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Offices, shops and garages building in Hacienda de San Antonio, Seville, for Vilamar Gestión, for a total of € 40.3 million.

Improvements and modernisation of irrigation on the left bank of the Vinalopó in Elche, Alicante, for Seiasa de la Meseta Sur, for €14 million. Affects an area of 3,286 Ha, involving the laying of over 240 km of high density polyethylene pipes, 75 to 400 mm in diameter and nearly 3,000 hydrants.

School in Carabanchel, Madrid, for Foemesa, for €15,1 million and an undertaking time of 12 months.

148 houses in San Jorge, Castellón, for the Grupo Pinar.

Adjudications

Adjudications

FCC wins two new adjudications in Romania

The Romanian Ministry of Public Works has awarded FCC Construcción two new projects in Romania, for a total of €80 million.

One involves the building of a trussed bridge and the widening from two to four lanes of the Bucharest ring road between the DN1A and DN1 roads. This work, valued at €38.4 million, will be carried out in a temporary joint venture with the Austrian subsidiary Alpine and involves building a bridge 240 m long with two spans of 120 m over a railway. The metal deck is 1.55 m deep and 17 m wide.

The second project involves the renovation and widening of 49 km of the DN66 (E79) road between Filiasi and Rovinari, for €41.6 million. It consists of widening the road from 6 to 10 m, implying the altering of nine structures and adapting the crosswise drainage, among other actions. The current surface will be stripped and recycled to form the new one.

FCC adjudicated a motorway in Mexico

The final section of the motorway joining Mexico City with the port of Tuxpan in Veracruz.

The Mexican Secretary of Transport and Communications has awarded Global Vía Infraestructuras, a subsidiary of FCC Construcción, the concession for 30 years for the Nuevo Necaxa-Tihuatlán motorway, with a planned investment of €400 million.

The contract involves the building, operation, maintenance and upkeep of the 37 km long Nueva Necaxa-Avila Camacho section and the operation, maintenance and upkeep of the Avila Camacho-Tihuatlán section, 48 km long.

The concession presents a new schema in Mexico, it combines the section of 37 km with a conventional toll and the 48 Km one with a shadow toll. A part of income comes from users and the rest of the government of Mexico.

This concession is the first motorway adjudicated to FCC in Mexico after the creation of its Globalvía Infraestructuras subsidiary.

FCC to lay the underwater gas pipeline from Alicante to Ibiza

FCC,in a temporary joint venture with another company, has won the contact to build the underwater gas pipeline from Alicante to Ibiza and then on to Mallorca. The contract is worth over €250 million and was awarded by Enagás

The Balearic Islands gas pipeline will run at depths ranging from 718 metres to 997 metres. FCC will work with Duro Felguera, who will design and install two tanks each with a capacity of 150,000 cubic metres for a total of €120 million.

Work will start in the autumn of 2008, after the end of the tourist season, and the pipeline is scheduled for completion by June 2009.

Events

Work ends on burying the railway and building the inter-mode station in Palma de Mallorca

The burying involves the railway running along the Calle Jacinto Verdaguer, the site of the Palma-Inca double railway line.

The project, carried out by FCC in two phases, involved the building of an underground corridor with four tracks, 1.1 km long, including the Son Oliva station and the Jacinto Verdaguer underground station.

The tunnel has four tracks, which split into two branches at the Son Oliva station, one containing the two underground tracks to the university and the other in an open air ramp towards Inca.

The four-track tunnel has an interior width of 15.90 m, the two-track area is 9.70 m wide and the stations areas are wide, at 26 m.

Diversions were needed during the undertaking to avoid interrupting rail and road traffic. The result has allowed the surface to be recovered for other uses: a pedestrian area, a bicycle lane and lanes for buses and other vehicles.

Technical data

Project name:
Burying of railway and inter-mode station in Palma de Mallorca. Phase III

Promoter/Owner:
Serveis Ferroviaris de Mallorca (SFM)

Budget:
38.383.244 €

Undertaking time:
26 months

Project team

Manager:
Miguel Ángel Rodríguez

Site manager:
Josep Vinyeta

Drawing office manager:
Cristina Barahona

Administration manager:
Juan Rodríguez

Surveyors:
Lorea Oribe/Alberto Antón

Events

FCC builds 243 houses in Arroyomolinos, Madrid

Houses in Ciudad Jardín

The FCC Construcción subsidiary Ibérica de Servicios y Obras, specialising in residential building, has built two housing estates

The Ciudad Jardín estate contains 137 houses in 21 groups with garages and storage rooms, comprising a basement, ground floor and three upper floors.

