

Presentation of the project Lyon-Turin Ferroviaire by M. Stephen Slot Odgaard, Project Manager



Agenda

European Transportation politics

- Objectives
- Priority projects

Railway transport corridors of the Alpine arc

- Historical
- Future

The Project Lyon - Torino Ferroviaire

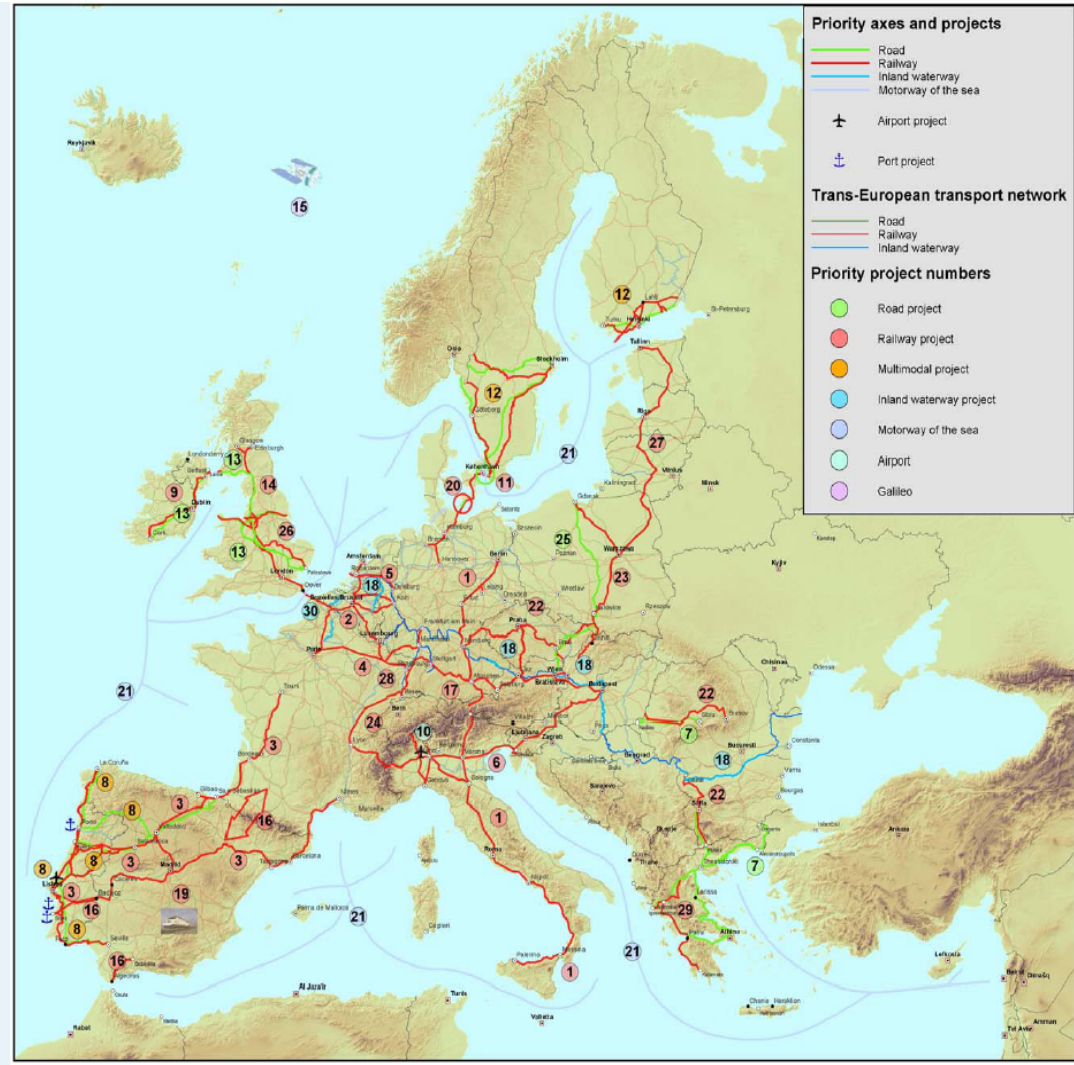
- History
- Technical
- The role of COWI
- The future of the project

DG-TREN

TEN-T Priority axis and Projects

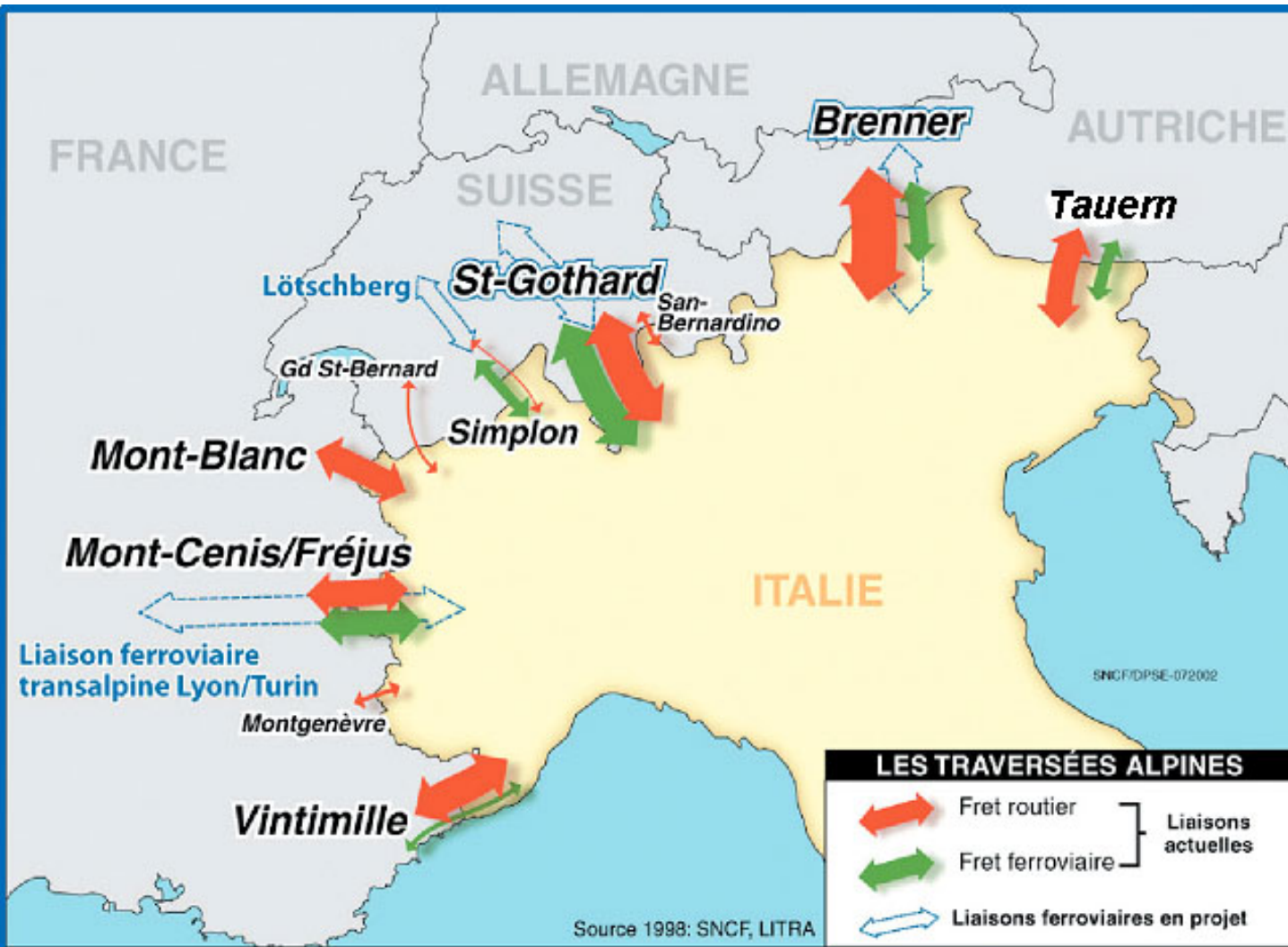


TEN-T priority axes and projects 2005



Railway transportation corridors of the Alpine arc

Historical and future



2006 traffic:

