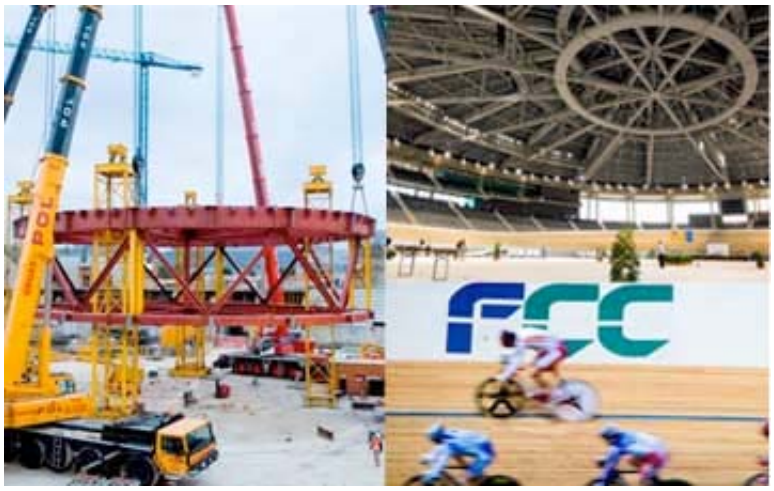
Photo of month

Work of elevation of overhanging roof of Vellodrome of Palma de Mallorca, Palma Arena.

The new Velódromo de Palma de Mallorca built by FCC in the sports complex of san Fernando has a rink of 60,000 m² made of pinewood from Ukraine and a spectacular dome simulating the spokes of a bicycle wheel.



Other contracts:

- **School of Fine Arts and the Advanced School of Design for the Provincial Government of Aragón,** , in a joint venture with a local company for 19 million euros. With a built-up area of 21,300 m², the most significant feature is the gym roof, to be made of a postressed slab on which the sports rink is set.

- **Social inclusion centre in Granada for the Sociedad de Infraestructuras y Equipamientos Penitenciarios (SIEP) of the Ministry of the Interior,** for a total of 11.8 million euros. With a built-up area of 8,600 m², it has 154 rooms, administrative offices and workshops.

- **108 housing units in Las Tablas, Madrid for Grugcasa,** for a total of 13.6 million euros.

- **Mixed use buildings and parking in the Sector Vullpalleres Oest de Sant Cugat del Vallés, Barcelona for the municipal company P.M.S. Cugat del Vallés (PROMUSA)** for 17.1 million euros in a joint venture with another company. Project consists of four buildings: two for housing, one for retail and another for offices. There are five basement levels, a ground floor and four or five floors per block.

- **Wet Handling course, as part of a set of courses of the IDIADA, en Santa Oliva (Tarragona).** This consists of a main circuit of 1,517 M with a wet course plus a second one of a similar length with a curved section for aqua planning.

FCC Construction selected preferred bidder for second motorway in Ireland

Work is planned to begin in August 2007

FCC Construction is been selected as a preferred bidder in a joint venture of two companies for the design, construction, financing and subsequent operation for 35 years of the M50 ring road in Dublin, Ireland.

This is the second contract won by FCC Ireland, as last year it won the contract for the design, construction financing and operation for 35 years of the N6 Galway – Ballinasloe motorway, a project that will involve an estimated investment of 350 million euros.

This new contract will be the first one awarded since it founded on 30 January with Caja Madrid the company Global Vía Infraestructuras, which groups together the two firms' portfolios in infrastructures.

The project consists of the construction of 41 km of main wearing course on the Dublin ring road on the section between the link to the north of the city with the M-1 and the link to the south with the N-11.

It also includes expansion and upgrade of the two stretches between the links M-1 y N-3 and between the Balymount and Sandyford links (expansion to three carriageways p in each direction and improvement of link roads) with a length of 24 km and the subsequent operation and maintenance of the expanded and upgraded stretches and the stretches between the links with the N-4 and N-7 (7 km) and between the N-3 and N-4.

Also part of the contract is maintenance of the stretch between the links of Sandyford and the N 11 (11 km) for a 7-year period.

The motorway will have a free-flow toll system in which the concessionaire will receive payment from the Irish Government for availability as consideration for the estimated investment of 400 million euros.

Construction in southeast Europe

The dynamic market situation in southeast Europe represents great potential for Alpine, whose long experience in building projects in the region provides valuable technical expertise and makes it one of the most competitive building firms.

In addition to the recently awarded projects, Alpine is presently building in Bulgaria the largest electrical plant in Europe, and is looking forward to another contract for the construction and sanitation of a dump, an important environmental project supported by the European Union.

Alpine will build the new central offices of the largest petroleum and gas holding company in southeast Europe, Petrom City”

The largest multinational firms participated in the tender

Alpine has won a contract with Petrom, the largest producer of petroleum and gas in southeast Europe, to build the future central offices of the company. The new headquarters next to the Straulesti Lake will bear the name of Petrom City in the northern district of Bucharest, Romania.

With a budget of 85 million euros, the project will involve construction of offices, a calculation centre, parking and an energy plant.

The start date for work is planned for late 2007 and the termination for the end of 2009.

Alpine wins contract for environmental project in Bulgaria funded by the European Union.

Value of project is approximately 15 million euros and duration is two years

Alpine has won the contract for southeast Europe in the area of the environment. The consortium in which it participates has obtained the contract for the construction of two water purification plants in the Bulgarian cities of Sevlievo and Bourgas Meden Rudnik on the Black Sea, purifying the wastewater of approximately 58,000 people. Both plants are equipped with a three-stage treatment process: mechanical, biological and chemical.

