Environmental Report 2017

FCC Construcción

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01

Letter from the General Manager

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Today, a responsible business activity is not conceived without a social or environmental purpose, which contributes to human progress and which, along its trajectory, develops its products or services while minimising its negative impacts. Economic profitability must be linked to environmental profitability and therefore achieve the sustainability of our activities, by virtue of which we coexist in the long term, meeting the needs of a growing world population.

This must be achieved through the responsible use of resources, maximum efficiency and the application of new economic and productive paradigms provided by the circular economy, innovation in processes or new technologies.

The construction sector plays an important role in shaping our environment and in contributing to the economic and social development of the areas in which infrastructures are executed. Moreover, in being a large consumer of natural resources, it is a sector that can positively influence the environmental dimension of sustainability by actively promoting the reuse and recycling of waste and effluents generated. The adoption of good practices, in compliance with our obligations, has the capacity to shape a better world.

Our commitment to society and the environment is reflected biennially in this Environmental Report, a pioneering publication in our sector with its first edition in 2000. It provides an account of our performance through continuous improvement, the application and dissemination of good practices, and our perseverance in obtaining results.

In spite of the difficult situation that the sector is experiencing, we do not cease our efforts to continue promoting progress in environmental matters and seeking excellence. We incorporate environmental criteria into decision-making throughout project life cycles, from bidding to operation. We have adapted our Management and Sustainability system to the new ISO standards of quality and environment applicable to all countries where we operate.

In keeping with our commitment to climate change, we have obtained the “Calculate and reduce” seal of the Carbon Footprint, Compensation and CO_2 Absorption Projects Registry, granted by the Ministry of Agriculture and Fisheries, Food and the Environment. We have also participated in initiatives with the potential to bring significant transformation, adhering, for example, to the “#Comunidad Por El Clima”, promoted after the Paris Agreement to establish commitments to reducing emissions.

In this same area, and in accordance with the European Energy Efficiency Directive, we have carried out energy audits in 28 FCC Construcción, FCC Industrial and Matinsa work centre located in Spain.

We have also extended this commitment beyond our borders. An example of this is our active participation in the KPESIC platform for the promotion of environmentally sustainable construction in Latin America and the Caribbean.

Amongst the external recognition of our responsibility, we can mention the National Award for FCC Industrial, in the category of environmental management and corporate sustainability, awarded by the European Business Awards.

Our conviction in the need to take care of the environment is complete, because it not only brings benefits to the environment and people, but also allows us to obtain better results for the business. At the same time that we optimise the management of natural resources, reducing the consumption of raw materials and energy and generating savings, we are improving our relationship with stakeholders. This is how society understands companies today and how it will also do so in the future. Our obligation is linked to these generations and those of tomorrow and for that purpose we continue to work, to forge a path, with the firm conviction of building a more sustainable and humane future for all.

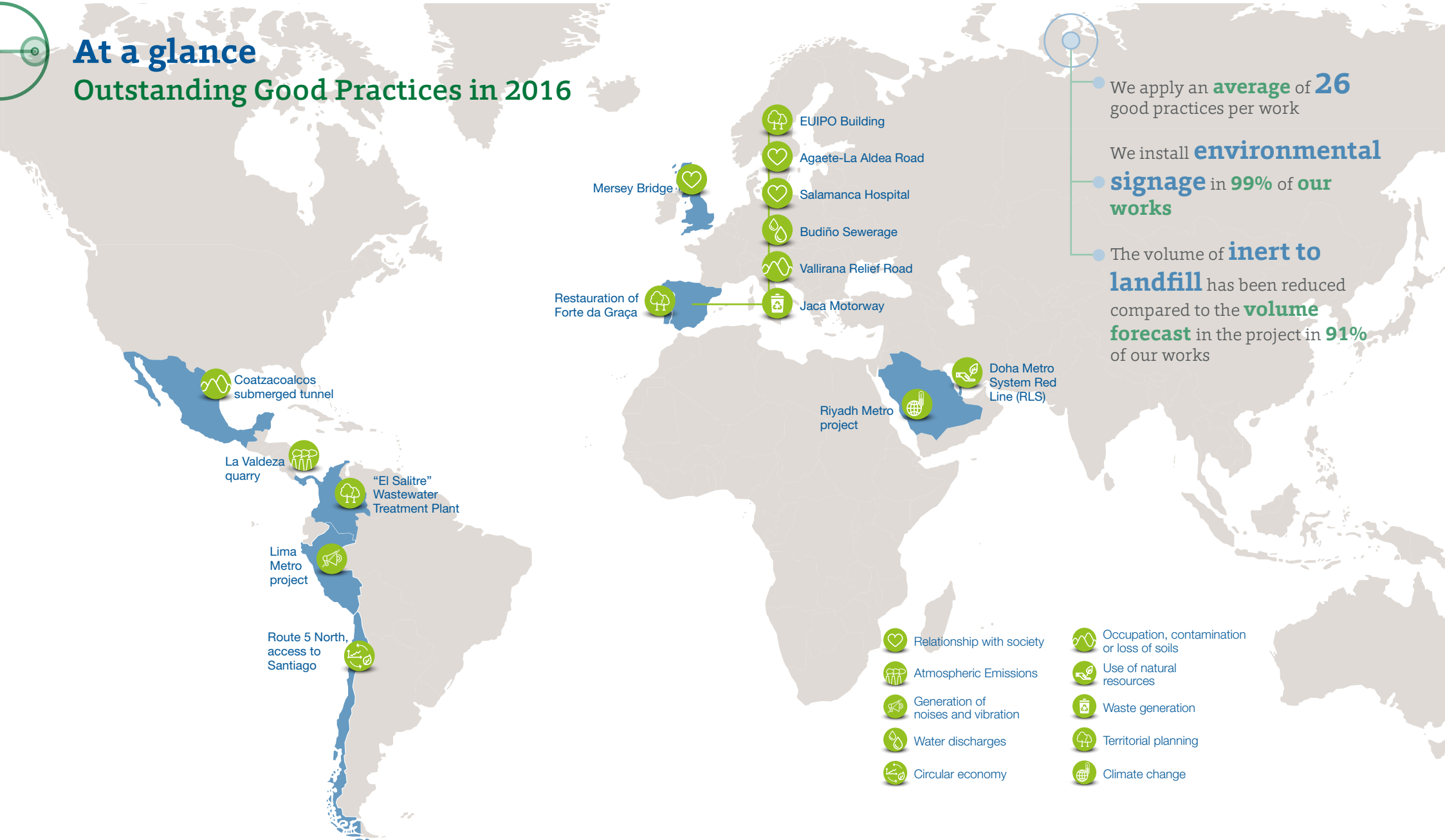
Pablo Colio Abril
General Manager, FCC Construcción
CEO of the FCC Group

02

At a glance

At a glance

Outstanding Good Practices in 2016



We apply an **average** of **26** good practices per work

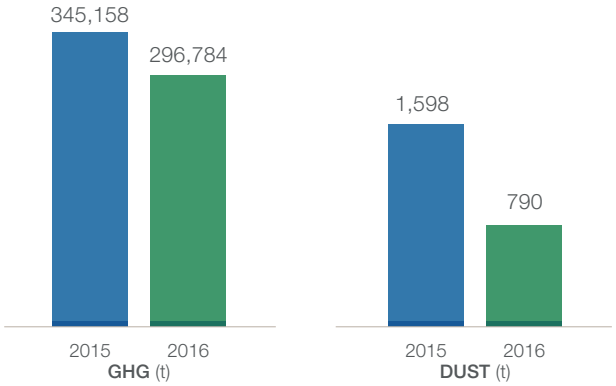
We install **environmental signage** in **99%** of **our works**

The volume of **inert to landfill** has been reduced compared to the **volume forecast** in the project in **91%** of our works

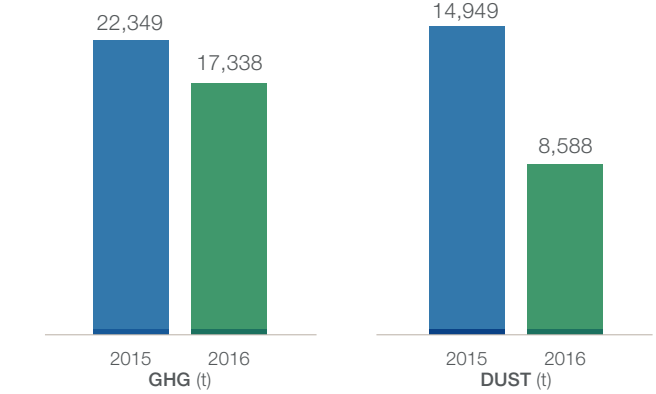
Our main environmental indicators

Atmospheric Emissions

Emissions produced

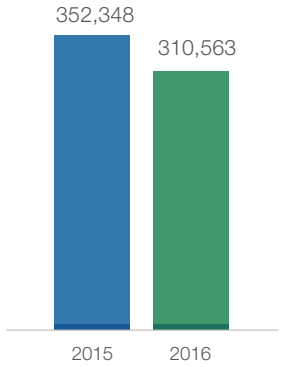


Emissions avoided

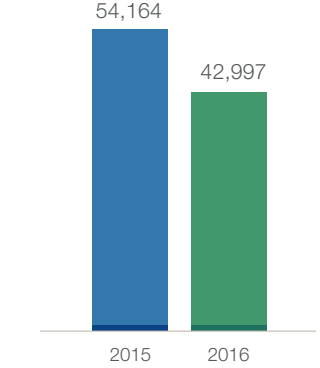


Discharges

Water discharged (m^3)

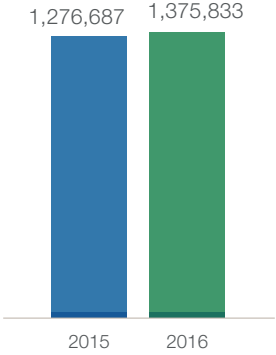


Water recycled (m^3)

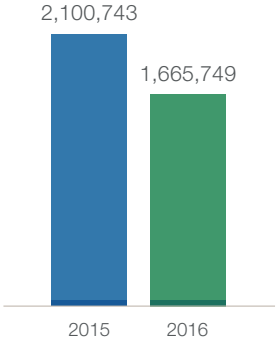


Natural Resources

Energy (GJ)

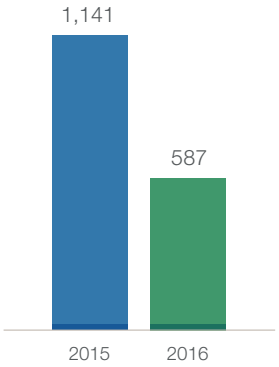


Water (m^3)

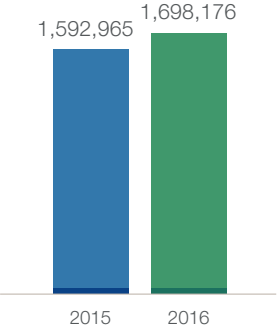


Waste

Hazardous (t)



Non-hazardous (t)



03

The contribution of FCC Construcción to environmental and social challenges through SDGs

The contribution of FCC Construcción to environmental and social challenges through SDGs

FCC Construcción wants to be prepared to face the global challenges related to demographic changes and a growing population in cities, adapting its business model and adding to new trends requiring a respectful relationship with the environment and people. Nowadays, the sustainability of organisations requires commitments that go beyond economic solvency; interest groups expect companies to respond to problems faced by governments and society. Therefore, FCC Construcción wants to be a participant in the changes that are taking place, acting within its scope to improve its environment and position itself as a benchmark in its sector.

Every year, FCC Construcción evaluates the environmental and social footprint generated by its activities, through a system of indicators that determine the company's environmental performance in different sub-areas: climate change, relationship with society, water resources, natural resources, waste and biodiversity. Additionally, FCC Construcción publishes its performance through periodic reports for all those stakeholders involved in the company's activity. This Environmental Report, the tenth edition, constitutes an exercise in transparency concerning the responsibility of the environmental and social impact of its works and progress made, and presents data for total industrial services and works in implementation throughout the 2016 financial year.

This year, following the line marked by the FCC Group and the 2015-2016 Sustainability Report, FCC Construcción wishes to highlight in this Environmental Report its commitment to the environment and its contribution to achieving Sustainable Development Goals (SDG).

Environmental report 2017

With this 2017 Environmental Report, we maintain our commitment to publicising our progress in sustainable management for all stakeholders involved in our activity.

The 17 Sustainable Development Goals approved in 2015 by the United Nations are a guide to protecting the planet and improve people's lives. These objectives establish a common road map to eradicating poverty, reducing inequality and fighting against climate change. FCC Construcción recognises and incorporates the SDGs in its practices, and advocates a value creation model. Therefore, the company strives to promote local employment in the communities where its operations are carried out, especially those with higher levels of economic difficulties; and to protect the environment by analysing its environmental footprint and approaching its processes as a learning exercise and continuous improvement.

Given the visible consequences of climate change and the scarcity of natural resources, in recent years there has been an increase in citizen awareness with respect for the environment. Specifically, this environmental report highlights two key aspects for the sustainable development of the company's activities: the fight against climate change and transition to the circular economy.

On the one hand, FCC Construcción's commitment to the fight against climate change has continued to grow since 2010, when it implemented a Greenhouse Gas (GHG) measurement protocol, and in 2014 it was the first construction company to register its carbon footprint in the Carbon Footprint, Compensation and CO_2 Absorption Projects Registry of the Ministry of Agriculture and Fisheries, Food and the Environment (MAPAMA).

Through its advances in the fight against climate change, the transition to a circular economy and activities related to sustainable construction, FCC Construcción contributes to:

Executing sustainable infrastructures that support social welfare and the economic development of communities.

Building more sustainable cities that counteract global change. Designing and building more efficient and less polluting infrastructures.

Generating a culture of resource reuse and responsible consumption. Encouraging the efficient use of resources and the reduction of waste.

Achieving a low carbon economy, reducing emissions in our works and adopting less polluting practices.

On the other hand, the concept of circular economy, which has been gaining strength in recent years, has been implemented by the company for some time, minimising the consumption of water, energy and materials for each project and conferring value upon their waste, turning them back into resources. This year, it aims to highlight its contribution to the circular economy, not only in the sense mentioned above, but also by promoting innovation in this field.

The circular economy and climate change are closely related, since the transition from a linear to a circular economy, linked to the use of resources, can contribute positively to the fight against climate change.

FCC Construcción continues to consider its participation in achieving a more sustainable construction with the development of guidelines, standards and norms in partnership with various work groups as being crucial. In 2016, it has worked on the preparation of Guidelines for the application of the UNE-EN ISO 14001: 2015 standard and the UNE-EN ISO 9001: 205 standard in the construction sector, together with AENOR and other major Spanish construction companies. In addition, in the international working groups CEN / TC350 / WG6 and ISO / TC59 / SC17 / WG5, chaired by FCC Construcción, work has been undertaken on the preparation of standards EN 16543-5. *Framework on specific principles and requirement for civil engineering works, and ISO 21931-2: Sustainability in buildings and Civil Engineering Works — Framework for methods of assessment of the sustainability performance of construction works — Part 2: Civil Engineering Works,* which will be published in 2017.

Finally, FCC Construcción's Good Practices System, consisting of voluntary measures that go beyond legal requirements, reinforces and improves its environmental and social performance. In each of the projects undertaken by the company, those actions that make more sense in the context of the project, and that generate greater benefits, are applied.

® *FCC Construcción 2009. "Evaluation system for environmental performance through good practices".*

Contribution of FCC Construcción by building basic infrastructures

An example of the contribution made by FCC Construcción makes through the implementation of basic infrastructures is the adaptation project for the Bogotá River, financed by the World Bank. With this project, which has improved the quality of the river water and the health conditions of the area's inhabitants, it has been possible to involve the local communities have been involved in reforestation actions in the area, and to re-use total surplus excavation from the project itself, amongst other benefits.

04

The role of FCC Construcción in sustainable construction

The role of FCC Construcción in sustainable construction

Contribution to the SDGs by FCC Construcción through sustainable construction

Our activity provides society with sustainable infrastructures, which support the economic development and social well-being of communities in which we run services. Through its implementation, we support the efficient use of resources and innovative technologies.

Our contribution is the design and construction of more efficient infrastructures involving less contamination. We invest in innovation and technology to offset the pressure exerted by development on natural resources.

The objective of our work is to encourage the efficient use of resources and substantially reduce waste generation from our works, progressing towards a more sustainable business model from the point of view of production as well as resource consumption.

FCC Construcción promotes sustainability in construction not only within the company, but also by building bridges of co-operation with other entities that serve to lead the rest of companies towards the same destination through working groups.

FCC Construcción, as a responsible company, understands the different social, environmental and economic contexts in which its activities are undertaken, and proceeds with the intention of achieving a more sustainable and respectful construction with the environment. It therefore incorporates sustainability into the company's strategy as part of its structure, in an integral manner, linking the three pillars of sustainability, economic, social and environmental, in each project and transversally in the company.

Precisely because of the nature of the construction activity, one of the most solid lines of action of FCC Construcción is the promotion of sustainability in construction not only through the analysis of the company's environmental performance, but also via participation in the development of guidelines that help companies in the construction sector to follow this path.

FCC Construcción is an active participant in sustainability trends that have emerged, and with which it continues to advance and participate in their development and implementation. To that end, it participates in different national and international work commissions to develop sustainability standards and principles in the construction sector.

Specifically, some of the actions being undertaken include the development of tasks related to the definition of terminology and the general principles of sustainable construction, the description of the life cycle of the building or infrastructure, the definition and use of sustainability indicators for the Environmental Product Declaration and the determination of an assessment method for the environmental, economic and social behaviour of construction and civil engineering works.

In this regard, it is worth mentioning the participation with the ISO / TC 59 / SC 17 and CEN / TC350 International Technical Committees, aimed at establishing sustainability bases in civil engineering works, one of the most important activities at FCC Construcción.

Given the nature of its activity, FCC Construcción regards partnership with work groups related to sustainable construction a fundamental pillar for the development and establishment of guidelines and sectoral criteria in this area. Some of the most relevant organisations and working groups with which it works in the establishment of sustainability criteria related to sustainable construction are shown in the following table.

Table 1. Working groups related to sustainable construction

Organisation	Participation
International Technical Committee **ISO/TC59/SC17** "Building construction/ Sustainability in building construction".	• Participation in ISO/TC59/SC17/WG1: "General Principles and Terminology". • Participation in ISO/TC59/SC17/WG 2: "Sustainability Indicators for Buildings". • Participation in ISO/TC59/SC17/WG3: "Environmental Declarations of Buildings Products". • Participation in ISO/TC59/SC17/WG4: "Framework for Assessment of Environmental Performance of Buildings and Constructed Assets". • Chair of ISO / TC59 / SC17 / WG5 "Civil Engineering Works", on sustainability in civil engineering works.
International Technical Committee **CEN/TC350** "Sustainability of Construction Works".	• Participation in the CEN / TC350 / Task group: "Framework for assessment of buildings". • Participation in CEN/TC350/WG1: "Environmental performance of buildings". • Participation in CEN/TC350/WG2: "Building life cycle description". • Participation in CEN/TC350/WG3: "Product level". • Participation in CEN/TC350/WG4: "Economic performance assessment of buildings". • Participation in CEN/TC350/WG5: "Social performance assessment of buildings". • Chair of CEN/TC350/WG6 "Civil Engineering Works", on sustainability in civil engineering works.
Technical Standardisation Committee **AEN/CTN198** "Sustainable Construction".	• Vice Chair of the Technical Standardisation Committee AEN / CTN198 "Sustainable Construction". • Participation in the Technical Subcommittee on Standardisation AEN/CTN198/SC1 "Sustainability in building". • Chair of the Technical Subcommittee on Standardisation AEN/CTN198/SC2 "Sustainability in civil engineering works".
International Initiative for a Sustainable Built Environment **(iiSBE)**.	• Members.
Spain Green Building Council **(GBCe)**.	• Members of this organisation that constitutes the Spanish Council of the International Association "World Green Building Council", establishing itself as a channel to offer in Spain all the information on the LEED building certification tool.
BREEAM Spain.	• Members of the Advisory Board, responsible for drawing up BREEAM Spain's development strategy and representing the stakeholders of the building sector.

FCC Construcción´s participation with work groups linked to sustainability goes beyond sustainable construction, since it is aware that it is also possible to offer its experience in other areas related to corporate responsibility, innovation or the environment. It therefore participates with the organisations listed in the following table.

FCC Construcción participates in different working groups related to sustainability, which enables the company to know the latest trends and to contribute to its development and sharing

Table 2. Working groups from other environmental fields

Organización	Participación
International Technical Committee ISO/TC207 **"Environmental management"**	• Participation in the Subcommittee ISO/TC207SC1: "Environmental management Systems" • Participation in the Subcommittee ISO/TC207SC4: "Environmental performance evaluation" – Working Group WG 4 "Data quality".
Spanish National Large Dam Committee (SPANCOLD)	• Spokesperson for the Spanish National Large Dam Committee. • Chair of the "Activities of the Planning Engineer" Technical Committee. • Participation in the "Environment" Technical Committee.
International Large Dams Committee (ICOLD)	• Participation in the "Committee on Engineering Activities in the Planning Process for Water Resources Projects" (ICOLD), representing Spain.
State Council of Corporate Social Responsibility (CERSE)	• Participation in the "Transparency" Working Group.
Madrid Division of the College of Civil Engineers	• Participation in the Transparency and Social Responsibility Committee.
Advisory Board of AENOR Construction Companies	• Participation in the Environment Commission: – Working group "Environmental indicators in construction".
SEOPAN	• Participation in the Environment Committee.
Spanish Quality Association	• Participation in the Environment Committee. • Participation in the Construction Committee.
European Network of Construction Companies for Research and Development (ENCORD)	• Participation in the Working Group on Environment and Sustainability. • Participation in the working group for the development of a Declaration of sustainability for European construction companies.
European Construction Technology Platform (ECTP)	• Members of the Steering Committee • Participation in the "Quality of life" area – Working group WG1 "Reduce environmental impact". – Working group WG3 "Improving the built environment for people".
Spanish Technological Construction Platform (PTEC)	• Patrons of the PTEC Foundation • Participation in the Sustainable Construction Strategic Line. – Coordination of Working Group 1: "Competitiveness". – Working group 2: "Environment". • Participation in the Strategic Line of the City of the future. – Working group 1: "Efficient city" – Working group 2: "Smart city"

FCC Construcción firmly believes that it has the responsibility to share its experience and participate in establishing a roadmap towards sustainability in construction. Only in this way will a better future be guaranteed for generations to come, and value will be created for the groups that are influenced by their activity.

FCC Construcción's work has left its mark on the standards and procedures in which it has participated, collaborating in the growth of environmental trends in the construction sector. The commitment to participate in establishing guidelines for moving towards sustainable construction is extra effort, but thanks to this, we learn from others and generate new knowledge, in addition to improving their willingness to face the challenges that will arise in the future. This experience reaffirms the tendency to continue moving in this direction, in the search for mutual benefit for the company and society.

FCC Construcción believes that teamwork, coordinated by all parties, is essential to achieving results that are respectful towards all groups involved.

05

Main magnitudes as indicators

Main magnitudes as indicators

FCC Construcción is aware that its activity undeniably impacts on the environmental and social environment in which it operates. However, this assessment is not enough; objective data is needed in order to measure this impact, and to manage and improve it. For this, FCC Construcción's Management and Sustainability System defines a series of impact indicators related to environmental, social, economic and productive aspects. Thanks to this system, the company is able to track its environmental behaviour, study trends, check the effectiveness of good practices applied and communicate the results obtained to stakeholders.

The company's own computer applications allow data to be obtained from each of its works in real time, which, when translated as indicators, provide information of a generally quantitative nature. In this way, FCC Construcción has been able to define a common reference system, translating the great complexity of the reality of the works into simplified information, which allows the interaction of the works with the environment to be effectively understood and communicated.