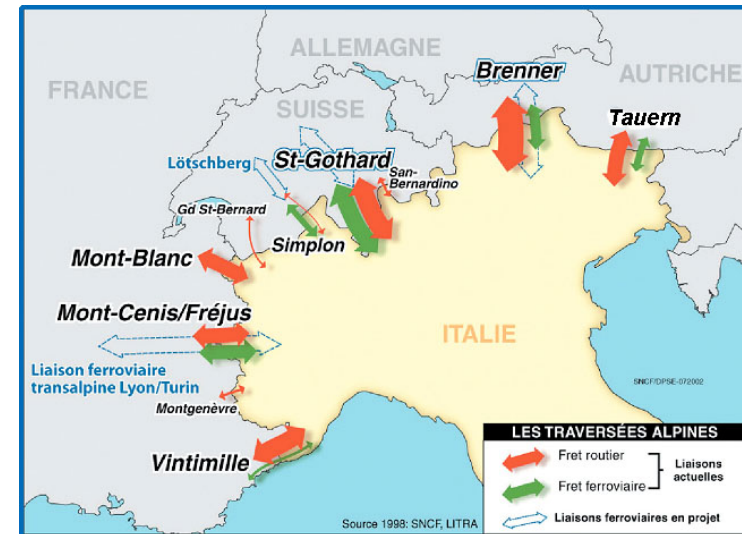
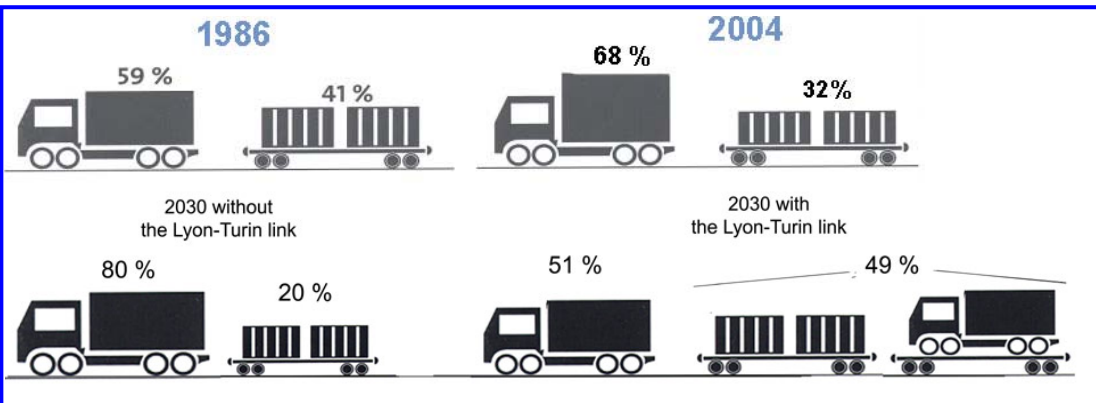
Alpine passage	Goods [Mil. t]
Tauern	20.2
Brenner	45.9
St-Gothard	26.2
Simplon	9.7
Mont-Blanc + Frejus	21.6
Mont-Cenis	6.1
Ventimille	19.4

European transport politics

Alpine arc

Inter ministeriel agreement of the Alpine countries (FR, IT, DE, AU, CH) of 2-3 June 1994:

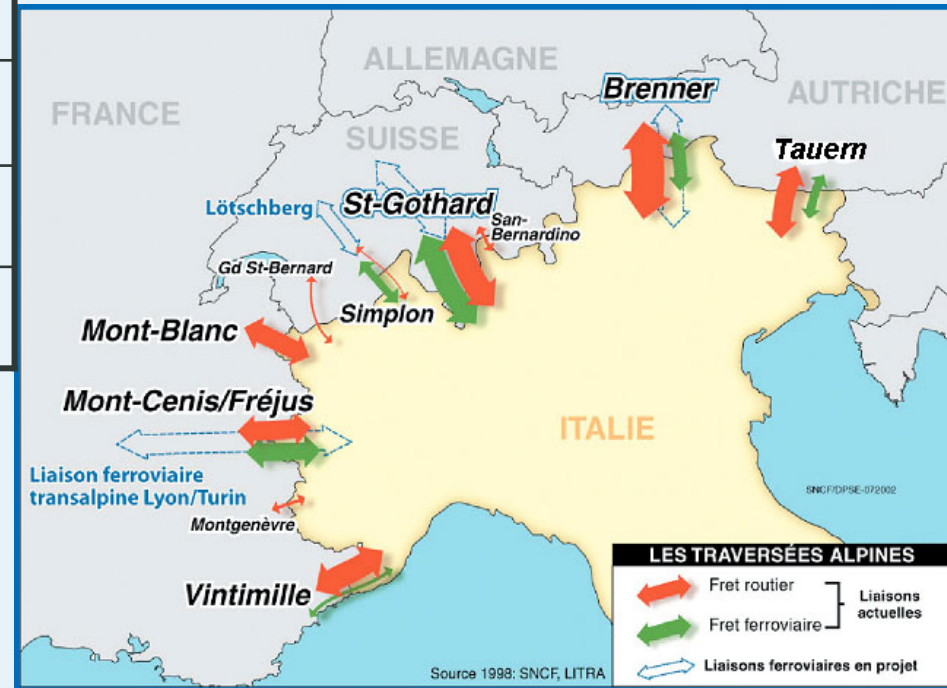
- Freight volume will double the next 20-30 years. The four countries (DE, AU, IT, CH) have already conclude this and decided on:
 - A modernization of the two existing axes (new base tunnels)
 - Saint-Gothard
 - Lötschberg
 - The need of at least two additional routes with high capacity:
 - The Brenner axe (north-south)
 - The Lyon-Turin axe (east-west)



Railway transportation corridors of the Alpine arc

Historical and future

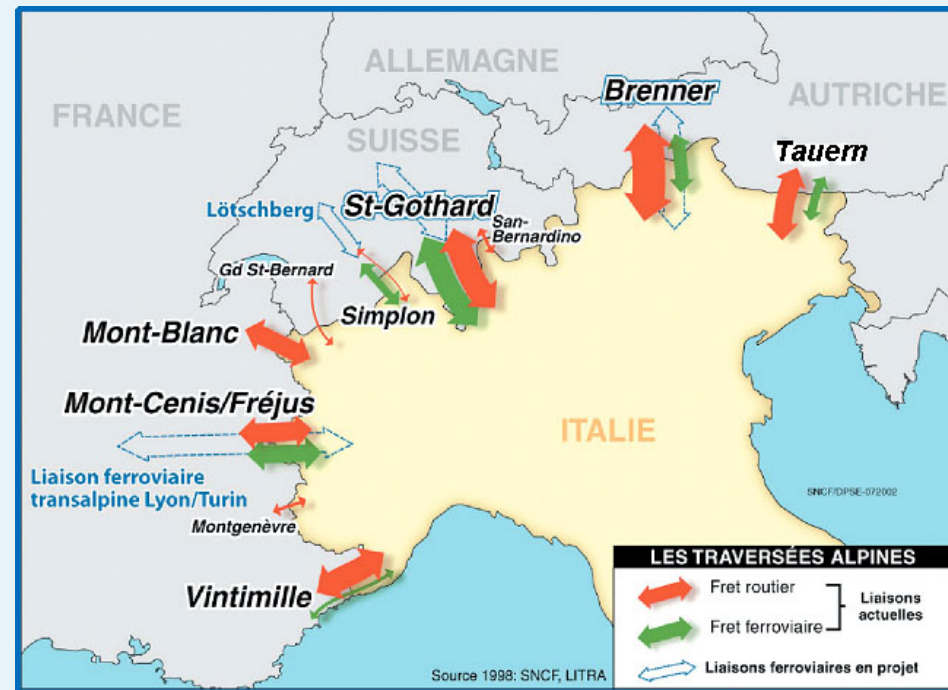
Name	Opening	Length [km]	Comments
Frejus - Montcenis	1871	13.7	Undergoing enlargement
Saint-Gothard	1882 (2016)	Old: 15 New.: 57	New base tunnel
Simplon	1906 (1.) 1922 (2.)	20	
Lötschberg	1913 2007	Old: 14.6 New.: 36	New base tunnel
Brenner	(2018)	56	New alignment
Lyon-Turin	(2020)	54 + 14	New alignment



Lyon - Turin Ferroviare

Why this project?

