

AERODYNAMIC SLEEPER, AE

Even safer at high speeds: Aerodynamic design to prevent ballast uplift

Ballast uplift is one of the key challenges in high-speed rail transport, particularly at speeds exceeding 300 km/h. It occurs when air turbulence generated beneath the train stirs up ballast particles, causing them to be ejected uncontrollably—posing a risk of damage to the train underbody and increasing maintenance requirements.

The patented aerodynamic sleeper design aims to reduce this phenomenon through an optimized sleeper geometry while simultaneously improving ride comfort and operational safety in high-speed rail. “The optimized sleeper geometry reduces wind speed at ballast

level in the area between sleepers, thereby reducing the aerodynamic load on the ballast bed and the likelihood of ballast uplift. The optimized design supports high-speed operation by reducing aerodynamic loads on the ballast bed and the likelihood of ballast uplift.

The Spanish RAILONE subsidiary TRAVIPOS received manufacturing approval with ADIF. The modified design is listed in the ADIF register of validated products, thereby enabling series production of the sleeper. International production and market availability are subject to the applicable operator approvals and patent-licensing arrangements in each country.

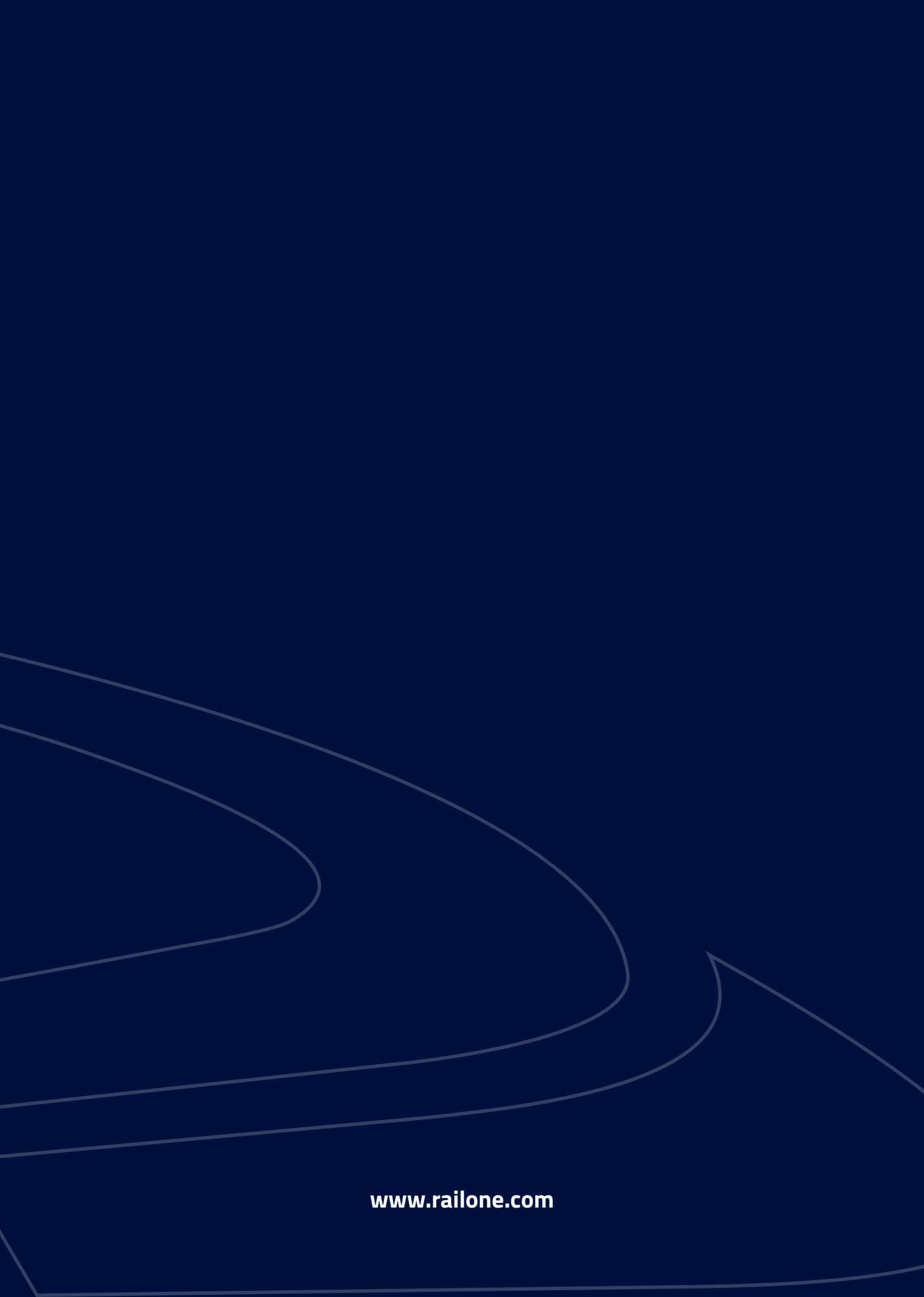
PROPERTIES

- Approved by ADIF and listed in the register of validated products (for Spain)
- Innovative design with a rounded center profile for optimized airflow
- Reduction of aerodynamic load above the ballast bed approximately 21%
- No additional manufacturing or handling costs
- Easy integration into existing processes

HOW YOU BENEFIT

- Minimized ballast disturbance and reduced ballast flight
- Potential increase in operating speed of approximately 12% without additional risk
- Cost-efficient and easy-to-implement solution



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