Houses Los Carrizos

The structure is of reinforced concrete with foundations formed with insulated shoes with braced girders and continuous shoes on concrete wall supports with façades of alternating facing bricks and perforated brickwork covered with a single layer of mortar rendering

The houses include electrical, plumbing, gas, fire-fighting and CO2 detection installations with solar panels on the roof. The project included landscaping, swimming pool with changing rooms, sports area, playground and gardening.

The Los Carrizos estate consists of 106 homes, 42 in blocks and 64 individual.

The 42 homes are in two blocks, consisting of a basement and four storeys above ground. The structure is of concrete on shoes with perimeter walls and unidirectional structure. The façades are of brick and the sloping roof of slate.

The 64 individual homes are in 32 semi-detached units with foundations based on shoes and walls.

The structure is of reinforced concrete, with frames of joists and arches, sloping roofs and sloping reinforced concrete slabs..

The project included landscaping with gardening, a swimming pool and a paddle court.

Ciudad Jardín technical data

Client:
Noralia

Undertaking time:
21 months

Department manager:
Juan César López Moreno

Site manager:
Miguel Ángel Martínez Chuan

Foreman:
Rafael Cejas Benjumea

Los Carrizos technical data

Client:
Bauenplan Promociones

Undertaking time:
23 months

Department manager:
Manuel Pérez Grande

Site manager:
Javier Aguilar Sáiz

Foreman:
Miguel Ángel Martínez Herrero

Events

First stone in Mancha Real bypass, Jaen

From left side to right, Concepción Gutiérrez del Castillo, Councillor of Transport and Public Works of the Government of Andalusia, together with Francisco García Martín, General Director of FCC Construcción, and Santiago Ruíz, General Sub-director for Area I

The Councillor of Transport and Public Works of the Government of Andalusia, Concepción Gutiérrez del Castillo, together with the General Director of FCC Construcción, Francisco García Martín and the General Sub-director for Area I, Santiago Ruíz, attended the laying of the first stone in the Mancha Real northern bypass in the diagonal intermediate axis of the Olivar, motorway, on 19 june.

The work consists of building an 8.7 km section to continue the section of motorway from Jaén to Mancha Real, currently in service, and that forms the Mancha Real northern bypass. It also includes a new access to Mancha Real, 1.6 km long.

The resulting section will solve the problems of saturation and lack of safety on the current A-316, removing the heavy traffic consisting of over 13,000 vehicles that use this motorway every day.

Once finished, the diagonal intermediate axis will have a total length of 190 km and will encourage economic development in the interior of Andalusia as well as providing excellent communications for over 90 adjacent municipalities.

Technical data

Project name:
Doubling of the Mancha Real northern bypass

Promoter/Owner:
Consejería de Obras Públicas y Transportes de la Junta de Andalucía

Architects:
UTE IMCA / Narval / Pereda4

Budget:
€32.672.196

Undertaking time:
30 months

Technical data

Length
8.700 metres

Design speed:
100 km/h

IMD 2008:
12.018 vehicles/day

Section:
2 carriageways, 2 lanes in each direction + central reservation

Junctions:
2

New access to Mancha Real:
1600 metres + two roundabouts

Structures:
viaduct 320 metres and 3 overpasses

Events

FCC builds an indoor municipal swimming pool in Sant Feliú de Llobregat

FCC Construcción has built an indoor municipal swimming pool in Sant Feliú de Llobregat for the Barcelona area municipalities communities.

The rectangular building consists of a basement, ground floor containing the changing rooms, saunas, jacuzzis and three swimming pools - one of competition size, 25x16 m - and an upper floor containing an aesthetics area, fitness rooms, indoor cycle, body-building, bar, offices and accesses to the competition grandstand.

The building has an accessible roof with a garden on a structure of laminated wooden beams and sheet.

The project included installations for air conditioning, water treatment, equipment with sauna, steam generator, 2 spas, sports equipment in the swimming pool and two lifts.

