

Rome, March 3rd, 2010

Monte Bianco Tunnel

(an analysis of compliance with the 54/2004 EC Directive)

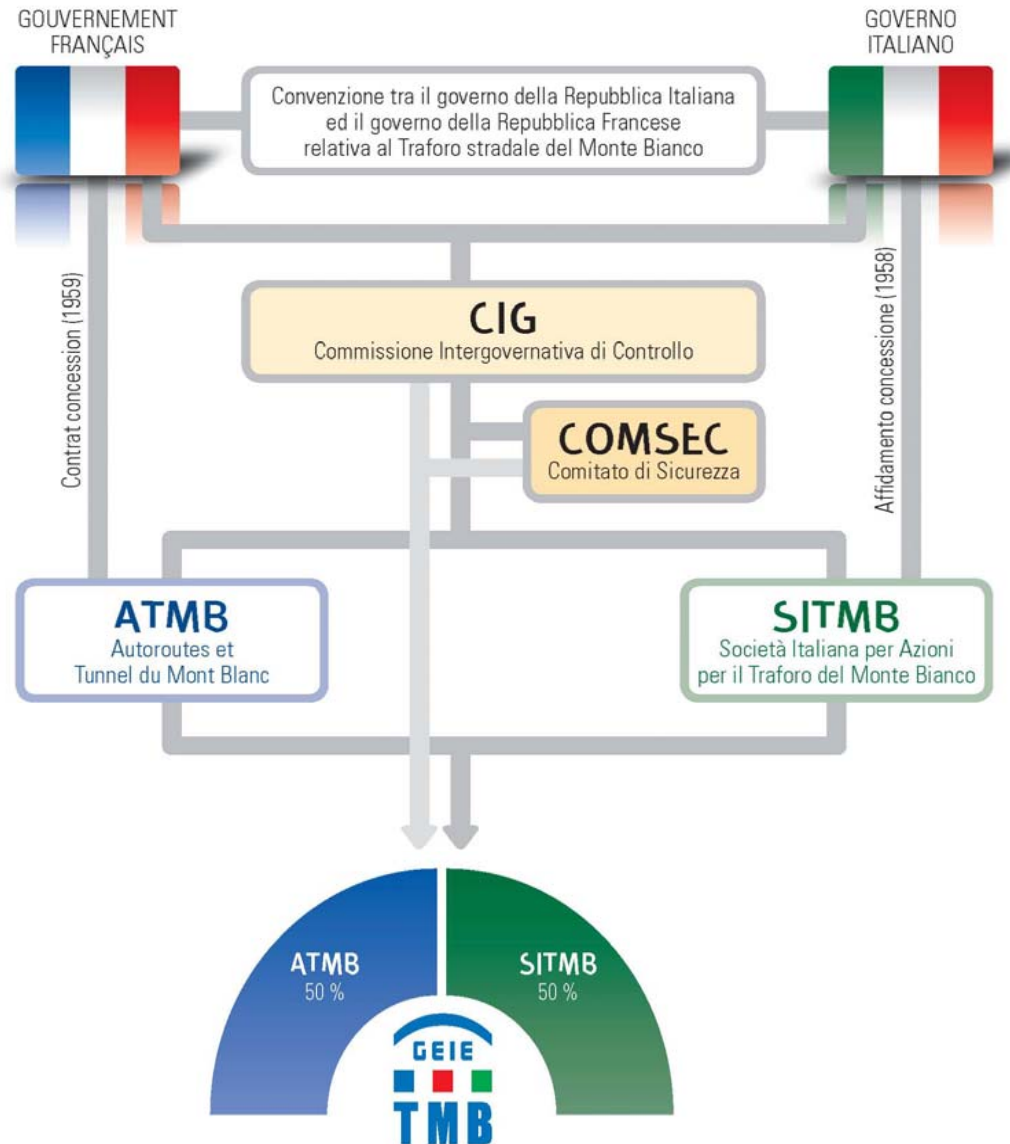
