

PRESS KIT

***WE
BUILD
MODULAR***

| JUNE 2019 |

**BOUYGUES
BATIMENT**

INTERNATIONAL



TOMORROW STARTS **TODAY**

- By 2060, the world population will increase from 7.3 to 10.2 billion people according to UN projections. **This demographic growth will have concrete consequences on the demand for housing** throughout the world, but also more broadly on the growth of hotel, healthcare and student accommodations... The World Economic Forum estimates that more than 2 billion new homes will have to be built by the end of the century! In the next decades, we will thus need to build better, faster and in a more cost-effective way. To take up this challenge, Bouygues Bâtiment International proposes a significant change in the way that we build buildings today, and a revolution in construction methodology : **we build modular!**
- **Bouygues Bâtiment International is the only company to offer a holistic approach worldwide**, from technical feasibility studies to project delivery. And this, with complete control of production: module manufacturing, transportation, logistics, installation and coordination of all trades off site and on site. **This is a true revolution.** In Singapore, Bouygues Bâtiment International has demonstrated that it is able to offer an alternative to traditional construction. An ambitious alternative: Clement Canopy, two high-end residential towers, 40 storeys, 505 apartments made with 1,899 modules. **With this new and iconic project, Bouygues Bâtiment International has established itself as the market leader in modular construction.**
- This project is the beginning of many others. In the United Kingdom, Australia, USA, Hong Kong... Bouygues Bâtiment International offers modular alternatives. We are only at the beginning of the history of modular construction. **Bouygues Bâtiment International is already involved in this game-changing technology** with the help of our engineers, partners and clients. And we will keep on innovating with our R&D team to always offer the best experience to our staff and clients. **We are ready to explore the modular path to propose concrete, green and long-lasting solutions** to meet the needs of the 21st century.

*Nicolas Borit
CEO President
Bouygues Batiment International*



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DRAGAGES SINGAPORE, **THE PIONEER IN MODULAR CONSTRUCTION**

- In April 2016, United Venture Development commissioned Dragages Singapore (a Bouygues Bâtiment International subsidiary) to build an ambitious new housing project on Clementi Avenue, in the heart of a residential and student district in western Singapore. **The Clement Canopy building consists of two 140m high towers, the tallest ever built in modular concrete.**
- Dragages Singapore is the modular construction laboratory for Bouygues Bâtiment International. The company has already delivered modular buildings in Singapore such as the Crown Plaza Hotel or Woodlands Care Nursing Home.
- The technology which is used by Dragages Singapore is PPVC (Prefabricated and Pre-finished Volumetric Construction). **Modules are prefabricated in the factory including the installation of most of the trades, before being brought to the site for assembly.**



THE CLEMENT CANOPY

THE HIGHEST MODULAR TOWERS EVER BUILT

To achieve this technical feat and meet the developer's needs and requests, Dragages Singapore provided support from start to finish.

The design process was developed with Dragages's in-house engineering team and the architect, to optimise the modular design (modularization of floor plans, design adaptation to facilitate off-site manufacturing, syntheses and coordination with BIM...)

The manufacturing was divided into two steps:

- In Senai, Malaysia: the place where modules structures are precast on a yard.
- In Tuas, West Singapore: in this factory technical and architectural works are carried out (up to 40 trades: plumbing, electricity, tiling, painting, waterproofing...)

Then, modules were transported to the site where it is stacked as per the sequencing programme and to form its structure.





CLEMENT CANOPY, KEY FIGURES

THE CLEMENT CANOPY PROJECT

2 TOWERS —



***— 40
STOREY
TOWERS***



***140_m —
HIGH***



— **505**
LUXURY
RESIDENTIAL
APARTMENTS
(2,3,4 BEDROOMS)




1,899 —
MODULES



— **GROSS FLOOR**
AREA :
46,000 m²





**MODULAR
CONSTRUCTION:
A MAJOR INNOVATION**

MODULAR CONSTRUCTION : **A MAJOR INNOVATION**

Modular construction is an off-site construction method. Concretely, modules are manufactured in a factory and then transported to the site, where all that remains is to assemble them in the Lego way.

It is a significant change in the way that we build buildings today, and a revolution in construction methodology. Modular manufactures the majority of the building off site and then the modules are assembled on site.



A MAJOR INNOVATION **FASTER**

- By industrialising and building offsite around 50% of a project, it removes any loss of time on site due to poor environmental or weather conditions.



A MAJOR INNOVATION **BETTER**

- Each module is manufactured under strict quality control and checks.
- Each unit is entirely pre-finished with fit-out and façade treatment.
- All defects are managed prior to handover to site which ensures lower maintenance cost during the lifecycle of the building.



A MAJOR INNOVATION **COST EFFECTIVE**

- Increased productivity and design optimisation from the start significantly reduces the need for large teams on site.
- A shorter construction programme means a quicker handover, leading to earlier revenues and reduced financial costs.



A MAJOR INNOVATION **SAFER**

- Health and Safety is our number one priority and Modular Solutions provide a more protected working environment for our teams, reducing occupational health risks and risks from working at height.



A MAJOR INNOVATION **GREENER**

- Waste is reduced on site by 70%.
- Traffic and disruption to local residents is also reduced with less deliveries, less noise and dust.





