



Picture of the month: Riera del Clarà Viaduct construction new Eje del Llobregat

Contract awards

- East container base, Santa Cruz de Tenerife.
- Thirteen stations on Underground Line 9 in Barcelona.

Other contract awards

- Renovation of the Plaza de Domingo Gascón in Teruel, for 6 million euro, for Sociedad Municipal UrbanTeruel, S.A., a company belonging to the city of Teruel.

Finished works

- New Eje del Llobregat road. Section: Puig-Reig to Berga

Events

- FCC builds the new Social Security Treasury building in Tarragona.
- Fuente Lucha Development, Alcobendas, Madrid.

CSR

- FCC updates its Code of Ethics.

News

- The Generalitat de Catalunya distinguishes Esther Koplowitz with the fifteenth Blanquerna Award.
- Homes in Sant Francesc Xavier, Formentera, win architecture prize.
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- Emergency action in Costa Rica.

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- Good environmental practices: searching for a sustainable road.

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- Brenner Base Tunnel, Austria.
- Water supply tunnel in China.

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Contract awards

FCC Construcción wins the new east container base in Santa Cruz de Tenerife

In September the Board of Directors of the Santa Cruz de Tenerife Port Authority chose FCC Construcción, in a joint venture with another company, to build phase II of the new east container base in Tenerife, for 21.2 million euro.

The job consists in extending an existing 16-metre-deep berthing line by an additional 360 metres in length, creating a 55,000 m² yard. To accomplish this, nine 33.75-metre-long reinforced-concrete caissons and two 25.75-metre-long reinforced-concrete caissons (all anti-reflecting)

will be built, on a foundation of quarry run with a 100- to 200-kilogram rockfill filter and a two-tonne protective layer of rockfill.

The project calls for a channel to be built down El Bufadero Ravine. Two reinforced-concrete frameworks will be built, each having five 3.65x2.10-metre, 191-metre-long cells. The bankside road will see some improvement as well: repaving, installation of basic services, site furniture and some final landscaping work where new beds will be laid out and different kinds of plant species will be planted.

FCC is awarded 13 stations on Underground Line 9 in Barcelona



Line 9 Barcelona's underground works.

The contract is worth 1,041 million euro

The Generalitat de Catalunya, Catalonia's regional government, through the publicly owned company Ifercat, has awarded a 30-year public-works concession contract to FCC in a joint venture with other companies. The contract is for the construction, upkeep, maintenance and operation of miscellaneous infrastructure on section I of line 9 in Barcelona's underground system, for 1,041 million euro. The work that still remains to be done accounts for 630 million euro of that total sum.

The section includes 13 stations, running from El Prat Airport to Amadeu Torner. The work will consist in finishing the stations and handling the architecture and physical plant. Transverse components, such as stairways, escalators, platform doors and turnstiles, are not included.

At present 22.9 of the 47.8 kilometres of line 9 have been built, and 75% of the stations are being built. Line 9 will be fully operational sometime between 2013 and 2014.

Events

FCC renovates the new Social Security Treasury building in Tarragona



FCC has renovated Tarragona's new Social Security Treasury building for the Ministry of Labour and Social Affairs.

The project, which has a total floor area of 7,878 m², was designed by architects José María Moreno García and Juan I. Gómez Toledano. The building consists of a basement (for the physical plant, storage and filing) and eight floors of offices. The voice and data, climate-control and emergency power facilities are located on the top floor.

Some details of construction

The foundation was built with separate footings and concrete walls, using a stabilising scaffold to hold up the existing façade. The structure is made of reinforced-concrete pillars with a reticular framework and solid slabs.

The roof is a trafficable inverted roof with "Losa Filtrón" roofing tiles and a ring of flowerbeds around the edge. The wall looking out onto the courtyard is a curtain wall whose opaque areas are a sandwich of granite-clad ventilated wall, polyurethane inner insulation and plasterboard.



