

bSI IfcTunnel

Systems & equipments

MINnD Team

Version v03 (MRI - 11-10-2019)

Taxonomy – IfcTunnel sub-systems

SOURCES

- MINnD Project (2018-2019):
 - Sub-systems IDM:
 - Ventilation,
 - HV/traction,
 - LV/Energized equipments,
 - Drainage,
 - Safety / evacuation
 - Fire protection
 - Geothermal
 - Sub-systems organic structure
 - Sub-systems data dictionary

SOURCES

- ITA data dictionary (En)
- CETU data dictionary (En)

IfcTunnel - Systems & equipments

Ventilation

HighVoltage / Traction

LowVoltage / Energized Equipements

Drainage

Safety / Evacuation

Fire protection

Geothermal

Ventilation

- Civil engineering associated to ventilation
 - Air ducts Civil engineering : galleries, shafts, tunnel ducts, branches
 - Premises, units, factories, central ventilating
 - Arrangements in tunnel, bosses
- Electromechanical
 - Electro-fan (and its control accessories)
 - Accelerator (and its control accessories)
 - Disconnecting devices: registers, motorized hatches, valves, doors
- Sensors
 - Air quality: CO, NOx
 - Air quality: opacimeter
 - Anemometer
 - Tunnel air temperature sensor
 - Weather station
- Other
 - Organs of Acoustic attenuation

HighVoltage / Traction

- Aerial High Voltage
 - Delivery post of Aerial High Voltage
 - Artery of Aerial High Voltage
- Low Voltage Distribution
 - Force Lighting Station / Force Station
 - Low Voltage Distribution
 - Emergency power - Uninterrupted power supply and generator (room for battery and generator)
 - System protection and grounding system
- TRACTION
 - Traction Substation + Sectioning Station
 - Traction Distribution
 - Traction Current Feedback Circuit
 - Braking energy recovery systems
- Autonomous system
 - Autonomous production plant
 - Low Voltage Distribution

LowVoltage / Energized Equipements

- Power supply
 - High tension
 - Transformation
 - Low tension
 - Wiring
- Lighting
 - Devices
 - Junction box
 - Sensors
 - Runway lights
- Networks
 - Optical Fibre junction box
 - Optical Fibre cable
 - Switch
 - Network Supervisor
- Centralised Technical Management system / Oversight
 - Programmable logic controllers
 - Remote output input module
 - Supervisory server
 - Archiving server
 - Supervision
 - Maintenance station
- Video surveillance
 - Shooting equipment
 - Automatic Incident Detection
 - CCTV system
 - Visualization system
- Emergency Call Network
 - Business Continuity Plan (BCP)
 - Emergency Call Station
 - Server of Emergency Call Station
 - radiating cable
 - Mast
 - Antenna
 - Transmitter / receiver
 - Radio station

- Signage and Safety Equipment
 - Closing and signaling
 - Auto evacuation
 - Security niche
- Various local
 - Ventilation ducts
 - Technical premises
 - PAU and possibly sound device
 - Signage (after the tunnel gate to the assembly point)
- Shelters with tracking
 - Sas
 - Waiting area
 - Geometry related to pedestrian traffic (connection with the outside, for users and rescue)
 - Doors
 - Ventilation of the shelter (including overpressure)
 - Ventilation of the path (direct connection with the outside)
 - Lighting
 - Fire resistance
 - PAU
 - Sound system (speaker)
 - Signage (after the tunnel gate to the assembly point)

Drainage

- Network of Drainage - Sanitation
 - Identification data of drainage-sanitation network
 - Typology of drainage-sanitation network
 - Information of network control
 - Information of network Implementation (Implementation)
 - Information of network construction (activities)
 - Information of Network Maintenance (Activities)
 - Information of Network dismantling (activities)
 - Transport of effluents
 - Absorption of effluents (terminals)
 - Acces to the Network Sewing
 - Management of effluent
- Drained Space
 - Typology of drained space
 - Typology of effluents
 - Liaisons between objects
 - Topological data of collected surface
 - Hydraulic surface data collected
- Water point
 - Typology of water point
 - Data of water point identification
 - Liaisons between objects
 - Hydraulic data of water point