Alpine will build and operate a motorway in Serbia

This is the largest tender announced by the government of Serbia. The budget will exceed 800 million euros.

In its consortium with the Austrian subsidiary Alpine, FCC has signed a contract with the government of Serbia to build and operate for 25 years the Horgos – Belgrade – Pozega motorway of 316 km.

Work is divided into three sections: Belgrade –Pozega, with 140 km, linking the capital to the southwest of the country, near the border with Bosnia. Horgos - Novi Sad, a stretch of 108 lm which will double the width of the existing road, and Novo Sad – Belgrade of 68 km, a stretch which has already been building and is under operation, it will be delivered at the beginning of the concession.

The last two stretches are part of the Trans European E – 75 network linking the coast of the Baltic sea in northern Poland to the Egean sea in Thessalonica, Greece.

By winning this contract, Alpine has obtained yet another concession in Europe.

Nacional

Inauguration of urban link between C/Jamaica in Salamanca to the N 501 road and the new Serna Bridge

On 2 April, the President of the Salamanca Provincial Government, Isabel Jiménez García, with the presence of the President of the Autonomous Government of Castilla y León, Juan Vicente Herrera Campo and the Counsellor of the Presidency, Alfonso Fernández Mañueco, officially brought into service the new urban road linking calle Jamaica of Salamanca with the N-501 road and the new Serna Bridge.

The new road, which begins at the link of the Santa Marta de Tormes bypass and ends at the calle Jamaica in Salamanca, has a total length of 3,370 m and includes construction of a new bridge over the Tormes River, the Serna Bridge.

The bridge has a total length of 200 m between the support axes of the abutments, distributed in 6 spans. The transversal section of the end spans is of post-stressed lightened slabs, and the remaining spans consist of a bicellular central box with lateral overhang composed of an upper slab and cross braces covered in weathering steel.

The width of the deck is 23.50 m distributed in two wearing courses of 6.5 m with a dividing wall of 1 M, a separator of 0.5 m, a bicycle lane of 3 m on the right margin and pavements of 3 m on both sides.

The section of the road is composed of two wearing courses of 6.5 m separated by a central reservation of variable width between 1 and 12 m, flanked on both sides by pavements between 3 and 4 m in width. There are lined parking areas, a bicycle lane of 3 m in width and 1,350 m in length and a service road for the La Fontana development.

Intersections with the existing road network have been achieved with roundabouts, each with a system of traffic lights.

The project is completed by a renovation of the urban utilities affected, installation of public lighting including decorative lighting of the bridge and environmental adaptation of the project, which includes the execution of hydroseeding, planting, an irrigation network connected to the water mains and gardening of roundabouts and central reservations.

Data

Name of project:
Project for urban linking road between calle Jamaica and the N-501 road

Developer/owner:
Provincial Government of Salamanca

Authors of project:
CASTINSA, Castellana de Ingeniería

Budget:
14.134.168,99 €

Term of execution:
31 months

Project team

Department chief:
José María Quintanilla García

Works supervisor:
David Céspedes Ferreiro

Production chief:
Jesús Rodríguez Martín

Topography chief:
Ramón Álvarez Fernández

Administrative chief:
María Jesús Arenas Bermejo

Most significant figures

Connection road

Length:
3.370 ml

Clearing:
124.650 m²

Clearing in earthworks:
84.660 m³

Cement:
16.700 m³

Hot bituminous mixing:
8.900 Tn

Bridge over the Tormes River

Length:

Completed in 31 months, the project facilitates links between the two sides of the Tormes River and provides relief to the intense traffic in the area.

200 ml

Number of spans:
6 uds

Maximum span:
40 ml

Deck width:
23,5 ml

Reinforced concrete:
5.220 m³

Passive steel:
882.000 kg

Active steel:
72.970 kg

Steel sheets:
23,5 ml

On-site concrete pillars:
292 ml

Nacional

Serna Bridge in Salamanca

New regional terminal in airport of Valencia

Illa Londres complex in Barcelona

First stone laying of Torrijos bypass in Gerindote

Inauguration of Cartagena-Vera motorway

Rehabilitation of Malaga park

1st stone of CV 13 road from Torreblanca to Castellon airport

Inauguration of terminal building for regional aviation in Valencia airport

On 25 March, operations began at the terminal building for regional aviation of the airport of Valencia which FCC built for AENA in the record time of 18 months so as to meet increasing passenger demand and the America Cup.

The new building has a surface area of 12,000 m² and is connected to the present terminal, which allows for transit of passengers between the two terminals, with direct access from the exterior, and which is accessible from the new underground facilities.

The new terminal is configured in two spaces: the first, called a processor, has a basement floor, ground floor and first floor. The first floor houses the check-in area with 12 counters in continuity with the existing ones, company offices and information and security filters with automated baggage inspection. The ground floor contains the baggage pick-up area and the car rental dealers, as well as the lost luggage offices. The basement floor is for auxiliary facilities and service areas.

The second space is the satellite building with 2,400 m² at the aircraft platform level. It is equipped with ten doors that function both for departures and arrivals, and which can service up to 5 aircraft simultaneously and in positions near the building through pedestrian ramps, plus others set up remotely.

