

## South Korea

### Metro Inferno Kills 125 Passengers

At least 125 people have died in flames and smoke after a man poured a canister of petrol into a train carriage and then set fire to it in a metro station in Daegu, South Korea's fourth city, on 18<sup>th</sup> February. Many of the victims were trapped unable to escape, while the thousands of rescuers who rushed to the city centre station had to battle the heat and fumes. The intensity of the fire left victims' bodies charred and entangled with each other.

The criminal metro arson is the latest mass loss of life from accidents and attacks on trains in tunnels around the world. Subway systems generally have excellent safety records, but the presence of large numbers of people in enclosed spaces can hamper rescue efforts when problems occur. Other mass disasters include the funicular train in the Austrian ski resort of Kaprun in November 2000 where 155 people died when the carriages caught fire at 600 metres into the 3.2 km mountain tunnel. In March 1995, members of the Aum Shinrikyo Sect released sarin gas into the metro system of Tokyo. Twelve people died. In November 1987, wooden escalators caught fire in London's King's Cross underground station killing 31 people.

## World Digest of Tunnels Under Planning

**Italy.** The 36.8 km-long Valtrompia highway between Brescia and Lumezzane will be a single and dual-lane carriageway for each direction with 11.6 km of bored tunnels and 2.5 km of cut-and-cover tunnels. The EIS is completed and the project is entering the next stage seeking approval from ANAS, the state road administration, and the ministry of public works. The infrastructure will cost €650 million. The project has been designed by Technital. Visit [www.autobspd.it](http://www.autobspd.it)

**Spain.** The City of La Coruña has approved a €3 million project for a direct seawater supply to the Aquarium Finisterrae to ensure the uninterrupted quality of its waters even in case of black tide like the one of the Prestige tanker. A seawater inlet will be built, consisting of a 200 m tunnel at a depth of 17 m.

**United Kingdom.** A surprise announcement has been made of plans for a new spur to the Crossrail scheme which would bring it through Acton and Chiswick. Two options are currently under consideration for a possible Norbiton to Paddington link service, both of which would link up to the core Paddington and Liverpool Street route via Kingston, Teddington, Twickenham, Richmond, Kew Gardens and Gunnersbury stations. Under the first option, an overground viaduct system would go on from Gunnersbury to Acton Central before going through to Paddington, while under the second option, the system would travel from Gunnersbury to Chiswick Park, where it would enter a 5.3 km tunnel near to Chiswick Common, before going onto Paddington. Either way, District line services to Richmond will be affected. Crossrail would replace some District Line trains between Gunnersbury and Richmond and the Silverlink North London Line Service would be diverted to Hounslow, if the overground option is taken, while if the underground option is taken, then all District line services to Richmond would be replaced. The plans also include an option of a link to Heathrow airport. Visit [www.chiswickw4.com](http://www.chiswickw4.com) and

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[www.crossrail.co.uk](http://www.crossrail.co.uk)

**United States.** San Francisco's Municipal Railway (Muni) plans to start digging a subway tunnel under Third and Kearny streets to Chinatown in 2005. The first federal money (only \$1.5 million) will go to help pay for preliminary engineering work.

Muni has started building the first phase of the project, the locally funded Third Street light rail line. It will be a surface line that will run from Bayview-Hunters Point to Fourth Street near Pacific Bell Park, then run on existing tracks to the Market Street subway. The second phase, called the Central Subway, will carry the line on the surface up Third to Folsom Street, where it will go underground, cross the Market Street BART and Muni subway, and continue up through the Financial District and Chinatown, to Washington Street. Visit [www.sfmuni.com/home/home50.htm](http://www.sfmuni.com/home/home50.htm)

## World Digest of Bids

**France.** Restricted call for bids, deadline 17<sup>th</sup> March, 2003 for preliminary studies for the Montgenèvre crossing, including a 450 m cut-and-cover tunnel. Visit <http://ted.publications.eu.int/udl?request=Seek-Deliver&language=en&docid=028005-2003>, OJ S 33, or contact DDE des Hautes-Alpes, Gap, tel. +33 492403500 or 49 or 50.

**France.** Open call for bids, deadline 21<sup>st</sup> March, 2003 for civil works in the Somport tunnel to bore three additional galleries between the road and rail tunnels. Rockbolts: 72 tonnes, wiremesh: 54 tonnes, HEB steel ribs: 25 tonnes, steel plates: 13 tonnes, etc. Visit <http://ted.publications.eu.int/udl?request=Seek-Deliver&language=en&docid=030188-2003>, OJ S 36, or contact DDE des Pyrénées-Atlantiques, Pau, tel. +33 559808600.