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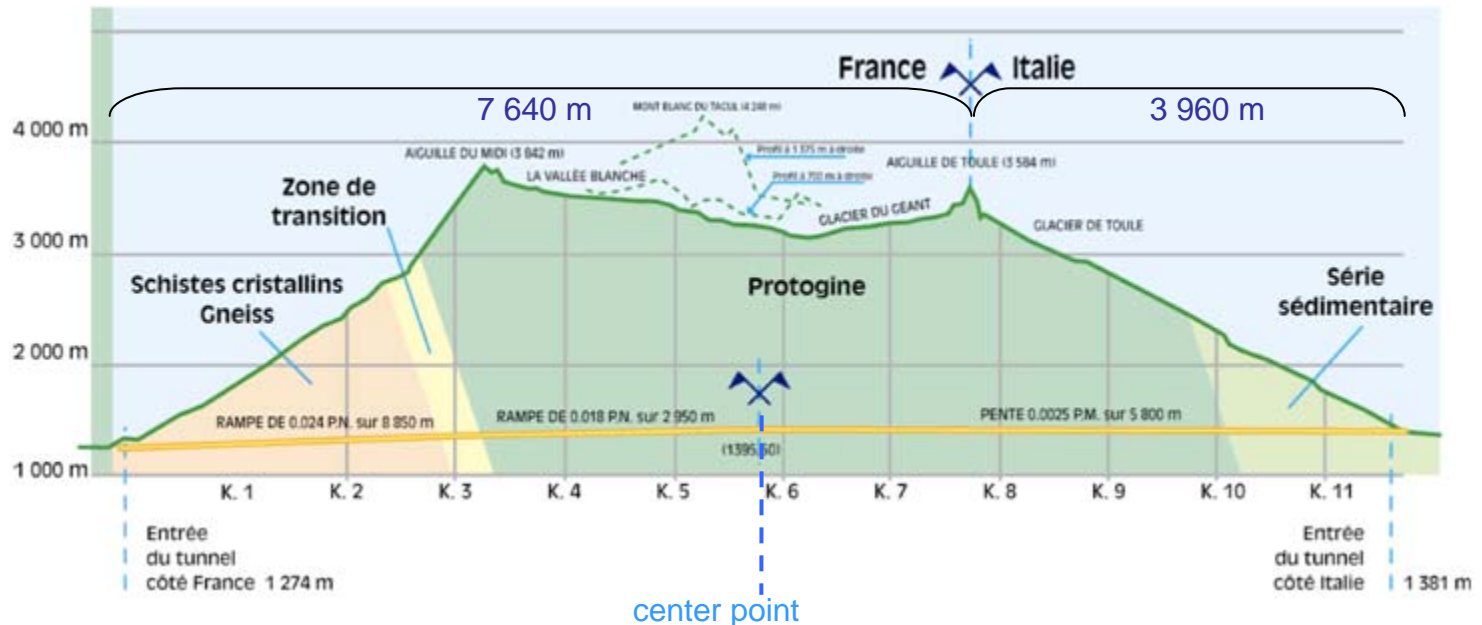
National Fire Corps - Italy



