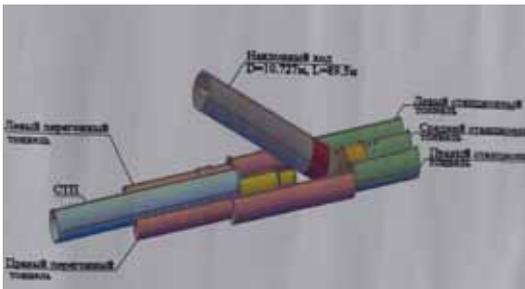


Metro Moscow, Russia

Back-up system for inclined shaft



Project representation

About the Project

The Moscow subway expansion will require numerous new subway stations. In this context, the Lovat company has supplied a special tunnel heading system with a Rowa back-up, which was developed for the sole purpose for accessing these subway station entries. This system allows for very short installation time and is used in repetitious operations. Its first deployment takes place in the North of Moscow, in the Mar'in Roshcha station, the extension of the Lyublinskaya-line.



Starting of the back-up system

Project data

Country	Russia
Execution period	2007-2012
Builder-owner	Moskau Metro, Russia
Customer	Lovat, Canada
Project	Metro Moskau
TBM	EPB Shield-TBM Lovat, Canada
First application	2008
Tunnel length	appr. 100 bis 150 m
Excavation diameter	11.0 m
Descent	30°
Ground	Soft ground
Rock Safety	Segment Lining
Heading time	appr. 4 Weeks



Slide consoles

Rowa's order

On March 16, 2007, the Canadian TBM manufacturer Lovat had given Rowa the order to develop and deliver a custom-made back-up installation for their TBM within 6 months. Rowa was responsible for the development, the manufacturing, the assembly and start-up monitoring of the back-up.

Specific Guidelines

Main focus points in the development were the modular construction for rapid assembly and disassembly as well as for ease of transportation, additional requirements for improved work safety due to the shaft gradient, and a simple operating system.

Experience

For many years, Rowa has been developing back-up installations for a diversity of tunnels and inclined shafts. In each case, these installations were developed in close cooperation with the client and finally manufactured according to the latest technical standards.

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Feeder car



Lining segment crane



Lining segment magazine



Material car

The Concept

Heading

EPB shield-TBM heading

Removal

The muck material is prepared with ground conditioner and pumped from the TBM to a transloading device by means of a screw conveyor. Thence, the material is pumped above ground with a further pump.

Lining segment handling: cars, cranes, magazine

At the portal, the lining segments are loaded onto the feeder wagon with a crane and transported to the back-up installation. There, they are transferred onto the lining segment handling crane and stored in the lining segment intermediate storage facility. From the storage facility, they are reloaded by crane into the erector feeder and finally placed by the erector into a 60 min/ring.

Supply

Back filling and ground conditioner are pumped. Fat barrels and material for the TBM are transported by feeder wagon to the back-up, and on the material car in the back-up to the TBM. Handling cranes are installed at both, the rear and the front end of the back-up.

Forward Movement

The back-up installation slides with skids on slide consoles which are bolted into the displaced lining segments. At the rear, the free consoles are continuously removed again, transported through the back-up via the material car and re-installed again in front of the back-up with the handling crane.

Scope of delivery

Back-up car – supporting structure

The back-up supporting structure is designed for the components of lining, and the energy-, storage- and powered components of the TBM in a 30° incline condition.

Trailing

Supporting cylinder 2 pcs.

Feeder car

Total load capacity max. 20 tons

Driving speed 60 m/min

Lining segment crane

Load 8 tons

Roadway 16 m

Driving speed max. 40 m/min

Operation remote control

Lining segment magazine

Capacity 1 ring with 6 segments

Slewing crane rear

Lift moment 8 mtons

Material car in the back-up

Load 2 tons

Length roadway 16 m

Driving speed 20 m/min

Handling crane front

Moveable handling crane

Load 3,2 tons

Additional installations

Pipe installation for electrical supply, industrial- and dirty water, mortar, compressed air, ground conditioning and ventilation.