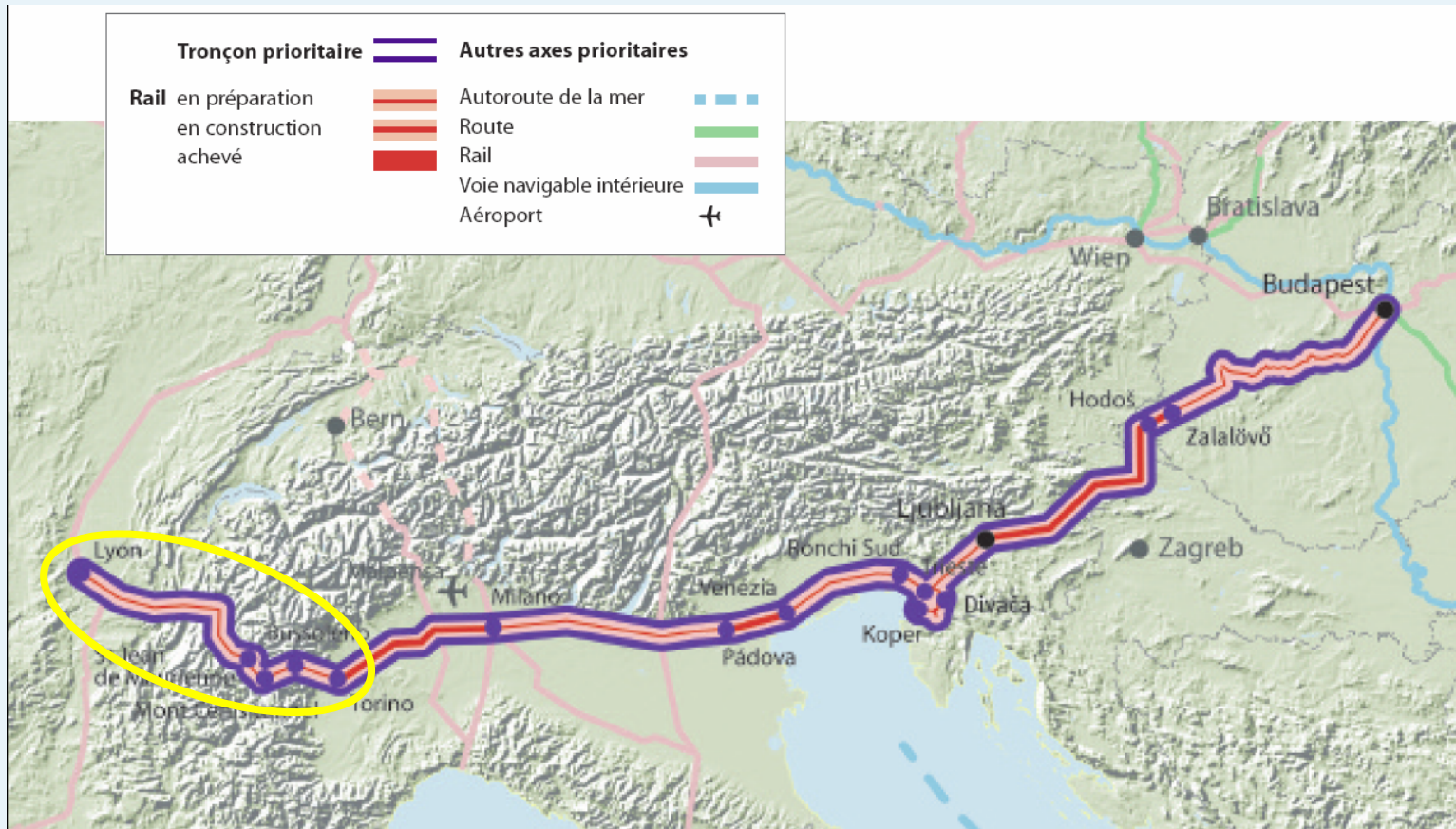
- Existing east-west oriented railway links:
 - Vintimille (Nice - Genova)
 - Historical line via Modane - Fréjus - Mont Cenis
- Swiss transportation politics
- Risk of freight transport on road. The accidents:
 - Mont Blanc (39 dead)
 - Tauern (12 dead)
 - Gothard (12 dead)
 - Fréjus (2 dead)



European transport politics

EU TEN-T, Priority Axis No 6

- Railway axis Lyon – Trieste – Divaca/Koper–
- Divaca - Ljubljana – Budapest –Ukrainian border



European transport politics

Transporting goods via rail

There are currently three modes:

- **Dedicated goods trains:** trains entirely composed of goods wagons, ensuring the transport of freight between two marshalling yards or between a marshalling yard and the final destination.
These trains typically transport heavy materials such as coal or minerals.
- **Combined road/rail transport:** this is a multimode system whereby goods are placed in containers that are in turn loaded onto trucks and train wagons.
- **Railway motorway:** this system involves loading full lorries, or trailers onto wagons specially designed to this effect.



European transport politics

Railway Experimental Motorway Savoy - Piedmont

Technical specifications:

- Test service and special Modalohr wagons 2003-2008:
4 shuttles run everyday between Aiton-Bourgneuf (in the French Savoie) and Orbassano (on the outskirts of Turin).
175 km covered in 3 hours
- Build new (**Modalohr**) wagons, specially designed to transport lorries and trailers offering three advantages:
 - they are lowered to facilitate access,
 - the loading/unloading system is lateral,
 - in addition to full lorries, they can also transport trailers separately.



European transport politics

Railway Experimental Motorway Savoy - Piedmont



- Differs from other systems adopted in Switzerland and in Austria known as “rolling roads”, load/unload vehicles in a single line at the end of the train (as the Channel Tunnel).



- Semi-trailer maximum Dimensions:
 - Height: 4.04 m
 - Length: 13.7 m
 - Weight: 38 t.
- Transit (Unloading/loading) time: 30 min.

European transport politics

Railway Experimental Motorway Savoy - Piedmont

Requires construction of terminals. A full size terminal has the following configuration:

- ~30 loading stations for large platform
- Space requirement: 800 m



European transport politics

Decision on the development of the Lyon-Turin project

10 Dec. 1994	The European council in Essen includes the railway link Lyon-Turin on its list of 14 priority projects.
July 1996	European parliament and council adopts decision no 1692/96/CE on the development of the Trans-European Transport Network (TEN-T) in order to approach its regions. Quote of the Transportation white book of 2001: <i>"Revive the railroads : Support the realisation of new infrastructures and in particular the railway links with priority on freight."</i>
24 Nov. 1994 - 23 Dec. 2001	The company Alpetunnel GEIE is established to manages the feasibility studies
Sept. 1999 & Nov. 2001	Franco-Italian summit in Rome where it is decided to accelerate the development of Lyon-Turin. Working plan is approved in 2001.
Jan. 2002	The company Lyon Turin Ferroviaire (LTF) is established in October 2001 as a subsidiary of RFF et RFI, and is given the scope of developing the international section. Law 228/2002 is rectified by the Italian Parliament Start of work on the access tunnels.
29 apr. 2004	Project is approved by the European Parliament (Decision 884/2204)

Lyon - Turin Ferroviaria

The project

- Historical

Alpetunnel

- CIG

- Participants

- LTF
- RFF
- RFI

	French Section	International Section	Italian Section
Section	Lyon - St. Jean de Maurienne	St. Jean de Maurienne - Bruzolo Est	Bruzolo East - Turin
Infrastructure owner	RFF	RFF+RFI	RFI
Developer (Study phase), Coordination, supervision of studies	RFF	LTF	RFI

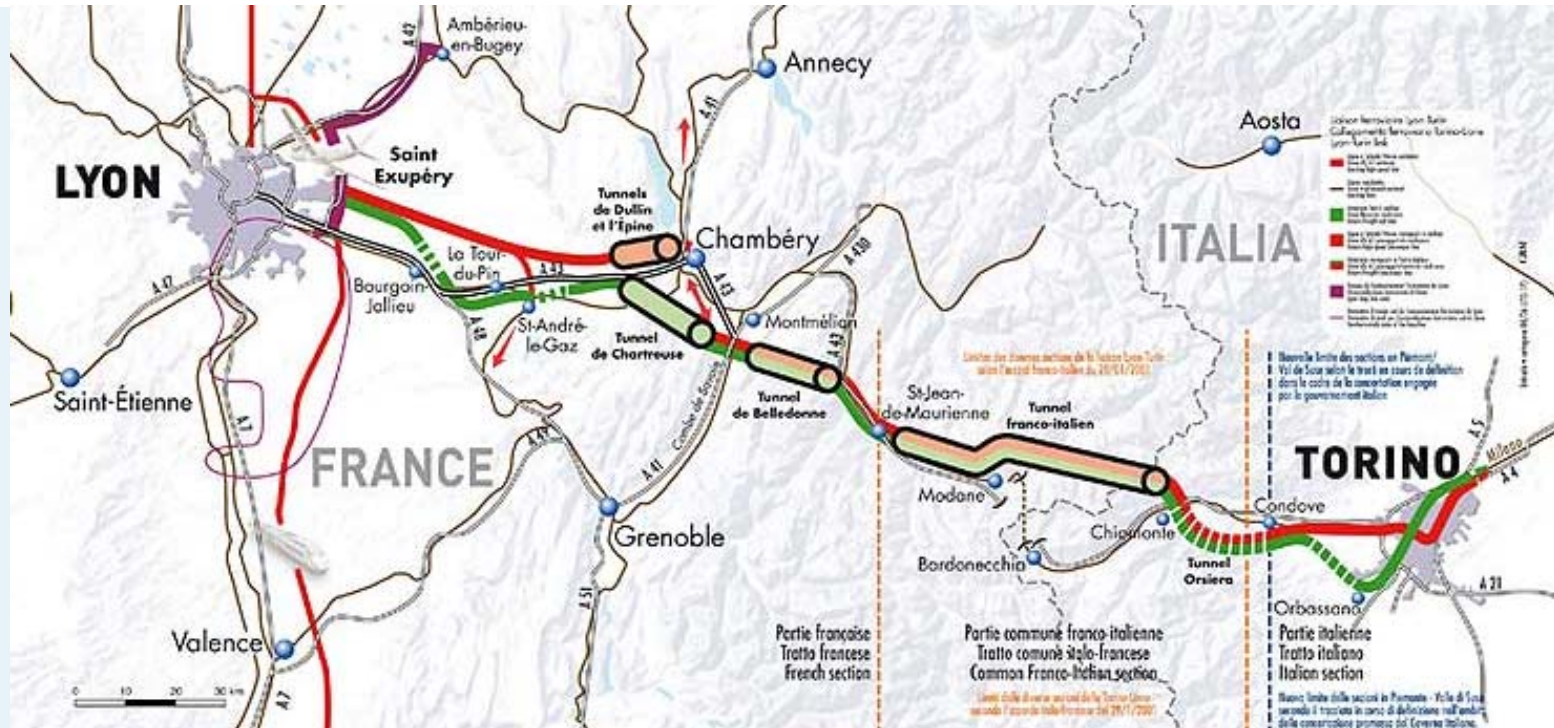
- Phasing

- 2001-2005: Feasibility studies ~150 mio EURO

- 2003-2012: Exploratory construction works of access tunnels

Lyon - Turin Ferroviaria

The project - National sections



Réseau Ferré de France (RFF):

- High speed passenger railway line Lyon - Chambéry ~79 km
- Freight line Lyon - la Combe de Savoie ~84 km
- Freight/passenger line la Combe de Savoie - Saint-Jean -de-Maurienne (with 3 long tunnels: Dullin/Lépine, Chartreuse, Belledonne) ~32 km.

