

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



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



FASZINATION
ENGINEERING

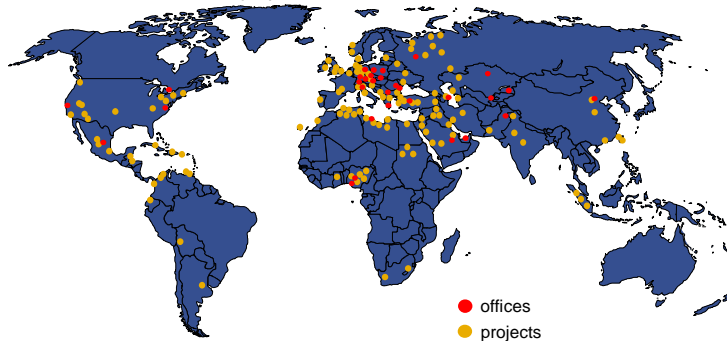
Christof Weigl, 21/04/2010

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ILF Consulting Engineers



■ 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
- Pipeline 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

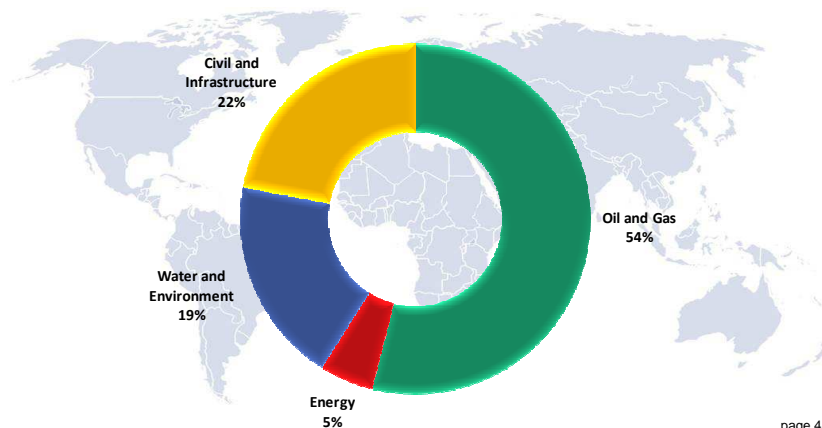
Civil engineering and infrastructure



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

■ **Turnover**

• Turnover 2009: EUR 176 million



■ 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



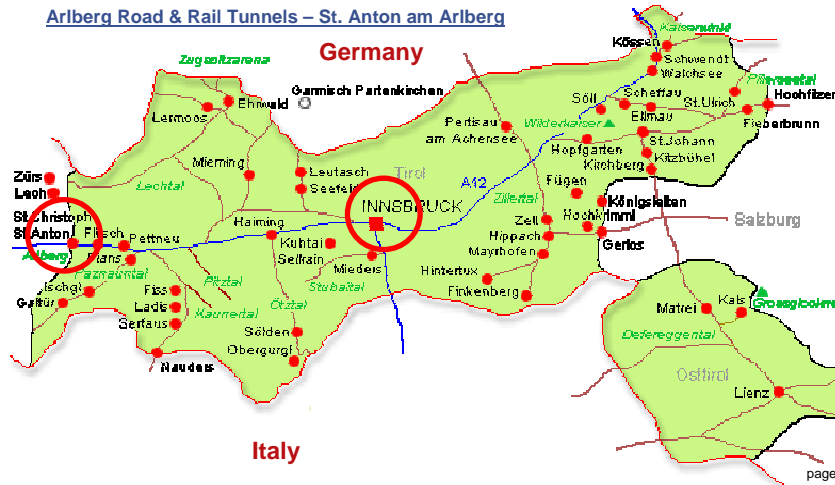
■ Safety and risk management

- Qualitative and quantitative risk analysis
- Safety concept
- Evacuation simulation
- Alarm and emergency response plan
- Safety coordination
- Occupational health and safety plan