Each one of the FCC Construcción's works or centres updates values on an at least quarterly basis, guaranteeing that information is at all times accurate. This data is integrated at the corporate level, obtaining the average values that are reflected in the tables of this section, and enabling the company to communicate information at different scales, both geographical and temporal, according to the needs of the stakeholders.

This section shows the average values of the indicators for the set of projects executed in 2016, explaining, in addition, these average values for building and civil engineering works. Similarly, the proportion of works in which the different magnitudes have been evaluated is reflected. The evaluation percentages show the quality and representativeness of the data provided, and may vary depending on the typology of the project and the geographical, environmental and socio-economic characteristics of its surroundings.

FCC Construcción uses a system of indicators, whose information comes from its works and centres, in order to monitor compliance with environmental and social objectives. In this way, by advancing in its achievements year after year, the company can improve its performance in terms of sustainability.

Knowing the location and environment of the work, it is important to properly plan the transport of materials, as well as the design of the activities associated with the work, which will serve to optimise and reduce the use of energy. Work efficiency translates into lower energy consumption, lower emission of greenhouse gases and, in turn, a reduction in economic costs.

Interaction with the environment

Indicators	Average values	% evaluated
1 Distance from nearest community (m)	1,261.3	100.00%
	1,761.2	96.72%
	1,596.5	97.78%
2 Distance to essential services to the community such as firefighters, hospitals, official centres, airports, power stations, telephones (m)	1,894.5	37.93%
	4,932.5	49.18%
	4,117.4	45.56%
3 Distance to homes or industrial activities (m)	592.8	93.10%
	1,537.8	73.77%
	1,183.4	80.00%
4 Distance to authorised landfill for inert or non-hazardous material (km)	16.1	100.00%
	19.9	98.36%
	18.7	98.89%
5 Distance to bodies of water (m)	4,902.8	96.55%
	1,006.6	88.52%
	2,337.0	91.11%
6 Channel length affected by diversions (m)		
	264.0	16.39%
	264.0	11.11%
7 Depth of water table (m)	26.2	89.66%
	10.8	85.25%
	15.9	86.67%
8 Simultaneous presence of hazardous substances on site (l)	1,082.3	79.31%
	8,565.6	80.33%
	6,175.1	80.00%

Building · Civil engineering works · Total

Each one of the **FCC Construcción's works or centres** provides **environmental information,** enabling us to understand its **interaction with the environment**

Characteristics of the works

Indicators	Average values	% evaluated
1 Surface occupied by works (m²)	41,668.6 815,040.4 565,842.8	100.00% 100.00% 100.00%
2 Built area (buildings) (m²)	45,789.6 1,089.2 17,557.8	72.41% 59.02% 63.33%
3 Office space (m²)	267.8 2,292.6 1,608.2	82.76% 77.05% 78.89%
4 Workshop space (m²)	72.0 200,133.3 120,108.8	6.90% 4.92% 5.56%
5 Surface of the work with movement or presence of HW or DS (m²)	2,081.5 190,914.9 130,831.5	48.28% 49.18% 48.89%
6 Surface area of pavement or road occupied by works (m²)	374.6 115,062.2 69,187.2	55.17% 39.34% 44.44%
7 Surface area of Water Public Domain or Maritime Terrestrial Public Domain affected by works (m²)	16,490.5 9,475.9 10,037.0	6.90% 37.70% 27.78%
8 Number of people on site (ud)	85 200 163	100.00% 98.36% 98.89%
9 Number of people involved in work (ud)	12 28 22	86.21% 78.69% 81.11%
10 Number of auxiliary installations excluding worksite office (plants, workshops, prefab units, quarries, landfills, machinery depots) (ud)	1 2 2	82.76% 86.89% 85.56%
11 Number of combustion engine powered vehicles or machinery on site (not including generators) (ud)	9 28 21	89.66% 77.05% 81.11%
12 Number of generators on site for more than 5 days (ud)	2 4 4	51.72% 72.13% 65.56%
13 Number of road closures (ud)	2 9 7	58.62% 54.10% 55.56%

Building · Civil engineering works · Total

Water is a valuable and limited resource, whose good use requires not only a reduction in consumption, but also care to be take in ensuring its quality. To do this, some of our projects require actions that return the optimum characteristics to the water to be reused or returned to the environment.

Production of materials

Indicators	Average values	% evaluated
1 Concrete plant production (m³)	29,501.7	3.45%
	53,008.9	21.31%
	51,329.8	15.56%
2 Asphalt agglomerate plant production (t)		
	11,185.8	4.92%
	11,185.8	3.33%
3 Aggregate plant production (t)		
	25,833.3	26.23%
	25,833.3	17.78%
4 Use of asphalt agglomerate on site (t)	447.6	44.83%
	7,020.9	67.21%
	5,438.5	60.00%
5 Use of concrete on site (m³)	4,951.2	96.55%
	17,346.6	91.80%
	13,214.8	93.33%
6 Amount of steel used on site (t)	493.8	100.00%
	1,666.5	88.52%
	1,256.8	92.22%
7 Percentage of night-time electricity consumed (%)	9.3	86.21%
	11.6	70.49%
	10.8	75.56%
8 Amount of non-ferrous metals used on site (t)	37.1	58.62%
	8.4	22.95%
	24.2	34.44%
9 Amount of bricks used on site (t)	11,364.8	72.41%
	3,401.0	18.03%
	8,627.3	35.56%
10 Amount of glass used on site (t)	4,295.6	79.31%
	9,167.1	18.03%
	5,871.7	37.78%

Building Civil engineering works Total

Good planning and coordination are key to reducing the consumption of resources and materials, thus minimising the impact on the environment.

Volumes managed

Indicators	Average values	% evaluated
1 Volume of inflammable/combustible substances stored (wood, paper, etc.) (m³)	2.0 31.9 22.3	79.31% 80.33% 80.00%
2 Volume of harmful or hazardous substances stored which may get accidentally broken (m³)	98.7 484.4 366.7	62.07% 67.21% 65.56%
3 Volume of aggregates and other materials collected with may cause turbidity in the water (m³)	295.6 2,848.0 2,369.4	10.34% 21.31% 17.78%
4 Volume of water extracted from rivers (m³/año)	2,674.0 38,337.7 32,988.1	10.34% 27.87% 22.22%
5 Volume of water extracted from wells (m³/año)	2,981.8 4,445.1 4,214.1	10.34% 26.23% 21.11%
6 Volume of water consumed in different concrete manufacturing activities and for spraying levellings and surfaces (m³/año)	2,477.3 42,608.9 26,305.5	89.66% 62.30% 71.11%
7 Volume of vegetable soil needed on site (m³)	479.5 7,834.1 6,285.8	27.59% 49.18% 42.22%
8 Volume of demolition work (m³)	2,070.7 4,789.4 4,043.1	48.28% 60.66% 56.67%
9 Volume of blasting (m³)	 41,911.9 41,911.9	 22.95% 15.56%
10 Volume of bulk materials used on site (earth, aggregates, agglomerates and concrete) (m³)	11,332.4 132,642.9 93,217.0	89.66% 88.52% 88.89%
11 Volume of earth movements (excavations and backfills, cuttings and embankments) (m³)	11,939.6 196,794.9 137,301.2	96.55% 96.72% 96.67%
12 Volume of borrow pits and quarries operated (m³)	 83,599.3 83,599.3	 27.87% 18.89%

Building Civil engineering works Total

Knowing the volumes of waste that will be handled is essential for managing them properly and designing correct systems of temporary storage on site.

Volumes managed (continue)

Indicators	Average values	% evaluated
13 Expected volume of earth and rubble (m³)	14,213.5	75.86%
	61,419.5	80.33%
	46,792.3	78.89%
14 Volume of landfill expected (m³)	99,018.0	3.45%
	70,898.5	36.07%
	72,121.1	25.56%
15 Volume of contaminated earth (not caused by work site) (m³)	9.9	3.45%
	4,663.1	9.84%
	3,998.4	7.78%
16 Expected volume of inert or non-hazardous dredged mud (m³)		
	21,420.4	6.56%
	21,420.4	4.44%
17 Volume of containment sludge used (bentonite) (m³)	164.0	20.69%
	8.7	11.48%
	80.4	14.44%
18 Volume of paint, solvents, release agents, cement curing liquids, accelerants, fluxing ingredients, antifreeze, epoxy resin (m³)	33.6	93.10%
	48.1	81.97%
	43.0	85.56%
19 Volume of land for landfills from the work itself (m³)	9,433.2	68.97%
	74,066.9	80.33%
	55,332.5	76.67%
20 Volume of earth for backfills (borrowed or from other works) (m³)	690.0	62.07%
	41,691.1	73.77%
	29,976.5	70.00%
21 Volume of aggregates used on site (m³)	1,663.2	37.93%
	7,405.1	60.66%
	6,089.3	53.33%

Building · Civil engineering works · Total

A common characteristic of large construction projects is the big amount of earth movements and the important consumption of this resource. For this reason, an accurate planning of the expected volume of earth for backfills, as well as its possible sources, and a proper mass-balance contribute to minimise the use of this primary input that can be reused on site.

06

Environmental footprint and good practices

Environmental footprint and good practices

Environmental impacts in construction

Regardless of the size and duration of the projects, FCC Construcción is aware that its activities generate environmental and social impacts on the environments in which they are carried out. Knowing and measuring these impacts is the first step to establish strategies aimed at minimising them.

With the objective of reducing its environmental footprint as much as possible and establishing priorities for action, from the integrated planning process for each work, environmental aspects are identified. First the potential impacts are evaluated and their magnitude assessed, as well as the amount of pollution or alteration, in order to identify the most significant. In this process, the sensitivity of the environment in which the project is undertaken is also taken into account.

The environmental aspects identified in the works of FCC Construcción are classified according to the following groups:

- Atmospheric Emissions.
- Noise and vibration pollution.
- Water discharge.
- Occupation of waterways or sea beds and water catchments.
- Operations that involve pollution, occupation and loss of soil.
- Consumption of natural resources (water, energy, raw materials, etc.).
- Generation and management of waste (hazardous, inert or urban).
- Radiation emission.
- Territorial planning / environment / relationship with society.
- Environmental accidents.

FCC Construcción considers it essential to identify and analyse the environment in which its activities will be developed. In this way, it is more feasible to carry out a correct evaluation of the potential impacts of the project and plan the most convenient actions to minimise them.

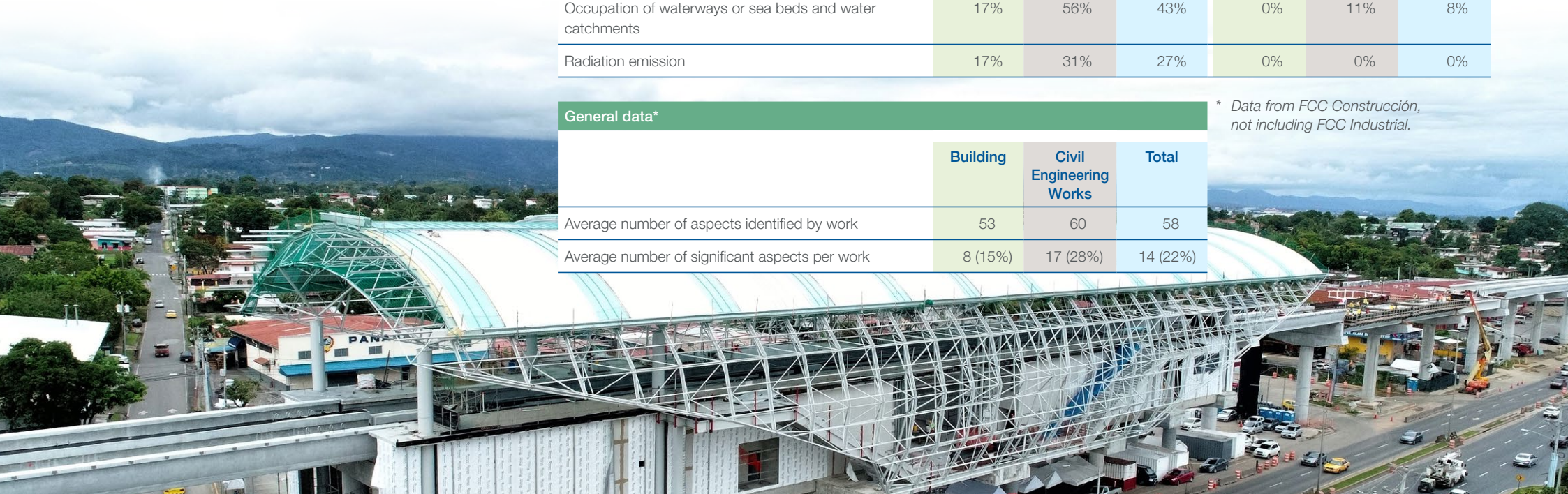
In addition, for each of the identified aspects, its main impacts on the environment are established.

The following table shows the data of the 90 works evaluated in 2016, specifying the percentage of works that identifies some environmental aspect of each of the groups of aspects as present in the project, whether real or potential, and the percentage of works with aspects that are significant after evaluation.

Groups of environmental and social aspects	% works that present aspects*			% works with significant aspects *		
	Building	Civil Engineering Works	Total	Building	Civil Engineering Works	Total
Waste generation	100%	100%	100%	69%	74%	72%
Emissions to the atmosphere	100%	98%	99%	**66%**	70%	69%
Utilisation of natural resources	100%	97%	98%	**52%**	72%	66%
Territorial planning / urban environment	100%	95%	97%	48%	74%	66%
Environmental accidents	100%	95%	97%	34%	49%	44%
Noise and vibration generation	100%	98%	99%	34%	38%	37%
Water discharges	90%	95%	93%	14%	43%	33%
Occupation, contamination and loss of soil	90%	98%	96%	7%	28%	21%
Occupation of waterways or sea beds and water catchments	17%	56%	43%	0%	11%	8%
Radiation emission	17%	31%	27%	0%	0%	0%

General data*	Building	Civil Engineering Works	Total
Average number of aspects identified by work	53	60	58
Average number of significant aspects per work	8 (15%)	17 (28%)	14 (22%)

* *Data from FCC Construcción, not including FCC Industrial.*



Prioritising the riskiest aspects

Once the environmental aspects are categorised, the next step is to determine which of these pose a greater risk to the environment and the people of the environment. These, therefore, will be the most significant and on which, in any case, action must be taken to establish prevention or mitigation measures, thus reducing the company's environmental footprint.

By integrating the data of the set of works carried out by FCC Construcción at the corporate level, the company is able to identify those aspects of recurrent priority in the construction projects, which allows to influence them and establish general business guidelines, to improve the environmental behaviour of the works.

The following table shows the information from the 90 works that were in execution throughout 2016, reflecting the environmental aspects which, after having their magnitude and importance evaluated, have been significant in a greater percentage of works.

In some works that are developed in especially sensitive aquatic environments, aquatic species can be driven away before the start of construction work and networks placed in adjacent water zones in order to prevent these species from returning to the area designated for construction and from being affected.

Significant environmental aspects

Code	Description of environmental aspect	% Of works in which the environmental aspect is significant *					
		Construction		Civil Engineering Works		Total FCCCO	
U-06	Effect on the territory / urban environment due to operations that involve dirt in the entrance and exit of work. Mud and loose materials	38%	(11/29)	51%	(31/61)	47%	(42/90)
U-07	Effect on the territory / urban environment due to granular material falling during transport	38%	(11/29)	43%	(26/61)	41%	(37/90)
A-09	Emission of dust by movement of machinery	3%	(1/29)	54%	(33/61)	38%	(34/90)
A-06	Emission of dust by earthmoving: excavations and fillings, clearings and embankments	3%	(1/29)	51%	(31/61)	36%	(32/90)
A-10	Emission of dust by transport of earth and debris	3%	(1/29)	48%	(29/61)	33%	(30/90)
R-62	Generation of urban waste from the recovery and cleaning of facilities / works	21%	(6/29)	39%	(24/61)	33%	(30/90)
A-04	Emission of dust by demolitions	28%	(8/29)	30%	(18/61)	29%	(26/90)
A-08	Emission of dust by supply and collection of powdery materials	7%	(2/29)	38%	(23/61)	28%	(25/90)
N-02	Consumption of water for irrigation of landfills and pavements	3%	(1/29)	38%	(23/61)	27%	(24/90)
R-02	Generation of inert or non-hazardous waste: leftover earth from excavation	21%	(6/29)	30%	(18/61)	27%	(24/90)
N-53	Steel consumption (structural and corrugated)	17%	(5/29)	30%	(18/61)	26%	(23/90)
M-02	Environmental accident due to fires in storage area for flammable / combustible substances (wood, paper, etc.)	31%	(9/29)	21%	(13/61)	24%	(22/90)
R-61	Generation of urban waste from offices, changing rooms and work dining rooms	14%	(4/29)	30%	(18/61)	24%	(22/90)
W-02	Noise generation due to demolition	31%	(9/29)	21%	(13/61)	24%	(22/90)
N-12	Gravel consumption	10%	(3/29)	30%	(18/61)	23%	(21/90)
N-21	Consumption of diesel, gasoline, fuel oil, coal	10%	(3/29)	28%	(17/61)	22%	(20/90)
R-28	Hazardous waste generation: empty containers contaminated (paints, solvents, oil, glue, stripping, release, silicone, aerosols, explosives.)	24%	(7/29)	20%	(12/61)	21%	(19/90)
A-11	Emission of dust by enclosures and finishes	52%	(15/29)	5%	(3/61)	20%	(18/90)
R-05	Generation of inert or non-hazardous waste: non-hazardous packaging, containers	38%	(11/29)	11%	(7/31)	20%	(18/90)
R-12	Generation of inert or non-hazardous waste: other non-stony debris (asphalt agglomerate, gypsum, scrap, glass, wood, fiberglass, etc.)	21%	(6/29)	20%	(12/61)	20%	(18/90)
V-04	Water spills: Installation of concrete	3%	(1/29)	28%	(17/61)	20%	(18/90)
W-05	Noise generation by earthworks: excavations and fillings, clearings and embankments	7%	(2/29)	26%	(16/61)	20%	(18/90)

* *Data from FCC Construcción, not including FCC Industrial.*

The washing of truck wheels when exiting the site is a simple practice, but highly effective in minimising inconvenience that can be caused on the environment closest to the work.

From the analysis of this table, it can be concluded that the most significant environmental aspects are those related to the affection to the territory due to operations that generate dirt, both for the works themselves and for the transportation of materials; dust emissions from transport, machinery, demolitions and earthworks; the generation of waste and the consumption of materials and resources.

The aspects that are considered relevant in a large number of projects are those that have an impact on the urban environment, highlighting the effects of operations involving dirt at the entrance and exit of work, which is significant in 47% of the works, as well as the inconvenience caused by the fall of the granular material during its transport, significant in 41% of the works executed in 2016. The most common actions aimed at minimising these problems are the cleaning of the access areas and public roads affected, the covering of trucks that transport materials that can emit dust or the cleaning of vehicles when leaving the site.

Another group of environmental aspects with a clear importance for FCC Construcción works are those related to dust emissions into the atmosphere. Of the 10 most significant aspects of 2016, five are related to the generation of dust in works, the percentage being considerably higher in civil engineering works than in buildings.

The most widespread cause of dust emissions has been the circulation of machinery (significant in 41% of total works, 43% in civil engineering works); followed by the activities of excavations and fillings, clearings and embankments (significant in 36% of the total works, 51% in civil engineering works); the transport of land and debris in third place (33% of the total works, 48% in civil engineering works); the demolitions (significant in 29% of the total works) and the supply and storage of dusty materials (significant in 28% of the works).

To reduce dust emissions, the works of FCC Construcción implement preventive measures, such as the control of the speed of vehicles, the irrigation of roads and stockpiles, the covering of trucks that transport materials that can generate dust, the use of horns for the discharge of rubble from height, the paving of work roads, or the use of conveyor belts, among others.

Another group of significant environmental aspects is the generation of waste, among which the following aspects should be highlighted: “Generation of urban waste from the recovery and cleaning of facilities or works” (significant in 33% of the total works), “generation of non-hazardous waste from excavated land” (significant in 27% of total works), “generation of urban waste from offices, changing rooms and dining rooms” (24% of the total works) “generation of hazardous waste from empty contaminated containers” (21% of total works), “generation of non-hazardous waste of containers and packaging“ (20% of the total works) and generation of non-hazardous waste from non-stone rubble such as gypsum or scrap” (20% of the total works).

Waste generated during FCC Construcción activities is classified on the basis of whether they are hazardous, non-hazardous or similar to urban waste, and are managed differently according to the legislative provisions. Hazardous waste requires a particularly effective management, which involves proper temporary storage (less than six months), an identification of its contents through standardised labelling and management by authorised managers for this purpose.

Dust emissions are one of the most common impacts in the works of the company. The irrigation of roads and stockpiles, or the covering of trucks are some of the Good Practices widely applied to reduce this problem.

Hazardous waste must be stored in areas with containment systems to avoid the potential contamination of the land or the affection to ground or surface water.

Good practices related to non-hazardous waste seek, in the first place, the reduction of the volume of waste taken to landfill, hence priority is given to its reuse, recycling and recovery. In addition, FCC Construcción encourages the responsible use of materials and resources, which reduces the generation of waste from the start and prioritises the correct classification of waste on site, facilitating its subsequent management.

Another group of relevant environmental aspects are those related to the consumption of resources, in the form of water, energy sources and construction materials. Although these are consumptions inherent to the project itself, FCC Construcción encourages their quantification and the application of good environmental practices, in order to make responsible use of them.

The aspects that have been most significant in this regard are the “water consumption for the irrigation of landfills and pavements” (significant in 27% of the total works), the “steel consumption” (26% of the total works), the “consumption of aggregates” (23% of the total works and 30% of civil engineering works), the “consumption of diesel, gasoline, fuel oil, coal” (22% of the total works), the “consumption of land“ (18% of the total works and 23% of civil engineering works) and “electricity consumption“ (18% of the total works).

Some measures implemented in FCC Construcción works to reduce the consumption of natural resources are the maximum use of natural light, the use of more efficient equipment, the reuse of effluents to reduce water consumption, the recycling of stone materials, or responsible selection of materials with less environmental footprint throughout its life cycle.

Construction works consume a large quantity of resources. Therefore, the reuse of elements, such as surplus excavation for filling material on site, allows the saving of natural resources and the reduction of waste that must be managed.

Noise is one of the most common annoyances caused by construction works. In special situations, when the environment is more sensitive, preventive actions are taken, such as the installation of temporary acoustic screens, in order to reduce the impact on the inhabitants most affected.

In order to reduce the impact of some works on the environment, the restoration works for the environment upon completion of the construction work are key, as is the case of this quarry in the Enciso dam, which was restored after the operation was completed. These measures allow, as far as possible, to return the medium to the state it was in before the project was carried out.

The generation of noise and vibrations by the various activities associated with the work are also relevant in the field of construction and their impacts on the population and nearby fauna can be considerable, depending on the intensity of the sources and the duration of the activity. Specifically, in 2016 the noise-related aspects that were significant in the largest number of works were the noise generated during the demolitions and earthworks, having been significant in 24% and 20% of FCC Construcción works, respectively.

To minimise noise pollution, actions such as the placement of soundproof screens, the previous execution of parts of the work that can function as such, the use of modern and quieter machinery, in addition to its correct maintenance, or the realization of tasks that may cause more noise at a time appropriate to the area, amongst others.

Finally, other environmental aspects that were significant in 2016, not related to the previous groups, are environmental accidents due to fires in storage areas of flammable or combustible substances, and the effect on the territory or urban environment by activities that cause alterations to the landscape and property, significant in 24% and 19% of the total of works respectively.

To avoid environmental accidents, such as fires, floods or accidental spills, the events that can cause them are identified through the Emergency Plans, so that preventive measures are defined and action to be taken in case the event occurs. In the event of impacts on the landscape, many of the company's infrastructure works have environmental impact studies in which an environmental restoration phase is contemplated. Furthermore, in other works there is an environmental cleaning and recovery stage included in the final stages in order to ensure, as far as possible, that the environmental impacts are minimised as much as possible once the work period has finished.

