
FCC
Construcción
2013
Environmental Report

The environmental management system and the good practices

At FCC CONSTRUCCION the Environmental Management System is based on the identification of environmental aspects most commonly found in our works.

To facilitate their identification and implementation, aspects and actions are classified into a number of groups. Criteria have been developed for the evaluation of the impact of each environmental aspect on a given project, in terms of magnitude and importance; as a result, the significance of every aspect is rated as part of the integrated planning process that takes place at the start of each.

Once the environmental aspects have been selected, their potential impact has been evaluated and the significant environmental aspects have been identified for each location, the actions on site are planned homogeneously throughout the organisation.

To minimize impacts at the planning stage, the works identify which environmental aspects are present, and evaluate their significance depending on the magnitude or the amount of pollution or disturbance, and the importance and sensitivity of the area impacted.

The chart on this page summarizes the environmental aspects identified at the works evaluated in 2012, such aspects being either real or potential, and they who are significant after evaluation:

ASPECTS	Works with environmental aspects (%)			Works with significant aspects (%)		
	B	CEW	TOTAL	B	CEW	TOTAL
Waste production	100%	100%	100%	58%	71%	63%
Regional Planning	94%	95%	94%	44%	67%	54%
Use of natural resources	98%	99%	98%	33%	65%	46%
Atmospheric emissions	99%	100%	100%	26%	71%	45%
Environmental accidents	100%	98%	99%	28%	43%	34%
Noise and vibrations	99%	100%	100%	22%	40%	30%
Water discharges	90%	94%	92%	7%	38%	20%
Occupation of rivers- or seabed and water collection	3%	67%	30%	0%	39%	17%
Use, contamination or loss of soils	92%	98%	94%	1%	35%	16%
Emission of radiation: use of radioactive sources	6%	35%	19%	0%	0%	0%

General Data	B	CEW	TOTAL
Media of the data identified at the Works	43	61	51
Media of the significant aspects identified in each works	3 (8%)	15 (25%)	8 (18%)

B: Building CEW: Civil Engineering Works

FCC CONSTRUCCIÓN has implemented a system of Good Practices that calls for actions, which adds to the requirements established by law, contract or otherwise, a group of actions aimed to guarantee the best possible real improvement in environmental performances.

There is a catalogue of Good Practices that can be selected by projects and applied as and where applicable.

These Good Practices are weighted by their importance; that is, higher value is assigned to those that result in a greater benefit for the environment, as well as those that are intrinsically better and those that are new or involve a greater effort for the works, in terms of investment or research, management or talent.

The real actual scope of the Good Practice is also valuated, so as a greater implementation, a wider generalization of the action taken, a higher number of interventions, or, all in all, a further scope of the Good Practice mean a better score.

All the works can select the Good Practices they consider to be most appropriate or applicable depending on their activities; thus obviating the difficulty posed by the huge diversity of project types (which prevents blanket application of a given practice).

The target Good Practices are evaluated on the basis of a standardized quantification these parameters:

- Importance: It indicates the importance of the Good Practice, assigning a higher value (3) when the importance of the means by or the difficulty of carrying it into effect is higher, and a minimum value (1), when lower.
- Target: It indicates its progress, assigning a higher value (3) when the implementation is more generalized or the best technologies are used, and a minimum value (1) when the implementation is lower.

The results of the degree of implementation obtained, given to the importance of good practice in internally demanded, provide a score, which is a true indicator of environmental performance and effort in the implementation of good practices at the worksites. The target now is to achieve a total of 57 points in all our works.

Good Practices proposed within the following environmental areas are:

- Relationship with society (Training / attitude of people, communication and awareness)
- Atmospheric emissions
- Noise and vibrations
- Water discharges
- Use, contamination or loss of soils
- Use of natural resources
- Waste production
- Regional Planning

Application software manages the Environmental Plan at the company's worksites and other locations, and guarantees the reliability and availability of the data by:

- Identifying the environmental aspects through a checklist in which those stages of the works that can affect the environment are selected; it evaluates their importance in order to reinforce those most significant.
- Selecting the environmental legislation to be applied for each aspect.
- Preparing a program of performances that gives compliance with legal requirements and others.
- Tracking the waste production at worksites, by using the Waste Management Record Sheet.
- Assisting the planning, monitoring and control of Environmental Practices deployed at the worksites.

The information generated at the worksites, and used by the works for environmental management, enters in a database that provides a snapshot of the company's environmental performance while guiding improvement actions and enabling disclosure to society.

A demanding system of internal audits and the inner controls within the different integration processes, validate the accuracy of the data.

TABLE OF CONTENTS

Chairman's statement

Once again we fulfil an important commitment with our stakeholders by making available to them all the progress made by FCC Construcción in the field of environmental management through biannual reports since the year 2000. These environmental reports have become a classic feature in the communication of our organisation.

We are convinced that it is vital to rediscover the concept of sustainability as a guiding principle for our corporate management, especially in a context of restructuration and economic contraction. Sustainability, as FCC understands it, calls for a full in-depth analysis of the entire organisation, the environments in which we operate and our principal social partners, in such a way that we are able to define the necessary strategies in the financial, technical, labour, environmental and ethical areas, in order to ensure the long-term survival of the company. In this report, I am pleased to share with you the progress and results of the analysis undertaken in the environmental area and the consequently evolution of the system to become increasingly more global and comprehensive.

Our business model is changing: the strict measures adopted in Spain to tackle the financial crisis and the need for infrastructures in other countries means that we are increasingly becoming a multinational company. This internationalisation strategy has had a clear influence on the management processes in the organisation and that is why this Environmental Report includes for the first time environmental data related to all construction projects and fixed centres of the company, at both the national and international levels.

We are aware that our activity takes place in a natural and social environment that deserves our utmost care; therefore, we set environmental and social targets as part of our Management System. More specifically, in 2012, international construction projects were incorporated in FCC Construcción's Good Practices System, so that all works projects comply with the company's strategic objective by planning and adopting environmental good practices that go beyond mere compliance with current regulations. By doing so, the actions aimed at the efficient use of resources, the protection and conservation of the environment and the struggle against climate change are integrated into our day-to-day operations, as an aspect that must be taken into consideration.

Moreover, we remain firmly committed to the fight against climate change. Having designed the protocol for the measurement of greenhouse gases in the construction sector in 2010, and having been in 2011 the first Spanish construction company to have its GHG emissions verified by an accredited independent verification body, FCC Construcción verified again its GHG inventory in 2012. This year, the company received the AENOR's Carbon Footprint certificate "CO_2 verified" which guarantees the accuracy of the organisation's Carbon Footprint calculation and demonstrates that the company has included GHG management in its System and its strategy. This initiative, and its implementation, has been recognised outside the company, since it was awarded by the Entorno Foundation in 2012 with a prize in the category "Management for sustainable development" of the European Business Awards for the Environment.

Understanding sustainability as a continuous process will allow us to identify the threats and risks of each situation and turn them into opportunities. Nothing can now be done as it was before, growth alone does not guarantee the model's survival, which is why it is essential to continue fostering strengths such as specialisation, works' quality and respect to our surroundings.

We have a future before us, perhaps different from what we have known up to now. We must, therefore, anticipate the challenges that await us, insist on "doing more with less" and fulfil our responsibility to the company, to society and to the environment.

Fernando Moreno García
President of FCC Construcción

Purpose of the document

In FCC we are aware that, in addition to respecting the environment in the course of our work, it is also vital to communicate this to all stakeholders with whom we interact. This is why, since the year 2000, we have published the company's Environmental Report, a document which brings together the main environmental indicators from the previous fiscal year, the company's progress in terms of environmental management and the implications of the projects for enhancing the sustainability of our construction processes, according to its three dimensions: environmental, social and economic.

> *Fulfilling our commitment of sharing our progress in environmental protection with society, we are pleased to present the Environmental Report for the financial year 2012, continuing the work begun in the year 2000.*

The 2013 Environmental Report aims to continue making our environmental management visible and comprehensible for all those who are involved or affected in one way or another by the company's activities.

2012 was the year of internationalisation for FCC Construcción in every sense, and environmental management was no exception, given that for the first time we incorporated the information of all the projects and fixed centres of the company, irrespective of their geographical location.

In order to ensure that our environmental management is applied efficiently and systematically in the various countries where the company operates, the skills training and awareness-raising of our own staff and subcontracted personnel continues to be one of the cornerstones, because it helps us to identify the interactions between the organisation's activities and the natural and social environment in which they are carried out and to adopt a conscious attitude, promoting measures to encourage the efficient use of natural resources and to minimise and control our emissions to the environment.

We wish to reaffirm the company's commitment in the challenge of climate change. Having designed in 2010 the protocol for measuring Greenhouse Gas Emissions in the construction industry, FCC Construcción again verified its inventory of Greenhouse Gases in 2012 and received the AENOR's Carbon Footprint certificate "CO_2 verified", which guarantees the authenticity of the Carbon Footprint calculation of an organisation and demonstrates that the company has included GHG management in its System and its strategy. Also in 2012, our project was awarded an honourable mention in the category "Management for Sustainable Development" of the European Business Awards for the Environment.

FCC Construcción continues aiming to position itself as one of the leaders in standardisation and certification for sustainable construction. We highlight the role played by the company in its participation in the ISO/TC59/SC17 and CEN/TC350 Technical Committees, which intend to establish the bases and principles of sustainability in the construction sector, as well as the qualification of our own staff as consultants for assessing the sustainability of buildings according to internationally recognised standards, such as LEED and BREEAM. Our first-hand knowledge of these methods and standards guides us in our endeavour to continuously improve our management and sustainability system.

> *Environmental milestones in fiscal year 2012.*

The role of FCC in sustainable construction

We find ourselves in the midst of an ever-changing context, largely due to the economic crisis, and it is a well-known fact that opportunities arise in periods of social transformation. For FCC Construcción, it is evident that part of our response to the challenges of sustainability will be the driving forces of technical changes in the construction sector.

FCC Construcción does not regard sustainability as merely an accessory to its growth and competitiveness strategy, but as an integral part of it. For us, truly sustainable management in construction means inter-relating environmental sustainability with economic and social sustainability, and by no means considering any of these as an individual item. In our construction operations, values such as competitiveness, growth and profitability are inseparable from key issues such as the scarcity of water, low-carbon economics, governance, globalisation and our influence on local communities.

Anticipating the trend of increasing activity in the international construction market, FCC Construcción conducted an analysis of the risks and opportunities in a globalised marketplace some years ago. From this analysis, we took on the responsibility of participating actively in a number of working groups to develop methods and standards, playing an outstanding role at the international level in heading up development in the ISO/TC59/SC17 and CEN/TC350 Technical Committees, both of which intend to establish the bases and principles of sustainability in the construction sector.

The following Table shows some of the organisations in which FCC Construcción plays a major role in defining criteria for sustainability, especially in the area of civil engineering works.

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/WG1: "Sustainability Indicators for Buildings". - Participation in ISO/TC59/SC17/WG1: "Environmental Declarations of Building Products". - Participation in ISO/TC59/SC17/WG1: "Framework for Assessment of Environmental Performance of Buildings and Constructed Assets". - Presidency of ISO/TC59/SC17/WG5 "Civil Engineering Works", which deals with the sustainability of civil engineering works.
International Technical Committee **CEN/TC350** "Sustainability of construction Works"	- Participation in CEN/TC350/Task group: "Framework for assessment of buildings". - Participation in CEN/TC350/Task group: "Environmental performance of buildings". - Participation in CEN/TC350/Task group: "Building life cycle description". - Participation in CEN/TC350/Task group: "Product level". - Participation in CEN/TC350/WG4: "Economic performance assessment of buildings". - Participation in CEN/TC350/WG5: "Social performance assessment of buildings". - Presidency of CEN/TC350/WG6: "Civil Engineering Works".
Technical Standardisation Committee **AEN/CTN198** "Sustainable Construction"	- Vice-presidency of the Technical Standardisation Committee AEN/CTN198 "Sustainable Construction". - Participation in the Technical Standardisation Sub-committee AEN/CTN 198/SC 1 "Sustainability in building". - Presidency of the Technical Standardisation Sub-committee AEN/CTN 198/SC 2 "Sustainability in civil works".
International Initiative for a Sustainable Built Environment **(iiSBE)**	- Members
Green Building Council Spain **(GBCE)**	- Members of this organisation, who make up the Spanish Council of the international association "World Green Building Council", serve as a channel for providing all the information in Spain on LEED buildings assessment method.
BREEAM España	- Members of the Advisory Council, responsible for setting out the development strategies for BREEAM Spain, representing the stakeholders of the building sector.

In addition, we participate in other organisations, in which we share our experience in subjects related to environmental responsibility, social responsibility, technological innovation and hydraulic planning. These organisations are described in the table shown below.

Working Groups of other environmental areas

Organisation	Participation
International Technical Committee **ISO/TC207** "Environmental management"	- Participation in Sub-committee ISO/TC 207 SC1: "Environmental management Systems". - Participation in Sub-committee ISO/TC 207 SC4: "Environmental performance evaluation". • Working Group WG 4 "Data quality".
Spanish National Committee on Large Dams **(SPANCOLD)**	- Spanish National Committee on Large Dams (SPANCOLD). - Presidency of the Technical Committee "Activities of the Engineer in Planning". - Participation of in the Technical Committee "Environment".
International Committee on Large Dams **(ICOLD)**	- Participation in the "Committee on Engineering Activities in the Planning Process for Water Resources Projects" (ICOLD), representing Spain.
State Council for Corporate Social Responsibility **(CERSE)**	- Participation in the Working Group "Transparency".
AENOR's Advisory Board for Construction Company Certification	- Participation in the Environment Committee. • Working Group "Environmental indicators in construction".
SEOPAN	- Participation in the Environment Committee.
Spanish Quality Association **(AEC)**	- Participation in the Environment Committee - Participation in the Construction Committee
European Network of Construction Companies for Research and Development **(ENCORD)**	- Participation in the Environmental and Sustainability working group. - Participation in the working group for developing a declaration of sustainability for European construction companies.
European Construction Technology Platform **(ECTP)**	- Participation in the area "Quality of life" • Working Group "Reduce environmental impact". • Working Group WG3 "Improving the built environment for people".
Spanish Construction Technology Platform **(PTEC)**	- Participation in the Strategic Plan for Sustainable Construction. • Coordination of Working Group 1: "Competitiveness" • Working Group 2: "Environment"

> *Caisson structure built by FCC Construcción at Dock 4, Rota Naval Base.*

The firm commitment of FCC Construcción to participate actively in drawing up the road map to sustainable construction entails an additional, but much-needed, effort because by contributing our experience and perspectives we are establishing, along with the other stakeholders, the guidelines that will be followed in years to come.

The firm and deliberate adoption of the principles of sustainable construction implies that decisions must be taken with due consideration of the full life cycle of projects, taking into account social and environmental factors that are not far removed from the ever more interconnected challenges we face such as the economic and energy crises, and the increasing demographic concentration in urban centres.

Thanks to our attendance to these Working Groups, we have participated in the genesis of numerous environmental trends and standards that are beginning to regulate them, we have worked on their development, learning constantly along the way, and we have begun to reap the rewards of the work done. All of this strengthens our position, which is that it is important to continue working in these areas; because of our commitment, our responsibility and our conviction.

Main figures as indicators

Our Management and Sustainability System constitutes the tool that integrates the economic, social and production factors with the impact our activities have on the environment and the company's environmental performance.

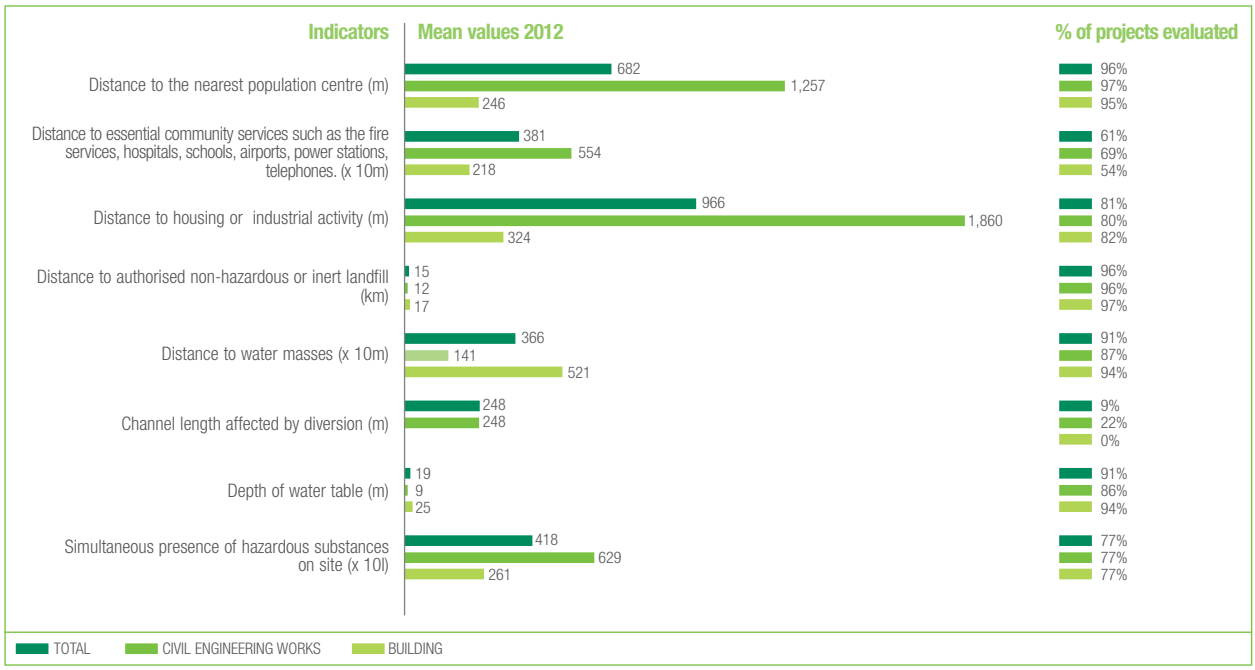
In addition, the System enables us to tackle the difficulty of obtaining information in as much detail as possible on construction projects with very diverse approaches, as the IT applications of the company provide data in real time which, translated into indicators, provide simplified and quantitative information. As such, we are able to transform a complex reality into a tool for communication, which reflects environmental trends in real time and which can be readily interpreted by the stakeholders with an interest in them.

