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#### Photograph of the month

Fitting the mobile roof to the Vitoria bull ring. The huge structure allows the roof to open in just eight minutes.



#### Other adjudications

• **259 homes in Camas, Seville for Atridaria S.L.** These are arranged in five closed blocks in with basement, ground floor and six storeys.

• Second phase of the Esfinge dock and southern enclosure of the containers terminal in Las Palmas de Gran Canaria, for €48.7 and €12.8 million, respectively. The work includes building 23 reinforced concrete caissons, stone fillings, filters, blocks and an esplanade of 55,000 m<sup>2</sup>.

• **94 homes in Ensanche de Vallecas, Madrid, for Oncisa.** The work has foundations on 45 m long piles and has a pre-installation for air conditioning plus a solar powered heating installation.

• Dam for creating a reservoir at the end of the Alarcón (Cuenca) reservoir, for €9.2 million. It is 1,087 m long with a 5 m wide crown, generating a reservoir of 520 Ha. The dam core is of 20 cm thick roller compacted concrete layers.



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## Building of outer dock in the new port of Granadilla in Tenerife adjudicated

The Santa Cruz de Tenerife port authority has adjudicated the building of the outer dock of the new port of Granadilla to FCC Construcción in a joint venture with two local companies, with a budget of €114.5 million and a building timetable of 37 months.

The outer dock of the port of Granadilla will have a total length of 2,512 m, 707 m of which is perpendicular to the coast, 664 m in a second alignment and 883 m in a third alignment at the end of which there will be a perpendicular section 258 m long.

The environmental factor was of great importance in the approval of this infrastructure. FCC Construcción has two months in which to comply with the corrective and compensation measures imposed by the European Commission.



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Hospital Marqués de Valdecilla, Santander

#### Enlargement of the Marqués de Valdecilla hospital, Santander, adjudicated to FCC Construcción

The Cantabrian Health Service has adjudicated phase III of the enlargement and renovation of the Marqués de Valdecilla university hospital in Santander, Cantabria, to FCC Construcción in a joint venture with another two companies.

This third and final remodelling phase consists of demolishing the current general hospital and building a new main entrance to the hospital and three new blocks of wards, including the obstetrics, laboratory, outpatients, paediatrics, pathological anatomy, pharmacy, medical subdirectorate and catering services.

The building has four underground levels and eight storeys above ground. The foundations are of piles and the floors of post-stressed construction.

The work includes the pneumatic transport installations for soiled clothing and samples, medical gases, photo-electric power, communications and signposting and clinical and laboratory furniture.

The hospital has a built-up area of 70,000 m<sup>2</sup> plus grounds of 17,000 m<sup>2</sup>.

The budget for the work is  $\in$ 72.2 million and is scheduled to take at most 38 months.



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## Last section of the Ebro motorway in Navarre adjudicated

The Department of Public Works, Transport and Communications of the Government of Navarre, under the Ministry for Development, has adjudicated the building of the Buñuel – Cortés section of the Ebro motorway to FCC Construcción in a joint venture with a local company, for €15.6 million.

The work consists of the third and final section of the project to widen the N-232 in Navarre. With a length of six kilometres, it runs between the Buñuel junction and the limit with the province of Zaragoza. The new carriageway lies on the left (northern) side and has made maximum use of the current road infrastructure.

The work started at the end of March and the full length of the N-232 in Navarra (34 km) is scheduled to be widened within a year. This section has one of the highest traffic volumes in the region, with an average of 10,000 vehicles a day.



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#### RACC safe driving school, Madrid

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## Inauguration of new RACC safe driving school, southern Madrid

The new RACC safe driving school in the southern Madrid town of Moraleja de Enmedio was inaugurated on 7 March. The ceremony was attended by authorities including Sebastián Salvadó, Chairman of the RACC, Carlos Alberto Estrada, Mayor of Moraleja de Enmedio, Fernando Falcó and Fernández de Córdova, Director of FCC and Antonio Pérez Gil, FCC Construcción Area VII Director.

