



## Helmet design

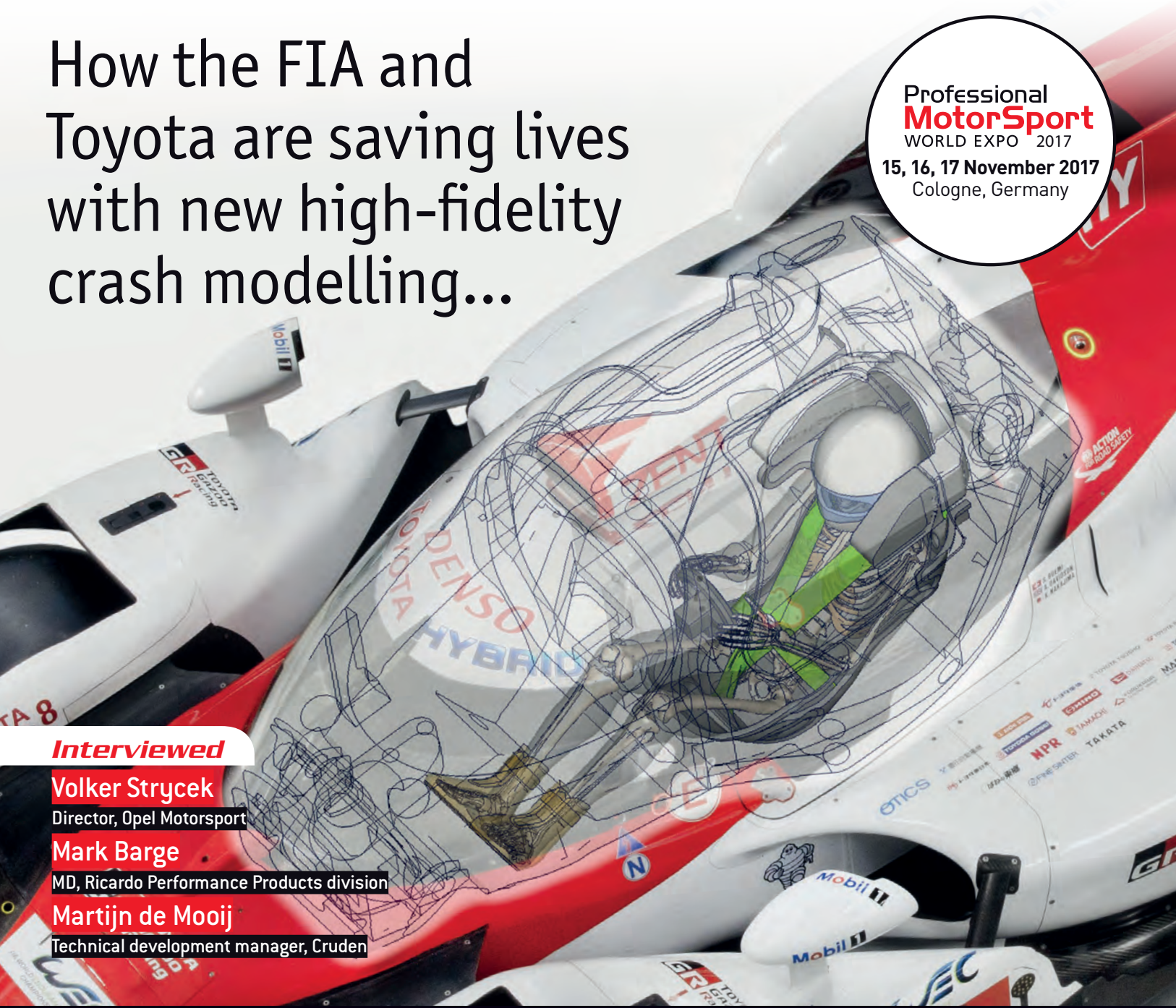
Advances in design, construction and materials are making competition helmets safer than ever

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### Interviewed

**Volker Strycek**

Director, Opel Motorsport

**Mark Barge**

MD, Ricardo Performance Products division

**Martijn de Mooij**

Technical development manager, Cruden

THE MAGAZINE FOR THOSE IN THE BUSINESS OF GOING MOTOR RACING

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# Layer of protection



## As the speed of race cars increases, debris fences are playing a more important role than ever in track safety

WORDS BY KARL VADASZFFY

Swiss company Geobruigg, which has subsidiaries and partners in over 50 countries, develops and manufactures high-tensile steel wire safety nets and meshes for protection against natural hazards and for the motorsport industry, the latter increasing racetrack safety levels. Over 50 years' experience in constructing wire nets and meshes has resulted in solutions that are characterized by their strength, high energy absorption capacity, and supreme durability.