Data

Name of project:
Terminal building for regional aviation of the airport of Valencia

Developer/ Owner:
Aeropuertos Españoles y Navegación Aérea, AENA

Authors of project:
Gonzálo Aguarón de la Cruz

Budget:
17.800.000 €

Term of execution:
18 months

Team

Department chief:
Juan Ramón Pascual Sanz

Works supervisor:
Vicente Pérez Gómez

Production managers:
Vicente Ibañez Royo / Marina Ferrer del Val / Joaquín Moltó

Topography:
Miguel Ángel Rodríguez Azor

Manager:
Lino Marcos Pastrana

The vertical facing walls of the building are composed of 3,800 m² of a curtain wall with cable-stayed system buttoned glass. The coating of the roof is a sandwich with trays of clamped Kalzip aluminium.

The building is outstanding for the uniqueness of its architectural design in addition to its volume and the roof the boarding room, with a light sheet supported at only two points, which allows for a free floor and total glazing of the perimeter.

Regional aviation terminal

Nacional

Serna Bridge in Salamanca

New regional terminal in airport of Valencia

Illa Londres complex in Barcelona

First stone laying of Torrijos bypass in Gerindote

Inauguration of Cartagena-Vera motorway

Rehabilitation of Malaga park

1st stone of CV 13 road from Torreblanca to Castellon airport

FCC builds the Illa Londres Complex in Barcelona

FCC has built the Proeixample (company with a stake held by the City Council of Barcelona) the Illa Londres complex. The project is located at the intersection of Londres and Villaroel streets in Barcelona. The complex is for a primary school, kindergarten and a block of 54 apartments for young people with subterranean parking of 4 floors, in addition to the fitting out of the interior courtyard for public use.

The project by the architects Jaime Coll and Judit Leclerc won the Barcelona Award of 2006 in the category of architecture and urban planning.

The block for apartments has 8 levels above grade with access through running metallic walkways, a metal structure and steel roofs.

The school and the kindergarten of 6 and 3 floors, respectively, have a steel-reinforced concrete structure with a meshed roof.

Garden areas and sports spaces have been created in the interior courtyard.

The façade wall unifying the entire complex is notable for its use of galvanized aluminium carpentry and fixed panels housing U-glasses in a chamber.

Data

Name of project:
Equipamientos Londres / Villarroel

Developer / Owner:
PROEIXAMPLE

Authors of project:
Jaime Coll /Judith Leclerc

Budget:
10.055.486 €

Term of completion:
34 months

Team

Department chief:
Carlos Sánchez

Works supervisor:
Miguel A. Empez

Work-site technician:
David Muñoz

Quality technician:
Nuria Ribalta

Facilities technician:
Carlos Carreño

Administrative assistant:
Rafael Bejarano

Nacional

Serna Bridge in Salamanca

New regional terminal in airport of Valencia

Illa Londres complex in Barcelona

First stone laying of Torrijos bypass in Gerindote

Inauguration of Cartagena-Vera motorway

Rehabilitation of Malaga park

1st stone of CV 13 road from Torreblanca to Castellon airport

Placement of first stone on Torrijos and Gerindote bypass in Toledo

On 20 March, the act of placing the first stone for the bypass of the CM-4009 road between the towns of Torrijos and Gerindote in Toledo. The event was attended by the counsellor of public works, María Encina Álvarez and and the director general of roads, Roberto Puente.

The building project is part of the 2nd regional plan of roads of the government of Castilla-La Mancha and is part of the regional road network of this autonomous region.

At present, the route of the CM-4009 runs through the urban centres Torrijos and Gerindote. It should be noted that in the centre of Torrijos, the Madrid-Extremadura railway line runs through at street level. For this reason, the conditions of functionality and road security are quite unfavourable, hence requiring a town bypass to avoid the routes through town centres.

The new bypass of 6,920 m. in length in the main axis, is a 7/9 section wearing course with lanes of three and a half meters, shoulders of one meter and embankments of half a meter. Five crossings are planned with existing roads, which are resolved through street-level roundabouts. Intersections with the railway line, livestock trails and roads will be resolved with three underpasses and two overpasses.

Data

Name of project:
Bypass of CM – 4009 road in towns of Torrijos and Gerindote

Developer / Owner:
Department of Public Works of the Government of Castilla La Mancha

Authors of project:
INOCSA

Project director:
Victor Cuéllar

Budget:
6.414.447 €

Term of completion:
18 months

Team

Director:
Enrique Fou

Works supervisor:
Teodoro del Barco

Production director:
César Escribano

Topography chief:
Gustavo Noval

Manager:
Paco Picapiedra

Nacional

Serna Bridge in Salamanca

New regional terminal in airport of Valencia

Illa Londres complex in Barcelona

First stone laying of Torrijos bypass in Gerindote

Inauguration of Cartagena-Vera motorway

Rehabilitation of Malaga park

1st stone of CV 13 road from Torreblanca to Castellon airport

The AP-7 Toll road open to traffic: Cartagena-Vera section

The new motorway opened on 29 March creates a high capacity road parallel to the coast, but sufficiently far from it to allow for the development of tourist resorts, linking up the towns of Cartagena and Vera, capturing the traffic of both existing and future tourist areas, as well as the intervening towns.

The project is divided into two clearly distinct sections: the first section is particularly rural, running from the south of Vera and the northwest of Cartagena. This is a toll motorway of 98.9 km in length. The second, which is urban in nature, is the toll-free motorway, constituting the Cartagena ring road of 16.6 km in length.

The design and construction of the project has taken special care in the protection and conservation both of the environment and the cultural heritage. In this regard, particularly significant are the actions taken in the vicinity of the PK 67+900 of the infrastructure for recovery and conservation of archaeological remains of the so called Finca Petén. These actions take the form of pre-stressed slabs and a pass of double T beams along with the creation of a protected area with steel-reinforced earthen walls.

