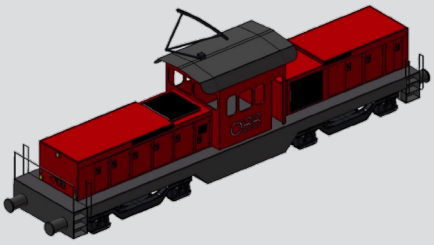
MOLINARI

CASE HISTORY

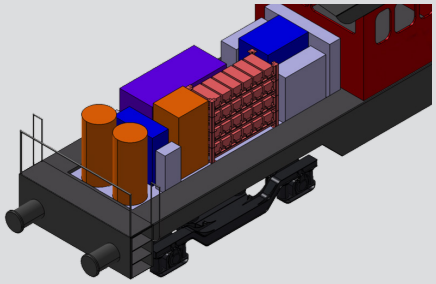
Electric shunting locomotive with battery energy storage for operation without catenary

Project requirements

- Approx. 200 kW power during battery operation
- Approx. 200 kWh energy at the battery outlet
- The battery storage shall be recharged while operating beneath catenary.



CAD-model of the shunting locomotive 1063



Locomotive hood with opened sheathing and visible accu-packs (in pink)

The challenge

Shunting operations are often performed using diesel locomotives, although these tasks mostly take place beneath catenary. The reason for this is usually the «last mile», for example catenary-free tracks at a plant entrance, which cannot be accessed by electric locomotives. Diesel locomotives are more expensive regarding energy and maintenance costs and are mostly operated in idle mode. Because of noise, air and soil pollution their use is undesirable especially in populated areas and in tunnels.

Aim of the project

The aim of our project was to prove the technical and commercial feasibility of the integration of accumulator cells into an electric shunting locomotive of type 1063 of the Austrian Federal Railways (ÖBB).

Procedure

In a first step the boundary conditions, interfaces and the underlying load collective were determined in order to compile the technical specification for the accumulator.

Subsequently, the best fitting accumulator technology was identified.

After the analysis of existing documents and an inspection of a locomotive in use, an integration concept and an electric schematic diagram were established and the available space was modeled in the CAD-system.

Results and findings

In the project, the most suitable accumulator technology for rolling stock applications was determined. It was shown that state of the art batteries can fulfill the special requirements of rolling stock but are therefore very expensive: The entire life cycle costs are dominated by the cost of the batteries.

Another important finding of our project was that there is a huge difference between the theoretical performance parameters of accumulators like energy- and power-density and the actual values shown in practical applications.

In a nutshell one can say: The future belongs to hybrid solutions!

Molinari Rail AG
Merkurstrasse 25
CH-8400 Winterthur / Switzerland
Phone +41 52 320 60 60
Fax +41 52 320 60 61
info@molinari-rail.com

www.molinari-rail.com

Subsidiaries: Austria, Germany, Turkey
Consulting · Engineering · Analysis · Systems

05.2016/250