

# ZF's Global Press Event in Aachen



by Larry Plachno

Arriving at the Aldenhoven test track and testing center, the journalists found this display of ZF components and products. While best known for transmission, axles and steering, ZF also provides several other products for heavy-duty vehicles. This event also showed that ZF was working on new technology in several areas. NBT.

ZF invited approximately 100 heavy-duty vehicle journalists to a Global Press Event in Aachen, Germany in early July. To some extent the event was a press preview of both existing and new technology to be shown at the forthcoming IAA show in Hanover, Germany this coming September.

Originally founded in 1915 to build transmissions and parts for Zeppelin airships, ZF has grown to become number nine among world automotive companies. In 2013 the company had 72,643 employees working in 122 production companies in 26 countries. Of that number, 7,237 worked in North America in 2013. Although best known for axles, transmissions and steering, ZF does offer other automotive components and is on the cutting edge of new technology.

One of our major reasons for interest in all of this is that bus innovations are often prompted by developments on the trucking

side of the business. In addition, with the United States and Canada only being one percent of the global bus market, it is not at all unusual for new bus developments and technology from Europe to spill over to this side of the Atlantic.

## Introduction

The press people boarded buses in Aachen and were taken to the impressive test track and testing center in nearby Aldenhoven. As the event started, the ZF staff mentioned several of their goals for reaching technological leadership and efficiency in motion and mobility. These include following megatrends with shorter innovation cycles as well as reduction of both emissions and cost of operation.

Other ZF goals are to make products and components more modular and gear spe-

cialized products for specific markets. They are putting more emphasis on both functionality and software and are also moving ahead in the area of autonomous driving. Obviously, these developments are continuing the trend of moving service technicians from wrenches to computers.

This was an interesting opportunity to both learn about the new technology and then test drive the vehicles. Each of the vehicles had an assigned driver who was familiar with the vehicle and who explained about the innovation, technology and ZF components found on a particular vehicle.

While some of the assigned drivers spoke English better than others, they all put in a great deal of effort to answer questions and assist the journalists. In most cases the journalists were given the option of riding along to see the vehicle in operation or actually

driving it. I was able to sample 10 different vehicles and drove all but two of them. Included were a few larger trucks as well as VW Amarok pickup truck with stick shift that reminded me of a VW Eurovan with stick shift that I owned many years ago.

The test track had a nice design. In addition to the primary oval track with sloped curves, there was a smaller test track on one side plus several staging areas. Unfortunately for us, the weather did not cooperate and we spent the entire day under dark skies, a light to moderate rain and cool

weather. It was not a typical German summer. Most of the stations around the track were little more than tents without sides so it took some effort stay dry while listening to the information provided and running to and from vehicles. However, the wet pavement did add interest to the test drives.

### Trucks, TraXon and Autonomous Driving

While National Bus Trader rarely deals with trucks, I can share some general information and mention two examples of new

technology. Two major differences with European trucks include the fact that they prefer the cab over design rather than the more popular conventional style found here. I received several answers to this question but I think the best came from Bryan Johnson at ZF. He explained that in Europe, the length of a truck and its load requirements are defined from the front of the vehicle to the back of the trailer. Hence, the shorter cab provides more capacity limits for the load. The second obvious difference is that many of the semi-trailers were curtain-sided, which is much more popular in Europe than in America.

Most of the trucks were equipped with AS Tronic transmissions but smaller ones had the AS Tronic light. The drivers were happy with these transmissions. I noted that a small lever controlled the air parking brake in most cases rather than the big button that is typical on U.S. and Canadian coaches. Another interesting point is that gear selectors are different. Some of the trucks had their gear selector mounted on a stalk on the steering wheel. One I drove actually had a transmission selector dial on the dash.

One new development worth mentioning is the ZF TraXon modular transmission system. It is state-of-the-art and very modular in that depending on the application, it can not only be driven by a dry clutch but also a hybrid module, dual-clutch module or a torque-converter clutch. Among its impressive features is a sensing function to determine the slope of the road ahead. A slight slope prompts a coasting mode to reduce fuel consumption while a greater downward slope prompts the application of engine or transmission brakes.

This brings a hybrid design and dual-clutch option to heavy-duty trucks for the first time and opens the door for possible future use in buses and coaches.

As you might expect, the dual-clutch version of TraXon has two clutches. The major advantage is that when changing gears, one clutch can back off on one gear while the other engages the higher or lower gear. This eliminates the interruption of tractive force and feels like a power shift although it retains the economy of a clutch over a fluid connection. This comes in very handy on your top three gears and allows you to have an economical or "long rear axle" on your top gear for flat roads. When you encounter a slight upgrade, the TraXon can downshift to the next lower gear without tractive force interruption.