The existence of undulated and/or accidental relieves as well as the existence of several Sites of Community Importance (LIC) have led to he design and construction of three tunnels and a false tunnel. Between PKs 25+100 and 26+200 is the Tunnel of the Sierra of Aguilón of 1209 m which allows crossing with no impact the Sierras of Almagrera, Pinos and the Aguilón. To cross the Sierra of Loma de Bas, the design includes the longest tunnel in the project of the same name, with a length of 1820 m. For the motorway pass through the saddle of Sierra de las Moreras, a design is made of a false tunnel with three parallel tubes, two for the wearing courses of the motorway and the third for the MU-332 bypass. The three 220 m tubes mean that the LIC of the aforesaid mountain range will be at a different levels than the infrastructures and will have geographic continuity. The last of the tunnels is that of the Sierra de Lo Alto, which crosses through the highest zone with a tunnel of 296m in length.

To overcome the large number of water courses, geographic accidents and roads, some 181 new structures are created, divided into 25 viaducts, 57 overpasses and 33 underpasses of beams as well as 66 portals and frames. Among these are structures like the viaduct over the Almanzora river with 10 spans and a length of 404 m or the viaduct over the rambla of Canalejas over the N-332 or over the Cabezos del Pericón.

The tolls and the control are equipped with the latest control and management systems. A good example is the innovative OBE system in

Data

Name of project:
Cartegena-Vera motorway

Promoteur / owner:
Ministerio de Fomento

Project director:
Vicente Plans Portabella

Budget:
540.639.931 €

Timetable:
26 months

Team

Works supervisor:
Juan Antonio López Cánovas

Director of section I:
Alberto Blanco

Director of section II:
Francisco Torres

Director of section III:
Candelario Portillo

Director of section IV:
José Francisco Muñoz

Facility manager:
Alberto Ureña

Technical office director:
Lionel Gómez

all the tolls. The tunnels are equipped with security and surveillance systems centralized in the control building in the PK 67+000.

Nacional

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Illa Londres complex in Barcelona

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Inauguration of Cartagena-Vera motorway

Rehabilitation of Malaga park

1st stone of CV 13 road from Torreblanca to Castellon airport

IRenovation work on Malaga park complete

On 31 March, the mayor of Malaga, Francisco de la Torre inaugurated the works on the renovation of the Park of Malaga and its surroundings. The work by FCC involved the renovation and rehabilitation of the botanical and historic/artistic heritage of the paseo del Parque in the city of Malaga from the curtain of the dock and the heritage museum to the paseo de los Curas.

The project was in response to the need for a major improvement in the conditions of use of the part, for which special pavements have been built both in the network of paths and in the lateral promenades and the paseo de España, which have yielded surfaces of high aesthetic and functional quality.

The full rehabilitation was undertaken of the roundabouts and squares, and three new traffic lighted pedestrian streets, thus improving the links between the two sides of the park and optimizing accesses to the public buildings on the avenida de Cervantes, with the conversion to pedestrian-only use of the calle Juan Luis Peralta and the improvement of public transport with the creation of two bus lanes.

Public lighting infrastructures are improved, as are the sewer systems, irrigation, cable communications, ornamental structures in the park and new bus shelters and modern kiosks.

Data

Name of project:
Rehabilitación Parque Málaga

Developer / Owner:
City Council of Málaga

Authors of project:
Mª del Carmen Muñoz López / Pilar Vila Herrero

Budget:
9.741.319 €

Term of completion:
15 months

Team

Works supervisor:
Héctor Santos García

Production director:
Juan Sevillano Polaina

Technical office director:
Cristina María García Vargas

Administrative assistant:
Tomás Castillo Iglesias

Manager:
Mariano Vargas Villena

Bearing in mind that work is made on a garden that ranks third on the list of subtropical gardens in Europe, invasive or diseased species are eliminated and a full plant restoration undertaken on the subtropical species from the five continents in the park, such as Vietnamese palm trees, Australian Ficus, Chinese bamboo, Ethiopian calla lillies, and new species of Cuban palm trees, cypresses, pine and new collections of ferns, nymphaeas, jujubs, etc.

The project also includes the renovation of the facing walls and entrances to the Pedro Luis Alonso gardens, the disappearance of the impact caused by the Eduardo Ocón Auditorium and the upgrade of the children's facilities. The works designed include adaptation to disabled persons.

Nacional

Serna Bridge in Salamanca

New regional terminal in airport of Valencia

Illa Londres complex in Barcelona

First stone laying of Torrijos bypass in Gerindote

Inauguration of Cartagena-Vera motorway

Rehabilitation of Malaga park

1st stone of CV 13 road from Torreblanca to Castellon airport

Placement of the first stone for CV – 13 road in Castellón

On 15 February the first stone was placed for the new CV-13 road running from Torreblanca to the airport of Castellón. The event was attended by the President of the Valencia Government, Francisco Camps, the Director of Infrastructure and Transport José Ramón García Antón, the President of the Provincial Council of Castellón, Carlos Fabra, the Vice-President of the Council Victor Camps and the President of FCC Construction, José Mayor Oreja.

The new CV-13 road is 14 KM long and replaces the present CV-145, thus connecting the towns of Vilanova d´Alcolea and Torreblanca, also linking the future airport of Castellón with the N–340 and AP-7 roads and the coast.

With projected speed of 100 km/h, the road has a single wearing course of 7m and tow lanes 3.5 m in width and shoulders of 1.5 m.

