

# Off-Highway Gears

Market needs push in 2013, but will it get one?

Matthew Jaster, Senior Editor

## The construction/off-highway industries have been here before.

New equipment, technologies and innovations during an economic standstill that some have been dealing with since 2007. Business is bad in Europe, lukewarm in the United States and companies are still waiting for the gigantic construction boom promised in areas like India, China and South America. Companies like Boston Gear, Durst Drives, ZF, Oerlikon and Forest City Gear supply gears for the off-highway industry. Some simply provide the gears themselves while other companies provide a total gearbox and/or assembly.

While slow growth will be the norm in the United States for 2013, encouraging signs in Europe (Bauma 2013 in Munich, Germany) suggest the economy will look better toward the end of the year. For the rest of the world, significant economic growth probably won't make news until 2014. And even then, how much growth are we talking and what part of the world will take the most advantage of it?

## Anticipated Growth

"Major market segments are experiencing growth, and Durst expects continued business expansion over the next five-year period as a result," says John Locarno, global sales and marketing manager for the Durst

division of Regal Beloit Corporation. "The increase in global population and personal incomes over the next several years, particularly in developing economies, will lead to investment into water, sewer, transportation and development programs and will support demand for infrastructure construction. Durst anticipates greater demand for the off-highway equipment into which Durst products are integrated."

Boston Gear expects moderate growth in this area, according to Mike Stegmann, product manager. "North America and Asia should provide the largest opportunities."

Wendy Young, president of Forest City Gear, expects the off-highway market to recover in the near future. "Last year we lost 15 percent of gross sales in heavy construction and off-road production. We expect some return toward the end of this year with some possible growth for 2014, but not returning to the levels of 2012."

Young continues, "Our gears are going into major off-highway applications. When our econ-

omy improves, I believe our orders will increase and return to above former levels due to pent up demand. We do not have orders for parts such as these offshore. I expect we will resume levels in our off-road and recreational applications, as well, from the business we receive in the United States and Canada."

Oerlikon Drives Systems Segment is currently strengthening its precision gearing, transmission and drive-line solutions in Russia. Recently, Oerlikon attended the CTT 2013 in Moscow to meet current and new customers and reinforce the brand presence of both Oerlikon Fairfield and Oerlikon Graziano.

Dana Holding Corporation is bolstering its ongoing support of the growing construction market in Russia and the