SITE TEAM

Department head: Bernabé Sanz
Construction manager: Hipólito Pasarius
Site technician: Juan A. Prats
Quality technician: Pau Rodríguez
Facility technician: Martí Vall
Foreman: José L. Pereira
Office staff: F. Xavier Martín



Development work starts at Fuente Lucha Polygon in Alcobendas, Madrid



On 8 October last work began in the city of Alcobendas, Madrid, on the Fuente Lucha development. The city's mayor, Ignacio García de Vinuesa, attended.

The work includes earth moving, sidewalks, paving, and installation of the sewer system and utilities lines (such as water, irrigation, power, street lighting, telephone and natural gas).

Special care was taken with the landscaping work; 3,670 trees of different species and 37,625 small trees were planted, and 11,320 m² of land were hydroseeded.

The Fuente Lucha polygon will hold 4,000 homes, 3,000 of which are publicly sponsored. One big feature of the

development is its requirement of top-quality facilities, and another is its use of new technologies, such as pneumatic rubbish collection, energy-saving lighting, solar panels that generate electricity and fibre optics.

Owner: Alcobendas City Council

Budget: 43.7 million euro

Completion period: 20 months

Area developed: 65 ha

Work finishes on a new section of the Eje del Llobregat



Viaduct construction.

The job's budget comes to 212 million euro.

FCC has finished the construction of some 21 kilometres of dual carriageway (a 23-metre cross-section, with two lanes in each direction) on the Eje del Llobregat, or Llobregat Corridor. This portion of the road is dubbed the "Puig-Reig to Berga" section, and it lies in the province of Barcelona. The first six kilometres of the section and three kilometres in the middle form a twin of road C-16, and the remaining 12 kilometres are relief road.

The contract was awarded by the Direcció de Carreteres de la Generalitat de Catalunya, Catalonia's regional road department, and it includes a concession allowing CEDINSA (to which FCC belongs, with a 34% share) to run the dual carriageway as a shadow toll operation for a 33-year period.

The new section has eight intersections: south Puig-Reig, central Puig-Reig, north Puig-Reig (zones 1 and 2), south Gironella, central Gironella (which includes the

construction of the road providing access to Casserres, about 4 kilometres long), north Gironella (which includes the road to Olván, about 1.5 kilometres long), Cal Rosal and south Berga.



Aerial view.

The job includes a double tunnel about 1,000 metres long and a cut-and-cover double tunnel about 140 metres long. It has also got nine viaducts (four over the Llobregat River and one on the access to Casserres).

Work started on 11 May 2004. In July 2006 the first five kilometres were opened to traffic; in August 2006 the last six kilometres (on the Berga end) were opened; in July 2007 three more kilometres were opened, and on 31 October 2007 the entire central section except the kilometre where the combined structure is located was opened. This last section, which completes the entire dual carriageway, is the one that is going to be opened on Friday, 21 December 2008.

Site team

Construction manager: Carlos Loscertales
Chief of office staff: Carme Capsada
Earth, paving and drainage production chief: Antonio Molina
Tunnel production chief: Javier González

Tunnel installations production chief: Pere Garrigó
Technical office: Julio Santamaría
Topography chief: Marcelo Serracanat
Quality and environment chief: Patrícia Golobardes
Earthwork foreman: Pedro Campos