The project includes construction of an elevated roundabout above the N 340, two roundabouts linking to the CV 145 and 10 viaducts.

The budget for the work contracted to FCC as part of a joint venture with another company totals 42,704,236 euros and the term of completion is 20 months.

Adecco Foundation and FCC Construction sign agreement for employability of disabled persons

FCC Construction and the Adecco Foundation have signed an agreement to undertake programs for the employability and social integration of disabled people. The agreement will have an initial duration of one year and will be renewable up to a maximum of three years.

For FCC Construction, the agreement aims to enable incorporation to its workforce of disabled people through the services of the Adecco Foundation.

The Foundation will give training courses to future employees to prepare them for the tasks they are to perform and will conduct a follow-up during the first few months to ensure the success of the process. Thus, as a cornerstone of FCC's corporate social responsibility of to its employees, the Foundation will start up the family plan for employees with disabilities. The plan aims to equip beneficiaries with a sufficient degree of personal autonomy and the resources necessary to actively seek employment.

Tranvía de Parla hosts meeting of Corporate Social Responsibility Committee of FCC

The Corporate Social Responsibility Committee met on 11 April in the offices of the concessionary company of Tranvía de Parla, with the attendance of José Mayor, President of FCC Construction, Jesús Duque, President of Global Vía, Felipe B. García, President of the Committee and representatives of different companies and areas of the Group.

José Mayor, who spoke first, stressed the importance assigned for some time to social responsibility at FCC Construction, which has been informing all stakeholders since 2003 on the mechanisms for economic, social and environmental work, implemented for the last fourteen years, with its Sustainability Management System, which contains the framework of action of all company management processes.

This system is upgraded periodically and the upgrades are approved by the Sustainability Committee, which meets quarterly; it has now held 59 meetings.

Thus, Jesús Duque made a presentation of Global Vía, the company created jointly with Caja Madrid, to assume the contract portfolio of both companies, with the objective of becoming a leading reference point in the infrastructure management market.

It has the right size to compete internationally and it seeks to exploit FCC's orientation to Eastern Europe and capture business in the US market, with a view towards a potential public listing in the medium term.

Representative of different departments explained the advances in the application of aspects of the Corporate Responsibility Master Plan and the Director of the Social Responsibility Department of the FCC Group, Javier López Galiacho presented a draft Corporate Responsibility Report of FCC for 2006.

The meeting ended with a presentation by Fernando de Marcos, Director General of Tranvía de Parla S.A., who gave a detailed explanation of the project for Line 1 of the streetcar line of the city of Parla.

Then the group made a visit to the facilities of the concession: the offices, the control post, the maintenance building, and a brief trip on the street car, which is already doing test runs around the city.

About the streetcar of Parla

Tranvía de Parla S.A. (www.viaparla.com) is the concessionaire firm responsible for the construction design, operation, maintenance and acquisition of materials for line 1 of the street care of the city of Parla. The company is held by the FCC Group, Acciona and the Caja Castilla La Mancha.

Line 1 of the Parla street cars, with a carrousel route, has a total of 12 km and 16 stops, one every 500 m approximately, two of which are inter-modal hubs with the Cercanias commuter train system of Renfe (the Parla Centro and Parla Norte stops).

Delivery of Barcelona City Awards of 2006

The Barcelona City Award of 2006 in the category of architecture and urbanism was unanimously given to the architects Jaime Coll and Judit Leclerc for their design of a primary school, kindergarten and block of 54 apartments for young people with a 4-storey subterranean parking, in addition to the renovation of the indoor courtyard for public use.

The complex built by FCC Construction for Proeixample (company owned by the City Council of Barcelona) stands at the intersection of the Londres and Villarroel de Barcelona streets.

Every year, the city council of Barcelona gives the Barcelona City Awards to recognize the most outstanding scientific and technical research in the city. The award was delivered on 22 February in the Cent salon of the city council building in recognition of the architects' ability to combine in a unique way to different programs for both schools and housing in an intelligent and innovative volumetric composition, in an architectural configuration that reflects the complexity and wealth of uses existing in the city.

New building code comes into force

Starting 30 March, all buildings constructed in Spain must meet the demands of the new technical building code (CTE), now that one year has gone by since its approval by the Council of Ministers.

Coinciding with the end of the period of voluntary application of the basic documents, except for those related to safety from fires, safety of use and saving energy, which have been in use since 29 September, the structural safety and health code is also coming into force.

The new CTE represents a new focus in building regulation and introduces numerous changes in the manner of designing and executing buildings; thus, in order to disseminate the new regulations, FCC Construction organized informational workshops last year for all technical personnel involved in building.

The European Union has granted an award to the architecture of the Museum of Contemporary Art in Leon, designed by the Madrid architects Emilio Tuñón and Luís Moreno Mansilla and built by FCC.

The museum has won the Mies van der Rohe Contemporary Architecture prize, awarded every two years and considered the most prestigious contemporary architecture prize in the European Union. The award ceremony will be held on 14 May 2007 in the Mies van der Rohe pavilion in Barcelona.

The European Union has awarded its Mies van der Rohe Contemporary Architecture prize to the Castile and Leon contemporary art building. Designed by the architects Emilio Tuñón and Luis M. Mansilla, built by FCC and located in Leon, the museum has been chosen for the prize for its conceptual, technical and constructional quality.

Designed by Tuñón and Mansilla, who won the Spanish Architecture Award in 2003, the museum opened in Leon in April 2005 and since then has become one of the reference artistic centres in Spain.