This driving school is designed to teach drivers to handle cars in bad conditions such as rain, aquaplaning, spinning, skidding, etc, and to develop precise driving skills on this system of paving.

To create the bad conditions, a pumping system has been installed to deliver water under pressure to the systems for spraying the tracks. Each track also has a drainage system to return the water to the tanks for re-use.

The equipment includes a hydraulic platform for practising all types of emergency braking on slippery surfaces, a circular track with concentric rings of different types of surfaces to determine adherence in curves and a slippery hill with a gradient of 11% ending in a bend to control traction uphill.

The complex also has a 12,000 m<sup>2</sup> area with a slippery surface for tests of handling and controlling the steering and off-road 4x4 installations for learning off-road driving.



#### Data

Project name: High performance driving centre

Promoter/owner: Real Automovil Club de Catalunya

Architect: GB – Consult GMBH and Tekno – Bau Ibérica

Budget: €3,201,067.83

Timetable: 6 months

Site team

Department manager: Juan Hernández Nodrid

Site managers: Juan Luis Hernández / Maria de la Cruz Molina

Production manager: María de la Cruz Molina

Administrative staff: Cèsar Jesús Cruz Rodríguez



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# Praga bridge – southern junction section of burial of M-30 inaugurated

The inner carriageway of the buried section of the M-30 between the southern junction and Vicente Calderón was inaugurated on 20 February. This section is approximately 3,000 m long of which 1,666 m were built by FCC Construcción in 20 months.

The inauguration ceremony was attended by the Mayor of Madrid, Alberto Ruiz Gallardón, together with the Deputy Mayor, Manuel Cobos, the Councillor for Town Planning, Housing and Infrastructures, the Councillor for regional safety and services and Councillors from the Centro, Arganzuela, Usera and Carabanchel districts.

The inaugurated tunnel was built using the cut and cover method and consists of 1 m thick panels and lightened, reinforced, pre-stressed concrete slabs of widths of between 0.8 m and 1.5 m. The cross section of the main section consists of two 0.50 m shoulders, 2 0.75 pavements and between three and five 3.50 m wide carriageways.

The side walls have a prefabricated concrete base 1 m high on which there is a 2.30 m high glazed panel. The tunnel has continuous side lighting in the main section and discontinuous lighting in the branches.

The tunnel has all the safety systems required by European standards. It has 12 pressurised emergency exits and a particles filtering system to clean the air expelled to the exterior.

This section frees up some 112,000 m<sup>2</sup> for parks and gardens to improve the quality of life for some 530,000 neighbours in the Arganzuela, Usera and Carabanchel districts by reducing the acoustic and environmental pollution of the area and improving traffic conditions for the 110,000 drivers who use this section daily.

The drainage system has also been improved and enlarged, increasing the side collectors as well as building storm reservoirs that will provide an important increase in the quality of the water that flows into the River Manzanares by reducing tippings and complying with the standards of the Tagus River Basin hydrological plan standards.

The overhead 132 kV electrical line that ran parallel to the river for approximately 6 km has also been buried.

#### Data

Project name: Burial of the M-30; Praga bridge – southern junction section

Promoter/owner:

Department of Town Planning, Housing and Infrastructures, Madrid City Council

Budget: €279,693,000

Timetable: 20 months

Site team

Site manager: Juan Manuel Dochao Salas

Department manager: Alberto Enciso García

Surface work manager: Javier González Laluzuela

Underground work manager: Miguel Ángel Hernández Santos

Finishes and installations manager: José María González Jiménez

Drawing office manager: Maximiliano Rodríguez Inés

Administrative manager: Ángel Luna Álvarez

Work units

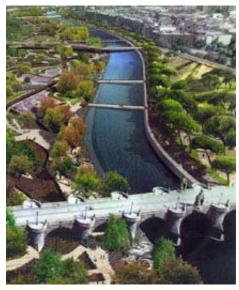
Screens: 45.790,86 m<sup>2</sup>

Piles: 2.585,70 ml

Concrete: 97.450,33 m<sup>3</sup>

<mark>Slab:</mark> 52.20,21 m<sup>2</sup>

Steel: 14.135,47 Tn



Burial of the M-30

Aggiomerate: 17.103,89 Tn

Jet fan (tunnel ventilators): 25 units

Emergency exits: 12 units

Temporary diversions: 8.586,48

Collectors: 4.596,22 m

Glazed panel: 9.499,94 m<sup>2</sup>



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#### Accesses to the Ponferrada university campus and new bridge over River Sil inaugurated

The Councillor for Development of the Government of Castile and Leon, Antonio Silván Rodríguez, together with the Chairman of the Government of Castile and Leon, Juan Vicente Herrera, and the Mayor of Ponferrada, Carlos López Riesco, attended the opening of the accesses to the Ponferrada university campus and new bridge (the Centenario) over the River Sil on 6 March.

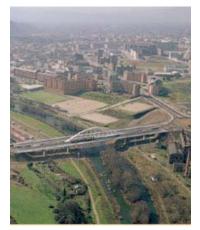
The work consisted of connecting the Avenida de América and the Avenida del Bierzo on the left bank for the River Sil with the Avenida de la Libertad and the Columbrianos road on its right bank with two roads, two roundabouts and the building of a new bridge over the river.

The roads consist of a 3 m pavement, 0.5 m shoulder, 7 m carriageway, 0.3 m shoulder and a variable width central reservation for each road.

The roads' structures consist of 25 cm of soil cement and three layers of hot bituminous mix, one being the 7 cm thick base with a 6 cm thick intermediate layer and a 5 cm thick surface layer.

The bridge has a mixed symmetrical structure formed by two access spans per carriageway, each 33 m long, a central span with an upper arch 88 m long to support the two carriageways and two other 33 m access spans.

The work was completed with a 920 m supply pipe, a rainwater collector and a reinforced earth wall of 955 m<sup>2</sup>.



bridge of Ponferrada

#### Data

#### Project name:

Accesses to the Ponferrada university campus and new bridge over River Sil.

#### Promoter/owner:

GICAL (Gestión de Infraestructuras de Castilla y León, S.A.), a public company of the Government of Castile and Leon.

Budget: €10,722,637

Timetable: 24 months

Site team

Manager: José Manuel San Miguel Muñoz

Production managers: Rafael Huerga Fernández / Luis Carrera Carro

Drawing office manager: Esteban García García

Foreman: Olegario Martínez Rodríguez

Technical details

Total bridge length: 220 m

Total length of roads: 1.673 m

Minimum radius of motorway trunk: 135 m

Maximum gradient: 6,5 % m

Specific speed: 60 Km/h

Camber: 2%



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Candás multi-purpose centre, Asturias

#### Inauguration of the Candás multi-purpose centre, Asturias

The Candás multi-purpose centre in Carreño (Asturias) was inaugurated on 28 February in the presence of the Chairman of the Principality of Asturias, Vicente Álvarez Areces, the Councillor for the Chairmanship, M<sup>a</sup> José Ramos, the Councillor for the Arts, Ana Rosa Migota, the Councillor for Social Communications, Tourism, Housing and Social Well-being, Laura González, the Councillor for the Environment, Territorial Ordering and Infrastructures, Francisco González and the Mayor Carreño, Ángel Riego.

The building, which has a built-up area of 4,797.10 m2, has four stories with useful spaces both inside and outside (terraces) and landscaping with gardens and recreational spaces.

The multi-purpose building has installations for the youth and culture with a music school, youth information and employment offices, an auditorium and classrooms as well as a day centre for the elderly with a physiotherapy room and games and lecture rooms as well as the various rooms for social services such as a psychology consultancy, consumer workshop and a therapy room.