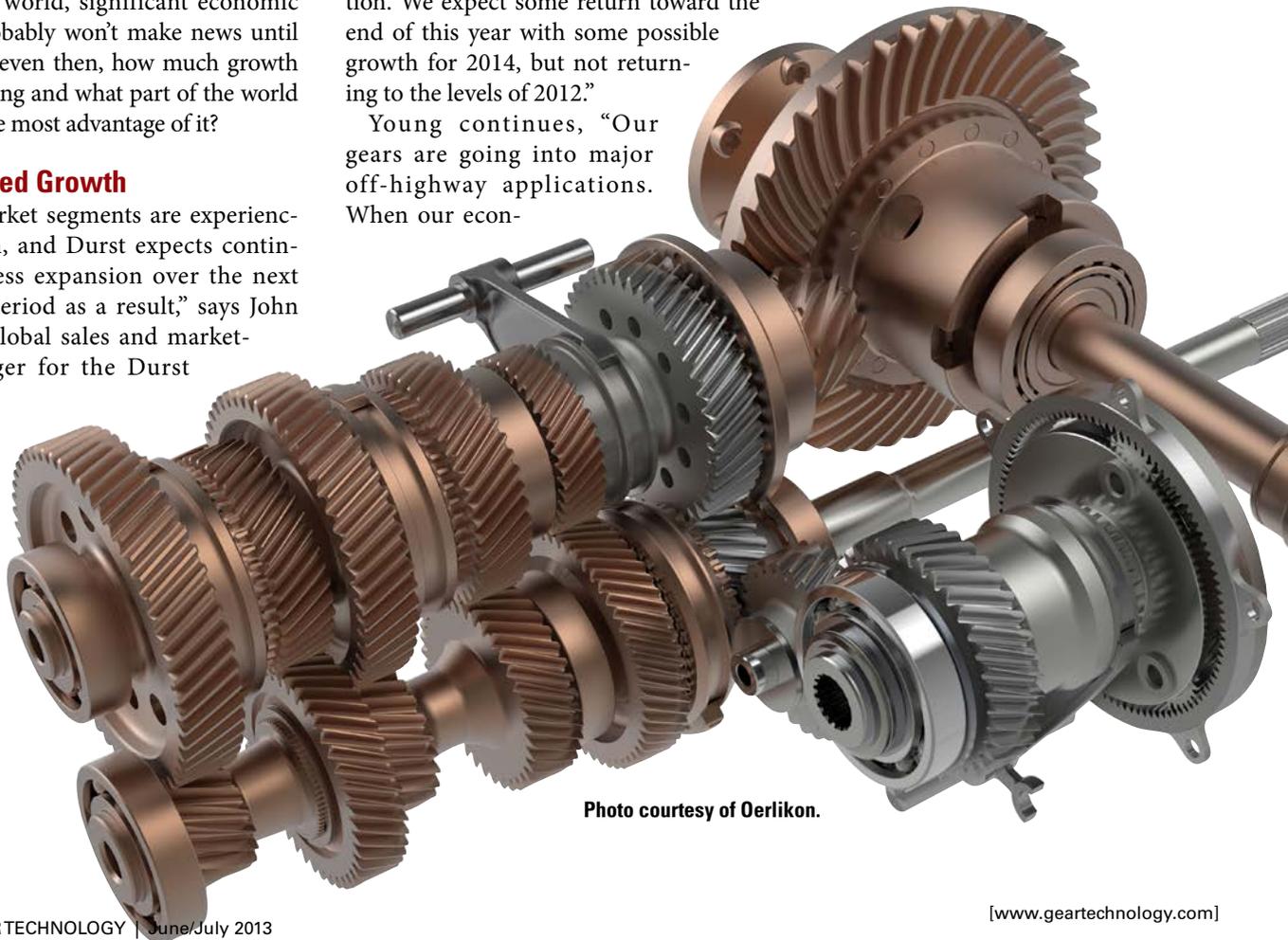


Photo courtesy of Oerlikon.

Commonwealth of Independent States by expanding its aftermarket network and offering customized drivetrain solutions for the region. Construction activity in Russia is expected to continue accelerating through 2015, spurred by state-funded civil engineering projects for transport and infrastructure expansion. Dana is increasing its local resources by actively expanding its network of Authorized Spicer Off-Highway Service Centers and strengthening the capabilities of the Dana distribution center in Gyor, Hungary, to improve the delivery of genuine original-equipment service parts.

Dana is also increasing the availability of driveline solutions produced in China for equipment buyers in the region. These solutions include the Spicer TZL Series of four-speed powershift transmissions as well as the Spicer Rui Ma brand of transmissions and axles, which provide an optimized blend of product features, performance, dependability and cost.

“At Dana, we recognize the increasing importance of this vibrant, growing market and the crucial role the construction industry will play here,” says Aziz Aghili, president of Dana Off-Highway Driveline Technologies. “We will continue to expand our support with complete drivetrain solutions and world-class aftermarket capabilities for construction equipment and other off-highway applications.”

Is a trade show a good market indicator of future business? If so, Europe has been in need of good news on the construction/off-highway segment for some time. Normal growth is expected with some areas even poised to make larger impacts by the end of the year. The 31st edition of Bauma 2013 amassed more than 530,000 visitors in April, breaking not only attendance records, but also exhibitor numbers and exhibition space.

“This is a very good for our industry in these turbulent times and it will certainly give it a boost,” says Johann Sailer, chairman of the Construction Equipment and Building Material Machinery Association of

VDMA and the president of the committee for the European Construction Equipment Industry (CECE).

“This has been an absolutely positive trade show for us,” says Stefan Heissler of the Liebherr International AG board of directors. “We welcomed customers from all around the world at our booths and we signed up lots of new orders. In some

“Major market segments are experiencing growth, and Durst expects continued business expansion over the next five-year period as a result.”

John Locarno

product sections, we exceeded our expectations.”