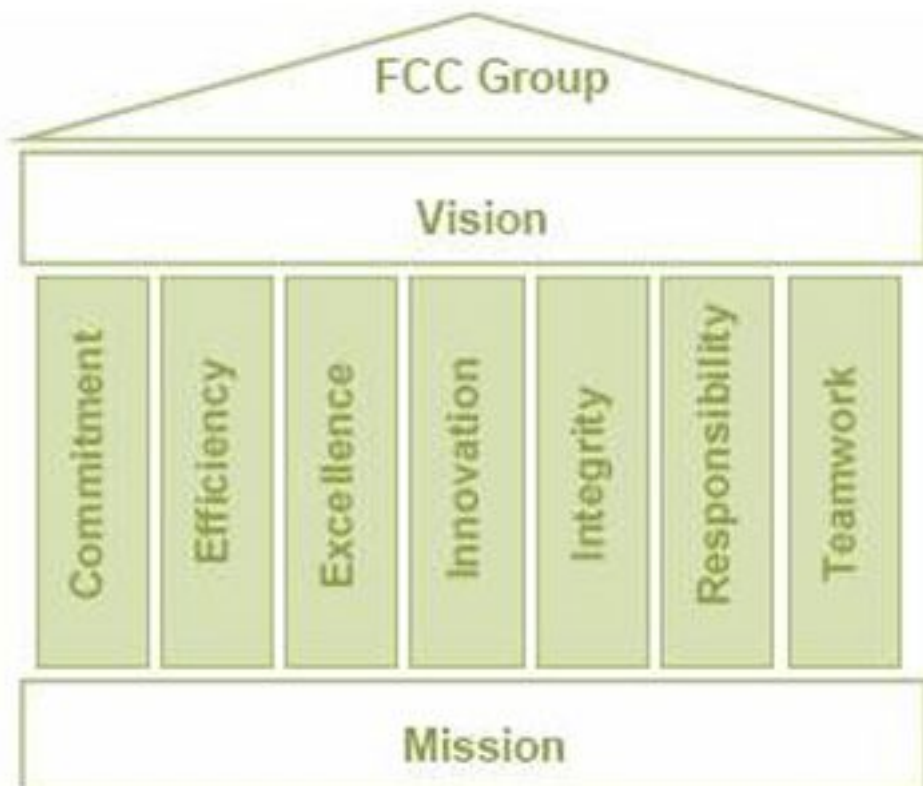
FCC updates its Code of Ethics

FCC has formulated its new Code of Ethics (approved by the Board of Directors on 10 June 2008) with the intent of unifying and reinforcing the Group's identity, culture and patterns of behaviour. The Code of Ethics marks the path to be followed in FCC's activities socially, environmentally and ethically.

This initiative is one way FCC is responding to the commitments to social responsibility and transparency that it made when it joined the United Nations Global Compact and designed the FCC CSR Master Plan.

The ethical principles stated in the Code are meant for all directors, executives and employees of FCC Group companies and must be respected.

The Code states that all employees can use the Group's Intranet to report actions and conduct that they find inappropriate in the light of the Code's principles, confidentially and without fear of reprisals.



The Generalitat de Catalunya distinguishes Esther Koplowitz with the fifteenth Blanquerna Award

The award ceremony will take place in the Teatro Real in Madrid on 5 November.



Businesswoman Esther Koplowitz has been honoured to receive the Fifteenth Blanquerna Award, granted by the Generalitat de Catalunya, the regional government of Catalonia. The award will be given in the Teatro Real in Madrid on 5 November at a ceremony presided over by the president of the Generalitat, José Montilla.

The jury has chosen Esther Koplowitz for the quality of her business management and the important role FCC has played in the business history of Catalonia in particular and Spain in general. The jury also wanted to draw attention to the laureate's career in social action, for through the Esther Koplowitz Foundation she has demonstrated her commitment to the most underprivileged sectors of society and her support for medical research

and the fight against disease. In Catalonia the foundation has built homes for elderly persons who have no resources, and in the scientific field it has plans to finance and build a cutting-edge biomedical research facility, the Esther Koplowitz Biomedical Research Centre, or CIBEK, and hand it over to the Clínic de Barcelona Foundation.

The Blanquerna Award is given each year by the Generalitat de Catalunya through its Madrid office to acknowledge the work of those persons or organisations that have distinguished themselves through contributions to the development, promotion, knowledge or prestige of Catalonia in the sphere of their own business.

The panel deciding the fifteenth Blanquerna Award is chaired by the Generalitat's councilman for culture and the media, Joan Manuel Tresserras, and the other members are the Catalan government's deputy in Madrid, José Cuervo, as vice chairman; the secretary of institutional relations and participation, Josep Vendrell; the director of analysis and prospecting of the Department of the Presidency, Jaume Bahía; the director of the Ramon Llull Institute, Josep Bargalló; the president of the Fine Arts Circle of Madrid, Juan Miguel Hernández; the director of the Madrid Students' Residence, Alicia Gómez-Navarro, and the winner of the 2007 Blanquerna Award, Javier Pérez Royo, chaired professor of constitutional law.

The first Blanquerna Award was given in 1993 to Fernando Lázaro Carreter.