Technical data

Project name:
Sant Feliú municipal swimming pool

Promoter/Owner:
Área Metroplitana de Barcelona, Mancomunitat de Municipis

Architects:
Claudi Aguiló/Martí Sanz

Undertaking time:
16 months

Project team

Department manager:
Carlos Sánchez

Site manager:
Mónica Buendía

Site technician:
José Tarrés

Quality technician:
Nuria Ribalta

Installations technician:
Martí Vall

Foreman:
José A. Rodríguez

Administrators:
Rosa Mª Rodríguez/Rafael Bejarano

Events

First stone in the New Tres Cantos sector en Madrid

The Councillor for the Environment and Territorial Planning for the Region of Madrid, Beatriz Elorriaga Pisarik, laid the first stone for the landscaping work in Sector AR in Tres Cantos, Madrid, on 9 July. The ceremony was attended by the General Director of Town Planning, Domingo Menéndez Menéndez, the Mayor of Tres Cantos, José Folgado Blanco and the Chairman of FCC Construcción, José Mayor Oreja.

The landscaping work is the climax of the process started in May 2005 after FCC won the project for town planning management and building in the sector in the Tres Cantos general plan.

José Folgado Blanco, Mayor of Tres Cantos, together José Mayor Oreja, Chairman of FCC Construcción, and Beatriz Elorriaga Pisarik, Councillor for the Environment and Territorial Planning for the Region of Madrid

Sector AR New Tres Cantos has a total area of 329 Ha of which 43 Ha are destined for green spaces and 152 Ha for public use as equipment and infrastructures. The rest of the area will contain 1,211,934 m2 of buildings in the form of 6,900 homes

The landscaping work is expected to last 33 months and includes the widening of the M-607 motorway to three lanes in each direction, the enlargement of the electrical sub-station, three structures to cross the high speed railway line, the enlargement of the waste water treatment station in the town and the installation of a rubbish collection system with underground containers, among other actions

Events

Renovation of the national road 12 in Guatemala inaugurated

Oscar Berger; The president of Guatemala, wearing a blue shirt, during the inauguration event of the National 12 Road.

The President of Guatemala, Oscar Berger, with the Minister for Communications, Infrastructures and Housing, Francisco Unda, and over 5,000 residents in the municipalities through which the work runs, inaugurated the work to renovate and improve national road 12 in the town of Tacaná, Guatemala, on 20 July.

The work, carried out by FCC, involves the renovation of 67 kilometres between the towns of Tejuela, San Sebastián, Ixchiguán, Tacaná and Tectitán, 270 km west of Guatemala City.

The section includes the enlargement of five small bridges, the building of a bridge over the River Coatán with 42 metre girders built on site, the placement of more than 45,000 tonnes of hot asphalt mix and more than 100,000 tonnes of sifted gravel for the lower payers of the road as well as the work of recovering 12 km of existing road and planting more than 6,000 trees of local species

Details

Project name:
Renovation and improvement of national road 12

Promoter/Owner:
Government of Guatemala

Budget:
$19 million

Undertaking time:
20 months

Project team

Department manager:
Pedro Collado Gómez

Group manager:
Juan José López Monge

Site manager:
Javier Olivares Castillo

Drawing office manager:
Alberto Jara Murillo

Quality manager:
Melvin Ajcá Cayax

Administration manager:
Jorge Rodríguez Gonzalez:

Events

The EN 396 diversion opened in the Algarve in Portugal

The building of this bypass provides improved access between the town of Loulé and the tourist area of Almancil, Quarteira and Vilamoura, as well as connecting the longitudinal axes of the Algarve.

The project, built by FCC subsidiary Ramalho Rosa Cobetar, consisted of building a new section of the EN 396 road, 3.9 km long, starting at the Loulé junction and ending at the EN 396, where a connecting branch was built. The work also included the remodelling of 1.8 km of the EN 125 road.

The connections with the existing roads involved three junctions at different levels, two intersections and two roundabouts.

The project also included lighting the new section and the installation of 6,900 m2 of acoustic panels.

Technical data

Project name: :
EN396 diversion – Connection of the Loulé 1 junction with Quatro Estradas.

