

Riding the Rails

Are Trains Still a Growth Industry Prospect for Manufacturers?

Matthew Jaster, Senior Editor

On May 26, 1934, the Burlington Railroad's Pioneer Zephyr No. 9900 made its grand debut with a record-setting 1,000-mile dawn-to-dusk run from Denver to Chicago in 13 hours. Appropriately enough, the Zephyr was named after the Greek god of the west winds. The train was powered by a Winton 8-201A 600-hp, two-cycle diesel engine designed to travel at speeds of approximately 110 mph. Not only was the Pioneer Zephyr faster and lighter than its predecessors, it also reduced the cost of passenger train operation. A new era in railroading history had begun (*courtesy of the ASME*).

Today, the Pioneer Zephyr sits in the lobby of the Museum of Science and Industry in Chicago, a relic from an industry that was mostly replaced by highways and airports back in the 1950s. For many years since, the U.S. rail industry (outside of freight) has been a transportation afterthought. But thanks to high-speed rail programs in Europe and Asia, the debate continues on the manufacturing and transportation benefits of



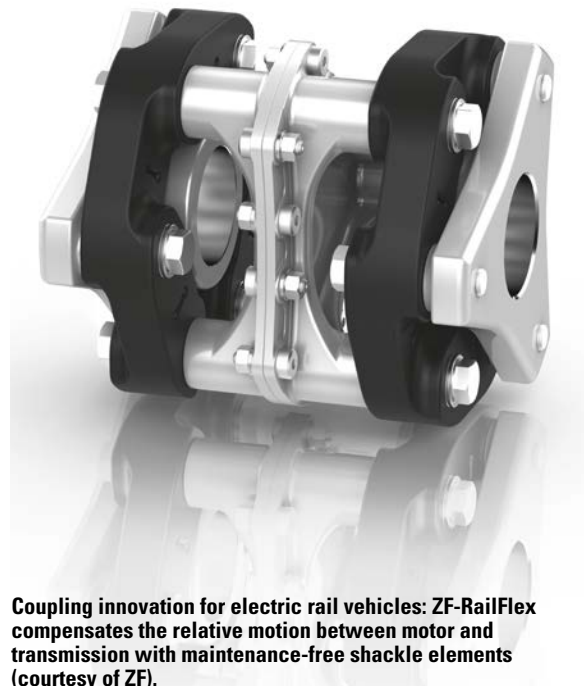
Overton Chicago Gear provides gearing for diesel engines, traction drives and light rail vehicles (*courtesy of Overton*).

expanding the rail industry in the United States.

"Europe already uses rail as transportation all across the continent," said Kerry Klein, sales manager at Overton Chicago Gear. "Because of the differences in geography, cross country travel is not as prominent in the United States. The new high-speed trains may change that, but it's still too soon to tell."

"Efficient and reliable mass transit systems are some of the key levers for many cities around the globe to tackle the challenge of sustainable urban development," said Rama Iyer, business development manager at Siemens. "Whereas the more mature markets like Europe and the United States have a strong focus on upgrading existing fleets, the emerging markets, mainly Asia but also Eastern Europe and Russia, are planning and building new state-of-the-art mass transit networks."

Whether you're onboard or on the fence on the merits of high-speed rail, there's no disputing the fact that traffic is terrible, energy costs are rising and greenhouse gases are impacting the environment. While the automobile industry is a necessary evil, engineers have been working for years on alternative and sustainable modes of transportation. Some have been around for decades while others are in the early stages of development. High-speed rail, particularly in Europe, China and Japan is a very plausible transportation solution and projects are being developed in



Coupling innovation for electric rail vehicles: ZF-RailFlex compensates the relative motion between motor and transmission with maintenance-free shackle elements (*courtesy of ZF*).

the United States to mirror global high-speed rail applications.

Of course, it's a political issue like anything else where Republicans and Democrats argue over funding and regulations and anything else left to fight about, but here's what we do know: the global rail industry (including high-speed, light rail, commuter rail and freight) still offers unique opportunities for gear and gearbox manufacturers.