Reports are issued by each of the works, with the figures that are most representative of the activity that is being undertaken. All this data, updated at least every four months, is integrated at the corporate level in order to obtain the mean values of the works activities. The advantage of having a complex indicator-based information system is that we can report our environmental performance at different scaled levels, both geographical and temporal, and adapt the environmental information to specific demands.

In this section, we show the average figures for the financial year 2012 considering building, civil engineering works, and the total for the company as a whole, reflecting the indicator's representativeness with the percentage of the projects that have assessed it.

> Thanks to the system of indicators, we can evaluate and improve our environmental performance, as well as the fulfilment of the objectives set. This tool is a key element for communication, both internal and external, with regard to our progress in environment-related matters.

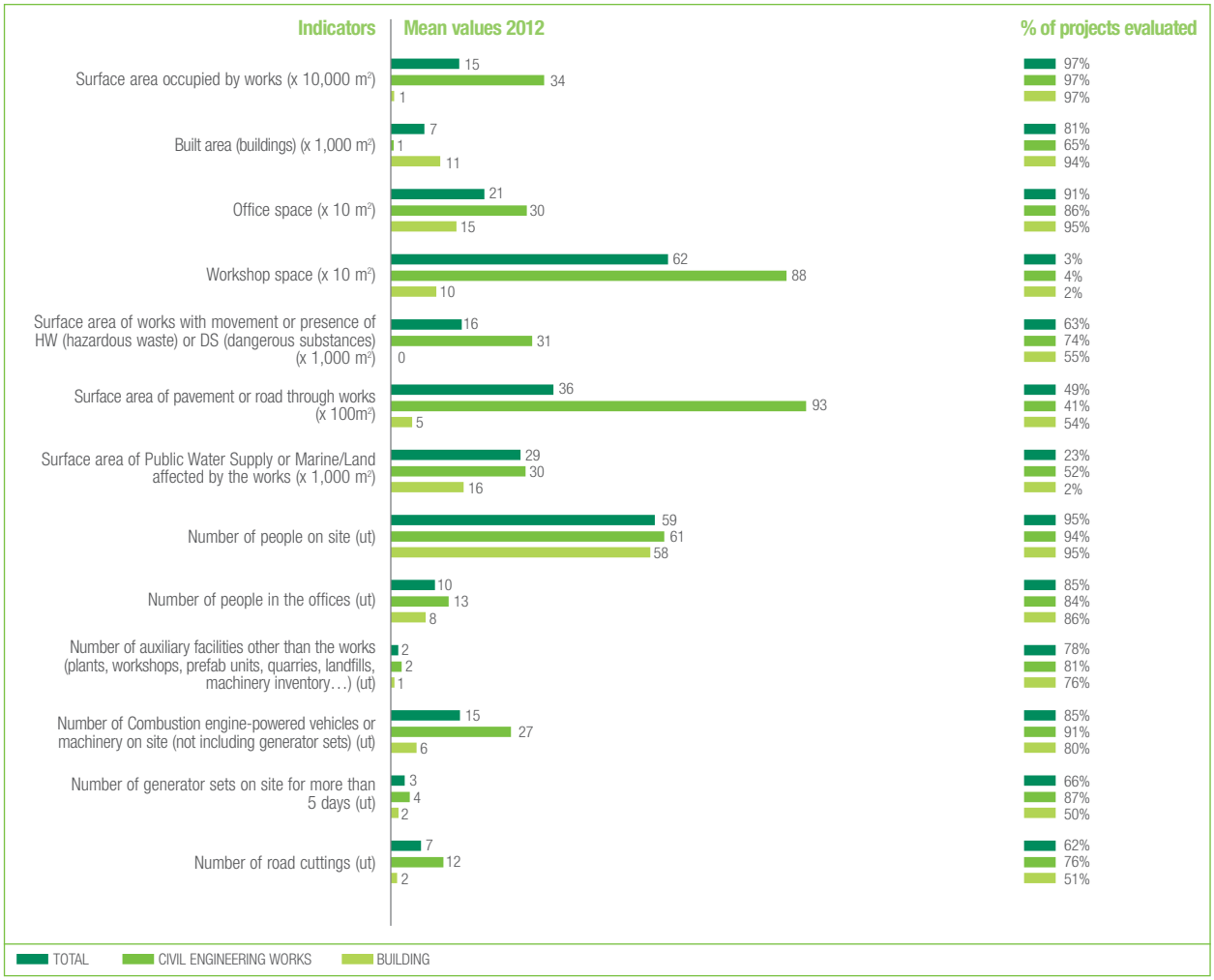
I Interaction with the environment



> *When planning a construction project is it essential to know the distances to the nearest population centres, as well as to the essential services and to the landfill sites. This is so important, because if our site is located far from these, the need for transportation will be greater, which entails higher costs and also increases the related greenhouse gas emissions.*

> *In building design and construction there is an increasing quest to minimise energy consumption in the use stage of the building, and also to use recycled materials during the construction stage.*

I Characteristics of the works



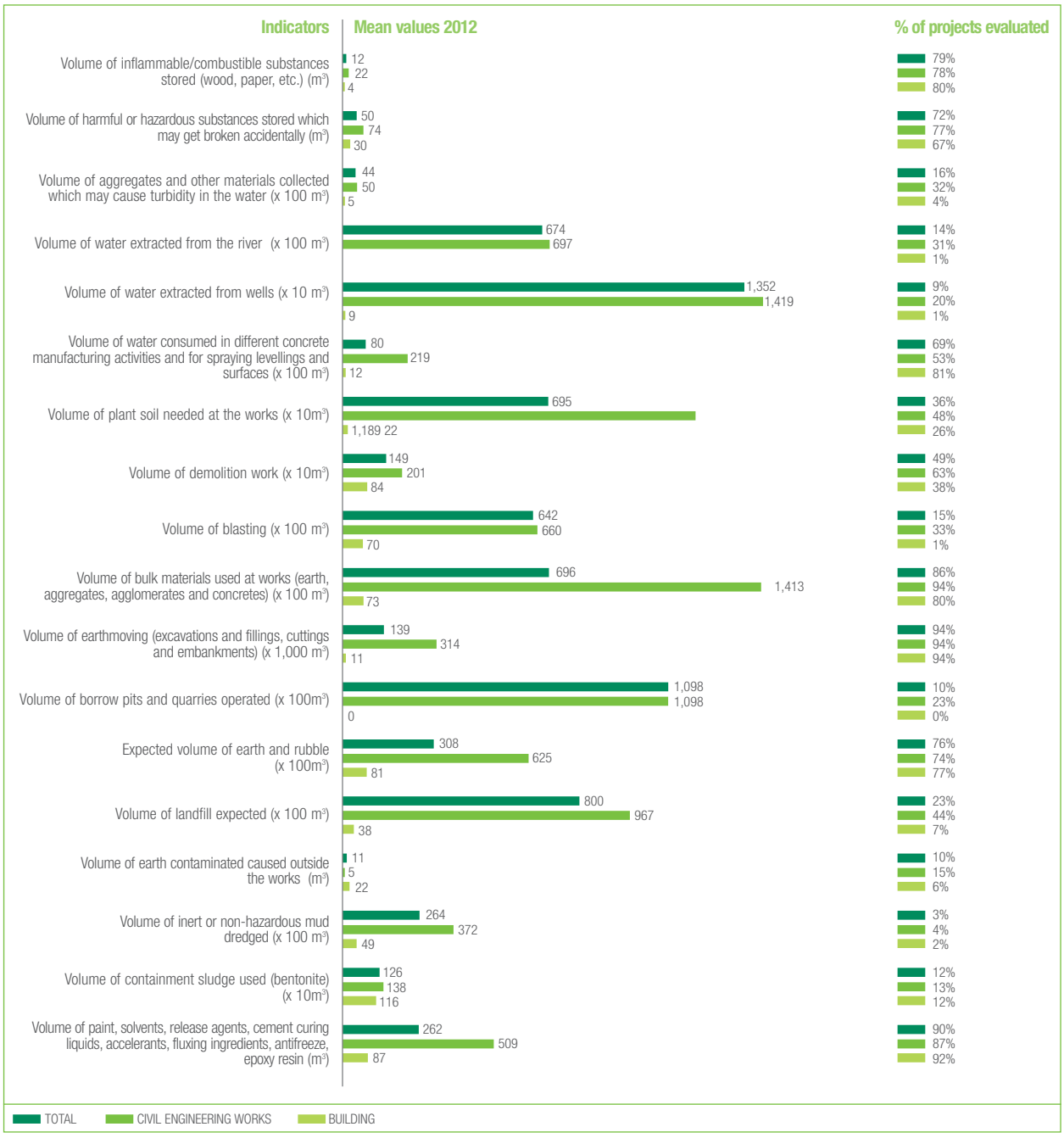
Production of materials

Indicators	Mean values 2012			% of projects evaluated		
	TOTAL	CIVIL ENGINEERING WORKS	BUILDING	TOTAL	CIVIL ENGINEERING WORKS	BUILDING
Concrete plant production (x 100 m^3)	262	316	44	7%	13%	2%
Production of the asphalt agglomerate plant (x 100 t)	423	423		2%	5%	0%
Production of the aggregate plant (x 100 t)	356	424	16	8%	16%	2%
Installation of asphalt agglomerate at the job site (x 100t)	95	121	10	36%	65%	14%
Pouring of concrete at the job site (x 100 m^3)	77	132	33	89%	91%	86%
Amount of steel used on site (x 10 t)	75	74	75	74%	70%	77%
Percentage of night-time electricity used (%)	7	11	4	83%	84%	83%

> *The consumption of resources for the production of the materials required for our works is a key aspect for FCC Construcción. For this reason, the most important materials are quantified; both those that are manufactured in our own plants on site and those provided by our suppliers.*

> *It is very important to know what hazardous substances are managed as most of them need to be stored in facilities of the appropriate size and characteristics, which need to be planned in advance before the work starts.*

Volumes managed



Environmental impacts of construction

The first step: to be aware of our impacts

In a construction project it is important to differentiate the environmental impact inherent in the type of infrastructure and its location, which is evaluated and attenuated in the process of studying alternatives and subsequently assessing the environmental impact, from the impacts associated with the construction process itself and ancillary operations. Minimising the latter, which are generally temporary and reversible, is FCC Construcción's goal.

From the integrated planning process of each project or production centre, we proceed to identify the environmental aspects involved, assessing their importance in relation to the magnitude or amount of contamination or alteration, while also considering the importance or sensitivity of the environmental medium that will be impacted. The various environmental aspects present in the construction works are divided into the following categories:

- Atmospheric emissions.
- Noise and vibrations.
- Effluent discharges.
- Occupation of rivers or sea beds and water abstraction.
- Occupation, pollution or loss of soils.
- Use of natural resources (water, fuels, raw materials, energy, etc.).
- Production and management of wastes (dangerous, inert or urban).
- Radiation emissions.
- Land planning (biological diversity, urban environment).
- Environmental accidents.

Prioritisation of significant impacts

The process of prioritisation of impacts follows the logical path of identifying the significant elements, assessing them, measuring how frequently they recur and following their corporate integration, defining actions that will enable us to correct them and improve environmental management within FCC Construcción.

Below, we present a summary of the information collected from the projects processed during the 2012 financial year.

The following table shows those aspects that have proven to be significant in more than 10% of the total of projects for the year 2012, including both building and civil engineering projects.

> *Works undertaken, in order to prevent the construction impact of the project storm water tank of Butarque.*

Significant environmental impacts

Code	Description of environmental aspect	% of projects in which the environmental aspect was significant*		
		Building	C. E. W.**	FCCCO Total
U-06	Impact on land / urban environment due to operations that cause dirt at the entrance and exit of sites, muds and loose material	39% (49/125)	53% (49/93)	45% (98/218)
U-07	Impact on land / urban environment due to spillage of granular material during transport	34% (42/125)	49% (46/93)	40% (88/218)
A-10	Emission of dust due to transport of earth and rubble	4% (5/125)	48% (45/93)	23% (50/218)
A-06	Emission of dust due to earth moving: excavations and fillings, cuttings and embankments	3% (4/125)	48% (45/93)	22% (49/218)
R-28	Production of hazardous waste: Contaminated empty containers (paints, solvents, oil, glue, paint strippers, release agents, silicone, aerosols, explosives...)	24% (30/125)	19% (18/93)	22% (48/218)
M-02	Environmental accident due to fires in storage area of inflammable / combustible substances (wood, paper, etc.)	20% (25/125)	24% (22/93)	22% (47/218)
A-09	Emission of dust due to heavy machinery traffic	2% (2/125)	46% (43/93)	21% (45/218)
N-53	Steel consumption (structural and reinforcement steel)	17% (21/125)	26% (24/93)	21% (45/218)
R-02	Production of non-hazardous or inert waste: Surplus earth from excavations	11% (14/125)	31% (29/93)	20% (43/218)
A-04	Emission of dust due to demolitions	14% (17/125)	24% (22/93)	18% (39/218)
N-02	Water consumption for embankments ground watering	5% (6/125)	35% (33/93)	18% (39/218)
R-62	Production of urban waste coming from the recovery and cleaning of installations / works	4% (5/125)	37% (34/93)	18% (39/218)
N-41	Electric energy consumption	10% (13/125)	27% (25/93)	17% (38/218)
R-22	Production of hazardous waste: Paints, solvents, stripping liquids, polishing liquids, epoxy resins, accelerants, antifreeze, accelerators, release agents and concrete curing liquids outside of specifications	16% (20/125)	18% (17/93)	17% (37/218)
W-02	Generation of noise due to demolitions	14% (18/125)	17% (16/93)	16% (34/218)
R-05	Production of non-hazardous or inert waste: Non-hazardous containers and packages	20% (25/125)	6% (6/93)	14% (31/218)
R-06	Production of non-hazardous or inert waste: Formworks and moulds	8% (10/125)	23% (21/93)	14% (31/218)
R-61	Production of urban waste from offices, change rooms and site canteens	2% (3/125)	30% (28/93)	14% (31/218)
S-03	Use of riverbeds or seabeds due to actions in publicly-owned water or sea/land	0% (0/125)	33% (31/93)	14% (31/218)
N-21	Consumption of gasoil, fuel-oil, petrol or coal	2% (2/125)	30% (28/93)	14% (30/218)
A-24	Emission of exhaust gases from electricity generators	5% (6/125)	25% (23/93)	13% (29/218)
U-02	Impact on land / urban environment due to interference with the surrounding traffic outside the worksite	5% (6/125)	25% (23/93)	13% (29/218)

** Data of FCC Construcción in Spain*
*** Civil Engineering Works*

> *Washing the wheels of trucks before they reach the public highway prevents mud and dust from being deposited, which is especially important when the site is located in an urban area.*

Following the analysis of these data, it is worth noting that the two environmental aspects that have proven to be significant in the majority of the projects are those related to the impact on the land and the urban environment due to debris from the transportation of materials, especially those that are likely to produce dust.

Hence, the environmental aspect "Use of methods to prevent dirt at the entrance and exit to the site" proved significant in 45% of the total of works and the figure was even higher if we look at civil engineering projects, at 53%. Meanwhile, the environmental aspect "Impact on land / urban environment due to fall of granular material when being transported" proved significant in 40% of the works, again with a higher percentage in the case of civil engineering projects.

Given that these environmental aspects are of considerable importance in the vicinity of the works, FCC Construcción strives to keep the access roads to the sites in a fit state of cleanliness by adopting corrective and preventive measures such as: covering transported materials to prevent them from producing dust, sweeping grit from affected public roads and washing the wheels of the vehicles as they leave the site.

Other environmental aspects that prove to be significant in the majority of the projects are related to dust emission, which is common in the construction sector and is related to the machinery and materials used. Emissions of other contaminants such as VOCs and gases that are frequently present in emissions due to combustion.

Proof of this is the fact that, among the most significant environmental aspects identified across the total of projects, four are related to the production of dust. These aspects are as follows: “Dust emissions due to the transport of earth and debris” (23% in all the works; 48% in civil works), “Dust emissions due to earth moving” (22% in all the works; 48% in civil works), “Dust emissions due to machinery traffic” (21% in all the works; 46% in civil works) and “Dust emissions due to demolitions” (18% in all projects; 24% in civil engineering projects.

> *Reducing dust is one of the top priorities on all of our sites. Among the Good Practices that are generally implemented is the watering of tracks and stockpiles, the covering of trucks and the use of machinery with dust capture systems.*

These results enable us to conclude that transportation is the main source of dust, followed by earth moving and demolitions. Washing with water is an efficient measure for minimising the production of dust, although it entails higher water consumption, an aspect which is included as among the most important elsewhere in this report. In addition, FCC Construcción implements in its works other measures such as using additives in water used for washing to create a surface crust of dust particles. The improvement of the conditions of the road surfaces on which vehicles run by resurfacing with asphalt and compacting, and the restriction of areas for vehicular traffic and speed limits are other good practices that can be complemented with the covering of stored and transported materials and the reduction in the height of dumped materials.

Another area in which many environmental aspects are concentrated is the production of waste: in 2012 there were seven significant aspects of this kind in over 10% of the company's projects. This involves the following: “Production of hazardous waste, contaminated empty containers” (22%), “Production of non-hazardous or inert waste, surplus earth from excavation” (20%), “Production of urban waste coming from the restoration and cleaning of installations / works” (18%), “Production of hazardous waste: paints, solvents, stripping liquids, polishing liquids, epoxy resins, accelerants, antifreeze, accelerators, release agents and concrete curing liquids outside of specifications.” (17%), “Production of non-hazardous or inert waste, non-hazardous containers, packages” (14%), “Production of non-hazardous or inert waste, formwork and moulds” (14%) and “Production of urban waste coming from offices, changing rooms and canteens on site” (14%).

Waste produced in our workplace is managed according to its nature (hazardous, non-hazardous or assimilable to urban waste). In the case of hazardous waste, this is managed in accordance with applicable laws and regulations. Temporary storage is provided at each site, which never exceeds six months, in which each container is clearly identified using standard labelling. In addition, special care is taken when handling such materials and reviews are carried out periodically to check that waste is not mixed together, that the containers' capacity is not exceeded and that the storage area is not contaminated.