Good environmental practices

FCC Construcción has designed its own model, the **Good Environmental Practices System**®, a pioneer in the sector since it was established in 2000.

The basis of this system consists of a series of voluntary actions that are implemented in FCC Construcción works, taking into account requirements and demands higher than those established by legislation, contractually or any other binding document and that result in a decrease of the company's environmental footprint.

The Good Practices System of FCC Construcción includes numerous actions carried out by the company works that are common procedures in the construction sector, such as the irrigation of roads to minimise dust emissions, the use of rubber blankets or intermediate barriers to reduce the conditions caused by blasting or the reuse of inert material from other works as filling material. However, the added value of FCC Construcción consists of the systematisation of the application of these actions in all the projects implemented, so that the measurement criteria can be unified and Good Practices carried out can be interpreted and understood in order to learn from errors and successes and identify opportunities for improvement.

The FCC Construcción Good Practices System allows the most convenient actions in each project to be managed and applied. In addition, the exhaustive collection of information on Good Practices implemented on site and its dissemination among company employees is key for the company to progress and constantly improve its performance in terms of sustainability.

® *FCC Construcción 2009. "System of evaluation of environmental performance through good practices".*

The practical application of the Good Practices System is considered as follows: each project individually selects the actions that it can carry out, from the set of measures that the system collects, according to its convenience and applicability. In addition, these measures may have different degrees of implementation, and therefore be adapted to the needs of each project; depending on the actual scope of the Good Practice adopted, different scores are obtained for each action.

The evaluation of good practices is carried out based on the standardised quantification of its importance and its goal.

- **Importance:** Indicates the importance of the Good Practice, giving a higher value (3), when the repercussion in the improvement of the final environmental quality is greater or its application entails a greater economic, technical or logistic effort, and a minimum value (1), when it is smaller.
- **Objective:** Indicates the degree of development of the Good Practise, giving a higher value (3), when the implementation is more widespread or the best technologies applied, and a minimum value (1) when the degree of implementation is lower.

The result obtained as a product of the degree of implementation due to the importance of internally demanded good practices provides a score, which is the true indicator of environmental performance and effort in the application of good practices by the work.

Owing to the Good Practices System, FCC Construcción obtains data on its actions, with unified measurement criteria common to all projects. This allows the company to manage information internally, facilitating both the learning process and continuous improvement, as well as the constant measurement of its performance.

The application of this system generates knowledge which, in addition to FCC Construcción, may be useful to other companies and interested groups. Disseminating these teachings promotes respect for the social and environmental environment by third parties, which is another of the objectives that the company aims to achieve with the publication and dissemination of this Environmental Report 2017.

The application of good practices follows a specific methodology, through which FCC Construcción ensures that the measures finally implemented are those that are most needed and can best be developed in each of the projects.

FCC Construcción Good Practices are categorised within the following areas:

- Relationship with society
- Emissions to the atmosphere
- Generation of noises and vibrations
- Water discharges
- Occupation, contamination or loss of soils
- Use of natural resources
- Waste generation
- Territorial planning

99% of the works executed by FCC Construcción during 2016 reported information on the Good Practices implemented in them. From the data obtained from the follow-up of these 90 projects, the following conclusions can be drawn:

- In 99% of the works, the subcontractors involved have received talks on environmental awareness, of least one hour in duration, from FCC Construcción. Moreover, in 96% of the projects, the production staff carried out the environmental course scheduled by the company. The training of company and subcontracted personnel contributes to the correct implementation of the Good Practices.
- In order to minimise dust emissions generated in the construction works, roads and stockpiles were irrigated with water, and the speed of the vehicles moving around the site was limited in 96% and 98% of the works, respectively.

General data of Good Environmental Practices

	Building	Civil Engineering Works	TOTAL
Works that provide data of Good Practices	29/30 (97%)	61/61 (100%)	90/91 (99%)
Average number of Good Practices applied by work	23	27	26

FCC Construcción considers environmental training and sensitisation of its own and subcontracted personnel to be fundamental, with the aim of improving its involvement in protecting the environment and ensuring that relevant legal requirements are met at all times.

In works that are located in urban areas, one of the most common impacts is the dirt produced by the trucks when leaving and entering the work site. An effective measure to prevent this problem is the washing of truck wheels when exiting the site, avoiding in this way the dirtying of the adjoining area with the dust and mud coming from the site.

- In 94% of the projects, the environmental conditions were taken into account in the planning of the work program to minimise the inconvenience that could occur due to the noises and vibrations generated.
- Gutter washing areas were defined, duly waterproofed and signalled in 96% of the sites, avoiding the possible contamination of surrounding waters and soil.
- Inconveniences caused the urban environment are largely related to dirt at the entrance and exit of the work, or the occupation of pavements. Therefore, in 95% of accesses and 98% of pavements of the works, measures were applied to solve these problems.
- In 86% of the projects, an environmental restoration of the areas affected by the works was carried out, and other measures related to soil conservation were taken, such as the limitation of the occupied areas (97% of the works), or the prevention of accidental spills (92% of the works).
- Regarding the generation of waste, the volume of inert waste taken to landfill was reduced with respect to the volume forecast in 91% of the projects.
- In 90% of the works, portable sewage treatment plants or recoverable prefabricated pits were used for the treatment of sanitary waters before their discharge.
- Elements recovered from other works were reused in 89% of the projects, such as portable sewage treatment plants, spill control tanks, etc. thus reducing the use of resources of these works.

The information gathered during 2016 regarding the Good Practices System is expanded upon below, illustrating its implementation with various practical cases, which show its application, utility and results in specific events.

When working in sensitive environments, such as near rivers or streams, work spaces are delimited, for example through the placement of straw bales, to avoid the presence of suspended solids in the aquatic environment.

Taking into account the conditions of the project environment from the planning phase, in order to establish an appropriate work programme, is essential so that the potential negative impact is as low as possible and the preventive and corrective measures to be implemented during the execution of the work are considered.

Relationship with society

The environmental awareness and training of our employees, subcontractors and suppliers is key to promoting an adequate environmental behaviour on site.

We want to be perceived as a responsible and clear organisation: that is why transparency is one of the pillars on which our relationship with stakeholders is based and is the basis for generating trust.

We promote the exchange of knowledge and information with our stakeholders, establishing bidirectional dialogue mechanisms to convey concerns, proposals for improvement and requests for collaboration.

Value for society

FCC Construcción is aware that construction activity has a very strong link with society, the nature and quality of this link being dependent on how it is managed. Therefore, one of the company's priorities is to integrate aspects that are important to its stakeholders in its strategy, which allows new business opportunities to be discovered that may imply a competitive advantage for FCC Construcción, while generating value for the whole of society.

In this sense, the dissemination of information in FCC Construcción is essential for motivating employees of the organization and establishing a relationship of trust with society and other interested groups, not only to transfer the company's effort and consequent performance in environmental aspects, but also to be able to obtain feed-back regarding the matter, which in turns provides feedback on continuous improvement.

Some of the fundamental aspects for Good Practices System, within the scope of "Relationship with society", are the environmental and social training of company personnel, the environmental behaviour of subcontractors, the relationship established by the company with the interested parties, and the involvement of the client in the work's environmental management.

	ACTIONS - OPPORTUNITIES							
Risks	Training of personnel in environ-mental matters	Contracting of environmentally committed subcontractors	Involvement of the client in management	Commu-nication and transparency with society	Attending to complaints, claims and suggestions	Adequate environmental management recognised by society	Environmental improvements introduced in the project	Environmental signage
Shortcoming in the relationship with people	✓		✓	✓	✓	✓		✓
Waste of resources and increased waste generation	✓						✓	✓
Insufficient segregation of waste	✓							✓
Lack of awareness	✓	✓		✓				✓
Insufficient environmental training	✓	✓						✓
Limited communication with affected parties			✓	✓	✓	✓		
Projects affecting the environment						✓	✓	

The following table shows the Good Practices developed in the field of "Relationship with society" and its degree of implementation in the 90 works executed throughout 2016.

Similarly, the table differentiates the data by building and civil engineering works.

Good practices from "Relationship with society" field

GOOD PRACTICE		IMPORTANCE			GOAL (DEGREE OF IMPLEMENTATION)								
					1			2			3		
0a	Production personnel (up to managers) of FCC who has completed the two-day FCC scheduled environmental training course.	3			> 30% of the construction personnel.			> 60% of the staff.			100% of the staff.		
	% of application	96%	96%	96%	8%	22%	17%	19%	27%	25%	73%	51%	58%
0b	Subcontracts that have received environmental awareness and training talks from FCC, of at least one hour in duration, in relation to subcontracted activities.	3			> 30% of subcontractors.			> 60% of subcontractors.			> 90% of subcontractors.		
	% of application	96%	100%	99%	26%	22%	23%	44%	31%	35%	30%	47%	42%
0c	Subcontracts that apply some environmental management system.	2			At least one subcontractor has ISO 14001 or EMAS certification.			Idem > 10%.			Idem > 25%.		
	% of application	94%	91%	92%	63%	60%	61%	31%	28%	29%	6%	12%	10%
0d	Environmental behaviour of subcontractors.	2			> 30% of subcontractors carry out actions related to the optimisation of waste, provide their relevant permits and licenses, and have contractual environmental requirements, which they comply with.			> 75% of subcontractors carry out actions related to the optimisation of waste, provide their relevant permits and licenses, and have contractual environmental requirements, which they comply with. or > 30% of subcontractors carry out actions related to the optimisation of waste, provide their relevant permits and licenses, and have contractual environmental requirements, which they comply with, and in addition, non-conformities as a result of their actions, or which do not occur, or are identified and notified by them.			> 75% of subcontractors carry out actions related to the optimisation of waste, provide their relevant permits and licenses, and have contractual environmental requirements, which comply with, and in addition, non-conformities as a result of their actions, or which do not occur, or are identified and communicated by them.		
	% of application	82%	88%	86%	86	67%	72%	0%	19%	14%	14%	14%	14%

Construction | Civil Engineering Works | Total

Good practices from "Relationship with society" field (continue)

GOOD PRACTICE		IMPORTANCE			GOAL (DEGREE OF IMPLEMENTATION)								
					1			2			3		
0e	Relationship with interested parties.	3			All the aspects that can give rise to relevant significant impacts have been dealt with by the client and the solution to be adopted has been agreed upon.			Those that most affect society have been addressed with the authorities or with the associations and individuals potentially affected.			Those that most affect society have been addressed with the authorities or with the associations and individuals potentially affected.		
	% of application	92%	93%	93%	75%	37%	45%	8%	26%	22%	17%	37%	33%
0f	Complaints and claims.	3			All complaints and claims received have been dealt with the affected individuals.			The solutions to be adopted have been agreed with them.			These actions have been carried out and there is written acceptance in at least 50% of the cases.		
	% of application	90%	91%	91%	44%	33%	37%	39%	45%	43%	17%	21%	20%
0g	Obtaining social recognition.	3			Some note of congratulation has been received from the client or from the local authority in relation to environmental behaviour.			An external publication to the company praises the environmental behaviour.			Some award has been received with express mention their environmental behaviour.		
	% of application	64%	68%	67%	57%	62%	60%	43%	38%	40%	0%	0%	0%
0h	Involvement of property in environmental management.	3			The Property knows the implantation of the Environmental Management System in the work.			The Property has actively participated in some aspects of the development of the Environmental Management Programme.			A formal presentation of the Environmental Management System has been made in a specific session, with slides or other audio-visual media.		
	% of application	95%	95%	95%	71%	44%	53%	19%	26%	23%	10%	31%	23%
0i	At least four hours environmental training has been provided for productive staff from managers to operators.	3			100% of the managers.			100% of managers and> 20% of workers / shop steward			100% of managers and> 50% of workers / shop steward		
	% of application	75%	82%	58%	30%	41%	32%	30%	30%	11%	41%	28%	23%
0j	Environmental improvements introduced in the original project.	3			Some environmental / social improvement has been proposed for the original project although it has not been finally admitted.			An environmental / social improvement has been added to the original project.			More than one environmental / social improvement has been added to the original project.		
	% of application	100%	86%	88%	60%	39%	43%	20%	33%	30%	20%	28%	26%
0k	Adoption of environmental signage on site that helps to inform and raise awareness amongst staff working on the work.	2			The standard environmental waste signage is used throughout the work.			The complete standard environmental signage is used throughout the entire project.			The complete standard environmental signage is used throughout the work and awareness posters are also displayed.		
	% of application	97%	100%	99%	29%	19%	22%	25%	34%	31%	46%	47%	47%

Construction | Civil Engineering Works | Total

Good practices from "Relationship with society" field (continue)

GOOD PRACTICE		IMPORTANCE			GOAL (DEGREE OF IMPLEMENTATION)								
					1			2			3		
0l	Dissemination of knowledge acquired in environmental matters.	2			At least one experience to be transmitted or an example of Good Practice (in relation to environmental management or social initiatives) is prepared and published on the Delegation, Area or Technical Services intranet so that it is available to other sites.			Idem with 2 experiences to be transmitted or examples of Good Practices (in relation to environmental management or social initiatives).			Idem with 3 or more experiences to be transmitted or examples of Good Practices (in relation to environmental management or social initiatives).		
	% of application	43%	45%	45%	67%	40%	46%	33%	30%	31%	0%	30%	23%
0m	Relationship with inhabited areas affected by the work.	3			The inhabited areas affected receive information on the social, economic, environmental and cultural impacts, duration of the activities, affected municipalities and the benefits and compensations of the project.			In addition, consultation and participation mechanisms are established with the populations likely to be affected by the work.			In addition, after the participation process, consent has been obtained freely and with full knowledge of the cause by the affected populations.		
	% of application	67%	92%	87%	0%	64%	54%	100%	27%	38%	0%	9%	8%
0n	Training in social matters for FCC production personnel and subcontractors.	3			> 30% of the workforce own and> 30% of subcontractors.			> 60% of the workforce own and> 60% of subcontractors.			100% of the own personnel and> 90% of the subcontractors.		
	% of application	50%	57%	56%	100%	25%	40%	0%	50%	40%	0%	25%	20%
0o	Ethical behaviour of subcontractors.	3			> 25% of subcontractors have their own code of conduct or contractually accept and comply with the FCC Code of Ethics.			> 50% of subcontractors have their own code of conduct or contractually accept and comply with the FCC Code of Ethics.			> 75% of subcontractors have their own code of conduct or contractually accept and comply with the FCC Code of Ethics.		
	% of application	50%	69%	65%	50%	22%	27%	0%	56%	45%	50%	22%	27%
0p	Communication Plan in environmental, social or cultural heritage matters.	2			A communication plan is developed and implemented to disseminate the project in environmental, social and cultural heritage matters; in which the affected communities participate.			In addition, institutional bodies also participate.			In addition, the respective Ministries (of Culture, Environment, etc.) also participate.		
	% of application	0%	86%	86%	0%	25%	25%	0%	67%	67%	0%	8%	8%

Construction Civil Engineering Works Total

Environmental training

FCC Construcción offers its employees environmental training, which is essential for the correct application of Good Practices in the projects in which they are involved, as well as to avoid incorrect actions related to environmental management. The courses given by FCC Construcción allow self-employed and subcontracted workers to acquire knowledge, skills and abilities in environmental matters, as well as to sensitise and motivate staff so that the company's commitment to the environment is displayed at all hierarchical levels and through all its members.

The investment in environmental education for employees, subcontractors and suppliers strengthens the company´s conviction that environmental management is at its most appropriate from the conception of each project, avoiding for the most part errors at the end of the processes, when it is more complicated to correct them.

During 2016, in 96% of the total of works carried out, there were personnel who carried out the environmental course programmed within the company's Training Plan. In addition, 99% of the sub-contractors of the works received awareness-raising talks and environmental training in relation to the activities subcontracted by FCC Construcción. Finally, in 82% of the works, at least four hours of environmental training courses were given to all productive personnel, from managers to operators.

With these actions, a greater commitment to the environment is achieved by FCC Construcción staff and the subcontractor, who will take on environmental challenges as their own and will be concerned about the possible environmental impacts of the works. Thanks to this training, they will also have the necessary knowledge to apply the System of Good Practices to each project, meeting in this way the demands and commitments of the organisation.

The actions of awareness and training are fundamental in the groups involved acquiring environmental awareness, converting respect for the environment into a practice that is applied at all levels and in all FCC Construcción projects.

Involvement of stakeholders

The different groups that are involved, to a greater or lesser extent, in the activity of FCC Construcción are a vital part of the road towards achieving the environmental goals established by the organisation. Thanks to communication with stakeholders, the company acquires important knowledge about the environment and society, which helps it to better identify the potential risks it faces and to find the appropriate solutions more easily. In addition to its importance in the application of Good Practices, the continuous bidirectional dialogue with these groups allows the company to align common interests and move in the same direction.

In this area, during 2016, subcontractors of 92% of the works applied some environmental management system (ISO 14001 or EMAS), and 86% of the works worked with subcontractors that displayed good environmental performance, performing actions related to the optimisation of resources, providing the pertinent permits and licenses, and complying with the contractual environmental requirements.

In addition, in 95% of the works executed in 2016, the involvement of the property in environmental management was achieved through the presentation of the FCC Construcción Environmental Management System. In this way, the client, a key figure within the stakeholders of FCC Construcción, is actively involved in the development of the Environmental Management Programme and knows the work and actions carried out by the operations in this area.

FCC Construcción establishes relationships with local communities in its projects, developing volunteer activities, training and dissemination, amongst others, and creating, in this way, a bond of trust with the people involved. This is the case of the work of the Mersey Bridge, in the United Kingdom, where outreach talks have been held in schools in the area.

Communication

Transparency of information is one of the main pillars on which FCC Construcción's communication with its stakeholders is based and, in turn, communication is the basis for establishing trusting relationships with them. The company's communication system is bidirectional, so that continuous feed-back is obtained to take into account their opinion in the progress of the company and, consequently, in its management.

To achieve efficient and integrating communication, FCC Construcción considers a triple aspect: on the one hand, it promotes an internal flow of information at all levels of the company, both downward and upward, from the works to a corporate level; in addition, it establishes relations with the interested parties, since the information must go beyond the internal level; and, finally, the image of the company is made known to society in general.

As part of its strategy, FCC Construcción establishes both internal and external communication channels through which it receives and transmits information on environmental concerns, proposals for improvement, and requests for collaboration or environmental guidelines. These allow the company to integrate the demands of stakeholders in its management system.

In this context, communication has been established with the populations involved in 87% of the works carried out during 2016. Specifically, they were provided with information on the impacts of the projects, the municipalities affected and the duration, as well as the benefits and compensations that the project would provide, establishing, in some cases, consultation and participation mechanisms.

On the other hand, 67% of the works of FCC Construcción have received social recognition, either in the form of a congratulatory note, award or mention in relation to their environmental performance.

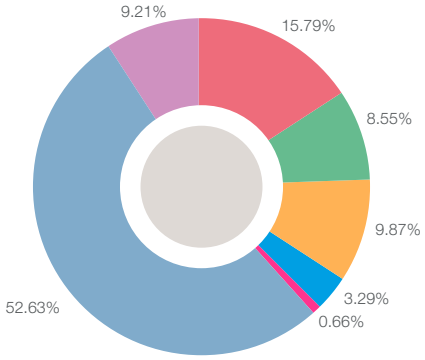
In addition, in 91% of the works, the complaints and claims received by those affected have been managed, so that finally the solutions to be adopted were agreed upon in 43% of the projects.

Throughout 2016, reciprocal communication with interested parties has occurred as reflected in the following graphs. These represent the number of environmental relationships established in one way or another. The total of environmental communications is organised according to the matter communicated and the type of institution with which the dialogue has been established.

Transparency in FCC Construcción activities is essential for generating confidence in stakeholders and gaining acceptance for the project, by members of the local communities. Adequate communication with them is part of providing truthful and real information and allowing them to participate in the process, enabling us to learn about their needs, expectations and requirements from our management.

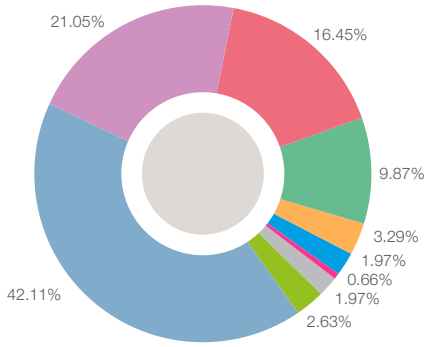
Some of FCC Construcción's projects include volunteer programs that help local communities become involved in projects and value their environment, either because of their environmental or cultural value.

Subject of communications



- **52.63%** Sending information or documentation to interested parties in response to prior request
- **9.21%** Partnership request
- **15.79%** Communication of actions that generate potential environmental risks
- **8.55%** Resolution of complaints and claims from interested parties
- **9.87%** Reception of guidelines or instructions
- **3.29%** Public dissemination (announcements, advertisements, advertising, prizes and tributes, mailing and congratulations, publication of texts, site visits)
- **0.66%** Others

Communication with interested parties



- **42.11%** Supranational, national, regional or municipal Public Administration of the Environment
- **21.05%** European, state, regional or regional administration different from that of Environment
- **16.45%** River Basin Organisation
- **9.87%** Companies and public entities. Autonomous agencies and institutes of an official nature
- **3.29%** Private businesses
- **1.97%** Individuals
- **0.66%** Own employees (in Construction, Management, Region, Technical Services or Senior Management)
- **1.97%** Universities, sector associations, professional associations and foundations
- **2.63%** Others

Internal communication and awareness raising regarding the environment are fundamental for involving personnel who work on site. For this reason, 99% of the projects used standard environmental signage from the company.

In addition, as a result of the internal dialogue and with the groups involved, environmental improvements were introduced or proposed to the original project in 88% of the works. Similarly, in 93% of the works, a relationship was established with the interested parties, dealing with aspects that could give rise to significant impacts with the client, authorities, or potentially affected associations and individuals.

FCC Construcción works have environmental signage, which informs the company's workers and other stakeholders about appropriate environmental management.

practical case

Carretera Agaete-La Aldea

Client: **Canary Islands Highways Authority**

Implementation deadline: **48 months**

Problem detected:

During the construction process of a connecting roundabout in the construction of the Agaete-La Aldea Road, on the island of Gran Canaria, when removing the rubble of a pre-existing house, remains of archaeological materials resulting from pre-Hispanic human activity in the area were located. The construction of this roundabout entails 50% of the surface of the discovered archaeological space being affected.

The discovery of archaeological remains during works implies the obligation to inform the relevant agency, and involves an intervention to recover the material found, inventory it, and prepare the required reports on the excavation. All this supposes a considerable delay in the accomplishment of the work, but it is indispensable, as it implies a discovery that enriches the historical and cultural heritage of the region involved.

Solutions adopted:

The finding was communicated to the Historical Heritage Service of Gran Canaria City Council, which authorised the archaeological intervention in which two leading archaeologists, two technical archaeologists, five auxiliary archaeologists and a survey engineer participated.

Given that the site was composed of decontextualized and disturbed archaeological materials, it was not very large and its conservation level was not optimal enough to be preserved in situ, it was decided to carry out a complete archaeological excavation in order to document these remains and continue with the work of the roundabout projected in this place.

Excavation work, after the cleaning of debris and the determination of the scope of the deposit, was undertaken in a 150 m^2 area.

Results:

The deposit turned out to be an area of open-air domestic activity, probably related to the group houses that existed in Las Gambuesillas area. Highlights were the remains of carved lithic and grinding industry (mills and mortars), fragments of pre-Hispanic ceramics, flint fragments in striking colours, as well as a set of cattle bones that could be the result of some kind of ritual. In addition to all this, samples of sediments and carbons were collected in order to be treated in the laboratory.