Rete Ferroviaria Italiana (RFI):

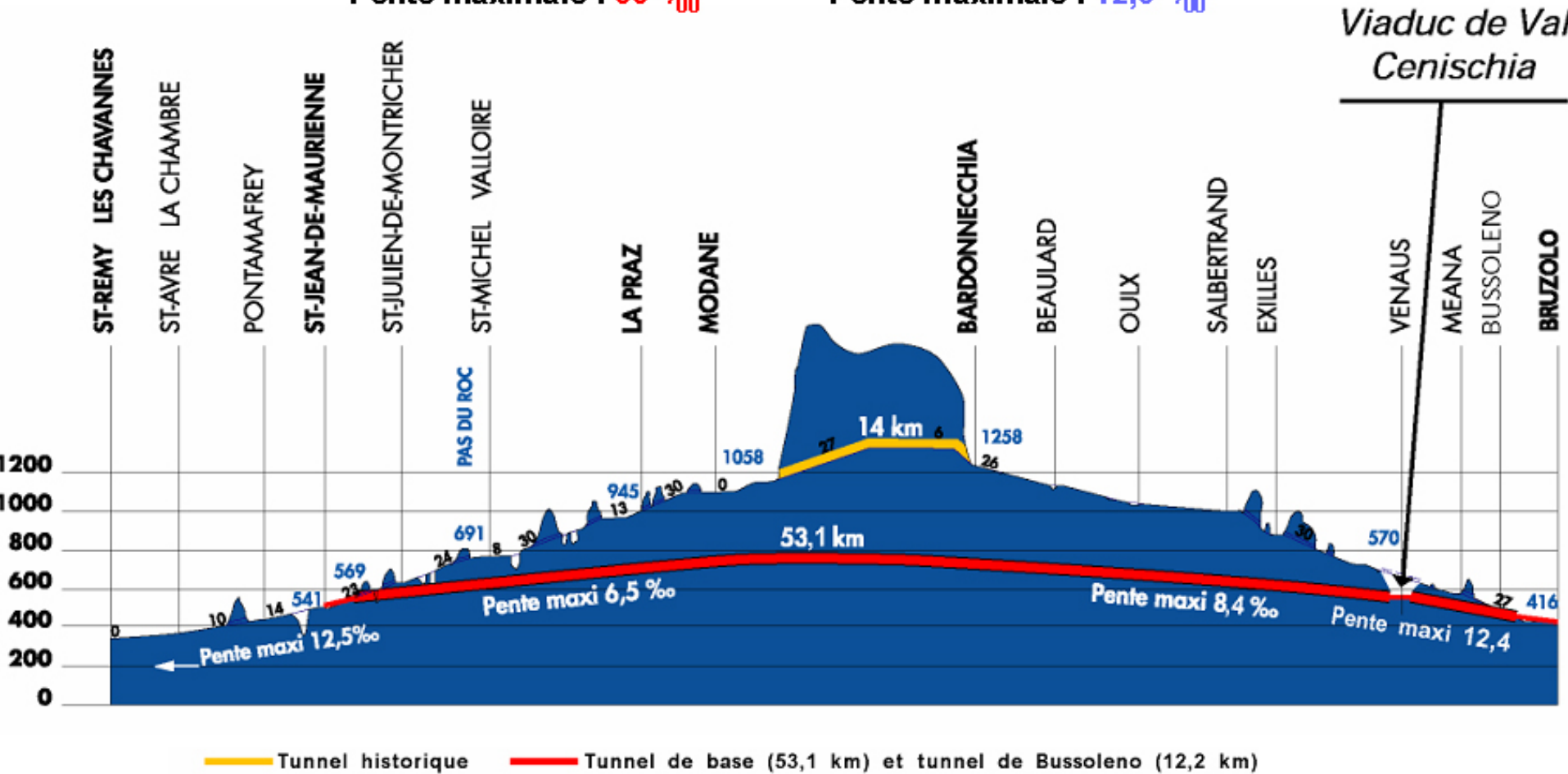
- Freight/passenger line (with one long tunnel: Orsiera).
- Freight line via new freight terminal at Orbassana

Lyon - Turin Ferroviaire

Why this project?

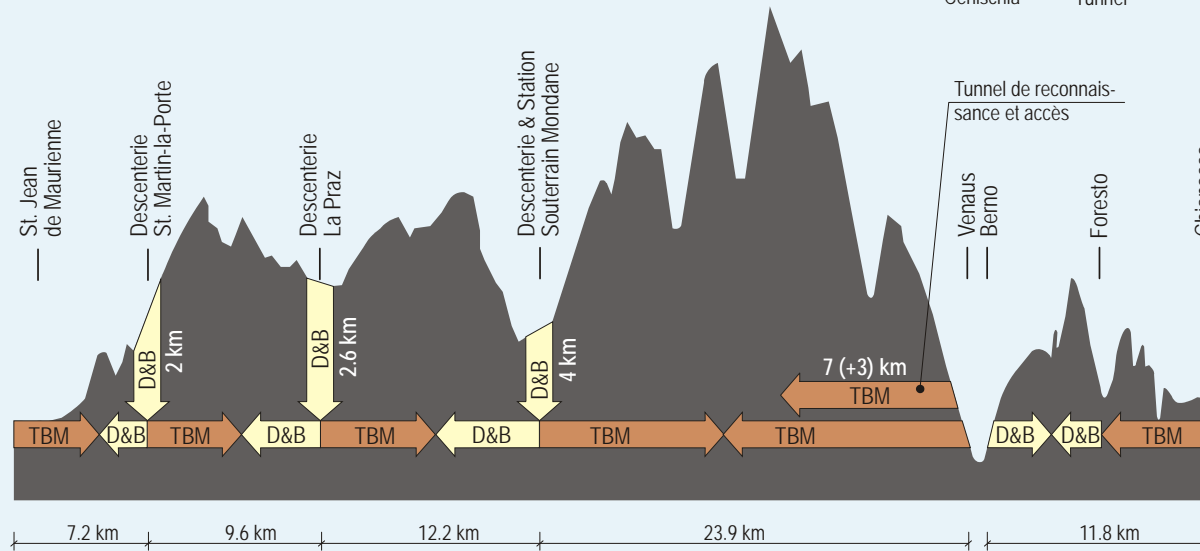
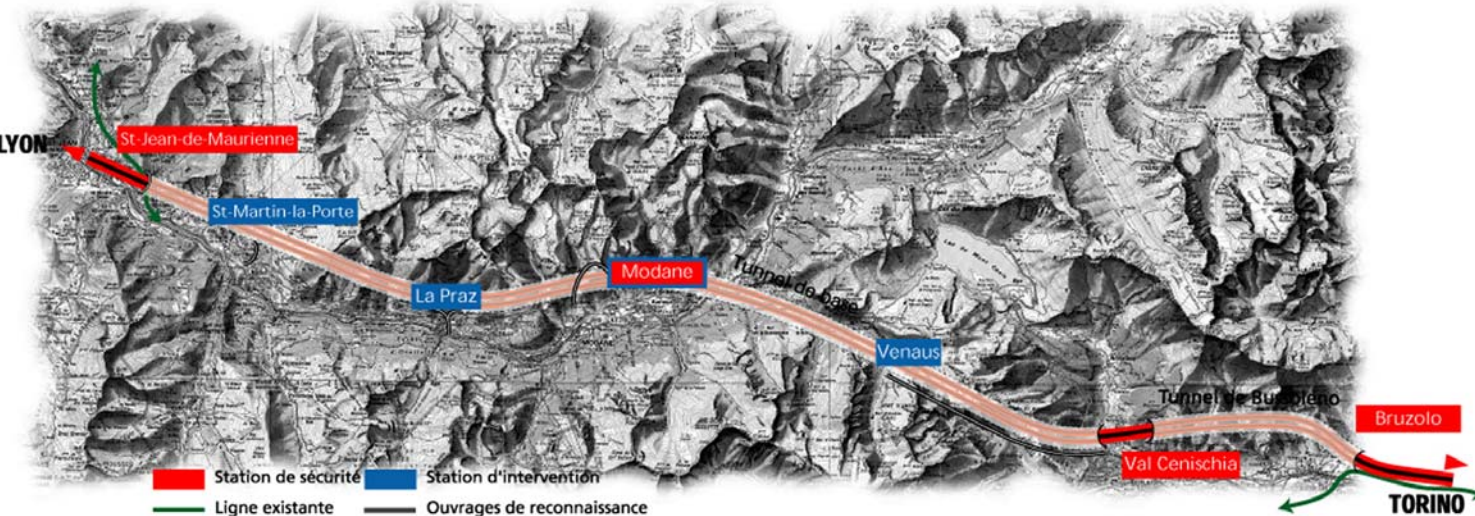
Ligne historique :
Profil de montagne.
Pente maximale : 33 ‰