#### Data

Project name: Candás multi-purpose centre

Promoter/owner: Carreño council

Architects: Manuel García García / José M. Caicoya Rodríguez

Budget: €3,577,016.62

Timetable: 18 months

Site team

Department manager: Aurelio Vega Fernández

Site manager: José María Arrieta Illumbe

Production manager: José Manuel Fernández Vázquez

Site foreman: Francisco Martín Iglesias Joven

Surveying: Antonio Anes Sanz 9



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#### San Pedro del Pinatar desalination plant, Murcia

#### The Prime Minister visits the San Pedro del Pinatar, Murcia, desalination plant

The Prime Minister, José Luis Rodríguez Zapatero, visited the site of the San Pedro del Pinatar II (Murcia) desalination plant on 4 February, inaugurated in January and in which FCC was involved in the four parts into which the work was divided, specifically the sea water inlet.

The Prime Minister was accompanied by the Minister for the Environment, Cristina Narbona, and the chairman of the Region of Murcia, Ramón Luis Valcarcel, as well as other regional and local authorities and directors of FCC Construcción.

The sea water inlet consisted of building a micro tunnel 1,800 m long and 2 m interior diameter to carry water to the San Pedro del Pinatar desalination plant. The working depth ranged from -3.30 m to -16.40 m.

The building procedure involved sinking with closed shield tunnel boring machine from a shaft located at 615 m from the pumping shaft next to the desalination plant and 1,150 m from the inlet itself. The driving shaft measured 12 x 6.5 m.

The inlet consists of an octagonal caisson 10 m high made of reinforced concrete and supported in the sea at the -17.50 m level.



#### Data

Project name: Seawater inlet at San Pedro del Pinatar (Murcia)

Promoter/owner: Taibilla Canals Community

Budget: €18,500,000

Timetable: 15 months

Site team

Joint venture manager: Miguel Ángel Lorente Sánchez

#### Surveying:

José Ramón Galia Muñoz / José Mª Coca García

#### Administration:

Enrique Fernández Martínez / Mª Dolores Sánchez López



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#### Internacional

Guayacán – Jinotega road, Nicaragua



#### Conditioning of the El Guayacan -Jinotega road, Nicaragua

The work of conditioning the El Guayacan -Jinotega road, adjudicated to the FCC Construcción Central American subsidiary Corporación M&S, comes within the work carried out by the Ministry of Transport and Infrastructures of Nicaragua to improve communications in the northern region of the country.

The road joins the cities of Matagalpa with 350,000 inhabitants and Jinotega with 110,000 and is used to transport the coffee produced in the north of Nicaragua.

The conditioning work consists of surfacing 23 km of existing earth road with a double layer of bitumen to convert it into a main road, which required moving and filling more than one million cubic metres of material.

Some 125,000 m<sup>3</sup> of stone material was used for the base and sub-base layers as well as 185,000 m<sup>2</sup> of double layers. All the arids used for the work were produced with equipment owned by Corporación M&S.

Nearly half of the road's route is complete new and crosses mountain areas with design gradients of the less than 9%.

The work included building 42 sewers of metal pipes with diameters between 1.0 m and 2.50 m as well as building three arches with spans greater than 4.0 m.

The work, with a budget of  $\notin$ 9,432,000, is financed 90.46 per cent with funds from the European Union and 9.54 per cent with funds from the Nicaraguan government. The timetable is 18 months.

#### Data

Project name: Conditioning of the El Guayacan - Jinotega road

Promoter/owner: Ministry of Transport and Infrastructures of Nicaragua

Budget: €9,432,000

Timetable: 18 months

Site team

Construction director: Pedro Collado

Nicaragua manager: Néstor Pereira

Department manager: Reynerio Romero

Site manager: Alembert Espinal

Earths foreman: Miguel Leiva

Drains foreman: Giovanni Telica

Various foreman: William Lovo



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Vitoria bullring

## FCC carries out the first work on the mobile roof for the Vitoria bullring

The Vitoria bullring, designed as a multi-use building, has a seating capacity for 7,778 spectators for bullfights and can house 11,292 for concerts and exhibitions, for which the centre can also be used.