BOUYGUES' HOLISTIC APPROACH

BOUYGUES' HOLISTIC **APPROACH**

Bouygues Bâtiment International is the only company to offer a global approach, from technical feasibility studies to project delivery. And this, with complete control of production: module manufacturing, transport, logistics, installation and coordination of all trades on site.



In order to meet demand in Singapore, Bouygues has launched two new production sites :

- A yard in Grisek Jaya, Malaysia which has 2 new prefabrication lines for modules;
- A smart factory in Jurong Port, Singapore in which we can notably monitor in real time the progress by trades with a «Start and stop» system through the use of QR code

— *FEASIBILITY*

- The company explores the possibilities of the project.
- Bouygues Bâtiment International analyses the affordability, programme, financial viability as well as the transportation and logistics and advises on the best layout and modules structure.



— *DESIGN & PRE-CONSTRUCTION*

- The design process is developed with Bouygues' in-house engineering team and the architect, to optimise the modular design and coordination of trades.



— MANU- FACTURING

- Each unit is manufactured in a quality-controlled factory environment.
- Once completed, the module is transported for the installation of internal and external finishes.



— INSTALLATION

- It is then ready to be assembled to the site, where it is stacked as per the sequencing programme and forming the building structure.



AN INTERNATIONALLY RECOGNISED EXPERTISE

Bouygues' teams in Singapore, France and the UK have already successfully delivered 40 projects over the years and we are continuously looking at ways in which we can learn and improve the way we build modular.

Some projects we are proud of :

the United Kingdom

CITIZENM SHOREDITCH

(A FOUR STAR HOTEL)

- 216 hotel rooms
- 136 Modules
- 11 storey hotel in east London
- Gross Floor Area: 6,790 m2



Singapore

WOODLEIGH LANE RESIDENCES

- 805 apartments
- 2,500 modules
- 15 storey blocks
- Gross Floor Area: 58,641 m2



France

CATALPA

(FRAMEWORK CONTRACT FOR MILITARY HOUSING)

- 17 buildings completed with 12 under construction
- 2,000 bedrooms completed with, 1,000 under construction
- 2,250 modules manufactured and installed, with 1,000 in production
- 3 storeys



A large red construction crane is lifting a concrete slab. The crane's arm extends from the top left, with cables and a hook holding a large, rectangular concrete slab. The slab has a dark window opening on one side. In the background, a multi-story building under construction is visible, featuring concrete frames and yellow safety railings. To the right, a tall red metal structure, possibly a tower or part of the crane system, rises vertically. The sky is overcast and grey.

Projects are flourishing...

In Singapore, 4 projects are currently underway in Perumal, in Serangoon, in Woodleigh, and the BCA Academy (for the Ministry of Construction). In the UK, Canterbury Riverside (student accommodations) is about to be launched soon, and Bouygues Bâtiment International always keeps a step ahead.

KEEPING A STEP AHEAD

We are at the dawn of modular construction, but we are making giant strides. Bouygues' Research and Development teams are fully committed to improving it and meeting tomorrow's challenges at all stages of construction :

Optimization of construction modes

- To reduce the weight and cost of the modules with innovative materials;
- Increase the part of the off-site production;
- Enhance the use of the BIM (Building Information Modelling)

Process optimization

- To increase digitization (particularly by putting QR codes on all modules to have a real-time tracking)
- Develop data and how to use them to improve modes of production
- Industrialisation through LEAN manufacturing

Products optimization

- How to design and equip modular construction for a specific public (notably elderly, with dedicated medical equipment)
- How to meet client expectations according to new trends?



Bouygues Bâtiment International is committed to ensuring that modular technology can meet the fundamental trends of industrialisation, prefabrication, digitisation and the circular economy. We will continue to pioneer the way so that this incredible new construction methodology meets all our clients and end-users expectations – and beyond.

DRAGAGES SINGAPORE

Dragages Singapore is a Bouygues Bâtiment International subsidiary. It landed in Singapore with its first project – Newton MRT Station, in 1984. Since then, the company has been involved in a range of landmark projects, playing a pivotal role in shaping a better country for Singapore.

With a track record of successful projects, Dragages Singapore is recognized as a pioneer in its industry, spearheading new construction techniques and technologies across its building and energy-efficiency solutions. Focusing on continuous innovation, Dragages Singapore has successfully developed and implemented Design for Manufacturing and Assembly (DFMA) system to its projects which is in line with the Singapore Government initiative and direction towards the industrialisation of construction industry and using less manpower through the application of Prefabricated Prefinished Volumetric Construction (PPVC) system and the implementation of MEP Modular System.

Pour en savoir plus : <http://dragages.com.sg/>



BOUYGUES BATIMENT INTERNATIONAL

Bouygues Bâtiment International is the subsidiary of Bouygues Construction that has been specialising in complex construction projects around the world for more than 40 years. Present on all five continents, Bouygues Bâtiment International draws on a strong local presence with a network of well-established local offices as well as on the engineering expertise of its head office. This complementarity enables the company to offer its clients innovative, sustainable solutions tailored to their requirements.

As part of a global network of construction-related companies in Bouygues Construction, Bouygues Bâtiment International benefits from the support, resources and technical know-how to complete the most technically demanding projects. Our mission is to deliver all projects to the highest level of client, staff, and stakeholder satisfaction.

Pour en savoir plus : <https://www.bouygues-construction.com>

Contact presse : m.perrot@bouygues-construction.com
weegin.goh@omnicomprgroup.com

