

Media Information

23 February 2024

**Customised spike plates from BMW Group 3D printing
accelerate the German bobsleigh national team.**

+++ Technology partner BMW is developing spike plates for the German Bobsleigh, Luge, and Skeleton Federation
+++ 3D printing technology from automotive engineering facilitates customised solutions and efficient optimisation cycles
+++ The focus is on the 2026 Olympic Winter Games
+++ Image and video material available +++

Munich. A rule of thumb in bobsleigh is that success is one-third start time, one-third equipment, and one-third performance on the steering pulley. When pushing off, it is the athletic prowess of the athletes that is key, but as in track and field, footwear also affects being able to generate maximum acceleration. Yet, while there are many different types of spiked shoes tailored to the requirements of different disciplines and personal preferences available for high-performance sport on the tartan track, comparable products for the ice channel have long been lacking.

As technology partner of the German Bobsleigh, Luge, and Skeleton Federation (BSD), BMW Group is committed to changing this – and using 3D printing processes from automotive development and manufacturing, they also have the perfect method and the required expertise to implement the project.

Defined rows of nails are permanently attached to the toe area of the soles of conventional bobsleigh shoes; these nails cannot be replaced or moved, meaning that once the nails have worn out, the shoe is destined for the rubbish heap. The solution that BMW and the BSD are working on is based on track and field shoes, for which threads for screw spikes are used to attach spike plates on which the spike nails can largely be distributed without restriction. This combines several advantages. There is a large selection of shoe styles, so athletes can use a shoe that suits their individual needs. The material and geometry of the plate, as well as the placement of the spike nails, can be used to vary the rigidity and, above all, the power transmission to the ice. With respect to individual running styles as

Media Information

Date 23 February 2024

Subject Customised spike plates from BMW Group 3D printing accelerate the German bobsleigh national team.

Page 2

well as the different running paths that the various positions entail, especially in a 4-man bobsleigh, this ensures better acceleration than standard spikes could ever make possible.

In practice, this means that customised spike plates have to be designed and efficiently manufactured for each athlete, a task with which the BMW Group Additive Manufacturing Center is very familiar. Here, plastics and metals are used to produce a large number of components without the need for tools or moulds. "We have been using 3D printing to make components for prototypes, customised one-offs, as well as for series production for more than 30 years," said Claudia Rackl, BMW Group Additive Manufacturing Projects & Qualification. "The major advantages of 3D printing are the time and cost savings as well as a high degree of flexibility. This allows us to quickly manufacture, test and efficiently optimise different variants."

BMW Group engineers have transferred this expertise from automotive engineering directly to bobsleigh. The geometry of the spike plates is developed using software and automatically aligned with the topography of the individual shoes, which was recorded by a 3D scanner. The spike plates are then printed by a laser welding the corresponding metal powder together layer by layer.

Various alloys and geometrics are currently being tested and refined until the optimum result is found – just like in automotive research and development. Once the ideal basic parameters have been determined, the software can automatically adapt the design of the spike plate to any type of shoe, any shoe size, and any number of attachment points on the sole of the shoe. It will also be possible to produce special spike plates for the individual requirements of athletes or even for different weather and ice conditions.

"We tested the spike plates in the World Cup and received a lot of positive feedback from the athletes," said bobsleigh head coach René Spies. "Nevertheless, a few tweaks are still necessary here and there, but we expect to have the perfect shoes to compete in by the 2026 Olympic Winter Games at the latest."

Media Information

Date

23 February 2024

Subject

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Page

3

This would then create the ideal conditions for the first third on the road to success, the optimum start time.

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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 over 30 production sites worldwide; the company has a global sales network in more than 140 countries.

In 2022, the BMW Group sold nearly 2.4 million passenger vehicles and more than 202,000 motorcycles worldwide. The profit before tax in the financial year 2022 was € 23.5 billion on revenues amounting to € 142.6 billion. As of 31 December 2022, the BMW Group had a workforce of 149,475 employees.

The success of the BMW Group has always been based on long-term thinking and responsible action. The company set the course for the future at an early stage and consistently makes sustainability and efficient resource management central to its strategic direction, from the supply chain through production to the end of the use phase of all products.

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