TMD friction

Press Release

27 June 2025

Revolutionising R&D: TMD Friction's AI-driven path to the perfect friction formula

- **TMD Friction uses sophisticated, in-house developed AI tools to support the development of new friction formulas**
- **As a pioneer in this field, the company has been using AI in its R&D activities since 2015**
- **AI-supported compounding makes the R&D process more efficient, saving time and resources on dyno testing**
- **AI is not a threat, but rather, an evolution of existing technologies which complement human intelligence**

Leverkusen, 27 June 2025 – The rise of AI tools for consumers has brought AI to the top of everybody's mind. While some embrace the technology and praise its ability to make certain processes faster, more accurate, and more creative, others are fearful for their jobs and the future of their industries. Yet though this technology may seem new, it's actually been around for decades, and the latest AI tools represent an incremental advancement in the field of data management, machine learning, and AI.

Even before AI tools became commonplace and available to regular consumers, TMD Friction was using the technology to enhance its Research & Development process to make the development of new friction materials faster and more efficient. Read on to find out how TMD Friction uses AI in its R&D, and why AI complements human skills rather than replaces them.

AI at TMD Friction today

TMD Friction uses a variety of sophisticated, in-house developed AI tools to enhance the development of new friction formulas. AI at TMD Friction today includes simple linear and non-linear models, deep learning models, and sophisticated neural networks. Each of these tools can communicate and learn from the others, steadily improving the quality of the company's data and the conclusions which can be drawn from it.

"The use of AI in our R&D process illustrates how TMD Friction is always using modern technology to speed up innovation and provide our customers with the highest quality products," says Christian Stolz, EVP OE Sales & Engineering at TMD Friction. "Paired with the knowledge and experience of our human compounders, machine learning and other AI applications saves us time, money, and resources, ultimately speeding up the development process and benefitting our customers."

A long track record in leveraging AI for R&D

Even as far back as 2004, TMD Friction was using the first early AI predecessors to predict the friction properties of certain mixtures based on the results of previous tests. 2015 saw the advent of AI-supported compounding, meaning a tool could predict the influence of specific raw materials on the friction properties of the final product. Rather than simply retrieving test results

from existing mixtures from the database, this technology was, for the first time, capable of synthesizing new mixtures which human compounders may not have come up with themselves.

“This was the first tool which could make suggestions that our compounders had not thought of yet,” says Frank Marx, Data Analyst at TMD Friction. “We knew we were on to something when our colleagues started saying ‘I wouldn’t have come up with that idea on my own, but it sounds plausible.’”

Another innovation was the development of “virtual testing,” meaning an AI tool could predict the behaviour of entirely new mixtures which hadn’t ever been tested before. As a single test run can take up to one and a half weeks and cost thousands of euros, ‘virtual tests’ are instrumental in saving real-world testing resources.

In 2020, the company developed the technology even further by training an AI model to predict how changing the concentration of individual raw materials affected specific performance metrics. This enabled compounders to determine by how much they needed to increase or decrease a specific ingredient to achieve the desired effect with a high degree of certainty. At that time, no other player in the automotive industry was using something similar, making TMD Friction the first automotive supplier to integrate this level of AI in its R&D process.

Outlook for the future

The future of AI at TMD Friction looks bright. After a decade of working exclusively with self-developed tools, TMD Friction has only recently started to integrate pre-trained AI models into its R&D process and fine-tune them for specific tasks. These represent an enhancement to the existing portfolio of in-house tools.

As a next step, the company is exploring potential applications for generative AI technology, including using next-level AI to target unstructured data – such as historical documents – moving beyond traditional database-driven approaches. This would give employees fast access to the company’s domain expert know-how, essentially “unlocking” a huge amount of historical data and opening up its business potential.

Beyond R&D, TMD Friction is also exploring opportunities to integrate AI into other areas of its business, including sales, operations, and pricing.