Promoter/Owner:
EP Estradas de Portugal

Architects:
ENGIVIA / COTEPROL

Budget
19.543.920 €

Undertaking time:
16 months

Project team

Department director:
Antonio Mendes

Group manager:
Óscar Álvarez

Site manager:
Joao Salgueiro

Production managers:
Jorge Brás / Rogério Berger

Events

FCC builds three water treatment stations in Portugal

FCC Construcción, through its Portuguese subsidiary, Ramalho Rosa Cobetar, has finished the design and building of three water treatment stations in the water supply and sewerage system for the Alto Zêzere in the north east of Portugal.

The Carvalhal do Eiro waste water treatment station in the municipality of Aguiar da Beira involved adapting the existing station for a maximum capacity of 2022 m3/day.

The water treated in the station comes from the reservoir of the same name. RRC is currently building the new Fumandinha dam to reinforce the water supply.

The work involved the complete remodelling of the operations building and of the current treatment line, re-using the filters for treated water tanks.

The Ponte Juncais waste water treatment station is in the municipality of Celorico da Beira and replaced the old Fornos de Algodres station. It has a maximum capacity of 2480 m3 /day.

The new Salgueirais waste water treatment station, in the same municipality as the above one, has a maximum capacity of 2,592 m3/day.

The treatment system used in the three waste water treatment stations to produce drinking water involves pre-oxidation, remineralising, chemical coagulation, decanting, filtering and final disinfection.

Technical data

Project name:
Water treatment station in the Aguiar da Beira, Celorico da Beira and Fornos de Algodres sub-systems

Promoter/Owner:
Águas Do Zêzere e Côa

Architects:
José Ferraz & Associados

Budget:
5.588.000 €

Undertaking time:
12 months

Project team

Department director:
José María Coelho

Site manager:
Carlos Ferreira

Production manager:
Pedro Silva

Administration manager:
José Amaral

Work under way

Over 10,000 passengers a day used the Parla tramway in its first month in operation

The average number of passengers on the Parla tramway after a month in operation is 10,000 a day

This first phase of the Parla tramway has nine stops and runs for 4.5 km to connect the city end to end in 15 minutes with a service frequency of six minutes.

The route will be completed shortly with the opening of the second phase of the tramway, 7.5 km long, connecting the town centre with the Parla East district, where 12,000 homes are to be built. The new route will have seven new stops and a future suburban railway station north of Parla.

The tramway will have a total length of 12 km with 16 stops, one every 400 metres, and will join the main points in the town, the development of Parla East and the two suburban railway stations. The new transport system also involves a group of investments in the town such as new green and pedestrian areas, the renovation of an arts centre and the creation of 4,700 parking spaces.

The investment needed to built the Parla tramway was over €120 million, 82 per cent of which was provided by the town council and the rest by the Region of Madrid

Company News

Spanish businessmen accompany the Prime Minister on his official visit to Panama.

The Prime Minister, José Luis Rodríguez Zapatero, paid an official visit to Panama on 17 July, where he met with the country's President, Martín Torrijos, with whom he visited the Miraflores lock on the canal which joins the Atlantic and Pacific. Both leaders met with various Spanish engineering and building representatives including José Ordoñez Sáinz, FCC General Sub-director for Area IV, Portugal and America.

Panama is in a period of strong economic growth with the widening of the canal and the planned expansion of the energy, petrochemical and real estate sectors.

Currently Spain is one of the main investors in Panama, which occupies second place in the ranking for Spanish investments.

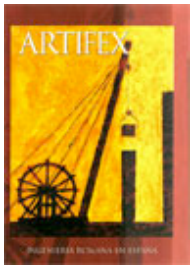
FCC sponsors the Peralada Festival

For a further year, FCC has sponsored the Castell de Peralada Festival of Music and Dance in Gerona, which this year reached its 21st birthday.

The St Petersburg Symphony Orchestra conducted by Yuri Temirkanov gave the opening concert on 20 July, playing music from Swan Lake.

The festival, held during July and August, has featured artists such as Ainoa Arteta, Joan Manuel Serrat, Joaquin Sabina and the Boston Ballet and Julio Bocca and Cristina Hoyos ballets, among others.

The Roman theatre in Mérida holds the Artifex exhibition of Roman engineering in Spain



The Artifex exhibition of Roman engineering in Spain opened in the National Museum of Roman Art in Mérida on 18 July, with the collaboration of the Ministries of Development and the Arts, the Juanelo Turriano Foundation and FCC Construcción.