Safety / Evacuation

- Specific equipment in tunnel
 - Flash fire
 - Guide chevron
 - Neons
- Lighting in case of evacuation
 - Positioning of the flash lights
 - Positioning of the rafters
- Sound system
 - Positioning
 - Characteristics
 - Sirens
 - Sound beacon
- Airlock
 - Dimensions
 - Characteristics
 - Ventilation
 - Doors
- Waiting area
 - Dimensions
 - Characteristics

Fire protection

- Fire Water supply
 - From the public network
 - Water connection point and counting
 - Storage / Cistern
 - Group of Pressurizing
 - Room for Pressurizing Group
- Delivery
 - Description of the network
 - Underground pipe
 - Culvert
 - Overhead line
 - Description of the freeze protection
 - Insulating
 - Electric tracing
 - Axis
 - Pressurizing Pressurizing
 - Device to prevent pressure chocks
 - Pipe (object / branch of network for calculation)
 - Canalization (node)
 - Pipe (interface)
 - Pipeline (product / range)
- Restitution
 - Recess for a fire hydrant or surge
 - Fire hydrant
 - Surge
 - Connector
 - Taps (Product / Range)
 - Instrumentation
 - Electrical tracing
 - Corrosion protection

Geothermal

- Thermal geostructures
 - Thermal Geostructure Identification Information
 - Information of characterization of the thermal geostructure
 - Regulatory information
 - Information for economic analysis
 - Information for recovering data from natural terrain
 - Information on energy needs
 - Geological information
 - Equipments and spaces
 - Caloporteur pipes
 - Facilities

Taxonomy – IfcTunnel sub-systems – 1/7

Ventilation - Elements that have a function to ensure air ventilation in a transport underground infrastructure

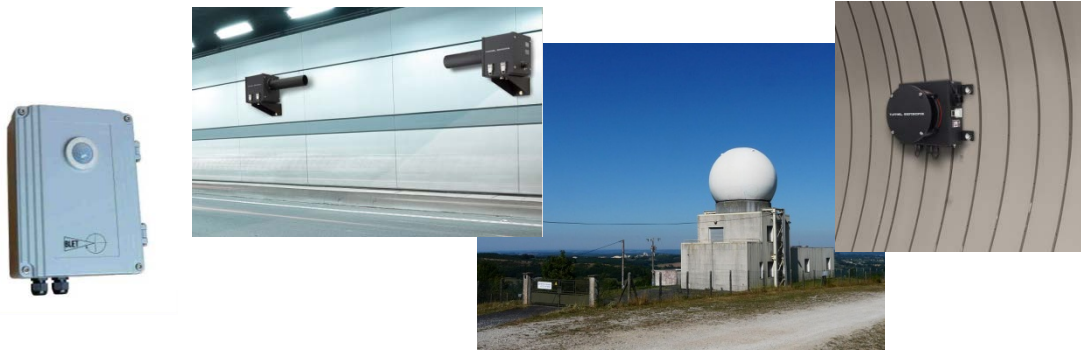


- Civil engineering associated to ventilation
 - Air ducts Civil engineering : galleries, shafts, tunnel ducts, branches
 - Premises, units, factories, central ventilating
 - Arrangements in tunnel, bosses
- Electromechanical
 - Electro-fan (and its control accessories)
 - Accelerator (and its control accessories)
 - Disconnecting devices: registers, motorized hatches, valves, doors



Taxonomy – IfcTunnel sub-systems – 1/7

Ventilation - Elements that have a function to ensure air ventilation in a transport underground infrastructure



- Sensors

- Air quality: CO, NOx
- Air quality: opacimeter
- Anemometer
- Tunnel air temperature sensor
- Weather station



