Reference sheet

Gotthard-Base tunnel

Section 360 Sedrun, Switzerland

Passenger shuttle – Modern and Low-Emission Passenger Transportation

About the project

The partial section Sedrun (lot 360) of the 57 km long Gotthard base tunnel comprises the most demanding and complex section of the NEAT, in terms of structural engineering and logistic aspects. Constructions of a multi-functional site as well as two single track tubes with a length of 8.6 km are planned. During the operating phase, the multi-functional site serves as an emergency stop, as well as a storage location for rail- and safety related installations. Site development, as well as all supply and removal take place over a 1 km long access tunnel and two 800 m deep vertical shafts. The multi-functional site constitutes the starting point for conventional excavation of the two tunnel tubes in both directions: South to Faido and North to Amsteg.

Project data

Country Switzerland
Execution 2002 - 2012
Builder AlpTransit Gotthard AG
Customer ARGE TRANSCO-Sedrun

Innovation

Innovative new technologies in drive engineering are applied to the new passenger shuttle.

The modern transport system

- Can be driven by a trained operator
- is appropriate for the transport of 14 persons
- is equipped for transporting injured persons
- has a reach of approx. 40km
- drives at a speed of 25 km/h

The Concept

Modern Passenger Transportation

For lengthy tunnel construction lots, track-bound passenger- and material transportation is still of major importance. Emissions are some of the important factors in underground construction. Rowa’s primary target is to modernize the hitherto customary passenger transportation system. Using the latest technologies from propulsion technology, Rowa has succeeded in developing a modern and low emission passenger shuttle with an electric power system. The battery driven shuttle perfectly meets customers’ requirements, with its light weight and modern design.

Advantages for the customer

- ecological / low-emission
- ergonomic / great driving comfort
- economical
- innovative
- efficient
- light
- safe
- easy to operate
Design
The development from a traditional to a more contemporary design took place over a number of stages. The improvements accomplished are not of a purely cosmetic nature - on the contrary: they offer more driving comfort, as well as optimal usage of available space in- and outside of the transportation device. Alu-cobond (aluminium synthetic composite plates) were used for lining the steel tube construction; these plates are especially light and sound absorbing. During manufacturing, we have paid particular attention to high precision. The aperture for the windscreen in the steel sheet, for example, was laser-cut for high precision fit.

Drive comfort
The passenger area is optimally developed and equipped with comfortable, heavy duty seats. Hollow spaces inside the lining have been isolated with glass wool for sound insulation. In order to secure an unobstructed view towards the driving direction, the shuttle is equipped with both, a front and a rear driver cabin. The cabins are designed in a clear and well arranged manner, and are equipped with big windowpanes.

Drive System
The passenger shuttle is electrically driven by an asynchronous induction motor. It can be infinitely variable accelerated and decelerated via a frequency converter. Gear drives are installed onto the drive axels. Power transmission between motor and drive is handled by a cardan shaft, thereby mostly protecting the motor from shocks.

Braking System
The primary braking system of the passenger shuttle is effected electronically. Part of the braking energy is recovered as electrical power via a control mode. Should power failure occur, emergency brakes are activated automatically via a dead man’s button. With electricity cut-off, the brakes remain operational and also serve as immobilization brakes.

Battery Concept
The passenger shuttle is equipped with two battery packs of 500ah capacity each, which have a range of 40 km. The batteries can be charged either via a charging device permanently mounted onto the shuttle at every grid connection on the track, or at a charging station permanently installed at the multi-functional site. There is no need to dismantle the batteries for charging. Distilled water is automatically refilled. The battery packs can also simply be exchanged as needed.

Conclusion
With this innovation, we have set a milestone in passenger transportation systems in the tunnel construction industry. The trend towards electric vehicles was adopted and implemented successfully.