

IAQ QUALITY SUSTAINABILITY AWARD 2021 - ONE-PAGE SUMMARY

Project and contact details

The name of the quality sustainability project (max. 100 characters)

Development and application of key technologies of high speed freight EMU based on QFD

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Project description

In 2019, the global express delivery business volume exceeded 100 billion pieces for the first time. With the maturity of the e-commerce industry and high-speed railways, the product of the combination of the two — the development of high speed freight EMU that meet the transportation requirements of low cost, automated fast loading and unloading, large volume, and cargo safety, has become an important topic for current train development.

Through the quality house of railway freight products constructed based on QFD theory, the focus and direction of the design are determined, and key core technologies such as large-span loading doorways, standardized containers, and automated rapid loading and unloading are broken through. Thereby significantly improving the speed level of freight trains and realizing intelligent rapid loading and unloading. Replacing traditional manual loading and unloading methods, effectively improving the capacity and efficiency of loading and unloading operations, and fundamentally solving the problem of timeliness of cargo transportation. It has made contributions to sustainable development and achieved the following results:

- 1) High running speed. The freight train with a speed of 350 km/h is the fastest freight train in the world.
- 2) Strong cargo capacity. The freight train has a maximum load capacity of 115t and a maximum load capacity of 800m³. The capacity is equivalent to 7 Boeing 737 cargo planes or 29 medium-sized vans.
- 3) Light environmental pollution. In terms of the unit pollution intensity caused by freight, the carbon emissions per 100 ton-kilometer are 79.8kg for roads, 10.7kg for aviation, and only 2.6kg for railways. The freight train is electric traction, which can effectively avoid environmental pollution problems such as dust, oil
- 4) Less energy consumption. Under the same transportation volume, the average energy consumption ratio of aviation, highway, and railway is about 11:8:1. The freight train uses secondary energy and one electric power, which is a clean energy, while automobiles and airplanes use non-renewable primary energy fuel.
- 5) Reduce logistics costs. Rising fuel prices and high road and bridge tolls restrict the development of highway and air transportation logistics. High-speed rail freight has the characteristics of large transportation volume and low energy consumption, so the level of freight is relatively low. The cost of high-speed rail express is only about 1/3 of that of air express.
- 6) Increase employment opportunities. Through the operation of high-speed rail freight, freight conditions are improved, freight time is saved, and regional accessibility is improved, thereby improving the investment environment and creating job opportunities.

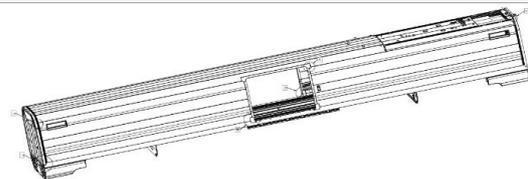
Project leverage potential

(1) In 2019, the business volume of the global express industry exceeded 100 billion pieces for the first time. The prospect is very broad. To meet the needs of the rapid development of e-commerce and logistics express industry, multimodal transport standards and rules have been established for the first time, a life-cycle integrated platform for high-speed rail freight trains has been built, and the technology and equipment system of freight train sets have been promoted.

(2) With the progress of Internet plus artificial intelligence, we update the technology to ensure the advanced nature of intelligent logistics control platform and form a series of products with different functions.

(3) It will be a new scale industry to create a standardized container industry, meet the integrated transportation of aviation, railway and highway, and can be used for market-oriented operation and sharing.

Picture/Image describing the project



Composition diagram of freight EMU body



Automatic loading and unloading container



Appearance of freight multiple unit vehicles