> *An appropriate signposting of the natural features that are present in the surrounding of the worksite, reminds us of the importance of these resources, and contributes to the protection of the environment.*

Furthermore, the waste depositing points are duly identified in a plan showing their exact location.

Waste products from construction and demolition exemplify the success that can be achieved following a strategy of minimisation, without the need for large investments, implementing Good Practices such as demolition with deconstruction techniques, separation at source preventing the mixing of materials that would hinder their re-utilisation and the use of primary aggregates as replacements.

The type and characteristics of the works to be carried out determine to a large extent the consumption of resources that, in general, can be high in terms of energy, water and materials. The implementation of Good Practices can help to ensure that this consumption does not exceed the amount projected and can even help to reduce it through re-utilisation, recycling or value-adding.

Four aspects of the consumption of resources can be identified which prove significant in 10% of the total of FCC Construcción's works projects. These are “Steel consumption”, significant in 21% of projects overall and in 26% of civil engineering projects, the “Water consumption for spraying levellings and surfaces” (18% of projects overall; 35% in civil engineering projects), the “Electrical power consumption” (17% of projects overall; 27% in civil engineering projects) and the “Consumption of gasoil, fuel-oil and coal” (14% of projects overall; 30% in civil engineering projects).

Among the main actions taken to reduce electricity consumption are the maximum exploitation of natural light, the use of low-consumption lighting instead of conventional incandescent bulbs, the installation of automatic energy economy devices or carrying out campaigns to provide information and raise awareness.

The consumption of water, as well as being considered in absolute terms, must be analysed in relation to the possibly unique characteristics of the water basin or hydrographical water table from which the resource is drawn and in which manner this may affect the quality and quantity of the water balance. Measures aimed at minimising its consumption and encouraging re-utilisation contribute to reducing the impact on this environmental resource.

Within the group “Generation of noise and vibrations”, the aspect “Generation of noise due to demolitions” proved significant in 16% of the total of projects.

> *It is vital to know the quantity and type of waste produced by each project so that it can be properly stored and subsequently disposed of. Hazardous wastes must be stored in special areas that are equipped with systems to prevent contamination of land or water in the event of a spill. Good Practices are implemented at all worksites of FCC Construcción, aimed at minimising the production of waste and ensuring that any waste is stored appropriately.*

> *Anti-turbidity barriers are widely used in projects with dredging or earth moving activities in rivers, lakes or the sea. These ensure that the environment is protected from turbidity caused by sediments.*

> *Flix Reservoir decontamination in Tarragona*

In order to minimise sound pollution, actions were taken such as placing soundproof screens, carrying out parts of the work in advance, using more modern and quieter machinery, which was properly maintained, and carrying out those tasks which produce the most noise at a suitable time, having due regard to the area involved, among other steps taken.

The environmental aspect “Actions in the Public Water Domain or Public Marine/Land Domain” were significant in 14% of all works, increasing to 33% in the case of civil engineering projects.

In this regard, FCC Construcción requests the authorisation of the relevant official body of the water basin or coastal area to conduct actions in the Public Water Domain

> *The first step to prevent environmental accidents is to identify, describe and determine the possible sources of risk for the various processes and activities involved in the project. The next steps are to evaluate the risk in the scenarios that have been identified and to determine the appropriate preventive measures.*

(DPH, in Spanish) or the Public Marine-Land Domain (DPMT, in Spanish). This request covers measures to be taken to prevent negative impacts on water channels or the coastline. In addition, measures are taken including the physical protection of spawning grounds, cordoning off the work area using physical barriers, and locating ancillary installations at a suitable distance from water masses, among others.

In order to be able to create mechanisms to prevent environmental accidents with greater or lesser consequences, FCC Construcción identifies the group of potential scenarios of environmental accidents, such as: fires, rupture of underground pipes, rupture of containers or storage tanks for hazardous substances, accidental spills, floods or landslides and instability. In this group, the aspect "Environmental accidents due to fires in storage areas of inflammable / combustible substances (wood, paper, etc.)" proved significant in 22% of the works.

In order to identify incidents that can cause environmental accidents, Emergency Plans are drawn up for all projects and sites, in which both the preventive measures to be adopted as well as the actions to consider in the first moments of any incident are defined.

> *Project personnel of the Vidin-Calafat Bridge, over the Danube River in Romania.*

Environmental good practices

> *The implementation of Environmental Good Practices and their systematisation allows us to evaluate our commitment to the protection of the environment and makes it possible to disseminate our experience so that we can progress towards the goal of a construction sector that respects the environment while at the same time being viable both from an economic and a social perspective.*

Once again, as we report on the environmental performance of FCC Construcción, we must refer the reader to our system of Environmental Good Practices®, a pioneering voluntary commitment in the sector that was first made in the year 2000. The definition of our environmental objective through the implementation of Good Practices, which led us to set objectives and demands for our operations that are more strict than those required by law, is the best possible systematisation of sustainability.

Actions such as the spraying of roads and stockpiles in order to reduce dust or the use of tarpaulins when blasting are Good Practices which are traditionally carried out in the construction sector; the importance of our system stems precisely from the advantages associated with the systematisation of these traditional experiences.

The Good Practices System allows us to use the knowledge generated to improve and transform existing systems at the internal level. In addition, it helps us to extract valuable lessons that can be shared internally through reports such as this Environmental Report, for instance.

Good Practices are assessed with respect to their importance and their purpose. Greater importance is assigned to those which have a more significant impact on the final environmental quality, as well as those which involve greater effort in their installation whether it be economic, technical, logistic or due to any other circumstance. Furthermore, the degree of implementation for each good practice is evaluated from 1 to 3, with 3 being the greatest effort or the broadest scope in the implementation and 1 is considered the minimum in order to specifically rate the Good Practice.

The Good Practices of FCC Construcción are defined within the following environmental areas:

- Relationship with society.
- Atmospheric emissions.
- Noise and vibrations.
- Effluent discharges.
- Use, pollution or loss of soils.
- Use of natural resources.
- Generation of wastes.
- Land planning (biological diversity, urban environment).

The system defines a series of Good Practices and the most appropriate of these are selected and implemented in each project and on each site according to their indivi-

General data on Environmental Good Practices

	National			International	FCCCO Total
	Building	CEW	TOTAL		
Projects that contributed data on Good Practices	125/125 (100%)	93/93 (100%)	218/218 (100%)	34/35 (97%)	252/253 (100%)
Average number of Good Practices implemented per project	20	24	22	23	22

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

dual characteristics, achieving a higher or lower score that must always be above 57 points.

During the 2012 financial year, 96.6% of the works executed by FCC Construcción reported on the Good Practices they implemented. Analysing the results of their monitoring, we can draw the following conclusions:

- Environmental signposting is used in 92% of sites with the aim of informing and raising the awareness of the personnel who work at the site.

- In 2012, in 88% of all projects, actions were carried out in an effort to restore the sites and facilities affected by the works activities and installations, with the aim of reintegrating them into the surrounding environment in both ecological and landscaping terms.

- Spraying tracks and stockpiles with water in 88% of works both in Spain and abroad to reduce the amount of dust and particles produced during construction.

> *Signposting on sites is crucial to promote the personnel's awareness and to indicate clearly the areas where materials and waste are to be stored.*

> *Spraying the wheels of trucks and sweeping the entrance and exit points at sites are simple practices, that are widely used at our sites to prevent fouling the area surrounding the sites.*

- In order to implement Good Practices in works it is crucial that all production personnel be properly trained. For this reason, in 2012, 86% of the personnel involved in all of the projects in Spain and abroad completed the environmental training course arranged by the company and in 87% of these, talks were given to sub-contracted personnel to inform them and raise their awareness with reference to the sub-contracted activities. These talks lasted for at least one hour.

- Modern machinery was used in 81% of projects to minimise noise and vibration that might be generated in the course of the projects.

- With the aim of preventing the depositing of dirt at the entrance and exit of its sites, FCC Construcción implemented a series of measures in 79% of its projects, such as the systematic sweeping of the entrances and exits and the cleaning of truck wheels before they are driven on the public highway.

- In particularly sensitive areas, in the last financial year the access areas and areas occupied by the sites were restricted in 77% and 73% of the total number of projects, respectively, in order to occupy only the space strictly necessary.

- In 75% of the projects executed, some environmental experiment was conducted and published, in order to publicise the knowledge acquired in the relevant form of operation.

- In 71% of the sites in financial year 2012, appropriate preventive maintenance was conducted on the machinery used at the site.

> *Limitating the sensitive areas in the vicinity of our sites reduces their occupation and the resultant compacting and possible soil contamination.*

- We succeeded in reducing the inert waste taken to landfill with respect to the volume expected for the project in 69% of sites with appropriate planning, endeavouring to improve the environmental indicators and economic indicators for the project.

- 67% of the sites prioritised the hiring of sub-contractors who apply some system of environmental management.

- In 65% of the FCC Construcción works, speed limit signs are used to control the speed of vehicles on the site and to minimise the dispersion of dust and generation of noise.

- In 62% of the works executed in 2012, the parent company has been involved in environmental management, as it has first-hand knowledge and participates in our management system, to ensure it is implemented effectively.

Below we provide more of the information collected on the Good Practices during 2012 and illustrate these with a number of case studies of how the system is implemented in practice. These examples demonstrate how each of the Environmental Good Practices has a preventive function, by reducing the probability of environmental risks occurring and protecting our surroundings.

RELATIONSHIP WITH SOCIETY

GOOD PRACTICE

Panama Hospital Complex

Client: Department of Social Security (C.S.S.)

Completion deadline: 36 months

Problem detected:

The grounds set out in the original project for the Panama Hospital Complex occupied part of the unspoiled section of the cobblestone path known as the **"Camino de Cruces"**, a road that was an integral part of the trans-isthmus road network during the colonial period and the first half of the 19th century.

The facilities and roads constructed in the country during the 20th century have altered the "Camino de Cruces" along almost 1,200 metres of its length, which amounts to approximately 68.5% of its total length. The alterations to the route of the road and its geo-political significance were the reasons for implementing control and protection mechanisms, concerned with the road itself and with external factors that have a bearing on it.

Therefore, it was essential to propose a modification to the original project before work could commence, in order to avoid affecting the route of the historic "Camino de Cruces".

Solutions adopted:

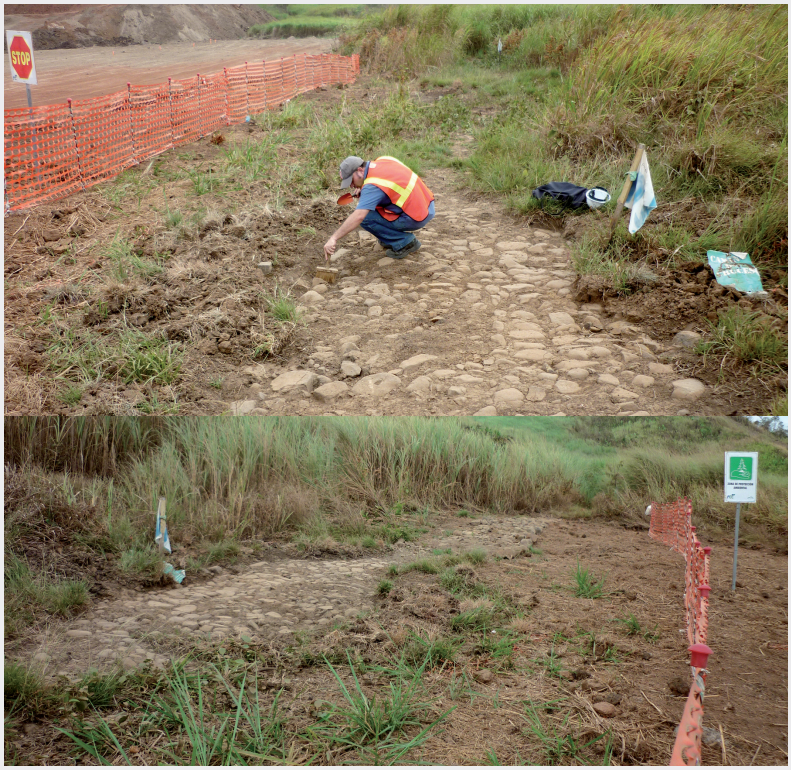
In order to avoid modifying or altering the surviving section of the "Camino de Cruces". FCC Centroamérica proposed a modification of the original plans, consisting in re-routing part of the internal road of the works site so that the Camino would lie outside the area of the project.

The measures recommended by the Department of Historical Heritage were adopted, ceding a space of approximately 7 metres on either side of the cobblestone road.

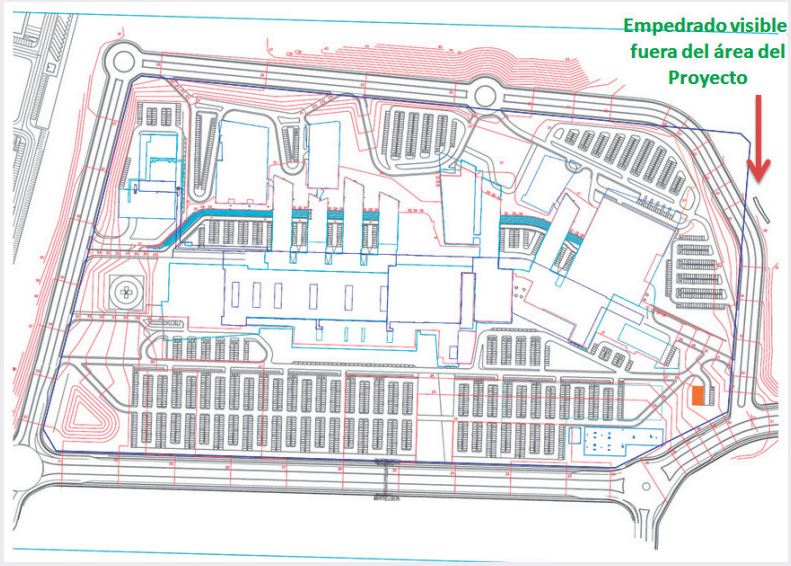
Results:

Having protected and restored the cobblestone road "Camino de Cruces" which had previously been within the limits of the project, an easement was established along the route and this was monitored on a weekly basis.

The modification of the project as originally designed succeeded in preventing any alteration to one of Panama's outstanding Cultural Heritage Sites.



Protection and restoration work on the "Camino de Cruces".



Modified plan of the site, including protection of the cobblestone road "Camino de Cruces".

	ACTIONS - OPPORTUNITIES							
RISKS	Personnel Training in environmental matters	Contracting of environmentally committed subcontractors	Customer involvement in management	Communication / transparency with society	Attending complaints, claims and suggestions	Suitable environmental management recognised by society	Environmental improvements introduced in the project	Environmental signposting
Shortcomings in relationships with people	✓		✓	✓	✓	✓		✓
Wastage of resources and increased waste generation	✓						✓	✓
Insufficient segregation of the waste	✓							✓
Lack of awareness	✓	✓		✓				✓
Insufficient environmental training	✓	✓						✓
Limited communication with affected parties			✓	✓	✓	✓		
Projects which affect the environment						✓	✓	

> *An essential aspect for undertaking our activity with environmental due diligence is the interaction with the agents involved and with society in general. This is why FCC Construcción maintains two-way communication channels, both internal and external, so that we can receive and transmit information, with the aim of continuously improving our environmental performance.*

Transparency

There are perhaps few activities whose actions have such a direct yet multi-faceted relationship with society as a whole, than construction. This is why the creation of collective value in contrast to individual self-interest is one of FCC Construcción's top priorities. Hence, to guarantee our long-term success, we conduct research do discover what is valuable to various stakeholders and we integrate this materiality analysis in our strategy, in order to gain a competitive advantage.

Our inter-relations with our stakeholders pose challenges for FCC Construcción and to a large extent these are related to our environmental management, reporting transparency in our environmental commitments and in how we conduct our actions for the protection of the environment. It is for us more than merely a requirement; it is a need - to ensure that its dissemination reaches all of our employees and interest groups, so that they are aware of it and we can also obtain feedback.

The Good Practices in the category “Relationship with Society” are inherent in the involvement of all our stakeholders and interest groups in the dynamic of environmental protection, making them partners in the role that they can

play, as they do indeed play a key role in the system that we have established.

The following table shows the Good Practices implemented in the category "Relationship with Society" and the extent to which they were implemented in works executed during the financial year 2012.

Good practice	National			International	FCCCO Total
	Building	CEW	TOTAL		
0a FCC Construcción production personnel (up to foreman) who have taken the environmental training course organised by the company	95%	87%	92%	47%	86%
0b Sub-contractors who have received environmental awareness and training talks of at least one hour from FCC Construcción related to the sub-contracted activities	93%	90%	92%	53%	87%
0c Sub-contractors who apply an environmental management system	63%	82%	71%	41%	67%
0d Sub-contractors' environmental behaviour	35%	55%	44%	71%	47%
0e Relationship with interested parties	42%	62%	50%	44%	50%
0f Complaints and claims	66%	63%	65%	21%	59%
0g Achievement of social recognition	8%	11%	9%	15%	10%
0h Involvement of the clients in environmental management	67%	66%	67%	29%	62%
0i Environmental training of at least four hours duration for production personnel from foremen to operators	50%	41%	46%	18%	42%
0j Environmental improvements introduced in the original project	11%	29%	19%	50%	23%
0k Adoption of environmental signposting on the site that helps to inform and make aware the personnel working on the site	98%	97%	97%	56%	92%
0l Diffusion of the knowledge acquired in environmental matters	9%	4%	3%	38%	8%

> *Personnel's training is an important help for the implementation of Good Practices, as the correct conduct of our workers is the cornerstone of its successful implementation.*

Environmental training

The environmental training that FCC Construcción provides to its staff has two clearly defined learning objectives: firstly, the cognitive learning of competencies, knowledge and skills, and secondly, increasing the awareness amongst our personnel, in order to create a corporate culture of commitment to the environment. These objectives extend to our employees, suppliers and sub-contractors. By training the personnel involved in carrying out the work, we will be able to achieve a real and effective implementation of the Good Practices, and hence improve our commitment and level in the

> *In any construction project, which has a great influence on the surrounding society and environment, it is vital to involve all stakeholders by informing them of the significant impacts and benefits for society, while also fostering their participation in the management process, from the very first stages of the project.*

area of environmental management. Aware of this, FCC Construcción lends great importance to environmental awareness training, as a first step to achieving the final goal of minimising the possible impacts on the environment.