general organization



main characteristics



Opening : **19 june 1965**

Length: **11,6 km**

width : **8,6 m** (lanes width: 7 m)

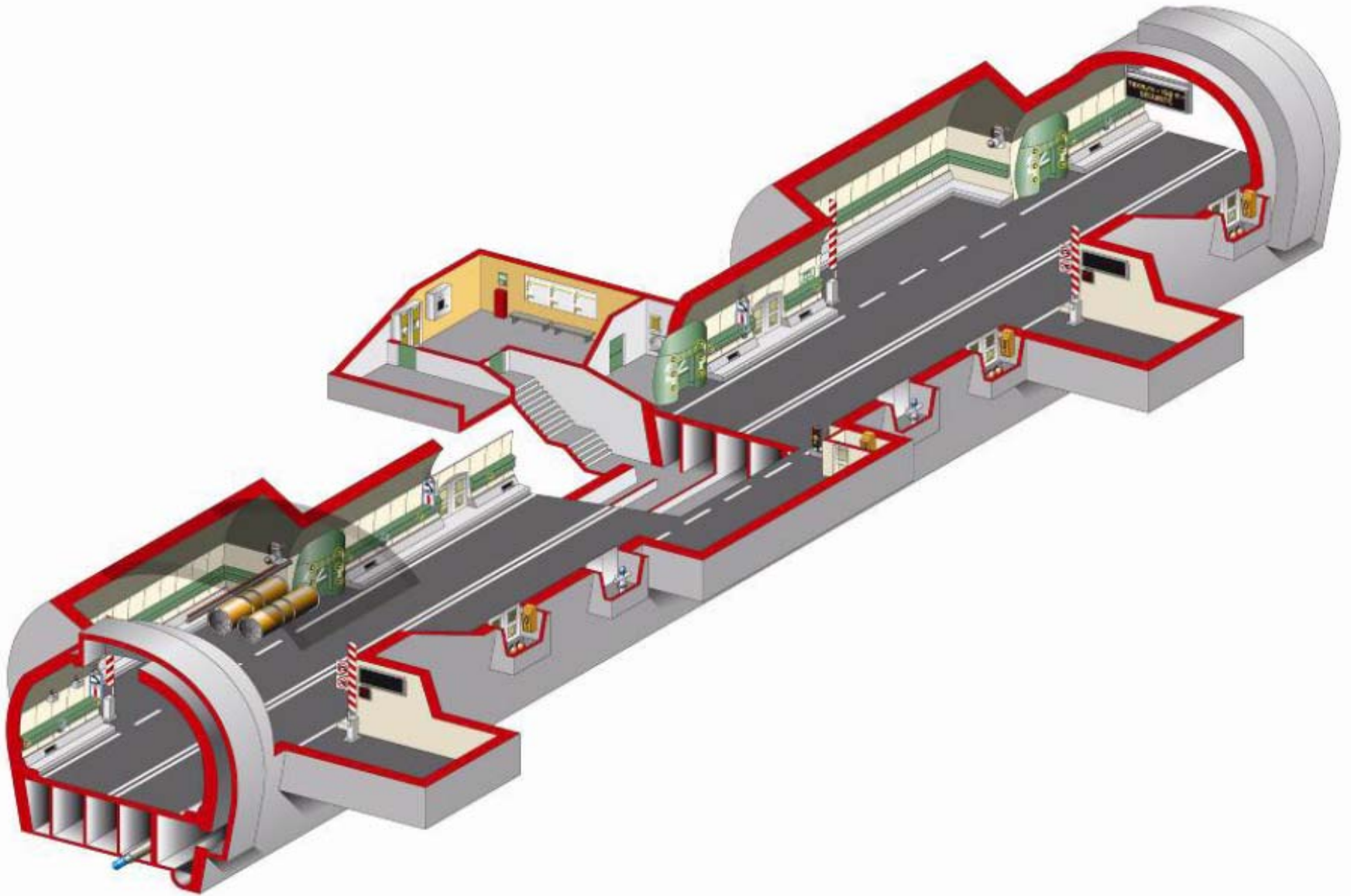
Openings height : **1274 m** (France), **1381 m** (Italy)

Highest lane : **1395,5 m** (tunnel center)

Rocks layer heigth: more than **2 km** in more than 40% of the tunnel

Trip duration: **12 minutesi** / 60 km/h

means of egress system



places of safety

- distance: 300 m
- total: 37
- surface: 40 m²
- continuous green light and flashing lights on the access door
- connected to the Tunnel communication system (Filo d'Arianna)
- every place of safety has access to the escape tunnel



places of safety

- information poster 4 languages (F-I-GB-D),
- communication with operator (voice-video)
- information system,
- firefighting equipment,
- first aid equipment (oxygen, water, masks, blankets),
- fire hydrant,
- stretcher



SOS cabins

SOS cabins are placed every 100 m (116 in total).

Each SOS cabin has:

- 1 telephone to PCC,
- 2 fire extinguishers,
- electric outlet (220/380 V),
- one glazed door,
- safety signs.



