

Revving Up Rider Safety: Reducing the Risk of Hindfoot Hyper-Rotation in the MotoGP



REV'IT! would like their first road racing boot on the racetrack before the racing season 2025 for the riders they sponsor in the MotoGP Championship. These riders wear everything REV'IT! from the neck down, except for boots. For boots, they currently have to arrange another sponsor deal with one of the direct competitors of REV'IT!. Therefore, the risk of losing the riders to these competitors for the entire sponsor package increases. REV'IT! has experience developing adventure bike boots, race gloves and race suits, but not in terms of motorcycle racing boots. Research, designing, and testing had to be done to get from this point to a race-ready product. This project served as a jump start in this process.

As REV'IT! stands for quality, technical innovation and solving user problems, it would be fitting to make a boot that is not only as good as its competition but also has an answer for the problems indicated by the riders. The identified problem statement was: "Limiting the damage caused by hyper-rotation of the joints of the lower limb of REV'IT!'s MotoGP riders during a crash with a lightweight, low-profile solution that does not cause any discomfort in terms of pressure or donning and doffing, and does not limit the riders in their freedom of movement and the tactile feel to a noticeable extend."

With in-depth research, ideation, calculations, prototyping, tests and multiple iterations, a final concept was generated that limits hyper-rotation in the direction of inversion and eversion even when combined with plantar and dorsiflexion. 2.1 (when plantar flexed), 7.0 (when neutral), and 3.7 (when dorsiflexed) times more force is required to invert this brace compared to the brace of one of the best racing boots currently available. Meaning this brace absorbs more impact energy during a crash. The concept combines a comfortable, lightweight and low-profile pivoting 3D printed PA11 hard part based on a 3D scan of the rider with six reinforcing Dyneema® strings that mimic the ligamentous structures of the ankle in terms of placement and functionality. It allows for the complete active range of motion in the direction of plantar and dorsiflexion while limiting inversion and eversion in all flexion positions. The strings allow for the personalisation of the amount of limitation based on rider anatomy and preferences.



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