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Media Information
BMW Motorrad Motorsport
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Technical innovations for the win at the racetrack: BMW Motorrad Motorsport and partner ZF.

- **BMW Motorrad Motorsport and partner ZF join forces to develop new spring damper parts for the BMW M 1000 RR for the FIM Endurance World Championship.**
- **Innovative telescopic front fork made from carbon offers many advantages.**
- **First joint success: BMW Motorrad World Endurance Team's victory at the 24H SPA EWC Motos.**
- **Marc Bongers: "An important factor for success is developing components alongside a partner and this partner being able to respond to our specific needs."**

Munich. Technological collaboration is an important component of success at the racetrack. A perfect example of this is BMW Motorrad Motorsport and ZF's partnership in the FIM Endurance World Championship (FIM EWC). As of this season they are working together on developing new spring damper elements for the #37 BMW M 1000 RR of BMW Motorrad World Endurance Team. An innovative telescopic front fork made from carbon is in the spotlight of this partnership. In their second race together, their collaboration celebrated its first major success, BMW Motorrad World Endurance Team's victory at the 24H SPA EWC Motos (BEL).

"We're delighted to have a partner like ZF at our side with whom we are able to work closely on the development of components such as the new front fork," said BMW Motorrad Motorsport Director Marc Bongers. "We complement each other very well in this collaboration. An important factor for success is developing components alongside a partner and this partner being able to respond to our specific needs. Because this results in components that are directly and perfectly customised for us, which has enabled us to further enhance the performance of our BMW M 1000 RR in the FIM EWC."

ZF is a technology group with a global presence that provides systems for the mobility of passenger cars, motorcycles, commercial vehicles and industrial technology. ZF and BMW have enjoyed a close partnership in automobile racing for many years. For example, the corporation has developed customised racing clutches and shock absorbers for various

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BMW racing cars in action in Formula One, the DTM, at the 24 Hours of Nürburgring or in Formula BMW. As of this season, ZF is now also BMW Motorrad Motorsport's technological partner.

The new telescopic front fork for the #37 BMW M 1000 RR made from carbon fibre composites was developed jointly by BMW Motorrad Motorsport, BMW Motorrad World Endurance Team and ZF. This is the first time that a manufacturer has used a carbon fork in endurance racing – and the fork is an example of top-notch engineering. The outer tube is made exclusively from carbon fibre, while the hybrid inner tube is made from a metal carbon fibre composite. Then there is the topology-optimised metal fork leg, which is glued to the hybrid inner tube.

One major advantage of using carbon fibre is obvious, its low weight. This is a factor for efficiency and success in endurance racing in particular. In addition, the rigidity can be changed systematically, which impacts the handling of the motorcycle. "Using this material and this technology allows us to shift the threshold at which body vibrations occur," said Bongers. One major focus during development was the design of the homogeneous bending loads. The goal being for the throttle response for the rider to be extremely subtle, even under the most extreme strains. And feedback from the riders confirmed that the goal was achieved.

Developing new components for motorsport is always a challenge from an engineering perspective. "A large number of functions are squeezed into a very small space, and the requirements are obviously very different from in production," explained ZF engineer Henner Fröderking. "That means that you have to really distance yourself from the solutions used in series production. ZF has a great deal of experience with motorcycle chassis in series production. We were now tasked with finding detailed solutions that are tailor-made for motorsport." A motorsport fork must withstand extreme strains, it is an important component for the tuning of the motorcycle – and it must be designed in such a way that rapid spring changes and rapid maintenance, for example, take just a few minutes.

The next challenge for engineer Fröderking and his colleagues in this project is the use of carbon fibre. "You need to handle this material very differently to metal," said Fröderking. "This starts with the first design of the element calculation, during which you calculate the rigidity. The layer structure also needs to be integrated directly here. This is followed by the validation process, which shows whether the rigidity calculated in theory has been achieved in reality. Everything also needs to be subjected to overload, since safety is the

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number one priority. This shows whether the calculations were correct. And then the performance of the component also has to meet expectations.”

The collaboration between BMW Motorrad Motorsport and ZF has been closely intertwined since the very first stage of development. “The handling of a motorcycle is determined by everything that happens between the points of contact of the front and rear tyre. The fork is a key part of the overall package here, because it is important for how the rider feels when braking and cornering,” explained Bongers. “However, this overall package also includes chassis and swingarm, for example. Then there are the practical requirements for the component in fine-tuning. We provided our input with all these various factors, and ZF implemented it with their technologies – and tailored the fork exactly to our extensive requirements.” Face-to-face meetings and agreements only being possible on the odd occasion due to the coronavirus pandemic was not an issue. The two companies proved that they can work together seamlessly and expediently, even online.

“The whole development process ran so superbly despite the coronavirus-related restrictions, meaning that we were able to roll out the new fork for the first time at Almeria in December 2021,” said Bongers. “And the results with a product as innovative as this one were so positive right from the start that we made every effort to implement the fork as quickly as possible. Both parties put a lot of energy into the further fine-tuning.” And the successful roll-out of the fork was followed by another component: ZF and BMW Motorrad Motorsport also joined forces to develop a spring monoshock, which was tested for the first time in January.

The goal was to use both components at the season opener of the FIM EWC at Le Mans in April. ZF's focus was now on ensuring the supply of parts for racing use. “Testing with one or two prototypes is very different from a race event, during which you need to provide several variations of the component, including all the replacement parts. But we knew we could do it,” said Fröderking.

At the same time, the intense phase of pre-season testing kicked off for BMW Motorrad World Endurance Team and riders Markus Reiterberger (GER), Ilya Mikhailchik (UKR), Jérémy Guarnoni (FRA) and Kenny Foray (FRA). “If you want to use a component from the first race, this means you also need to ride with it in every test. This is because this kind of fork requires completing around 4000 kilometres to ensure that it is safe and durable,” explained Bongers.

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We overcame all these challenges together, Bongers said in conclusion: "We did it, and competed using the new fork and the spring monoshock as of the first race of the season at Le Mans. And at the second race in Spa we got the first 24-hour win for BMW Motorrad which proves that this collaboration is bearing fruit."

The #37 BMW M 1000 RR's next outing with the ZF spring damper elements will be this coming weekend at the 8 Hours of Suzuka (JPN), the third round of the FIM EWC 2022.

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