This action highlights the fact that incorporating measures to protect the cultural and archaeological heritage in construction projects can result in a finding that contributes to historical and scientific knowledge, enriching the cultural knowledge of a region and generating value for surrounding communities.

Detail of the excavation where the walls of the historic house have been found.

Ceramic remains found in the deposit.

practical case

Salamanca Hospital

Client: **Castilla León Regional Government's Health Board (SACYL)**

Implementation deadline: **145 months**

Problem detected:

The construction of a new Clinical Hospital is considered in the project for the Salamanca University Health Centre Complex. This project has important benefits for the community, since it will be equipped with facilities capable of responding to a series of citizens' needs.

Due to the dimensions of the work and its situation within the city, there is not enough space to create the access required or to have an area for the collection of materials with adequate dimensions for the volume generated. Without the proper management of this problem, it is not possible to undertake the works to build the hospital.

Solutions adopted:

In order to carry out the project, it was decided to expand the initial collection area of work on the banks of the river Tormes, located parallel to the work, which is made up of an old park in a state of neglect and whose trees are at risk of falling.

Due to the nature of the project and the complexity of the enclave, as well as the public interest in its construction, it was considered convenient to bring together positions and establish cooperation mechanisms between the interested parties. To this end, the appropriate permits were managed with the Administrations involved (Salamanca City Council, Park and Gardens Service and Douro Hydrographic Confederation), which authorised the occupation of the aforementioned area until the completion date of the work, at which time it will proceed to the complete withdrawal of the access roads and the restoration of the occupied land to its earlier state.

Results:

Once the appropriate permits were obtained, an interim access road was built, consisting of a road with an agglomerate layer, between the University bridge and the construction site, and a path with a gravel layer, included between the walkway of San Vicente and the hospital complex. In addition, the adaptation of a collection area of materials was undertaken, with sufficient dimensions for the needs of the work and consisting of a layer of natural gravel, previous felling of trees in poor condition, clearing and grading.

Owing to these actions and cooperation between the parties, and highlighting the management carried out with the relevant authorities, easy access for long transport vehicles and adequate organisation of the different materials by zones was achieved.

The management of problems related to works with such social impact, such as a hospital, must be swift and meticulous, in order to delay the project as little as possible and ensure that the solutions adopted are effective and have the least possible impact on the area affected. A correct interaction with the client and the competent authorities facilitates effective decision-making and results in the satisfaction of the interested parties.

Area before and after the project.

Mersey Bridge

Client: **Merseylink Limited**

Implementation deadline: **47 months**

outstanding

The construction of the new bridge that crosses the Mersey estuary and the works associated with it (to incorporate the new passage within the existing road network), is intended to provide an effective road connection from the area of the city of Liverpool to Cheshire.

The design of the bridge was selected within a wide variety of options, taking into account the maximization of the benefits and welfare of the users and local communities and the minimisation of the environmental impact of the work in the estuary and the surroundings.

Parallel to the undertaking of the project implementation works, powerful environmental and social awareness campaigns have been carried out, both with employees and the communities involved, with the aim of guaranteeing their well-being, as well as preventing any kind of activity that harms the environment.

To this end, a series of environmental bulletins were prepared in several languages, explaining possible contexts and the appropriate and not appropriate behaviour for each situation, making it easier for employees to make decisions and improving their capacity to react to any setback in those areas. In addition, volunteer programmes have been carried out since 2014 with the aim of disseminating the history of Halton and its new bridge, as well as child road safety campaigns, an artistic exhibition dedicated to the bridge, and even a school garden to promote the approach to nature between the students.

Merseylink helped to renovate the installations of a local rowing club.


Merseylink Environmental Bulletin

Impact of Litter

What is Litter?

Non-biodegradable (does not rot) material includes everyday items such as crisp packets, cigarette stubs, glass, polystyrene and plastics such as cups, bottles and bags.

If not disposed of correctly litter looks unsightly, causes complaints and can also have a serious impact on wildlife and our environment.

Impact on Wildlife and Environment

Birds can be injured by broken glass or suffer from broken wings when they become entangled in plastic strapping or rope.

Hedgehogs and other small mammals easily become trapped in discarded food containers, plastic cups and cans.

Wildlife impact: Cigarettes and plastic are mistaken for food causing injury and death.

Kick the Habit

Cigarettes are NOT bio-degradable. They contain up to 3,900 chemicals and micro plastics that are persistent in the environment and hugely damaging to wildlife.

Birds often mistake these and other plastic items for food resulting in injury or death through starvation: this significantly impacts global bird populations. The mistake is easy to make: plastic in saltwater gives off the same chemicals as krill, a tasty food source for birds[1].

Heavy metals and toxins coat the surface of microplastics which are then eaten by crustaceans and fish[2], making their way into our food chain.

Section 3: Cigarette stubs discarded onto the estuary are mis-

- ✓ Dispose of all litter in waste bins provided
- ✓ Use designated smoking areas

1) New Scientist Article 2112231 2) New Scientist Article dn28242-

Bulletin No: MLEB-2015-009c
Issued By: Kathryn Ierston
Date: 12/12/2016

MERSEYLINK

Examples of environmental bulletins provided for employees.

Atmospheric Emissions

Aware of the potential effects of light pollution and atmospheric pollution by particle emissions on the health of the human population in the environments in which we operate, we focus on their prevention and mitigation via the conception of each project.

With a preventive approach, we use lighting devices that respect the life cycles of the species to mitigate light pollution and thus minimise the impacts that this causes on biodiversity.

	ACTIONS - OPPORTUNITIES							
Risks	Watering of roads and stockpiles	Use of screens	Use of dust control systems	Use of tubes for dumping rubble	Creation of value for improvement of required levels	Proper maintenance of machinery	Speed limitation	Control and limitation of night lighting
Climate change						✓	✓	
Increase in the index of suspended particles (dust)	✓	✓	✓	✓	✓		✓	
Increase in VOCs	✓				✓	✓		
Decrease in environmental quality	✓	✓	✓	✓	✓	✓		✓
Light pollution					✓			✓

Atmospheric emissions are one of the most frequent impacts in the construction sector, emissions constituted by dust and particles being the most common, and occasionally volatile organic compounds, which are produced in the processes of asphalting or transport of materials. Light pollution, caused by the lighting installed for the performance of night work, is also a type of atmospheric pollution. These impacts tend to affect to a greater extent the surroundings of the work and surrounding areas, although they can also have repercussions on natural spaces or populations located outside the project boundaries, although within their area of influence. Atmospheric emissions can have a negative impact on the health of populations near the work environment.

In FCC Construcción's Good Practices System, actions aimed at minimising the harmful effects of atmospheric emissions on the environment and communities are highly represented, due to the large percentage of works in which the most significant environmental aspect are emissions. Actions to be implemented in each of the works are chosen according to the type of project and the particularities of the environment where it takes place. Some of these Good Practices include actions aimed at reducing the dispersion of dust in the air, improving the levels of emission required by the legislation in controlled parameters, or limiting night lighting, so that it is respectful with the fauna present in the area surrounding the work.

Good practices from "Atmospheric Emissions" field

GOOD PRACTICE		IMPORTANCE			GOAL (DEGREE OF IMPLEMENTATION)								
					1			2			3		
1a	Dust reduction through water irrigation of roads and stockpiles.	2			Sporadic application.			Frequent application.			Systematic application.		
	% of application	88%	100%	96%	45%	14%	23%	41%	46%	44%	14%	40%	33%
1b	Use of additives in irrigation water to create surface crust, paving of tracks, or other practices of durable dust control.	1			Sporadic application.			Frequent application.			Systematic application.		
	% de aplicación.	0%	33%	33%	0%	50%	50%	0%	50%	50%	0%	0%	0%
1c	Use of screens against dust dispersion.	1			In more than 30% of the perimeter of the enclosure where the dust is generated.			Idem in more than 60%			Idem in more than 90%		
	% of application	67%	50%	53%	50%	38%	40%	50%	25%	30%	0%	38%	30%
1d	Use of molecular action sprayers in dust generating facilities, such as aggregate treatment plants, etc.	2			Sprayers in more than 30% of dust generation points.			Idem in more than 60%.			Idem in more than 90%.		
	% of application	100%	43%	50%	0%	67%	50%	0%	33%	25%	100%	0%	25%
1e	Use of drilling machinery with a dust humidifier system, establishment of a wet curtain at the outlet of ventilation ducts, or other dust collection systems.	3			Implementation in an activity.			Implementation in two or more activities.			Implementation in five or more activities.		
	% of application	100%	69%	73%	100%	67%	73%	0%	11%	9%	0%	22%	18%
1f	Improvement of the levels required by the legislation in parameters that are controlled (opacity of discharges, particles in suspension, etc.).	3			Systematic collection of contaminant levels better than those required by more than 5% in all controlled parameters.			Idem in more than 15%, or in more than 30% in half of the controlled parameters.			Idem in more than 30% on all the controlled parameters.		
	% of application	100%	56%	60%	100%	40%	50%	0%	0%	0%	0%	60%	50%
1g	Proper maintenance of the machinery that works on the construction site.	2			Preventive maintenance, additional to that required by legislation, in at least 30% of the machines that work on the site.			Preventive maintenance, additional to that required by legislation, in at least 60% of the machines that work on the site.			Preventive maintenance, additional to that required by legislation, in at least 90% of the machines that work on the site.		
	% of application	77%	82%	81%	71%	19%	35%	6%	43%	31%	24%	38%	33%

Construction | Civil Engineering Works | Total

Good practices from "Atmospheric Emissions" field (continue)

GOOD PRACTICE		IMPORTANCE			GOAL (DEGREE OF IMPLEMENTATION)								
					1			2			3		
1h	Night lighting that respects the environment.	1			Directional lighting instead of environmental in at least 30% of the area, or automation of switch up, switch down.			Directional lighting instead of environmental at least 60% of the area and automation of switch up, switch down.			Directional lighting instead of environmental at least 90% of the area and automation of switch up, switch down.		
	% of application	93%	76%	81%	69%	64%	66%	23%	18%	20%	8%	18%	14%
1i	Use of tubes for the discharge of debris from height, and covering of containers with tarpaulins.	1			In more than 30% of the containers.			Idem in more than 60%.			Idem in 90%.		
	% of application	67%	50%	60%	50%	20%	40%	30%	20%	27%	20%	60%	33%
1j	Appropriate speed control of vehicles on the construction site.	1			More than 30% of the work roads with speed limitation signs.			Idem in more than 60%.			Idem in more than 90%.		
	% of application	94%	100%	98%	31%	21%	23%	25%	31%	30%	44%	48%	47%
1k	Reduction of dust emission in auxiliary installations.	2			Shielding on features of the facility.			Individual fairing of some equipment of the installation.			Fairing of the whole facility.		
	% of application	25%	45%	40%	100%	40%	50%	0%	40%	33%	0%	20%	17%
1l	Proper site selection of machinery and dust emitting activities.	1			There is a written or visual planning of the work areas where machinery and activities that can emit dust will be placed.			In addition, the planning regards the environment to place these areas as being far away from possible receivers.			In addition, the planning is dynamic and contemplates the transfer of these areas according to the constraints of the work and the environment.		
	% of application	71%	83%	79%	100%	50%	67%	0%	30%	20%	0%	20%	13%
1m	Paving of the work roads to reduce the lifting of dust.	2			The entrances and exits are paved.			The entrances and exits and more than 10% of the work roads are paved.			The entrances and exits and more than 20% of the work roads are paved.		
	% of application	50%	88%	75%	50%	14%	22%	0%	29%	22%	50%	57%	56%
1n	Reduction of the emission of combustion gases from vehicles and machinery.	2			Shutting down vehicle engines when they are not working.			In addition, minimisation of construction traffic in the construction area.			In addition, use of fuel with low sulphur content.		
	% of application	88%	88%	88%	71%	67%	68%	29%	27%	27%	0%	7%	5%

Construction Civil Engineering Works Total

Atmospheric quality

In the FCC Construcción projects, especially civil engineering works, large earthworks, as well as company concrete manufacture or agglomerate plants or aggregate crushing plants, the transport and stockpiling of construction materials, and demolitions and perforations are common. All these are activities that involve the movement of vehicles, machinery and materials that often occur on unpaved land, and that entail emissions, mainly of dust. This circumstance often compromises the quality of the air in the vicinity of the works, which is why in most of the company's projects executed in 2016, measures were implemented to reduce or prevent dust emissions. These include the covering of trucks that transport powdery material, or the use of tubes for the discharge of debris from height, both easy to apply but with a great positive impact on the dispersion of particles in the atmosphere.

In relation to the transport of materials, in 6% of the projects carried out there was irrigation of both roads and stockpiles, and a control of the speed of the vehicles on site. Regarding good practices to reduce dust emissions produced by other types of activities not related to transport, in 79% of the projects, the location of machinery and dust emission activities was planned to cause the least possible impact, and in 73%, machinery with a humidifier system was used to reduce the emission of dust during drilling work.

The fairing of the conveyor belts avoids the generation of dust due to falling material, having a positive effect on the cleanliness of the facilities and emissions into the atmosphere.

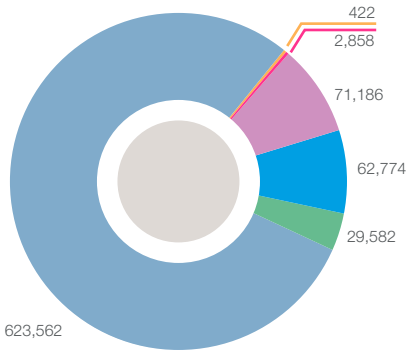
Minimising dust emissions can be achieved through good practices that are simple to apply, such as watering roads and stockpiles, or covering trucks.

Emissions of pollutants, not associated with the greenhouse effect

Polluting emissions (kg)	Construction Area	FCC Construcción
Total NOx emissions	82,816	82,356
Total SOx emissions	1,331	741
Emissions of total particles	790,384	790,024
Total emissions	**874,531**	**873,121**

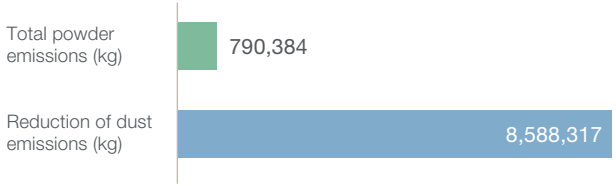
Dust collection systems, such as those located in cement silo vents, serve to reduce dust emissions by capturing them, preventing their release into the atmosphere.

Dust emissions (kg)



- **2,858 kg** By manufacture of asphalt agglomerate
- **71,186 kg** By concrete manufacture
- **62,774 kg** By crushing aggregates
- **29,582 kg** By storage of materials
- **623,562 kg** By earthworks
- **422 kg** By transport of consumed materials and waste of earth and debris

Thanks to good practices implemented in order to minimise dust emissions, these emissions have been reduced in construction projects by 8,588 tons.



Another type of emissions from construction works is the combustion gases produced by the use of machinery and transport. Some of the actions that have been carried out in 2016 for their reduction are the limitation of the speed of construction vehicles in 98% of the site, which reduces the amount of fuel used; or the preventive maintenance of the machinery used on site, which was carried out in 81% of the projects, and which guarantees the efficient use of the fuel so that the polluting emissions remain within the established limits. These and other measures have resulted in 88% of the works in 2016 reducing emissions of vehicles and machinery.

Light pollution

Light pollution is a problem that is usually not considered, due to its recent identification and the limited information that exists about it. However, there is growing evidence that it has a great impact on the population and biodiversity of the affected areas. In people, this phenomenon can produce sleep disturbances, damaging health and generating stress. In other species, it can affect their life cycle, reproductive cycle and survival rate, by interfering with their habits or confusing their senses. For these reasons, the mitigation of this problem in the works is being incorporated, designing and choosing lighting systems that are respectful with the natural cycles of light.

In this sense, during 2016, night lighting systems that respect the environment were implemented in 81% of the works executed by FCC Construcción Depending on the project in question, your lighting needs and the characteristics of your environment, a type of lighting was chosen. The specific measures carried out in this section include the installation of timers, presence detectors to illuminate only for the time required, or directional lighting that illuminates only the required area so that it does not directly affect the environment.

Light pollution, although less known, can have repercussions on the life cycles of the fauna near the project. Therefore, if this is the case, measures are implemented to minimise their effects, which are focused on causing as little discomfort as possible, illuminating only at times when strictly necessary, and using directional lighting.

practical case

La Valdeza Quarry

Client: **Projects for FCC Construcción América, S.A. and other external clients (Cemex, Constructora Norberto Odebrecht, Concretos Emperados S.A., Concretos S.A., Central Mix S.A., Conalvias S.A., etc.)**

Implementation deadline: **Stationary site, with no end date**

Problem detected:

Dust emissions are very common in crushing plants. The Valdeza crushing plant, located in the western area of Panama City, carries out activities aimed at the production and sale of mineral resources of different grading. However, these activities generate significant dust emissions, specifically during the processes of crushing and transporting the material.

Dust emissions generate other associated externalities, such as the reduction of visibility in work areas, considerably affecting the safety of workers. Similarly, the materials in suspension generate so much environmental impacts, slowing plant growth and negatively affecting the quality of the landscape, as well as social impacts on the surrounding communities, due to the poorer quality of the air.

Solutions adopted:

In order to minimise dust emissions from the crushing plant and the transport of quarry materials, a series of good environmental practices were implemented in the different phases of the production process.

In the first place, pumps and water pipes were installed to moisten the rocks brought from the quarry and reduce, in this way, the dust emitted during the crushing of the materials.

In addition, in order to reduce dust emissions from road transport, the internal roads of the quarry and the access road to neighbouring communities are periodically irrigated by means of a tanker truck. It should be noted that the water used for irrigation comes from the collection of rainwater, which implies responsible use of water resources. Finally, the planting of a natural barrier of trees was carried out, which, in addition to performing the delimitation function of the area, avoids visual contamination and embellishes the landscape.

Results:

All the measures put in place have contributed significantly to reducing the dust and discomfort derived from these emissions in the area. On the one hand, dust was reduced in the work areas, which has a significant positive impact on the health and safety of workers. Similarly, the affectation of the flora surrounding the La Valdeza quarry diminished, also improving its internal landscape. In relation to social aspects, there was a decrease in complaints from the communities surrounding the quarry, having improved relations with them, as a result of the decrease in their discomfort.

Dust mitigation systems using pipes and pumps.

Irrigation of internal roads.

Generation of noises and vibration

We implement measures to prevent and reduce noise and vibrations in the environments in which we develop our activities, to avoid inconvenience to neighbouring communities and protect their health and that of our workers and subcontractors.

We take into account the impacts of noise and vibrations in the life cycles of the biodiversity of the areas in which we operate, and we implement actions in order to minimise them in each phase of the project.

	ACTIONS - OPPORTUNITIES						
Risks	Devices for noise and vibration reduction	Consideration of environmental conditions	Reduction of the conditions caused by blasting	Creation of value for improvement of the required levels	Employment of modern machinery	Speed limitations	Rational use of machinery
Acoustic pollution	✓			✓	✓	✓	✓
Disturbances to the neighbouring centres of population	✓	✓	✓	✓	✓	✓	✓
Effects on the reproductive cycle of fauna	✓	✓	✓	✓	✓	✓	✓

The generation of noise and vibration is another of the environmental aspects with the most impact that occur in construction projects. This type of impact causes significant inconvenience, affecting not only the construction workers, but also the inhabitants of the nearby population centres and the surrounding fauna.

Beyond the occasional inconvenience, noise pollution has severe effects on human and animal health: prolonged exposure to noise can harm the health of people, causing stress and insomnia. Also, in some animal species, noise can alter their habits and even cause the shortening of their life cycles. Therefore, it is necessary to consider the generation of noise and vibrations in all phases of a project, from design to execution and operation.

Due to its impact on the nearby population and fauna, it is important to consider the generation of noise and vibrations in all the stages of the project

The following table shows the Good Practices adopted throughout 2016 in relation to the reduction of the impact caused by noise and vibrations.

Good practices from "Generation of noises and vibration" field

GOOD PRACTICE		IMPORTANCE			GOAL (DEGREE OF IMPLEMENTATION)								
					1			2			3		
2a	Incorporation, in installations or machinery of the work, of noise / vibration reduction devices, such as silencers, noise barriers, mufflers, shock absorbers, etc.	3			Presence of these devices in some equipment considered critical.			Idem in 50% of the equipment considered critical and in 50% of those used in night work.			Idem in 100% both critical and those used in night work.		
	% of application	0%	76%	73%	0%	50%	50%	0%	25%	25%	0%	25%	25%
2b	Rubber coating on hoppers, mills, screens, containers, buckets, etc.	2			Presence of rubber coated elements.			More than 30% of these elements are protected against noise.			Idem more than 60%.		
	% of application	60%	38%	46%	100%	33%	67%	0%	33%	17%	0%	33%	17%
2c	Consideration of environmental conditions in the work programme.	2			Limitation of noisy activities to less annoying schedules.			Limitation of noisy activities at least annoying times of the year.			Frequent interruption of work according to external conditions.		
	% of application	92%	95%	94%	92%	68%	73%	0%	19%	14%	8%	14%	12%
2d	Reduction of the conditions caused by blasting.	2			Protection of the affected area through the use of rubber blankets, provision of intermediate barriers between the affected area and the origin of the blasting, or protection by tarpaulins, meshes or any other device of the sensitive features.			In addition, use of low density explosives.			In addition, reduction of the explosive load by micro-retarding in blasting, or preparation of decoupling or spacing of the load.		
	% of application	0%	64%	64%	0%	22%	22%	0%	22%	22%	0%	56%	56%
2e	Improvement of the levels required by the legislation in the noise levels that are controlled.	3			Systematic obtaining of noise levels better than those required by more than 5%.			Idem in more than 15%.			Idem in more than 30%.		
	% of application	100%	63%	68%	33%	70%	62%	67%	10%	23%	0%	20%	15%
2f	Employment of modern machinery.	2			Percentage of machinery with CE marking (own and subcontractors) greater than 50%.			Idem higher than 70%.			Idem higher than 90%.		
	% of application	96%	90%	92%	32%	13%	19%	24%	23%	24%	44%	64%	57%

Construction | Civil Engineering Works | Total

Some of the Best Practices aimed at reducing noise during the development of the works include the installation of devices to reduce noise and vibration in equipment and machinery, the rubber coating of specific noise sources, the limitation of the speed of circulation in the work or the selection of more modern and silent machinery.

During 2016, environmental conditions were considered when carrying out the work programme in 94% of the works executed by FCC Construcción, establishing a time limitation for the noisiest activities in order to affect the surrounding populations and environment as little as possible. In addition, devices to reduce noise were incorporated in 73% of the projects, such as silencers, shock absorbers or anti-noise barriers. In 64% of the civil engineering works, the effects of by blasting were reduced through measures such as the protection of the affected area with rubber blankets or the use of low density explosives.

Finally, in order to reduce noise derived from machinery, 92% of the projects used modern machinery, with CE marking or equivalent certification and environmentally friendly. By applying these and other measures, it was possible to improve noise levels compared to those required by legislation in 68% of the works executed in 2016.

In certain projects whose surroundings have a special sensitivity towards the effects caused by noise, an effective solution consists of the installation of noise-proof panels, which help to minimise discomfort.

In some projects, noise measurements are made in selected locations in order to ascertain to what extent the inhabitants of the area may be affected.

The construction works usually have a considerable acoustic impact, so this circumstance must be considered from the beginning of the work in order to design an action plan to minimise potential discomfort to the environment, especially if the project is located near a centre of population.

practical case

Lima Metro project

Client: **Lima New Underground Consortium (Line 2)**

Implementation deadline: **72 months**

Problem detected:

The construction of railway infrastructures, such as the metro project, is especially delicate because they are usually close to residential areas. In projects with these characteristics, the acoustic impact of the construction works causes inconveniences for the local communities, and may have repercussions on the health of the people who live in these areas, as a result of stress, insomnia, or other side effects.