Since then the winners have been Adolfo Suárez (1994), Federico Mayor Zaragoza (1995), Octavio Paz (1996), Joaquín Ruiz-Giménez (1997), Miguel Herrero y Rodríguez de Miñón (1998), the Madrid Students' Residence (1999), José María Martín Patino (2000), Javier Tusell (2001), Jorge Semprún (2002), the People of Madrid, in homage to the victims of the attacks of 11 March (2004), Baroness Carmen Thyssen-Bornemisza (2005), Antonio Garrigues Walker (2006) and Javier Pérez Royo, chaired professor of constitutional law (2007).

2004-2007 Ibiza-Formentera Architecture Award



The 2004-2007 Ibiza and Formentera Architecture Awards were the fifth of the series. The panel of judges, Juan Diego Dueñas, Ariadna Miguel, Carles Muro and Ramón Pico, decided unanimously to give the award for the best work of architecture for 2004-2007 to the set of three buildings containing 37 units of publicly sponsored housing in San Francisco Javier, Formentera

The project, designed by F. Xavier Calleja and Salvador Roig and built by FCC, gives an intelligent answer to an architectural problem under tight constraints, offering not only a home but also a group space that facilitates relations amongst the different blocks of flats, while upholding a high level of quality.

FCC's activities at FICNI 2008



From 25 to 28 June 2008 Gijón, Asturias, played host to the Ninth Monographic Construction and Public Works Fair of the Iberian Northwest, which is one of the most important events in the region for businesspersons and professionals in the construction sector.

In the four days the fair lasted at the fairgrounds' grand Conference Hall, a number of exhibits were on display and lectures and technical and economic meetings were led by experts in current events to discuss the hottest topics in construction today, including both building and civil works.

These were some of the heavyweight topics discussed:

1. The training of new generations and research into new technologies.
2. The new challenges for construction in Europe.
3. Concrete workshop.
4. The fourth day was "the Sector's Social Day". The highlights were masonry, formwork and painting competitions pitting professionals against professionals.

Over 20,000 construction professionals gathered on the Social Day, mainly from the Asturian region, organised by the Construction Labour Foundation of the Principality of Asturias, as part of FICNI 2008.

The Northern Bureau of FCC Construction, whose headquarters are in Oviedo, participated in the masonry contests, where the journeyman-and-helper team of Mariano Martinez and José M. Benito brought home third place with the construction of the proposed object, a lovely set of brick arches.



M&S, FCC Construcción's subsidiary in Costa Rica, spearheaded the tropical storm Alma emergency work



The National Roads Council, part of Costa Rica's Public Works and Transportation Department, selected Corporación M&S Internacional to act immediately in response to the impact of Tropical Storm Alma in Costa Rica. Alma dropped 432 millimetres of precipitation in the southern zone of the country, where it rained non-stop for three days, affecting 75,000 people directly and indirectly. Roads and bridges alike were severely damaged. One of the most hard-hit roads was National Route N2, which connects the country's capital, San José, to the South region and Panama. National Route N2 had 34 major earthslides, trapping 2,000 people.

First-response work

Corporación M&S Internacional mobilised technical personnel and machinery in the Cerro de la Muerte sector from the first day of the emergency, to free the people trapped between earthslides and to get emergency vehicles through.

Due to the situation, work went on non-stop until everyone was rescued; some remained trapped for over 72 hours. It took four days to clear the way for vehicles, removing over 30 earthslides in a 30-kilometre stretch of the road.

Mitigation work

After the first-response stage, all hands set to to mitigate the damage. This consisted in stabilising slopes at several points.

In this work, M&S provided both design and construction. The design employed limit equilibrium theories, and geological conditions were found by the indirect method using DMT (Marchetti dilatometer testing), SPT (standard penetration testing) and geological fieldwork.



Partnerships

Good environmental practices: searching for a sustainable road

Summary of the article published by FCC Construcción in Carreteras.



The processing and restoration of affected areas allow a faster regeneration of damages caused by works.

Sustainability consists in making the needs of the present possible without compromising the needs of future generations. Balancing out the three-columned account (social and cultural aspects, economic aspects and environmental aspects) guarantees, at least conceptually, that any activity can have a chance to last without compromising itself or its environment in future.