The exhibition shows the immense technical legacy of the Roman world and the application of its civil engineering knowledge in Hispania, describing the procedures and techniques used by the artifex (artisan), the materials, the machinery used in building public works, the systems for supplying water to the cities and the building of infrastructures for land and sea transport.

The exhibition catalogue was sponsored by FCC Construcción and contains 12 articles written by specialists, university staff and researchers of the historical and technical aspects of engineering, its various fields and industry in the Roman era, from the building of bridges and aqueducts to dyeing, roads and mining.

Contributions

Sustainability in building: some ideas

Awareness of the effects of human activities on the environment and their consequences on all orders, social, economic, environmental and territorial, is increasing day-by-day. Some of the environmental problems that frequently appear in the Press especially affect us in Spain - climate change, desertification, erosion, etc

The question of what is really and truly sustainable, not as just a rhetorical resource, will lead the debate over the next few years. In building infrastructures and equipment, sustainability of actions will be a new environmental condition to which we must adapt, both for ethical reasons and in order to achieve continued improvement in our professional activity.

To contribute to this dialogue, the following are some brief comments on ideas that could affect building activities.

General aspects

Sustainability means the social and economic development that can generate progress in the quality of life of persons for an indefinite time, conserving the capacity for renovation of natural resources in order to continue to generate goods and services.

Sustainability is associated with limits, that is, the properties that cannot be exceeded on the planetary scale of all the available resources (physical and biological). These resources are exhausted through their use or consumption, through the pollution inherent in human activities or by being used as dumps for wastes. Nature is not inexhaustible, not even in the most optimistic theory of technical and scientific progress.

The well-being of future generations depends on maintaining the renewal rate of natural resources. The destruction of non-renewable resources (fossil fuels, biodiversity, soil) may be irreversible if they are used up before alternative resources or means of production are found and renewable resources (water, energy) can be exhausted through over-consumption beyond their capability for renovation or regeneration.

Properties

Firstly, we will look at some of the properties that could define an ideal sustainability scenario and that are affected by building activities:

- **Economy:** The result of a balanced development in which employment opportunities are produced and there is an effective internalisation of the environmental costs due to the effects of human activities on the environment, together with the search for efficiency and effectiveness (improved processes, improved techniques, R&D, competitiveness, etc).
- **Social perspective:** The result of improvements in the quality of life through the putting into practice of social policies based on the existence of basic social infrastructures and equipment: housing, education, health, transport, supplies, energy.

- **Defence of the biodiversity:** Conservation of ecosystems: protection of species and their habitats, preservation of natural spaces.
- **Management of resources:** The consumption of natural resources (water, fossil fuels, energy, soil, materials) must not exceed the renovation rate in the case of renewable resources and must not endanger

the overall quantity of non-renewable resources

- **Pollution control:** Maximum reduction at origin of all forms of pollution and wastes that may affect water, the atmosphere or the soil, to prevent the exhaustion of the planet's load capacity.

Specific aspects

Within this scenario, the application of the above principles to practice in the area of building implies paying special attention to some ideas