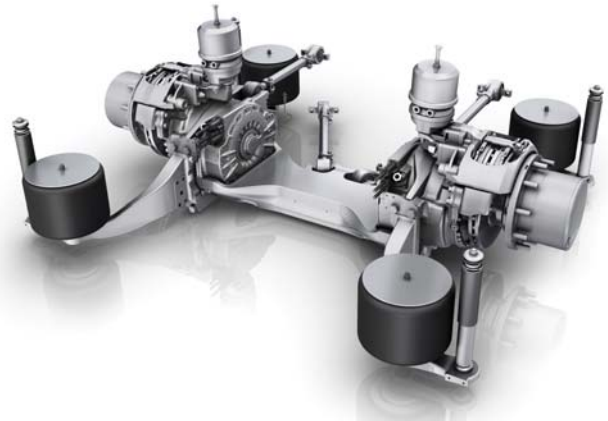
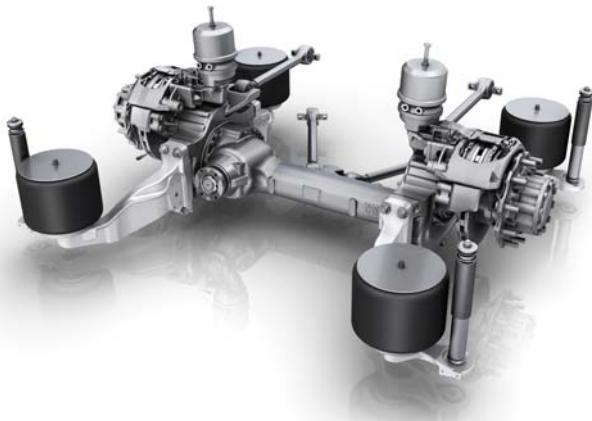
The other very interesting development is the ZF Innovation Truck. Parking big trucks is always a challenge and possibly more so in Europe where you sometimes need to get a curtain-sided trailer sideways to a dock. ZF had a tractor with TraXon hybrid drive with a semitrailer and trailer.

On the positive side, the Aldenhoven testing center was very well laid out. Here, we see several trucks on the smaller test track waiting for the journalists to jump on board. On the negative side, the weather was terrible during the event. The wet pavement did add interest to the test drives. NBT.



The ZF Innovation Truck is powered by a TraXon hybrid drive. Upon reaching its destination, the driver simply steps out of the cab and parks the truck using a tablet with Bluetooth and an App. It was absolutely impressive to watch that tractor back up by itself with both a semitrailer and a trailer hooked behind. ZF.





ZF now has 30 years experience with low-floor axles and is currently providing a fourth generation product. Shown is the AV 133 low-floor portal axle used in low-floor transit buses. ZF.

The ZF AVE 130 portal low-floor axle includes water-cooled asynchronous electric motors on the axle hubs. Power can come from hybrids, trolley wires, batteries or fuel cells. ZF.

Hence, backing it up with two couplings would tax any but the most accomplished driver.

Upon reaching his or her destination, the driver could step out of the truck and control its parking with a tablet with Bluetooth and an App. The driver simply uses the tablet to indicate where he wants the truck parked and the software controls the battery-powered hybrid drive in the tractor to put both the semitrailer and trailer where wanted. Trust me, it was amazing to watch that driverless tractor backing up and turning in order to get both trailers where they were wanted. You could actually ride in the cab and watch the tractor turn and move by itself.

This could very easily filter down to buses in the future. Consider the merits of a bus capable of driving itself through the wash rack. Or, sending the coach in the garage back to the parking lot on its own, much like letting a horse run back to the stable.

### Buses

It was obvious that the ZF staff took great pride in 30 years of development of low-floor transit bus axles in 2013. Today, ZF is offering their fourth generation of low-floor portal axles, their AV 133. Current developments include a move to a lighter weight aluminum carrier replacing the casted iron carrier. This reduces weight while increasing fuel efficiency.

Meanwhile, one of the newest directions for ZF is their AVE 130 electrical portal drive for low-floor buses. Individually driven wheels provide driving power using a water-cooled asynchronous electric motor with a high power density on the axle hubs. Passengers will not notice any tractive force interruptions because of the absence of any gear changes. One major advantage of this system is that it can be combined with various power inputs including serial hybrid, overhead trolley wires, batteries or fuel cell power.

More than 300 buses using this system have travelled more than six million miles in recent years. EvoBus has even used this system on articulated buses. Both Foton in China and Bozankaya in Turkey are currently using this axle. Noteworthy is the fact that ZF is developing a hybrid version of the AS Tronic lite called the HyTronic. It is already in use in light intercity buses and coaches in South America and China and uses regenerative braking.

