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## **BMW Motorrad receives JEC Innovation Award. Prize-winning rear swinging arm made of carbon fibre.**



**Munich.** On 7 March 2018, BMW Motorrad was presented with the 2018 JEC Innovation Award in the Leisure & Sports category for the development and manufacture of a rear swinging arm made of carbon fibre. The award ceremony was held at JEC World in Paris Nord Villepinte. As the person at BMW with overall responsibility for funding projects in the area of lightweight composite fibre, Dr. Joachim Starke was there to receive the award on behalf of the team as a whole.

Established in 1996, the JEC Group is the world's leading specialist organisation for the development, manufacture and processing of composite materials. The JEC Innovation Award is conferred by a jury of international experts and goes to 30 companies in ten categories.

The BMW Group uses lightweight construction in both automobiles and motorcycles, applying an intelligent combination of different materials including carbon fibre as a particularly important element. The latest example from BMW Motorrad was the HP4 RACE, where the entire main frame was made of carbon fibre reinforced plastic produced by means of an industrial RTM process. In 2017 the carbon fibre frame of the HP4 RACE opened a whole new chapter in motorcycle chassis construction, combining optimum technical qualities, uniform manufacturing quality and cost efficiency for the first time.

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BMW Motorrad has now taken a further step towards consistent lightweight construction and excellent technical properties in motorcycles with a rear swinging arm likewise produced by means of an industrial process. The project MAI hiras+handle was sponsored by the German Federal Ministry of Education and Research as part of the leading-edge cluster MAI Carbon. The aim of this cooperative venture bringing together seven partners from industry and research was to develop a process that enabled the cost-effective volume-production use of carbon fibre composite materials (CFP) in structural components subject to high levels of continuous stress. In the case of this particular part, it was also possible to establish a cost-efficient manufacturing process suitable for the large-scale production of injection mould components made of carbon fibre reinforced plastic with CFP tape reinforcements using thermoplastic material.

Project manager Elmar Jäger explains the development of the concept as follows: "We opted for chassis components under continuous load since the requirements involved are especially demanding. While car chassis parts are concealed, the visible motorcycle rear swinging arm was ideal for our project since the forces at work are immediately evident. Our production technique uses CFP in the form of high-strength endless fibres where this is required by the stress pattern, while an injection mould part with short CFP recycling fibres is used where the stress levels are not as high. In this way, we developed a cost-efficient design that can be scaled according to requirements by inserting endless fibres with varying levels of strength in the same tool. These were the points that impressed the international jury. The insights we gained from this motorcycle component are equally valuable from the point of view of car development and can be applied accordingly."

Joachim Starke explains the new production process and its advantages: "In addition to achieving weight benefits and cutting costs significantly, we also managed to develop a technology that allows precise configuration of component properties by using a variety of composite and metal inserts." This scalability means that a single tool can be used to produce a wide range of different components at cycle times of less than a minute. The maximum strength can be adjusted by means of additional CFP panels which can be thermoplastically joined. The project also involved successful testing with welding robots. "All this impacts



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significantly on cost efficiency (component costs) as well as part properties (strength and stiffness)," adds Starke.

"With this example of the rear swinging arm, the project has allowed BMW Motorrad to take on a pioneering role within the motor vehicle industry. The insights gained consistently build on the BMW i3 as the basis for the use of CFP in serial production and include interesting aspects in terms of the future development of new BMW motorcycles and automobiles.

You will find press material on BMW motorcycles and BMW Motorrad rider equipment in the BMW Group PressClub at [www.press.bmwgroup.com](http://www.press.bmwgroup.com).

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## **The BMW Group**

With its four brands BMW, MINI, Rolls-Royce and BMW Motorrad, the BMW Group is the world's leading premium manufacturer of automobiles and motorcycles and also provides premium financial and mobility services. The BMW Group production network comprises 30 production and assembly facilities in 14 countries; the company has a global sales network in more than 140 countries.

In 2017, the BMW Group sold over 2,463,500 passenger vehicles and more than 164,000 motorcycles worldwide. The profit before tax in the financial year 2017 was € 10.655 billion on revenues amounting to € 98.678 billion. As of 31 December 2017, the BMW Group had a workforce of 129,932 employees.

The success of the BMW Group has always been based on long-term thinking and responsible action. The company has therefore established ecological and social sustainability throughout the value chain, comprehensive product responsibility and a clear commitment to conserving resources as an integral part of its strategy.

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