- **Control of process:** Each phase in the process of creating a new infrastructure must include a means of controlling and monitoring it, based on both legal standards and on criteria for good professional practice. In the planning phase, plans and programmes must be evaluated environmentally; in preparing specific projects, with their environmental impact reports; during the building of the project with a suitable environmental management system and with the site environmental plan; and during operation with environmental monitoring plans. The infrastructure will be more sustainable according to how the steps are carried out with rigour and controlled monitoring, with easily measurable indicators that show the degree of environmental quality in each phase.
- **Suitable framework for action:** An increasing number of companies are putting this aspect into practice by implementing environmental management systems in their organisations or by joining organisations that regulate corporate responsibility to improve the social, financial and environmental aspects of their business activity overall.
- **Technology:** Set as an objective that the "best available technology" is also the "most sustainable technology." Encourage the use of local materials and techniques that require minimum transport.
- **Internalising of environmental costs:** Determining the real cost and the relevant responsibility of the environmental effects of any activity is a problem that has still not been fully solved. Carrying out the principle of "he who pollutes, pays" would bring us closer to a sustainability situation. This provides an important opportunity for involving clients, site management and suppliers in the effective application of this principle.
- **Participation, information.** It is increasingly necessary to have the maximum social participation of all those affected by the building of new infrastructures. The most recent laws (law 9/2006, environmental assessment of plans and programmes, law 27/2006, the right to information, public participation and access to justice in environmental matters) are designed for this purpose. In the building phase, the good management of the person responsible for carrying out the work is fundamental.
- **Compensatory measures.** Given the effect that any infrastructure or equipment has on its environment, it is necessary to take maximum care of this aspect so that the negative effects caused by building the project are minimal. It will always be necessary to carry out corrective or compensatory measures to the maximum, including beyond those in the project.
- **Respect for natural processes:** Conservation of ecosystems, protection of affected species (above all if they are in a category of species in danger of or threatened with extinction) and of their natural habitat, additional measures in areas with special degrees of protection, forests, etc. Check especially the possible effect of the work on the biological and functional diversity of the area in which it is located.
- **Aesthetics:** Society is increasingly demanding in this aspect, often with important legal support (think of the effects of work on archaeological and historical matters as well as the importance of balanced development in urban areas). In both the design, building and operating phases, the interaction of the project on the landscape (natural or urban) surrounding it must be taken into account and the necessary measures taken to improve the relationship between them.


- **Management of water:** The effect of building activities on water is not quantitatively as important as that of other sectors (agriculture, industry and domestic consumption) but it must be taken into account given that it is one more factor in the group of effects on the environment. The final effect on any environmental aspect is the result of many impacts or effects from all sectors of human activity and environmental problems can be aggravated when these effects are permanent or accumulative. For this reason, it is necessary to set plans that help to save water during the building of the project and to ensure that **pollution** caused by any tipping into natural water (rivers, lakes, aquifers, coastal areas) is minimal.
- **Control of air pollution:** The greenhouse effect, caused by CO2 emissions, acid rain caused by the emission of SOx gases, the deterioration in the ozone layer and the effects of emissions of gases and particles on human health give this aspect maximum importance. In work near inhabited areas, the emission of particles, dust, rubble, etc, can also produce important nuisances that must be reduced to the minimum.
- **Defence against erosion and desertification:** This is one of the main environmental problems, even more so in Spain. Due to various factors (the cutting down of trees and forests, changes in the use of land, intensive agricultural, cattle and industrial use, pollution from various causes, diversion of rivers, etc) the topsoil that maintains plant life is lost. From this moment on, the weather (rain, wind, currents) erodes the land. The result is the desertification of entire regions. It is necessary to take measures that reduce this phenomenon and it even reverse it, such as reforestation or replanting, as well as the recovery of the

topsoil in the area affected by the project.

- **Water and energy balances:** It is important to consider changes to the run-off coefficient and the exchange of water between the soil and the atmosphere in the area affected by the project. The same happens with the heat exchange between the soil occupied by the project and the surrounding environment. In both cases, the accumulative importance of these effects in areas that have a large number of infrastructures must be studied as well as in urban areas where both effects can cause important changes to local micro-climates and nearby ecosystems.
- **Management of dumping:** The idea is to reduce at origin the need to transport material to tips, re-using excess from excavations and rubble, working with controlled tips to ensure they occupy the minimum amount of land.
- **Saving natural and energy resources:** (Water, materials, fuels, energy sources.) Another of the main problems in achieving sustainable development is in the foreseeable exhaustion of natural resources and sources of energy. This requires working with the focus on saving, thinking in terms of economy of resources as a technological challenge. Always plan processes with the minimum possible use of natural resources, especially scarce ones, that may be exhausted even over the long term or that must be transported from far away and with a minimum overall energy balance. Plan the analysis of the life cycles (consumption of energy and materials) in any project. Search for the effective management of the consumption of resources and energy, either through increased efficiency, savings in the processing phases and the reduction of the requirements for resources at origin. Any action on the site will be more sustainable if it encourages the saving of energy, materials, soil and water, if it induces the saving of non-renewable energy sources and favours the use of renewable energy.
- **Prevention of risks:** Because of its effect on the environment and also on human health, the prevention of risks, in its various aspects, is important for improving sustainability. The project that suitably includes risk management measures in its undertaking (various types of prevention plans, emergency plans, etc) and that includes measures for preventing natural, environmental, health, safety at work, traffic accidents risks will be more sustainable.