The ring has a moving roof split into two translucent sections. This massive structure allows the roof to open and close in just eight minutes.

At the time this bulletin was published, FCC Construcción is planning the first tests of the roof, complying with the timetable, and terminating the finishes to the two large girders, 50 m long, that span the bullring and support the translucent grey polycarbonate sheets that form the roof. The metal structure that supports the weight of the roof and the rails on which it runs have already been installed.

It is also fitting the final plates on the façade, which will be of silver and gold to reflect the sunlight. Gold will be the predominant colour at the highest point, still awaiting finishing.

The inauguration is scheduled for the end of April.



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#### Speech given at CONAMA8 Sustainability as company culture

From the point of view of the new company culture, sustainability is "something more than creating reports," although doing so is "a good starting point, a commitment that must be fed," according to the conclusions of the recent meeting in Amsterdam for the presentation of the G3.

Sustainability means obtaining maximum profits, satisfying the needs of society and the environment, is voluntary and must include the social and environmental concerns in the company's operations. Sustainability is a form of new humanism but is not merely philanthropic nor social action.

#### Sustainability reports as a communications element

Sustainability reports are a powerful communications element but it must be remembered that communicating only good news is not good communications. They must be aimed at all those involved (employees, customers, suppliers, sub-contractors, shareholders, investors, etc). The age of the "prestige book" aimed only at customers and producing selfsatisfaction among directors has passed.

They generate immediate advantages over the competition in a sector in which it is increasingly more difficult to stand out. Time will mark the difference between companies that can select rigorous initiatives from those that are purely cosmetic, that transmit their real intentions regarding sustainable development.

A modern company will be defined by its groups of interest and its ability to meet their needs for information; transparency is essential for giving confidence and this cannot be purchased or created spontaneously - it must be achieved over the long term.

#### Correct orientation in sustainability reports: generating confidence

According to the Corporate Social Responsibility Observatory, there are two ways to orient the reports:

1. A compendium of commitments and actions relating to the management of sustainability with a descriptive focus, not always structured and not necessarily detailed, aimed at the marketing activity.

2. A report on the policies, actions, processes, results and impacts measured over a specific period with the objective of submitting accounts to the interested parties, designed to generate confidence.

The second option implies working while thinking of the long term; these are the so-called "fourth generation reports."

The FCC Construcción report

In its last sustainability Report, prepared with the collaboration of the Fundación Entorno, FCC Construcción has offered transparent information on its actions to all those interested and made them participants in its management, providing a thorough analysis of the main risk situations generated while carrying out its activities, of the expectations of the various groups of interest and of the company's response to these concerns.

The previous report detailed the company's response to the risks and opportunities arising from changes in its environment. The current document has taken a further step and includes an analysis of the results of the company's actions both on the company's progress and on the groups of influence.

This method has involved a real examination of company conscience that has allowed the designing of an argument that includes the information that really interests the reader.

""The RSE is above all a manner, a style of thinking on the way we do business." (Cristina García Orcoyen).



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FICON

#### 15th FICON

FCC Construcción participated in the 15th Iberian Building, Town Planning and Environment Fair (FICON) held on 14 to 17 March in the Extremadura exhibition centre (FEVAL) in Don Benito, Badajoz.

The fair was opened by the Minister of Housing, Mará Antonia Trujillo, and included the most important companies and professionals from the building sector in Spain and Portugal.

It included a pavilion dedicated exclusively to public works machinery and various specialised halls aimed at the most important complementary sectors in buildings such as the town planning and environment hall, the real estate hall and the renewable energies hall.

With an area of more than  $30,000 \text{ m}^2$  and 400 exhibiting companies, FICON 2007 provided an overview of the latest developments in the sector.