Firefigthing water system

- 80 firefighting niches (each every 150 m) complying with Italian and French standards. There are other 37 niches (every 300 m) in places of safety in the Italy-France direction;
- 4 water reservoirs (120 m³ each), 2 ubicati outside the tunnel and 2 in the tunnale);
- 1 main riser protected against freezing



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central technical management (GTC)

Analysis of 35.000 control sensors. The systems suggest to operators the best strategies depending on the fire scenario. There are 2 control centers (PCC) always manned, with traffic regulation, user information and communication tasks



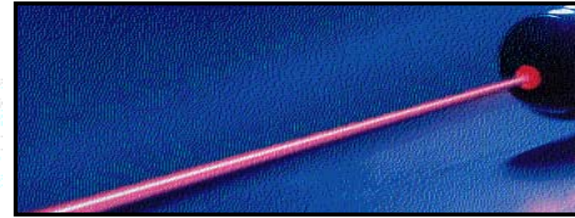
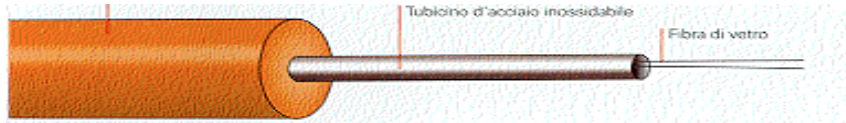
sensors

there are sensors for:
smoke, wind velocity sensors, CO, NO2



Laser thermometers

One « Fibro Laser II » (2 optical fibers)- It allows temperature measures every 25 m every 12 sec. Alarm is given to GTC for temperature growth exceeding 10° C



La Video Surveillance and Automatic Event Detection (DAI)

the system allows operators to be aware of events like change of lane, stopped vehicles, people walking in the tunnel, smoke in the tunnel, slow traffic or single slow vehicles



Ventilation System

Ventilation system is entirely computer controlled, from the inlet to the outlet

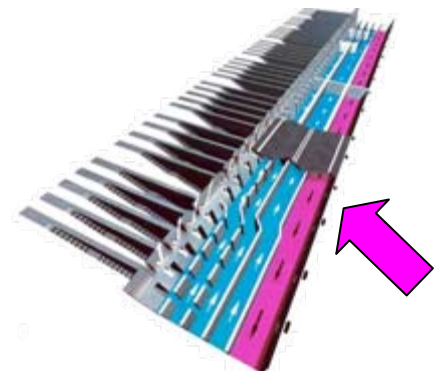
inlet system

4 inlet stations (+ 1 emergency) with 25 to 80 m³/sec. flow capacity - input opening every 10 m



outlet system

2 outlet stations 116 air intakes with 156 m³/sec flow capacity for a 600 m tunnel section

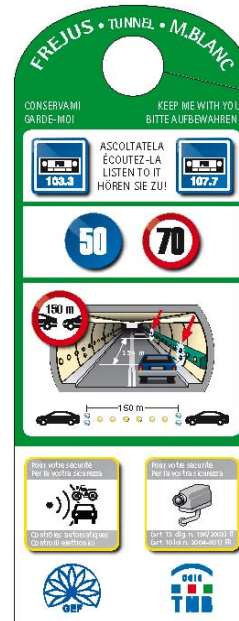
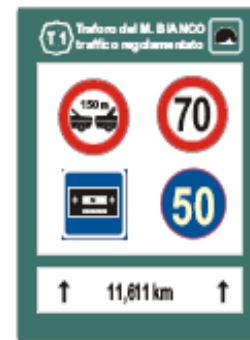


other safety features

manned traffic control systems (traffic lights, barriers, digital message panels, FM radio messages).



Users information
(before entering the tunnel and during tunnel travel).



Operating control centers

On both sides there are two centers (PCO), aimed at emergency management.



Emergency procedures

PRO 101	Lane stopped with Fire risk
PRO 102	Lane stopped without Fire risk
PRO 103	Fire in fixed location
PRO 104	Fire in mobile location
PRO 105	Fire in technical space
PRO 108	Tunnel entrance obstruction
PRO 109	Slow vehicle
PRO 110	Tunnel close without queue
PRO 114	Fire alarm in PCC building
PRO 116	Stopped vehicle in parking area without smoke

Staff training

first specific staff training for new staff

CPP 	AS 	AST 
24 ore	24 ore	24 ore
OST 	EII 	EST 
480 ore	312 ore	200 ore

continuous training

SPB 	SP 
24 ore	24 ore



Fire drills

Once a year a fire drill is conducted by French and Italian rescue services (Firefighters, Medical services, Police). 3 times a year fire drills are conducted by the single rescue organizations