

CASE HISTORY



Technical data

- Breakaway force of 30 kN
- Temperature range: -40°C to +50°C
- Can withstand temperatures of up to -50°C
- Can be operated on a purely mechanical basis without power supply using a hand lever
- Status monitoring:
 - Oil level
 - Oil temperature
 - Engine temperature
 - Oil pressure
- Monitoring of retracted and extended position
- Hose break safety device
- Use of special power trains for direct operations with 110 V DC battery
- Guaranteed identification of final positions despite extreme ambient conditions
- Extremely robust construction due to exposed installation position in the underframe of the passenger car



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Hydro-mechanical folding step for passenger cars operating under extreme climatic conditions

The challenge

In 2010, Siemens AG was awarded a contract for the development and delivery of 200 sleeper cars by the Russian railway company RZD via Russian rail car manufacturer TVZ. The cars will be used for international traffic in the European part of the Russian Federation, the CIS countries, Baltic States and Western Europe. This large scope of application meant that the loading gauges and standards of the international railway association UIC as well as the Russian loading gauges and GOST standards for operation in CIS countries had to be taken into account and adhered to.

Our assignment

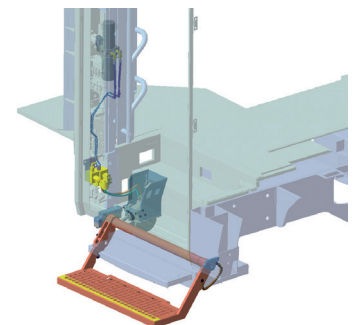
Siemens commissioned Molinari with the development and delivery of the subsystem folding step as an external engineering partner and system supplier based on a Siemens concept protected for patent application. The folding step makes it possible to enter the cars from low Russian platforms. In this case, the folding step is activated through the door control and extends hydraulically.

Implementation

Through the systematic application of RAMS methods (reliability, availability, maintainability, safety) and FMEA (failure mode and effects analysis) from the start of the development phase, Molinari was able to design this complex mechatronic system in accordance with the client's reliability and availability requirements and in compliance with the requirements regarding maintainability and safety.

Together with a partner company, Molinari developed a hydraulic power unit especially for this project, which is designed for the limited available space and extreme temperature range.

The success of the integrated Molinari development approach was confirmed during the climate and icing tests in the climatic wind tunnel, which were immediately passed. Series production and delivery of the 400 folding steps started in May 2012 and successfully finished in March 2014.



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