Ligne nouvelle :
Profil de plaine.
Pente maximale : 12,5 ‰



Lyon - Turin Ferroviare

Int. section: St. Jean de Maurienne - Bruzolo East



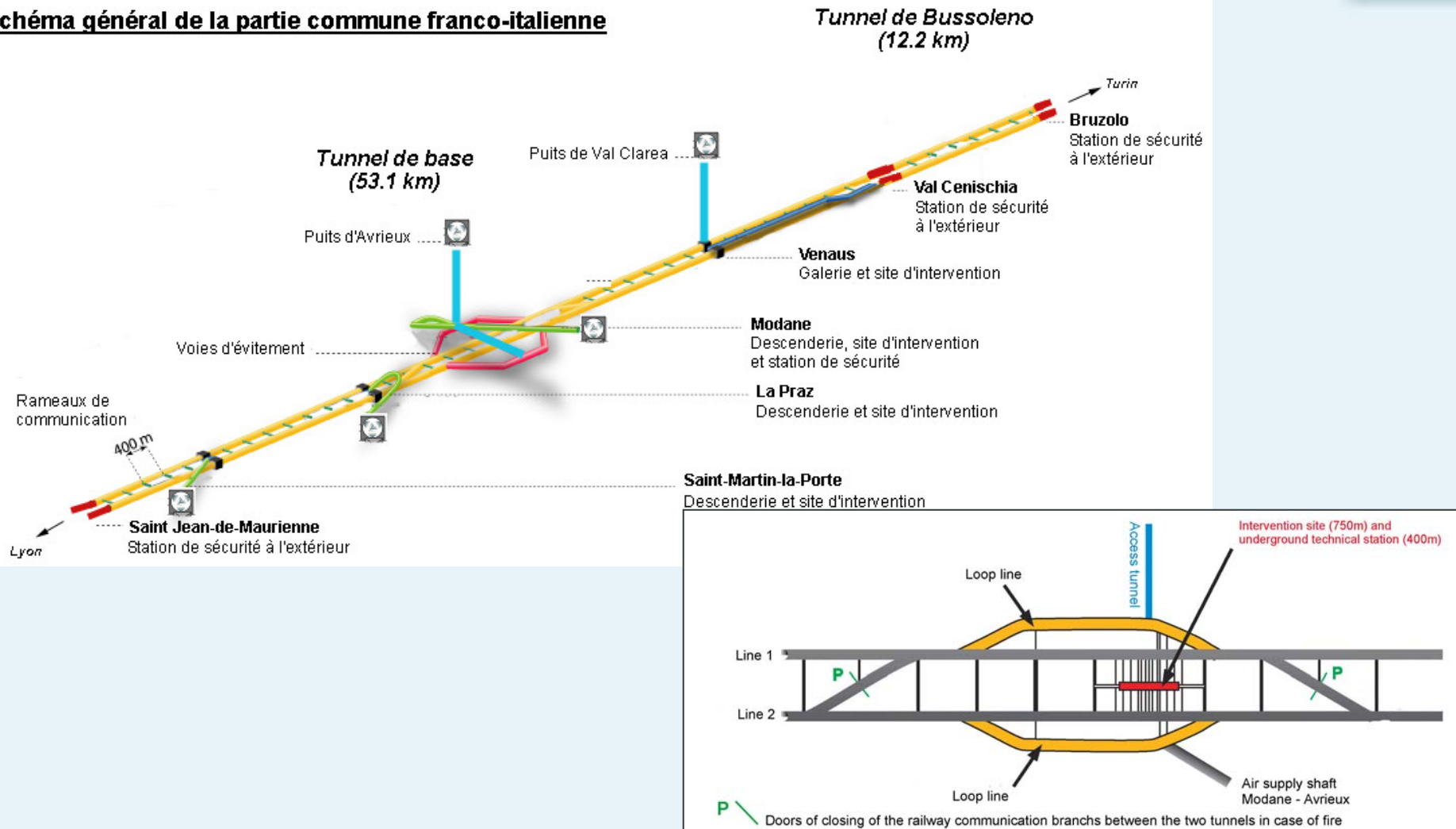
Sections:

- Base tunnel, 54 km
- Val Cenischia Viaduct 1 km
- Bussoleno Tunnel 12 km
- Open by-pass section Bruzolo, 4.4 km
- Totale 71.5 km

Lyon - Turin Ferroviare

Safety and ventilation

Schéma général de la partie commune franco-italienne



Lyon - Turin Ferroviaria Safety

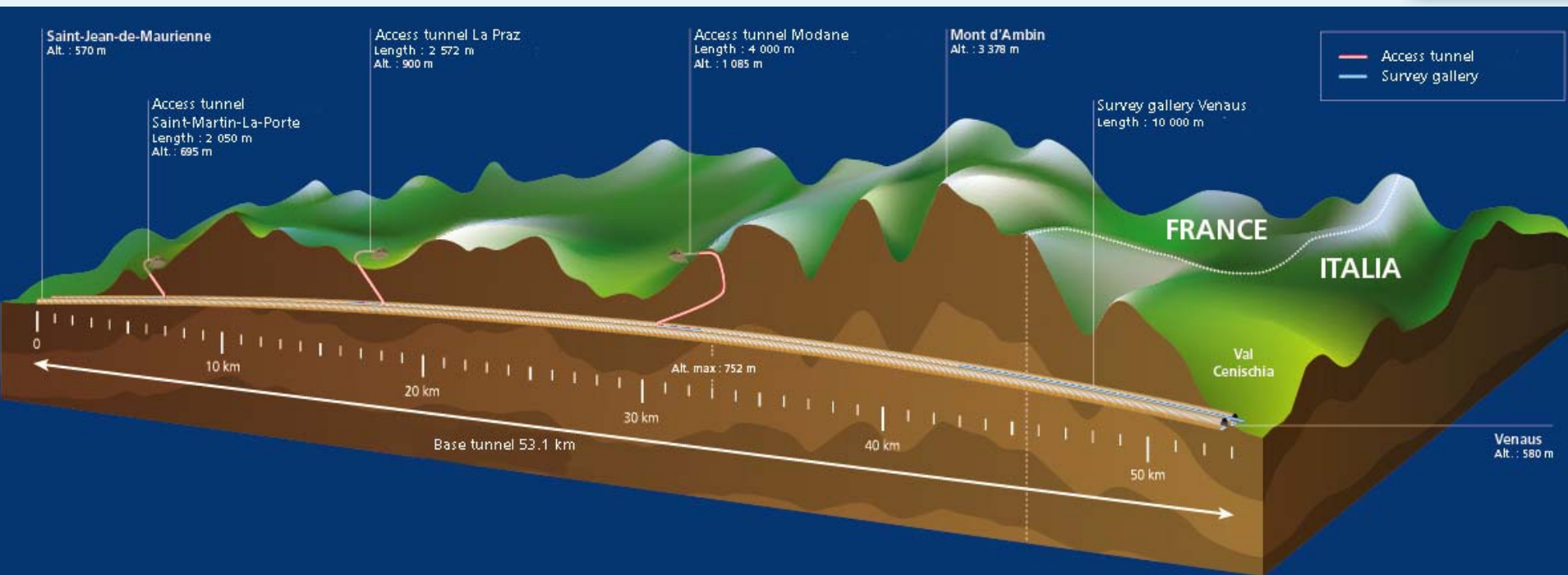
Name of Tunnel	Length of Tunnel (m)	Emergency Stations (Nos. / max distance to safe zone *)	Distance between Cross passages (m)
LTF Base Tunnel, Italy - France	53	1**/14	400
Gothard Base Tunnel, Switzerland	57	2/10	325
Brenner Base Tunnel, Austria – Italie	56	3/10	336
Lötschberg Base Tunnel, Switzerland	35	2/12	333
Hallandsås Tunnel Sweden	9	0/4.5	500
Great Belt Tunnel Denmark	8	0/4	250