Other relevant works by Tuñón and Mansilla and built by FCC are the Castellon Fine Arts Museum, the Zamora Archaeological Museum, the City of Leon Auditorium - which won the Spanish Architecture price in 2003 - and the Royal Collections Museum, the first phase of which is also being built by FCC.

The EU and the Mies van der Rohe Foundation in Barcelona award this prize every two years with the intention of recognising and rewarding the quality of architectural production in Europe. The museum in Leon now joins a list of awarded contemporary buildings such as the Netherlands Embassy in Berlin, by OMA/Rem Koolhaas and Ellen van Loon (2005), the parking and terminal at Hoenheim North in Strasburg, in Zaha Hadid (2003) and the Kursaal in San Sebastián, by Rafael Moneo (2001).

A group of independent experts from various European countries proposes the candidates for the prize every two years, with the final decision being taken by a jury. This year it was presided over by the architect Ricky Burdett and consisted of Peter Cachola Schmal, Beth Galí, Bettina Götz, Luis Fernández Galiano, Ellen van Loon, Mohsen Mostafavi, Francis Rambert, Dietmar Steiner and Lluís Hortet as secretary.

High-rise buildings. General overview

Jesús Gómez Hermoso
Civil Engineer
Chief of Foundations and Structures Dept
FCC Madrid Building Office II

What is a high-rise building? Perhaps this question, which is the first one we ask when dealing with any subject, must be answered before continuing with other issues. When we think of a high-rise, what comes to mind are the Petrona towers or the late Twin Towers in New Cork, the Sears Tower in Chicago and so many other human works that bring us closer to the sky.

And speaking of the sky, perhaps we should think of the Tower of Babel as the first high-rise known by humanity. Or were the Mayan, Aztec or Egyptian pyramids high-rises? At least the taller ones like the Kheops, which was 146 m in height, could be considered high rises. However, some might say that it not slim enough as a construction, with an excessive base. Then, and focusing mainly on the past, the high-rises par excellence would be the minarets of Muslim mosques. This slimness has been exceeded only by some of the industrial chimneys from the last two centuries, or a telecommunications tower, although in all these cases we should speak of “constructions,” more than buildings strictly speaking.

Among the buildings we might call high-rises of the past, we would doubtlessly include the towers of the European Gothic cathedrals whose height and, quite often, their slimness had nothing to envy of present-day high-rise buildings. Also, buildings like the Giralda of Seville are among those from past eras that might be called high-rises.

However, if we focus on our attention on the contemporary, i.e. the 20th century and these first few years of the 21st for our intents and purposes, we will understand high-rises to refer to buildings for residential, office or hotel use, with more than … stories. The ellipse is no mistake, but rather an ongoing doubt and a relative value. The International Council of Tall Buildings and Urban Habitat (ICTBUH) considers any building with more than 10 stories to be a high-rise. This value, which may have been a valid point of departure in a past era, is today obviously meagre. Moreover, the Picasso Tower, with which 43 stories and 156 m of height, was the tallest building in Spain until recently, would not be anything more than a tall building in other areas of the world – above all Asia and North America – and certainly not a high-rise.

The criteria for defining a high-rise would also include structural typology.

They could be considered buildings for which the portal design would be insufficient as a construction skeleton. However, taking into account certain architectural designs from recent years, some buildings which are not very tall require unique structural designs of the type that would be unexpected owing to their vertical dimension.

Thus, we will adopt generous criteria to include a broad spectrum of buildings whose height, slimness or construction uniqueness, always high, allow them to be considered high-rise buildings.

Materials, uses and location of tallest buildings

From the earliest days of the construction of modern high-rise buildings, also called skyscrapers, there was a clear domination in their design and construction by the United States. There is a traditional rivalry between cities like New York and Chicago to have the tallest building. However, since the 80's, and particularly since the 90's, the cities in southeast Asia have joined this rivalry in building the "tallest", which is making this practically an Olympic issue.

However, the race to have the tallest building in a city, country or, as it might be, the headquarters of a company, must not conceal from us a general, and not very unique view of this competition. This race is reaching such a point that four categories have been established according to whether their height is "to the structural limits," "to the top floor," "to the roof," or "to the pinnacle or antenna."

Apart from the particular record of having the tallest building, which will always be temporary – because, when one is done building the "tallest building in the world," already under design or even construction what will be, a few months or years later, of the one hundred tallest buildings in the world, 59 are in the United States, 6 in Japan, 6 in China, (3 in Hong Kong), 5 in Malaysia, 4 in Canada and in Singapore, 3 in Korea, 3 in Australia, and 2 in Taiwan (according to the latest report from the ICTBUH). And of the cities with the tallest buildings by numbers, New York leads with 18, Chicago has 10, Houston 8, Los Angeles, Kuala Lumpur, Atlanta, Toronto and Singapore 4 and Tokyo and Philadelphia 3.

As regards the materials for the structures, at first these buildings were dominated by steel. Nevertheless, the development of concrete, with significantly increased resistance to compression, above all after the addition of fume silica, thus enabling resistances typical for building projects of up to to 130 MPa, has resulted in a notable increase in its use. Although the aforesaid list of the 100 tallest buildings is still dominated by steel as the primary structural component (46 of them), concrete has been used for 18 buildings and in mixed configurations combining steel and concrete account for 36. A more generalized approach is the design and construction of the central core of with concrete, the perimeter structure of pillars and beams with metal elements and the roofs also with concrete (at times over metal sheeting).