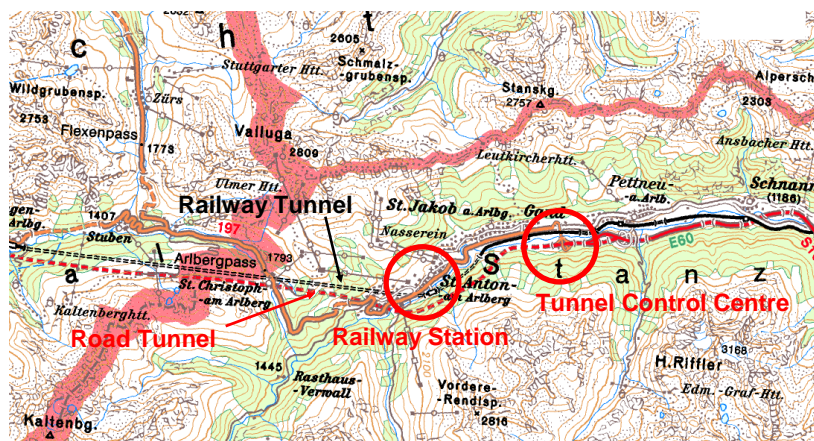
■ Locations of todays excursion

Arlberg Road & Rail Tunnels – St. Anton am Arlberg



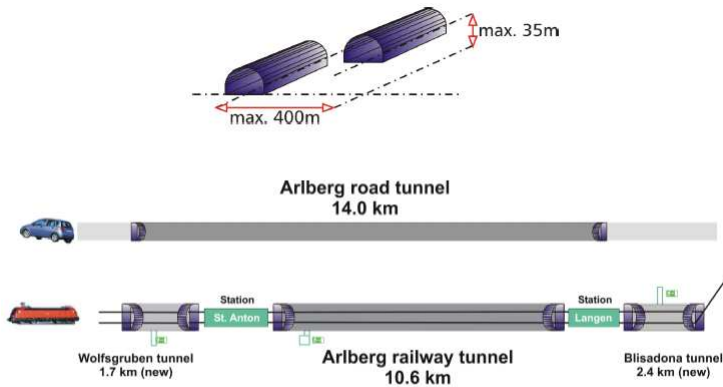
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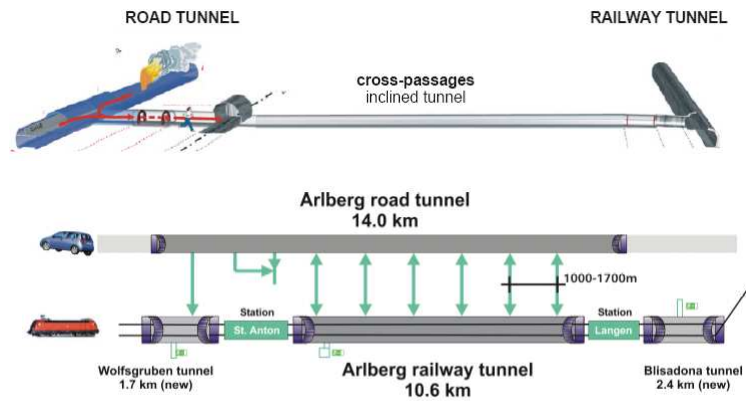
■ Upgrading of the Arlberg Railway Tunnel

