

Michelin worked with outdoor brand Mizuno to develop soles for its Wave Daichi and Wave Mujin trail running shoes.

 Mizuno



FOOTWEAR TECHNOLOGY: MICHELIN / JIHUA GROUP

French company Michelin has been making high-performance tyres for over 120 years. Through a partnership with Chinese textile manufacturer Jihua Group, it is now channelling its knowledge and experience into developing bespoke technical soles for footwear brands.

Tyre specialist steps into footwear

Michelin has more than a century of experience developing tyres for a variety of purposes. JV International, of which Jihua is a major shareholder, has been designing soles for technical footwear for over 20 years. Now they have teamed up to try and shape the future of high-performance footwear. Michelin says the partnership is an opportunity for its “know-how in rubber compounds, novel materials, tread patterns and innovative technology to be extended beyond the world of tyres”.

Michelin’s role in the partnership is to offer the expertise it has garnered from decades researching and developing tyres for a wide range of vehicles, from off-road bikes to elite-level racing cars. The knowledge it has amassed of how to improve the “ground contact” of its products is invaluable to JV, which produces rubber and soles at its design and product development centre in Verona, Italy.

The ideal qualities of tyres and footwear soles are not that far apart. From a shared vocabulary (think tread, stability, grip) to similar performance requirements, it is clear that there is potential for a crossover of research ideas from one product to the other. Michelin’s commitment to developing tyres that give its customers safety and reliability on the roads has seen it compile a vast catalogue of rubber compounds. This makes it well placed to develop soles that are adapted to the needs and demands of various types of footwear.

“The sole development process begins with a briefing presented by the footwear company and once the specific needs have been identified, we add the technology derived from Michelin tyres,” explains Trond Sonnergren, head of design and product development for the project.

Each sole is “aligned with the design and technical requirements” of partner brands, which are offered the chance to add their own technical expertise during the development

phase so that Michelin knows exactly what its target should be. After these initial discussions, it can select the compound or mix of compounds best suited to the job and begin work on a prototype. Mr Sonnergren says that the design process takes at least eight months from the time a brand first approaches Michelin, with the possibility of the final product being on the market within 18 months.

Mountain walking

Last year, Italian outdoor brand Salewa became one of the first companies to turn to JV International and Michelin for technical soles. Michelin combined different blends of its rubber to create two exclusive soles that met the requirements of the brand’s Lite Train and Ultra Train mountain boots.

For the Lite Train, the aim was to create a sole for use on softer ground. It has an aggressive tread pattern that digs deeper into the ground, drawing inspiration from Michelin’s Wild Grip’r mountain bike and Starcross HP4 motocross tyres. This Salewa boot is targeted at hikers, so it was important for the sole to provide stability on irregular surfaces. Empty tread blocks along the edge of the sole give better traction when

Outdoor brand Salewa wanted a sole that could cope with the rigours of fast hiking so Michelin added more tread blocks and smaller grooves.

 Michelin





(Left) The Michelin Summit sole that features in a range of boots from snow sports brand Ride contains a special compound able to function in extreme temperatures.

(Right) The asymmetrical tread on Michelin's XAS car tyre was the inspiration behind the sole designed for Hi-Tec's "city hiking" boots.

 Michelin

walking on slopes; reinforced tread on the edges of the sole act like claws to prevent slipping. Siping, a process of cutting thin slits across the surface in the tread, assists draining, helpful in wet conditions, and allows the sole to self-clean.

This siping also features on the sole developed for the Ultra Train boots, which was designed to cope with firmer ground. It has extra tread blocks and lower tread grooves for increased stability when walking fast on difficult terrain, which is the main intended use of this Salewa model. Michelin added a compound it calls Outdoor to the rubber mix used for extra traction and to make it more resistant to the abrasion that frozen or hard ground can cause. Mr Sonnergren says the Ultra sole is "optimised for the kind of hard-pack terrain found during colder seasons in the mountains".

Dutch brand Hi-Tec recruited Michelin to provide the sole for its Ox collection of "city hiking" boots. It copies the asymmetrical design of tread in the XAS car tyre, which allows different sections of the tyre to perform different roles. The fact that the human foot is also asymmetrical meant the concept could be applied to the design for the sole. The tread arrangement varies on different areas of the sole. The toe has edges designed to "bite" into the ground to help change direction while the ridges on the heel give better grip when slowing down. Ridges on opposite sides work in tandem in a similar way to the tread patterns on the XAS tyre. Overall, the tread pattern follows the natural roll of the foot to provide more consistent contact with the ground.

