New ZF Airbag Concepts Help Raise the Bar in Passenger Car Occupant Safety

- ZF engineers respond to new crash scenario test from the U.S. National Highway Traffic Safety Administration (NHTSA)
- Front seat passengers can be better protected even in extreme “OMBD” types of crashes
- Tests with advanced “THOR” dummies highlight enhanced safety performance of the innovative airbag system

Friedrichshafen. To help mitigate injuries in the event of a collision, ZF is set to launch several new and innovative passenger airbag concepts, including a passenger and curtain airbag system with either V or U-shaped design features. ZF’s new airbag system is designed to better protect front seat occupants from serious injuries even when the vehicle is struck head-on and from the left at 90 km/h (56 mph). This performance test scenario, known as the “Oblique Moving Deformable Barrier” (OMDB) will be added by the National Highway Traffic Safety Association (NHTSA) for the North American “New Car Assessment Program” (US NCAP) for new vehicles as of MY 2019. Only passenger cars that successfully pass this new standard crash test will receive 5 stars in the U.S. NCAP.

Crash tests conducted by NHTSA rank among the strictest in the world. Starting from MY 2019, the organization is planning to raise the bar even higher by applying the OMDB crash test developed from oblique accident scenarios in North America.

“Our new system consisting of front and curtain airbags can help improve a vehicle’s safety performance in these crash test scenarios. The curtain airbags come with special V or U-shaped airbag chambers and offer improved protection,” explains Dirk Schultz, head of global development of Airbags & Gas Generators in the Active & Passive Safety Technology Division at ZF.
There is opportunity for improvement on conventional airbags to help better protect an occupant in the OMDB scenario. After all, that test involves a moving deformable barrier weighing almost 2.5 tons striking a non-moving vehicle at 90 km/h (56 mph) head-on at an angle of 15 degrees and with a 35 percent overlap. In addition to this OMDB crash test, the NHTSA will also be deploying the new Test devices for Human Occupant Restraints (THOR) dummies. “These are highly sensitive test devices that more accurately record how accidents affect the occupants. The comprehensive data we collected helped us determine what to focus on to help further improve safety,” adds Schultz.

**Unique airbag geometry can enhance safety**
In the event of an OMDB-type crash, the new ZF airbags have an added function in that they can help to prevent the front occupants’ heads from hitting the dashboard or A-pillar. To achieve this, ZF enhanced the curtain airbags installed in the roof liners with a unique bag shape design. When the airbags deploy, an additional safety cushion inflates next to the driver’s head. “In comprehensive test series, we have demonstrated that this innovative airbag geometry helps to enhance occupant safety. It comes in a pointed V shape or a rounded U shape, depending on the vehicle’s interior design,” says Schultz.

To help better absorb the front seat passenger’s potentially extreme movement forward or to the left if a head-on or side crash occurs, ZF has developed its “parallel cell front seat passenger airbag”. It features a unique chamber design with a special geometry that is widened towards the center of the vehicle. “This revolutionary airbag concept helps to cushions the head’s rolling motion when it impacts the airbag at an angle – and is designed to reduce the risk of head injury,” says Schultz in describing this innovative front airbag system.
Caption:
ZF’s new system consisting of front and curtain airbags can help improve a vehicle’s safety performance in extreme oblique accident scenarios, too.

Photo: ZF

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ZF is a global leader in driveline and chassis technology as well as active and passive safety technology. The company acquired TRW Automotive on May 15, 2015, which was then integrated within the organization as the Active & Passive Safety Technology Division. The combined company reported sales of €29.2 billion in 2015 and now has a global workforce of around 135,000 with approximately 230 locations in some 40 countries. ZF annually invests approximately five percent of its sales in Research & Development (€1.4 billion in 2015) ensuring continued success through the design and engineering of innovative technologies. ZF is one of the largest automotive suppliers worldwide.

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