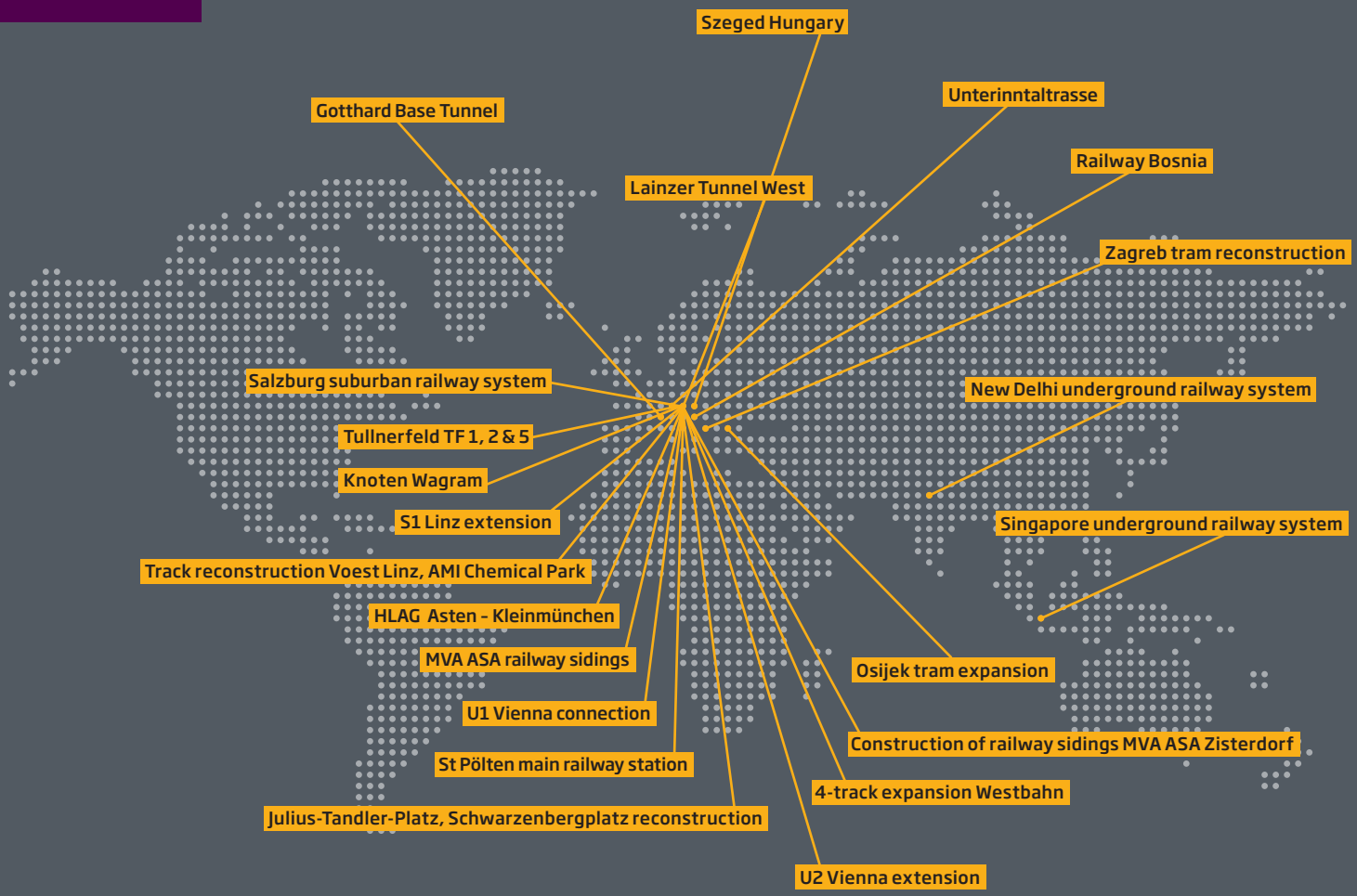
Railway
Construction

Wherever your railway system runs

Our range in railway construction

Railway Construction



At the Core of Construction. Worldwide.

Founded in 1965 as a small construction machine dealership, ALPINE is now one of the leading construction groups in Europe. Today, our name is synonymous with state-of-the-art know-how, extreme flexibility, tailor-made solutions and the use of the latest in material and equipment. We cover the entire spectrum of construction output with competence in every single sector and complete projects of any kind and size reliably and on time in more than 30 countries. In doing so, we are committed to each project as if it were the only project we had.

The classic construction activities are complemented by a number of services in project administration, planning and financing. Our intensive commitment to R&D is to ensure the highest possible quality in future constructions and secure our leading position in construction procedures and material.