During 2012, 86% of personnel (including management level staff) of the total of projects executed in Spain and overseas completed an environmental management training course, included in the company's Training Plan. In addition, 87% of the sub-contracted personnel who took part in our activities in the same year attended talks held by FCC Construcción concerning awareness-raising and environmental skills training, of at least one hour in duration, related to the sub-contracted activities.

In this way, we ensure that both our own staff and sub-contracted personnel learn about environmental issues and the company's commitment to protecting the environment which they can then apply on a daily basis in their workplace, contributing to the optimal implementation of the Good Practices on each site.

Stakeholder involvement

Aware that our activities affect and are affected, to a greater or lesser extent, by interested parties such as our customers, suppliers and sub-contractors, we believe it is crucial to maintain a constant flow of communication with all of them and to share our goal of establishing an appropriate level of performance with regard to the environment.

In this regard, during the year 2012, subcontractors in 67% of our works had some form of environmental management system (ISO 14001 or EMAS) and carried out actions related to the optimisation of waste products, providing the relevant permits and licenses and complying with all contractual requirements in terms of environmental protection.

In addition, in 62% of the projects executed in 2012, we succeeded in involving the client in the environmental management through a formal presentation of FCC Construcción's Environmental Management System in a specially-convened meeting, ensuring that the client participated actively in the implementation of some aspects of the Environmental Management Programme.

Communication

Communications with regard to the environment involve specific factors that have contributed to this becoming a specialised professional field. The ever-increasing influence of public opinion on environmental strategies necessarily entails a communications policy with stakeholders and this is carried out by FCC Construcción.

The flow of communications is directed through two-way channels which, as well as enabling us to communicate our progress in environmental management to Society as a whole, make it possible for us to learn about our Stakeholders' expectations. The incorporation of this feedback in the company's management system contributes to the continuous improvement of the system and the satisfaction of our stakeholders.

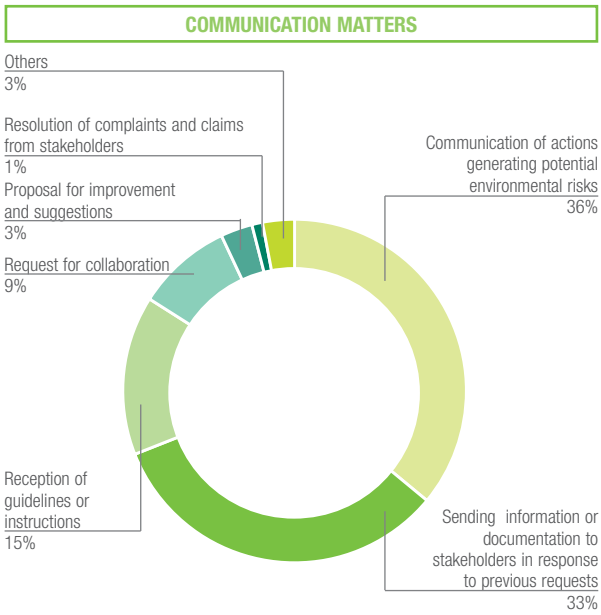
In order to ensure that our communications constitute an integrated vision and are really efficient, it is necessary to consider them in terms of three areas:

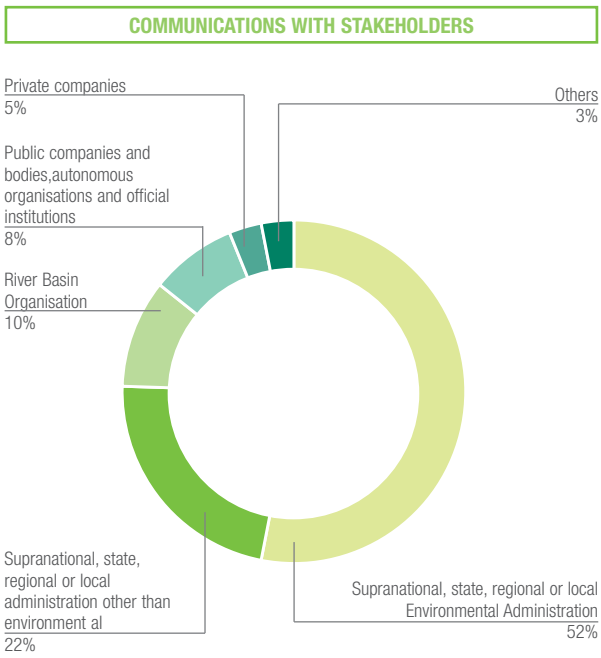
- FCC CONSTRUCCION's image to the general public
- Establishment of relations with stakeholders
- Flow of internal information (top-down and bottom-up), both at the site and in the company

As part of its overall policy, FCC Construcción has set up internal and external communications channels that make it possible to receive and transmit information regarding environmental concerns, proposals for improvement and also acknowledgement of the work done. The communication channels are not only used to disseminate information but are also essential for being able to receive information; this enables stakeholders' demands to be integrated in the company's management system.

As an example, during the last financial year, communication with interested parties was conducted as indicated in the graphs in this report that show the number of relationships

> *Appropriate signposting and fencing of the working area will help to ensure that both FCC Construcción personnel and others involved in the projects (subcontractors or suppliers) will be kept informed of the current environmental regulations and practices.*





of an environmental nature that were established. All the environmental communications appear structured according to the communication matter and the type of institution with which dialogue was established.

As a consequence of environmental communications with the interested groups, 50% of works in the last financial year have dealt with aspects which can give rise to a significant impact relating to the organisation or institution that is directly involved. Furthermore, as a result of internal and external communications in 23% of the works, proposals have been made for environmental improvements with respect to the original project.

In relation to internal on site communications, and in the company itself, we can highlight that 98% of the locations make use of FCC Construction's standard environmental signposting for informing personnel and raising their awareness.

ATMOSPHERIC EMISSIONS

GOOD PRACTICE

Açu Port

Client: LLX Minas Rio Logística Comercial Exportadora S.A. **Completion deadline: 34 months**

I Problem detected:

The Puerto de Açu site is located on the north side of the state of Rio de Janeiro in Brazil, which is a vital area for the reproduction, feeding and resting of sea turtles; the sea turtle is a protected species in danger of extinction. Of the 5 species of sea turtle that can be found along the coast of Brazil, the loggerhead sea turtle (Caretta caretta), is the one that uses the area around the Port of Açu to lay its eggs.

Artificial lighting on the site may cause photo pollution (aka luminous pollution) if it is badly designed, which entails a very harmful impact on the sea turtles' reproductive process. The turtles generally make their nests at night, and so if there is a lot of artificial lighting, the females will not come out of the water and will look for beaches more dimly lit, which can cause them to perish from exhaustion. Even if the eggs have been laid on the beach, excessive lighting can be a problem for the hatchlings, because as they make their way to the sea, they may become disorientated by the light and become easy prey for predators or die from dehydration.

I Solutions adopted:

In order to help protect the specimens of loggerhead or green turtle present in the vicinity of the site, FCC-TARRIO TX has taken a series of steps to minimise the impact of artificial lighting in the area of Puerto de Açu.

The temporary floodlights on the site are orientated in such a way that they do not directly illuminate the sea and are at an angle of 30 degrees to the horizon in order to prevent excessive levels of hemispheric flow, dazzling or intrusive lighting. Both the installation of the lighting system itself and of any structure, whether fixed or mobile, which may receive indirect light, have been painted in dark matt colours. In addition, the lighting system is switched off whenever it is not in use for specific activities.

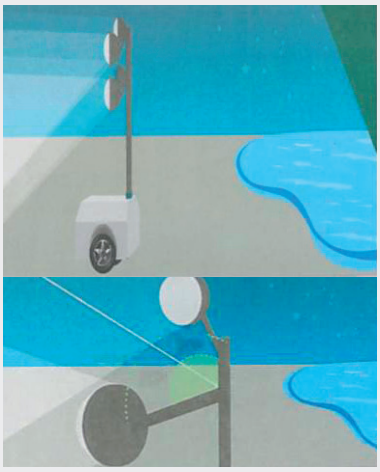
The works have been scheduled so that operations such as dredging, the removal of dredged materials and the construction of breakwaters are carried out exclusively between 7 am and 4 pm during the months of November, December and January.

In order to ensure that all personnel working on the site, both our own hires and sub-contracted personnel, are aware of the impact of their activities on the reproductive period of the sea turtles, and of the environmental determinants and measures implemented by the project management, talks have been given to raise their awareness and information leaflets have been published and distributed.

I Results:

Concrete results of the measures implemented to minimise light pollution during the turtles' reproduction season are as yet unknown as so far execution of the work has not coincided with the turtles' hatching period. However, during the last reproductive season (September 2012 - March 2013) the TAMAR project, the aim of which is to identify and protect sea turtles as they hatch in the vicinity of the Açu Port Complex, identified 28,115 turtle eggs, from which 19,379 hatchlings emerged that succeeded in reaching the open sea to begin their life cycle.

An awareness-raising talk to personnel on the site in relation to the protection of the loggerhead sea turtle.



Positioning of temporary lighting to minimize its effect on turtles present in the vicinity of the site.

Hatchlings leaving the nest and beginning their march to the sea.

	ACTIONS - OPPORTUNITIES							
RISKS	Spraying of roads and stockpiles	Use of screens	Use of dust control systems	Use of pipes to dump rubble	Creation of value due to improvement of levels demanded	Suitable maintenance of the machinery	Speed restriction	Control and restriction of night lighting
Climate change						✓	✓	
Increase of particles in suspension (dust)	✓	✓	✓	✓	✓		✓	
Increase in VOCs					✓	✓		
Decrease of environmental quality	✓	✓	✓	✓	✓	✓	✓	✓
Light pollution					✓			✓

Emissions into the air in the construction sector are mainly dust and particles, occasionally also VOCs, mostly from the production and laying of asphalt, in addition to exhaust gases from equipment powered by combustion engines. These emissions occur basically in a limited space. Apart from these emissions that are directly related to the execution of the works, the consumption of power in buildings where FCC Construcción's corporate services are located is an additional source of indirect atmospheric emissions.

The majority of the works in which the most significant environmental aspect is dust and particle emissions confirms what we pointed out at the beginning of the previous paragraph and justifies the widespread implementation of Good Practices that aim to reduce these emissions; these are shown in the following table:

> *Simple actions that are easy to implement such as covering trucks that transport dust-producing materials or the use of chutes to dispose of rubble from heights considerably reduce the generation of dust on sites.*

Good practice	National			International	FCCCO Total
	Building	CEW	TOTAL		
1a Reduction of dust by spraying tracks and stockpiles with water	86%	95%	90%	79%	88%
1b Use of additives in spray water to create surface crust, paving of tracks, and other lasting dust control practices	0%	3%	1%	9%	2%
1c Use of screens to prevent dust dispersion	10%	5%	8%	15%	9%
1d Use of molecular crushers in installations that generate dust, such as aggregates treatment plants etc…	0%	3%	1%	6%	2%
1e Use of drilling machinery with dust damping system, use of water curtain in the outlets of ventilation ducts or other systems for collecting dust	2%	15%	8%	6%	8%
1f Improvement over the levels required by law relating to controlled parameters (opacity of discharges, suspended particles, etc.)	0%	1%	0%	24%	4%
1g Suitable maintenance of machinery operating on site	66%	78%	72%	68%	71%
1h Environmentally-friendly night lighting	27%	40%	33%	50%	35%
1i Use of ducts for tipping of rubble from heights and covering of containers with canvas	30%	2%	18%	21%	19%
1j Suitable control of vehicles' speed on the site	46%	88%	64%	74%	65%
1k Reduction of dust emission in auxiliary premises	6%	3%	5%	44%	10%

Air quality

Most construction projects call for large-scale earth-moving, as well as the transportation of raw materials that create dust, and quite often, blasting. All of these operations involve the movement of vehicles and machinery that occur on terrain that has not been surfaced with asphalt and constitute a threat to the air quality in the surrounding area.

With the aim of reducing the negative effects caused by dust emissions as much as possible, Good Practices are implemented in FCC Construcción's works such as covering containers and trucks with tarps, surfacing tracks, spraying tracks and stockpiles, erecting screens to prevent the dispersion of dust and using dust capture systems.

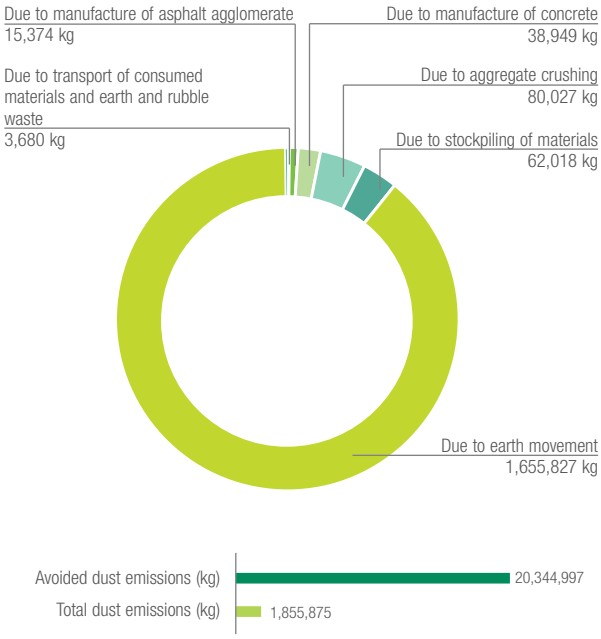
As an example, during the 2012 financial year a systematic hosing of stockpiles and tracks was carried out in 88% of the total of projects (95% in civil engineering projects) and in 65% of projects (88% in civil engineering projects) speed limits were enforced on all vehicles on the site, with signposting in over 30% of the site access roads.

The effective application of Good Practices relating to dust suppression has meant a total reduction of some 20,345 tonnes of dust in works conducted in Spain in the year 2012.

Emissions of contaminants not associated with the Greenhouse Effect

Emissions of contaminants (kg)	Construction Division	FCC Construcción in Spain
Totals of NOx emissions	584,762	452,964
Totals of SOx emissions	6,605	3,992
Total particle emissions	2,352,407	1,855,875
TOTAL EMISSIONS	**2,943,774**	**2,312,831**

DUST EMISSIONS



The data of this table refers to all the works executed by FCC Construcción in 2012 in Spain.

Climate change

As a result of our business activity, gases are also generated that contribute to the greenhouse effect, emissions that need to be minimised, regardless of whether or not they are especially significant in quantitative terms. Aware that climate change is one of the most important problems that society faces today, FCC Construcción made a corporate commitment in 2010 to integrate the variable "Carbon" in its Management System.

FCC Construcción's carbon footprint quantifies the direct emissions (scope 1) caused by the consumption of fuel by boilers, electricity generators, vehicles, machinery and our own manufacturing plants for asphalt agglomerate; indirect emissions (scope 2) which come from the consumption of electricity by project sites and fixed centres and other emissions produced at sources that are not the property of FCC Construcción, but which do result from its activities (scope 3), which may include business trips, the production and transportation of materials, sub-contracted work units and waste management, among others. Scope 3 emissions, the reporting of which is voluntary when drawing up the Greenhouse Gas inventory of an organisation, are the most significant of all types for our company, as they constitute around 90% of the organisation's total emissions.

Direct and indirect Greenhouse Gas Emissions

Emissions classified by scopes (t CO_2e)	Construction Division*	FCC Construcción in Spain**
Scope 1: Direct GHG emissions	**75,084**	**20,750**
Associated with fuel used at projects	NA	19,456
Associated with fuel used at premises	NA	1,294
Scope 2: Indirect GHG emissions	**8,995**	**4,820**
Associated with electricity used at projects	NA	4,165
Associated with electricity used at premises	NA	654
Associated with electricity used as vehicle fuel	NA	1
Scope 3: Other indirect emissions	**506,963**	**305,762**
Associated with the production and transport of purchased materials	446,599	255,177
Associated with the subcontracted works units	32,597	24,863
Associated with the transport and management of surplus waste and materials	18,023	17,008
Associated with employee business travel	9,068	8,430
Derived from losses due to electricity transport and distribution	676	284
TOTAL EMISSIONS	**591,042**	**331,332**

** Emissions reported by the various organisations and countries; not verified.*
*** Emissions verified by AENOR. Scope: worksites and centres located in Spain.*

> *FCC Construcción has published its greenhouse gas emissions report each year since 2010.*

Since the year 2010, FCC Construcción incorporates a protocol that it has developed, implemented and verified for quantifying and reporting Greenhouse Gas emissions. As a result of implementing the Protocol, emissions reports are prepared, verified and published each year that include the inventory of greenhouse gases from FCC Construcción's works sites and fixed centres located in Spain. We present in this Environmental Report the third **Greenhouse Gas emissions report**, with the data for the year 2012, which can be reviewed on the FCC Construcción corporate website.

Having been, in 2011, the first Spanish construction firm to have its greenhouse gas emissions report (for the year 2010) verified by AENOR, FCC Construcción again verified its inventory of Greenhouse Gases in 2012 and received the AENOR Carbon Footprint certificate in that financial year. "Environment CO_2 verified", which certifies the authenticity of an organisation's Carbon Footprint and demonstrates that the company has included all of the management of its GHGs as part of its management system and strategy.

In addition, in 2012, the sector benchmark of the European Network of Construction Companies for Research and Development, entitled "Protocol for the measurement of CO_2 in construction", which was drafted with the active participation of FCC Construcción, obtained the logo "*Built on GHG Protocol*", making the GHG Protocol the set of guidelines for the construction sector. This recognition of the work done by the network of European construction firms means that the method developed by the sector itself is borne out by the tool most widely-used internationally for the calculation and reporting of emissions inventories.