- Other

- Organs of Acoustic attenuation



Taxonomy – IfcTunnel sub-systems – 2/7

HighVoltage / Traction - Elements that have a function to convey energy to a guided transport system in an underground infrastructure



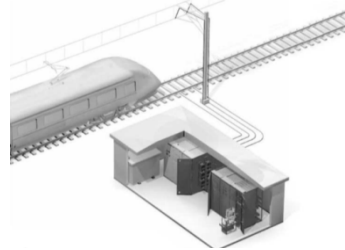
- Aerial High Voltage
 - Delivery post of Aerial High Voltage
 - Artery of Aerial High Voltage



- Low Voltage Distribution
 - Force Lighting Station / Force Station
 - Low Voltage Distribution
 - Emergency power - Uninterrupted power supply and generator (room for battery and generator)
 - System protection and grounding system

Taxonomy – IfcTunnel sub-systems – 2/7

HighVoltage / Traction - Elements that have a function to convey energy to a guided transport system in an underground infrastructure



- **TRACTION**

- Traction Substation + Sectioning Station
- Traction Distribution
- Traction Current Feedback Circuit
- Braking energy recovery systems



- **Autonomous system**

- Autonomous production plant
- Low Voltage Distribution

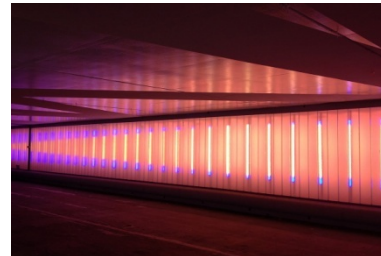


Taxonomy – IfcTunnel sub-systems – 3a/7

LowVoltage / Energized Equipements - Elements that are necessary for the exploitation and safety of the tunnels



- Power supply
 - High tension
 - Transformation
 - Low tension
 - Wiring



Lighting

- Devices
- Junction box
- Sensors
- Runway lights

Taxonomy – IfcTunnel sub-systems – 3a/7

LowVoltage / Energized Equipements - Elements that are necessary for the exploitation and safety of the tunnels