**Italy.** Restricted call for bids, deadline 24<sup>th</sup> March, 2003 for railway construction on section Saronno-Malpensa, lot 2. This tender deals with cut-and-cover tunnels and associated works for transferring tracks underground in Castellanza and Busto Arsizio. Tender value: €62.5 million. Visit <http://ted.publications.eu.int/udl?request=Seek-Deliver&language=en&docid=029459-2003>, OJ S 35, or contact Ferrovie Nord Milano Esercizio, Milan, fax +39 0285114231. Visit [www.tunnelbuilder.com](http://www.tunnelbuilder.com), it/33 for the bored tunnels.

**Norway.** Open call for bids, deadline 8<sup>th</sup> April, 2003 for construction of a 370 m-long bored tunnel on E6 motorway in Steinkjer, with a 50 m cut-and-cover portion at the north end and a 120 m cut-and-cover tunnel in Eggelia. Visit <http://ted.publications.eu.int/udl?request=Seek-Deliver&language=en&docid=029477-2003>, OJ S 35, or contact Statens Vegvesen Region midt, Steinkjer, fax +47 74122606. E-mail [olav.olsen@vegvesen.no](mailto:olav.olsen@vegvesen.no)

**Portugal.** Open call for bids, deadline 7<sup>th</sup> April, 2003 for construction of a 1,442 road section on the west access to Funchal, Madeira's capital. The works include a 117 m tunnel. Visit <http://ted.publications.eu.int/udl?request=Seek-Deliver&language=en&docid=026686-2003>, OJ S 32, or contact Região Autónoma da Madeira, Funchal, fax +351 291 207385.

**Spain.** Open call for bids, deadline 7<sup>th</sup> April, 2003 for work control and supervision for the upgrading of section Trepmp-La Pobla del Segur of road C-13 in Catalonia, including a 187 m tunnel. Tender value: €1.2 million. Visit <http://ted.publications.eu.int/udl?request=Seek-Deliver&language=en&docid=027908-2003>, OJ S 33, or contact GISA, Barcelona, fax +34 934300124. E-mail [dlh@gisa.es](mailto:dlh@gisa.es). Read E-News Weekly # 55.

## World Digest of Contract Awards

**Czech Republic.** The D47 motorway leading from Lipnik nad Bečov through Ostrava to the Polish

border is expensive according to Housing & Construction CZ (H&C), the company which won in March 2002 the BOT contract from the government without a tender. The contract signed by former transport minister Jaromir Schling contains risks both for the government and H&C. This is why talks are under way on adjusting the conditions of the contract. By the end of February, transport minister Milan Simonovsky should submit the proposals to the cabinet which should by 19<sup>th</sup> March decide whether it will pull out from the contract or not. The total price is now estimated at Kc112-Kc115 billion, including construction cost and 25-year operation before it is handed over to the government.

The 80 km motorway has been designed by Dopravoprojekt, Pragoprojekt, and HBH Projekt with two tunnels, 15 flyovers and 141 bridges. If built, construction should be completed in 2009. Visit [www.hch.co.il](http://www.hch.co.il) and [www.tunnelbuilder.com](http://www.tunnelbuilder.com), cz/20.

## World Digest of Ongoing Tunnelling

**Armenia.** The Vorotan-Arpa tunnel has holed through on 13<sup>th</sup> February. This 21.6 km-long tunnel will take the waters of River Vorotan, in the southern Armenian province of Syunik, to the Kechout reservoir. From there, waters will flow into Lake Sevan, Armenian's biggest reservoir of fresh water in the province of Gegharkunik, through the 48.3 km-long Arpa-Sevan tunnel inaugurated on 21<sup>st</sup> March, 1981.

Excavation of the Vorotan-Arpa tunnel was kicked off in 1982, but was suspended in the first years of Armenia' independence due to the lack of funds. It resumed in 1998. The government released about 1.4 billion drams to carry on with construction in 2002. Soviet contractor Hydrospetstroy CJSC started the project and Arpasevan took over to complete it. The tunnel, which was bored at a depth of 46 m, is expected to be put into operation in August.

A programme to restore Lake Sevan has been debated in Armenia's National Assembly. A bill is being prepared to provide the possibility of raising the water level of this unique alpine lake by nearly seven metres in the next 25 years. This can be achieved by stabilising all components of the water balance and also after repairing the Arpa-Sevan tunnel and commissioning the Vorotan-Arpa tunnel. The Arpa-Sevan tunnel is presently in very bad condition, due to lack of maintenance during the economic blockade. Its repair will make it possible to supply the lake with an additional 33 million tonnes of water annually, which will raise its level by 23 centimetres.

Completion of the Vorotan-Arpa tunnel will add to Lake Sevan's water resources a further 165 million tonnes a year by raising its level by 12 centimetres. In 25 years' time, given the stabilisation of all ecological factors, the lake level can be raised by 7 metres. Over the past 60 years, the water level in Lake Sevan has dropped by 20 metres as a result of overuse of its resources. To stop the Lake Sevan level lowering and to provide water for irrigation and energy, additional water resources are required. For this purpose, the Arpa-Sevan tunnel was constructed. It carries 250 million cubic metres of water annually to Lake Sevan. The tunnel was a relief for the lake but not a solution to the problem. The level rose only by 1.5 m. This was judged insufficient by Armenian and Soviet engineers who started to drill the second tunnel, the Vorotan-Ketchut tunnel, in 1981.