In addition, the initiative implemented by FCC Construcción has received external recognition in the form of an honourable mention for the category "Management

> *Awards ceremony of the 2012 European Environment Prizes in which FCC Construcción's project for the Greenhouse Gas Inventory was awarded an honourable mention in the category "Management for sustainable development."*

for Sustainable Development" for its project in the European Environment Prizes, awarded by the foundation Fundación Entorno.

In addition to the emissions produced as a consequence of its operations, FCC Construcción also calculates the reduction in Greenhouse Gas emissions achieved by the implementation of a series of environmental good practices that go beyond legal requirements and prevent GHG emissions.

> *In order to reduce the emission of Greenhouse Gases all vehicles and machinery used in all works are carefully maintained. Also, when procuring machinery, low-fuel consumption is a priority.*

Avoided emissions

Avoided emissions by the implementation of Good Practices (t CO_2e)	Construction Division*	FCC Construcción in Spain**
By reusing surplus material on site and not taking it to landfill	17,057	13,092
By pH neutralisation with CO_2	453	452
By suitable maintenance of the machinery operating on site	763	745
Due to vehicle speed control on site	95	75
Due to the use of electric vehicles	3	3
TOTAL EMISSIONS	**18,371**	**14,367**

** Emissions reported by the various organisations and countries; not verified.*
*** Emissions verified by AENOR. Scope: worksites and centres located in Spain.*

With regard to the reduction in GHGs, in 72% of the works there was an appropriate and meticulous maintenance of the machinery used on the site, preferably low-fuel consumption machinery, supervised to ensure that the vehicles' engines were turned off when waiting.

Additional strategies that may be implemented to reduce greenhouse gas emissions are controls of cooling temperatures, only using the air conditioning apparatus when strictly necessary, maintenance of the CO_2 collection function of the vegetation, avoiding unnecessary felling and transplanting of trees to other areas, or the reduction and recycling of materials, preventing manufacturing and transport emissions associated with the consumption of materials and waste that replaces them.

Light pollution

Light pollution alters the life-cycle of animal species, affects the habitability of urban areas and, at times, involves an excessive use of power.

In 35% of the projects executed by FCC Construcción in 2012, night-time lighting was used that was respectful of the environment, with the use of directed lighting instead of floodlighting in at least 30% of the surface area, or the automation of on/off switching.

NOISE AND VIBRATIONS

GOOD PRACTICE

Vigo Port Commercial Docks

Client: Vigo Port Authority

Completion deadline: 53 months

I Problem detected:

Although this is a construction project carried out in a port area, in the case of the city of Vigo, the port is located near the city centre, which meant that the noise generated during the execution of the work could disturb the residents in nearby buildings.

The main activity in this project was pile driving, 60% of which had to be inserted into rock, which entails noise and vibration. Pile driving into rock calls for special tools which either drill into the rock using a percussion hammer or a rotating screw head fitted with wolfram carborundum teeth. Piles to be driven near the sea in turn require vibratory grips, which work by making the steel jacket vibrate; as this vibrates, so does the surrounding material, which reduces the resistance between the drill cylinder and the earth.

In addition to the typical noise and vibrations, the problem worsened given that from the beginning it was envisaged that should delays be caused in driving the piles, it might be necessary to work double shifts, which would have involved further disturbance of the local population as this would mean working at night.

I Solutions adopted:

In order to minimise the noise of the work and the repercussions for the residents, an exhaustive study was conducted of the phases of the work and two pile-driving rigs were used whenever the operation permitted. With these two rigs it was possible to meet the deadline while avoiding having to work during the night. Furthermore, during the execution of the work there was no need to carry out tasks on recovering casings lost during night work, although this would have enabled the work to proceed ahead of schedule.

In addition to setting a period during which the work was to be carried out, machinery was procured which would generate the least noise and vibration. The pile-driving was carried out as follows:

- Rotation-drilling rigs with special widia tools for excavation, in order to obviate the need for a vibrohammer, as this tool's blows, fracturing the rock and using a scoop to remove the debris, creates more of a disturbance in terms of noise and vibrations.
- Driving lost casings using a hydraulic variable-frequency vibrohammer, a type of machine that eliminates resonances when it is set in motion and on completion of the job, thereby reducing noise and vibrations to a minimum.

I Results:

Thanks to the implementation of these solutions, there were no complaints or protests from the residents or the Authorities. In addition, the monthly readings of the noise level that were taken at five monitoring stations, within the framework of the Environmental Surveillance Plan, show that the relevant regulations were fully complied with, as the readings were 49% below the permitted limit in 2012 and 63% below it in 2013. In order to achieve the reduction in the figures collected in the field with regards to the permitted upper threshold, the values in units of sound pressure (pascales) were compared.

Special tools with widia teeth for rotation drilling of the pile-driving in rock.

A hydraulic vibrohammer in action driving lost casings.

Site location: close to Vigo city centre.

GOOD PRACTICE

JV: Leon Conference and Exhibition Centre

Client: The Leon Conference and Exhibition Centre Consortium **Completion deadline: 28 months**

I Problem detected:

Traditionally, in order to make a screen wall, cement is poured above the level of the wall to ensure that the healthy cement (not contaminated with bentonite) reaches the level of the finishing. Subsequently, the screen wall is topped off, that is to say, the contaminated cement is chipped off and removed, and then the crown beam is made.

This system produces waste concrete from the demolition, involves the consumption of gasoil and electricity for the demolition machinery and also produces dust and noise when the concrete is being broken up by picks.

I Solutions adopted:

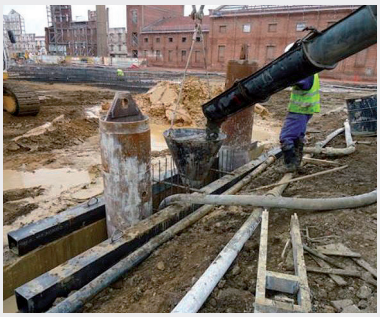
In the Leon Conference and Exhibition Hall project, a decision was made to replace the pile head stripping system and the crown beam with the following process, which has clear environmental advantages compared to the traditional method.

1. First of all, the guide wall is constructed. Its upper edge must match the lower edge of the crown beam.
2. Before concreting the slurry wall, two 20 cm - tall tubes are placed so that the contaminated concrete of the slurry wall is 20 cm higher than the upper edge of the slurry wall. These metal tubes were re-used each time concreting of the slurry walls was done.
3. Once the tubes are fixed in position, the concreting goes ahead up the upper edge of the retaining walls, to ensure that the uncontaminated concrete reaches the upper edge of the wall.
4. Once the concrete is cool, the tubes are removed to proceed with the head stripping of the slurry wall before the concrete sets. As the contaminated concrete is still unset, the head stripping is faster and sustainable, as there is no need to use hammers and therefore no noise is produced and electricity is saved. Also, waste cement has less volume than waste from conventional demolition.
5. During the construction of the adjacent retaining walls, mud containing bentonite will spill over and impregnate the cavities in the metal cages that reinforce the slurry walls constructed previously, so subsequent cleaning will be required. As this is clay, it can easily be removed with a shovel, thereby obviating the need for mechanical means and the associated debris. To ensure that no trace of mud is left in the concrete, a final cleaning is carried out using a high-pressure water hose.
6. Finally, the crown beam is laid. As the upper edge of the slurry wall matches the lower level of the crown beam, this serves as a supporting surface and level for the crown beam to fit, which reduces the consumption of concrete that would otherwise be needed to produce this supporting surface.
7. At the same time as earth is removed to place the anchors, the slurry wall situated on the side where the earth is to be excavated is removed. As the other guide wall will be left in the soil below the crown beam, there is no need to demolish it, which eliminates the production of debris unlike the traditional technique, as well as eliminating noise and dust.

I Results:

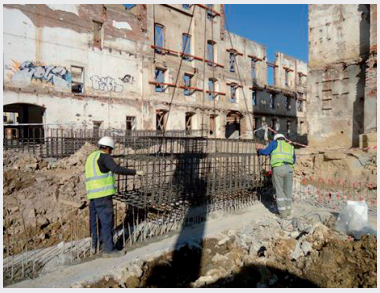
This innovative building technique not only means that the work can be done more quickly, leading to an improved output, but also contributes to better environmental protection, as it reduces both noise pollution and atmospheric emissions. In addition, the solution adopted reduces power consumption and the amount of debris left behind, in contrast to the conventional method.

Building the guide wall with formwork on one side.



Placing the tubes before concreting the slurry wall.

Cleaning the mud mixed with bentonite from the adjacent screen walls.



Making the crown beam.

	ACTIONS - OPPORTUNITIES						
RISKS	Noise and vibration reduction devices	Consideration of the environmental conditions	Reduction of the impact of blastings	Creation of value due to improvement of levels demanded	Use of modern machinery	Speed restrictions	Rational use of machinery
Sound pollution	✓			✓	✓	✓	✓
Discomfort to the neighbouring population	✓	✓	✓	✓	✓	✓	✓
Impacts on the fauna reproductive cycles	✓	✓	✓	✓	✓	✓	✓

In addition to creating dust, noise and vibrations are also significant environmental aspects that are inherent in construction activities and in urban areas they can be a major nuisance and affect the residents' quality of life. In the case of projects carried out in natural environments they can affect the behaviour of the fauna present in the habitat.

The following table shows the Good Practices adopted to reduce noise and vibrations caused by works carried out during the last financial year.

> *In those projects in which noise can have impacts on humans or on the environment, noise level measurements help us to take the necessary measures to reduce their generation.*

		National			International	FCCCO Total
Good practice		Building	CEW	TOTAL		
2a	Use of devices to reduce noise and vibration in installations or machinery on site, with silencers, anti-noise barriers, shock absorbers, etc…	12%	25%	17%	32%	19%
2b	Rubber lining in hoppers, mills, sieves, containers, buckets, etc…	6%	2%	4%	3%	4%
2c	Consideration of environmental conditions in the works programme	47%	41%	44%	59%	46%
2d	Reduction of the effects of blasting	0%	13%	6%	12%	6%
2e	Improvement over the levels required by law for controlled noise levels	1%	4%	2%	26%	6%
2f	Use of modern machinery	82%	90%	85%	53%	81%

> *Simple measures such as reducing the speed limit of vehicles circulating on the site can be very effective for reducing the noise pollution associated with these activities, as noise falls according to speed, traffic density and driving habits.*

Some Good Practices that contribute to minimising sound pollution during a project include fitting equipment and machinery with noise and vibration attenuation devices, to place a rubber coating on specific sources of noise, to impose speed limits within the site, to use modern machinery, to ensure that this is properly maintained, and other such measures.

During the 2012 financial year, in 81% of all projects executed by FCC Construcción, modern machinery was used with the CE mark (includes both own machinery and that of sub-contractors). In addition, in 46% of the projects executed in that same year, the conditions of the surrounding area were taken into account, limiting noisy activities to those times of the year when they would be least disruptive, in order to minimise the effects on the local population and on animal species. Noise and vibration attenuation devices were fitted to installations and machinery in 19% of the projects, in addition to noise-reduction barriers, dampeners, etc.

> *When we are located in sensitive environments, such as the one of Açu Port Project, we are well aware that there is a need of developing a demanding environmental action plan and of monitoring it periodically. The environmental Good Practices related with noise and vibrations are key to the fauna protection in the area of influence of the project.*

EFFLUENT DISCHARGES

GOOD PRACTICE

PAC4, Enlargement of the Panama Canal

Client: Panama Canal Authority (PCA)

Completion deadline: 44 months

I Problem detected:

One of the pools built for sedimentation of the solids in suspension in the waste water from the crushing process was not meeting its objective efficiently. Consequently, the concentrations of the solids suspended in the final effluent were above the maximum permitted threshold according to the relevant regulations.

The problem was caused by a flaw in the pool design, as this was not appropriate to ensure the retention time needed to allow the deposits to settle.

Specifically, the concentration of the suspended solids in the effluent was not considered as an important factor when the pool was designed. What is more, no protocol was established to regulate the activation of the pumps that discharge the water into the pool from the Northbound channel, nor was the use of any chemical agent considered (for example, flocculants) to facilitate the precipitation of the solids in suspension.

I Solutions adopted:

To optimise the pool system, reduce the concentration of solids in suspension and comply with the maximum permitted limit, the following measures were implemented:

- The pool was divided into two compartments by placing stones which simultaneously functioned as a filter.
  - In the first compartment, which receives the water from the sedimentation bath at the crushing plants, the flocculant is added, which enables the greater part of the sediments to be decanted. This compartment is cleaned regularly, as the sediment accumulates.
  - After the sediment flocculation, the water exits through a small sluice to one side and flows through the second compartment until it reaches the pumping point. As this is a longer route, the sediments are captured. Cleaning of this zone is conducted according to the extent of sediment saturation. In this second compartment, a dipstick was placed to determine the water level and monitor the pumping of the water to the diversion channel.
- A dosing dispenser was fitted to dispense liquid flocculant into the channel outlet for the water from the crushing and rinsing processes at the crushing plants.

I Results:

As a result of this process, the silt is deposited in the Disposal Site allocated and the water is pumped to the North Diversion Channel, where sampling is conducted twice a month to check that regulations are being complied with, as well as to monitor the effectiveness of the process.

The results of the samples taken since the pool sedimentation system was overhauled by dividing the pool into two compartments, adding flocculant and placing a dipstick to determine the water level, confirm that that the pool is now more efficient. With the solutions adopted, the retention time and effluent quality have been improved, and the concentrations of suspended solids are well below the maximum limits according to regulations.

Flocculant tank at the entrance to the first pool compartment.

View of the pool at its maximum pumping level.

Sampling pool effluent.

Division of the pool - the central dyke acts as a filter.

	ACTIONS - OPPORTUNITIES						
RISKS	Treatment of waste water	Effluent decanting pools	pH treatment	Prior aeration to landfill	Creation of value due to improvement of levels demanded	Re-use of process waters	Choice of suitable cleaning systems
Generation of large volumes of effluent discharges		✓	✓			✓	✓
Water pollution	✓	✓	✓	✓	✓		✓
Acidification and subsequent impact on aquatic flora and fauna	✓	✓	✓		✓		
Loss of scarce resource						✓	✓
Increase in temperature and subsequent impact on aquatic flora and fauna		✓		✓	✓		
Eutrophication	✓	✓	✓	✓	✓		✓

The potential alterations caused by construction work in aquatic ecosystems can be categorised according to the extent to which they alter the hydrological cycle when they extract water for use in processes and operations, to how much they affect the quality of the water resources by returning water that has been used containing contaminants or the morphological alterations at source (extraction of aggregates, diversion and filling of water channels). FCC Construcción identifies these potential effects when carrying out the environmental planning for each project, selecting the Good Practices that are to be implemented as preventive measures.

Below, we show the percentages of Good Practices implemented in relation to water management in works executed by FCC Construcción during the year 2012.

	National			International	FCCCO Total
Good practice	Building	CEW	TOTAL		
3a Use of portable wastewater treatment plants or recoverable prefabricated septic tanks for treating sewerage water	4%	32%	16%	35%	19%
3b Effluent decanting pools with or without use of additives, in effluent discharges and process waters	1%	25%	11%	32%	14%
3c Neutralisation with acid of the pH of basic effluents	0%	11%	5%	0%	4%
3d Improvement of the levels required by legislation or by the discharge licence in controlled parameters	0%	3%	1%	9%	2%
3e Re-use of concrete mixer washing water	26%	20%	24%	12%	22%

> *The use of geotextile screens minimises the increase in the dispersion of fine sediment and separates other substances in emulsion such as oils and hydrocarbons by flotation, which prevents the contamination of nearby water.*

All of the Good Practices that permit a reduction in the consumption of water contribute to minimising the problems that can affect water masses as a result of modifying natural waterways. An efficient use of water in ancillary works and installations minimises the risk of not maintaining the environmental channels and reduces the flows of effluent, permitting a simpler and more economical treatment of the waste waters. In general, and except for certain unusual projects, such as tunnels, the volumes of waste water, including sewage, are small. Even so, we carry out prior treatment on all of our effluent and waste water in all of our works before they are discharged. To avoid problems such as the reduction of dissolved oxygen or eutrophication, portable purifiers and septic tanks are installed, depending on the water channel that needs to be treated.

The most common problem with managing water in construction works is that solids can be carried away by surface run-off. Although it is an inert, non-contaminating material, the increase in the concentration of suspended solids in the water basins has a negative impact on fish and on the natural conditions of the water masses. Our Good Practices reduce the probability of erosion on sites and place containing structures (straw barriers, geotextiles, etc.) to prevent these solids from reaching the water.

As we have already said, tunnel boring presents a particular set of problems from the point of view of managing water spills: high flows, alterations in pH, a high concentration of solids and sites that are often located in places of great natural value. This requires the installation of technically more advanced water treatment plants that may require reagent dosing, continuous pH monitoring, solids drying ,etc. The water can also be used again; for instance, in preparing bentonite. In this aspect, 14% of the construction projects that were ongoing in 2012 used pools to decant effluents in effluent discharges and process water and 4% of these installed an automated pH treatment system for their basic effluents.

During the 2012 financial year, with the aim of reducing consumption and water discharges, the water used to rinse concrete drums was reused at the concrete plant itself in 22% of the works. Also, in 19% of the total of projects, portable water purifiers or retrievable prefabricated septic tanks were used to treat waste water and thus avoid discharging it directly.

