



Integrated Safety: ZF Presents Strategies for Pre-Crash Airbag Activation

- **Advanced external pre-crash airbag helps create a lateral crumple zone – can be deployed immediately prior to a collision**
- **'Dual contour' airbags designed to cover extended passenger positions in automated driving scenarios**
- **'Far-side airbags' are designed to help enhance occupant protection in far side crashes**
- **Knee airbag module will offer best-in-class weight and packaging**

Friedrichshafen / Alfdorf / Mannheim. The future of mobility presents new challenges for occupant safety, combining active and passive safety technology to, for example, trigger airbags immediately before a crash. Protecting passengers in autonomous vehicles with new seating configurations is another area where restraint systems are undergoing modifications. At the same time, traditional passive safety systems are being designed to help improve weight, installation space and protection performance. At the 'Airbag 2018' symposium in Mannheim from November 26 to 28, ZF will present the current state of development as well as new solutions.

"Occupant safety is paramount when developing new vehicles for automated and autonomous driving," says Dr. Michael Büchsner, Head of ZF's Passive Safety Systems Division. "Our concept of the pre-crash external side airbag is a great example of how ZF wants to achieve its Vision Zero, a world without accidents and emissions."

Designed to be deployed externally from the side of the vehicle, this airbag helps serve as an additional crumple zone in the event of an accident. Tests have shown it can help reduce the occupant injury severity up to 40 percent. ZF will present the current state of development of this external pre-crash system at the symposium,



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describing amongst other things the activation strategy and pole test requirements.

Well protected also in new seating positions

In addition to the ever-stronger connection of active and passive safety technologies, occupant safety must also be adapted to new seating positions. A vehicle travelling in highly automated mode would ideally allow the driver to relax or work. In the future, it will be possible to recline the seat or turn it to face other directions. Restraint systems like seatbelts and airbags must be designed to help protect the occupants in these flexible seating positions and will increasingly be integrated into the seat itself. Adaptive 'dual contour' airbags have been developed for this purpose. These airbags are designed to adapt to the occupant position and the new degree of freedom in the passenger compartment that automated driving has created.

Safety cushion in the middle

To help lower the risk of collision between front seat occupants or with interior structural components during cases such as far side impact, ZF's development of a far-side airbag is well advanced. It unfolds in the vehicle's center and is designed to help meet future regulatory testing: "The new test requirements of Euro NCAP, scheduled to be introduced by 2020, extend occupant safety requirements for the side facing away from the occupants in case of a side impact," as Norbert Kagerer, Head of Development at ZF's Passive Safety Systems Division, points out. "In the future, the far-side airbag may be necessary in order to receive a 5-star crash safety rating."

Flexible flyweight

ZF is also addressing other automotive megatrends with the lightest knee airbag in the automotive industry: "Due to its lower weight, the vehicle consumes less fuel and gives off fewer emissions," says Kagerer. "In addition, the smaller and more flexible size helps meet new interior requirements of future electric and autonomous vehicles." Featuring a housing made of fabric instead of metal, ZF's new development weighs



up to 30 percent less than conventional knee airbags. Volume production will begin in 2019.

The steering wheel of the future

Today the driver airbag is located in the steering wheel and both are integral parts of the occupant safety system. Partly or highly automated vehicles will for the foreseeable future feature a steering wheel that will evolve with new design features. Apart from the classic round shape, flat and to some extent open forms will also be available on the market. In combination with new folding mechanisms, they will ensure more freedom of movement for the occupants. Integrated displays, for instance, will increase interaction with the occupants and allow for more control of interior systems from the steering wheel.

Where to find ZF at the 'Airbag 2018' symposium:

Tuesday, November 27, 2018	
4:55 – 5:20 p.m.	Enabling Technologies for Future Vehicles – Integrated Safety
Wednesday, November 28, 2018	
11:25 – 11:50 a.m.	PROSIP: Proactive Side Impact Protection System – Insight into a Scenario Driven Top-Down Development Approach
November 26 – 28	
all day	Alternative Approach to Steering Devices of the Future (poster presentation)

Caption:

ZF's pre-crash external airbag can fire before an inevitable accident. Tests have shown it can help reduce the occupant injury severity up to 40 percent.

Image: ZF



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ZF Friedrichshafen AG

ZF is a global leader in driveline and chassis technology as well as active and passive safety technology. The company has a global workforce of 146,000 with approximately 230 locations in some 40 countries. In 2017, ZF achieved sales of €36.4 billion and as such, is one of the largest automotive suppliers worldwide.

ZF enables vehicles to see, think and act. The company invests more than six percent of its sales in research and development annually – in particular for the development of efficient and electric drivelines and also in striving for a world without accidents. With its broad portfolio, ZF is advancing mobility and services for passenger cars, commercial vehicles and industrial technology applications.

For further press information and photos please visit: www.zf.com