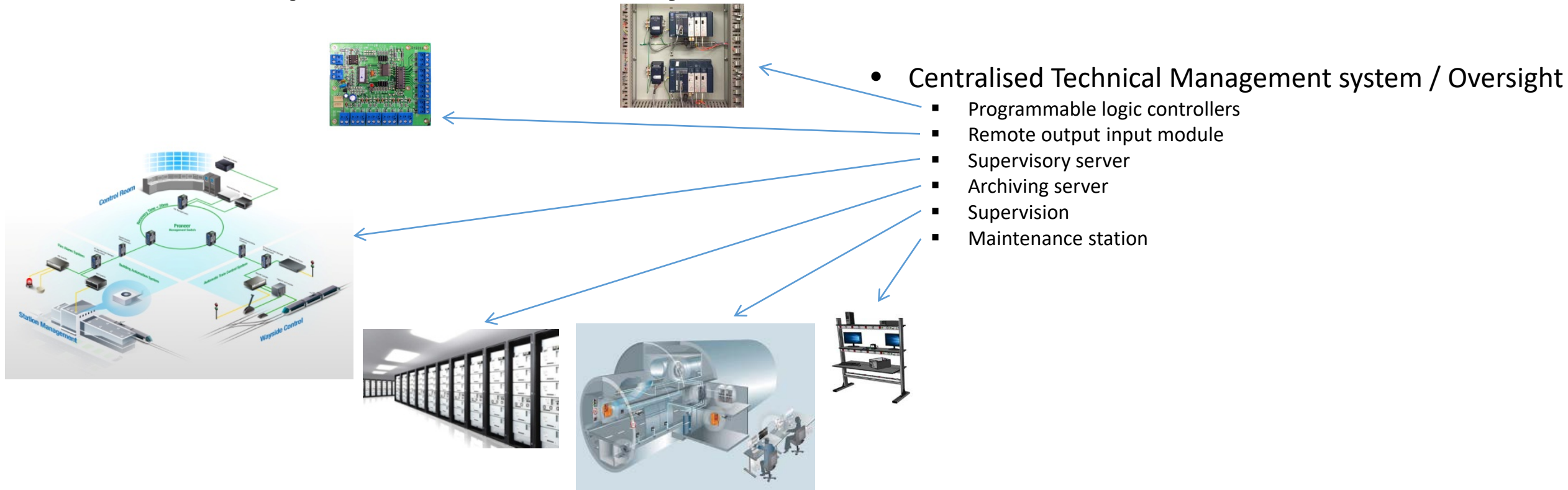
- Networks

- Optical Fibre junction box
- Optical Fibre cable
- Switch
- Network Supervisor



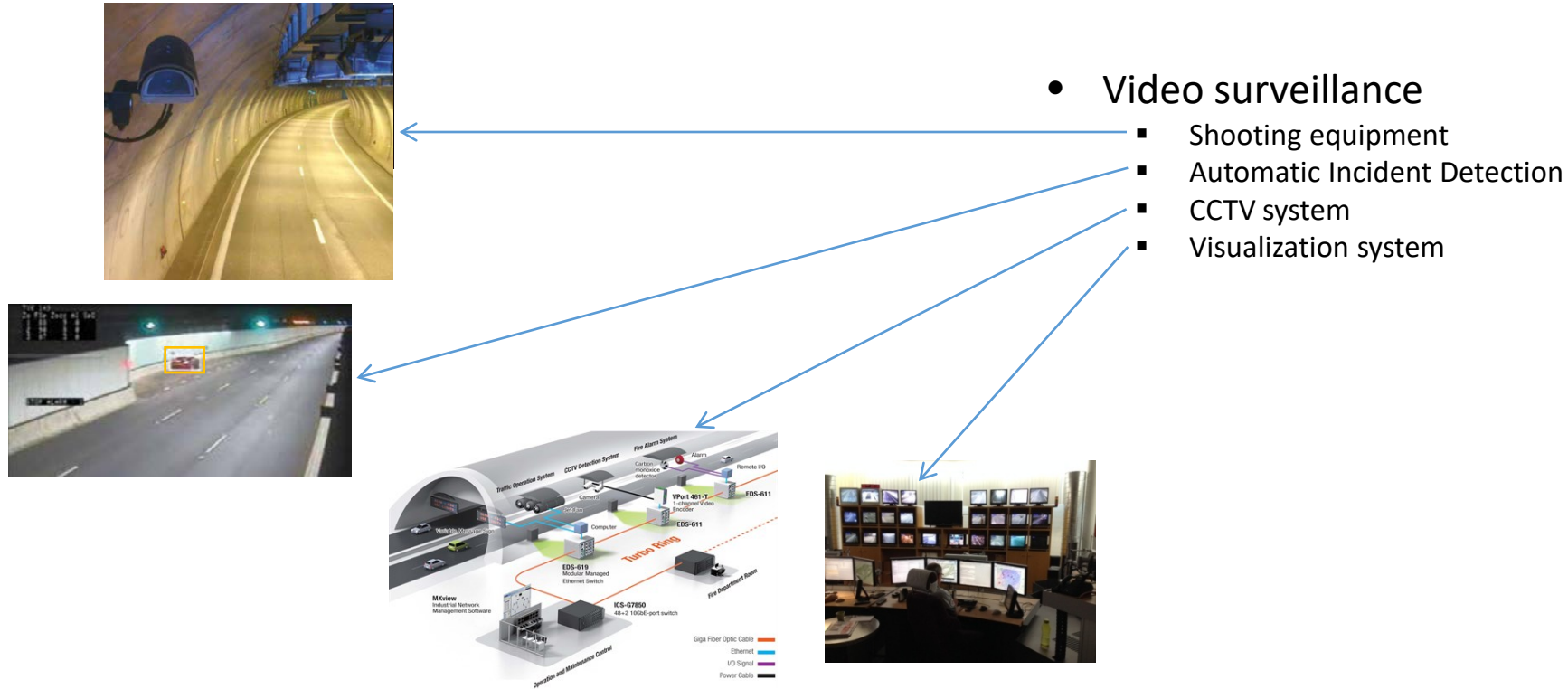
Taxonomy – IfcTunnel sub-systems – 3b/7

LowVoltage / Energized Equipements - Elements that are necessary for the exploitation and safety of the tunnels



