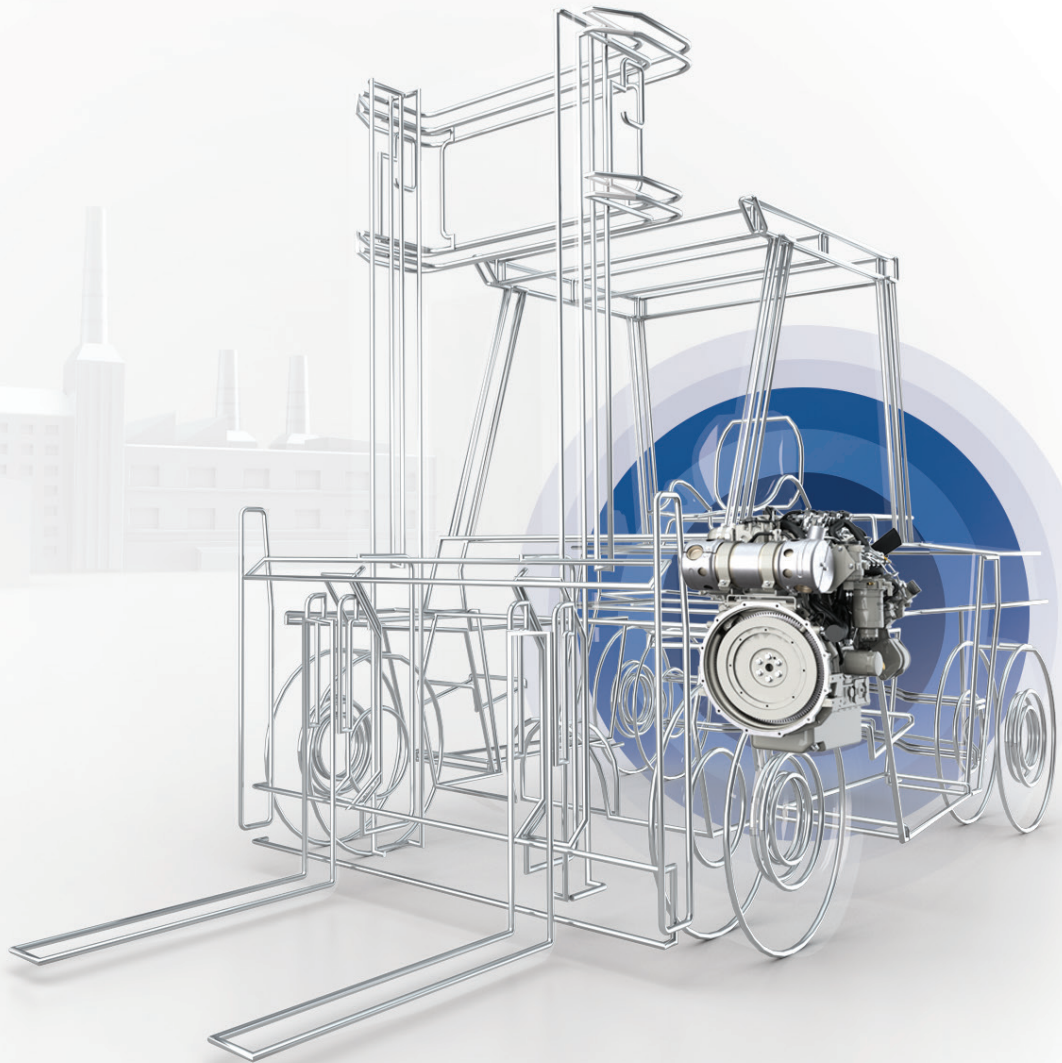
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