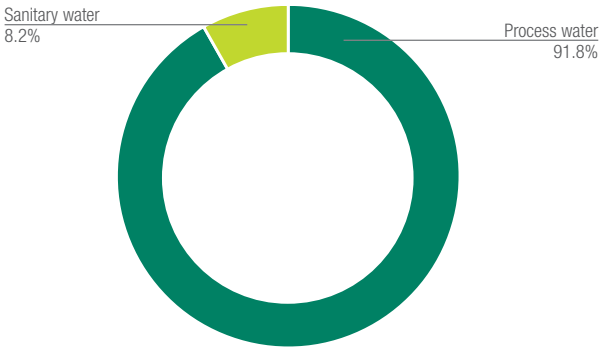
The measuring of the volumes discharged to the various water channels and of the reused water allows us to quantify our impact on the environment. The data collected during the financial year 2012 enable us to show the

> *Example of two Good Practices related to discharges, which were implemented in the construction of Vigo New Station. Firstly, a temporary barrier using bales of straw was erected to prevent an increase in turbidity in nearby water courses and, secondly, the channelling of water used for rinsing concrete mixer gutters into a specially designed purpose-built pool before discharging it into the surrounding area.*

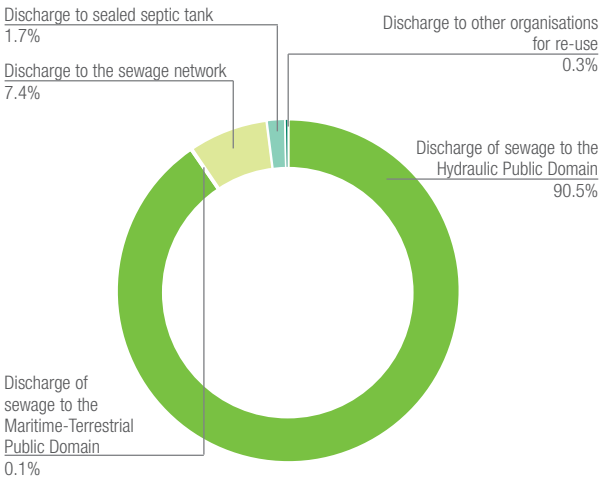
volumes of waste water discharged, as well as the volumes of treated and reused water from all of the works executed in Spain.

As you can see from the graphs, 91.8% of the discharges come from process water, while 8.2% of this is sewage water. As for the destination of the discharges, most of them (90.5%) go to the Public Water Domain, while the rest is discharged into the sewers (7.5%) and septic tanks (1.7%).

ACCORDING TO NATURE OF THE DISCHARGE



ACCORDING TO DESTINATION OF DISCHARGE



Discharge of effluent

Type of discharge	Volume (m³)
Total discharge	**2,331,565**
According to nature of the discharge	
- Sanitary water	190,955
- Process water	2,140,610
According to destination of discharge	
- Discharge of sewage to the Hydraulic Public Domain	2,110,341
- Discharge of sewage to the Maritime-Terrestrial Public Domain	1,383
- Discharge to the sewage network	173,801
- Discharge to sealed septic tank	39,759
- Discharge to other organisations for re-use.	6,281
Recycled or neutralised water on site	**210,126**
Treated water	**1,725,358**

Water resources affected by significant discharges

Type of effect	Nº obras
Major spills or leaks in protected natural sites	8
Major spills or leaks on undeveloped sections of the coast	10
TOTAL	**16**

Most significant accidental spills

Type of spill	No. of spills	Volume (m³)
Total uncontrolled or accidental spills	**55**	**16**

The data in these tables refer to all works executed by FCC Construcción in Spain in 2012.

> *Example of two Good Practices related to discharges, which were implemented in the construction of Vigo New Station. Firstly, a temporary barrier using bales of straw was erected to prevent an increase in turbidity in nearby water courses and, secondly, the channelling of water used for rinsing concrete mixer gutters into a specially designed purpose-built pool before discharging it into the surrounding area.*

OCCUPATION, CONTAMINATION OR LOSS OF SOILS

GOOD PRACTICE

Machinery park and some worksites in Portugal

Client: Various **Completion deadline: N/A**

I Problem detected:

In some works in Portugal, particularly those over a wider area, and in the Equipment Depot there were processes of contamination of the soil, due to discharges of cement, used oils or hazardous substances.

This basically occurred because some concrete mixers rinsed their discharge chutes directly on site, which, as well as having a considerable impact on the environment, created a negative image among the local townspeople. Moreover, although the site had sealed areas for the equipment, at times some components were left in other areas where the ground was unprotected, which could lead to discharges of used oils.

I Solutions:

When it was discovered that this problem was recurring in several different sites, it was decided as an internal requirement that all FCC works must set up washing pools for the chutes that would need to be easy to access and fully sealed and signposted, with protection from the rain whenever possible. These washing areas were designed to be of sufficient size to handle the amount of concrete expected. Also, through the purchase specifications, concrete suppliers were informed that this was mandatory and that no drums were to be washed on site, only the chutes being permitted to be washed there.

In addition to the maintenance of the vehicles and equipment in waterproofed areas, it was also ensured that the equipment or component parts thereof that could cause possible contamination of the soil with oils or gasoil would always be stored in waterproofed zones.

I Results:

As a result of this generally implemented practice, there has been a significant reduction in cases of soil alteration on sites due to possible spillage of water from washing cement, oil or fuels.

There has also been a reduction in complaints from nearby towns and the implementation of this new system contributes to preventing possible non-compliances with laws and regulation with the adverse rulings that might entail.

Finally, the customers have demonstrated their satisfaction with the environmental management of the works, which are now cleaner and more organised.

Concrete washing pools.

Storage of hazardous substances and waste.

Protection of the ground on which equipment and machinery are parked.

	ACTIONS - OPPORTUNITIES						
RISKS	Restoration of areas affected	Restriction of occupied areas and access areas	Prevent occupation of environmentally valuable zones	Concentration of auxiliary installations	Prevention of accidental discharges	Correct execution of loading and un-loading operations	Suitable maintenance of the machinery
Occupation of the ground	✓	✓	✓	✓			
Visual impact on countryside	✓	✓	✓	✓			
Pollution of soil		✓	✓		✓	✓	✓
Destruction of the regenerative capacity of the vegetation		✓	✓		✓	✓	✓
Loss of potential uses	✓	✓	✓	✓	✓		

> *Some worksites may be located in sensitive areas of great environmental value. FCC Construcción promotes the physical limitation of these spaces in order to protect the flora and fauna.*

Due to the functions it performs and its individual characteristics, the land is one of the natural resources most valued by humans as it is a fundamental element for a host of their activities. It has a series of characteristics that make it different from other resources and, at the same time, make it very vulnerable. Firstly, it is a resource that is virtually non-renewable as it possesses quite rapid degradation kinetics and the rates at which it forms and is regenerated are extremely slow. Secondly, it has a great storage and buffering capacity, due above all to its high organic material content. It is able to store water, minerals and gases but also many contaminating agents. It may occur, therefore that it goes beyond the point of no return in trapping these elements and buffering, and the contamination may be released and dispersed in many different forms.

Construction operations have a direct effect on this resource both due to the intrinsic needs of the project to occupy the surface as for the space needed for ancillary installations, areas for stockpiling and access roads. In addition, other activities associated with the works such as earth moving, excavations, access roads, moving heavy machinery and accidental discharges can alter the natural state of the soil due to compacting or contamination.

This is why on all FCC Construcción sites, Good Practices are implemented, such as those set out in the following table, that allow us to minimise the impact on the land.

During the 2012 financial year, in 88% of national and international work tasks restoration of the affected areas was carried out using on-site means, including the clea-

	National			International	FCCCO Total
Good Practice	Building	CEW	TOTAL		
4a Restoration of the areas affected by site installations	96%	97%	96%	35%	88%
4b Limitation of the access areas	87%	78%	83%	32%	77%
4c Limitation of occupied areas	86%	83%	85%	0%	73%
4d Prevention of accidental discharges	66%	71%	68%	9%	60%

> *The restoration of the areas affected using the means available on the site is a Good Practice that counter-acts environmental risks of land-use, visual impact of the works on the surrounding landscape and loss of the potential uses of the land on which the building or infrastructure is being constructed.*

ning and removal of elements foreign to the environment and reconditioning the compacted land to give it a shape in accordance with the surrounding environment.

Access was restricted in 77% of the works executed by means of a written plan or diagram for the access roads and other routes as well as signposting in situ. In addition, the areas occupied were demarcated in 73% of works to minimise occupation and alteration of the land.

Operations such as loading and unloading, maintaining the equipment used in the works and the delivery and storage of fuels can lead to contaminating discharges on the land. Besides exercising the utmost care with which these operations are performed and providing adequate means to prevent soil contamination, for example, the use of protective sheeting against spills or the use of storage bins for waste and hazardous substances, the project management draws up and implements Emergency Plans that include actions to be taken in the event of accidental discharges. In 60% of works executed in 2012, a range of operations were conducted with a view to preventing accidental discharges.

> *To prevent harm from accidental discharges of fuel, oils or other hazardous substances, we waterproof the surface where the machinery used on site is located, such as the generator in the picture.*

USE OF NATURAL RESOURCES

GOOD PRACTICE

Enniskillen General Hospital

Client: Northern Ireland Health Group (NIHG)

Completion deadline: 36 months

I Problem detected:

One of the project requirements was the reduction in the consumption of energy in comparison with the consumption levels of the former Enniskillen Hospital, which had to be kept below 50 GJ/m^3 per annum and with CO_2 emissions of less than 120 kg/m^2. To achieve this reduction in energy consumption, the hospital design envisaged a Combined Heat and Power unit (CHP), to take advantage of the waste heat energy produced to become water vapour used in the heating system, thereby saving on energy consumption, which was the target set in the project.

However, when an attempt was made to purchase the planned CHP it had been discontinued, so the construction team had to look at the construction stage for an alternative with equal or better benefits than that originally planned with the acquisition of the CHP unit.

I Solutions adopted:

Having studied a number of different alternatives, such as geothermal energy or the installation of a wind turbine, the solution finally adopted to replace the CHP unit was to use a Spilling Engine, which produces the same amount of power and heat as the discontinued unit.

For the installation of the Spillings engine one of the 8 bar biomass boilers was replaced with a new 30 bar boiler with similar specifications to the one it replaced but larger and with a greater heat capacity.

The Spilling engine generates electricity and produces steam at a pressure of 8 bars, after passing through a pressure reduction system, which is combined with the steam produced by the other boilers and channelled to the hospital to cater for its heating requirements.

I Results:

Following the installation of the Spilling engine and the new system, it was observed that although more fuel pellets are consumed, the annual calorific energy output is higher than expected according to the original design, and so the overall cost of the installation is lower.

There has also been a considerable reduction in the maintenance work needed as the Spilling engine works according to the hospitals demands for heat, in contrast to the on/off control system of the CHP unit envisaged in the original project design.

All of the above is evidence that the solution selected has enhanced the energy efficiency of the building in its post-commissioning phase. This and other actions taken helped the project win the *Green Apple Award* in the category "Improvement of the Environment and Architectural Heritage."

New installations at Enniskillen Hospital, to reduce the energy consumption of the old hospital.

GOOD PRACTICE

Atletico Madrid's new stadium

Client: Atlético de Madrid S.A.U

Completion deadline: 56 months

I Problem detected:

The enlargement and refurbishment of the Madrid Municipal Stadium (La Peineta) to convert it to a football ground involves earthmoving of a total of 663,069 m^3, with 81.7% projected landfill and the remaining 18.3% to be re-used for the works themselves.

Also, due to the requirements of the manner in which the project is to be carried out, it will be necessary to make an excavation that was not included in the original project design, of 50,000 m^3 in trenches for the pile caps in the foundations, which will subsequently be filled in up to a level above them.

As these are such large volumes and no hazardous waste is involved, hauling such quantities to a landfill site would mean missing an opportunity to makes use of potentially useful material, which we should endeavour to upgrade and reuse to improve the project's environmental impact.

I Solutions adopted:

In order to reuse earth from excavation and with the expectation that the earth will be of good quality since the site is an old sepiolite mine restored with material from the mine workings themselves, the project management decided to start collecting land from the earth moving operations in the area intended for the future Stadium car park.

In addition, when the earthmoving subcontractor was hired, a letter of undertaking with regard to Land Use was requested, to identify possible sites for disposing of soil and thus seeking an alternative to sending them to landfill, which was the destination initially planned in the project.

Before reusing the soil to fill in the trenches required to fit the pile heads, tests were conducted to ascertain the characteristics of the extracted arid material and the stockpiled material. The results obtained were more than satisfactory.

I Results:

By mid-2013, of the 381,384 m^3 of excavated soil:

- Almost 55% had been deposited by the sub-contractor at other sites, mostly for the extension of the Mercamadrid urban development project (FCC), the A-2 Northeast Motorway (OHL) and the 117 houses in El Cañaveral and the Valdebebas Park construction project.
- To date, 13% of the excavated soil has been reused on the actual site for refill in the foundations.
- 123,097 m^3 of excavated soil (approximately 32%) have been stockpiled on the site, awaiting their use/final destination.
- The remaining 25 m^3 were sent to landfill, as this was soil mixed with rubble and other inert waste.

Although at that date the football pitch and access tunnels had not yet been excavated (approximately 230,000 m^3), the manner in which the excavated soil has been managed thus far is evidence of the good environmental performance of the project.

The substantial reduction in the amount of land that was planned to be allocated to landfill from the initial project involves the use of the resource, obviates the removal of new material, minimises emissions of greenhouse gases associated with transportation and reduces the need for landfills.

On the left, a panoramic view of the site; on the right, stockpiles of earth.

Machinery excavating earth for the foundation landfills.

The initial project involved digging a trench for each pile head, which made the pile head stripping and steelwork tasks, and the formwork for them more difficult.

The definitive solution for fitting the foundation pile was to dig a trench to ensure that the work could be executed correctly.

	ACTIONS - OPPORTUNITIES						
RISKS	Re-use of inerts	Re-use of topsoil removed	Compensation of mass diagram	Use of elements recovered from other works	Exchange of surpluses with other works	Re-use of effluents and process waste waters	Reduction of water and power consumption
Over-exploitation of natural resources	✓	✓	✓	✓	✓	✓	✓
Drought						✓	✓
Climate change	✓		✓				✓
Difficulty when opening borrow pits	✓	✓	✓		✓		

Since the 1970s, organisations such as the Club of Rome have been alerting about the loss of balance between the rate at which natural resources are being consumed and the rate at which they are being renewed. Since then, uncoupling economic growth from the increase in the rate of consumption has been a challenge for governments, scientists, social agents and companies.

During these years, with the aim of encouraging the sustainable use of natural resources, institutions, universities, associations and companies have made their contributions in the form of management tools, models, regulations, corporate social responsibility commitments, etc. In the case of the construction business, a consideration of the life-cycle of projects at the design stage (according to the alternatives chosen in terms of the construction techniques or materials employed) can significantly influence the minimisation of the consumption of raw materials and energy resources. However, it is also possible to achieve notable results in minimising consumption during the execution of the project itself. As proof of this, the following table shows the percentage of FCC Construcción sites where Environmental Good Practices were implemented that contributed to optimising the consumption of materials.

	National			International	FCCCO Total
Good practice	Building	CEW	TOTAL		
5a Re-use of inerts from other sites.	14%	14%	14%	18%	15%
5b Use of recoverable elements in site processes such as removable walls (traditionally of concrete for later demolition) in aggregates crushing installations, etc…	4%	2%	3%	18%	5%
5c Reduction of borrow-pits compared to the volume forecast in the project	60%	66%	62%	21%	57%
5d Re-use of effluents wastewaters from processes	1%	12%	6%	6%	6%
5e Re-use of removed topsoil	4%	62%	29%	44%	31%
5f Usage of elements recovered from other projects, like portable water treatment plants, containers, etc…	26%	22%	24%	9%	22%
5g Use of recycled water for watering, if it complies with the necessary quality requirements	1%	6%	3%	24%	6%
5h Use of renewable energies	0%	0%	0%	6%	1%

> *A Good Practice to reduce the volume of soil to landfill is to stockpile earth and uncontaminated materials for later use for filling in the same project. In this way, we modify the use originally planned for this material; reducing the need for space associated with landfill sites and minimising the consumption of material from borrow pits.*

In the analysis of the project from the works planning stage, the bases were laid to be able to maximise the reuse and recycling of any material that could be reincorporated in the life cycle of the project without having to turn it into waste. In this way, by implementing Good Practices we were able to ensure that inert materials, earth, rubble, effluents and waste process water were reused, either in the works themselves or at another site where there was a need for such materials, in order to reduce the consumption of fresh resources as much as possible.

In general construction projects, especially in the case of civil engineering works, call for large-scale earth-moving, part of which involves the layer of vegetation covering the soil. The management undertaken by FCC Construcción is focused on two objectives: "zero borrowing" and upgrading as the key element in the edaphic regeneration of the topsoil that needs to be removed.

In financial year 2012, the use of resources provided by the land itself rather than those brought in from external sources permitted a reduction in the volume of borrowed material in relation to the amount projected within the initial project in 57% of the works. In addition, in 31% of the total number of works, (62% in civil engineering projects) the topsoil removed at other sites was reused to carry out the re-landscaping. This operation was conducted by separating the topsoil in horizontal layers of less than two and half meters in height and tossing the material gathered over six months. These processes preserved the land's original edaphological characteristics.

Certain auxiliary elements maintain their operational conditions when the works are completed, or they can be recuperated, which enables them to be reused for new projects. In the last financial year, 22% of FCC Construcción's projects reused equipment such as portable purifiers or vats, among others.

Construction is not an activity with intensive water consumption, but given that this is such an important resource and that it is influenced to such an extent by complex spatial and temporal circumstances resource, FCC Construcción applies to its management a series of integrated saving criteria, with the aim to cut "demand" before resorting to any increase in the extraction of this resource. FCC Construcción is consistent in driving the policies of “save”, “make good use of” and “reuse” to achieve the responsible consumption of water.

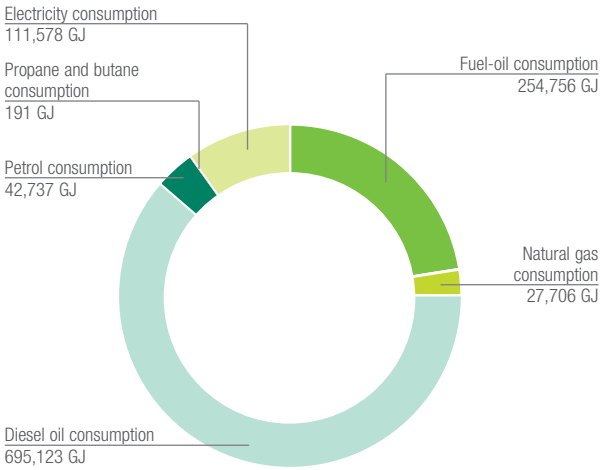
> *FCC Construcción encourages and values the use of recovered items from other works, as in the case of waste storage vats, which, after completion of a project are stored temporarily and re-used in a new project.*

> *Aware that water is a scarce resource of which we must make a rational use, in many of our works recycled water is used for spraying roads and stockpiles, provided it meets the necessary quality requirements.*

Energy consumption is also managed by increasing the yields of conventional systems or by using more efficient alternative systems with a dual purpose: contributing to the conservation of an exhaustible resource and reducing emissions of the associated greenhouse gases.