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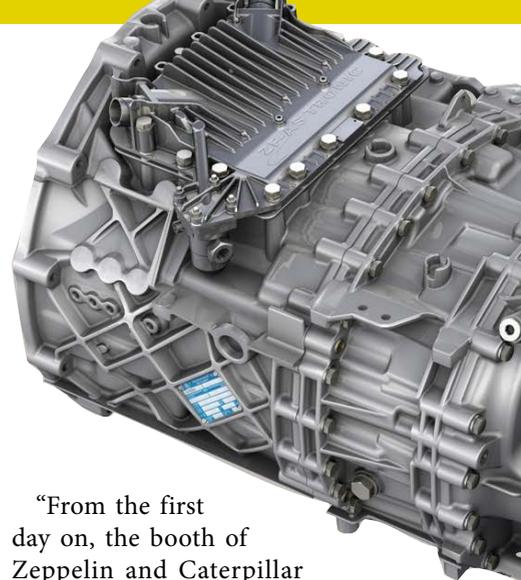
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"From the first day on, the booth of Zeppelin and Caterpillar was almost overrun with visitors," says Michael Heidemann, chairman of the management board at Zeppelin Baumaschinen GmbH. "We have sold more machines at Bauma 2013 than ever before and have set a new record."

### Putting the Gears to Good Use

Whether standalone products or part of an assembly, off-highway companies have made the most of their downtime by producing new transmission and driveline products and technologies.

ZF, a worldwide automotive supplier for driveline and chassis technology, supplies automated transmission systems for mobile cranes and special vehicles. The 12 or 16-speed ZF AS Tronic is available for mobile cranes in direct speed or overdrive transmissions. The main components, including dry clutch, are fully integrated into a light-metal alloy housing. There is no need for an additional transmission cooler in the standard vehicle configuration under normal usage when the outside temperature is at 40°C or below. The ZF AS Tronic is able to do more than driving and braking. The transmission can be combined with up to two clutch dependent or drive dependent PTOs that can be engaged independently of one another.

The technology of AS Tronic mid is based on the large AS Tronic; the 12 gear steps are shifted pneumatically. In order to cover a wide range of applications, ZF offers AS Tronic mid with low power-to-weight ratio for torque ranges from 800 to 1,600 N-m. In harbors, the medium AS Tronic version is used for in-terminal tractors of well-known manufacturers of these special vehicles.

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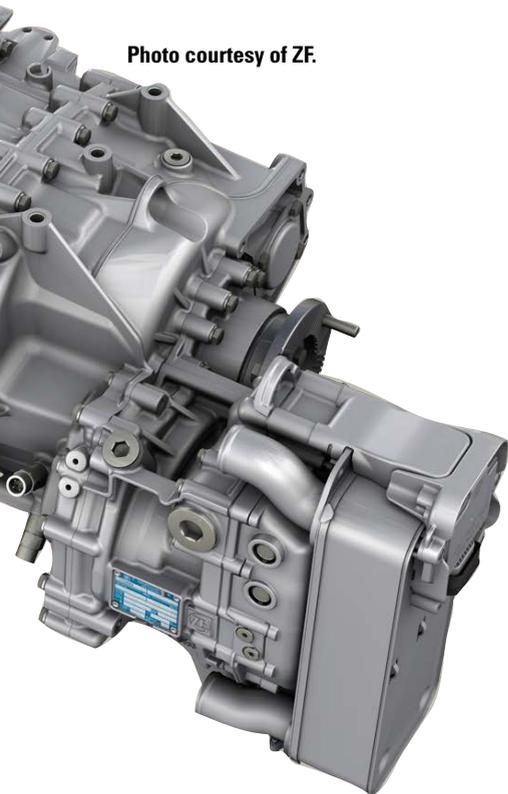
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**News of Note**  
Things are happening in the gear industry. Here's a look at some of the latest.

**Hardinge to Acquire Forkardt**  
Hardinge Inc. recently announced that it has entered into a definitive agreement to acquire Forkardt from Illinois Tool Works for \$34 million in a negotiated transaction. The acquisition will be funded with a combination of cash and debt. With well-established brands, Forkardt includes companies that are leading global providers of high-precision, specialty and customized workholding devices... [Read more.](#)

**Machine Tools Matter at EMO**  
From September 16 to September 21, 2013, this year's EMO Hannover will be opening its doors. At the world's premier trade fair for the metal-working sector, manufacturers of machine tools and components will be showcasing products, solutions and services for meeting the challenges involved in industrial production.

