UNECE
4th Joint Meeting of the TEM & TER Master Plan Revision Expert Groups

Excursion to Arlberg Road & Rail Tunnels / St. Anton 21.04.10

Christof Weigl, 21/04/2010

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**ILF Offices and projects**

- Head offices in Innsbruck and Munich and more than 30 branch offices and subsidiaries worldwide, more than 1600 employees

- Over 3,500 successful projects
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**Business areas**

**Oil and gas**
- Production facilities for oil & gas
- Pipelines systems
- Tank farms and underground storage facilities
- Refineries and petrochemical plants

**Water and environment**
- Water supply
- Wastewater treatment & disposal
- Waste treatment & disposal
- Hydropower, dam and river engineering

**Energy**
- Thermal power plants
- Sea water desalination plants
- Renewable energy
- Climate protection
- Transmission and distribution systems

**Civil engineering and infrastructure**
- Airports
- Roads
- Railway systems
- Tunnels and caverns
- Buildings and structures
- Alpine engineering

**Turnover**
- Turnover 2009: EUR 176 million

- Civil and Infrastructure 32%
- Oil and Gas 54%
- Water and Environment 19%
- Energy 5%
**Railways: references**

- Arlberg Railway Line St. Jakob - St. Anton - Klösterle (23 km), Austria
- Vienna – St. Pölten HSR (54 km), Austria
- Stuttgart – Ulm HSR (63 km), Germany
- Nuremberg – Ingolstadt HSR (83 km), Germany
- Havelian – Khujrab Railway Link (750 km), Pakistan - China
- Vidin – Sofia Railway Line (270 km), Bulgaria
- Irmak – Karabük – Zonguldak Railway Line (415 km), Turkey
- Buenaventura - Medellin, Bogota - Belencito Railway Lines, Colombia
- Warsaw Metro Line 2 (6.5 km), Poland

**Roads and Highways: references**

- S16 Arlberg Expressway, (62 km), Austria
- A26 Linz Motorway, (8 km), Austria
- SS12 Branzoll–Bozen Highway, (9 km), Italy
- B23 Garmisch-Partenkirchen Bypass, (5 km), Germany
- Warsaw Southern Bypass, (2.6 km), Poland
- Highway No. 1 Jammu–Srinagar, (286 km), India
- Toll system for heavy goods vehicles, short-distance radio system, Austria
- Toll system for heavy goods vehicles, GSM, Germany
- Traffic management system S1, Austria
- Traffic control system A14, Austria
Tunnels and caverns: references

- Arlberg Road Tunnel, (13,972 km), Austria
- Rehabilitation of Arlberg Railway Tunnel (10,6 km), Austria
- Maliakos - Kleidi Highway Tunnels, (11 km), Greece
- Pfänder Road Tunnel, (6 km, TBM), Austria
- Demir Kapja – Smokvica Motorway Tunnels, (2.6 km), Macedonia
- Gotthard Railway Base Tunnel, (57 km), safety-oriented investigation (SIOP), Switzerland
- Tunnels of New Ebensfeld-Erfurt Railway Line, (38 km), Germany
- London Underground, Crossrail, Great Britain
- New Ioannina – Kalambaka Railway Line (15 km), Greece

Safety and risk management

- Qualitative and quantitative risk analysis
- Safety concept
- Evacuation simulation
- Alarm and emergency response plan
- Safety coordination
- Occupational health and safety plan
Locations of today's excursion

Arlberg Road & Rail Tunnels – St. Anton am Arlberg

Italy

Germany
**Upgrading of the Arlberg Railway Tunnel**

Tunnel Safety Upgrade in connection with the road tunnel

- Arlberg road tunnel
  - 14.0 km

- Arlberg railway tunnel
  - 10.8 km

- Wolfgruben tunnel
  - 1.7 km (new)

- Bisalodona tunnel
  - 2.4 km (new)

**Cross passages between railway and road tunnel**

- Arlberg road tunnel
  - 14.0 km

- Wolfgruben tunnel
  - 1.7 km (new)

- Bisalodona tunnel
  - 2.4 km (new)
Arlberg Railway Tunnel Cross-passages between railway and road tunnel

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Arlberg Railway Tunnel

Turning area for rescue service vehicles at entrance to the cross passage in the railway tunnel

Rooms for technical equipment:
- Power supply
- Radio equipment / GSMR
- Remote control of equipment and cross passage door
Retrofitting of the Arlberg Railway Tunnel

### Regelquerschnitt Arlbergtunnel

**Variante 3.1 und 3.2**

- Fahrleitungsabschaltung
- Fluchtweg
- Orientierungsbeleuchtung
- Fluchtwegkennzeichnung
- Elektroanschlüsse
- Löschwasserversorgung
- Notruffernsprecher
- Funkeinrichtung

### Hinweis:

Die Bestehende Tunnelbauwerke unter anderem aus dem jeweiligen Regelquerschnitt.

- Lichtraumprofil
- Kabeltrog Gr. II
- Gehfläche bö 1,0m
- Gehfläche bö 1,5m

### Varianten 3.1 und 3.2

- Feste Fahrbahn Gleis 2 (befahrbar) mit Sohlabsenkung
- Lichtraumaufweitung Gleis 1 und Sanierung Spritzbeton

Das bestehende Tunnelgewölbe unterschreitet auf langen Strecken im Tunnel erheblich die dargestellten Regelmessungen.

### Alpine World Ski Championships 2001 St. Anton New Railway Station

- Landeck
- St. Jakob am Arlberg
- Bludenz
- St. Anton am Arlberg
Alpine World Ski Championships 2001 St. Anton New Railway Station

New Railway Station

km 99,5

ST. ANTON AM ARLBERG

BESTEHENDER BAHNHOF
ST. ANTON AM ARLBERG

km 99,0

BUNDESSTR. 5197

ARDERGTUNNEL

VERLÄNGERUNG
ARLBERGTUNNEL

WOLFSGRUBEN TUNNEL

RESTHAUS ROSA HORA

NEVER BAHNHOF
ST. ANTON AM ARLBERG

STOCKIBACHLAWINE

NEUER BAHNHOF
ST. ANTON AM ARLBERG

ARLBERGTUNNEL

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Alpine World Ski Championships 2001 St. Anton New Railway Station February 1999
Last avalanche on April 30th, 1999

Flooding on May 22nd, 1999
Flooding on May 22nd, 1999

Alpine World Ski Championships 2001 St. Anton New Railway Station
Alpine World Ski Championships 2001 St. Anton

- New Railway Station
- Protection Measures against rock fall, bypassing avalanche and debris flow hazard zones

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For program details please refer to the folders!

- Peter Mall, C.E.O. Arlberg-well.com: Organization and infrastructure measures for the Alpine World Ski Championships 2001 in St. Anton
- Karl Hartleitner, ÖBB: Alpine World Ski Championships 2001 in St. Anton – support and services provided by the Austrian Railways
- Christian Schreiber, Rhomberg Bahntechnik: Rehabilitation measures for the Arlberg railway tunnel
- Bernhard Kohl, ILF: Safety in road tunnels
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Thank you for your Attention!