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#### Technical building code conference

The approval of the Technical Building Code (CTE) has become an important challenge for all those involved in building since it provides a new focus on the standards applicable to building, giving them a performance nature in line with other Western countries and also introduces numerous changes in the form of designing and constructing buildings.

To face this challenge, FCC Construcción has held conferences to publish the CTE to technicians, both those on site and those in specialised departments, dedicated to building.

These conferences have been given by notable specialists from the Eduardo Torroja Institute for Building Sciences. These speakers have coordinated the preparation of the CTE and have taken part in preparing the various documents in it.

The conferences have been structured in five large blocks:

- Presentation of the CTE and its compliance
- Safety documents
- Habitability documents
- Building solutions in the framework of the CTE
- Undertaking and control in basic CTE documents

A total of 15 conferences have been held, attended by more than 800 technicians, in Madrid, Barcelona, Seville, Valencia, Valladolid, Las Palmas and Santa Cruz de Tenerife.



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#### The Ministry of Housing awards FCC Construcción

The Ministry of Housing has awarded to the national prize for public housing quality to the San Jerónimo building built by FCC for the Municipal Housing Company in Seville. This is a building with 68 homes for renting, designed by Francisco Javier Terrados Cepeda and Fernando Suárez Corchete.

The jury praised the architectural quality of the project in search of a serene architecture that reinterpreted the spaces of the landscape of Seville under the galleries of the backstreets of the housing in the historical centre, connected with the city, joining the urban residential area of San Jerónimo with the new area of expansion and also including the services and spaces needed to make a city.

The jury also appreciated the fact that the houses are for rent and the high functional quality and provisions in houses measuring  $70 \text{ m}^2$ .



03 April 2007

### Most important adjudications

Port of Granadilla, Tenerife

Valdecilla hospital, Santander

Ebro motorway

Inaugurations and first stones

National

International

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Vitoria bullring

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Parla tramway: a new means of transport

The city of Parla in the region of Madrid will inaugurate its tramway next May, after which users will have a new, comfortable, accessible and ecological means of transport that has become a rare reality in just 20 months. An urban tramway that travels on the surface throughout its route, linking the historic and administrative centre of the city with the new urban and developments.

Parla is a town in the south of the region of Madrid, 20 km from the capital and linked to it by the A-42 Toledo Road, the C-4 suburban Renfe railway line and 10 inter-urban transport lines. The town has four urban bus lines that suffer the consequences of traffic and untidy urban development. This situation, and the fact that Parla was not included in the Metrosur network, gave birth to the current Parla tramway.

This new means of transport has been made a reality in just 20 months. A highly urban tramway that runs on the surface throughout its route, communicating the historic and administrative centre of the town with the new developments. It has also allowed the Calle Real, the backbone of the town and, until the 1990s, the Madrid - Toledo road, to become a pedestrian street with wide green areas for recreation, commerce, living, etc.

This investment has been made possible thanks to the income from new developments in the Parla East urban consortium (with a 55 per cent shareholding by the region of Madrid and 45 per cent by the Parla Council), reinvested in transport infrastructures with a contribution of private capital.

The first tramway to run in the region of Madrid will do so in the streets of Parla. From the time when the Parla town council team took the decision to set up a tramway until it became a reality running in the town's streets has taken less than two years.



The timetable, a challenge

The town council decided on the tramway in December 2004 under its integral transport infrastructure plan while the Madrid Regional Transport Consortium (CRTM) took care of the request for tenders to make the tramway a reality.

The CRTM held a public request for tenders to finance the railway operation in February 2005, which included investment for preparing the building project, its financing, the carrying out of the work and the acquisition of the rolling stock in exchange for the rights to operate it for 40 years.

The four most important building groups in the country - Dragados, FCC-Acciona, Sacyr and OHL - presented their tenders in April of that year.

