In mid-2015, Ohio-based Cooper Tire & Rubber Company completed work under a $1.5 million government grant to develop new tire technology aimed at increasing vehicle fuel efficiency. The grant objectives from the U.S. Department of Energy called for Cooper to develop tires with a minimum of a 3% improvement in fuel efficiency and a 20% lower tire weight. By integrating Teijin Aramid’s Twaron fiber and other high-performance materials in a new concept tire, Cooper was able to surpass the grant’s ambitious goals.
Sustainability on the agenda

Tire manufacturers are working hard to meet demands from consumers and regulatory authorities to reduce the weight and rolling resistance of their products, as well as to use materials that are more sustainable. Cooper has been highly dedicated to tire innovation for years, and the recent establishment of its Global Technical Center has helped further drive its technology and sustainability efforts. “The aims of the grant were aligned with our vision on the role of tire manufacturers to help improve vehicle fuel efficiency and drive down fossil fuel dependency,” says Greg Bowman, Cooper’s Manager, Innovative Technology.

“Once our grant application was approved in 2011, we started work on developing new technology for a concept tire designed to address the grant objectives. Our work continued through the end of March 2015, when we submitted our final summary report of findings to the U.S. Department of Energy.”

Aim high, reach high

“Ambitious targets were set for the grant,” explains Greg. “Not only did Cooper have to improve vehicle fuel efficiency by 3% and lower tire weight by 20%, but we had to do so without compromising other areas of tire performance, such as dry and wet traction, wear, handling, driver comfort and durability. In order to achieve these high goals, we sourced some innovative materials that could help push our tire performance to the next level. In all, we developed and evaluated six new technologies as part of the program’s first phase. In the second phase, we evaluated the holistic impact of putting all of these technologies into a concept tire. The final results of our innovative concept tire exceeded the project’s goals, delivering an average fuel efficiency improvement of 5.5%, and weight reduction ranging from 23% to 37%.”

Teijin’s essential contributions

One of the key innovative materials that was integrated into Cooper’s concept tire was Teijin Aramid’s Twaron fiber. Thanks to its unique chemical and mechanical properties, Twaron can allow tire manufacturers to achieve significant reductions in weight, as well as deliver high quality handling performance. “Even before we started work on this grant, we had a good relationship with the development team at Teijin Aramid,” explains Greg. “The partnership between Cooper and Teijin actually started through Cooper Europe’s Avon racing tire line, where Teijin’s Aramid is used in multiple products. The team at Teijin were very helpful during the development of the concept tire, providing not only technical assistance, but also allowing us to leverage its network of high-performance material suppliers. And above all, their Twaron fiber proved key to helping us improve the outcome for both tire weight and fuel efficiency.”

Exciting times ahead

As a result of the grant work, Cooper has already incorporated new tire modeling technology into its development process and is evaluating long wearing and fuel efficient tread compound technology for use in future tires for the replacement and original equipment markets. What’s more, Cooper is developing other technologies for potential commercial applications in the future, such as the use of the Guayule shrub as an alternate source of sustainable natural rubber for use in tires. “These are exciting times for us at Cooper,” says Greg. “We need to continue responding to market needs and developing innovative products. We hope that Teijin Aramid can continue to support us on the road ahead!”

For more information, please email us at tires@teijinaramid.com or visit www.teijinaramid.com

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