Photo courtesy of ZF.



solutions for a market that is increasingly demanding a more efficient energy use and emission reduction. In the last 20 years Oerlikon Graziano has acquired experience in electric and hybrid drive-line assemblies. The products go from the very first golf/utility transaxle to single- and multi-speed transmission systems, developed for vehicles ranging from the ever more popular and fancy "full electric zero emissions" city cars, to light commercial electric vehicles, and exotic full

electric and hybrid sports cars. All these transmissions share some advantages, such as the compact size, the light weight and a high operational efficiency.

Additionally, these products were recently displayed at the VDI Wissensforum in Friedrichshafen, Germany including a four-speed seamless-shift transaxle, a new eDCT multi-speed transmission that provides EVs with greater range while reducing vehicle weight and battery pack size. This inno-

At 840 or 900 mm in length and 50 or 65 kg in weight, the two ZF AS Tronic mid variants are both shorter and lighter than the "original" model. The 12-speed transmission works with a direct speed or overdrive ratio. Clutch dependent or drive dependent PTOs can be engaged independently of one another via two PTO locations. The TC Tronic HD (Heavy Duty) was developed by ZF to meet the requirements of engines with continuously increasing horsepower. It also aims at applications in crane trucks and heavy trucks starting from 6 axes (72 tons) and has been designed for torques of up to 3,000 N-m.

For several years Oerlikon has been studying, developing and producing new

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Wendy Young

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vative transaxle uses the principles of dual clutch transmissions (DCTs) to provide seamless shifting and up to 15 percent improvement in vehicle efficiency.

For passenger cars and light commercial vehicles the company will exhibit a dual-speed seamless-shifting transaxle that can be coupled with a transversal electric motor, for front or rear full electric axle. It has been designed for inner city transport, not only for the reduction of the CO<sub>2</sub> emissions and environment noise but also for significant cost savings. The transaxle has been developed together with VOCIS Driveline Controls, contributing with its control software and electronic hardware design skills to the transmission design.

"Electric drive is a field where integrated system-level optimization is the only way to offer significantly improved customer benefits, and our efforts are aimed at increasing as much as possible the integration level of motor and transmission within the powertrain," said Paolo Mantelli, head of performance automotive at Oerlikon Graziano. "Another crucial element for us is the innovation level of transmissions conceived for the ultimate electric and

hybrid vehicles: Our multi-speed concepts are the most suitable for a modern full electric or even hybrid vehicle, allowing the best sizing of the electric motor and usage of batteries' power."

Dana recently showcased the Spicer Model 114 planetary rigid axle for medium-sized front-end loaders during CTT 2013 in Moscow. The Spicer Model 114 axle includes a limited-slip differential lock with a 45-percent locking capacity, delivering excellent tractive force and nimble vehicle steering for front-end loader applications. The axle can be configured with a variety of other hydraulic-locking differential options, including dog clutch and multi-disc clutch. Inboard wet disc brakes offer proven fail-safe stopping performance and energy absorption, while a fail-safe park brake featuring internal negative SAHR is available as an option.

Durst is a complete solutions provider, focusing on challenging power transmission applications across a number of industries. "Durst manufactures all products to customer specifications, including clutches, brakes and yokes. As a solutions provider with extensive industry experience, Durst fills the gaps left by most vendors. Durst provides single-source capabilities that translate into reduced project costs for the client. Our engineering team works with system integrators to evaluate needs and quickly isolate the critical factors needed for the success of complete power transmission solutions," said Locarno.

## Challenges and Trends

So what does this new business mean to those working in off-highway applications? Staying on top of your inventory, reducing costs and getting the right people trained (or rehired) to do the job.