As for the fundamental us of these buildings, 77% of the above list are for offices, 3% solely for a hotel and 20% for multiple uses, with combinations of offices, residential and hotel. The representative and symbolic nature of this construction makes it particularly appealing as a headquarters for large companies, helping to boost the firm's international image.

Unique elements of the project

When a high-rise project is planned, it must be born in mind that it is a unique project, which involves considering a series of design criteria which are special both in functionality and in aesthetics and resistance. Focussing on the latter two, we would make note of a series of issues that clearly distinguish them from other types of buildings.

First, consideration must be given in to wind - which has less of an

influence in lower rise buildings - on the effort to be sustained by the different structural components, but which in high-rises are a vital action. In turn, its evaluation, both of the direct action of wind on the building and on the indirect action resulting from the influence of other buildings in the vicinity, may condition the structural approach, sometimes radically. An important aspect that must also be controlled, is the horizontal deformation of the building, owing both to its impact on structural elements and on users of the building. Head movements of these structures can reach levels which result in a significant reduction in the comfort of people, as well as the sensation of insecurity as a possible decisive psychological effect. Analysis of performance in wind is often conducted in a specific study with wind tunnel trials.

The materials considered for the design of a structure of these characteristics are steel and concrete, which, as noted above, can be used in isolation or in a combination of the two. As for concrete, the trend is clear as regards the use of the high-resistance variety. Although higher levels have been used, the typical resistance of concrete used normally is between 50 and 80 MPa, with its varying with the height of the building, and resistance being logically higher in the lower floors.

Study of a strategy for dealing with fire in these buildings has become a crucial issue, owing to their vulnerability for an evacuation. Elements of detection and extinction require a special analysis and, above all, protection of the structure against the fire. It should be understood, in any event, that the ultimate objective of this protection is not to prevent the collapse of the structure, but rather delay it in time, which would facilitate an evacuation with the lowest possible harm to persons.

A vital aspect, although not structural in nature, are mechanical transports. Lifts, their capacity for moving an ever greater number of people at ever greater speeds to ever greater heights, with a reduction or elimination of the number necessary to traverse the entire building, are one of the main elements enabling these buildings in functional terms.

Unique construction components

Among the unique construction components of these buildings are the construction of the central core, above all in aspects related to the encasing. The core, when made of concrete, is made with creeping or sliding formwork. The first involves greater use of the auxiliary crane, making work slower, but allowing execution in “static phases.” The second significantly reduces the auxiliary crane, concentrating on the ends of their application for assembly and disassembly, and allows for a greater pace of execution; however the continuous construction requires continuous work shifts, with no delays allowed in the different phases of formwork, reinforcement and concrete laying. However, in recent years the use of self-creeping formwork is growing, which, as a static system lacking the dependencies of the continuity of the sliding formwork, also reduces the use of the crane at the ends of its run, lifted up with the support of a “zipper,” which is fastened to the completed wall in a certain phase and in the next phase it is raised up on the structure of the formwork itself.

For the use on site of the concrete it has to be pumped. This technique usually requires tests prior to the “industrial” execution on site, with notable influence on the dosing of the concrete, as well as the resistance conditions and durability required in the project must be complied for the on-site work with this system.

A third main construction element is the cranes. Whether they are self-stable, braced or creeping, become a crucial elements for the movement of materials to high altitudes: the last typology indicated must be closely linked to the study, design and building process of the core, within which it usually finds its support.

International high-rises

When the mass media speak of skyscrapers, they usually do so to talk about records. This is how they refer to the 452 m of the Petrona Towers, the 508 m of the Taipei 101, the 512 m of the World Financial Center in Shanghai (under construction), of the 705 m of the Burj Dubai when its construction is complete in 2008 or the 710 m of the Noida Tower when it is complete in 2013 (it has not yet begun).

However, we must be realistic and familiarize ourselves with the most common heights of high-rise buildings. Of the 200 tallest buildings currently in existence, only one exceeds 500 m, 2 are between 450 and 500 m, 3 are between 400 and 450 m, 6 are between 350 and 400 m, there 18 between 300 and 350 m, 64 between 250 and 300 and between 200 and 250 m there are 106. Thus, only 30 buildings in the entire world are higher than 300 m, though there are 170 between 200 and 300 m.

This fact should make us think about real heights which are reasonably economical and others which have more to do with records and image.

Our towers

In Spain, the construction of high-rise buildings does not reach the elevations cited above. These are concentrated mainly in three cities: Madrid, Benidorm and Barcelona, each having 10, 9 and 7 buildings, respectively, of more than 100 m in height.

Of the 33 buildings of more than 100 m in height, 1 surpasses 200 m, 4 are between 150 and 200 m and 28 are between 100 and 150 m. As we can see, these are far below international standards, although these are concentrated in just a few countries, mainly the US and Asian countries.

Building trends in recent years would suggest an expansion both of the number of buildings above 100 m and in the maximum height being reached. Of buildings presently under construction, we would make note of the Lugano Tower in Benidorm and the four towers in the northern part of the Paseo de la Castellana in Madrid. Their heights are as follows: 250 m for the Torre Castellana. 259 for the Torre de la Mutua, 235 m for the Torre Espacio and 223 m for the Torre Vallehermoso, with 45, 48, 45 and 52 stories, respectively. There use as offices and a hotel confirms the present trend international, and the combination of structural elements (high-resistance concrete and steel) and their façades made by curtain walls.

These realities suggest a hopeful future for the technical personnel and professionals in any interested in the design of high-rise buildings, and for the general progress of techniques that always occurs in the construction of unique buildings.