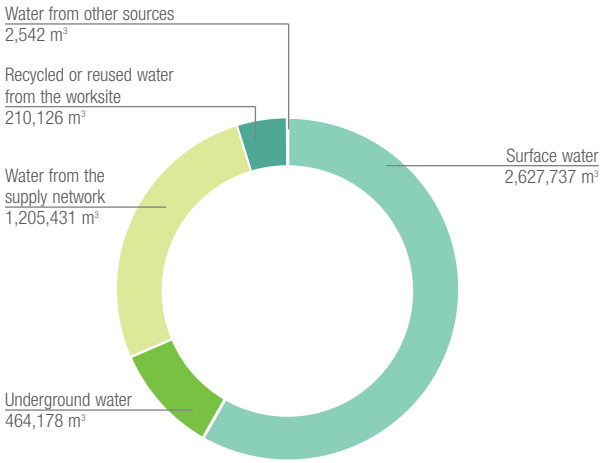
In such a disparate activity in terms of type and location as construction is, it is no easy matter to collect the data needed to record the consumption of resources. However, this inventory is paramount in the strategy to reduce resource consumption so FCC Construcción records the consumptions in all activity centres and measures their developments over time.

ENERGY CONSUMPTION



TOTAL: 1,132,091 GJ

CONSUMPTION OF WATER BY SOURCE



TOTAL: 4,510,014 m³

Consumption of Resources

Resource consumed	Consumption
Raw materials and materials * (t)	
Asphalt agglomerate	4,295,489
Concrete	7,106,459
Steel	221,719
Brick	9,476
Glass and metals	24,675
Aggregates, soil and rubble	31,448,247
Plant soil	1,719,755
Wood	591
Paint, solvents, stripping substances, concrete curing liquids, accelerators, fluidifiers, antifreeze and epoxy resins	62,793
Other harmful and hazardous substances	8,341
Resources from valuation of inert waste ** (m³)	**5,751,571**
Surplus earth or rocks	5,706,854
Surplus clean rubble	44,717

** Construction Division*
*** FCC Construcción in Spain*

GENERATION OF WASTES

GOOD PRACTICE

North Tenerife Airport

Client: AENA

Completion deadline: 24 months

I Problem detected:

The work consisted in the demolition and rebuilding from the sub-base level of most of the apron at North Tenerife Airport.

Specifically, a concrete slab apron had to be demolished and resurfaced; the slabs were 30 cm thick as well as an apron with 35 cm thick asphalt agglomerate. A series of structural repairs were also required on a concrete slab platform 35 cm thick.

These works generated 51,000 tonnes of rubble from the demolition of the concrete and 21,000 tonnes of asphalt agglomerate rubble, which, according to the building project, had to be removed and dumped at an authorised dumping site. In this regard, it must be borne in mind that the project was being executed on an island, which due to the fact that it is a tourist destination and possesses natural scenery of great value, is particularly sensitive in terms of environmental protection and is also subject to strict limitations when it comes to areas for dumping.

I Solutions adopted:

In view of the amount of material that had to be transported to the tip, alternatives were considered from the outset to reduce or monetise the material, with the aim of maximising the environmental and economic outcome.

After demolishing the existing slabs, it was discovered that the quality of the 'picón' (pyroclastic basalt often used in the Canary Islands as a sub-grade) was insufficient for re-use and would not meet the requirements for the sub-grade of an apron parking area for aircraft. To resolve this problem, the solution proposed consisted in re-using the material from the crushed concrete slabs and converting it into an artificial aggregate; meanwhile the excavated basalt was placed at the disposal of the airport for use in landscaping.

As for the asphalt agglomerate slab, this was milled and placed at the disposal of the airport to build an operations apron in the area used for stockpiles.

I Results:

With the solutions described, it has been possible to upgrade all of the debris from the works, that is to say, 100% of the demolished airport apron.

First of all, the amount of concrete rubble from the demolished slabs taken to tips was reduced to zero. Then, the basalt extracted from beneath the slabs was re-used as material for landscaping and for fill in areas that were not load-bearing, thereby obviating the need to purchase such materials. Finally, the milled asphalt surface provided the material required to build an operations apron for the airport.

The success of the project, which has helped to make the project more economically viable, its contribution to the protection of the environment and the company's corporate image, merited the award for the most eco-efficient project that improves the company's results in the III International Eco-efficiency Awards of the FCC Group.

Demolishing the apron concrete slabs.

Installations built with crushed concrete.

Spreading and levelling crushed concrete fill.

Laying the HP45 slabs.

Stockpiled milled asphalt agglomerate.

Laying the asphalt agglomerate.

	ACTIONS - OPPORTUNITIES							
RISKS	Improvements in the design and construction process	Reduction of packaging waste	Purchase of material in suitable quantity and container	Correct identification and storage of waste and y containers	Classification and individual management of the C&D Wastes	Compensation of mass diagram	Management of excavation surplus	Assessment "in situ"
Generation of large volumes of C&DW	✓			✓	✓	✓	✓	✓
Increased quantity and diversity of containers and packaging	✓	✓	✓	✓	✓			✓
Production of HW and associated risk	✓		✓	✓				
Increased quantity of earth and other excess excavation materials	✓					✓	✓	✓
Increase in production of waste due to inadequate storage		✓	✓	✓	✓			
Increase in production of waste due to inadequate transport		✓			✓	✓		✓

> *The containers for the storage of hazardous substances and waste must be clearly identified with the appropriate symbol and label.*

The series of environmental problems that are posed by demolition and construction waste is determined by their large volume, and despite the fact that they are mostly inert, mismanagement could cause a considerable environmental impact that would manifest itself in the form of illegal dumping, the obstruction of public water courses and a major impact on the landscape. FCC Construcción bases its management of C&D waste on the implementation of objectives that aim at utilising their great potential for recycling and conducting a selective separation of the substances that could be toxic and hazardous.

The objective set in the Waste Disposal Act of recycling 70% of C&D waste by 2020 will be the challenge that FCC Construcción seeks to meet with an integrated waste management strategy that follows the hierarchy established by the EU: reducing at source through selective separation of materials according to their characteristics, reuse, recycling, revaluation and, to the smallest extent possible, disposing of waste with as little impact on the environment as possible. The Good Practices that have allowed us to come closer to meeting these objectives and the implementation of which in 2012 is shown in the following table, take as their starting point a firm commitment at all the organisation levels within FCC Construcción.

Goood practice	National			International	FCCCO Total
	Building	CEW	TOTAL		
6a Reduction of inerts taken to landfill compared to the volume forecast in project	77%	76%	77%	18%	69%
6b Classification/segregation of construction and demolition wastes for its individual management	66%	62%	64%	18%	58%
6c Changes in the design or in the building system with regard to the use of materials that generate hazardous wastes such as asbestos, de-coffering liquids, additives, resins, varnishes, paints, etc., generating wastes of less or no danger	5%	1%	3%	21%	6%
6d Reduction of packaging waste through practices such as requesting materials with packaging that is returnable to the supplier, re-use of polluted packaging, reception of elements in bulk that are normally provided in packages, etc…	27%	22%	25%	6%	22%
6e Management of excavation wastes	23%	35%	28%	44%	31%
6f Valuation of rubble	23%	29%	26%	9%	23%
6g Use of devices to reduce waste volume (paper, cardboard, metal, etc.)	17%	13%	15%	24%	16%

FCC Construcción calculates the waste produced in the course of each works project. During the year 2012, a total of 3,660,660 tonnes of waste was produced, of which just 0.12% was hazardous waste.

Waste produced

Recycled/reused materials	Quantity (t)
Hazardous waste	4,490
Non-hazardous waste	3,656,170
TOTAL	**3,660,660**

The full data on waste produced in FCC Construcción projects are shown below:

> *Awareness of the value of implementing proper waste management means that even less quantitatively significant waste, such as paper generated in the offices on the site, is subjected to selective separation for subsequent recycling. While this may appear to be a small gesture, it is indicative of the awareness and conscientious attention to detail of FCC Construcción staff.*

Waste produced *		QUANTITY
HAZARDOUS WASTE		**4,357,629**
Empty hazardous waste Containers (kg)		**68,952**
15 01 10	Empty packaging containing residues of DS or contaminated by DS	47,662
15 01 10	Empty plastic packaging containing residues of DS or contaminated by DS	6,897
15 01 10	Empty metal packaging containing residues of DS or contaminated by DS	14,394
Solid hazardous waste (kg)		**2,109,393**
15 02 02	Absorbents and wiping cloths contaminated by DS	15,749
16 01 07	Oil filters	85,526
16 01 09	Components containing PCBs	0
16 02 13	Discarded electrical and electronic equipment containing hazardous components	1,353
16 05 04	Gases in pressure containers containing DS	7,482
16 06 01	Lead batteries	106,066
16 06 02	Ni-Cd batteries	590
16 06 03	Mercury- containing batteries	31
17 01 06	Mixtures of, or separate fractions of concrete, bricks, tiles and ceramics containing DS	3,340
17 02 04	Glass, plastic and wood containing or contaminated by DS	115
17 05 03	Soil and stones containing DS	1,750,451
17 06 01	Insulation materials containing asbestos	7,120
17 06 05	Construction material containing asbestos DS	128,189
17 09 03	Other construction and demolition wastes (including mixed wastes) containing DS	152
20 01 21	Fluorescent tubes and other mercury-containing waste	3,231
20 01 31	Cytotoxic and cytostatic medicines	0
Used oil (kg)		**2,059,822**
12 01 12	Spent waxes and fats	26
13 01 13	Hydraulic oils	1,337,000
13 02 05	Mineral-based chlorinated engine, gear and lubricating oil	9,806
13 03 08	Motor, synthetic insulating and heat transmission oils	705,189
13 03 10	Other insulating and heat transmission oils	7,801
Liquid hazardous waste (kg)		**119.462**
08 01 11	Waste paint and varnish waste containing organic solvents or other DS	7,601
08 01 17	Stripping Wastes from paint or varnish removal containing organic solvents or other DS	0
08 01 19	Aqueous suspensions containing paint or varnish containing organic solvents or other DS	1,641
08 04 09	Waste adhesives and sealant containing organic solvents or other DS	2,815
08 04 15	Aqueous liquid waste containing adhesives or sealants containing organic solvents or other DS	5,340
12 01 09	Machining emulsions and solutions free of halogen	141
13 07 03	Fuels (including mixtures)	12,235
14 06 03	Solvents and solvent mixtures	6,488
16 01 13	Brake fluids	1,300
16 01 14	Antifreeze fluids containing DS	0
16 01 21	Release agents, curing liquids, plasticizers, liquidisers	22,910
16 05 06	Laboratory chemicals consisting of or containing DS	837
16 07 08	Wastes containing oil	58,153

** For FCC Construcción works only (in Spain and International projects); excluding FCC Industrial.*

> *The reuse of surplus materials such as earth and rocks, preferably by the same project that generates them, or in another project, means that waste can be converted into useful material to complete other phases of the works projects. As well as reducing the volume of waste sent to landfill, this means that natural resources can be spared.*

Waste produced *		QUANTITY
NON-HAZARDOUS WASTE (kg)		**3,612,427,403**
Inert (m^3)		**3,558,782**
17 01 01	Concrete	45,225
17 01 02	Brick	778
17 01 03	Tiles and ceramics	3,121
17 01 07	Mixtures of concrete, bricks, tiles and ceramics not containing DS	1,122,940
17 05 04	Soil and stones not containing DS	2,386,717
Urban waste (kg)		**2,857,637**
20 02 01	Compostable waste	431,625
20 03 01	Mixed municipal waste	2,426,012
Other non-hazardous waste (kg)		**50,788,226**
01 05 04	Fresh-water drilling muds and wastes	331,260
08 03 18	Waste printing toner	62,828
10 11 03	Waste glass-based fibrous materials	950
12 01 13	Welding wastes	2,003
15 01 06	Non-hazardous mixed packaging	67,978
16 01 03	End of life tyres	3,410,537
16 06 04	Alkaline batteries (except mercury-containing batteries)	471
17 02 01	Wood	2,699,841
17 02 02	Glass	34,680
17 02 03	Plastic	388,516
17 03 02	Bituminous mixtures not containing coal tar	6,045,733
17 04 07	Mixed metals	3,097,650
17 08 02	Gypsum-based construction materials other than those mentioned in 17 08 01	252,531
17 09 04	Mixed non-hazardous construction and demolition wastes	33,472,797
19 08 05	Sludges from treatment of urban waste water	718,821
20 01 01	Paper and cardboard	201,627
20 01 32	Expired medicines other than cytotoxic and cytostatic	2

** For FCC Construcción works only (in Spain and International projects); excluding FCC Industrial.*

FCC Construcción's strategy takes the specific form of a series of Good Practices that, implemented in the various works, allow us to manage the waste produced in an efficient manner. Among the most outstanding results of the implementation of these Good Practices in 2012, in addition to the reduction in inert waste sent to dumping sites in 69% of the works in progress, were the separation and classification of wastes from construction and demolition for individualised management in 58% of the works and centres of the company.

In addition, in 31% of the works the surplus materials from excavations were managed and reused in another project or in the restoration of the areas degraded, while in 23% of the works executed in 2012, the rubble was upgraded.

In addition, in order to improve our waste management, a forecast is made of the amount of such materials that are likely to be generated. These forecasts, along with the milestones of waste generation, allow us to study the various different alternatives for managing the waste, as well as plan how best to handle, separate and stockpile the waste.

The following table shows the data for the forecast amounts and the amounts actually produced of excess earth and clean rubble in the financial year 2012.

> *The signposting of the waste storage areas, especially if it is graphical signalling, increases the understanding of the project personnel, regardless of their nationality; what improves the organisation and cleanliness of the working place.*

Recycled/Used materials

	Quantity forecast	Actual Quantity
Surplus soil and stones (m^3)		
Disposed in landfill	5,427,690	4,217,183
Used in the same project (compensation/excavation/fill)	5,798,925	5,633,484
Used from other projects	162,162	73,370
Used in other projects	373,568	1,044,179
Obtained from borrow pits	5,519,211	1,752,867
Total excavation	12,452,493	11,400,017
Total fill	10,242,768	7,805,672
Clean rubble (concrete, mortar, brick, prefabricated elements, others) (m^3)		
Disposed in landfill	975,929	1,134,902
Used in the same project	25,277	40,632
Used from other projects	14,510	4,085
Used in other projects	120	2,082
Delivered to a recovery installation	345,869	28,536

The data of this table refers to all the works executed by FCC Construcción in 2012 at Spain.

As far as surplus soil and rocks are concerned, alternative uses were found for 1,210,507 m^3 other than landfill, they were used namely as raw materials for the same project in which they were generated. Also worthy of note is the reduction in clean rubble (concrete, mortar, bricks, prefabricated items, etc.) that was sent to landfill, which came to 15% less than initially projected. These data are clear evidence of the successful management of the waste and of the resources used.

By applying the principles set out by the Management with regard to waste from packaging, in 22% of the works, practices were implemented to reduce them, such as requesting the material supplier to use returnable packaging, reusing contaminated containers or purchasing high volume products in bulk rather than in lower capacity containers. These practices were implemented for 5 or more materials in every one of the projects.

The active participation and commitment of all personnel is especially important in the implementation of Good Practices relating to waste management; this is why it is essential to provide appropriate and sufficient environmental training to all personnel involved in the project.

Although produced in small quantities, FCC Construcción pays special attention to the management of hazardous waste, as its toxicity can cause serious environmental problems. In order to prevent potential impacts at source, a series of guidelines are followed: knowing their characteristics and implications, understanding and practising actions to avoid contamination of other waste and exhaustive monitoring and tracking, as required by law.

This is why all works have areas specifically designed for storing waste properly and safely, whether it is the result of the activities or generated by subcontractors.

> *The control and suitability of waste storage areas are crucial for correct waste management.*

LAND PLANNING

GOOD PRACTICE

Elblag-Podrodzi Road

Client: Olsztyn Regional Road Network

Completion deadline: 24 months

Problem detected:

The renewal of 24.3 km of roadway of a highway located in northern Poland, in the Elblag and Tol regions, meant that the site was located in protected natural areas.

Within a 100-metre strip from the highway, habitats of hermit beetles (Osmoderma ermita), were identified. This is a rare and protected species. Moreover, this species in included in the Nature Network 2000 and is on the Red List of animals in Poland, where it is classified as 'at risk'. The presence of this animal species in an area so close to the site called for the implementation of preventive and protective measures to prevent possible impacts on the creature and its habitat.

Solutions adopted:

The following measures were adopted:

- Before felling trees likely to contain larvae inside its trunk, the entomologist extracted them and they were deposited in a kind of wooden barrel with mineral wool and two litres of rotten wood mulch inside. The larvae spent the winter in these containers, which helped them to survive, because if the larvae had remained in the trees, they would have been exposed to inclement weather and rodents.

- Throughout the winter, shelters for the transfer of the larvae to their natural habitat in spring were created. To achieve this, the tree trunks that had been cut after removal of the larvae were cleaned and cured with natural materials, in the unlikely event of the trunk having been damaged in the extraction process. The 27 tree trunks that were treated in this manner were lashed together 3 x 3 to form 9 dens. The trunks were then buried at a depth of one metre and at the base stones, soil, arid material, plant wool and some 20 litres of wood mulch were laid. Also, a small roof was fitted to the upper part of the dens and a protection against rodents in the lower section.

Results:

All of these measures implemented have succeeded in protecting hermit beetle specimens present in the habitats in the vicinity of the site and also promote their development. The high degree of awareness amongst the team engaged in the work has been a key factor in achieving these successful results.

Extracting hermit beetle larvae from the trees in the vicinity of the highway route.

The Hermit Beetle Osmoderna ermita.

Lashing the trunks together to make a den.

Constructed dens in which the larvae were placed at the end of the winter.