Now that the culture of sustainability, the culture of social responsibility, is taking deeper and deeper root in business, government and society, we are going to have to think about whether roads as we now conceive them are

sustainable. The symptoms give us grounds for concern:

The high rate of accidents, traffic jams, CO2 emissions into the atmosphere (Transport by road contributes around 25% to the total CO2 emissions in developed countries), and pollution by CO, NOx, particles and volatile organic compounds are a fact. These plus run-off contaminated with hydrocarbons and heavy metals, the way the landscape is changed and the costs associated with solving these problems make us wonder whether society is really prepared to absorb them in the future, and whether the apparent willingness of governments to work toward sustainable transport will yield any concrete results.

DIRECT IMPACTS		
CONSTRUCTION	MAINTENANCE	OPERATION
<ul style="list-style-type: none"> - Annoyance caused by clouds of dust - Run-off and sediments - Blacktop laying - Noise - Changes in land use: <ul style="list-style-type: none"> -Visual impact -Changes to accessibility 	<ul style="list-style-type: none"> - Emissions when cracks are patched - Combustion of leftover blacktop - Mowing, brush cutting and pruning - Sewer cleaning (impact on wildlife) 	<ul style="list-style-type: none"> - Run-off containing hydrocarbons. Dumping. - Effects on air quality - Noise - Effects on weather - Accidents - Effects on comfort and access to communities

The environment's capacity to assimilate the waste generated by the infrastructure involved in transport by road is limited. Its effects can be mitigated, during both the construction and the maintenance and operation of infrastructure, but the truth is that the right steps are not always taken to reduce undesirable impact.

Environmental management systems, the voluntary good practices that all the stakeholders in construction and road operation ought to deploy, are not yet valued highly enough. When authorities entrust the responsibility for

each phase of the process to "the cheapest" instead of the most responsible, the effect can be discouraging.

The new law on public sector contracts, which went into effect in May last, is the first to deal with environmental criteria in bid assessment. It declares that environmental criteria are essential contractual obligations. This is great news for responsible companies, the kinds of companies that have got an effective environmental management system.

POTENTIAL POLLUTANTS RELEASED DURING ROAD CONSTRUCTION AND MAINTENANCE

- Benzene	- Toluene
- Styrene	- Cyclohexane
- Biphenyl	- Volatile organic compounds
- n-Hexane	- Ethylbenzene
- Aromatic hydrocarbons □	- Xylenes

The authorities are making economically sustainable solutions?that is, solutions society can live with?one of their priorities, and they are saying so daily; the PEIT, or Strategic Infrastructure and Transport Plan, is committed to the gradual integration of sustainability objectives in transport policy. The paradox of transport is that on the one side the media report the adverse effects of roads, their environmental impact and effect on safety, and on the other side there is general agreement as to the positive impact of roads as one of the factors of economic growth and territorial development.

Sustainable development is one of the priorities for any government. The greenhouse effect and air pollution are part of the debate. The work of the European Conference of Ministers of Transport clearly shows the need for research to provide solutions, so that citizen mobility can be dealt with according to the principle of equity.

The reduction of accident rates and emissions are the top-priority lines of action for the different rulemakers, and not only for them, but also for private users and transport professionals, construction companies, road concession holders and maintenance providers, fuel suppliers, road product manufacturers, automakers, etc.

Thanks to these actions, and despite the fact that citizens cannot actually perceive all these actions, pollution emissions have come down, as has the accident rate.

This is because of the measures taken by the different stakeholders in the transport family and because of technological progress in making motors more efficient, the higher rate of diesel use and safer designs. However, the carbon dioxide problem remains, and carbon dioxide accounts for around 80% of all emissions due to transport by road.

The way to make roads sustainable is to make road construction, maintenance and operation sustainable. The starting place is the design phase, with correct natural resource management (earthwork allocation, adaptation of the layout to the terrain, recycling, etc.); reduction of energy consumption during construction; reduction of noise and emissions into the air, water and land; landscaping; protection of the cultural heritage; and protection of biodiversity.

