

Articulated trainsets

Guaranteeing comfort and safety

> The principal

TGVs™ have always been designed by Alstom and the SNCF as articulated trainsets. This offers maximum weight reduction, comfort and safety.

The bogies (axles and wheels) of traditional trains are situated beneath the cars, and thus below the seats of the passengers. On a TGV™ however, they are placed between the individual cars. This eliminates the majority of vibrations and rolling noise on board, while the links between carriages absorb almost all of the movement between them.

The TGV™ and Alstom's latest-generation AGV™ very high speed train are the only high-speed models in the world to feature articulated design.

> How does it work?

A non-articulated train is made up of cars that sit on two bogies and are linked by couplings.

A train of 200 m is made up of six passenger cars with a power car at either end and thus features 16 bogies.

An articulated train is made up of interdependent cars, each linked by a bogie,

A train of 200 m is made up of eight passenger cars with a power car at either end and thus features 13 bogies (20% fewer).

> The benefits

▪ **Safety:** the fact that the cars are interdependent adds rigidity to the trainset. Thus, in the case of a derailment, the trainset stays in one piece and does not lose its shape, unlike non-articulated trains (which suffer from an "accordion" effect).

▪ **Comfort on board:** rolling noise and vibrations are restricted to the area between cars, ensuring maximum acoustic comfort in the spaces designated for passengers. What's more, as the cars are interdependent, there is little movement between them. This means they can be covered in pressure wave-resistant casing, to limit the effects of air pressure in tunnels on the eardrum.

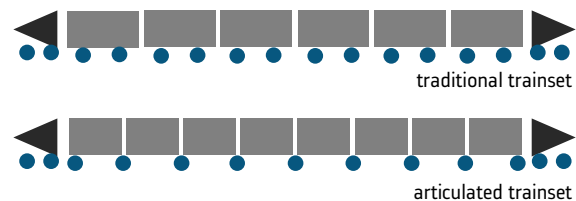
▪ **Aerodynamics:** reducing the number of bogies improves aerodynamic resistance. The complex structure of the bogies creates swirls of air that slow the train down - the fewer bogies there are, the less turbulence there is, and thus less resistance.

▪ **Cost:** a bogie accounts for 35 to 40% of the cost of maintaining a car as it contains the most frequently worn-down parts (such as the wheel, axle, brake and dampers). As a result, fewer bogies means lower maintenance costs.



The bogie is situated between the cars on articulated trainsets

Distribution of bogies



Vibrations and rolling noise are confined to the area between carriages, ensuring maximum comfort for passengers

TGV™, Train à Grande Vitesse, is a trademark of the SNCF

AGV™, Automotrice Grande Vitesse, is a trademark of Alstom