

A GREEN LIGHT FOR GREENER RAIL

KONI and Bombardier Work Together to Advance Eco-Friendly Rail Platform

Canadian transportation giant Bombardier had a vision to build a new generation of electric multiple-unit (EMU) passenger trains that would provide outstanding eco-friendliness, while maintaining maximum performance

and reliability. To make the new AVENTRA train a reality, Bombardier needed special custom-engineered dampers for its advanced FLEXX Eco bogie platform – so KONI stepped in.



A Long Track Record

KONI and Bombardier share a long and successful track record of collaboration and innovation in the rail market. KONI, founded in 1857 in the Netherlands, started engineering shock dampening technology for rail platforms over 50 years ago, and has worked with all major railway original equipment manufacturers (OEMs) and operators throughout this time. The KONI-Bombardier relationship is more than three decades in the making, and is built on the shared values of trust, responsiveness, innovation and mutual respect.

With a commitment to continued improvement with its dampening technology and radically rethinking existing concepts, KONI has become a strategic supplier to Bombardier and works directly with the company's bogie division. With highly specialized, purpose-built dampers, KONI directly supports Bombardier's vision to improve the life-cycle costs and reliability of its train platforms. Over the years, KONI has equipped many of Bombardier's platforms with shock dampening technology. Among them are the Flexity, Movia, Omneo, Veolia, Regina, Twindexx, Zefiro and Traxx designs.

Safer, Smoother and Greener

With the AVENTRA vehicle platform, Bombardier envisioned an evolved train that weighs significantly less, optimizes energy consumption and minimizes maintenance costs for operators, while continuing to deliver the high performance

and reliability for which the company is known. KONI supports this vision with industry-leading and innovative damping solutions for Bombardier's advanced FLEXX Eco bogie platform, which will be used on all new AVENTRA trains.

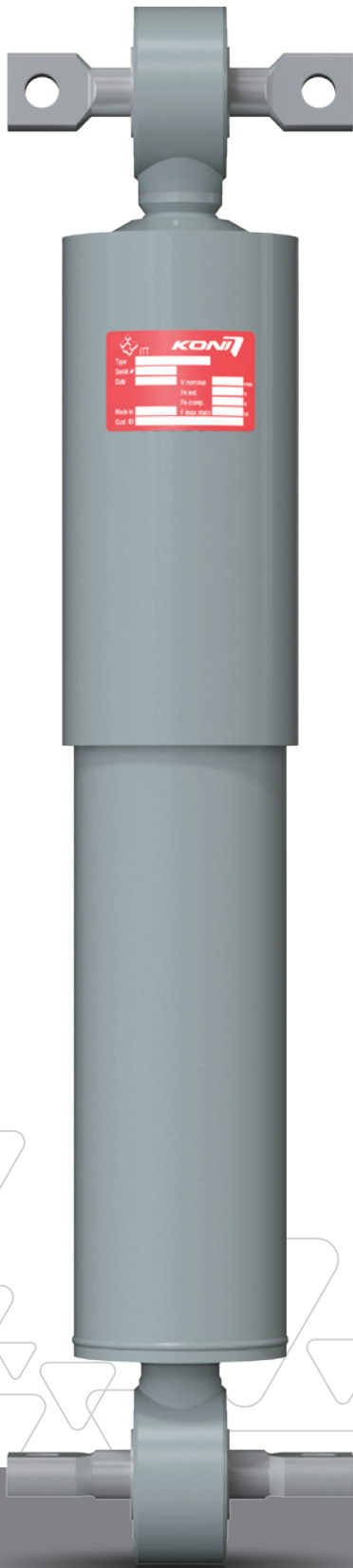


Bombardier's Challenge

Bombardier had to challenge the industry's conventional wisdom and solve significant engineering problems to deliver on its promise to develop the most economical and ecologically friendly rail platform. Responding to today's stringent market demands, the train's bogie needed to be lightweight and "track-friendlier" than any existing platform, in order to significantly reduce operator costs being driven by rail access charges introduced in many European countries.

KONI played a substantial role in the development process of the FLEXX Eco bogie platform. The company was tasked with developing a yaw damper and a vertical damper that would stabilize the connection between car body and bogie, dampen the train's wheel track force, reduce life-cycle cost, and increase the reliability of the dampers. Bombardier needed KONI to deliver this, all while reducing weight and without increasing the cost of components.





How KONI Solved It

KONI redeveloped its bogie yaw dampers in 2010. Yaw dampers are the most sophisticated dampers on a bogie – preventing uncontrolled yaw movement and playing a vital role in both safety and ride comfort for rail passengers. The redevelopment provided a significantly higher inherent stiffness and up to 30% less weight compared to the previous design.

KONI's vertical damper sits parallel to the air spring, which is positioned between bogie and car body. Controlling the medial movement of the car, KONI's vertical dampers are position-dependent and adjust their dampening characteristics accordingly. In case the air spring is completely deflated, the damper compresses and provides stiffer performance. When the spring is inflated, the damper extends and softens its performance to practically zero.

With its innovative vertical and yaw dampers, KONI was able to fully meet and exceed Bombardier's expectations for its new FLEXX Eco platform, delivering two products that have outstanding economic and ecological benefits, excellent performance and a significantly reduced weight.

Building on a Foundation of Trust

Bombardier's success is KONI's success. But the success of this collaboration is built on more than technological and engineering innovation. Building on a foundation of trust, KONI and Bombardier have established a matrix of active dialogue between many different functions within the two organizations. Lines of communication were opened, not just between the traditional sales and procurement teams, but also between project management and engineering, allowing better information sharing and coordination – which has a direct bearing on product performance.

Immediate Impact

The excellent performance and reliability of KONI's damping solutions significantly contribute to Bombardier's vision to develop a train platform with drastically reduced maintenance cost and optimized performance. Together with Bombardier's modern, economic bogie design, FLEXX

Eco, KONI is contributing to the unprecedented eco-and track-friendliness of the new AVENTRA train platform. A platform that is fit for the future and easily adaptable to shifting market requirements.



Looking Ahead

In future generations of the FLEXX-Eco bogie, KONI is ready to provide its innovative FSD (frequency selective damping) technology to improve further on the safety, reliability, comfort and performance of Bombardier's trains. FSD integrally adjusts the damper forces to the frequency input without any external electrical power. The result is to further reduce the wheel-track load, and subsequently, wear and tear to both wheels and track. Adopting FSD would therefore contribute to even greater track-friendliness of Bombardier's bogies and the AVENTRA platform.

Between KONI and Bombardier, the shared vision of cleaner, safer, more comfortable and more affordable rail transport gets closer every day.