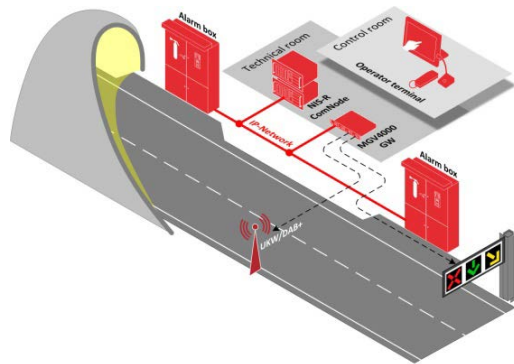
Taxonomy – IfcTunnel sub-systems – 3b/7

LowVoltage / Energized Equipements - Elements that are necessary for the exploitation and safety of the tunnels



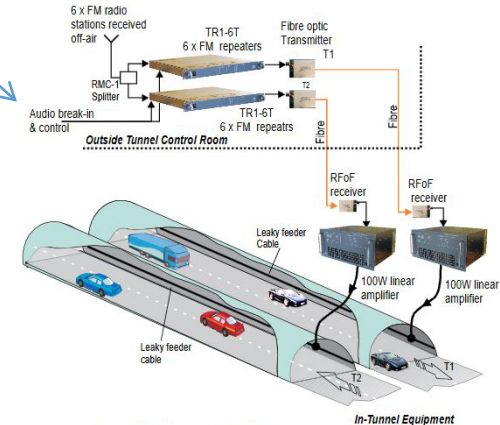
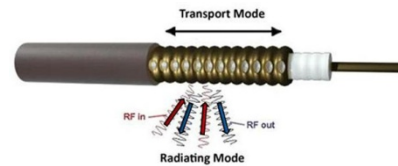
Taxonomy – IfcTunnel sub-systems – 3c/7

LowVoltage / Energized Equipements - Elements that are necessary for the exploitation and safety of the tunnels



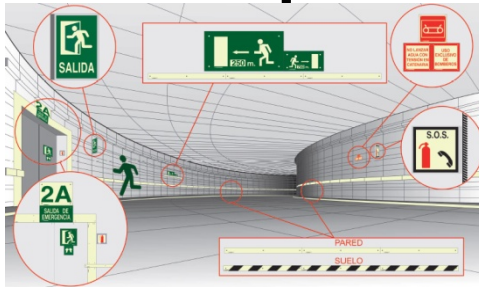
- Emergency Call Network

- Business Continuity Plan (BCP)
- Emergency Call Station
- Server of Emergency Call Station
- radiating cable
- Mast
- Antenna
- Transmitter / receiver
- Radio station



Taxonomy – IfcTunnel sub-systems – 3c/7

LowVoltage / Energized Equipements - Elements that are necessary for the exploitation and safety of the tunnels



- Signage and Safety Equipment

- Closing and signaling
- Auto evacuation
- Security niche



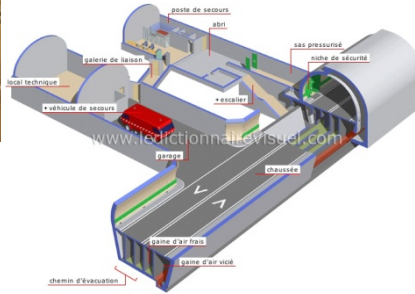
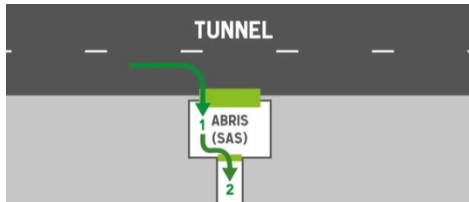
- Various local

