**By-pass Saas GR, Schweiz**

**Back-up installation for Gripper-TBM with conveyor belt**

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**About the project**

The Saas tunnel between Kueblis and Klosters in the Praettigau area in Graubuenden has a length of 2580 meters. As with the Gotschana tunnel, a safety tunnel is built for the Saas tunnel. Its purpose is to provide an escape route for traffic users. The planned safety tunnel runs parallel to the main tunnel, separated by 30 m towards the valley side. The breakthrough of the Saas tunnel is scheduled for the end of 2008.

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**Project data**

- **Country**: Switzerland
- **Execution period**: 2005 - 2011
- **Building owner**: Tiefbauamt Graubünden Chur
- **Client**: Arge ATUS
- **Arge ATUS**: Walo Bertschinger AG, CSC Impresa Costruzioni SA, Rothpletz, Lienhard+Cie AG, Gebrüder Vetsch AG
- **Driving method**: Gripper TBM
- **Excavation diameter**: 4.50 m
- **Driving length**: 1'950 m
- **Inclination**: 2.6 %
- **Lining method**: Spritzbeton
- **Curve radius**: > 300 m

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**Rowa’s order**

On 30 June 2005, the company Rothpletz, Lienhard+Cie AG in Aarau awarded Rowa with the contract for the manufacture and supply of a back-up installation for a gripper TBM with tunnel belt.
**The Concept**

The concept of a back-up installation consists of an anchor boring sledge, a shotcrete sledge, a lining segment-track installation bridge and an apparatus-/double rail rolling platform supported by auxiliary rails, with the necessary superstructures and a direct rail to the segment lining construction site. After completion of the boring stroke, the TBM pulls the back-up train by means of a towing cylinder.

**Special aspects**

The characteristics of Rowa’s supply scope lie in the development of an optimized back-up system making use of existing components.

**Supply and removal logistics**

Installation and waste material are transported by rail. The installation material can be transported from the platform car to the rear of the shotcrete sledge via base segment transloading cranes.

Shotcrete is delivered in a mixing container. The latter is mechanically transferred across from the platform car to the shotcrete transloading station.

The muck material is transported directly into the rotary tipper via a back-up conveyor. The muck train loading is supervised and controlled by the locomotive via video monitor.

**Scope of delivery**

- Trailing installation, consisting of butt straps fixed to the rear of the TBM, as well as the corresponding towing rods
- Transfer and back-up conveyor
- Anchor boring- and shotcrete sledges, supported on skids by the tunnel floor
- Invert cleaning conveyor
- Lining segment-/track installation bridge
- Lining segment transloading crane
- Apparatus-/double rail rolling platform
- Car relocating station
- Mortar transloading station
- Dust removal, ventilation
- Shotcrete installation
- Airduct storage transloading station
- Auxiliary rail transloading station

**Technical data**

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<th>Back-up system</th>
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<td>Length</td>
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<td>Weight</td>
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<tr>
<td><strong>Conveyor belt</strong></td>
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<td>Length of conveyor belt</td>
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<td>Output</td>
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<tr>
<td><strong>Base segment-transloading crane</strong></td>
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<td>Route length</td>
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<td>Crane capacity</td>
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