

BUILDING CONSTRUCTION

Improving the energy performance of buildings is a major research topic. It is also a fundamental aspect of property management for which Artelia is elaborating innovative and global approaches. Developing building information models and the associated simulation tools is vital for coordinating design tasks and optimising project management assignments.

Artelia's research efforts concern both the **energy performance of new buildings** (low-energy and positive energy), where the data are fully available, and the **renovation of old buildings**, all of which are particular cases that require a specific survey and evaluation to draw up various improvement scenarios. And even for our own needs (a new low-energy office building currently under construction) Artelia is developing an innovative HVAC solution based on an active floor slab associated with groundwater pumping.

3D building information modelling has become a basic tool for designing buildings, and Artelia is working in particular on optimising the interfaces with measuring and planning tools.

In addition to the comprehensive **Rénovélia** package described opposite, Artelia is providing innovative technical solutions for **building renovation**. When restructurings involve alterations to floor areas and load values (in particular for high-rise buildings in dense urban locations), structural elements may have to be modified, with in particular serious implications for the foundations. As it is almost always a prototype application, this calls for extensive research.

Innovative **complexity management** approaches and tools are required when carrying out works on occupied sites or modifications required by purchasers.

With regard to **deconstruction and asbestos removal**, Artelia continues to devote considerable research to the development of methods for adapting to the wide variety of situations encountered (confinement, disturbance, maintenance of operation, etc.). The results of this innovation are included in the **Valorélia** package, together with soil remediation and waste treatment.

To improve **building and equipment safety**, detailed strategies have been defined for studying scenarios involving explosions and their impacts (whether accidental or the result of terrorist activity), and for providing protection against electromagnetic radiation.

Work was also carried out to reduce **vibrations** in metal-structure high-tech buildings (data centres, recording studios, etc.) and provide protection against vibration disturbance.



Roger Durand
Director of Technical Division
Building Construction
& Industrial Facilities

Fifteen market leads (high-rise buildings, hotels, hospitals, shopping centres, data centers, etc.) and nineteen technical leads (structures, fluids, electricity, envelope, energy performance, biotechnologies, etc.) have been appointed in Artelia's Building Construction and Industrial Facilities sector to coordinate groups of specialists, manage competitive technical intelligence, and identify and anticipate clients' needs. They likewise ensure that Artelia's know-how (methods, tools and data bases) is kept up to date. The leads and the working groups they coordinate initiate the R&D and innovation topics that we may then decide to pursue further.



Olivier Auffret
Development Coordinator
Real-Estate Consultancy
& Multi-Site Projects

Over the past two years, Artelia has developed an innovative approach - called **Rénovélia** - which combines the financial profitability of a renovation project and its energy performance. This methodology thus positions improved energy efficiency in a more general context, including aspects such as statutory compliance, improved use of floor space, etc., and aims at optimising the value of the property and its operations and maintenance costs in the long term.