In relation to the acoustic emissions, it was important to consider that a section of the work, specifically the closure of station 23, adjoined the Hermilio Valdizán Hospital, a psychiatric hospital, and the Jorge Voto Bernales Hospital, a specialist clinic and therefore located in an area classified as a "special protection area against noise", since it can affect particularly vulnerable citizens. In addition, in the rest of the work, the activities related to the removal of excavation material from the tunnel with hoppers and the loading of the same in trucks for their transportation, involved a considerable effect upon the residents' ability to rest, as they were executed at night.

View of the panels from inside the Jorge Voto Bernales Hospital.

Solutions adopted:

Being aware of the impact of noise pollution on the communities surrounding the work, especially on patients admitted to the two hospitals located near station 23, who are a group particularly sensitive to the impact of noise and vibration, a series of preventive and corrective measures were implemented and which aimed at minimising impact.

Before the start of the works, anti-noise panels were placed along the fences of the two hospitals. These panels enable acoustic absorption of the noise generated by the works, so that the volume of sound is much lower inside the areas they cover.

The hoppers were lined with neoprene, which is very effective at muffling the noise produced when unloading the materials. In addition, the truck unloading schedule was modified to carry out this activity for the day, with the consequent improvement in the residents' ability to rest.

Results:

As a result of the actions undertaken to minimise the acoustic impacts of the works of Line 2 of the Lima Metro, the negative impact generated by noise on the inhabitants of the area has been reduced by improving the quality of life of these people.

Download of material on surface.

Water discharges

Aware that our greatest impact in relation to water takes place in the pouring phase after water is used, we carry out purification and treatment measures of the effluents generated in the project before they are returned to the natural environment.

In the current context of scarce water availability, it is essential to reuse project effluents, as this results in a lower need for resource consumption.

In addition to monitoring the discharge parameters of our effluents, we carry out actions that reduce the amount of suspended solids in the water discharged so as not to affect aquatic biodiversity.

In the construction sector, water is a fundamental resource that is used in the vast majority of activities. Its use, although not carried out with intensive nature in the sector, can entail the alteration of the ecosystems linked to water resources, either by the extraction of water for construction activities, because its quality is affected, or by the morphological alteration of the channels. To avoid these impacts as much as possible, it is necessary to contemplate the protection of the water resources from the environmental planning of each project, and, in this way, to select the most appropriate Good Practices.

FCC Construcción is aware of the importance of properly managing their discharges so that they do not affect the natural environment when they are returned to the environment. In the town of Allende, Mexico, the project has been executed in such a way that the works minimally affect two existing lagoons in the nearest surroundings.

In the System of Good Practices, those that include actions to reduce the impacts on this resource are based mostly on the treatment of the effluents before being returned to the aquatic environment by means of purifiers or neutralisation of the pH of the water. Similarly, FCC Construcción takes measures regarding the consumption of the resource, so that certain wash waters are reused whenever possible in order to optimise and reduce water consumption.

In particular, the most common problem in relation to discharges in the construction sector is the increase of solids in suspension with runoff water. This material, despite being non-polluting, negatively influences the natural conditions of aquatic ecosystems and their fauna, because it increases the turbidity of water by reducing the entry of light into the water, which implies a weaker photosynthetic activity, affecting the production of phytoplankton and also the dynamics of the system. Some of the Good Practices of FCC Construcción consider this impact by reducing the possibilities of erosion in the pits or placing containment elements that prevent solids from reaching the water. Another process, rare in construction, that can cause a decrease in water quality, is eutrophication, caused by increasing the nutrients in the water and producing excessive growth of phytoplankton, thus reducing the amount of dissolved oxygen. Similarly, the discharges of water from washing of concrete and other building materials, not previously neutralised, can lead to the acidification of the receptor medium, due to its low pH.

FCC Construcción requests administrative authorisation in its works and production centres to carry out direct or indirect discharges of waters that could contaminate or affect any body of water, so that these actions are duly supervised by the competent environmental agency. Similarly, for most of the projects carried out by the company, an initial analysis is undertaken of the wastewater, through which it is determined if the established quality parameters are met or if it is necessary to treat the effluents before being discharged.

	ACTIONS - OPPORTUNITIES						
Risks	Treatment of sanitary waters	Rafts for decanting effluents	PH treatment	Aeration prior to discharge	Creation of value for improvement of the required levels	Reuse of process water	Choice of proper cleaning systems
Generation of large volumes of discharges		✓	✓			✓	✓
Water contamination	✓	✓	✓	✓	✓		✓
Acidification and consequent effect on aquatic fauna and flora	✓	✓	✓		✓		
Loss of scarce resource						✓	✓
Increase of the temperature and consequent affection on aquatic fauna and flora		✓		✓	✓		
Eutrophication	✓	✓	✓	✓	✓		✓

Through the treatment of the water used during the construction work, FCC Construcción reaches the quality levels required by the legislation, especially when the washing waters have come into contact with the concrete.

The table below shows the percentages of application and degree of implementation of the Good Practices related to the management of discharges in the works executed by FCC Construcción during the 2016 tax year.

Good practices from "Water discharges" field

GOOD PRACTICE		IMPORTANCE			GOAL (DEGREE OF IMPLEMENTATION)								
					1			2			3		
3a	Use of portable sewage treatment plants or prefabricated watertight pits for sanitary water treatment.	3			They are installed at least in the effluent with the strongest flow.			At least 50% of the spill generating points are installed.			Idem with elements recovered from other works.		
	% of application	100%	88%	90%	75%	59%	62%	25%	23%	23%	0%	18%	15%
3b	Rafts for decanting effluents with or without the use of additives in effluent discharges and process waters.	2			That control fats and solids in suspension.			In addition, the pH.			Also, that the effluent does not have coloration.		
	% of application	0%	89%	89%	0%	56%	56%	0%	31%	31%	0%	13%	13%
3c	Neutralisation with acid of the pH of basic effluents.	2			Neutralisation with HCl or H2SO4 at least at one discharge point.			Idem in 50% or at least in two different spills.			Idem in 100% or at least three discharge points.		
	% of application	0%	58%	58%	0%	43%	43%	0%	14%	14%	0%	43%	43%
3d	Improvement of the levels required by the legislation or by the discharge permit in controlled parameters.	3			Systematic collection of contaminant levels better than those required by more than 5% in all parameters.			Idem in more than 15%, or in more than 30% in half of the controlled parameters.			Idem in more than 30% on all the controlled parameters.		
	% of application	100%	50%	57%	100%	67%	75%	0%	0%	0%	0%	33%	25%
3e	Reuse of the washing water of concrete tanks.	3			Reuse on site for irrigation of roads.			Reuse on site for subsequent tank washes.			Reuse in the concrete plant.		
	% of application	100%	73%	79%	43%	44%	43%	0%	6%	4%	57%	50%	52%
3f	Neutralization with CO_2 of the pH of basic effluents.	3			Neutralization with CO_2 at least at one discharge point.			Idem in 50% or at least in two different spills.			Idem in 100% or at least three discharge points.		
	% of application	0%	50%	50%	0%	50%	50%	0%	0%	0%	0%	50%	50%
3g	Gutter washing area.	1			Definition of points away from water bodies and the water table where to wash the gutters.			They are also waterproofed.			In addition, they cover and recover landscaping at the end of the work.		
	% of application	100%	93%	96%	40%	43%	42%	27%	18%	21%	33%	39%	37%

Construction Civil Engineering Works Total

The installation of setting basins is a useful measure to separate the solid fraction, with the objective that the water recovers the necessary conditions before being returned to the water environment or to the sanitation network.

In 79% of the projects carried out by FCC Construcción, the water used to wash concrete tanks was reused

In 96% of the works of the year 2016, washing areas were defined for gutters, thus avoiding the direct discharge of residual water into natural channels without any treatment. In addition, in 89% of the projects, setting basins were installed with the objective of minimising the amount of suspended solids in the effluents. To avoid this, other good practices were also carried out, such as the reduction of erosion in the areas near riverbeds or the placement of containment elements, such as straw barriers or geotextiles.

Regarding the use of the resource, in 79% of the works carried out by FCC Construcción, the water used to wash concrete tanks was reused, which, in addition to reducing consumption, reduced the amount of water discharged. Provided that the washing waters comply with the established physical-chemical requirements, they are reused for subsequent tank washes, for watering road works or for making new batching in the concrete plant.

FCC Construcción carries out an inventory of the water flows captured, consumed and discharged. This practice, although it does not constitute a calculation of the water footprint as such, is useful both for checking the effectiveness of Good Practices, and for quantifying our impact on the environment and detecting areas for improvement in this regard.

As had been done since previous years, in 2016 the discharges were also measured by classifying them according to their destination. The following figure shows that the main destination of the discharges was the Hydraulic Public Domain, after an adequate purification treatment was carried out. 21% of our wastewater was discharged directly to the sanitation network, while 4% was discharged to septic tanks. It should be noted that during 2016, no discharges were made to the Maritime Terrestrial Public Domain.

In addition to quantifying spills, the Management System also records accidental spills that occur at our sites. Specifically, in 2016 there were a total of 212 accidental spills, which represented an approximate volume of 62 m^3.

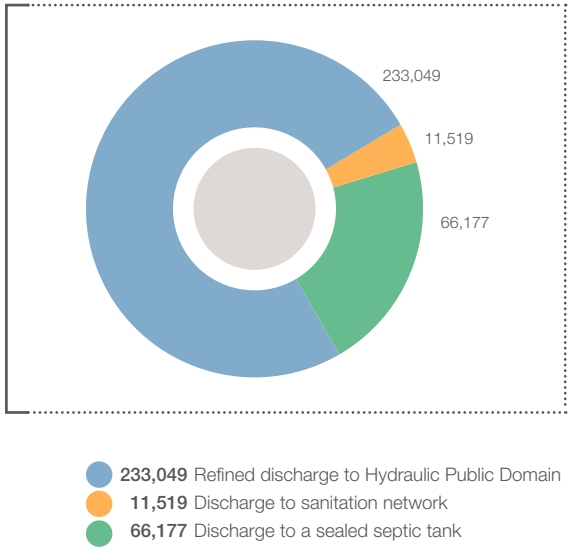
Wastewater discharges

Type of discharge	Volume (m^3)
Total discharge	**310,563**
• Refined discharge to Hydraulic Public Domain	233,049
• Refined discharge to Domino Maritime Terrestrial	0
• Discharge to sanitation network	66,177
• Discharge to a sealed septic tank	11,519
Water recycled or reused in the work itself	**42,997**
Purified water	**244,917**

Most significant accidental spills

Type of discharge	No. of discharges	Volume (m^3)
Total uncontrolled or accidental spills	**212**	**62**

Destination of discharge (m^3)



Through its Management System, FCC Construcción is able to identify the significant discharges that occur on sites, as well as to determine which are close to environments with a relevant environmental or social value, such as a protected natural area, or an area relevant to local communities. These factors determine the works in which extreme caution should be exercised in relation to the treatment of wastewater.

Water resources affected by significant discharges

Type of effect	Number of works
Significant spills in protected natural areas	2
Significant spills in areas of high value to biodiversity	6
Significant spills in channels with very high value for local communities and indigenous populations	2
Significant spills in channels with relevant value for local communities and indigenous populations	4
Significant spills on natural coastline	4
TOTAL	**16**

* *The data refers to the total works executed by FCC Construcción in 2016, not including data from FCC Industrial.*

FCC Construcción ensures compliance with the quality parameters of the water discharged by conducting periodic analysis of the parameters of the effluents, both in the laboratory and in situ.

practical case

Budiño sewerage

Client: **Aguas de Galicia**

Implementation deadline: **26 months**

Problem detected

The project is part of a series of actions that aim to eliminate the current discharge points, to improve the quality of life of the residents of the environment and reduce the effects on the natural environment. To do this, it is necessary to carry out surface ditches in order to build the sanitation network.

During the excavation of the trench, a layer of mud appeared that could not be reused in the trench filling. Transferring this material to landfill was an additional cost, since the transport of these materials had to be carried out in watertight trucks that avoided the loss of material during the journey. On the other hand, due to the high phreatic level of the area where the CE collector was located, it was necessary to carry out water drainage, and to find a solution so that the discharge did not reach the river directly and could cause turbidity.

Solutions adopted:

Two decanting pools were made covered with geotextile, in which sludge from the excavation of the trench was poured. An area remote from the watercourses was selected, which prevented leaks and discharges of these substances to the ground or to the groundwater of the public domain water. After the sludge is deposited, the complete evaporation of the water is allowed to occur until only dry material remained, which was collected and transferred to an authorised landfill.

To solve the problem from the drainage waters, a series of setting basins covered with geotextile were also built, where they decanted the suspended solids before reaching the river.

Results:

The result was satisfactory, achieving the stability of the trench. The transportation of the completely dry sludge guaranteed safety during the journey from the vicinity to an authorised dump. Regarding the drainage water basins, evaporation and filtering enabled the eliminating of all the water, with no discharge to the river being required.

Setting basin for sludge.

Water from drainage.

Occupation, contamination or loss of soils

Due to its limited nature and given the importance for anthropic activities of sustenance, when executing our works special attention is paid to the use of the soil, seeking to reduce to the maximum our occupation of and effect upon it.

In order to preserve the conditions of the land, we carry out both prevention activities, such as the limitation of areas or the control of effluents, as well as recovery actions through the cleaning, conditioning and replanting of those areas affected by erosion.

The ecological restoration of slopes by hydroseeding manages to stabilize the inclined terrains, so that the soil recovers its natural utility as a support for vegetation, whilst minimising visual impact.

Soil is the support on which natural ecosystems and anthropic activities develop. This resource is not unlimited, and due to its importance for life is one of the resources on which most pressure is exercised, despite being very vulnerable. Therefore, we must take special care that our activity involves the least possible impact on it.

The construction sector directly affects this resource, both for the occupation needs of the territory itself, and for the space required by all the facilities, machinery, storage areas and access roads. In addition to affecting its occupation, the construction has associated activities of alteration of the soil, such as its compaction, contamination by spills and discharges, or earthworks and excavations. These alterations can modify the natural dynamics of the soil as well as increase erosion and ultimately affect the vegetation.

	ACTIONS - OPPORTUNITIES						
Risks	Restoration of affected areas	Limitation of occupied areas and access areas	Avoid the occupation of environmentally valuable areas	Concentration of auxiliary facilities	Prevention of accidental spills	Correct execution of loading and unloading operations	Proper maintenance of machinery
Land occupation	✓	✓	✓	✓			
Visual impact on the landscape	✓	✓	✓	✓			
Soil pollution		✓	✓		✓	✓	✓
Destruction of the regenerative capacity of vegetation		✓	✓		✓	✓	✓
Losses of potential uses	✓	✓	✓	✓	✓		

Due to the close relationship of FCC Construcción with this resource and, at the same time, its great importance, the company applies good practices related to the adequate management of the soil in practically all of its works. Below are the percentages of the Good Practices implemented in the works executed by FCC Construcción during 2016:

Good practices from "Occupation, contamination or loss of soils" field

GOOD PRACTICE		IMPORTANCE			GOAL (DEGREE OF IMPLEMENTATION)								
					1			2			3		
4a	Restoration of the affected areas by the construction facilities.	2			Cleaning and removal of features outside the environment, or with no later use, with written and / or visual action planning.			In addition, the land decompaction and morphological adaptation to the environment are carried out.			The same but adding plantations and ornamental features integrated into the resulting or pre-existing environment.		
	% of application	86%	85%	86%	60%	50%	53%	36%	35%	35%	4%	15%	12%
4b	Limitation of access areas.	2			There is a written or graphic planning of road accesses that is respected throughout the work.			The same, but including the physical signage that delimits them "in situ".			The same, but limiting road access to existing ones.		
	% of application	92%	96%	95%	18%	16%	17%	50%	51%	51%	32%	33%	32%
4c	Limitation of occupied areas.	1			There is a written / visual documentation of the areas that the machinery and personnel can occupy.			In addition, there is a physical delimitation or beaconing of the aforementioned areas.			In addition, these areas are limited to the area occupied by the work.		
	% of application	96%	98%	97%	39%	15%	23%	35%	47%	43%	26%	38%	34%
4d	Prevention of accidental discharges	2			Physical defences and / or warning posters are available on the perimeter of the storage tanks for dangerous substances or hazardous waste, in order to prevent unwanted access and avoid collisions.			There is additional protection in the supply area of the storage tanks for dangerous substances or hazardous waste.			In addition, there are platforms or protected areas for handling or maintenance operations that must be carried out on site or at the centre.		
	% of application	88%	93%	92%	27%	33%	31%	67%	44%	50%	7%	23%	19%
4e	Proper planning of the execution of access roads.	2			Take advantage of existing roads.			Search for a definitive use for temporary access roads.			The two previous ones.		
	% of application	67%	91%	86%	75%	60%	63%	25%	5%	8%	0%	35%	29%

Construction Civil Engineering Works Total

During 2016, in 86% of the works of FCC Construcción, restoration measures were applied to the territory affected by the works facilities. The actions of restoration of the land are fundamental for minimising the long-term impacts on the landscape, and are applied to all works where possible. The restoration of ecosystems helps to re-naturalise the affected area, minimising the problems derived from the work such as erosion or loss of soil. The restoration actions include the cleaning and removal of elements outside the environment, the conditioning of the land to recover its morphology or the replanting of the area.

Through previous planning, the access areas were limited in 95% of the works executed in 2016, and the areas occupied in 97% were delimited. The limitations of these spaces minimise the impacts of occupation, compaction and contamination of the soil, while ensuring the maintenance of an adequate structure to fix the vegetation cover.

The placement of organic meshes on slopes and the subsequent application of the hydroseeding technique helps to avoid soil erosion, allowing the regeneration of the slopes and the physical integration of the work in the environment.

Sometimes the roads or spaces occupied by the works are delimited to minimise the impacts on the surrounding areas, especially when they are sensitive. Through this measure, the vegetation cover is protected and soil compaction is avoided.

Similarly, 86% of the projects executed carried out an adequate planning of access roads. On the one hand, by taking advantage of existing roads, the impact of creating new roads is avoided, and on the other hand, when it is not possible to use existing roads, permanent use is sought for the access roads, once construction work has been completed. This type of actions entails a lower occupation and compaction of the land and, in many cases, also an economic saving for the company.

Preventive actions against accidental pollutant discharges were carried out in 92% of the works. These actions include extreme caution in loading and unloading operations, lubrication operations, cleaning, maintenance and supply of machinery, all of which are of considerable risk in terms of discharges onto the ground. In addition, for storage of hazardous substances or waste, properly conditioned spill control tanks are available to avoid unwanted contamination on the ground. Similarly, prior to the start of the work, Emergency Plans are drawn up with the aim of establishing the procedure for action and measures to be followed in the event of an accidental spill.

Preventive actions against accidental pollutant discharges were carried out in 92% of the projects

Avoid accidental spills that could lead to soil contamination, is achieved by enabling areas roofed with waterproofed soil, in which spill control tanks are placed to store the waste with its corresponding signage.

practical case

Vallirana Relief Road

Client: **Ministry of Public Works and Transport**

Implementation deadline: **54 months**

Problem detected:

The road works of Vallirana municipality include the execution of a tunnel whose entrance presents a large calcareous clearing on which it is necessary to carry out environmental restoration work.

Due to the clearing's rock composition, its morphology and inclination that is difficult to treat, it was decided to cover it with concrete and, as a consequence, the traditional solutions of land extension and replanting of the clearing were impossible to apply.

Solutions adopted:

An innovative system of maintenance and replanting of the clearing was proposed, called Organic Shotcrete. The aforementioned system consists of installing superimposed three-dimensional geogrids, which confine and structure the substrate, anchored to the ground by means of a high resistance network that ensures its direct contact with the surface of the slope. This system has an anchor that allows the correct adhesion of the features on the clearing. A substrate composed mainly of organic matter was used, and a great variety of species was sown through hydroseeding.

Due to the climatic characteristics of the area and the location of the slope, it is necessary to install an irrigation system to ensure the implantation of the vegetation, in addition to periodic fertilisations.

Results:

One week after executing a test section of the "organic shotcrete" system in the lower bank of the clearing, of approximately 100m^2, the first germinations of the seeds were already observed. During the following two months, their evolution was monitored, which turned out to be very positive.

This case constitutes a great step in the restoration of complex recovery systems, such as slopes. For this reason, it is important to apply innovative techniques such as this one more frequently, since their effectiveness is demonstrated and they can serve as an example to replicate in other projects that present similar problems.

Three-dimensional geogrids.

Evolution of germination one week after application.

Test slope section.

State of the slope after the period of autumn rains.

practical case

Submerged tunnel of Coatzacoalcos

Client:State Government of Veracruz, through the concessionaire “Coatzacoalcos Tunnel”

Implementation deadline: **12 months**

Problem detected:

The Allende Road Project, whose purpose is to provide access to the submerged Coatzacoalcos tunnel, consists of the construction of a kilometre-long road, using asphalt cement. Its construction is intended to cross two natural lagoons, located on the axis of the road which implies the need to divide them. This division of the lagoons would have the effect of blocking the flow of water to the sections located north of the axis, as well as presenting problems of flooding in the surrounding communities during the rainy season.

Solutions adopted:

Taking into account the circumstances described, it was decided to form an embankment with prefabricated caissons inside, so that the structure would give continuity to the lagoon bed and thus avoid blocking the water flow and possible consequences.

On the other hand, to avoid water contamination by suspended solids, all the stony material had a previous washing process. Similarly, a programme of ecological restoration of the lagoons was implemented and the restoration of the sides of the embankment was carried out by means of hydro seeding.

Results:

The use of prefabricated caissons had positive impacts on the work, given its high hydraulic capacity, high structural strength, rapid installation and low cost, especially if this solution is compared with other alternatives such as the construction of a bridge or the use of cement pipes. Also, derived from the restoration measures, there was a proliferation of aquatic species, both fauna and flora, which were in decline due to contamination of the groundwater reserves before the work.

Installation of prefabricated caissons inside the lagoons in order to give continuity to water and aquatic species.

Hydroseeding on the sides of the embankment.

Formation of the embankment by fragments of rock with different sizes and weights.

Use of natural resources

We calculate our carbon footprint through the monitoring of energy consumption and focus on energy efficiency in our production processes, adjusting the energy needs of each project to the availability of resources.

As a construction company, we contribute to the sustainability of cities through the design and construction of more efficient buildings and infrastructures, investing in innovation and technology to counteract the pressure of urban development on natural resources.

In order to move towards, a more sustainable business model, aligned with the circular economy concept, FCC Construcción encourages the efficient use and adequate management of resources, as well as the prevention, reduction, reuse and recycling of waste, in order to increase its longevity and availability over time.

Natural resources are the elements on which the vast majority of human activities are based. However, for some time now there has been warnings regarding its overexploitation, caused by excessive consumption with respect to its renewal rate. The excessive use of resources has consequences that directly harm human beings, derived from the depletion of raw materials. In addition, anthropic overexploitation also has negative effects on biodiversity, biogeochemical cycles and processes and the balance of ecosystems.

Due to the very nature of the activity carried out, the construction sector is particularly intensive in the consumption of natural resources, both because of the occupation of the land on which the works are located and because of the need for water and construction materials for its execution.

With the aim of establishing consumption patterns that respect the environment, in recent years the concept of efficient use of resources has been promoted. In this sense, numerous institutions, companies and associations have contributed values and knowledge in the responsible use of natural resources, through the development of management systems, standards, models, commitments and procedures. In the case of construction, these aspects can be considered from the design stage of the project, through the construction and use stages, to the end of operational life stage. Specifically, in the construction stage, where organisation can have a direct influence, FCC Construcción implements Good Practices aimed at the reuse of construction materials or the use of recycled water or renewable energies, if feasible.

