French Chamber Singapore

Sustainable Investment and Best Practices SHOWCASES

Year: 2017

Category :
(delete wrong ones)
Energy efficiency
Sustainable building

Country of the Best Practice: **France**

Company name: **Dragages Singapore (a member of the Bouygues Construction Group)**

Industry: **Construction**

Turnover (2015):
Worldwide: 12 billion EUR
Asia Pacific: 3 billion EUR

Workforce (2015):
Worldwide: 50,000
Asia Pacific: 13,500
Singapore: 1,070

Headquarter (country): **France**

Company Website :
www.bouygues-construction.com
www.dragages.com.sg

Company logo:

BOUYGUES CONSTRUCTION

Dragages Singapore
A member of Bouygues Construction group

ABC Building
Designing a completely self-sufficient building

DRAGAGES SINGAPORE

BACKGROUND

For more than 25 years, **Dragages** has contributed to shape Singapore skyline having built iconic projects like the Singapore Sports Hub or the Fullerton Hotel and some of the most prestigious high-end high-rise residential buildings.

Dragages Singapore is a member of the **Bougyues Construction Group**, one of the world's most influential construction groups of the 21st century. Created in 1952 and active in over 80 countries, the Group benefits from a stable shareholder structure with the two main shareholders being the Group's employees and the Bouygues family.

Our belief in **sustainable development** means balancing competitiveness and business acumen with quality, safety and the environment. With the goal of becoming a key player in green design and low-carbon construction we implement solutions combining environmental and economical performance for our customers.

OBJECTIVE(S)

To design a completely self-sufficient building (control of energy consumption, production of energy from renewable sources, energy storage), and to put the user at the focus of the building

APPROACH

As part of the Research and Development programme it launched in 2012, Bouygues Construction is developing an ABC demonstrator in Grenoble (a 90-unit apartment building) under a partnership with the Municipality and social landlord Grenoble Habitat.

The ABC—Autonomous Building for Citizens—concept aims to achieve self-sufficiency in water and energy and to optimise waste management at the scale of a building or an entire development.

RESULTS

On-going

KEY SUCCESS FACTORS

A for Autonomous:

- **Reduction of energy and water consumption** (efficiency/frugality and effectiveness of saving mechanisms);

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- **Production of energy from renewable sources** to cover the year-round requirements of occupants;
- **Storage and self-consumption of the energy produced;**
- **Harvesting of rainwater for use in the building, partial recycling** of wastewater;
- **Increased sorting of waste and waste-to-energy applications for fermentable waste.**

Related solutions: electricity generation by photovoltaic panels, wind turbines, or tidal-stream turbines (including run-of-river turbines); storage of electricity in batteries and/or hydrogen production; water filtration and recycling systems; water-recycling showers; ultra-low-flush toilets; heat-recovery systems; micro-methanation (production of biogas from fermentable waste, sewage, and domestic bio-waste)

B for Building:

- **A thermally-efficient building** ('passive' building);
- **A connected, communicating building** (monitoring of consumption, customised information and alerts for occupants, etc.);
- **A building incorporating the most highly advanced construction methods** (designed with building information modeling, industrialisation of construction);
- **A building that takes account of its energy production and optimises storage.**

Related solutions: high-efficiency façade solutions, Building Information Modeling, monitoring interface and alerts on tablet and phone, low-consumption appliances supplied with the building, real-time management of technical services for consumption, production, hybrid storage, etc.

C for Citizens:

- **Incorporation of shared premises and places for interchange** (shared guest rooms, club room, community gardens);
- **Ensure buy-in** of the building and its operation by the occupants;
- **Co-design of the building with** Grenoble Habitat, the future manager.

Related solutions: 'virtual' tests and trials with future occupants, progressive training of occupants, monitoring of building performance and the level of buy-in by occupants over time, etc.

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Recycled concrete- Using recycled materials to reduce the carbon footprint of structures

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OBJECTIVE(S)

To reduce the carbon footprint of engineering structures by targeting a more circular economy

APPROACH

The use of recycled concrete aggregate (RCA) for construction is currently being investigated. The use of concretes made with RCA is now authorised by European standard NF EN 206-1/CN*, but the number of cases where it has been used is still low and feedback is rare.

RESULTS

On-going

KEY SUCCESS FACTORS

The main partners** in the Nîmes–Montpellier railway bypass project studied the **technical and industrial feasibility of using concrete made with RCA** for one of the structures in the project as part of a joint innovation procedure aimed at making beneficial use of recycled materials.

Carried out with the support of France's Recybeton concrete-recycling research program, this demonstration operation led to the development and deployment of an **RCA concrete for a bridge on a cycle path.**

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This innovation procedure:

- **demonstrated the industrial feasibility** of using such a concrete and gave an appreciation of its interest in environmental terms;
- **identified current obstacles** to the development of this kind of concrete in France and opened up new avenues for work to facilitate its use.

MAIN STRENGTHS

By carrying out this trial, Bouygues Construction and its partners made a contribution to two important issues:

- **Production of concrete with as little impact as possible in terms of energy, carbon, and finances,**
- **Reduction in the use of virgin aggregate, a natural resource that is to be preserved.**

(*) There are some restrictions on its use, however. The standard describes the requirements applicable to the ingredients of concrete, to the properties of fresh and hardened concrete and their verification, to the restrictions imposed on the composition of concrete, to the delivery of fresh concrete, to manufacturing control procedures, to conformity criteria and assessment
(**) Oc'Via and the Bouygues group, Owner and coordinator of the construction consortium; the SETEC Group in charge of engineering

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Low Carbon Concrete

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OBJECTIVE(S)

To test a 'low-carbon' concrete for reducing the carbon footprint of a project

APPROACH

Concrete is the basic raw material used in construction. But its manufacture generates substantial emissions of CO2.

RESULTS

Close to 60% of the concrete works of this operation were made using CEM V cement. Half of the structural works were built during the winter.

The CarbonEco® software solution highlights a reduction in CO_2 emissions of **10% for the construction phase as a whole.**

KEY SUCCESS FACTORS

The Ivry Barbès Thorez residential development is the first Bouygues project to have used a 'low-carbon' concrete (CEM V) for all aspects of the work and throughout the entire construction period.

Features:
Most of the structures were built using a concrete made with CEM V cement.

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SHOWCASES

- **A series of tests** was carried out to analyse performance under routine placement conditions. They proved to be satisfactory compared to 'conventional' concretes. This study served to standardise the use of a concrete based on CEM V cement for a standard jobsite by determining the special conditions and restrictions on use of this kind of concrete.

- **A feedback report summarising the tests performed and analysing the conditions of placement of the concrete** ended this stage of the test. Carbon footprint and financial analyses were carried out at the end of this phase. The carbon footprint analysis can be used to promote company know-how in business-development proposals (demonstrating competitive advantage)

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