

## Gotthard Base Tunnel Amsteg Section 252, Switzerland



### Editorial

Dear Reader

This issue is dedicated to the Amsteg section 252 of the Gotthard base tunnel. The order placed with Rowa Tunnelling Logistics AG for this project concerned the development, manufacturing, supply, installation and commissioning of two back-up systems and one installation for the excavation of the cross passages.



Back-up system

### Project and Objective

Whilst the tunnel boring machine and the back-up system are usually supplied together by the manufacturer of the tunnel boring machine, Arge AGN Murer/Strabag preferred to place the order for the back-up system directly with Rowa. This has proven to function perfectly. The interface problems could be managed without any difficulties, and the contractor had an experienced logistics partner available.

### The customer's opinion

Dipl. Ing. Hans A. Treichl, Strabag AG



"AGN and Rowa have together developed a highly mechanized complete system, which has been perfectly adapted to the construction processes. Rowa has proven to be a highly competent and efficient partner for the solution of all logistics problems. Also the assembly and the start-up were carried out expertly and within the given time limits."



**Back-up system 3**

## Project-Data

Tunnel length up to the section limit	11350 m
Excavated diameter	9.58 m
Inclination	4.08‰
Curve radius	>5000 m
Type of heading	Gripper-TBM
Tunnel finishing	Shotcrete with Concrete invert construction
Muck handling	by conveyor



**Shotcrete robot**

## Los 252

Starting from the intermediate point Amsteg, two tunnel boring machines are excavating about 11 km of the two tubes of the Gotthard base tunnel to the south, to the meeting point with the advance of the Sedrun section.

The Arge AGN consists of the building contractors Strabag AG and Murer-Strabag AG.



**Invert construction area**

## The conception

### High-performance Back-up Installation

In close cooperation with Arge AGN, Rowa developed the back-up system for the tunnel boring machine. A suspended monorail railway makes it possible for the material to be transported without transloading from the supply train to its destination. Thanks to the suspended platform and a double-track rail service up to the invert construction area, the invert can be built at the same speed as the advance progresses. A longitudinally movable shotcrete robot with a 360° working area applies shotcrete support to the excavated section.



**Rock crusher**

## Specific characteristics

### Rock crusher

Rock crusher for the breaking up of the excavated material, which will probably occur in large blocks in these geological formations, and in order to guarantee an uninterrupted removal of the material by the continuous conveyor.



**Suspended platform**

### Suspended Platform

The tunnel invert is being constructed simultaneously with the advance. A suspended platform bridges the invert construction area. Thanks to the working area being clear the operations can take place in a flexible and efficient way, independent from the advance. The length of the suspended platform has been optimized, working together with the customer, for the planned performances and work processes.



**Monorail**

### Independent Monorail

The monorail is suspended from the tunnel crown and is independent from the rest of the back-up system. This allows for rock support material, shotcrete etc. to be transported without transloading from the supply train to the workplace.

### Shotcrete

The spraying robot with a working area of 360° is designed in a way to prevent as far as possible any rebounding of material on machinery parts, so as to guarantee the highest possible degree of availability.



**Assembly**

## **Assembly**

In order to keep the launching chamber as short as possible, the tunnel boring machine started working with a rudimentary back-up system. After an advance of 500 m, the tunnel boring machine was stopped and the back-up installation was completed. Thanks to the meticulous preparation of the assembly and good logistics planning, the tunnel boring machine could resume its operations after a very short time.



**Cross Passage Installation**

## **Cross Passage Installation**

For the excavation of the cross passages, Rowa has developed a complete installation which makes it possible for cross passages to be excavated simultaneously with the main tunnel advance. With this installation, the cross passage excavation can be carried out efficiently, while protecting the installations of the main advance. The complete equipment can be moved on the rails of the back-up platform and thus transported from one cross passage to the next.



**Back-up System**

## **Experiences**

The optimized and made-to-measure back-up installation with all its newly developed features has proven to be successful. The performances asked for by the contract were already reached during the starting-up. Thanks to the spacious working areas and the flexible logistic system of the back-up installation, extensive rock consolidation work could be carried out efficiently, even in difficult geological conditions.