During the construction of a road, there are three things to bear in mind in terms of environmental impact: the layout, the natural environment and safety. The layout has effects on the landscape (Remember, tourism is important in Spain), on the archaeological and cultural heritage and on the wildlife and plant life. A new road leaves a scar on the land that takes the environment ten to fifteen years to assimilate completely. Traffic conditions, vehicle behaviour, speed, fuel consumption and, as a result, emissions must be taken into account in road design.

The impact on the environment has to do with biodiversity and land, emissions, raw materials and waste production. A road's physical influence covers around three to four hectares of natural space per kilometre of road, while only 30 to 40% of the area eventually become re-assimilated into the environment. And we must not forget the indirect impact due to the various kinds of production centres not located so close to the road, such as refineries, cement plants, blacktop plants, steelworks, and so on.

Accident prevention is a prime topic in any developed economy. Accident prevention means:

- Giving personnel at plants and at the road site the safest working conditions. It is a matter of identifying the risks and perfecting the procedures to reduce the accident rate and above all to intensify information and training.
- Guaranteeing the safety of road users so they can travel securely. If the risk of accidents is minimised, road quality (which is usually inversely proportional to accident seriousness) does not become an additional risk.

Roads age, like any other kind of infrastructure. Their behaviour as they age will depend on the quality of their construction and, of course, their maintenance. Without maintenance, a road's service and safety level plummets. When a road is being overhauled, the impact on the land around the site and at production centres should be limited, the same as during construction. The idea is to

avoid the kinds of inconveniences that go with resurfacing and infrastructure aging, so that the right service level can be upheld for the current needs.

Automakers have got their share of responsibility. They have the challenge to build ever-less-polluting automobiles and to conduct research into cleaner fuels and alternative energy sources. They have got to strengthen safety measures and help make vehicles easier to drive, to limit the risk of accidents.

Tiremakers have got to mitigate the potential harm inherent in manufacturing tires (due to the impact on the environment and the amount of raw materials consumed in tiremaking) and the problems caused by tire use and the tire's life cycle. The challenge of tire grip is not just a commercial issue; it is an essential aspect of road safety that is being improved every day.

Road operation is involved as well. Rational traffic management improves road safety and emission levels. Renewal of the country's motor pool, intermodal management and motorist conduct management too affect fuel consumption. Those in charge of operating roads must furnish solutions to air pollution, the noise problem, the impact on land, surface and underground water, and forest fires, which are often the consequence of passing vehicles or their occupants and can be reduced through information and driver education.



The information and training reduce the incidents and accidents at works.

A lot of ground has been covered. Sustainability, as we see it at FCC, consists in moving toward the goal, not reaching it. There is still a long way to go in the construction field, in maintenance operations and in road operation, and to get there we have got to continue improving in the following areas:

- Natural resource management. We have to get along with nature through good practices and an environmental management system that promotes the development of procedures to guarantee the minimum impact on the environment, generate the smallest possible quantity of waste and promote the use of on-site recycling, which not only reduces the need for new materials, but also makes for a considerable savings in shipping costs.

- Emission reduction. Emissions include substances and noise that can potentially cause discomfort or damage to people, animals and plants.

During the construction of a road and for a limited period of time, significant emissions are released. These emissions later subside but do not stop altogether; they last throughout the road's maintenance and operation. Although technology has managed to reduce vehicle emissions significantly, noise and light pollution are a big problem for communities living near roads. Run-off carries with it any substance dumped on the road, flux, pesticides and herbicides, and so has a significant effect on surface and underground water. The measures involve builders and maintenance providers, automakers and tire manufacturers.

- Reduction of energy consumption. The road is a big consumer of energy during its construction and maintenance, and so are the vehicles that run on it. Each year the vehicles that use a road consume the equivalent of all the energy used to build the road in the first place. Large quantities of energy are also consumed in lighting, illuminated signals, etc.

The shipping of materials is the biggest energy consumer during construction. That is why fostering recycling and the use of local materials has a decisive influence on reducing energy consumption.