Production facilities on four continents house 350 specialists who work with customers during all stages of implementation, from design to

installation, using either standard barriers or custom-made solutions.

The only company in the motorsport market to offer tested systems, Geobruigg has released a new debris fence with 6m post spacing as an alternative to the standard 4m post spacing systems on offer.

After a severe NASCAR incident in Daytona, Florida in 2013, in which a car was completely destroyed and debris flew into the crowd, a call was made by the industry for manufacturers to discover how to improve debris fences. As steel posts are the most dangerous part of these fences, a further call was made to reduce the number of posts used.

Geobruigg's 6m spacing is made possible by a unique interconnection system for the ropes and nets. Peter Utz, head of technical department safety solutions, says, "The idea behind reducing the number of posts was steel post impact reduction, which is most severe for bikes but can also be devastating for cars as they are the hardest spot within a debris fence."

The Debris Fence system was tested at Dynamic Test Center's facility in the Swiss Jura mountains, where engineers applied FIA testing conditions – a vehicle of one ton at a speed of 150km/h (93mph), with the center of gravity hitting the fence at a height of 2m (6.6ft) and an angle of 20° – to validate it.

Utz comments, "All elements of the Debris Fence 6m work together harmoniously and, therefore, the level of resistance is increased and the energy absorption is more equal and more effective. We have achieved an





Höljes RX circuit, Sweden (main), the Bremerhaven Fischereihafenrennen, Germany, (left) and Paul Ricard, France (below) all use the latest Geobruigg products to protect drivers and riders



energy absorption capacity of almost 1,000kJ. This means we have the same capacity as with the Debris Fence 4m, despite a greater supporting distance between posts. At the same time, there is less deformation in the fence and less debris behind the fence.”

In developing it, an end post (*Endstütze*) was tested with a compression strut (*Druckstrebe*). Says Utz, “Due to its eccentric control, the bending moment is generated at the same time and the post is deflected laterally. This is how the degradation of energy is optimized.” The eccentric control of the compression strut at the outer post prevents stability failure. This also contributes to harmonic energy degradation, without any noteworthy power peaks.

A 2.8m-high (9ft) version of the Debris Fence 6m has been fitted at Höljes RX circuit in Sweden, which hosts the FIA World Rallycross Championship, providing improved safety with an unobstructed view of the track for circuit operators.



“Our new system reduces the amount of material used and, above all, installation costs for the circuit are minimized,” explains Utz. “As we calculate it takes an hour’s work to erect each post, for a protected racetrack 5km in length, this means 50% fewer posts, which equals a saving of 400 posts, or 400 man-hours. In addition there are reduced transport costs, lower material costs and a more competitive installation cost.”

All these advantages benefit the racetrack owner or operator, but what of the benefits to the spectator? Utz comments, “Fewer posts naturally means that the spectators gain a superior view of the track and the spectacle on it.”

Of today’s trends, he says that fences must be multifunctional, or must house other infrastructure opportunities, to be an optimal solution. “The space around a racetrack needs to be surrounded by a fence for safety, but also by solutions that fulfill other needs, and the desire is that they fit together in one system,” he says. “There is also a growing need for additional infrastructure such as camera openings and marshal posts. As a result of these requirements, we are not just a fence supplier, but a system supplier.”

There is also growing interest in rallycross, which comprises an asphalt section, a gravel section, and a joker lap. Utz states that it is possible to transform a classic Formula 1 track into a rallycross track by complementing fixed racetracks with mobile elements.

For instance, the gravel section and joker lap are designed to be within a certain area of an existing Formula 1 circuit, such as turns 11 to 13 at Circuit de Catalunya in Spain or at Hockenheimring in Germany. Here, in the days leading up to the Rallycross weekend, mobile FIA debris fence sections are installed to mark the new layout, gravel sections are prepared and, if required, additional grandstands are installed. “A standard racing circuit can be modified within days,” Utz states.

“We support such modification. No matter what the requirements of the customer, we offer a complete range of motorsport barriers to build any racetrack. This could be a city circuit, a permanent circuit with temporary extensions, or a complete permanent circuit with multiple, different track layouts.”

The introduction of Formula E has increased and advanced the development of crash protection, Utz suggests. “As Formula E races take place in urban areas, where space is limited, protection is dominated by mobile, temporarily installed fences,” he explains. “At the same time, we have the challenge of tackling increasing safety requirements due to the proximity of the spectators to the racetrack.” He concludes by revealing that, as a result of these challenges, Geobruigg is currently testing a new system through which engineers are already able to prove that the company’s energy absorption system also works with mobile protection systems. <

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