ALPINE's success is based on the motivation and qualification of our employees. High investments in training of employees and our above-average commitment in safety at work are witness that we take responsibility for our employees seriously. Responsibility for people also means responsibility for the environment. Part of our company culture is a careful use of natural resources.

PORTFOLIO ALPINE GROUP

- Bridge Construction
- Building Construction
- Energy
- Environmental Engineering
- Foundation Engineering
- Power Station Construction
- Railway Construction
- Road Construction
- Sports Facility Construction
- Underground Construction

Gotthard Base Tunnel / CH

Main line railway

Construction period: 2009 - 2017

04

Unterinntaltrasse / AT

Section A1 basic facilities

Construction period: 2009-2012

05

St Pölten main station / AT

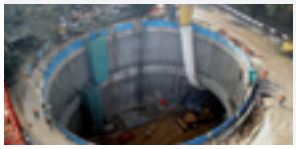
Reconstruction

Construction period: 2007 - 2011

06

U1 connection / AT

Construction period: 2004 - 2006



New Delhi metro / IN

Construction period: 2007 - 2010

07

FURTHER REFERENCE PROJECTS ▶ www.alpine.at

MAIN LINE RAILWAYS
4-track expansion Westbahn, Asten-Linz // AT
4-track expansion Westbahn, Knoten Rohr // AT
Knoten Wagram // AT
Salzburg suburban railway system // AT
Tullnerfeld TF 1, 2 & 5 // AT

CONNECTING RAILWAYS
Construction of rail sidings MVA ASA // Zistersdorf / AT
Reconstruction of rail tracks Voest Linz, AMI Chem. Park // AT

UNDERGROUND RAILWAY SYSTEMS
Extension of U2 underground line // Vienna / AT
Underground rail system // Singapore / SG

SUBURBAN RAILWAY SYSTEMS
Extension of S1 Ebelsberg and Solar City // Linz / AT
Reconstr. Julius-Tandler-Pl., Schwarzenbergpl. // Vienna / AT
Reconstruction in Zagreb, expansion in Osijek // HR

OVERHEAD CONTACT WIRE ENGINEERING *(ALPINE-ENERGIE)*
Overhead traction line replacem. on Vienna rail routes // AT
Lainzer Tunnel West // AT

On the right track

National and international railway construction projects are put on the right track with experience, competence and innovative technologies. Comprehensive know-how makes us a reliable as a one-stop solution provider for tailor-made package solutions. Whenever special solutions are required we provide ground breaking ideas.

Projects in numerous countries are the best evidence that our course in railway construction is headed for success in the future too. The installation of railway tracks at the Swiss Gotthard base tunnel definitely is the currently largest railway construction project of international renown.

RANGE OF SERVICES

- Earth work
- Underground engineering
- Track bed structure
- Cable engineering
- Noise protection systems
- Rail joint welding
- Material trade
- Machine leasing
- Railway infrastructure

SUPPLEMENTARY PORTFOLIO

- Civil engineering
- Cable and pipeline engineering
- Underground engineering & earth work
- Specialist foundation engineering
- Project planning
- Project funding
- Noise protection systems
- Overhead contact wire engineering*
- Signal technology engineering*

** ALPINE-ENERGIE*

TYPES

- Main tracks – ballast tracks
- Main tracks – slab track
- Industrial tracks
- Tram networks
- Underground rail systems/metros
- Crane rails

Milling train
Globally innovative technology for mobile track work

INNOVATIVE SOLUTIONS

- **CEMENT TRAIN // New development for the Gotthard Base Tunnel**
  Special superstructures enable the cement required for the track in the tunnel to be mixed directly on the train. The train has 21 railway cars and two locomotives, each with 1,500 HP engines. Accordingly, up to 200 m of slab tracks are concreted every day.
- **MILLING TRAIN // Unique in Austria**
  Using the world's most advanced technology, rail head surfaces can be given a new profile in just one work process. This means that the milling train saves both time and money. High precision is ensured through the use of CNC-controlled units.

Gotthard Base Tunnel

In 2008, as part of a consortium of bidders, ALPINE was awarded the contract for the railway installations in what is currently the longest railway tunnel in the world, stretching 57 kilometres. The project includes the track, the power supply and cable systems, the installation of light and power, overhead contact systems and switchgear, tunnel guidance systems, data networks and operating communication, a tunnel radio system as well as signal box systems, railway control technology and a signalling and railway supervision system.

The single-track structure of the tunnels, coupled with their lengths, presents significant challenges in terms of **construction site logistics,** and requires the use of special equipment.

FEATURES

- The length of the tunnel (57 km) and the limited access (through entrances only) requires the **development of special solutions** for construction method and equipment.
- The **newly developed cement train** has only ever been used in similar dimensions during the construction of the Channel Tunnel between England and France.
- The integration of rail technology in the tunnel, including all start-up operations, will take approximately **7.5 years.**
- A range of **temporary logistics and transport services** are necessary, such as a construction railway, workshops, storage warehouses, power supplies, etc.