The tender from the group led by FCC, Detren (a subsidiary of FCC-Connex), Acciona and Caja Castilla La Mancha Corporación was adjudicated the work on 23 May, 2005 and the Parla tramway concessionaire company was formed in June.

Work started on phase one in September 2005 and on phase two several months later. The building work in phase one ended on 31 December, 2006 with only the landscaping and urban furniture remaining to be finished.

The first trams arrived in Parla last February and integration and empty running tests started during March and early April 2007. **The work** 

Line one of the Parla tramway, with a circular route of more than nine kilometres and 16 stops, allowed the landscaping of approximately 150,000 square metres and the building of four car parks with more than 400 places.

The method of building the platform on the surface and designed in sections reduced nuisance caused to neighbours to the minimum. The building project specified that line 1 of the Parla tramway should be built in two phases.

The first phase involved inserting the tramway in the consolidated urban area of Parla and joining it with the depots. It involved 4,270 metres of electrified double track with nine stops: Plaza de Toros, Julio Romero de Torres, La Ballena, Parla Centro Bulevar Norte (interchange with suburban railway), Iglesia Centro, Bulevar Sur, Reyes Católicos, Isabel II and Gran Parque Parla Este (12,000 homes, 80% subsidised housing). The route runs on the surface and has an overpass over the M-408 road (Parla-Pinto).

The second phase, 4,230 metres, involved closing the circle of line 1 of the Parla tramway, crossing the two main avenues in Parla East and the city's industrial estate to reach the new depot. It has seven stops: Avenida del Sistema Solar, Tierra, Venus, Estrella Polar, Jaime I, Polígono Industrial Ciudad de Parla and Parla Norte (second interchange with the C-4 suburban railway line).

The tramway's functional structure includes the workshops and depots area. These are to the north of the town between the Parla-Pinto road and the C-4 Parla-Atocha suburban railway line. It is designed to operate as the neurological centre of line 1 and of future expansion to the tramway system. As well as maintenance and tram parking buildings, there is an office building containing the central control post from which the line is controlled and operated.

By spring of this year, the tramway running through the streets of the town of Parla is a reality. The noise of machines, cuts in traffic and nuisances caused by work of this size, have given way to a silent, comfortable, accessible and quick tramway that respects its environment.

#### The trams

The first trams that will travel through the streets of Parla arrived in February. These are nine bidirectional Citadis 302 model units from Alstom, 32 metres long and 2.4 metres wide with an integral low floor, consisting of five coaches with three bogeys (two of them with motors). The units can carry 182 passengers and have four double doors (for wheelchair access) and two single doors on each side which open at all stops.

All the rolling stock is adapted to the needs of persons with reduced mobility such as double doors for wheelchair access that open at all stops, simultaneous extension of the step between the train and platform when the doors open, optical signposting over the doors with differing lighting frequency, audio indication during door closing with different lighting frequency, door opening button with high contrast chrome and the word "open" in Braille and pictogram of persons with reduced mobility on the doors. Inside, the handles are in high contrast colours, there is a protective screen, safety belt, support for our companions, space for turning wheelchairs and signs on the platform and stop for locating persons with reduced mobility.

Another feature of the trams is that they do not have stop request buttons for passengers since the tram stops and opens its doors at all stations for passengers to enter and leave.

Integration tests started at the beginning of March and consisted of checking clearances, infrastructure, catenary, tramway signalling, dynamic tests and adjusting the phases of the signals, tests of the SAE and of the radio.

#### Training

The training of future tramway workers started last January. In the case of drivers, theoretical and practical sessions were planned. Once the evaluation process had been passed, these new drivers are qualified to drive the Parla trams. The purpose of the sessions is to check the behaviour of each system and work process with the teams. After definitive preparation and system tests, empty running started, during which periods the driver operates alone and in conditions similar to those of commercial running with passengers.

The control centre inspectors and operators follow the same training process which, once passed, trains them in specific tasks for their posts. In the case of the control centre operators, the second step of training focuses more on the functioning of the systems and their configuring to the specific features of operating the line in Parla (SAE, radio, SCADA, ticketing, video in depots, signalling, etc).