"In the past when business such as this returned, our experience is that it is usually with immediate vigor, and we cannot fulfill those needs with the same immediacy," said Young at Forest City Gear. "We have worked diligently to fill our empty machines with orders (perhaps much smaller orders, but many) and do not have the capacity. We had reduced our workforce,

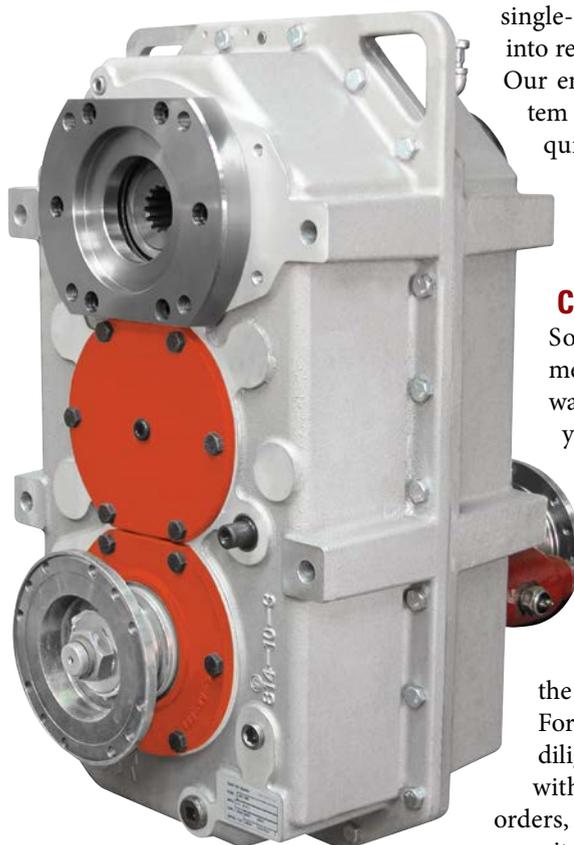


Photo courtesy of Durst.

and now have to address the growing needs of former customers. We increase second shift requirements, add overtime, and if we are extraordinarily lucky, can find a few unemployed and talented individuals who were laid off by companies such as ours during the slowdown.”

At Boston Gear, significant challenges include offshore competition and tooling costs. “We manufacture mostly in-house with 70 percent stock and 30 percent customized gears. Higher value-add from engineered solutions distinguishes our company from a pure commodity supplier.”

“Thousands of new products hit the market each year. Many quietly disappear without ever registering on the radar,” said Locarno. “What sets Durst products apart from the also-rans is

product excellence and cost-effective manufacturing. Product development is an ongoing process, and the Durst organization is always working toward new product opportunities. Development procedures streamline the steps from the creation of the concept through development and design to the final production and service.”

Gear manufacturers serving the off-highway industry have had plenty of time to make products since 2007. Here’s hoping that 2013-2014 is when customers get back to purchasing them. ⚙️



Photo courtesy of Forest City Gear.

**For more information:**

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# Off-Highway Global Update

## Asia

The Asia Off-Highway Vehicle Summit took place in Singapore from June 27-28. Despite a turbulent economy and an imposing wall of challenges facing the OHV market in recent years there are still formidable advances and developments occurring in the Asian and global markets. With the internationalization of many leading OHV companies, competition is also increasingly fierce. Topics discussed included independent analysis of leading markets, technical development trends as well as new profit points of the aftermarket, including remanufacturing and leasing. The event gathered more than 540 delegates from 438 businesses and was sponsored by Duxes of Shanghai.

## Europe

Strict emission legislation is forcing OEMs of construction machinery to implement not only wide-ranging

but also expensive measures in their diesel engines. Over the last decade, many engine suppliers invested heavily on research related to developing emission control technologies. Understanding and controlling the combustion process is the first step in reducing engine-out emissions and reducing the burden on the emission control after-treatment systems. Thus the engine design is an important part of controlling and facilitating the combustion process. In diesel engines, particulate emissions are controlled by optimizing the mixing between air and fuel. The turbulence, which helps the better mixing of air and fuel, is achieved by modification. Additionally, the topic of high efficiency of non-road vehicles has become an important issue on the market. All of these issues were recently discussed at the 3rd International Conference of Next Generation Off-Highway Engines

2013. European regulations, advanced engine concepts and efficiency improvements were debated during the event in Hamburg, Germany.

## India

According to the organizers of The Big 5 Construct India, the country is expected to emerge as the world's 3rd largest construction market by 2020. The Big 5 trade show, taking place in Mumbai from September 2-4, will give insight into the trends and developments taking place in the off-highway and construction markets. The largest construction event in the Middle East, Big 5 attracted more than 60,000 audited buyers at last year's show. This event will feature free seminars, panel discussions and live interactive demonstrations including trend analysis and case studies on these growing markets.



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