- **Wastes management:** This is another important environmental aspect - the generation of wastes that requires the availability of a large number of tips with the resulting energy consumption, pollution problems and land occupation, above all in the most populated areas. The reduction of the generation of wastes during the undertaking of the project must be studied, considering various alternatives - reduction of wastes at origin, recycling of wastes, selective collection and revaluation of wastes. Attempt must also be made to make use of materials in old infrastructures for the new ones.
- **Noise control:** The problem of noise associated with traffic and human activities is fundamental, above all in urban areas and those with a high population density. Specific measures to be adopted to reduce the noise caused by activities on the site to nearby populations must be studied in detail.
- **Control of other forms of pollution:** irradiation, heat and light: As with other aspects, this requires preparing specific plans to adopt measures to prevent the negative effects of these types of pollution.

Sustainability in carrying out the product

The following are some aspects to be considered in the project's environmental plan, taken from the environmental guides and the objectives of good practices of FCC Construcción:

- Measures to **minimise the pollution** of natural elements:
  - **Air pollution:** Spraying in areas of traffic and stockpiles, use of stabilisers on tracks, protections, filters, screens and humidifiers, speed limits..
  - **Tipping to water:** Site sewerage system, decanting pools, purifying, treatment of wastes, ditches, cleaning, waterproofing. Re-use of effluents and waste process water.
  - **Treatment of wastes:** Specific management of inert wastes, USW, sewerage, RP, packaging, scrap, others (sanitary, radioactive). Classification, re-use, recycling, storage, management and transport. Provision of containers and areas for stockpiles. Protection of storage areas.
  - **Protection of soil:** Access and occupation limits, signposting, waterproofing, removal of polluted soils, recovery of topsoil. Re-use of inert wastes from other projects. Reduction of loans and inert materials to tip with respect to the volume foreseen for the project.
  - **Noise reduction:** Limits on hours and traffic, anti-noise screens, protection for machinery, rubber linings, planning of work. Reduction of effects of blasting.
- **Protection of species:** Protective barriers, replanting, transplanting, movement of plants, wildlife passes, replanting of slopes, irrigation or recovering of nearby plantations, channelling or burying of overhead lines, re-scheduling of activities.
- **Measures to protect the environment affected during the undertaking of the project:** landscape, ecosystems, habitats, affected population, historical, artistic and archaeological heritage, urban areas, protection systems, limits to accesses and occupied areas, cleaning of accesses
- **Restoration of the natural environment** in the areas next to the site at the end of the project as well as repositioning of affected areas (accesses, quarries, stockpiles, loans, tips), landscape and ecosystem

recovery, connectivity of habitats, flora, fauna, protection of watercourses, repositioning of rights of way.

- Improvements in the building process and installations to **save energy and natural resources** (use of renewable energies, water, fossil fuels, quarries, loans, inert materials). Environmental improvements on the initial project. Analysis of the life cycle of the materials used.
- Measures to be adopted in the site's **fixed installations and offices:** waste management, control of tipping, plans for saving energy, water and paper, sound installation, night-time lighting that respects the environment
- **Environmental training** for the site personnel including own staff and those of sub-contractors. Meetings and signs.
- **Relationship with interested parties.** Involvement of the client and site management in environmental management. Involvement of suppliers and sub-contractors. Attention to complaints and claims.
- **Environmental emergency plans,** to prevent natural and sanitary risks:
  - Fire protection measures
  - Protection and signposting of areas with potential danger (tanks and buried conduits).
  - Measures to protect unstable areas with danger of erosion or movement: rock fills, boltings, ditches, drains, systems, plantations.
  - Emergency measures for accidents, spillages and floods.

Conclusions

Building companies are paying increasing attention to the ideas described above. When carrying out projects, they implement environmental management systems which, in the case of FCC Construcción, are accompanied by a group of good environmental practices in order to improve the levels required by environmental legislation and to contribute to a more sustainable building practice.

In order to obtain an effective internalisation of costs caused by the environmental effects, it would be advisable to include all the environmental measures adopted (Site Environmental Plan) in the building design with the same structure and scope as used currently in the safety plan, similar to that established in the Government Contracts Law, which makes it compulsory to include a chapter in the design relating to the site safety plan.

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