- Ventilation ducts
- Technical premises
- PAU and possibly sound device
- Signage (after the tunnel gate to the assembly point)



Taxonomy – IfcTunnel sub-systems – 3d/7

LowVoltage / Energized Equipements - Elements that are necessary for the exploitation and safety of the tunnels

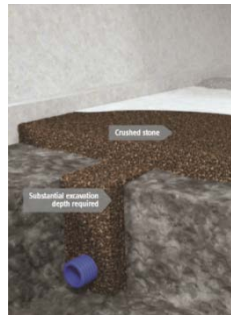
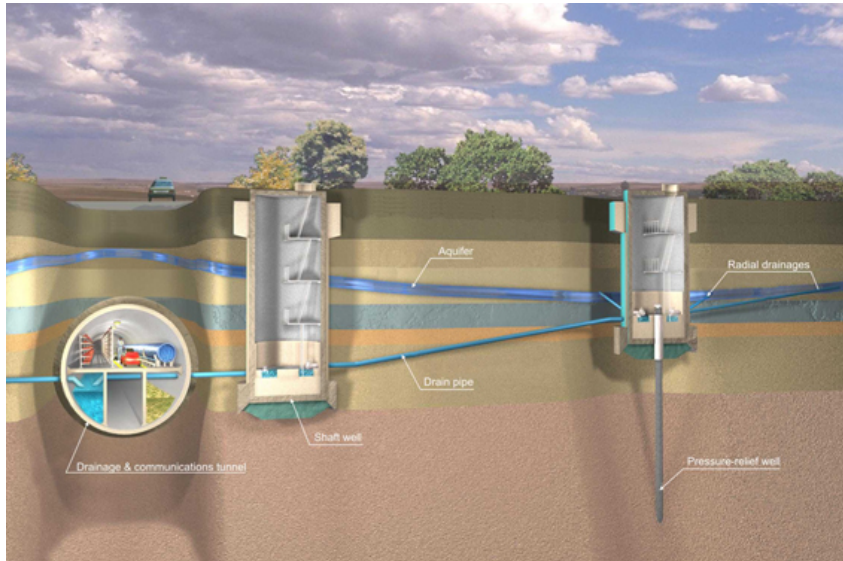


- Shelters with tracking

- Sas
- Waiting area
- Geometry related to pedestrian traffic (connection with the outside for users and rescue)
- Doors
- Ventilation of the shelter (including overpressure)
- Ventilation of the path (direct connection with the outside)
- Lighting
- Fire resistance
- PAU
- Sound system (speaker)
- Signage (after the tunnel gate to the assembly point)

Taxonomy – IfcTunnel sub-systems – 4b/7

Drainage - Elements that have a function to collect and channel water within a transport underground infrastructure



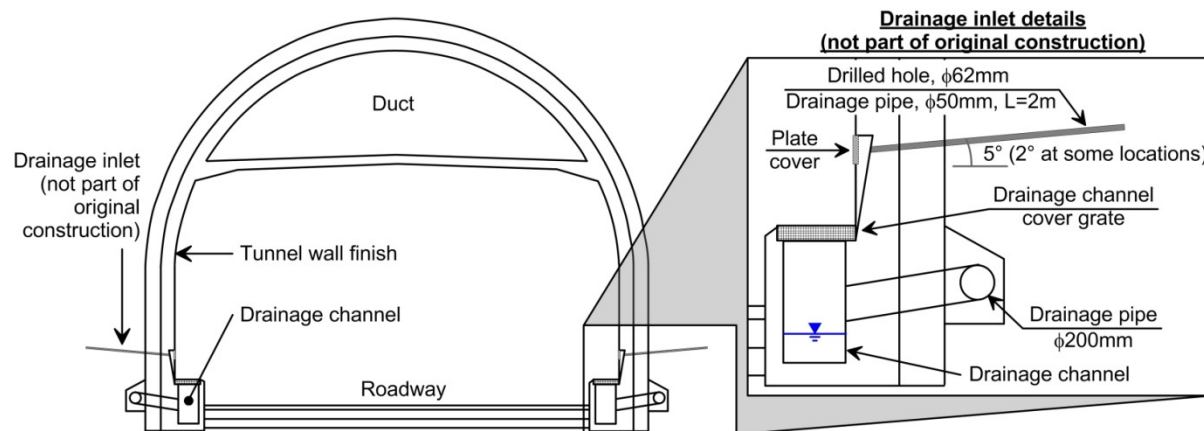
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 - Transport of effluents
 - Absorption of effluents (terminals)
 - Acces to the Network Sewing
 - Management of effluent
- Drained Space
 - Typology of drained space
 - Typology of effluents
 - Liaisons between objects
 - Topological data of collected surface
 - Hydraulic surface data collected

