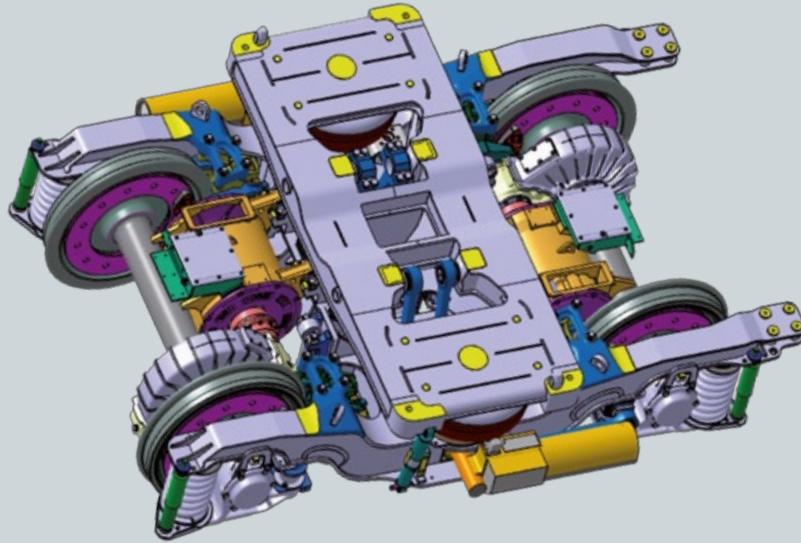


◁ FLEXX Tronic WAKO ▷



Safety, efficiency and flexibility are guiding principles in Bombardier's product development. **BOMBARDIER* FLEXX* Tronic WAKO*** system is an innovative mechatronic solution designed to compensate the natural roll movement of a carbody.

The mechatronic platform

FLEXX Tronic WAKO is based on the innovative mechatronic platform developed by Bombardier Research and Development Engineering team.

The following products are derived from this concept:

- *FLEXX Tronic* technology with ARS (Active Radial steering and Stability control)
- *FLEXX Track* (track condition monitoring)
- *FLEXX Guide* (bogie condition monitoring)
- *FLEXX Tronic WAKO* (roll movement compensation)

Those 4 applications use a modular system with standard components which represent a major advantage in terms of maintenance and costs. These applications can be applied to any *FLEXX* bogies.

The FLEXX Tronic WAKO system

FLEXX Tronic WAKO is an innovative system for the compensation of the natural roll movement of a carbody, integrated into the existing secondary suspension. The system allows a speed increase in curves of ~15% and therefore allows for shorter journey times with lower investment in infrastructure.

Main features of FLEXX Tronic WAKO

An outstanding high reliability is achieved with the use of latest technology in electronics and a full redundant system configuration inclusive actuator. Therefore, in case of any component failure, there is no impact on the journey time and schedule at all. A reduced mechanical complexity is achieved by the mechatronic multifunctional setup of the system, which allows for a compact design with short wheel base, even with integrated drive system. The system cinematic provides fail-safe behavior and allows for a wide carbody design with a first class space comfort even for double deck coaches. In addition, the contact of the pantograph with the catenary is ensured under all possible service conditions without any additional active means. Through the low compensation of the roll movement together with the active comfort control based on advanced control design principles, a very high comfort level is achieved with no sea sickness effect as generally experienced with active tilt systems.

Well controlled service and maintenance activities are enabled by the extensive self diagnostic features, which leads to a high availability of the trains at respectively low LCC costs. In addition, the lower mechanical complexity with the lower number of components allow for even lower investment costs.

A modular system

With the consequent development of all systems in modular structures, additional functionalities like ARS, hydraulic brake, etc. can easily implemented, even down the lifetime of the product.

A very high economic value is offered to the customer by the ARS system through reduced energy consumption (rolling resistance), the lower wheel/rail forces with respective lower wheel and rail wear and therefore extended wheel life. Despite higher axle loads and higher curving speed, the track maintenance costs can be leveled even at lower values than today, according to the Swedish track access charge model.

Major benefits of the FLEXX Tronic technology:

- Increased speed
- High reliability
- Higher comfort
- Lower life cycle costs
- Lower mechanical complexity
- Lower track maintenance
- Fail-safe

ECO4 – Energy, Efficiency, Economy, Ecology

The *FLEXX* Tronic technology forms part of Bombardier's *ECO4** environmentally friendly technologies. Addressing the growing challenges among operators to reduce Energy consumption, improve Efficiency, protect the Ecology while making sense Economically, *ECO4* is the concrete validation of Bombardier's declaration – *The Climate is Right for Trains**.

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