	ACTIONS - OPPORTUNITIES						
Risks	Reuse of inert waste	Reuse of removed vegetable soil	Compensation of the mass diagram	Use of elements recovered from other works	Exchanges of surpluses with other works	Reuse of effluents and process wastewater	Reduction of water and energy consumption
Overexploitation of natural resources	✓	✓	✓	✓	✓	✓	✓
Drought						✓	✓
Climate change	✓		✓				✓
Difficulty opening source borrow materials	✓	✓	✓		✓		

The following table reflects the percentage of FCC Construcción works that were applied in 2016 by Good Practices with the aim of optimising the consumption of natural resources.

Good practices from "Use of natural resources" field

GOOD PRACTICE		IMPORTANCE			GOAL (DEGREE OF IMPLEMENTATION)								
					1			2			3		
5a	Reuse of inert waste from other works.	3			More than 1% of all inert waste (fillings).			More than 5%			More than 15%.		
	% of application	90%	67%	77%	11%	25%	18%	44%	13%	29%	44%	63%	53%
5b	Use of recoverable elements in work processes such as removable walls (traditionally of concrete of later demolition) in aggregates crushing facilities, etc.	2			Use of some system in at least 50% of possible cases in the development of an activity.			Idem in 2 or more activities.			Idem in 5 or more activities.		
	% of application	100%	38%	44%	100%	67%	75%	0%	0%	0%	0%	33%	25%
5c	Reduction of source borrow materials with respect to the volume planned in the project.	3			Reduction greater than 5%.			More than 15%.			More than 30%.		
	% of application	90%	97%	95%	56%	66%	63%	22%	18%	20%	22%	16%	18%
5d	Reuse of effluents and process wastewater.	2			More than 15%.			More than 30%.			More than 60%.		
	% of application	100%	53%	56%	100%	50%	56%	0%	13%	11%	0%	38%	33%
5e	Reuse of the removed vegetable soil.	2			Separation of vegetable soil in horizontal layers less than 2 and a half metres high.			In addition, dump of vegetable soil stockpiled more than six months.			In addition, sown or fertilized of the collected vegetable soil.		
	% of application	60%	95%	87%	83%	66%	68%	17%	14%	15%	0%	20%	17%
5f	Use of recovered items from other works, such as portable purifiers, spill control tanks, etc.	2			Use of 1 item.			Use of up to 3 items.			Use of more than 3 items.		
	% of application	87%	91%	89%	31%	52%	44%	8%	19%	15%	62%	29%	41%
5g	Use of recycled water for irrigation, provided that it meets the necessary quality conditions.	2			More than 30% of the water used for irrigation is recycled water, coming from the work itself.			More than 80% of the water used for irrigation is recycled water, coming from the work itself.			Recycled water from external sources is used.		
	% of application	100%	77%	80%	0%	40%	33%	50%	50%	50%	50%	10%	17%

Construction | Civil Engineering Works | Total

Good practices from "Use of natural resources" field (continue)

GOOD PRACTICE		IMPORTANCE			GOAL (DEGREE OF IMPLEMENTATION)								
					1			2			3		
5h	Use of renewable energy.	3			Some renewable energy source (photovoltaic solar panels, thermal solar panels, biomass boilers, etc.) is used for the self-supply of the construction offices.			Some renewable energy source (photovoltaic solar panels, thermal solar panels, biomass boilers, etc.) is used for some activities of the construction process.			The two previous ones.		
	% of application	100%	38%	44%	100%	33%	50%	0%	33%	25%	0%	33%	25%
5i	Use of recycled aggregates, instead of source borrow material.	2			More than 5% of the total aggregates required are recycled aggregates.			More than 15% of the total aggregates required are recycled aggregates.			More than 30% of the total aggregates required are recycled aggregates.		
	% of application	80%	77%	78%	50%	70%	64%	25%	10%	14%	25%	20%	21%

Construction Civil Engineering Works Total

The natural resource that is most consumed in construction projects, especially civil engineering works, is the soil. The works not only require the occupation of the land, but also the movement of lands for their execution. One way to reduce land consumption is to compensate for the debris and embankments within the same project using the materials extracted as fill on site itself, always subject to a prior verification of compliance with the appropriate characteristics and requirements.

Thus, in 95% of the projects it was possible to reduce the necessary volume of source borrow material, with respect to the volume initially planned in the project, and in 87% of them the previously removed vegetable soil was reused in the stripping and clearing works. In addition, 77% of the projects used inert material from other works, thus prolonging their useful life and in 78% of the works recycled aggregates were used, instead of source borrow material. Owing to this type of actions, it is possible to reduce the consumption of natural resources in the works, minimising their overexploitation, as well as reducing the waste generated and contributing to an improvement in the environmental as well as economic performance of the work.

Excess materials from the excavation can be reused for filling, provided they meet the technical and quality criteria required. In this case, the most advisable thing is to reuse them in the same work from which they come, since, in addition to minimising the consumption of material, the impacts derived from transport to the work and its management as waste are minimised.

Below is the consumption of the main resources throughout 2016, specifying the revalued and consumed waste again on site, to be inserted in the production cycle.

Resource consumption

Resource consumed	Consumption (t)				
	Spain	Rest of Europe	Latin America	Middle East North Africa	TOTAL
Raw materials and materials	**7,924,962**	**773,000**	**7,999,080**	**5,767,827**	**22,462,869**
Asphalt agglomerate	149,146	49,003	111,124	35,623	344,896
Concrete:	929,302	49,013	630,974	1,012,779	2,622,068
Steel	370,568	3,498	44,011	32,941	451,018
Bricks	4,250	84	0	739	5,073
Glass and metals	4,646	265	124	661	5,696
Aggregates, soils and gravel	6,334,009	567,822	7,033,683	4,682,406	18,617,920
Vegetable soil	125,560	103,060	177,452	216	406,288
Paint, solvents, release agents, concrete curing fluids, accelerators, fluidisers, antifreezes and epoxy resins	6,554	92	1,007	7	7,660
Oils, fats and other harmful and dangerous substances	928	163	705	454	2,250

Resource consumed	Consumption (m^3)
Resources coming from the valuation of inert waste *	**5,746,732**
Leftover lands or rocks	5,613,983
Excess clean rubble	132,749

* *FCC Construcción, not including FCC Industrial.*

FCC Construcción uses recycled water in many works to irrigate roads and stockpiles, always complying with the established quality conditions.

In 89% of the FCC Construcción works, auxiliary elements such as portable sewage treatment plants, spill control tanks or construction houses have been reused, which are likely to be used in other projects, thus maximising their useful life.

On the other hand, although the construction does not constitute an activity with an intensive consumption of water, this resource is indispensable for the preparation of materials or cleaning of machinery and tools. Also, given the importance of water resources for life, FCC Construcción applies to its management criteria of saving, use and reuse to achieve a responsible consumption of water. In 2016, 56% of the projects executed reused effluents and process wastewater. In addition, in 80% of the projects, that used water to irrigate roads and collect dusty materials, recycled water was used.

Another resource used in construction activities is energy, whose type varies depending on the project, location or machinery required. FCC Construcción keeps track of the energy consumption of the stationary sites and of the executed projects, which also helps us to calculate the organisation's carbon footprint. In order to be more efficient in the use of energy, the use of renewable energies is rewarded whenever possible, and attempts are made to increase the yields of conventional systems or to use more efficient alternative systems. The good practices applied in this area seek to reduce the consumption of energy and in turn reduce greenhouse gas emissions. The first step is to make a correct measurement of consumption. This is a difficult task due to the disparate nature of the consumption by type and location of the works. However, the computer applications of the company make it possible to record the consumption of all the production centres, and allow extracting the information in different formats and for different periods of time, thus facilitating its measurement and monitoring. The following tables show the energy and water consumptions of the works of FCC Construcción in the different geographical areas in which work has been carried out throughout 2016.

FCC Construcción promotes efficient and responsible energy consumption amongst its employees.

Power Consumption

Type of energy	Consumption (GJ) Spain	Rest of Europe	Latin America	Middle East and North Africa	TOTAL	%
Direct power consumption	**150,342**	**39,083**	**206,721**	**899,453**	**1,295,599**	**94.2%**
Fuel oil consumption	7,676	0	17,797	107,762	133,235	9.7%
Natural gas consumption	124	904	17	0	1,045	0.1%
Diesel consumption	141,198	37,582	182,160	779,178	1,140,118	82.9%
Oil consumption	1,344	597	6,747	12,513	21,201	1.5%
Indirect power consumption	**42,109**	**5,657**	**29,270**	**3,198**	**80,234**	**5.8%**
Electricity Consumption Cost	42,109	5,657	29,270	3,198	80,234	5.8%
TOTAL	**192,451**	**44,740**	**235,991**	**902,651**	**1,375,833**	**100.0%**

Water consumption

Source of water consumption	Consumption (m^3) Spain	Rest of Europe	Latin America	Middle East and North Africa	TOTAL	%
Surface water	571,053	1,757	203,874	0	776,684	46.6%
Underground water	11,753	226	160,174	1,456	173,609	10.4%
Municipal water supply	91,708	51,615	53,739	475,396	672,458	40.4%
Water recycled or reused from the work itself	42,055	0	943	0	42,998	2.6%
TOTAL	**716,569**	**53,598**	**418,730**	**476,852**	**1,665,749**	**100.0%**

practical case

Doha Metro System Red line (RLS)

Client: **Qatar Railway Company**

Implementation deadline: **50 months**

Problem detected:

For the construction of the underpass of the Al Wakra highway on the Doha Metro red line, it is necessary to dismantle approximately 3 kilometres of paved road, which entails the generation and withdrawal of 1.4 million m^3 of land and demolition waste.

Construction of the motorway underpass in the northern area of the project.

It should be noted that initially the reuse of 93% of the materials on site from excavation, or asphalt material, was not planned, so the material was being collected for later disposal. The collection of these materials was a problem for the work, due to the limitations of the land and the limited space that is available to operate.

Solutions adopted:

The consortium and the Qatar Public Works Authority, Ashghal, established that all the materials obtained during excavation and demolition had to be reused, for which it was necessary to carry out different actions of processing and transfer of the materials:

- The materials from the excavation were categorised, ground, and calibrated for reuse.
- Both the materials from the excavation and those resulting from the demolition were moved from the work to a safety area where they were stored to avoid traffic jams in the operation areas and thus facilitate the work.
- The processing of materials - categorisation, crushing and calibration - was carried out in the safety area through the use of specific machinery.

Results:

Thanks to the environmental awareness of the client and the consortium of construction companies, all the materials produced by the excavation ending up in landfill has been avoided, since their reuse is guaranteed by Ashghal's authorisation for them to be used as filling materials. In this way, 7% of the materials from the excavation is used in the project itself and the remaining 93% is used as filling material in other works of the developer.

As for the asphalt materials from the demolition of the road, these were removed from the safety area and processed and reused by the Public Works Authority.

Demolition material deposited in the safety area.

Waste generation

Through sustainable construction, we contribute to reducing the environmental impact of cities, and consider the waste generated in them as one of the environmental, social and economic variables to be taken into account from the initial planning stages.

We work with the objective of substantially reducing the generation of waste derived from our activities and trying to return them to be reintroduced in the productive cycle as another material.

Construction and demolition waste (CDW) that is generated by the company's activity is generally, non-hazardous and susceptible to being reused or recycled. However, its problems derive from the large volumes in which it is generated, causing an environmental and landscape impact, which can be reflected in the existence of landfills or dumps, if proper management is not carried out.

The main lines of action of FCC Construcción are to minimise the amount of CDWs to be managed externally through their reuse and use, thereby contributing to the circular economy model towards which the Company wishes to evolve.

The European Waste Directive sets as a goal for 2020 that the amount of non-hazardous construction and demolition waste, reused or recycled, must be at least 70%. In order to achieve this objective, FCC Construcción follows the legally established framework of integrated waste management: reduction at source, segregating according to characteristics, reuse, recycling, recovery and, as a last option, elimination in landfills authorised to cause the minimum possible impact.

	ACTIONS - OPPORTUNITIES							
Risks	Improvements in the design and construction process	Reduction of container waste	Purchase of material in quantity and adequate container	Correct identification and storage of waste and bins	Classification and individualised management of the CDW	Compensation of the mass diagram	Management of excavation surplus	"In situ" recovery
Generation of large volumes of CDW	✓			✓	✓	✓	✓	✓
High quantity and diversity of containers and packaging	✓	✓	✓	✓	✓			✓
Generation of hazardous waste and associated risk	✓		✓	✓				
High amount of land and other leftover materials from excavation	✓					✓	✓	✓
Increase in waste production due to inadequate storage		✓	✓	✓	✓			
Increase in waste production due to inadequate transport		✓			✓	✓		✓

In FCC Construcción's Good Practices System, those related to waste are intended to achieve effective waste management, so that both the amount of waste generated that ultimately reaches the landfill and the consumption of natural resources are reduced simultaneously, having found a use for this material, in principle considered as surplus. In the table shown below, the percentage of application and the objectives achieved during 2016 can be seen.

Good practices from "Waste generation" field

GOOD PRACTICE		IMPORTANCE			GOAL (DEGREE OF IMPLEMENTATION) 1			2			3		
6a	Reduction of inert waste to landfill with respect to the project's expected volume.	3			Reduction greater than 5%.			More than 15%.			More than 30%.		
	% of application	93%	91%	91%	65%	63%	64%	12%	16%	15%	23%	20%	21%
6b	Construction and demolition waste is classified / separated for its individualised management.	2			Construction and demolition waste is classified as a further category required by legislation.			Construction and demolition waste are classified in two further categories required by legislation.			All construction and demolition waste is classified and valued.		
	% of application	83%	89%	87%	58%	39%	45%	32%	32%	32%	11%	29%	23%
6c	Changes in the design or in the construction system in relation to the use of hazardous waste generating materials such as fibre cement, release agents, additives, resins, varnishes, paints, etc., generating low or zero danger waste.	3			Some expected hazardous waste stops being produced in at least one activity / project unit is generated. Applying for example paints to water instead of paints with organic solvents.			Idem in three or more activities.			Idem in five or more.		
	% of application	100%	43%	50%	0%	33%	25%	100%	0%	25%	0%	67%	50%
6d	Reduction of packaging waste through practices such as requesting materials with returnable containers from the supplier, reusing contaminated containers, receiving large or bulk items, materials normally served in containers, etc.	2			It applies to two or more materials.			Idem to 5 or more.			Idem to 10 or more.		
	% of application	67%	77%	74%	100%	71%	78%	0%	6%	4%	0%	24%	17%
6e	Management of excavation surplus.	2			More than 1% in another work or restoration of degraded area.			More than 30%.			More than 50.		
	% of application	100%	85%	89%	36%	62%	55%	27%	28%	28%	36%	10%	18%

Construction | Civil Engineering Works | Total

Good practices from "Waste generation" field (continue)

GOOD PRACTICE		IMPORTANCE			GOAL (DEGREE OF IMPLEMENTATION)								
					1			2			3		
6f	Debris recovery.	2			Reuse or recycling in another work or external plant.			Reuse on site itself.			Recycling stone by mounting a plant at the worksite itself.		
	% of application	100%	79%	85%	67%	45%	53%	25%	36%	32%	8%	18%	15%
6g	Use of measures to reduce the volume of waste (paper, cardboard, metals, etc.)	1			It applies to a type of waste.			It applies to two different types of waste.			It applies to three or more different types of waste.		
	% of application	80%	75%	77%	50%	40%	43%	38%	40%	39%	13%	20%	17%

Construction Civil Engineering Works Total

The reduction in the amount of waste generated can be achieved in all phases that make up the life cycle of a project, but prevention stands out for its effectiveness because it avoids the generation of waste from the start.

The first step in the treatment of waste is its separation on site according to its type, so that the most appropriate management can be carried out in each case.

Thanks to simple practices such as the purchase of materials with returnable packaging from the supplier, the reuse of contaminated packaging, or the purchase of bulk materials instead of packaging, the volume generated from packaging waste was reduced by 74% in works. In addition, 50% of the works in 2016 generated waste of less or no danger, by changing the design or construction system in relation to the use of materials that generate hazardous waste.

Additionally, in 77% of the works, means have been used to reduce the volume of waste generated such as paper, cardboard or metals. This practice enables the reduction not only of the space needed to store this waste, but also the volume of waste to be transported and the emissions of Greenhouse Gases associated with the aforementioned transport.

As for construction and demolition waste (CDWs), 87% of the works were classified for individual management in at least one category more than those required by legislation. In addition, all CDWs were classified and valued in 23% of these.

One of the Good Practices of obligatory application for all those works in which it is possible is the reduction of inert to landfill with respect to the volume foreseen in the project, which was applied in 91% of the works carried out in 2016. Some of the practices that aim to reduce the amount of inert waste to landfill are: the management of surplus excavation for use in another work or restoration of degraded areas, which was carried out in 89% of the works in 2016; and the reuse of debris on sites or in external recovery plants, which was carried out in 85% of the works.

FCC Construcción monitors the amount of waste generated by each project. During 2016, the industrial services and works of the organisation generated a total of 1,698,763 tons.

Waste Generated	Amount (t)				
	Spain	Rest of Europe	Latin America	Middle East and North Africa	TOTAL
Hazardous waste	231	70	99	187	587
Non-hazardous waste	427,646	4,142	911,015	355,373	1,698,176
TOTAL	**427,877**	**4,212**	**911,114**	**355,560**	**1,698,763**

An alternative that is used in many works is the reincorporation of construction and demolition waste (CDWs) as filling material. In this way, they are considered useful resources for the work, reducing both the volume of inert waste destined to landfill and the volume of virgin aggregates consumed.

The management of hazardous waste is especially delicate in construction projects, which must be stored in specially designed areas, and have a service that is responsible for removing and managing them properly.

Hazardous waste requires special care in its management, treatment and management, since its effects on the environment are highly harmful. Although FCC Construcción does not generate significant amounts of hazardous waste (0.03% of the total waste generated in 2016), all of them are initially identified in our works to ensure compliance with current legislation and making appropriate decisions for their management. Similarly, in the works of FCC Construcción, specific areas are created to store hazardous waste in a safe manner, regardless of whether the ownership of this waste is by FCC Construcción or by the subcontractor.

The following table shows a more exhaustive list of the amount of waste generated by FCC Construcción projects during 2016, grouped according to their danger.

Waste generated

Hazardous waste (kg)		492,315
Empty hazardous waste containers (kg)		**16,780**
15 01 10*	Empty hazardous waste containers	11,592
15 01 10*	Empty plastic hazardous waste containers	1,626
15 01 10*	Empty metallic hazardous waste containers	3,562
Solid hazardous waste (kg)		**327,077**
15 02 02*	Absorbents and cleaning cloths containing solid hazardous waste	11,494
16 01 07*	Oil filters	5,343
16 02 13*	Discarded electrical and electronic equipment	6,467
16 05 04*	Sprays containing solid hazardous waste	1,728
16 06 01*	Lead batteries	1,829
16 06 02*	Ni-Cd batteries	17
16 06 03*	Batteries that contain mercury	302
17 01 06*	Debris containing solid hazardous waste (concrete, mortar, bricks, prefabricated elements, others)	4,928
17 02 04*	Glass, plastic and wood containing solid hazardous waste	74,221
17 03 01*	Bituminous mixtures with tar	68
17 05 03*	Polluted lands and rocks	100,695
17 06 05*	Construction materials containing asbestos	118,686
17 09 03*	Construction waste (including mixed) containing solid hazardous waste	873
20 01 21*	Fluorescent tubes containing mercury	426
Used oils (kg)		**52,052**
12 01 12*	Waxes and greases used	157
13 01 13*	Hydraulic oils	2,504
13 02 05*	Mineral oils, non-chlorinated engine, mechanical transmission and lubricants	11,636
13 03 08*	Motor oils, mechanical transmission oils and lubricants	37,622
13 08 99*	Residues of oils not specified in other categories	133
Liquid hazardous waste (kg)		**96,406**
08 01 11*	Paint and varnish waste containing hazardous waste	844
08 04 15*	Aqueous liquid waste containing adhesives and sealants with hazardous waste	440
12 01 09*	Cutting fluid: Halogen-free machining solutions and emulsions	80
12 03 01*	Aqueous cleaning liquids	573
13 07 03*	Liquid fuels	1,070
14 06 03*	Solvents and solvent mixtures	697
16 01 21*	Release agents, curing liquids, plasticizers, liquidisers	536
16 05 06*	Laboratory chemicals with hazardous waste	153
16 07 08*	Waters with hydrocarbons	89,566
19 08 13*	Sludge from other industrial wastewater treatments, which contain dangerous substances	2,447

* *The data refers to the total works executed by FCC Construcción in 2016, not including data from FCC Industrial.*

Non-hazardous waste (kg)		1,690,075,998
Inerts (m^3)		**1,329,958**
17 01 01	Concrete:	98,442
17 01 02	Bricks	523
17 01 07	Clean Debris (concrete, mortar, bricks, prefabricated elements, others)	267,273
17 05 04	Leftover lands or rocks	963,720
Urban waste (kg)		**4,182,356**
20 02 01	Waste vegetation	76,682
20 03 01	Mixed municipal waste	4,102,425
20 03 07	Bulky municipal waste	3,250
Other non-hazardous waste (kg)		**355,936,132**
01 05 04	Fresh-water drilling muds and wastes	28,300
08 03 18	Waste printing toner	1,317
12 01 13	Welding residues	70
15 01 01	Paper and cardboard packaging	10,587
15 01 06	Non-hazardous packaging	4,262
16 01 03	End of life tyres	7,261
16 02 14	Discarded electrical and electronic equipment, non-hazardous	452
16 06 04	Alkaline batteries that do not contain mercury	310
17 02 01	Woods	1,107,251
17 02 02	Glass	614
17 02 03	Plastic	1,403,837
17 03 02	Bituminous mixtures not containing coal tar	1,900,571
17 04 07	Metals	14,210,803
17 04 11	Remains of cable, which do not contain dangerous substances	137,124
17 06 04	Insulation materials, which do not contain asbestos, nor dangerous substances	970
17 08 02	Plasters	30,830
17 09 04	Mixed debris (mixture of non-hazardous waste)	38,612,096
19 08 05	Sludge from urban wastewater treatment (septic tanks and treatment plants)	298,426,751
20 01 01	Paper and paperboard	52,248
20 01 32	Expired medicines other than cytotoxic or cytostatic	480

Waste Generated (kg)	
TOTAL	**1,690,568,314**

The organisation of the works in terms of waste management should specify the needs for handling, segregation and storage of waste, beginning with predicting which ones are going to be produced and in what quantity, in order to identify the most appropriate management alternative. Therefore, in FCC Construcción works, these forecasts are made, and by comparing them with the final result of waste generation, knowledge is acquired that helps to improve forecasts in future projects, and thus maximise accuracy.

The correct segregation of waste is the first step to facilitating its subsequent management and recovery. To this end, clean points and differentiated areas are enabled, duly conditioned, in which the hazardous and non-hazardous waste generated is temporarily stored.

* *The data refers to the total works executed by FCC Construcción in 2016, not including data from FCC Industrial.*

practical case

Jaca motorway

Client: **Ministry of Public Works and Transport**

Implementation deadline: **60 months**

Problem detected:

The construction of the Jaca - Navarra highway included the construction of a viaduct over the Aragón river, for which the execution of a series of auxiliary concrete features was necessary. Once the viaduct was completed, these features had to be removed, demolished, and managed as non-hazardous waste.

Solutions adopted:

Due to the large volume of material that had been generated in the demolition and the fact that the construction of an esplanade was required for which the waste material met all the technical requirements, the possibility of reusing this material in the construction of the esplanade, instead of managing it as a hazardous waste, was examined. After analysing the technical, economic and environmental conditions, the proposal was accepted and the work undertaken accordingly.

On site, there was a mobile crusher, which was used to crush the debris coming from the demolition in situ, minimising any additional resource that might be needed in the process of moving the material.