Taxonomy – IfcTunnel sub-systems – 4c/7

Drainage - Elements that have a function to collect and channel water within a transport underground infrastructure



- Water point
 - Typology of water point
 - Data of water point identification
 - Liaisons between objects
 - Hydraulic data of water point



Taxonomy – IfcTunnel sub-systems – 5a/7

Safety / Evacuation - Elements that have a function of protection and evacuations of the users in case of a disaster



- Specific equipment in tunnel

- Flash fire
- Guide chevron
- Neons

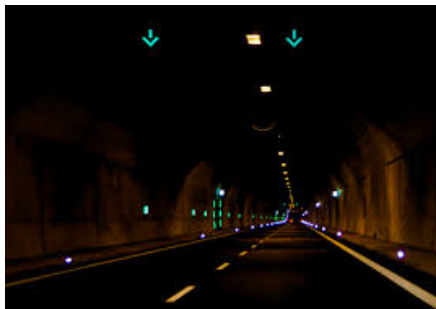
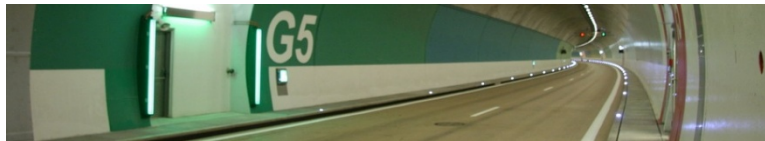


- Lighting in case of evacuation

- Positioning of the flash lights
- Positioning of the rafters

Taxonomy – IfcTunnel sub-systems – 5a/7

Safety / Evacuation - Elements that have a function of protection and evacuations of the users in case of a disaster



- Permanent lighting

- Neon positioning
- Ark
- Pictograms

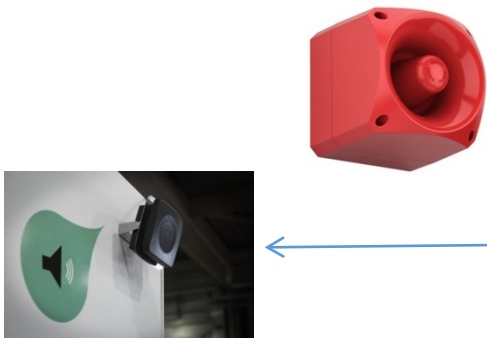


- Dramatization

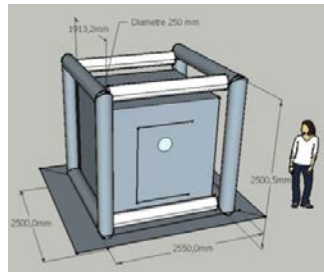
- Set of arches
- Set of pictograms

Taxonomy – IfcTunnel sub-systems – 5b/7

Safety / Evacuation - Elements that have a function of protection and evacuations of the users in case of a disaster