Rail Product Placement

"Overton was founded in May 1956 and has been servicing the rail (locomotive) industry ever since," said Klein. "Overton Chicago Gear provides gearing for the diesel engines, traction drives and light rail vehicles."

"Siemens has provided gearboxes and couplings for the rail industry for over 15 years," said Iyer. "We provide rail gearboxes in different configurations, including helical and bevel helical, complete with torque arm and couplings."

"ZF Friedrichshafen AG is recognized as a reliable partner for innovative driveline and chassis technology," said George Ehling, head of marketing and business development at ZF. "Based on an over 60-year tradition in the rail business with manufacturers and operators of rail vehicles, ZF stands for flawless, reliable, and long-lasting driveline and chassis products in future-oriented rail travel applications."

Companies like these and others have been optimizing rail components for years, both standard and customized products.

“All of our business is custom-made parts to customer supplied drawings,” said Overton’s Klein. “We’re always adding new manufacturing equipment to serve our customers since we manufacture to their specifications.”

“Siemens has locally available service personnel in Elgin, Illinois and Bakersfield, California,” said Iyer. “We rebuild and service gearboxes at these facilities. Additionally, we’ve developed customized solutions for a number of rail projects in the last year.”

ZF focuses on short routes and faster service to accommodate its rail customers. “Our high-coverage service network for maximum quality covers the entire life cycle. Seven days a week, round the clock, ZF has its own sales and service companies where staff is always available as local customer contacts and problem solvers. With over 700 authorized ZF After Sales Service Centers, the company can offer flexible and timely intensive support – backed up by fast delivery of spare parts,” said Ehling.

Similar to applications in the wind, automotive or aerospace industries, rail has its own unique set of market challenges. “Staying competitive with the worldwide supply chain is one of the greatest challenges,” said Klein.

“As this market involves funding from the government or other agencies, there are delays which affect costing. Smaller product companies compete on price and when the product fails or has a problem, exit the market due to the high liabilities involved. Shorter lead times in a competitive market demand first-class performance during the development and engineering of gear units. This again is only possible based on stable processes and abundant experience, both of which Siemens has in place,” said Iyer. “Energy efficiency, safety and easy maintenance are the key factors in 2013.”

“The things that manufacturers and operators of rail vehicles expect in the

future have already been turned into practical reality in the form of ZF products: Increased driving comfort and safety with reduced fuel consumption and lower emissions. Highly integrated products and superlative systems expertise is the key to this. All driveline components are provided from a single source,” said Ehling.

Making rail traffic significantly more comfortable, economical, and safe is the important industry objective ZF focuses on. “ZF brings a clear added value to all different kinds of train types. The newly developed ZF-RailFlex fiber composite coupling, for example, achieves two contradicting requirements: It increases passenger comfort and at the same time reduces the life cycle costs of electric trains. Since it is installed in the partly suspended bogie, it does not only have to transmit torque but also needs to effectively compensate the relative motion between motor and transmission,” added Ehling. “ZF-RailFlex uses a technology which has been tried and tested millions of times in automotive engineering and is now used in rail vehicles for the first time. Since ZF-RailFlex does not need any additional components, there are further advantages: installation is especially easy and the coupling’s weight is

reduced — although it is still a high-performance component.”

High cost-effectiveness and economy play a decisive role for trains operated not only nationwide but also for urban public transport. “ZF developed the new E-Rail-SH 15 F metro transmission, which reduces life cycle costs and has already been used successfully in trains of Moscow’s metro.

The Canadian city of Calgary recently awarded Siemens an order to supply 60 S200 light rail vehicles, worth more than 135 million euros. The LRVs will be built at the Siemens factory in Sacramento, USA and are due to be delivered starting in summer 2015. The full order is to be completed by December 2016. This is the first order for the new light rail generation from Siemens. “The 60 LRVs will continue our more than thirty-year success story in Calgary. The new generation of vehicles delivers exactly what this modern and constantly growing Canadian metropolis needs. The LRVs are energy-efficient and provide passengers with even higher levels of comfort and safety,” said Jochen Eickholt, CEO Siemens Rail Systems, in a recent press release.