Results:

Owing to the environmental awareness of FCC Construcción site personnel, the alternative proposal could be executed, which allowed the reintroduction of the waste as productive material, contributing, in this way, to the paradigm of the circular economy. With this action, all the resulting material was used as a landfill, demonstrating that often the most appropriate environmentally is also the most efficient from an economic point of view. In particular, the following benefits can be highlighted:

- The consumption of natural resources was reduced, since by using this material, the acquisition of the equivalent rock volume was avoided in order to execute the esplanade.
- The remaining material was reused, reducing the volume of waste destined for disposal, which would have had a greater environmental impact.
- The need to transport the waste material was minimised, which reduced the economic costs, consumption of fossil fuels and CO_2 emissions resulting from the material transport process.

Waste material.

Collection of waste material prepared for the work.

Territorial planning

We are aware of the negative impacts that our activities can cause when working in urban areas, so we carry out preventive measures in order to minimise the inconvenience of the works on the residents of these areas.

Given that the company's activity causes changes in the environment, at FCC Construcción we are especially careful in the implementation of measures that favour the coexistence of the most sensitive animal and plant species with the works executed.

Construction is an activity that, given its characteristics, causes significant changes in the environment in which it is taking place, as well as in adjacent areas. In addition to the obvious modification of the relief and landscape, as a consequence of the movement of land and occupation of the land by the infrastructure itself or the possible contamination of air, soil or water, construction activities can interfere with the life of the species present in the area, both animal and vegetable. The modifications introduced by the execution and implementation of construction projects may be affecting the territory where these species develop, or interfere with their life cycle, habitat or biological processes. In addition, projects can also affect the surrounding local communities, causing discomfort and interfering with their way of life.

Certain infrastructures, such as roads, have a negative impact on the biodiversity of the environment due to the fragmentation of their habitat.
To minimise this "barrier effect" impact, animal crossings can be built or ecological restoration and species relocation measures can be implemented

When the works are executed in locations where they can interfere with animal species in the area, transfers of animal specimens are undertaken in order to prevent fauna from being affected.

	ACTIONS - OPPORTUNITIES						
Risks	Protection of flora specimens	Transplants	Employment of native species in the restoration	Planning of the work (life cycles, critical stages)	Transfer of nests or individuals	Use of measures to avoid dirt	Use of beaconing, protection and signage for lesser occupation of pavements and roads
Removal of vegetation	✓	✓	✓	✓		✓	
Erosion, desertification	✓	✓	✓	✓			✓
Effect on fauna	✓			✓	✓		
Biodiversity loss	✓	✓	✓	✓	✓		
Visual impact on the landscape	✓	✓	✓	✓		✓	✓
Dirt in the environment						✓	✓
Interference with traffic and outdoor facilities						✓	✓

Therefore, another of the challenges facing FCC Construcción is to minimise the impact that its activity may have on biodiversity and the populations of the area. The Good Practices of the company include conservation and recovery actions, whose selection depends on the type of work, specific cases and characteristics of the area.

For this, FCC Construcción analyses the natural environment and the landscape through the study of the work's environmental impact or project, so that it is able to determine the biodiversity present in the area, and to what extent this can be affected by the project in question. In addition, the possible negative repercussions on nearby residential areas are identified in order to establish the actions to be carried out. This process is carried out in all stages of the work, from planning, through the construction and operation of the building or infrastructure, to the end of its useful life.

The following table shows the Good Practices applied by the works executed in 2016 in relation to minimising the impacts on biodiversity and the urban environment.

Good practices from "Territorial planning" field

GOOD PRACTICE		IMPORTANCE			GOAL (DEGREE OF IMPLEMENTATION)								
					1			2			3		
7a	Physical protection of vegetation specimens present on site.	1			All the singular specimens affected by the work are protected.			Idem for all copies.			In addition, care and maintenance work is carried out.		
	% of application	88%	80%	82%	14%	70%	56%	57%	10%	22%	29%	20%	22%
7b	Transplants.	1			The transplant of some singular specimen affected by the work is carried out.			Idem for all singles.			In addition, the success of transplants is greater than 80%.		
	% of application	100%	65%	69%	0%	47%	39%	67%	27%	33%	33%	27%	28%
7c	Adaptation of the planning of the work to the life cycles of the most valuable species.	2			Project forecasts are improved.			It was not expected to form part of the project and then is included.			In addition, the affected individuals are monitored for more than six months.		
	% of application	67%	69%	68%	0%	36%	31%	100%	18%	31%	0%	45%	38%
7d	Transfer of nests or individuals	1			Some transfer is made.			A generalised transfer is made.			In addition, the affected individuals are monitored for more than six months.		
	% of application	100%	55%	62%	50%	33%	38%	50%	33%	38%	0%	33%	25%
7e	Use of measures to avoid dirt at the entrance and exit of the work.	2			The entrances and exits are systematically swept.			The wheels of all the trucks are cleaned before their incorporation into the public thoroughfare.			Some fixed device is used for the above (pits with water at the exit, sprinklers, etc.)		
	% of application	96%	95%	95%	74%	73%	73%	22%	23%	22%	4%	5%	5%
7f	Occupation of pavements and roads.	2			Protection measures are adopted (fencing, signalling, sidewalk / roadway separation, etc.).			In addition, alternative access roads are enabled.			Furthermore, the maximum time or space of authorised occupation is reduced.		
	% of application	100%	97%	98%	50%	45%	47%	35%	34%	35%	15%	21%	18%

Construction Civil Engineering Works Total

Good practices from "Territorial planning" field (continue)

GOOD PRACTICE		IMPORTANCE			GOAL (DEGREE OF IMPLEMENTATION)								
					1			2			3		
7g	Prevention of falling debris on public roads or adjoining buildings.	1			Placement of "protective tray" on the front of the facade (flying scaffolding protruding from the facade with vertical defence).			Placement of wraparound mesh around the structure of the building.			In addition to placement of "protective tray" or enclosing mesh, signage for the preventative means installed.		
	% of application	80%	56%	64%	0%	20%	11%	25%	60%	44%	75%	20%	44%
7h	Use of measures to minimise the barrier effect and avoid animal abuse.	2			Creation of specific fauna crossings to assist animals when crossing.			Installation of protective hunting-style enclosures or warning signs to avoid the crossing of animals.			The two previous ones.		
	% of application	100%	57%	63%	0%	0%	0%	100%	50%	60%	0%	50%	40%
7i	Establishments of wildlife refuges with artificial structures.	1			Temporary shelters are created for at least one animal species.			Temporary shelters are created for at least two animal species.			Shelters are created, which become permanent at the end of the work.		
	% of application	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
7j	Biodiversity Plan.	1			An initial ecological inventory is carried out to define the habitats and the plant and animal species existing on the work site.			The initial inventory is used to define and implement measures that reduce or compensate the loss of biodiversity.			In addition, the measures are monitored for more than six months.		
	% of application	50%	100%	80%	0%	67%	50%	0%	0%	0%	100%	33%	50%

Construction Civil Engineering Works Total

Biodiversity

In most of the works carried out by FCC Construcción during 2016, good practices have been implemented with the aim of preserving the biodiversity of the affected areas. Specifically, in civil engineering works, the development of a Biodiversity Plan providing information on the characteristics of the fauna and flora of the area is more frequent, and establishes the suitable measures for its conservation.

To protect wildlife from the possible negative effects of projects, it is essential to have the right information. Therefore, prior to implementing projects, the identification of the animal species present in the area is made, paying special attention to the existence of protected species. In 2016, thanks to this previous step, the planning of the works could be adapted to the life cycles of the species in 68% of the works. This measure minimises the impact that the project may have on the species, by respecting the most vulnerable stages for them, such as the breeding or reproduction stage.

In 68% of the projects executed in 2016 the planning of the works was adapted to the life cycles of the most valuable animal and vegetal species

One of the most damaging effects for animal species that can be produced by certain types of work is the fragmentation of the habitat. Therefore, in 63% of the projects in 2016 where this impact occurred, devices were designed to minimise the barrier effect produced as a result of the infrastructures themselves and of the construction works. In this way, greater mobility of the animals was allowed and the number of abuses was reduced. In addition, a transfer of nests or individuals of significant animal species was carried out in 62% of works.

In some projects, prior to the work, studies are carried out to detail the species in the area in order to understand how they will be affected.

On the other hand, measures were also taken regarding plant species, such as the physical protection of specimens, which was carried out in 82% of the projects. In those cases where, due to the condition of the project itself, the removal of plant specimens was essential, transplants were carried out (69% of the works), thus avoiding the elimination of the specimens as a direct consequence of the project.

Sometimes, the buildings or infrastructures that we build may affect plant species located on the site's land. In order to preserve them, protection areas are established for the species, so that they are not affected and, in the event that it is not possible to respect their location as required by the project, the transfer and transplant is carried out of the specimens, so that they can continue to live in an alternative place.

Below is the data on the surface and number of works located in the vicinity or within a natural area that is highly biological diverse or important for nearby local communities during 2016. In addition, the surface that has been protected and restored is shown.

Land adjacent to or located in natural protected areas or in non-protected areas of high biodiversityv

Type of effect	Number of sites	Surface (mill. m²)
Location in natural or protected areas or with high value for biodiversity	5	1.13
Location in an area with catalogued landscape as relevant	12	16.51
Effect on natural channel in a protected area	1	0.02
Effect on natural protected riverbed or located in areas with high biodiversity value	5	8.39
Effect on channels with very high value or relevant for local communities and indigenous species	8	8.98
Effect on catalogued or protected vegetation	12	9.90
Effect on catalogued or protected animal species	10	15.52

Restoration and protection of areas

Protection measures	Area (ha)
Restoration of affected areas	73.14
Protection of sensitive areas	63.94

Urban environment

FCC Construcción Good Practices system also includes measures aimed at reducing the negative effects and discomfort caused by the projects on the population of the surrounding urban areas.

In this area, the most widespread measures are: the taking of actions to avoid dirt at the entrance and exit of the work by watering the dirt roads and cleaning machinery wheels; the limitation and delimitation of the occupation of pavements and roads, which in 2016 were carried out in 95% and 98% of the works respectively; or the installation of elements designed to prevent the fall of debris on public roads and adjacent buildings, a measure that was implemented in 64% of the projects where applicable.

We apply **Good Practices** aimed at **reducing** the **negative effects** and **discomfort** that may cause our **projects** on the **population of the surrounding areas**

The washing of truck wheels before using public roads or the adequate delimitation of the work considering the minimum occupation of pavements and adjacent roads are simple measures to apply and effective, reducing the impact on the urban areas where the work is developed.

practical case

"El Salitre" Wastewater Treatment Plant

Client: **Autonomous Regional Corporation of Cundinamarca (CAR)**

Implementation deadline: **48 months**

Problem detected:

The construction works of the "El Salitre" wastewater treatment plant in Bogotá are part of a project that aims to bring about the environmental recovery of the Bogotá River. During the course of the works, four colonies of bees were identified, two corresponding to domestic bee (Apis mellifera) and two to bumblebees (Bombus spp.), which play a large role in the pollination and dispersion of vegetation in the area, within of the project areas. In addition to endangering the survival of the colonies, the presence of these animals in the vicinity can pose a risk to workers on site.

Solutions adopted:

Preventive in nature and with the purpose of avoiding that the works affected to these species as well as putting at risk the security of the workers during the project, it was decided to relocate the colonies of bees to areas not affected by the project.

First swarms were captured, following the appropriate procedures to prevent their viability from being compromised by the actions. The queen and as many individuals as possible were transferred to a core port, which was left until night so that the other members of the colony could enter following the scent trail of the queen. At night, the core carriers were transported to the farm established for this purpose. A period of 30 days was expected to change them to a hive, with enough space for their development.

Results:

The rescued swarms were followed, observing that the populations adapted well to the new conditions. In addition, there was no competition among bee hives, due to the sufficient amount of food supply present in the vicinity of the new site.

This is a case of success in the translocation of species that may be affected by a project. Specifically, pollinators are an essential component of ecosystems, since they are responsible for the production of new plant propagules every year. In recent years, human practices have increasingly compromised the activity of these species, so the adoption of measures such as this, to prevent their disappearance, is increasingly necessary.

Capture of the swarms and rellocation of the hives.

practical case

Restoration of Forte da Graça

Client: **Elvas Town Council**

Implementation deadline: **12 months**

Problem detected:

The purpose of the project is the restoration as a museum of the fortification of Nossa Senhora da Graça, which is a UNESCO World Heritage Site and a National Monument.

During the execution of the restoration works, the presence of bats was detected, among which several protected species are found all over the world due to the decline that their populations have suffered in the last decades. Their protection is vital not only for the balance of ecosystems, but also because they act as a natural control of insect pests that can harm human beings and their economic activities.

Works to exclude bats.

Solutions adopted:

During the works, various actions were carried out in order to protect bat populations. Firstly, a sampling was carried out to count the individuals and the existence of three species of special interest was determined in this way: *Myotis myotis, Rhinolophus hipposideros and Rhinolophus ferrumequinum.*

The actions carried out for their protection were the following:

- Exclusion of bats from the fortification by closing entrances to it at night, which is when the animals emerge from it. In this way, the bats look for a place to spend the day, and are not affected by the works of the fortification. This process was supervised by a technician from the Institute for the Conservation of Nature and Forests (ICNF).

Eptesicus spp. detected in one of the bastions of the Forte da Graça.

- Actions to educate and sensitise workers about the biological importance of these animals, their role in urban ecosystems, and the steps to follow in case of detecting the presence of a bat on site.
- As progress was made in the execution of the work, the holes were reopened to allow the reoccupation of the fortification, by the bats, once the works no longer pose a threat to them.

Results:

Once the most hazardous work for the animals was completed, and the openings were replaced, a sampling was carried out to account for the presence of the bats in the area. More than 100 individuals were registered, which showed that the measures adopted were timely, since the animals were once again occupying the site. This case shows that it is possible to carry out collaborative works with the conservation of native fauna.

Making human activities and the presence of other species, both animal and plant, compatible, is essential for achieving environmentally friendly coexistence. Despite the extra effort these actions may entail, it is crucial to raise awareness of the importance that species have, not only for ecosystems, but also for humans.

practical case

EUIPO Building

Client: **Intellectual Property Office of the European Union (EUIPO)**

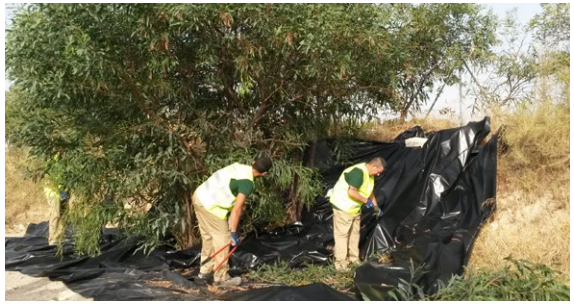
Implementation deadline: **16 months**

Problem detected:

This action takes place within a complex project comprising several phases undertaken on the EUIPO Campus, in Alicante. Its purpose is to connect different plots by pedestrian and vehicle access, build a roundabout, the regeneration of green zones, the construction of parking with underground connections, the development of one of the plots, and the construction of a new office building.

Prior to the demolitions on the plot, the presence of numerous specimens of the exotic invasive species Acacia saligna, commonly known as mimosa, a perennial evergreen tree native to Australia, was detected.

Invasive species are one of the major environmental problems globally, and, according to the UN, are the second cause of biodiversity loss in the world. In addition, this problem represents an annual cost to the European Union of 12,500 million euros per year. Administrations work on the establishment of prevention and action systems, but all stakeholders involved in this problem have cooperated in order to mitigate it.



Process of pruning of the specimens avoiding the fall of seeds to the ground.

Solutions adopted:

First, an action strategy was developed to establish the management and enforcement measures, in order to eradicate the existing units and avoid their future reappearance.

In order to elaborate the strategy, the legal indications established in Decree 213/2009 of the Council, which approve measures for the control of exotic species in the Valencian Community, were taken into account, as well as the recommendations of the different strategies and national invasive species management protocols.

In the first place, the aerial part of the plants was pruned, in safe conditions to avoid its propagation, and protecting the soil from the seeds and ensuring that there were no plant remains or propagules.

Subsequently, the stumps and the roots were extracted, as well as the lands of the marked perimeter, verifying that remain of these were left. All soil and root residues were used to fill spaces to a minimum depth of 2 meters to prevent them from spreading.

Removal of stumps, roots and surrounding soil.

Results:

The work environmental manager was present during the collecting of the plants to record and ensure the proper management of the entire process. Afterwards, the area was monitored and new outbreaks of the species were not detected and the objective of the operation was fulfilled.

The actions undertaken to solve the problem of invasive species are sometimes difficult to carry out, since it is easier to establish preventive measures instead of acting in a corrective manner. However, cases such as these show that with proper documented planning, based on existing guidelines and guidelines, the goal of eradicating an invasive species in an area where it is already well established can be achieved.

07

Committed to climate change

Committed to climate change

13 CLIMATE ACTION

We quantify our of greenhouse gases emissions and verify our carbon footprint externally. Through the application of the Good Practices System, we establish measures that prevent the emission of GHG into the atmosphere.

17 PARTNERSHIPS FOR THE GOALS

We participate in initiatives and forums to spread our experience and promote the achievement of globally established goals in the fight against climate change.

Climate change is one of the most important threats to the planet's balance, and governments and governments have gradually increased their commitment, as well as regulatory requirements and incentives to reduce emissions. Following the recent global milestones, such as the agreements reached at the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP21) in Paris and in 2016 (COP22) in Marrakech, the position of companies as part of the solution is re-asserted.

The mitigation of climate change, and the adaptation of economies and productive systems to it, also presents new opportunities for companies. FCC Construcción is aware of the challenges presented by a transition to a low carbon economy, unavoidably requiring investing in innovation to reduce consumption, increase the efficiency of processes and optimise the use of resources.

In this context of progress and profusion of regulations, requirements and standards for the measurement and reduction of emissions, at the G-20 summit in 2017, the recommendations report of the Climate Stability Board[1] of the Financial Stability Board (TFCD) was presented in order to provide a framework that helps companies to understand the risks related to climate change, and consequently, quantify them so as to respond to them.

FCC Construcción has applied the recommendations of the TFCD framework in this environmental report, by structuring the information on climate change in 4 large blocks

Certification stamp awarded to FCC Construcción by the Government, in recognition of the voluntary adoption of the initiative of the Ministry of Agriculture and Fisheries, Food and Environment, for its effort in the fight against climate change.

FCC Construcción wishes to echo the advances in this field and has applied the recommendations of the TFCD framework in this environmental report by structuring the information on climate change in four large blocks: "Government", "Strategy", "Risk Management" and "Metrics and Objectives".

[1] *Task Force on Climate Related Financial Disclosures (TFCD). Financial Stability Board.*

Government

FCC Construcción is aware that in order to face the consequences of climate change, it must integrate its management at all levels of its operation. This determination materialised with the development and implementation of a protocol for the measurement of Greenhouse Gases (GHG), in 2010.

Since then, the company has been preparing and checking its Greenhouse Gases (GHG) emissions report on an annual basis, being the first Spanish construction company to have it assessed by AENOR. Since 2012, it has had the Carbon Footprint certificate, "CO_2 Environment assessed", certifying both the veracity of the calculation and the inclusion of GHG management in the organisation's system and strategy.

In addition, FCC Construcción has registered its carbon footprints for the years 2012, 2013, 2014 and 2015 in the Carbon Footprint, Compensation and Carbon Absorption Projects Registry, created in 2014 by the Ministry of Agriculture and Fisheries, Food and Environment (MAPAMA). It was the first construction company that appeared in the public list. In 2016, it obtained the "Calculate and Reduce" stamp with the carbon footprint of 2015, and was one of the 19 companies -of the more than 360 that were part of the Registry at the date of obtaining the stamp- to have been awarded this distinction for the reduction of emissions.

Currently, FCC Construcción is working on the development of its climate change strategy, with the purpose of establishing lines of action to be followed, as well as the challenges and the opportunities that arise.

Greenhouse Gas emissions reports can be *checked and downloaded here*

FCC Construcción has quantified and published annually, since 2010, its inventory of greenhouse gas emissions.

Strategy

With the commitment to incorporate the fight against climate change into its business strategy, FCC Construcción establishes some lines focused on mitigating, on the one hand, the consequences of climate change, and on the other, the increase of greenhouse gases.

Emissions

FCC Construcción has a series of tools that it uses to calculate, record and reduce its GHG emissions, in all their scope. The first step in the establishment of an adequate reduction plan is the development of an emissions inventory, which FCC Construcción has carried out since 2010, in accordance with the requirements established in the GHG Protocol, ISO 14064 and the sector protocol of ENCORD[1].

After carrying out energy audits of representative installations and works and large energy consumers in 2016, possible improvements in management and energy efficiency have been detected, which will be translated into a guide, aimed at helping future works reduce their energy expenditure.

Waste

The generation of waste and its treatment contributes to a greater or lesser extent to the emission of GHG. The actions of FCC Construcción related to its waste are aimed at promoting the circular economy model, reusing, whenever possible, materials and improving design to minimise the use of materials and therefore the generation of waste.

Innovation is an essential element in the progress towards the circular economy and therefore, FCC Construcción promotes some initiatives such as the printing of complex 3D structures, which would lengthen the useful life of the materials and, at the same time, reduce GHG emissions from other construction machinery.

Smart cities

FCC Construcción continues to research the application of new construction materials that represent greater energy efficiency in its facilities, as well as in new constructive criteria that contribute to the resilience of buildings in the face of the effects of the climatic change.

The reduction of the speed of the vehicles on site is a simple practice that manages to reduce the emissions of greenhouse gases derived from transport.

The correct treatment of waste on sites, trying to have them reused or recycled instead of taken to a landfill, helps to reduce greenhouse gas emissions, as well as promoting a model based on the circular economy.

[1] *European Network of Construction Companies for Research and Development.*

Biodiversity

Climate change greatly influences ecosystems, and is one of the main causes of biodiversity loss. To mitigate this effect, projects must not place added pressure on the environment.

Through the application of good practices in its works, FCC Construcción minimises its impact on the environment and carries out environmental restoration actions, through which it assists in the recovery of the degraded environment, to return it, as far as possible, to the state prior to impact. For this, innovative techniques of environmental restoration are applied and work is undertaken so that the constructed infrastructures adapts to the natural environment.

Climate change supposes an added pressure on the natural environment, which is why FCC Construcción promotes actions in its projects to protect and restore biodiversity.

Risk management

The failure to mitigate and adapt to climate change is one of the issues addressed by the Global Risks Report each year[1]. FCC Construcción understands that climate change entails a series of risks for the company, physical, financial and regulatory risks, and some opportunities associated with mitigating them, which must be identified and exploited.

One of the most notorious effects of climate change is the increase in extreme weather events. These phenomena cause significant damage and impacts on infrastructure, and therefore pose a risk to the construction sector. It is estimated that, in 2030, the increase in natural disasters caused by climate change will generate losses of 314,000 million dollars a year, more than double that of 2012[2].

Different risks associated with different types of infrastructures can be distinguished: transport infrastructure can be affected not only directly by the damage, but also by changes in transportation patterns due to climate change. On the other hand, climate change can have effects on energy infrastructure in terms of transmission, distribution, generation and demand. Finally, buildings and infrastructure can be vulnerable to climate change due to their materials, design or location.

FCC Construcción establishes lines of action for the design of its infrastructures by taking into account these aspects, such as the use of resistant structural strengthening systems, the use of structures and materials that withstand maximum temperatures and thermal oscillations, and the reinforcement of existing infrastructures to improve their resistance to climate change, among others.

Adapting infrastructures to make them resilient to climate change is a key opportunity. The need to carry out prevention and mitigation measures in this regard has been supported by numerous investment entities, such as pension funds, multilateral institutions and other long-term financial mechanisms such as green bonds. In addition, there are currently European plans to finance adaptation to climate change, such as the Green Climate Fund, which allocates half of its funds to adaptation in the most vulnerable countries. Another example is the Adaptation Fund of the United Nations Framework Convention on Climate Change, which, amongst others, finances projects to build resilient infrastructure.