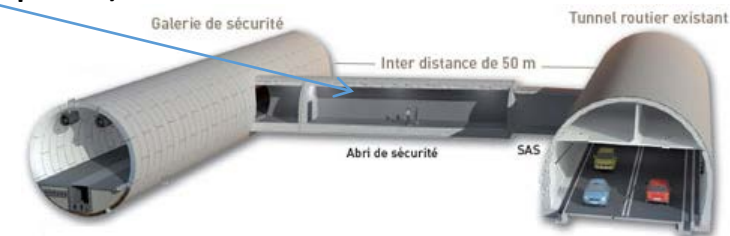
- Sound system
 - Positioning
 - Characteristics
 - Sirens
 - Sound beacon



- Airlock
 - Dimensions
 - Characteristics
 - Ventilation
 - Doors

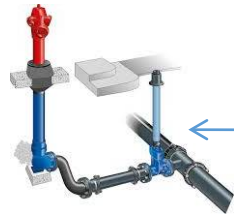


- By-pass (safety space)
 - Dimensions
 - Characteristics



Taxonomy – IfcTunnel sub-systems – 6a/7

Fire protection - Elements that have a function to fight and protect against fire in the underground infrastructure



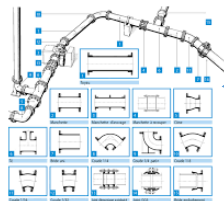
- Fire Water supply

- From the public network
- Water connection point and counting
- Storage / Cistern
- Group of Pressurizing
- Room for Pressurizing Group



Taxonomy – IfcTunnel sub-systems – 6a/7

Fire protection - Elements that have a function to fight and protect against fire in the underground infrastructure



- **Delivery**

- Description of the network
- Underground pipe
- Culvert
- Overhead line
- Description of the freeze protection
- Insulating
- Electric tracing
- Axis
- Pressurizing Pressurizing
- Device to prevent pressure chocks
- Pipe (object / branch of network for calculation)
- Canalization (node)
- Pipe (interface)
- Pipeline (product / range)

Taxonomy – IfcTunnel sub-systems – 6b/7

Fire protection - Elements that have a function to fight and protect against fire in the underground infrastructure



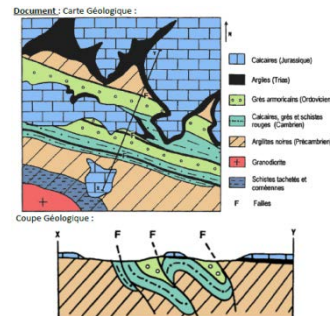
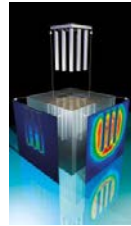
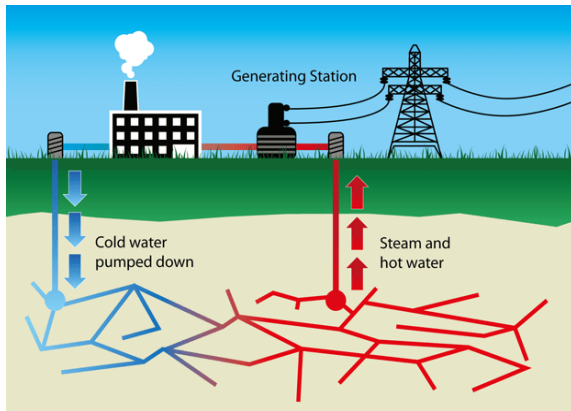
- Restitution

- Recess for a fire hydrant or surge
- Fire hydrant
- Surge
- Connector
- Taps (Product / Range)
- Instrumentation
- Electrical tracing
- Corrosion protection



Taxonomy – IfcTunnel sub-systems – 7/7

Geothermal - Elements which provide to exploit the free energy from the ground for the underground infrastructure



- Thermal geostructures

- Thermal Geostructure Identification Information
- Information of characterization of the thermal geostructure
- Regulatory information
- Information for economic analysis
- Information for recovering data from natural terrain
- Information on energy needs
- Geological information
- Equipments and spaces
- Caloporteur pipes
- Facilities



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