



Success story

Balancing multiple disciplines to design adaptable and sustainable buildings

ESTECO Technology helped Bouygues Construction automate the simulation process to identify appropriate designs quicker.

Bouygues Construction develops innovation to support companies with new construction methods and materials, while considering future usages. The main requirements for a new construction include objective measures, flexibility, industrialization, collaboration and sustainability. Moreover, customers also ask for innovative and evolving buildings. Bouygues keeps developing innovative processes together with a collaborative Multidisciplinary Design Optimization (MDO) platform, which allows the various actors involved in the project to make quicker decisions and have a crystal clear overview of the possible solutions.

Challenge

A building is a prototype that is manufactured once. It's not a functional project like a car or an airplane, where a design process can be profitable thanks to the sales volumes involved. On top of this, a building is created on site with local resources and labour, as well as environmental challenges that need to be taken into account. Engineers have to mix different disciplines such as cost engineering, methods, structure (reinforce concrete, steel, timber etc.), and building life cycle.

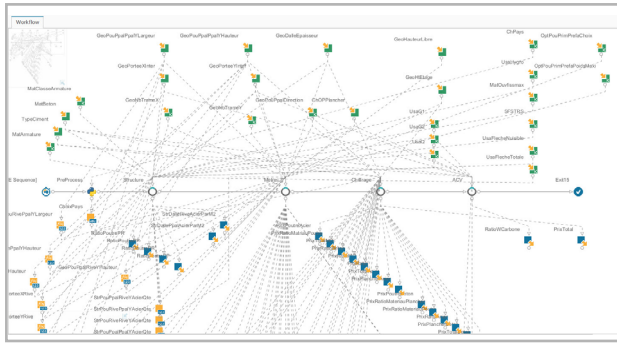
Bouygues Construction had to take into consideration a variety of disciplines and variables to optimize building performances and propose the most adapted design to its client.

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Solution

Bouygues has automated the design process of a building floor with modeFRONTIER, considering 26 input parameters such as geometry, solutions, usage specifications, structural dimensions, unit prices, and unit times of construction. The outputs were the costs, construction pace, carbon footprint.



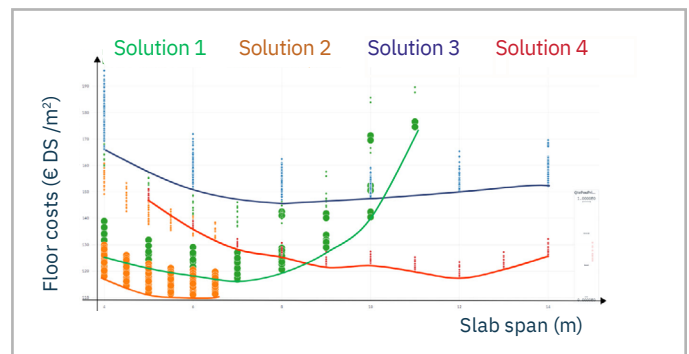
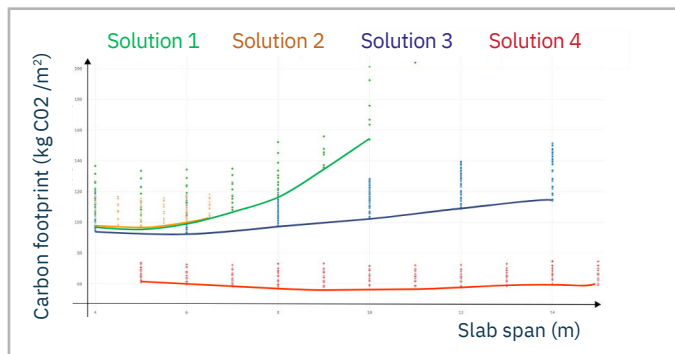
VOLTA workflow with multiple disciplines

Within the VOLTA collaborative platform, engineers succeeded in implementing different construction designs and provided the most profitable and the most sustainable solutions to the building team. This was possible thanks to the seamless integration of the simulation tools currently deployed at Bouygues. This was performed in as little as two days with one engineer. “The good software is the one the designer knows and masters - explained Sylvain Géry, Senior Structural Engineer at Bouygues Construction - ESTECO Technology can easily integrate with any simulation solver. This helps when a project involves different countries and enterprises who are used to working with different tools”.

Benefits

Thanks to the ESTECO Technologies for process automation, design optimization and simulation data management, Bouygues fastened the simulation process and reduced the overall design project time. Engineers built multidisciplinary processes and effectively coordinated all the phases involved. They could also assess the final design performance while considering costs and carbon footprint. Moreover, the collaboration between experts from different areas and the traceability of the simulation model evolution simplified the management of the project. In the building industry there are many construction options available. “Thanks to MDO, - Géry said - we could objectively quantify the benefits of the various construction types and identify the most appropriate combination of material usage, material technology and construction workers costs.”

Results deriving from the study, emphasizing carbon footprint and costs.



About Bouygues Construction

With 58,000 responsible and committed employees in more than 60 countries, Bouygues Construction designs, builds and operates projects in the sectors of building, civil works and energies and services. A leader in sustainable construction, the Group sees shared innovation as its primary added value and ensures that Health and safety are its top priorities. It has pledged to cut its greenhouse gas emissions by 30% by 2030 and offers its customers a wide range of low-carbon solutions. In 2020, Bouygues Construction generated sales of €12 billion. [bouygues-construction.com](https://www.bouygues-construction.com)



ESTECO is an independent software company, specialized in numerical optimization and simulation process and data management. With a 20-year experience, ESTECO supports over 300 international organizations (such as Ford Motor Company, Honda, Lockheed Martin, Toyota and Whirlpool), accelerating the decision-making process and reducing development time. [esteco.com](https://www.esteco.com)