MAIN LINE RAILWAY

SWITZERLAND

Tunnel length: **57 km**
LVT sleeper blocks: **400,000 units**
Cement slurry: **130,000 m³**
Construction period: **2009 – 2017**
Project value: **approx.€ 1,05 million**
Consortium share: **25 %**

Unterinntaltrasse

Kundle–Baumkirchen section
Section A1 basic facilities

The Alptransit Brenner consortium (Alpine Bau GmbH and Rhomberg Bahntechnik) is responsible for implementing the rail installations on a 41-kilometre section of the northern feeder line to the Brenner Base Tunnel between Kundl and Radfeld-Baumkirchen. The project is part of the rail axis from Munich to Verona for high-speed and goods transport, and is the largest project of its kind ever to be carried out in Austria. Comprehensive rail facilities are being installed, including tunnel safety provisions and the power supply. In addition, detailed concepts on planned construction progress, logistics and safety are required.

Optimal vibration protection is ensured by **mass spring systems,** which are individually adapted to meet the specific requirements.

FEATURES

- **Complete coordination** of the construction site
- Construction of **71 km of slab tracks.**
- **Mass spring systems** offer optimal protection against vibrations. They require the highest level of technical expertise and it is the first time that they have been constructed on this scale in Europe.
- **Noise protection equipment** over a surface area of almost five football pitches (30,000 m²) must be able to withstand speeds of up to 250 km/h.

MAIN LINE RAILWAY

TYROL / AUSTRIA

Construction section: 41 km
Tunnel section: 34 km
Main tunnel: 2 tracks
Slab track: 71 km
Upgrade speed: 250 km/h
Construction period: 2009 – 2012
Total project value: approx. € 258 million

St Pölten Main Station

Reconstruction of section 1
Section 2 Eisbergbogen

In addition to the construction of four platforms at the main station, the track network will be extended. The existing tracks will be renewed and eight thoroughfare tracks will be created. The track project will use the tried-and- trusted conventional ballast track system. Through the modernisation of vehicle technology and the attainment of higher speeds, the track system has undergone further developments: a stronger ballast bed and sleepers, improved tracks and anti-vibration measures.

Train services must remain uninterrupted during the whole project.

FEATURES

- During substructure improvement work, old installations, platforms, bridge structures and tracks will be **removed and renewed.**
- **The ground will be stabilised** rather than replaced.
- Given the existing rail area boundaries, **supporting walls in the form of piled curtain walls with shotcrete covers** must be constructed on the slope top.
- In some places, **sub-ballast mats** will be used, which serve to minimise vibrations and reduce the noise level.

MAIN LINE RAILWAY

ST PÖLTEN / AUSTRIA

Length: 3,450 m
Open excavation: 567,800 m³
Basement excavation: 76,200 m³
Cable paths: 56,000 m
Plastering: 12,650 m2
Construction period: 2007 - 2011
Project value, section 1: € 16.9 million
Project value, section 2: € 27.5 million

U1 connection, section 1

As part of the U1 line extension project from Stadion Kagran to Leopoldau, our experts are working on the ‚Kagraner Platz' section and construct tracks over a distance of 1,200 m. The track conditions and line routing are designed for a speed of 80 km/h. The line goes underground in some places at a maximum gradient of 40 %.

FEATURE

- Installation of **lightweight prefabricated concrete components** to lift the track bed by approx. 70 cm.

UNDERGROUND RAILWAY SYSTEM

VIENNA / AUSTRIA

System (slab track): 3.3 km

Slab track with plastic sleepers in tunnel area: 2.9 km

Slab track with wooden sleepers in switch area: 0.4 km

Slab track with concrete sleepers: 0.6 km

Construction period: 2004 – 2006

Project value: approx. € 8.8 million

Consortium share: 50 %

New Delhi metro

ALPINE was commissioned to plan and construct a bored tunnel complete with a changeover ramp and ventilation shaft between Talkatora Garden and Buddha Jayanti Park. At the end of the section, in the transition area from underground to elevated tracks, a 200-m stretch will be constructed using a cut-and-cover method.

FEATURES

- Using **two entrance shafts,** the tunnel will be excavated simultaneously from four sides. Once completed, there will be space for two train tracks.
- The steel concrete inner shell lining of the pipes is **35 cm** thick.

UNDERGROUND RAILWAY SYSTEM

NEW DELHI / INDIA

Section length: 2.612 km

Internal diameter: 10 m

Construction period: 2007 – 2010

Project value: approx. € 45 million

A **40-cm-thick** steel concrete central wall divides the two tracks.

Subject to changes, printing and typographical errors. Date: 05.2011 / IV

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