Especialidades Eléctricas, S.A., ESPELSA is a company in FCC Construction that leads the diversification of the electricity sector on the basis of its solid experience in the design and execution of electrical projects and assemblies at medium and low voltages, as well as systems for fire detection, safety and communications.

ESPELSA also offers maintenance services for high, medium and low voltage installations to the major Spanish electricity suppliers, such as Unión FENOSA, Endesa and Iberdrola.

New technologies

One of its main areas of business is the design and development of high-level information technology projects, especially command and control, simulation and occasional incursions into developments for information management in companies and software for both civilian and military use.

Command and control systems

The command and control systems developed by ESPELSA are mainly for the Spanish Air Force, the DGT, for the consortium of European countries making the Eurofighter (Germany, Spain, Italy and the United Kingdom) for NATO and other large organizations such as EUROCONTROL, the European Agency for the Safety of Air Navigation, of which 34 European states are members.

These products are complex IT tools (R+ D) with great versatility and a huge potential, used by these organizations or by military organizations for different purposes or in different situations, as in the case of the management of large systems (combat planes and their ground support) or contingencies of diverse kinds (NATO actions in humanitarian missions, the organization of civilians and military personnel in a crisis in some region of the world, or in response to a natural catastrophe etc.). Thus, command and control systems are a crucial support for decision-making.

Here, ESPELSA has been working since 2000 on a mission planning system created for the Eurofighter Typhoon 2000 along with international clients and partners, such as the large EADS-CASA consortium and the Italian Alenia Aeronautics in the Finmeccanica Group. The system is equipped with a modular structure that allows for intelligent use of information of diverse kinds (meteorological data, intelligence information, command guidance combined with cartographic information, operational studies, etc) and a wide range of functionalities, among which are the possibility of defining missions to be performed in flight, of transferring specific data from ground formats to the planes meant to use them, of making complicated calculations for operations and actions in flights or record and reproduce in two or three dimensions the missions completed by pilots for subsequent analysis.

Also internationally, ESPLESA is performing the engineering and development of the TRES software, an application designed for the

EUROCONTROL, which in turn will be a part of the SASS-C system (Surveillance Analysis and Support System for ATC Centre) distributed among more than 60 organizations and countries in the world. This tools will allow for control over the performance of air surveillance systems and, specifically, TRES will enable traffic control centres to reconstruct reference routes on the basis of aerial traffic data and other external sources, while it also provides means for evaluating the features of surveillance infrastructure and for justification and analysis of problems in control centres.

Two factors like the specializations of ESPELSA in this sector of advanced software and the accumulated know-how from its experience have been functioned as a guarantee in one of the most recently contracted projects directly with NATO, TOPFAS, a command and control tool for planning and management of NATO actions.

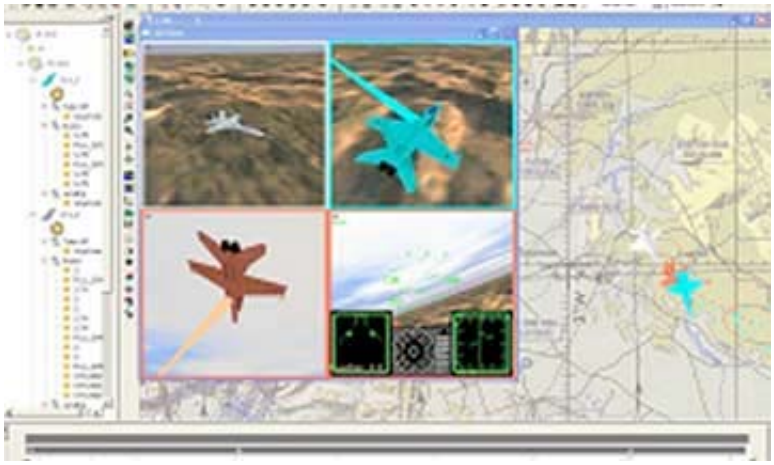
For its part, at a national level, ESPELSA has designed and developed the MPDS system (Mission Planning and Debriefing System), another product of immense potential and high technology, which has had the close collaboration of pilots and other professionals in the Spanish Air Force in conceiving its design and perfecting the final software. The result has been a great success after more than a year of implementation in all Spanish air bases.

Simulation

ESPELSA also develops software for systems of simulation and training in real time. These systems are usually equipped with two kinds of stations: one for the instructor and another for the student, thus enabling recreation of the same physical conditions and elements composing the systems they “copy.” Systems for helicopter simulation reproduce, as faithfully as possible, all the instruments in the flight cabin, so that learning can perform in a simulated manner all operations in a real flight (flight path, possible failures, etc). It also reproduces environmental conditions (atmospheric effects, turbulence, etc) and the user can observe all these elements interacting in 3D scenarios to achieve the highest degree of realism.

Information management

One of the areas of recent exploration for ESPELSA is the development of information management systems for companies, through study and analysis by experts in the information processing and database systems.



Building and infrastructures

More than two decades of experience have culminated in emblematic projects in recent years, both in building and in infrastructures. The Financial City of the Banco Santander, the Communications City of Telefónica, the lighting of the Almillo Bridge for the Expo 92 of Seville, the New Sport City of the Real Madrid C.F., the San Lorenzo Theatre of El Escorial, expansion of the Reina Sofia Airport in Tenerife Sur, the

reconstruction of the Palacio de Deportes of the Madrid region, the burying of the M-30 ring road, and many others, constitute a diverse sampling of these projects.