FCC Construcción is aware of the importance of undertaking infrastructure adaptation projects to climate change, and for this reason is the promoter of innovative solutions such as the SORT-i R + D + i project, whose main objective is the development of tools based on optical systems and new technologies for the identification, monitoring and management of structural risks in buildings and infrastructures in an intelligent, automatic and telemetric manner, in the face of natural disasters that may cause structural damage. This project aims to solve this problem via risk identification, including its evaluation and management.

[1] *Global Risks Report 2017. World Economic Forum.*
[2] *World Bank and the Global Facility for Disaster Reduction and Recovery (GFDRR).*

Metrics and Objectives

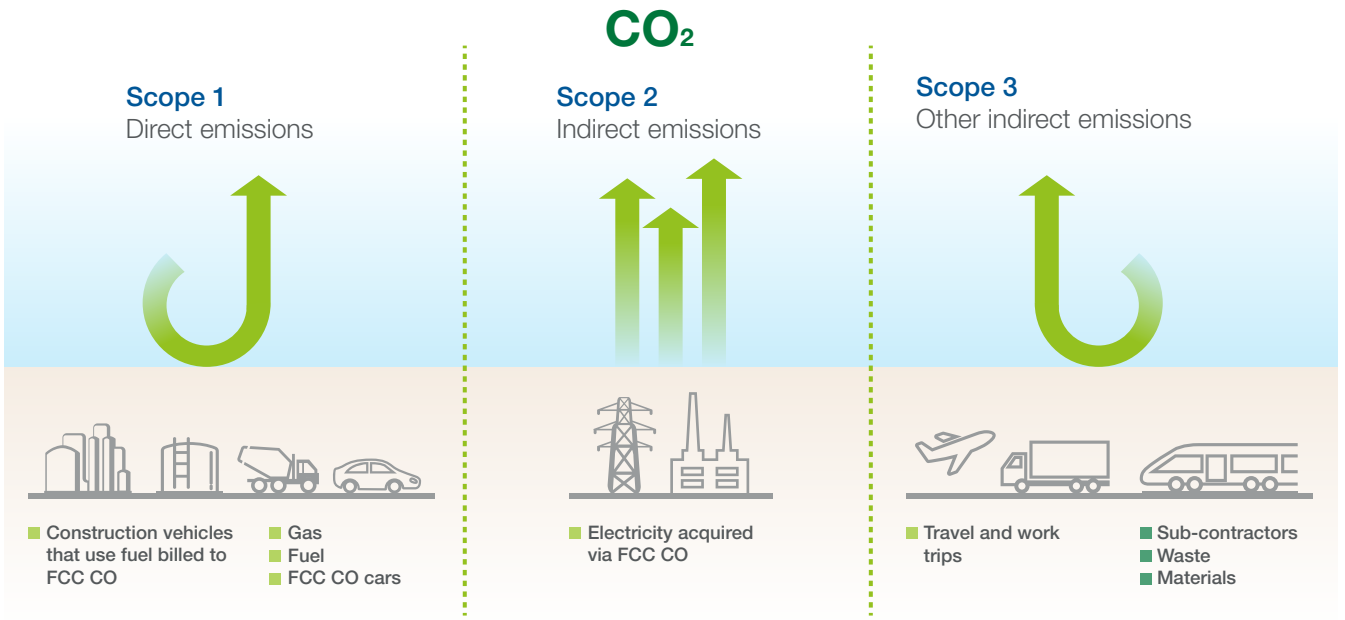
To measure the carbon footprint, FCC Construcción identifies the main sources of greenhouse gas (GHG) emissions from its works and stationary sites and defines the limits of the organisation and operational limits. Each productive site collects and transmits its activity data through a corporate tool, in which emission factors are defined, and through which FCC Construcción quantifies scope 1, 2 and 3 emissions.

The Company carries out awareness-raising initiatives aiming at reducing its Scope 3 emissions

FCC Construcción uses a centralised approach, integrating the activity data received from each of the works and stationary sites, and quantifying GHG emissions at corporate level, being able, however, to individuate the information according to work, geographical area, area of the organisation, type of work, etc.

In addition, the company also carries out awareness-raising initiatives for its own employees, suppliers and subcontractors, with the aim of reducing its scope 3 emissions, beyond its direct management environment.

The following are good practices related to climate change and GHG emissions produced by FCC Construcción during 2016.



Sources of emission in the FCC Construcción of greenhouse gases emissions inventory.

Carbon footprint quantification

In the construction sector, the volume of greenhouse gas emissions is not as high as that of other emissions, such as particles. However, given its importance as a cause of climate change, FCC Construcción includes in its Good Practice system actions to minimise our contribution to it. The following table shows GHG emissions for 2016:

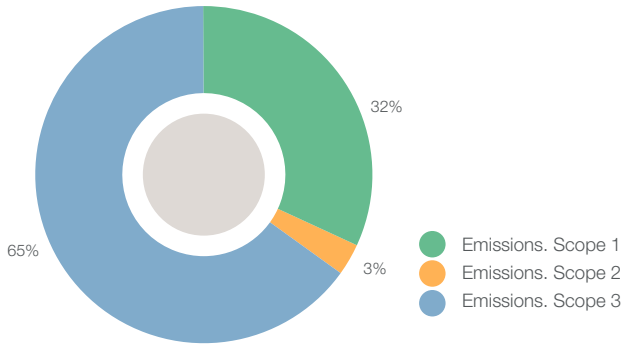
The main sources of emission for which FCC Construcción is directly responsible for the execution of its activity, and therefore can manage, are those produced by boilers, generators and auxiliary plants for the manufacture of materials and vehicles, which use fuel billed to FCC Construcción and generate direct emissions (scope 1). On the other hand, the emissions derived from electricity consumption that the company acquires to use in works and stationary sites are indirect emissions (scope 2).

Direct and indirect emissions of Greenhouse Gases

Emissions classified by scope (t CO_2e)	Construction Area*	FCC Construcción in Spain**
Scope 1: Direct GHG emissions	**96,446**	**4,960**
Associated with fuel used at projects	88,344	3,785
Associated with fuel used at premises	8,102	1,175
Scope 2: Indirect GHG emissions	**7,977**	**2,632**
Associated with electricity used at projects	4,850	2,056
Associated with electricity used at premises	3,127	576
Scope 3: Other indirect emissions	**192,361**	**55,006**
Associated with the production and transport of purchased materials	167,367	39,154
Associated with the subcontracted works units	10,838	6,349
Associated with the transport and management of waste and surplus materials	6,998	2,881
Associated with employee business travel	6,394	6,394
Derived from losses during electricity transport and distribution	764	228
TOTAL EMISSIONS	**296,784**	**62,598**

* *Emissions reported by different organisations and countries; without third party verification.*
** *Emissions verified by AENOR. Scope: works and centres of FCC Construcción located in Spain.*

GHG Emissions



However, these emissions are much lower than scope 3 emissions, which are those produced as a result of the company's activity, but over which FCC Construcción has no managerial capacity, since they are produced in sources that are not controlled, nor are they owned by the organisation. Within this last type of emissions, it is worth highlighting the emissions produced during the production and transport of building materials that are consumed on site, which constitute 56% of the organisation's carbon footprint. Within this scope, FCC Construcción also takes into account the emissions associated with the execution of subcontracted works, those due to the transport and management of waste and leftover materials, as well as those derived from losses incurred during transport and distribution of electricity and generated by the displacement of personnel for work reasons.

Avoided emissions due to implementation of Good Practices

To reduce FCC Construcción's environmental footprint linked to GHG emissions, the works executed throughout 2016 have implemented a series of good environmental practices that have managed to avoid a part of emissions that would otherwise have been released into the atmosphere. Below is a table with emissions avoided by the Good Practices applied. This is the action that has contributed the most in this regard the reuse of materials on site instead of transferring them to landfill and, following this, the proper maintenance of the machinery and construction vehicles.

Avoided emissions

Emissions avoided by the application of Good Practices (t CO_2e)	Construction Area*	FCC Construcción in Spain**
By reusing surplus material on site and not taking it to landfill	14,704	4,360
By neutralising pH with CO_2	49	49
By suitable maintenance of the machinery operating on site	2,506	163
"due to vehicle speed control on the construction site.	78	22
Due to the use of electric vehicles	1	0
TOTAL EMISSIONS	**17,338**	**4,594**

* *Emissions reported by different organisations and countries; without third-party verification.*
** *Emissions verified by AENOR. Scope: FCC Construcción works and sites located in Spain.*

The valuation of demolition waste by using them on site has the secondary effect of avoiding GHG emissions, which would be produced by transporting both this waste to landfill and the required construction materials to work.

In relation to climate change, the awareness of staff and collaborators is essential. Hence the works use signage aimed at raising awareness about the reduction of GHG emissions through daily actions.

practical case

Riayadh Metro Project

Client: **Arriyadh Development Authority**

Implementation deadline: **60 months**

Problem detected:

In the construction of Riyadh Metro, night work is carried out for which adequate lighting is necessary, which provides safety for workers and allows them to adequately perform their tasks without compromising end quality. Diesel lighting towers were traditionally used to obtain light. In addition to the air pollution that this implies, the towers were installed near residential areas, which could distract drivers, generated noise that bothered the rest of the residents, and whose maintenance and management consumed time and resources.

Solutions adopted:

To solve this problem, an alternative innovative solution was sought to mitigate this impact, without reducing the level of illumination. To achieve these objectives, mobile solar panels were installed, which replaced the diesel lighting towers.

Results:

Owing to this action, several objectives related to sustainability were achieved: the problem of noise and distraction with adjacent communities was solved by traditional lighting systems, while minimising the maintenance of the facilities.

In addition, this case stands out for the substitution of the use of traditional greenhouse gas emitting energies for renewable clean energies, thus contributing to the fight against climate change. This case shows that adapting to sustainability trends such as the transition towards the use of renewable energies brings other benefits beyond the reduction of emissions.

Replacing diesel lighting towers with solar panels.

08

FCC Construcción and the circular economy

FCC Construcción and the circular economy

We contribute to responsible production and consumption by improving the efficiency of our productive activities, reusing our resources and extending the life of the waste that we generate.

We reduce the emission of greenhouse gases through the application of Good Environmental Practices. Especially significant are the emissions avoided by reusing the land on site itself, instead of taking it to landfill.

Given the overexploitation of resources, the depletion of raw materials and the degradation of the environment, the current linear production model on which the global economy is based needs to be revised, and propose a new economic model that decouples economic development's global consumption of finite resources.

In this scenario, the concept of the circular economy has emerged, whose objective is to achieve efficient production models that contribute to the smart, sustainable and inclusive growth of economies, protection of resources, reduction of environmental impacts and fight against climate change. At the same time, the competitiveness of production models is promoted, and new opportunities for the creation of employment and social welfare arise[1].

The circular economy can often be an adequate response to certain problems. In this case, an essential service road was created, reusing the excavation material that would otherwise have been taken to landfill.

FCC Construcción is committed to the transformation of its business model, seeking to "close the circle" and address all phases of the life cycle of products, from design to the end of their operational life. To do this, it promotes the transition from a linear economy to a circular economy in which wastes are minimised and conceived as potential resources of utility.

[1] *Circular Economy Package and Europe 2020 growth strategy.*

The activities carried out in the construction sector are intensive in the consumption of natural resources, considering both the land where the works are located and the materials necessary for their execution, as well as water and energy. The management of FCC Construcción has advanced towards the circular economy, minimising the consumption of water, energy and materials with each project, and reusing those resources susceptible to be incorporated in other activities.

Promoted by the Ellen MacArthur Foundation since 2012, the ReSOLVE framework presents a methodology to guide companies and countries towards a circular economy. Together, its six areas of action - “Regenerate”, “Share”, “Optimise”, “Loop”, “Virtualise” and “Exchange” - increase the use of physical assets, prolong their life, and change their use from sources of resources from finite to renewable.

In this Environmental Report, FCC Construcción wants to structure its progress towards the circular economy around this framework. Many of the actions carried out in this regard, such as the reuse of construction materials or the revaluation of waste, have traditionally been used for economic savings and the environmental advantages they imply. This shows that the opportunities linked to the circular economy also often have greater economic profitability, as an added benefit for companies.

The six areas of action of the framework include opportunities that the company has already begun to develop.

According to the Ellen MacArthur Foundation guide, the areas with the greatest potential for profit in the construction sector are “Share” and “Loop”.

REGENERATE	Use renewable energies and materials, and return the recovered natural resources to the biosphere, to preserve ecosystems.
SHARE	Maximise the use of the products by sharing, reusing and designing for their durability.
OPTIMISE	Increase product efficiency and decrease the waste production.
LOOP	Keep materials in closed cycles, through re-manufacturing and recycling.
VIRTUALISE	Dematerialise the use of resources through the digitalization and virtualisation of products and services.
EXCHANGE	Replace materials by more advanced, apply new technologies, and choose new products and services.

Regenerate

FCC Construcción conceives each project as a regenerative system: reducing the generation of waste in all its phases, making a correct selection of materials in order to increase the resilience of buildings and infrastructures, and, insofar as it can influence the design, providing options that are capable of adapting to different utilities throughout their life cycle.
In this sense, it takes into account from the conception of each project that the impact on the environments in which it develops its activities is minimal and these are regenerated in the shortest possible time, once its operations are finished.

FCC Construcción takes into account that the impact on the environment in which it develops its activities is minimal and these are regenerated in the shortest time possible

Share

Collection site of materials, whose recycling meant energy discounts and delivery of diapers, which were donated to various local NGOs.

This area includes maximising the life of resources by optimising their use and reuse.

In the construction sector, the use of spaces can be optimised, by centralising personnel in corporate offices or by renting unused spaces, construction materials or equipment. Also, the fact of having own machine parks that centralise the company's machinery, allows it to be repaired and reused in new projects, which avoid having to acquire it again.

The reuse of materials and components, such as stock or equipment left over from construction, can, in addition to being respectful with the environment, generate an economic benefit, as in the case of donating to NGOs or local communities, wealth is produced in the productive fabric close to the project. For example, in the works of the Lo Marcoleta Axis, in Chile, FCC Construcción delivered materials such as cardboard, glass, cans and office paper for reuse. The recycling company offered in exchange energy discounts, which were donated to the Coaniquem Foundation, and diapers, which were donated to the San José Foundation for adoption.

Optimise

The optimisation in the processes entails an increase in the efficiency and the performance of the activities.

FCC Construcción seeks to optimise its processes with actions such as the reuse of excavated material in order to reintroduce it into the economic cycle, or the reduction of the use of non-renewable raw materials and fossil fuels. Also, in this sense it works on more innovative techniques, such as intelligent deconstruction and selective demolition, as well as prefabricated construction, modular design and 3D printing for the manufacture of building materials. For example, it participates in the innovation project ManuBuild, focused on the manufacture of components and products with an open and efficient system for later assembly on site and, thus, the reduction of waste generated.

The reuse of demolition material for filling on site, results in evaluation of these materials and their reincorporation within the production cycle.

The following table shows the expected and actual amount of the remaining excess rubble and land generated by FCC Construcción during 2016, as well as the origins and destinations of these materials.

It highlights the management of land and remaining rubble as an important contribution to the circular economy, since it is a material that is produced in high volumes in the construction sector and whose physical and chemical characteristics allow it to be reintroduced in the economic cycle.

On these data, the reduction of 1,336,972 m^3 of the planned amount of waste rock or land destined for landfill, as well as of clean rubble (concrete, mortar, bricks, prefabricated elements and others), whose amount destined for landfill has been reduced by 92% compared to the amount initially planned. Results like these show how good management of materials, which in principle are regarded as waste, can render them raw material to be used again and incorporated into the production cycle.

Recycled / used materials	Expected Quantity (m^3)	Real Quantity (m^3)
Surplus soil and stones		
Obtained from borrow-pit	1,381,355	2,240,671
Used from other projects	25,980	162,840
Used in the same project (compensation/excavation/fill)	3,725,468	5,451,143
Temporary stockpiling (prior to its final use)	176,181	37,510
Disposed in landfill	3,209,291	317,198
Used in other projects	93,892	123,764
Total excavation	7,317,682	6,656,086
Total fill	5,231,812	9,658,170
Clean rubble (concrete, bricks, prefabricated elements, others)		
Disposed in landfill	198,458	45,282
Used in the same project	215,485	112,865
Used from other projects	0	19,883
Used in other projects	0	848
Delivered to a recovery installation	49,319	336,898

* *The data refers to the total works executed by FCC Construcción in 2016, not including data from FCC Industrial.*

Loop

This area includes the treatment of products and materials in cycles, the re-manufacturing of products and components, the recycling of materials and the reuse of natural resources, such as water.

Again, focusing the planning of a project on the reuse of materials and the integration of materials from other industries and works, is the first step to achieving a circular life cycle of materials and products. In the construction sector, maximising the use of recycled materials, components and structures supports their circulation in the industry and minimises the need for raw materials.

Special mention must be made of the awareness-raising work carried out to prevent valuable materials from ending up in landfills and the use of materials found in waste. In addition, the implementation of measures such as the reuse of water from on-site processes, the reuse of grey water from toilets and rainwater during the use phase of construction and the use of recycled aggregates in gravel, gravel, mortar or the production of concrete.

Regarding the recycling and reuse of construction and demolition waste, the FCC Construcción REWASTEE innovation project stands out. Its technology has been created for the recycling of steel residues and manufacture of multifunctional construction products from them.

In the works on line 1 of the Panama underground system, wood waste was reused to build useful objects for the local inhabitants, which at the same time was an important awareness-raising task regarding recycling and use of materials.

Virtualise

Digitisation replaces the consumption of some resources, facilitates tasks and helps maintain services, minimising costs and use of resources.

One of the most important contributions by FCC Construcción in this area is the research line in Building Information Modelling (BIM), which is promoted through its participation of the working groups of the Executive Committee of the BIM National Implementation Strategy With this ROBIM project, research work on autonomous robotics is carried out for the inspection and evaluation of existing buildings with BIM integration, which provides faithful and detailed information on building systems and problems.

This technology represents a technological revolution in the building sector, since its widespread use would have a noticeable impact on a more efficient construction, reducing the use of raw materials and the generation of waste.

Exchange

FCC Construcción considers it fundamental to prioritise the use of renewable energies, sustainable materials and low impact or high percentage of recycled material in the building sector: in addition to reducing consumption of natural resources, it creates value for other industries, which could incorporate their waste as recycled material in construction materials.

This area also includes the use of alternative materials that replace traditional ones and which are more efficient and easier to recycle and reuse. Replacement also includes replacing traditional solutions with advanced technologies that offer longer life cycles, more affordable repair and flexibility for improvement.

practical case

Route 5 North, access to Santiago

Client: **Sociedad Concesionaria Autopista del Aconcagua S.A.**

Implementation deadline: **20 months for OCSU and 28 months for PID ORPL and ORPL**

Problem detected:

The objective of this project was to expand the capacity of the access road to Santiago de Chile by constructing six new uneven links erected with the mechanically compacted earth system. In particular, 871,000 cubic metres of embankment had to be executed, which means 58,000 hopper truck trips to supply the necessary material.

The large amount of material needed for the operation entailed an increase in the costs of the project and implied an intensive use of natural resources, in addition to the negative impact of greenhouse gas emissions as a result of the numerous trips.

Solutions adopted:

During the bidding study of the work, a survey was conducted to determine the amount of existing materials in an environment closer to the work. It found a stockpile of steel slag, located 2km from the area. Since in Chile there was no experience in the use of this type of material in public works, at first, its use was rejected, due to a lack of knowledge regarding the material's behaviour.

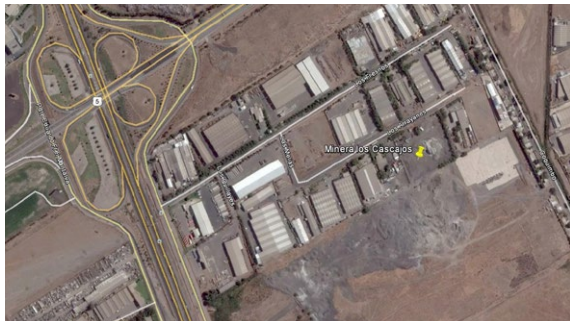
From FCC Construcción it was considered that converting potential waste from another industry into a resource for the execution of the work was a fundamental contribution to sustainability and the circular economy, for which an exhaustive analysis of its composition and mechanical behaviour was carried out, determining finally its suitability for the shaping of the embankment. Additionally, the current environmental regulations were complied with, analysing their possible impact due to contamination, and it was determined that there were no risks in this regard. After all the relevant studies, the approval of the use of this material for the construction of the embankment was obtained.

Results:

About 120,000 m^3 of steel slag was reused, which represented 14% of the total material required for the execution of the embankment. This meant a saving of € 2.5 / m^3, totalling € 300,000, taking into account both the purchase costs of the virgin material and its transport to the site.

Similarly, the elimination of the slag collection supposed a positive visual impact in the area, since this accumulation was close to housing.

Finally, the use of this material set a precedent in Chile. From now on, owing to the studies and analyses carried out in this project, and the positive experience of the use of the material, this pioneering solution could be replicated in other regions of the country. This case is an important example of how the reuse of materials, even those that initially seem to lack value, can serve to reduce the use of natural resources and, in this way, be more efficient and minimise the environmental impact of our activity.



Location of steel plant slag stockpile.

Use of steel slag in the core of the embankment for one of the walls.

09

Focusing on the future

Focusing on the future

The population growth and the rapid process of urban development that we are experiencing, forces us to pay more attention to the environment that surrounds us. The scarcity of natural resources, extreme weather events and the increase in social inequality, amongst others, exacerbates the need to take action in this regard.

Global trends mark the present and the future of business management

FCC Construcción is aware that the path towards a more sustainable construction must be followed by all the groups involved.

- Accelerated urbanisation and population growth
- Inequality in the concentration of wealth
- Scarcity of natural resources
- Climate change and renewable energies

In this context, the Sustainable Development Goals (SDGs) of the United Nations have been formulated in order to establish a series of global objectives integrated in the 2030 Agenda for sustainable development.

FCC Construcción integrates in its strategy the potential risks and opportunities derived from global challenges, and aligned with the SDGs, seeks to undertake sustainable development in its three dimensions - economic, social and environmental - in all its projects.

The company aims to minimise its environmental footprint year after year, protecting the planet through sustainable consumption and production, promoting better environmental performance and putting measures in place to deal with climate change, so that the needs of present and future generations are not affected.

For this purpose, the Good Practices System®, is used, which helps to identify and focus on those actions that deserve to be highlighted, serve as a reference for future projects in the sector and help to perfect the processes achieving a better environmental performance and social with excellence as the main aspiration.

Some examples of this have been the adaptation of the Management and Sustainability System of FCC Construcción to the new standards ISO 14001: 2015 and ISO 9001: 2015 and the company's adhesion to the "Community for Climate", promoted after the Paris Agreement, to establish commitments to reducing emissions.

In an increasingly globalised and interconnected world, walking alone is not possible, so we go hand in hand with our stakeholders and integrate their concerns, concerns and expectations in our management.

Together, we work to adapt to the external tendencies and conditions that can affect the business and our stakeholders, focusing on sustainable construction, technological innovation and favouring the transition to a circular and low carbon economy.

The involvement of FCC Construcción in the field of sustainable construction has led to active collaboration in more than 17 international working groups related to sustainability and the environment. Among them, it is worth mentioning participation in the International Technical Committees ISO / TC 59 / SC 17 and CEN / TC350, whose aim is the establishment of sustainability bases in civil engineering works, one of the most important activities in FCC Construcción.

We are aware that by having a stable foundation, based on responsibility, integrity and respect for people and the environment, we can build a more sustainable future.

We want to be key actors in the construction of tomorrow, which is why FCC Construcción works to integrate sustainability into its vision, responding in this way to the challenges that will shape our future - everybody's future.

® *FCC Construcción 2009. "System of evaluation of environmental behaviour through good practices".*

Av. del Camino de Santiago, 40. Madrid 28050. Tel +34 91 757 38 00
www.fcc.es www.fccco.com calidad_rsc_construc@fcc.es