As far as coaches are concerned, the ZF staff was proud to mention MCI's recent switch to ZF axles on their J4500 and D models. The J4500 now has a ZF steering axle with independent front suspension and a tag axle with a passive or trailing feature. The D model coaches will have a ZF solid beam front axle but an optional passive or trailing tag is available. Both models will have ZF drive axles.

I might mention that ZF has done very well with their axles on the American market in recent months. If my memory is correct, the latest four new coach introductions or improvements all offered ZF axles. This includes the Caio G3600, the BCA-45, the Temsa TS-45 and now the MCI models. Some of them also use other ZF components.

Time was short and I was faced with so many buses but so little time. Which buses do I pick to drive or ride?

My first choice was about as typical as you can get for a European coach. This M.A.N. Lion's Coach was 12 meters (39 feet) long with two axles and a center door with lower level restroom. It was painted a bright red and equipped with a M.A.N. engine with an AS Tronic transmission. It rolled right around the test track as nice as

With a length of 12 meters, two axles, two doors and an AS Tronic transmission, the M.A.N. Lion's coach was fairly typical of a standard European coach. It handled very well on the test track and did very well with acceleration and braking. It was equipped with ZF's PCV shock absorbers with steps and gradients that keep the body stable at all speeds. NBT.





This display above the aisle on the Bozankaya Sileo electric bus showed what the system was doing while riding around the track. The coach accelerated well and operated at higher speeds around the test track. NBT.



The Bozankaya Sileo model from Turkey was an all-electric, battery-powered bus. It used the ZF AVE 130 low-floor axles with built-in electric motors. It had three passenger doors and a standard transit interior. NBT.

can be. I could not fault the acceleration, braking or handling.

When I mentioned the excellent ride and handling, the on-board staff informed me that this coach was equipped with ZF's PCV - Premium-Comfort Valve. The PCV shock absorbers use a new type of damping technology that has various steps and gradients. As speeds increase, the damping forces increase to keep the body more stable. My guess is that we may see more of this in the future.

My next choice for a ride was the Bozankaya Sileo model. The body is built at the TCV factory in Turkey. From here they go to the Bozankaya facility in Salzgitter-Watenstedt, Germany for installation of the drive system and completion. It is an all-electric, battery-powered bus and uses the ZF AVE 130 low-floor axles with built-in electric motors. With the possible exception of putting the high voltage components on the roof, the bus looks remarkably like any other conventional transit bus. It had three passenger doors and was painted red and white with some exterior lettering to advertise its components and capability. The interior was very typical of a transit bus.

Having little experience with all-electric buses, I decided to ride as a passenger. This turned out to be a good choice since I could monitor a large display above the center aisle that showed what the system was doing. I was frankly impressed by the acceleration and the high speed the bus maintained while on the test track. The staff on board explained that there was a special system to balance power between the battery cells. The Sileo is currently available in lengths of 10.7 or 12 meters with an articulated version in the planning stage.

For my third and final bus ride I climbed behind the wheel of a Mercedes-Benz Citaro. For those who do not know, the Mercedes-

Benz Citaro is to Europe what the GM Fishbowls were to the U.S. many years ago. Although they come in several versions including an articulated, the Citaro is easily the most popular transit bus model in Western Europe.

The one I drove was equipped with a six-speed ZF EcoLife transmission, the low-floor AV 133 axle, dampers plus a ZF steering pump and steering column. Off the line it did amazingly well. It got up to speed quickly and was very stable at higher speeds on the racetrack. I wish we had transit buses like this decades ago when I drove them regularly.

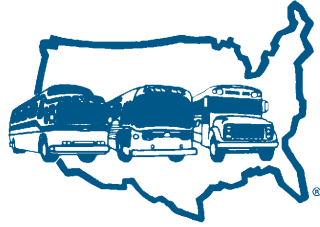
I should probably admit that I threw caution to the wind and put on a helmet to volunteer for a ride on a M.A.N. Lion

Race Truck tractor. It was equipped with a 16-speed ZF Ecosplit manual transmission and was driven by a girl even shorter than me. While the driving was impressive, I did not find it particularly scary. I was later told that the ride would have been "more interesting" had the pavement been dry. That left me with something to think about.

My experience at the ZF Aldenhoven Testing Center was interesting and informative. I got a chance to see and even drive some of the latest developments in heavy-duty vehicles. There is absolutely no question that vehicles and computers are merging with the help of state-of-the-art engineering to bring us into yet another new generation of travel. □

The ubiquitous Mercedes-Benz Citaro is the most popular transit bus in Western Europe. This particular unit was equipped with a six-speed EcoLife transmission as well as a ZF steering pump and steering column. It was a delight to drive around the test track. NBT.





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