- Biodiversity. Care for natural species of life is one of the pillars of the health of the ecosystem near and not so near the road. A public works project's ability to alter the conditions of the thousands of hectares within the project's area of influence is tremendous, with the movement of huge quantities of earth, highly aggressive upkeep work and the risks that traffic itself generates, with its spilled substances. Keeping environmental conditions unchanged must be a commitment for everyone involved, and motorists must be encouraged through awareness campaigns to be good citizens and avoid starting fires.

- Landscape and cultural heritage. Roads enable us to travel and enjoy our heritage, one of Europe's richest. The authorities have got the obligation to take care of that heritage by applying tight control during design so that environmental quality is taken into account. Roads can be integrated into their environment by using local species for replanting and making sure that corrective measures are enforced so that the environment can recover in the best, shortest possible time.

- Personnel care. This refers to how construction and maintenance personnel are managed, how they are hired and trained, how the best professionals are convinced to stay. Personnel have got to be furnished with a workplace in the best possible environmental, health, safety, personal and career development conditions. Employee satisfaction has got to be enhanced through non-discrimination, payment in line with employee functions and responsibility, and the possibility of adequate training.



The layout according to the topography of land saves earth movements and reduces significantly the visual impact.

- Search for the best companies. Only the best companies are able to supply the products and services society requires, able to satisfy the expectations that ought to preside over the results of good business management, able to improve the way decisions are taken, able to reduce business risks and, in the end, able to be more competitive and sustainable. Time periods will be shorter; productivity, higher; defects, slighter; and the number of accidents; lower.

ALPINE closes Austria's biggest railway-tunnel engineering contract, for the construction of the Brenner base tunnel

The biggest feature of this section is the 34-kilometre-long twin-track tunnel

The railway-engineering equipment contract for the northern entrance line has been awarded to ALPINE in a joint venture with another firm, for 260 million euro. Construction is anticipated to commence in 2009 and end in 2012.

The project consists of a 41-kilometre-long segment of railway joining the cities of Kundl and Radfeld-Baumkirchen. This will be the first part of the line entering Brenner base tunnel through its northern entrance. The line belongs to the Munich/Verona railway corridor being built for high-speed traffic and cargo. The section is designed to take a maximum speed of 250 kilometres per hour.

Scope of the services

The railway-engineering services include the construction of the tunnel platform (on slabs) and the accesses, plus the laying of the track with an elastic anchoring system.

Additionally, the job calls for construction of the different ventilation systems and the wiring, safety and flood control facilities. The mechanical service rooms and engineering buildings will be enlarged as well. The contract also covers the construction, operation and elimination of temporary facilities, such as power systems, communications, ventilation and access control while work is under way.

ALPINE builds a water supply tunnel in China



In Pinglu, province of Shanxi, for 47 million euro.

ALPINE, FCC Construcción's Austrian subsidiary, is building an approximately 25-kilometre-long water supply tunnel in Pinglu, in the Chinese province of Shanxi, west of Beijing, for Shanxi Province Wanjiazhai Yellow River Project General Corporation Ltd. The project costs 47 million euro and is scheduled to be completed in 2009.

This tunnel is part of the main north line of the Yellow River Diversion Project, and it diverts water from the Yellow River to the regions of Pinglu, Shuozhou and Datong. ALPINE has just finished boring 13 kilometres to Daliang cavern, on the first partial section of this project.

Despite the extremely difficult geological conditions, ALPINE has managed to make progress at an average rate of 750 metres a month. Since the job started in mid-2006, it has been necessary to bore through several zones that are highly complicated, geologically speaking, and several coal deposits up to 12 metres thick. To bore

the tunnel, ALPINE is using a special latest-generation TBM with a double telescopic shield for hard rock, articulated in two parts, which provides continuous support for the terrain as the tunnel is pushed forward.

The bored tunnel is 4.8 metres in diameter. To line it, 83,450 pieces of concrete lining will be used, cast at a prefabricated-parts plant set up right at the site, where 54,200 lining pieces have already been produced so far.

ALPINE in China

Back in the late nineties, ALPINE built two pumping stations for the Yellow River Diversion Project. It also handled the construction of the 42-kilometre-long Ningbo-Shengzhou Expressway on China's east coast.