GOOD PRACTICE

Improvement of Las Chilcas Mountain Road

Client: Aconcagua Motorway **Completion deadline: 24 months**

I Problem detected:

One of the main objectives of the Environmental Management Plan of the Project "Improvement of Las Chilcas Mountain Road" is to minimise the environmental impacts on the low-mobility threatened wildlife, in particular the Andean Toad (*Bufo spinulosus*).

Relocation and wildlife rescue programmes are a conservation tool to reduce the loss of genetic variation that occurs in species threatened by the reduction or disappearance of their populations. These efforts of capture are aimed more at rescuing individuals and safeguarding their gene pool than saving entire population groups.

This type of rescue is appropriate in projects such as this one, which modifies the habitat in a specific and limited area, where there are few threatened species.

I Solutions adopted:

The operations to rescue and relocate the individual animals with low mobility commenced, applying the protocol for amphibian sampling. Each operation lasted three days and was carried out by a team consisting of two specialists and two technicians.

The success of the capture was based on Zippin's population removal index, which explains how all of the individuals in the area can be found by means of consecutive samplings in the area. In order to o this 100 m^2 cross-sections were conducted in the rescue zone in which samplings were conducted until all individuals had been captured. A mesh bag was used to contain the amphibians collected. The entire riverbank zone was inspected between the foliage and stones in the moist sectors.

Meanwhile work proceeded in parallel to select the area where the animals would later be released. This area has to have the minimum abiotic and biotic tolerance ranges for the species in question; in other words, an area was selected similar to the one where the animals were captured, with special consideration of the food resources and places where they could seek shelter.

I Results:

Due to the conditions of environmental stress of the Las Chilcas estuary, owing to the total lack of water, no individuals of Bufo spinulosus or any other type of amphibian were found in the first search, although the protocol for amphibian rescue was followed precisely.

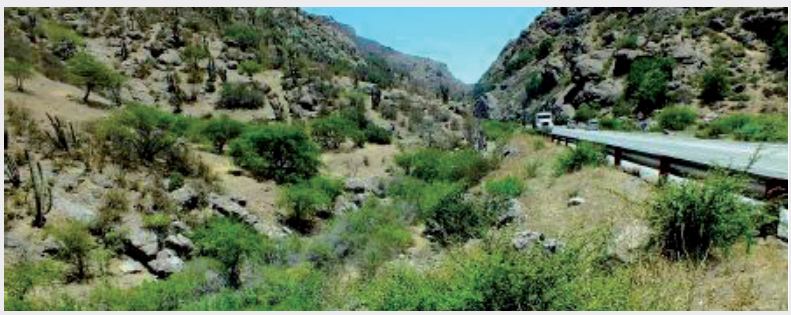
The absence of the species that it was intended to rescue and of any other species of amphibians, was essentially due to the environmental conditions that were encountered: drought, a totally dry water course, and exposure to average temperatures of 35 degrees centigrade, characteristic of such a hostile habitat.

Despite not having detected the presence of this protected species, circumstances may be different if in the autumn-winter precipitations restore the balance of the water level in the estuary, allowing juvenile or adult individual amphibians to be carried from the higher levels by run-off water. Therefore, the project management has proposed to continue with the monitoring program during the autumn-winter, when there is water availability as a result of precipitation and then in the spring to assess whether there has been any colonisation by species.

Las Chilcas riverbed - totally dry.

A section of the riverbed colonised by bushes, which shows that there has been no flow of water.

The area selected for release, where there are zones with available water and humid substrate.



A photograph showing the landscape around Las Chilcas, the habitat of Bufo spinulosus.

	ACTIONS - OPPORTUNITIES						
RISKS	Protection of examples of flora	Replanting	Use of indigenous species in the restoration	Planning of the works (life cycles, critical stages…)	Transfer of habitats or individuals	Use of means to prevent dirt	Use of signposting, protection and signalling for reduced occupation of pavements and roads
Removal of vegetation	✓	✓	✓	✓		✓	
Erosion, desertification	✓	✓	✓	✓			✓
Impact on the fauna	✓			✓	✓		
Loss of biodiversity	✓	✓	✓	✓	✓		
Visual impact on countryside	✓	✓	✓	✓		✓	✓
Dirt in the environment						✓	✓
Interference with traffic or external installations						✓	✓

Concern with the conservation of biodiversity has manifested itself in numerous international agreements that set out to promote cooperation between countries, to ensure that the process of extinction of species is halted and with it the destruction of the habitats they need to survive.

Europe, a highly populated continent, densely urbanised and with extensive communications and transportation infrastructures, is a region where the aims described above are especially complex. This is why a number of tools have been introduced, such as the European Strategy for the Conservation of Biodiversity, the Habitat Directive, the Birds Directive, Nature Network 2000, LICs, etc. Also, in Latin America, there are countries which are richer in terms of biodiversity, and this adds to the challenge of the conservation of this valuable cultural heritage.

There are many interactions between our works and natural spaces, flora and fauna and this is true even in those places where humans have already shaped the landscape to a large extent. FCC Construcción strives to overcome these hurdles with a set of Good Practices that are a pragmatic version of a corporate strategy for the conservation of biodiversity which is aimed at minimising the effects on plant and animal life and also on the urban environment and existing infrastructures. These actions are shown in the following table:

	National			International	FCCCO Total
Good practice	Building	CEW	TOTAL		
7a Physical protection of individual items	16%	37%	25%	18%	24%
7b Transplants	10%	28%	18%	18%	18%
7c Adaptation of the project planning to the life cycles of the most valuable species	1%	14%	6%	21%	8%
7d Movements of nests or individuals	1%	8%	4%	6%	4%
7e Use of measures to avoid dirt at the site entrance and exit	86%	82%	84%	44%	79%
7f Occupation of pavements and roads	73%	52%	64%	9%	56%

> *FCC Construcción takes special care of those arboreal species that may be affected in the zone where we conduct our works. With the aim of conserving these species, protective areas are established and if it is not possible to respect their location due to the requirements of the project, the trees are replanted.*

Biodiversity

A total of 24% of the works executed by FCC Construcción in 2012 implemented Good Practices related to the physical protection of the plant species present on the site. Thus, the unique species are protected from possible harm caused by construction work or traffic vehicles and machinery on the site itself.

In turn, in 18% of the works, it was necessary to replant some unique specimen that would have been affected by the work, in order to prevent its destruction and continue to grow in another location.

In addition, if there are protected animal species in the working area, the impacts that our activities may have upon them are studied and if it is determined that these could be harmful, the nests or individuals are relocated. Another measure that is often taken is to plan the work schedule around the life cycles of the fauna, avoiding noisy processes during mating seasons or in the early hours of the morning and late in the evening, which is when birds are most active.

In the year 2012, a total of 13 works were located in natural areas listed as important and another 6 in protected natural areas. During that year, 44 ha of land affected by construction work were re-landscaped and a total of 37 ha of vulnerable areas were protected.

> *In order to integrate sites where construction works into the surrounding landscape, re-landscaping operations are conducted. For instance, measures were employed such as hydroseeding, which enables cuttings to be replanted.*

Restoration and protection of spaces

Protection measures	Surface area (ha)
Restoration of affected spaces	44.09
Protection of sensitive areas	37.32

Ground adjacent to or inside natural protected spaces or areas of high, unprotected biodiversity

Type of impact	No. Works	Surface area (m²)
Location in natural or protected pairs	6	1,405,390
Location in zone with countryside classified as of high importance	13	4,218,953
Impact on natural river bed in protected area	8	106,807
Impact on vegetation catalogued or protected	14	6,615,250
Impact on catalogued or protected species	13	4,063,763

The data of this table refers to all the works executed by FCC Construcción in 2012 in Spain.

Urban environment

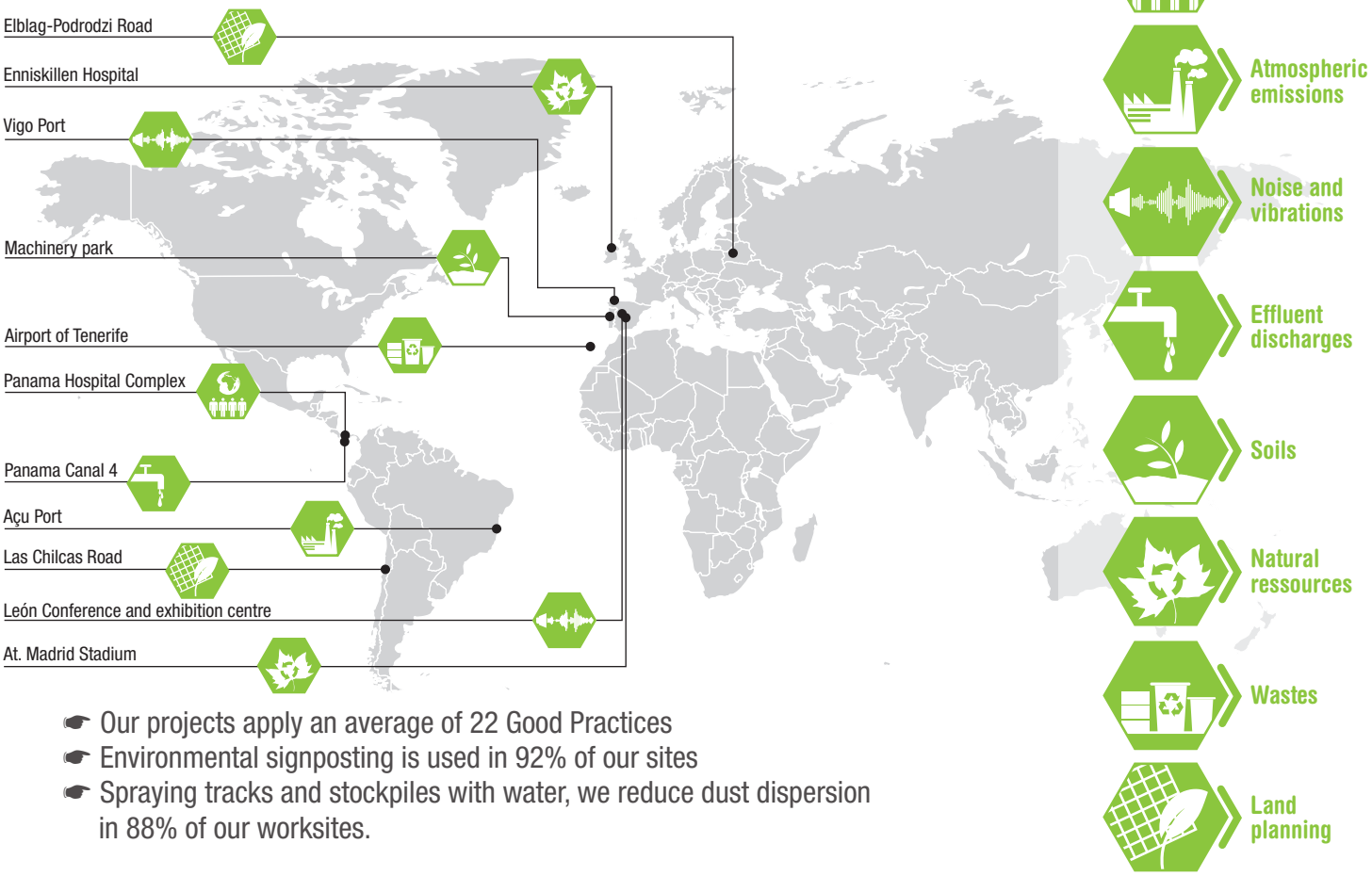
The built environment is a concept that reflects with precision the new concept of the urbanised world in which we live. Making construction and the infrastructures of buildings compatible is fundamental in order to achieve dynamism and competitive cities, with the minimum temporary disruption of people's quality of life. It is the citizens who will benefit from those works that interact with the everyday processes of urban metabolism.

The Good Practices encompassed in this group succeed in reducing nuisances such as the dirt that can be associated with construction sites. Thus, in 79% of our construction projects truck wheels were sprayed before they ventured onto the public highway. Likewise, to minimise the nuisance occasioned by occupying pedestrian areas and link roads to the site's facilities, protective measures were taken on 56% of sites (fencing, signposting, cordoning off the pavement, road surface etc.) and alternative access routes were provided.

> *To minimise the inconvenience caused by our operations and prevent soiling of roads from the works, actions such as the use of sweeping or washing the wheels of trucks before going on to public roads are carried out.*

At a glance

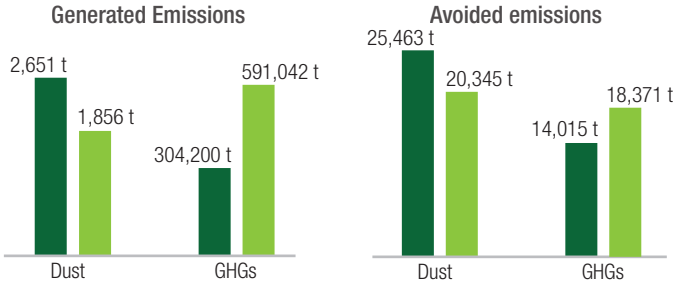
The outstanding Good Practices of 2012



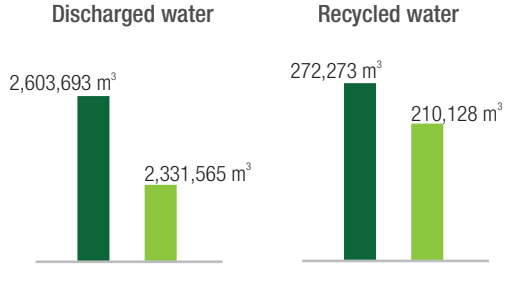
- Our projects apply an average of 22 Good Practices
- Environmental signposting is used in 92% of our sites
- Spraying tracks and stockpiles with water, we reduce dust dispersion in 88% of our worksites.

Our main environmental indicators

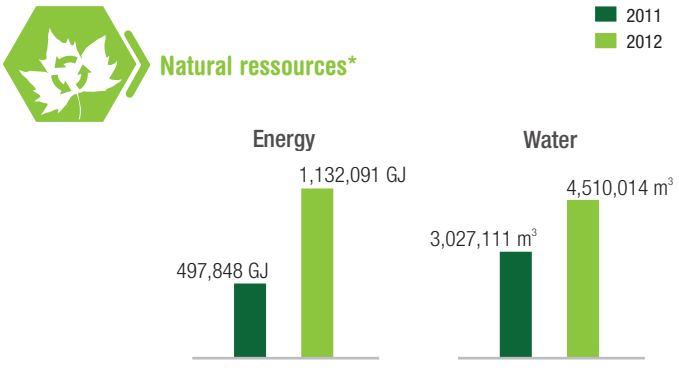
Atmospheric emissions



Effluent discharges



Natural ressources*



** The data of 2011 do only refer to the projects of FCC Construcción in Spain*

Wastes*

** The data of 2011 do only refer to the projects of FCC Construcción in Spain*

The challenges for the future

United Nations forecasts indicate that in 2050 three quarters of the world's population will live in cities; cities, which are the engines of the economy, but which also have a major impact on the natural and social environment. In this context, and given the demand in terms of energy efficiency, sustainable development and quality of life, the challenges we face and the opportunities presented to us as a company are clear.

It is, therefore, essential that the civil engineering works and buildings we construct for the citizens of the future are efficient and that they embody the three variables of sustainability. Particularly, in a period so deeply affected by the current economic situation, we must face our future by boosting innovation, cultural values and respect for our surroundings.

> *The Official College of Architects of Madrid.*

To paraphrase Kofi Annan, development is a challenge, which demonstrates that stability and prosperity are inseparable. Therefore, as a company that is committed to development and future prosperity, we must look beyond short-term benefit and persevere in our responsibility and commitment by turning the demands of the environment and society into our greatest strength. FCC Construcción's actions must continue to be based on the central premise of continuous improvement and be focused on respect to the environment. This continuous improvement, through the analysis and reduction of environmental incidents, stems from our activity and our actions to prevent contamination, to reduce waste and to optimise the consumption of resources.

We must reinvent ourselves. In order to rethink our future, it is evident that we must take into account the opinions of all stakeholders and find out what services are being demanded by the society, because they are ultimately the future users of the projects in which we work today. It is, therefore, essential to set up two-way communications channels to inform, to communicate, to listen and to relate with other parties.

In this Environmental Report we have given an overview of the most important environmental aspects that impact on our activities. We have grown and improved the channels of dialogue with our stakeholders. We have participated in many international working groups to develop standards for sustainable construction. We have calculated our organisation's carbon footprint and established an ambitious commitment to fight against climate change. We have committed ourselves to a "circular economy" by enhancing our targets for reuse and recycling of waste in our worksites and by increasing the ratio of recovered materials. We have provided training in environmental management to our professionals, in order to increase their awareness and improve their competitiveness and productivity. Furthermore, thanks to our Environmental Good Practices system we set environmental objectives for all our projects and we analyse those that benefit the environment most, seeking the ideal solution according to the activity carried out.

In these years, much progress has been made, but we must not become complacent, we must not look back, as there is still a long road before us and we must not lose sight of the future if we are to press on. We must continue evolving and innovating to achieve the best results, which is our constant goal.

We must also be prepared for a different future, one that is characterised by new needs and new challenges that will force us to adapt our strategy and improve it, to renew ourselves and to continue growing. A future based on a global enterprise yet with local needs, which has meant that in the course of the last year we have develop new procedures and improved the existent ones, in order to facilitate the organisation's entrance onto the international market and the implementation of our Management and Sustainability System. The improvement and adaptation of FCC Construcción's IT applications constitute another important challenge for improving the planning and collection of data, abroad as well as at home. Good Practices are a key element in our management, but the information and analysis of results are the basis for their improvement, which is why the incorporation of the System in our international projects has been an important step in 2012. Being aware of our impact is the first step for defining a sustainable future.

The problem is not finding a different future, but rather to make sure that we have a future; let's build it together.

Construcción

Balmes, 36
Barcelona 08007
Tel: +34 93 496 49 00
Fax: +34 93 487 97 92

Av. Camino de Santiago, 40
Madrid 28050
Tel: +34 91 757 38 00
Fax: +34 91 514 10 12

www.fccco.es
www.fcc.es