* Emergency station or ends of tunnel

** 2 stations just outside the tunnel

Lyon - Turin Ferroviaria

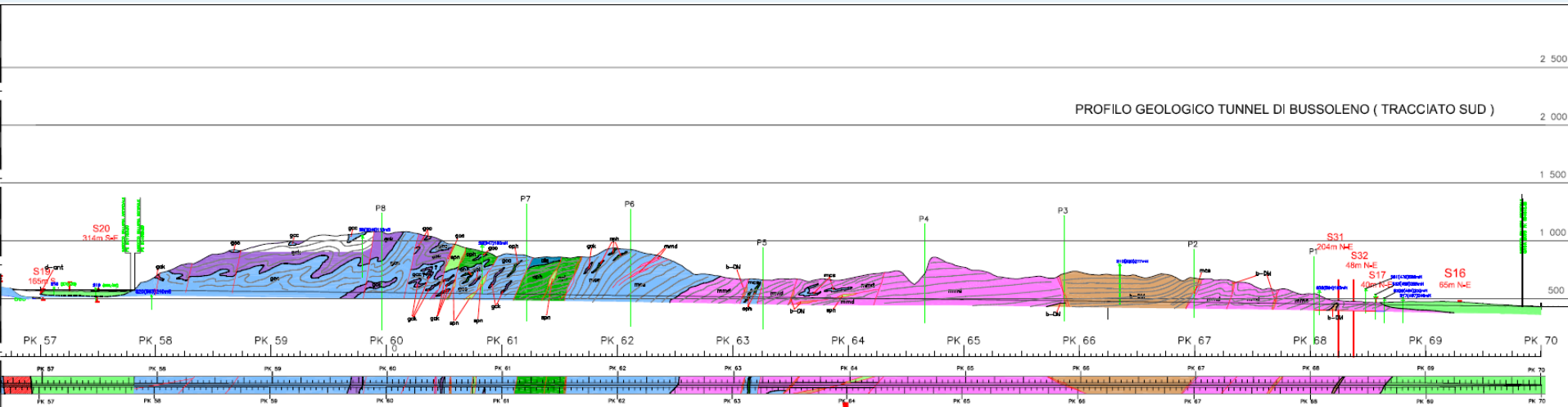
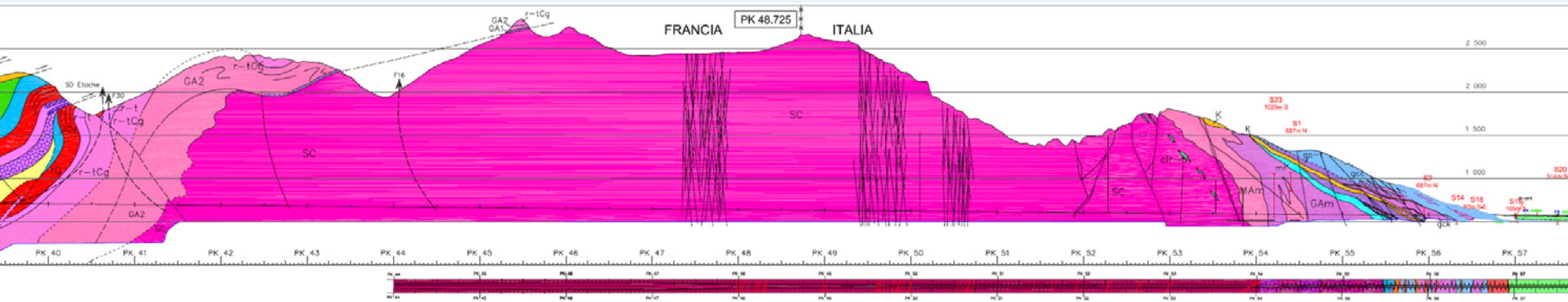
Safety and access during construction



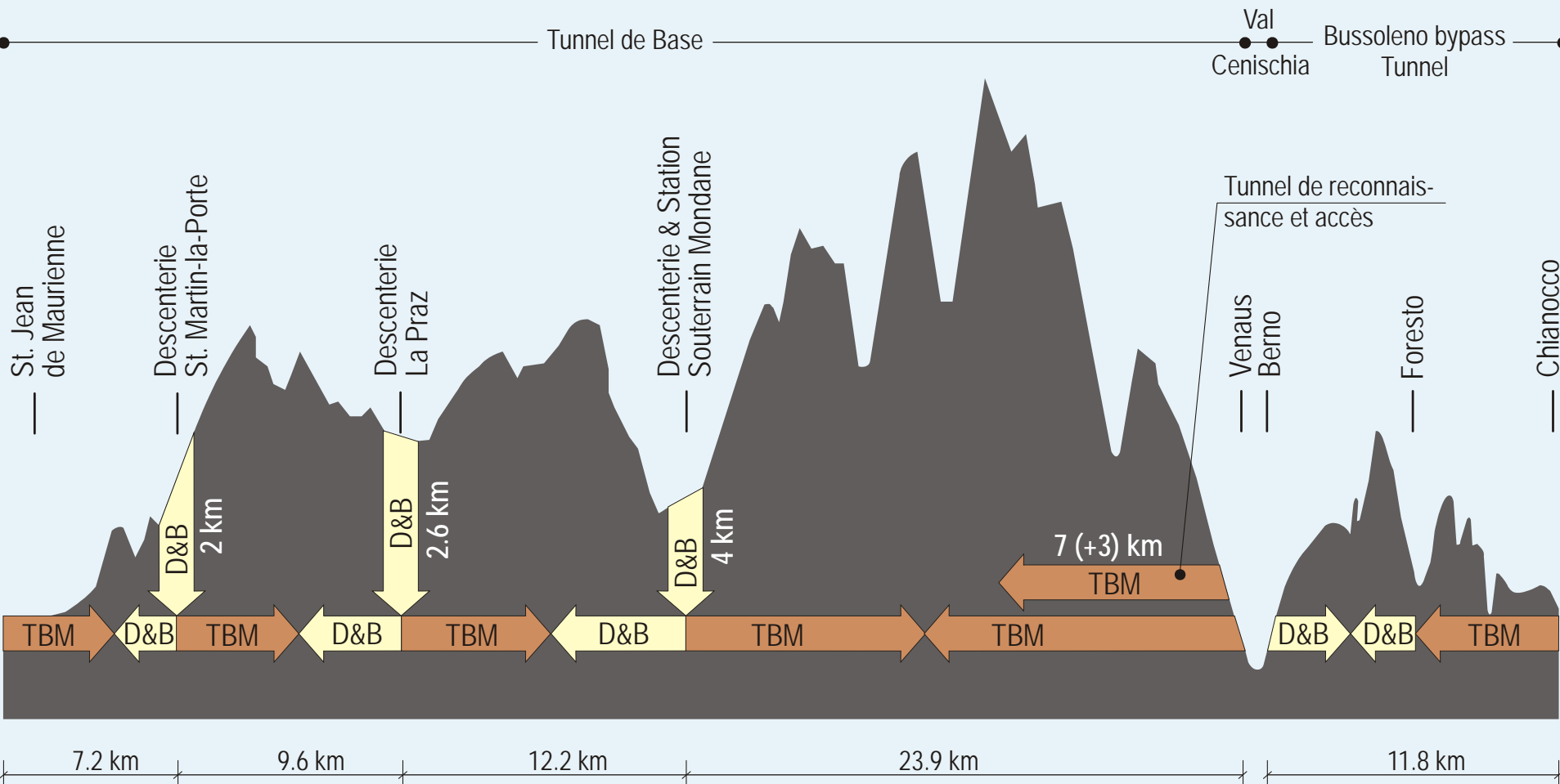
Lyon - Turin Ferroviaria Environmental

- Hydrology
 - Water quality
 - Risk of dry out of streams and rivers
- Impact on the valleys crossed
 - Noise
 - Visual
 - Separation of communities
- Health
 - Asbestos
 - Radon
 - Uranium