Trail running

Trail runners are another group who rely heavily on the grip of their footwear for safety. Japanese brand Mizuno is a more recent addition to the JV International and Michelin roster. Mizuno says "it was a logical choice to merge the huge experience of both companies"

for its Wave Daichi and Wave Mujin products, saying it was happy to find a partner that could "add another performance dimension to our trail footwear range". The brief from Mizuno was to produce a sole that adapts to irregular terrain and ensures its customers don't find themselves in potentially dangerous situations when practising their sport.

For the Wave Daichi, Michelin developed the G-Adaptive sole based on its cyclocross bike tyres. The rubber sculpting around the edges gives strong lateral grip for sudden changes in direction, especially useful on muddy or slippery surfaces. There are also deep ridges in the heel for increased confidence during deceleration on all types of terrain and double density ridges on important parts of the sole for more stability.

The Twister sole, which features in the Wave Mujin range, is built for long-distance trail running. It is inspired by the Wild Mud bike tyre and adapts to the wide variety of surfaces that a wearer might encounter on a prolonged hike. To cope with long periods of wear the sole offers better support and to combat the dangers of uneven surfaces Michelin made sure it had added protection for the most sensitive areas of the foot. The 'Twister' name comes from the spiral pattern of tread, which Michelin says aids "multi-directional breaking".

When asked by WSA if it is considering working with JV International and Michelin again, Mizuno said it wants to "offer the best matching shoe for each trail runners type out there", suggesting that future collaborations are in the pipeline.

The Kodiak Klondike children's boot has a Michelin sole that is designed to offer extra stability on slippery surfaces.

 Michelin



Winter sports

Winter sports is another outdoor sector where Michelin technical soles have had success. Snow sports specialists Ride worked with Michelin to develop a range of soles for its snowboard boots. The Peak and Summit soles have been used in several different Ride models, including the Trident, Insano and Cadence. Ride says they have featured in some of its "best selling and most requested models".

The weight-bearing zones of the sole have small, deep ridges for greater penetration of the ground. According to Ride, this gives better traction "on all types of snow from powder to ice". A special feature of the Peak and Summit soles is their ability to operate in extreme cold. Michelin says the compound can maintain its softness in temperatures as low as -40°C so that grip performance is not compromised. It also uses one of the company's lightest rubber mixes, a bonus for snowboarders trying to stay in the air for as long as possible.

"On snow, the sole is a critical point; for those who, like us, offer premium collections, it's necessary to have a product that ensures maximum grip and total safety," says Joerg Schramm, marketing manager for Ride Snowboards Europe. The brand hopes to incorporate the soles into more boot models, including those from its women's line.

A partnership with Canadian snow boot maker Kodiak saw Michelin develop a sole specifically for use in a children's shoe. The Kodiak Klondike, which is designed for icy condition, features the Glacious sole, which is based on its tyres for heavy vehicles. A key requirement of these tyres is good traction and

the ability to perform on slippery surfaces. The added grip that the compounds used in these tyres offer make them ideal for use in children's shoes as it gives parents some peace of mind that their children are safer in icy conditions than they might have been otherwise. It has small teeth on the tread for gripping icy surfaces and a vertical channel running down the sole for better traction.

Brand manager Karen McSorley says Kodiak turned to Michelin for "a technical model custom-made for us that tries to always imagine every scenario in which the product could be used".

Two-way street?

When they announced their partnership in November 2014, JV International and Michelin said they thought the footwear market was "hungry for technology" and set a target of supplying technical footwear brands with 500 million pairs of soles per year within five years. Although this goal is ambitious, capturing business for the likes of Salewa and Mizuno, established brands within their respective sectors, is a step in the right direction.

Of the two companies, Michelin perhaps has more to gain from this venture. If the knowledge and experience from over a century making tyres can be so easily transferred to technical soles, it stands to reason that developing the soles could throw up ideas and information that could be applied back to its day-to-day work with tyres. The two industries could be closer aligned in the future if this venture proves successful. 



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