Tunnel Safety Upgrade in connection with the road tunnel



■ Upgrading of the Arlberg Railway Tunnel

Cross passages between railway and road tunnel



■ Arlberg Railway Tunnel Cross-passages between railway and road tunnel

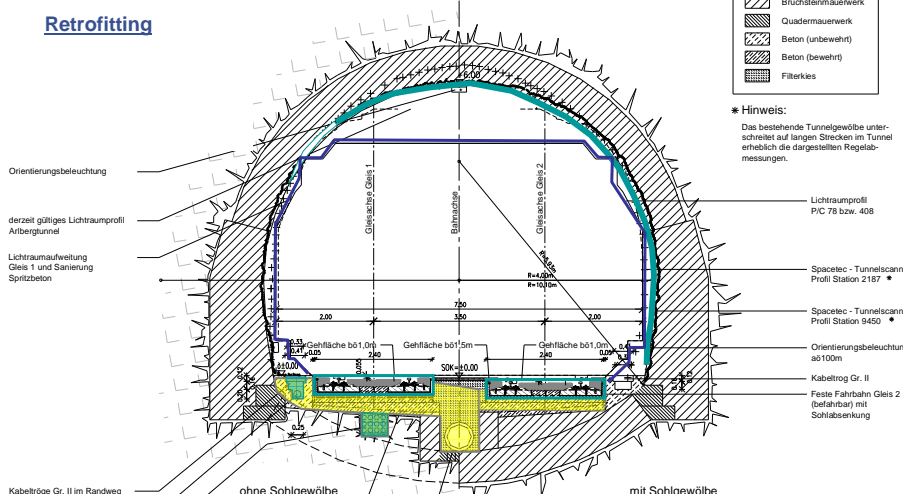


■ Arlberg Railway Tunnel Cross-passages between railway and road tunnel

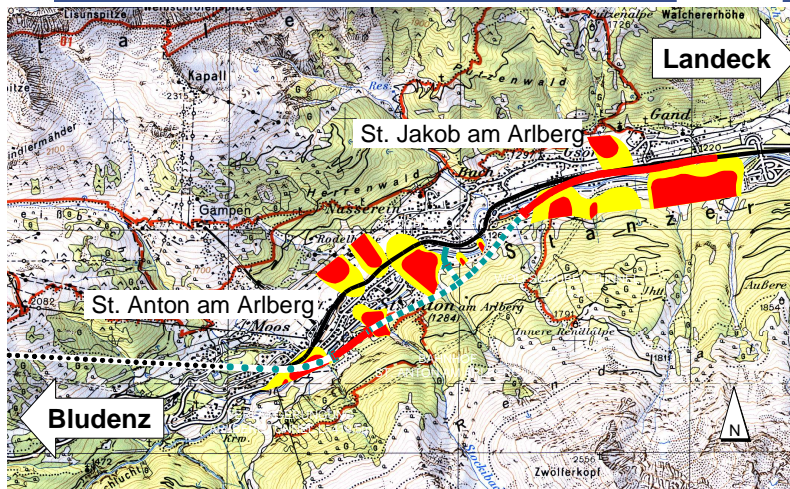


■ **Arlberg Railway**
Retrofitting

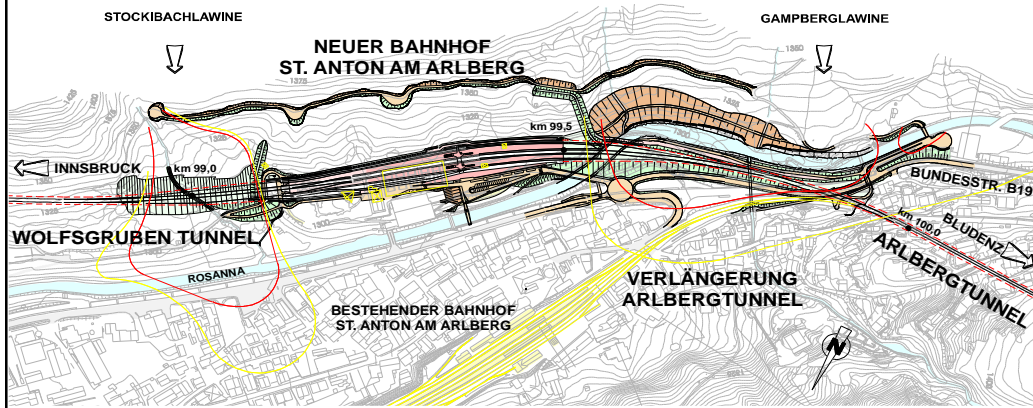
Regelquerschnitt Arlbergtunnel
Varianten 3.1 und 3.2



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



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



■ Alpine World Ski Championships 2001 St. Anton New Railway Station February 1999



■ Last avalanche on April 30th, 1999



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■ Flooding on May 22nd, 1999



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■ Flooding on May 22nd, 1999



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



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- 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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- Alpine World Ski Championships 2001 St. Anton
 - **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

For program details please refer to the folders!

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