Calgary is the third largest city in Canada and its population has grown



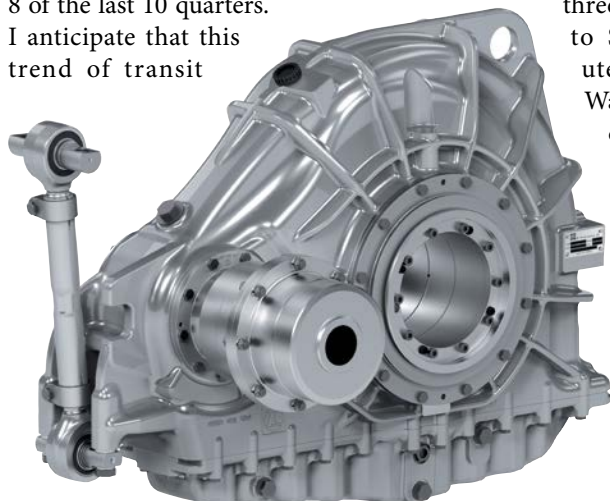
The ASEF 380 helical gearbox from Siemens.

since 2006 by one quarter to over one million. As the population has grown, so has the number of passengers using the light rail system. Passenger volumes have increased by 50 percent in the last ten years alone. Today the LRT system is the busiest in North America and the second busiest in the world, transporting more than 300,000 passengers every day. The network is around 56 kilometers long and has 44 stations. The fleet consists entirely of Siemens vehicles and, in total, 156 LRVs are in service in Calgary.

Public Transportation Thriving

Nationally, nearly 2.7 billion trips were taken on U.S. public transportation in the second quarter of 2013, according to a report released in September by the American Public Transportation Association (APTA). Compared to the second quarter of 2012, this year's second quarter increased by 1.2 percent, with nearly 31 million more trips taken from April through June. In comparison, vehicle miles traveled (VMT) on our nation's roads was up by 0.5 percent. Noting that in eight of the last 10 quarters, ridership on U.S. public transportation has increased, APTA President and CEO Michael Melaniphy said, "In big and small communities, demand for public transportation continues to grow. Public transit ridership has increased in 8 of the last 10 quarters.

I anticipate that this trend of transit



ZF's E-Rail-SH 15 F metro transmission is equipped with innovative tapered thrust washers that serve as the basis for longer service life, thermal resistance, and less maintenance efforts (courtesy of ZF).



Calgary recently awarded Siemens an order to supply 60 S200 light rail vehicles, worth more than 135 million euros (courtesy of Siemens).

ridership growth throughout the United States will continue."

In the second quarter, some cities saw ridership increases due to economic recovery. They include: Birmingham, AL; Los Angeles, CA; San Francisco, CA; Miami, FL; Denver, CO; Champaign-Urbana, IL; Chapel Hill, NC; Ithaca, NY; Houston, TX; Hampton Roads, VA; and Seattle, WA.

"As the local economy continues to recover, public transportation ridership continues to increase in those communities where jobs are increasing," said Melaniphy. "Since nearly 60 percent of trips taken on public transportation are for work commutes, it makes sense that ridership goes up when employment goes up."

In conclusion, the U.S. high-speed rail phenomenon is a real possibility if politicians can get on the same page and cut through all the red tape. Imagine a three-hour ride from Los Angeles to San Francisco or 60-minutes from New York City to Washington D.C. A passenger could get similar treatment between Midwest cities like Minneapolis, St. Louis, Chicago and Detroit.

The U.S. High-Speed Rail Association sees a future where a national rail system forms the backbone to a completely sus-

tainable transportation system including regional and commuter rail, light rail, streetcars, trams, electric buses and bicycles. We look at the future in simpler terms: more trains, more jobs, more work for the manufacturing industry.

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