#### **Commercial operation**

The route of the Parla tramway has a carousel structure. The best form of operating it is with two circular lines operating in opposite directions at the same frequency. Thus, all the users have the same service coverage.

The service start and end hours have also been adjusted to allow users to catch the first suburban train at the Parla Centro station and to allow those who arrive on the last train to travel to any stop on the system.

The frequency of passenger service has been matched to variations in demand according to the various time bands, attempting, equally, to provide maximum connection with the suburban railway lines. At rush hours, the service intervals are seven minutes in each direction.



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Previous Newsletters 1 February 2 March Mantenimiento de Infraestructuras, S.A. (Matinsa) is the FCC Construcción company dedicated to the upkeep and maintenance of waterworks, roads and motorways as well as reforestation work, firefighting and environmental restoration.



#### Forest fires

Since 1998, Matinsa has run the forest fire-fighting and prevention service for the north west of the region of Madrid, covering an area ranging from Somosierra to Aranjuez.

It has prevention and extinguishing management software and uses the Arc view and Arc info systems for designing, scheduling and monitoring preventive work and for decision-taking during the fighting of forest fires.

It uses new fire-fighting technologies with the installation of communications systems for integrating the work of managing, monitoring and fire-fighting, a GPS installation for positioning its fleet of vehicles and has acquired and set up high pressure fire-fighting equipment with water consumption below 50 litres/minute.

The company uses an integral system for its services, which include:

#### Fire prevention

This work is carried out at times of low risk and is needed to break the horizontal and vertical continuity of the plant life, thus hindering the propagation of fires. It involves creating safety zones, fire breaks and work in the town/forest interface.

#### Monitoring work

Matinsa manages fire monitoring from mobile and fixed watchtowers and sets up the means of detection for quickly determining the existence and location of a fire. This work includes.

#### Fire-fighting

Since the summer of 2004, Matinsa has operated two special forest firefighting units for the Region of Madrid, within the integrated defence service.

#### Restoration of dune eco-systems

Matinsa's reforestation and environmental restoration work includes the restoration of the eco-systems in the dunes in Guardamar del Segura, Alicante and on the coast of Zahara de los Atunes, Cádiz.

Coastal dunes are very dynamic eco-systems that are directly dependent on the sea. The lack of plant life on the dunes, the erosive power of the wind and human activity have greatly influenced their development and state of conservation and have made them unstable and susceptible to degradation. Currently, nearly half the coastal dunes are degrading and many have disappeared.

Matinsa examines the most common causes of alteration and carries out a diagnosis to determine the dunes' vulnerability and state of degradation 21 in order to apply the most suitable reconstruction techniques.

The techniques for reconstructing dunes consist of setting up rows of plants on the dunes that act as passive sand collectors, reducing wind speed by friction and facilitating the continuous depositing of sand.

In areas without plants, sand traps are installed that consist of fences of dry reeds set vertically in the sand with their branches upwards. The installation is matched to any existing plants and is created or modified according to the winds that predominate in the area, arranging it obliquely or perpendicularly to the coastline.

The work is completed with the planting of dune plants to enhance the stabilising of the dune fence, using structuring species such as marine thistles and clumps of beach and Bermuda grass.

These techniques enhance and facilitate the restoration of ecosystems which, because of their dynamism, have a great capacity to regenerate themselves geomorphologically and biologically once these sources of alteration have been removed.



The environment is protected by the installation of protective fences and pedestrian passageways giving access to the beach. These wooden structures are supported on piles buried in the sand without the need for any foundations, thus producing little impact on the landscape and acting as passageways to channel users between both sides of the dune fences to prevent their treading on the dunes' plant life.

Passageways designed for the handicapped are installed, following the May 2001 plan for accessibility to Spanish beaches which includes measures for access by persons with reduced mobility.