Enhancing human knowledge

By using AI tools to weed out the least-promising mixtures early on, TMD Friction can use its testing resources more efficiently, saving time, money, and ultimately reducing lead times for customers. Yet AI still remains a tool to support human decision-making, not replace it. Beyond the performance on the test bench, there are many different factors that determine which formulations ultimately make it into finished products: market considerations, economic factors, and legal requirements, just to name a few. Ultimately, no AI tool can keep track of them all, meaning there is no replacement for human oversight.

“I don’t think that artificial intelligence is capable of understanding customer requirements,” says Christian Stolz. “Some things require a human touch.”

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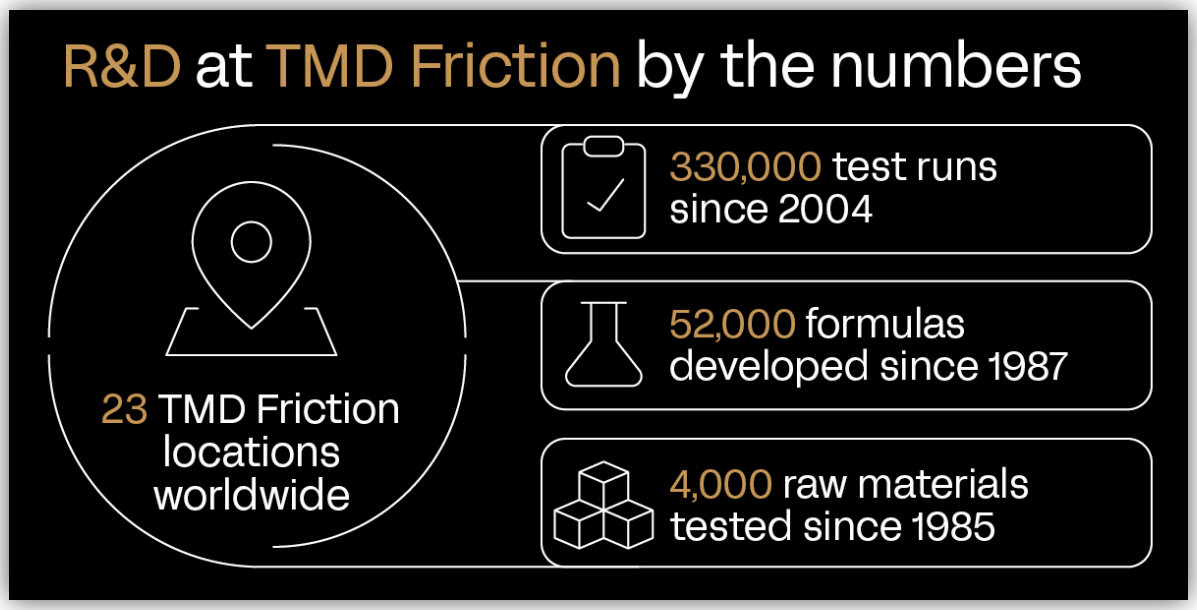
Pictures:



TMD_R&D at TMD Friction_1200x600.jpg: TMD Friction is a leading global supplier of high-quality brake friction solutions to the automotive and brake industries. The company develops and manufactures disc brake pads and drum brake linings for passenger cars and commercial vehicles.

About TMD Friction

TMD Friction is a leading global supplier of high-quality brake friction solutions for the automotive and brake industries. The company develops and manufactures disc brake pads and drum brake linings for passenger cars and commercial vehicles. Since 1878, TMD Friction has tackled the challenge of safety in motion, becoming a trusted leader in friction technology.

TMD Friction supplies vehicle manufacturers with premium braking products for original equipment (OE) as well as the international aftermarket (IAM) with the renowned brands Textar, Mintex, Don, Pagid, Cobreq and Bendix. With over a century of experience in motorsport, the company´s portfolio also includes high-performance racing products under the Mintex Racing and Pagid Racing brands.

With a dedicated global network of more than 4,200 friction experts worldwide and locations across Europe, the Middle East, the USA, Brazil, Mexico, China and Japan, TMD Friction is a driving force for a safe and sustainable future of mobility.

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