Lyon - Turin Ferroviaria Geology



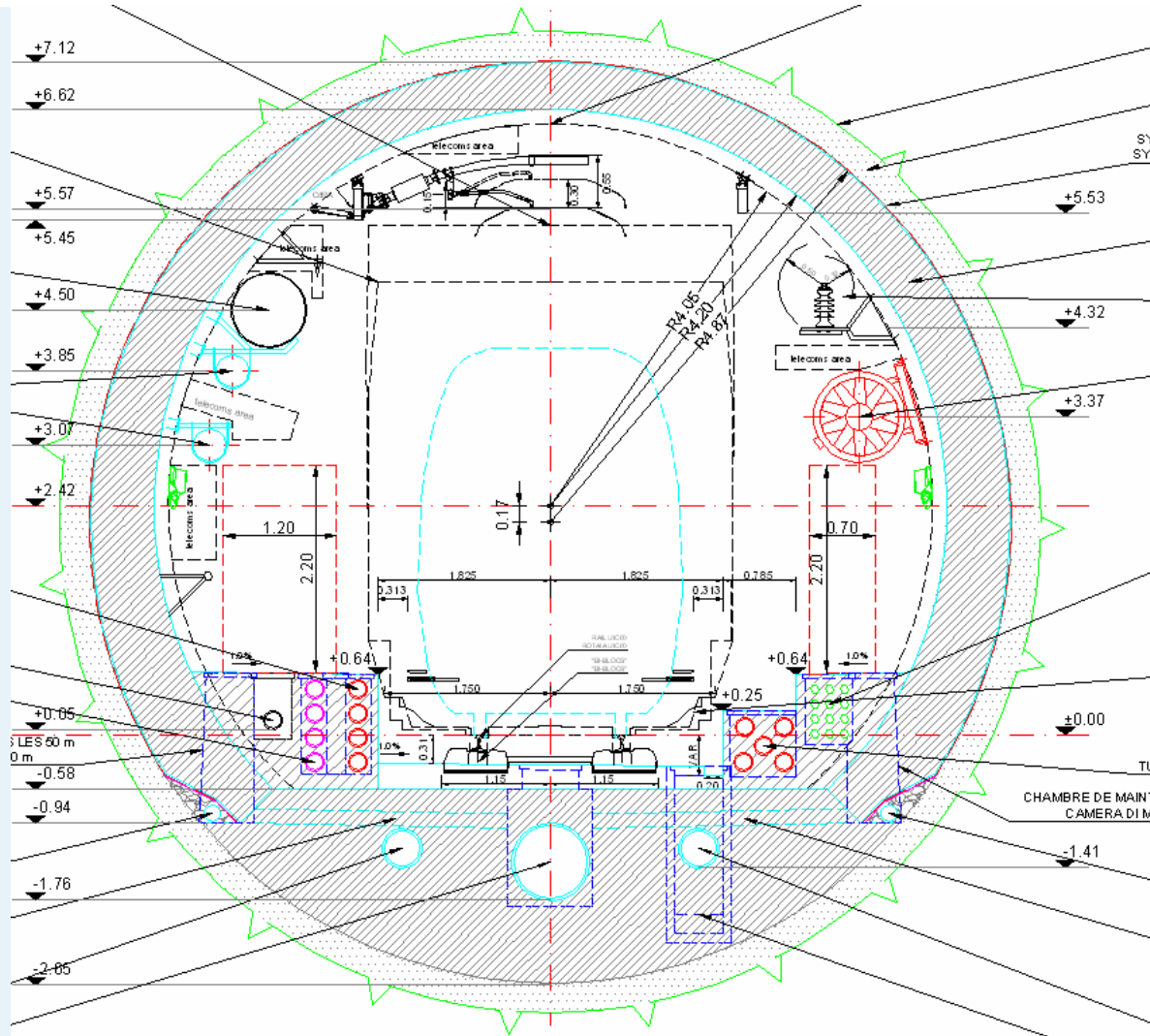
Lyon - Turin Ferroviare Construction methods



Lyon - Turin Ferroviare Construction Methods

Tunnel	Site	Main function	Duration of works (years)	Excavated Volume (million tonnes)
Base Tunnel	St. Julien	Excavation of tunnel	3 - 4	2.4
	St. Martin de La Porte	Excavation of tunnel (initially access tunnel)	3 - 4	3.4
	La Praz	Excavation of tunnel (initially access tunnel)	3 - 4	4.6
	Modane	Excavation of tunnel (initially access tunnel)	4 - 5	9
	Venaus	Excavation of tunnel (initially reconnaissance tunnel)	4 - 5	8
	Val Clarea	Only limited activities	-	-
Support sites for Venaus et Berno	Esclosa	Loading Station for cablecar, Usine Voussoies, Temporary Depot, Water treatment plant	4 - 5	
Bussoleno Bypass Tunnel	Berno	Excavation of tunnel	3 - 4	1.4
	Foresto	Excavation of tunnel	3 - 4	1.6
	Chianocco	Excavation of tunnel	3	2.5

Lyon - Turin Ferroviare TBM typical cross section



Lyon - Turin Ferroviaria Access tunnels

Access tunnel
Length : 4 000 m

Survey gallery

Base tunnel

Modane : descenderie
discenderia / access tunnel

- Modane
- La Praz
- Saint Martin La porte

Lyon - Turin Ferroviaire Access tunnel - Modane



Length 4 km. Max slope 12%. Cross section 65-80 m².
Descent: 360 m
Progress November 2007: Completed.

Rate of excavation 5-7.5 m/24 hrs

Main concern:

- Control of water

Lyon - Turin Ferroviare Access tunnel - La Praz



Length 2.6 km. Cross Section 70-100 m². Sections of carbonaceous rock / slate ("skifer")
Progress November 2007: 1.3 km.

Main concern:

- Convergence > 1m the 1st month after excavation
- Risk of gas (no use of explosives possible)

Lyon - Turin Ferroviaria Access Tunnel - Saint Martin la Porte



Lyon - Turin Ferroviaire

Access Tunnel - Saint Martin la Porte



Length 2.3 km. Cross Section 70-100 m². Sections of carbonaceous rock / slate ("skifer")
Progress November 2007: 1.7 km.

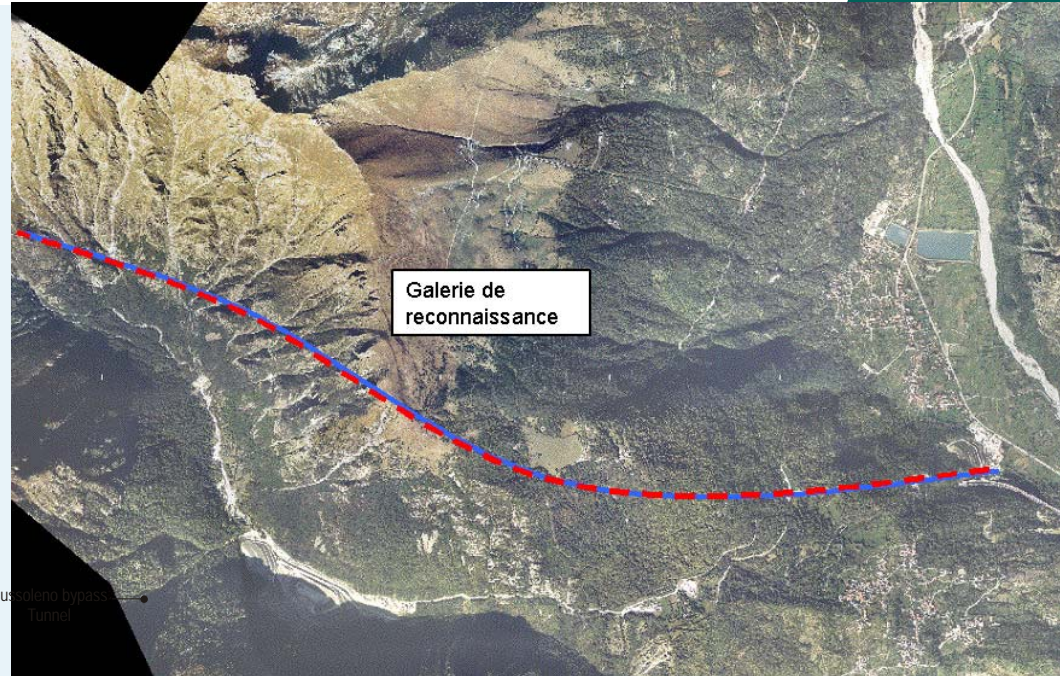
Main concern:

- Convergence > 1m the 1st month after excavation
- Risk of gas (no use of explosives possible)

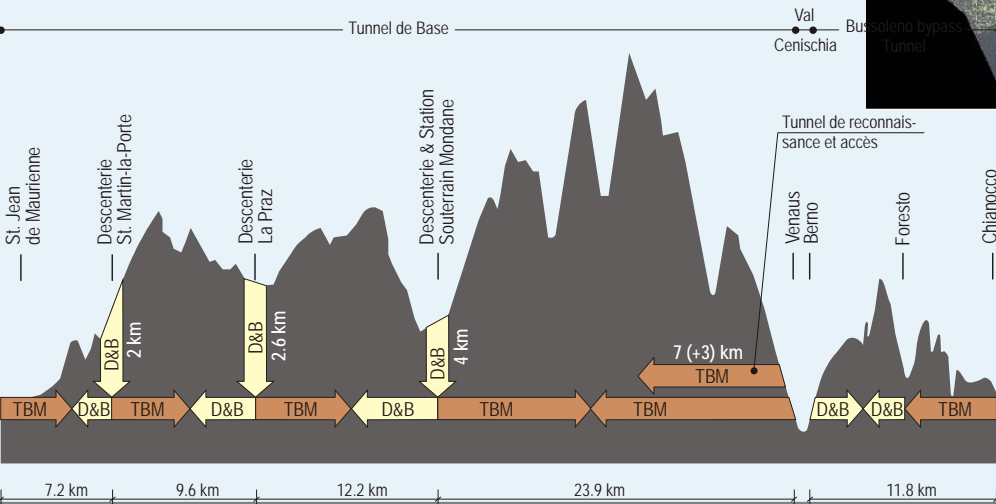
Lyon - Turin Ferroviare Access Tunnel - Saint Martin la Porte



Lyon - Turin Ferroviare Exploration Tunnel - Venaus



Galerie de reconnaissance



Length 7 km + 3 km optional
Excavated by TBM

Lyon - Turin Ferroviaria

Role of COWI

Basis

- Susa vally conflict
 - Asbestos
 - Radon
 - Traffic volume through valley

Scope 2006

- To verify the coherence of the work performed by LTF for EU DG-TREN.