**Italy.** Italcementi, the well known Italian cement producer, operates a cement plant in Calusco d'Adda, Bergamo province. The plant is supplied with materials extracted from two quarries. The first is a limestone quarry situated in Colle Pedrino in the Palazzago municipality and the second – a marl quarry – is in Monte Giglio, two kilometres away from the plant. The marls are conveyed through an underground belt to the plant but this is not the case for the limestone which is transported by cable cars and trucks between Pontida and Calusco d'Adda.

A 9.6 km-long 4.8 m OD tunnel is under construction since July 2001 to install an underground conveyor belt designed to replace the cable cars and trucks. This tunnel follows a route with a level difference of 700 m and curves with a minimum horizontal radius of 2 km and a minimum vertical radius of 1 km. It is driven by a consortium of Strabag, Del Favero and Seli using a Robbins double-shield TBM for hard rock, model 1611-283. The tunnel will be almost fully lined with precast concrete segments. To date, 825 m has been driven. The muck is removed by means of a 800 mm-wide belt with a capacity of 600 tonnes per hour and a speed of 2.5 m per second. The tunnel will be monitored

by a fiber optics system which, among other things, will synchronise the motors which regulate the belt. The belt supplier is RBL-REI. Visit [www.rbl-france.com](http://www.rbl-france.com). Completion of the tunnel is planned for year-end or early 2004. The tunnel will cost €40 million. Visit [www.italcementigroup.com/newsite/index.htm](http://www.italcementigroup.com/newsite/index.htm) and [www.italcementi.it/newsite/ambiente/agenda21.htm](http://www.italcementi.it/newsite/ambiente/agenda21.htm). Also visit [www.strabag.at](http://www.strabag.at) and [www.selitunnel.com/TBM/TBMROBBINS1661-283.htm](http://www.selitunnel.com/TBM/TBMROBBINS1661-283.htm)

**Spain.** The 2 km of tunnel for the light rail between Nou Barris and Can Cuiàs in Barcelona has been holed through on 7<sup>th</sup> February. Commissioning is programmed for year-end. Read E-News Weekly # 53.

**Spain.** On motorway A-1 linking Eibar to Vitoria in the Basque province of Guipuzkoa, the San Marcial tunnel on the Bergara north-Bergara south section (4.5 km) has been holed through in November by Nortunel who is subcontractor to a JV of FCC and Necso for the excavation and support. This twin-tube tunnel, with lengths of 1,490 and 1,515 m and a cross section of 78 sq m, was blasted in soft limestone using two Tamrock jumbos. Support consisted of rockbolts, shotcrete, wire mesh and TH and HEB steel ribs (HEB at the portals and TH where necessary). Construction of the invert and two connecting galleries between both tubes as well as drainage works are under way. The tunnel should be completed and equipped with all the necessary equipment (ventilation, lighting, etc.) within 4 to 5 months. Opening is programmed in October or November. Visit [www.fcc.es](http://www.fcc.es) and [www.necso.es](http://www.necso.es)



Picture 1: Portal of the San Marcial tunnel.



**Spain.** The Herrenknecht EPB shield TBM to be used to bore metro line 9 in Barcelona arrived at the harbour. The voluminous pieces of the 12.06 m-diameter machine (number S-221) have been loaded on supertrailers to be transported to Can Zam in Santa Coloma where they arrived on 20<sup>th</sup> February. The JV comprising Dragados, Necso, ACS, Comsa and Sorigué will use it on section IV in Badalona and section II to Zona Franca. Visit [www.herrenknecht.com](http://www.herrenknecht.com) and [www.tunnelbuilder.com](http://www.tunnelbuilder.com), es/22.

Picture 2: Herrenknecht's TBM S-221 during handling at Barcelona harbour.

## World Digest of Inaugurations

**United Arab Emirates.** Sultan bin Mohammed Al Qasimi inaugurated on 16<sup>th</sup> February the two-lane Kalba-Wadi Al Helou tunnel, the longest mountain pass in the Middle East. Located atop the highest mountain in Kalba, the 1,280 m-long tunnel will be open to vehicles by the end of the month. The tunnel is equipped with sophisticated air conditioning units, CCTV cameras every 80 metres, fire escapes, emergency phones every 200 metres and modern ventilation systems. An exit has been constructed at the middle of the tunnel for its future connection to a second tunnel which is to be built parallel to this one. The tunnel shortens the distance from Kalba to Wadi Al Helou and directly to Sharjah by half an hour.