Root of Conflict:

- Not in my backyard
- EIA of permanent structures
 - Mandatory
- EIA of the temporary phases (including access tunnels)
 - France: Mandatory
 - Italy: Optional (Legge Obiettivo)

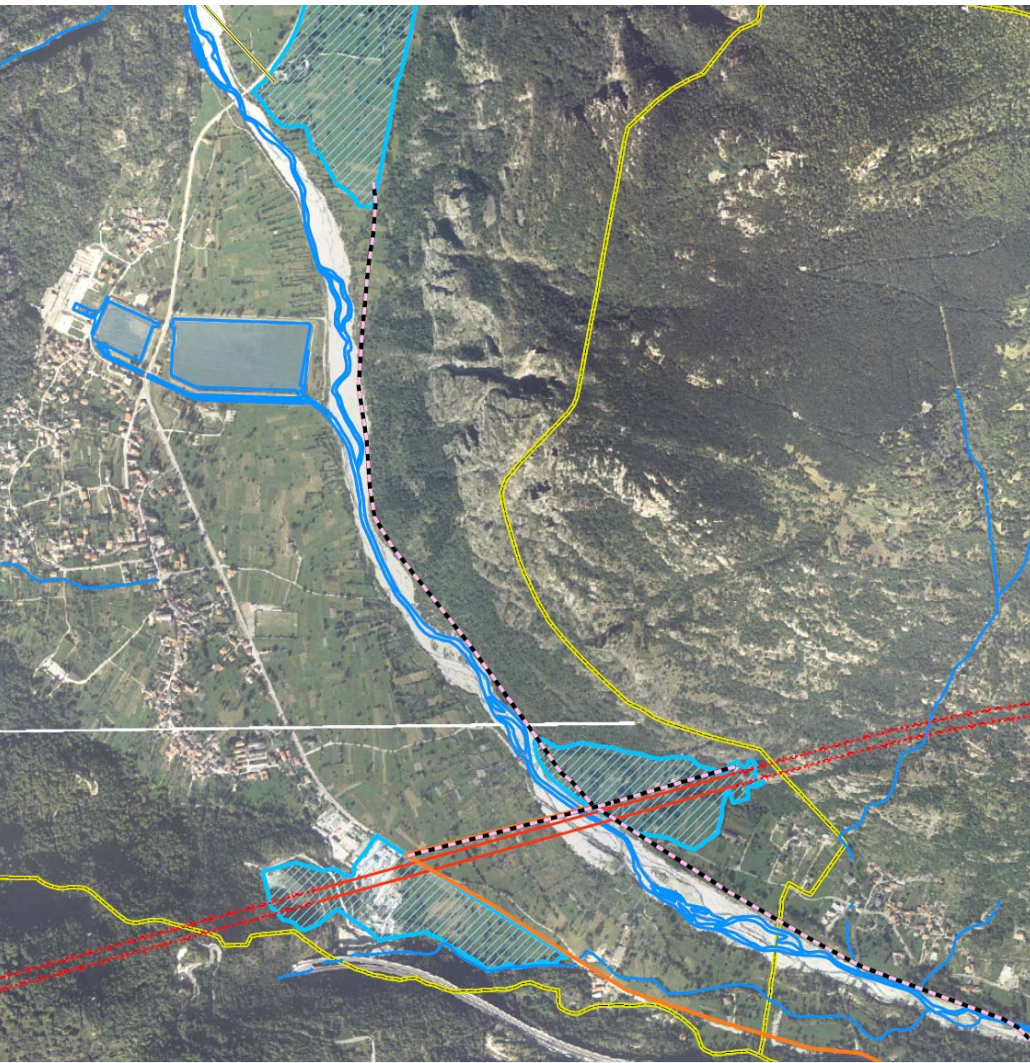
Conclusions:

- EIA of access tunnels should also be performed, as they cannot be considered temporary works.

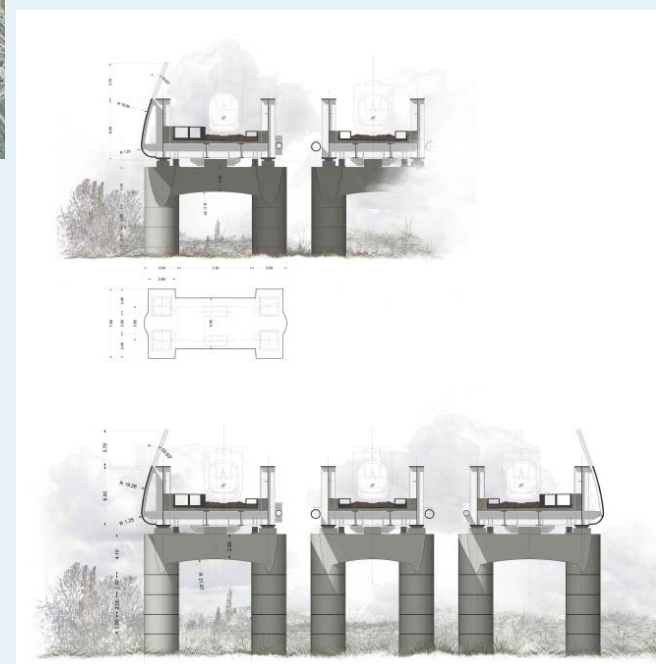
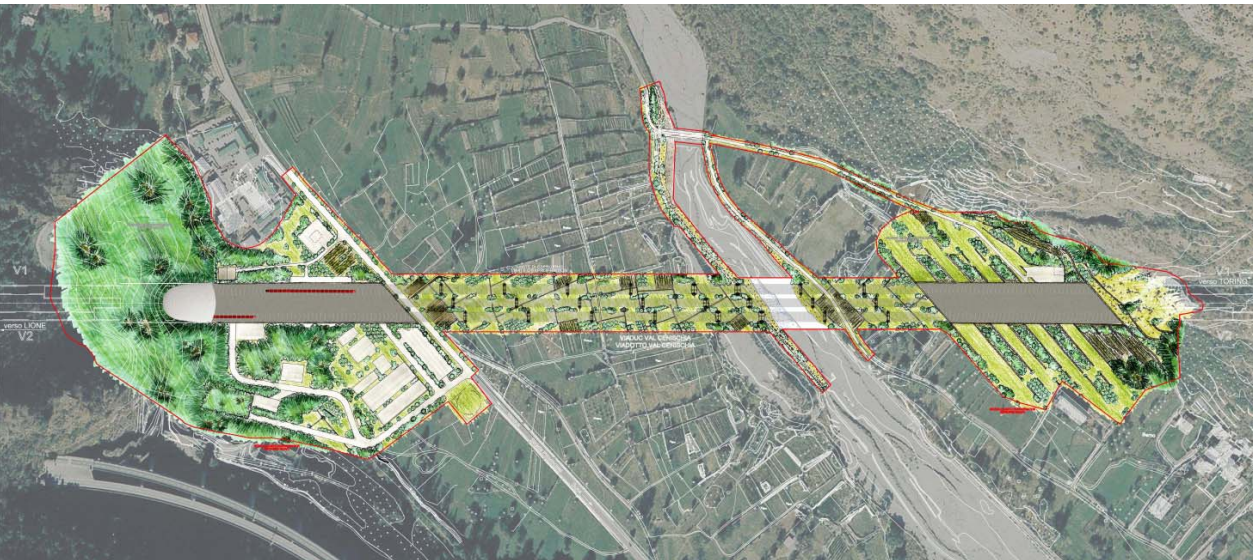
Lyon - Turin Ferroviaria Pro's and Contra's



Lyon - Turin Ferroviaria Val Cenis



Lyon - Turin Ferroviaria Architectural renderings



Lyon - Turin Ferroviaria Val Cenis - site installation



Lyon - Turin Ferroviare

Future of the project

- Construction Schedule
 - Critical path: Modane - Venaus
 - Start of Service 2015 - 2020
- Public Opinion
 - France
 - Italy
- Decisions of the developers
 - France & Italy
 - European Commission
- Financing (International section)
 - 7.6 billion Euros updated value January 2006
 - Commission European (At least 20%)
New EU financing of 23rd May 2007 now allows for 30% for TEN-T projects.
 - France & Italy (37% - 63% of the part not covered by the EU)

