



### ÉTIENNE CRÉPON

PRESIDENT OF THE CSTB

n the construction industry, as in most major industries in France, innovation is flourishing.

## The five key factors of innovation

At the CSTB, we decided to examine the major drivers of innovation in the construction industry.

For us, there are 5: the environmental transition, the digital revolution, the growing demand of end users for buildings, neighborhoods and cities that deliver tangible performance, the increased industrialization of structural components assembled in factories to create systems whose quality and performance are checked on-site, and, finally, the growing focus on renovating the existing building stock, in line with environmental transition policies.

#### Identifying needs, upstream

In 2018, the CSTB continued to adapt in order to improve the guidance and support it provides to the public authorities, city planners and stakeholders of the construction industry. Through its research activities, the CSTB explores new fields, while deepening its knowledge of existing topics. For example, its work on asbestos in

buildings led the CSTB to develop specific sampling and measuring tools, as well as dust containment systems.

Regarding the circular economy, the CSTB conducted research to determine how to recycle decades-old PVC in construction products, which may contain materials that are now banned, such as lead and cadmium stabilizers.



THE CSTB
CONTINUED TO
ADAPT IN ORDER
TO IMPROVE
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AND SUPPORT IT
PROVIDES TO THE
PUBLIC AUTHORITIES,
CITY PLANNERS AND
STAKEHOLDERS OF
THE CONSTRUCTION
INDUSTRY.

As an innovation accelerator in the area of comfort, the CSTB developed the Pulse method, which assesses the sensory qualities of products and places to enhance the well-being of users. Pulse's broad range of applications has attracted an equally varied array of stakeholders: local governments for the taste of water, cosmetic manufacturers to assess the effects of skincare creams, vehicle equipment manufacturers for the comfort of the vehicle interior, and more.

#### **Guiding projects**

The CSTB guides the stakeholders of innovation in the area of digital models, to help professionals use these tools and create their own digital environment with their partners. Research partnership agreements have been signed with building stock managers, such as the Ministry of Defense, or social housing operators, such as CDC Habitat and RIVP. For the latter, the research will examine the use of BIM to monitor the design, construction, renovation and operation of residential buildings.

The CSTB also supports startups through an ongoing program called CSTB'Lab, which is supporting some

15 innovative new companies. Launched in 2017, CSTB'Lab is nonspecialized yet oriented toward digital technologies. It is now focusing its calls for applications on renovation, indoor air quality, and similar areas. The aim is to facilitate the emergence of interrelated ecosystems at CSTB'Lab, consistent with the main challenges of the construction industry and sustainable cities.

### A WORD FROM...

A WIDE RANGE OF SERVICES AND EXPERTISE TO GUIDE INTERNATIONAL STAKEHOLDERS IN THEIR PROJECTS.



Sylvie Ravalet,
Delegate General Director
Deputy CEO in charge
of Strategy and Finance

HELPING CREATE BUILDINGS AND NEIGHBORHOODS THAT PROMOTE HARMONIOUS LIVING.



Hervé Charrue, Deputy CEO in charge of Research and Development

DEVELOPING KNOWLEDGE AND IMPROVING PRACTICES TO ENSURE THE STABILITY AND RESISTANCE OF BUILDINGS.



Charles Baloche, Deputy CEO in charge of Technological Activities

#### **Developing tools**

The CSTB continues to pursue projects in which it leads innovation. In Health & Comfort, it signed partnership agreements with about 20 social housing operators for Bioguess, a system developed by the CSTB that detects mold, dry rot and wood-eating insects.

To meet the quality requirements of end users, the CSTB is developing and expanding its certification guidelines, which have also been simplified. This is the case with a procedure for using the ACERMI insulation certification, developed by the CSTB and the National Metrology and Test Laboratory (LNE). Likewise, the new, revamped ECAU classification is a guide for selecting sanitary equipment, including faucets, based on type of usage. Slated for completion in mid-2019, it will help project owners and private individuals choose the right products for their needs.

OsmoZ, a quality-of-work-life certification developed by Certivéa for office buildings, has already attracted the interest of major corporations and local government agencies that want to improve their organization and services.

Finally, customized in-company training is being developed to guide and support the clients of the CSTB. For example, Société du Grand Paris chose the CSTB to jointly lead the BIM Club of the "Grand Paris Express Community". This far-reaching project entails sharing digital models on a networked collaborative platform. As Société du Grand Paris wants to use the KROQI platform, the CSTB is delivering a large-scale program to train the broad range of participants who will need to use the tool.

Progress and development at the CSTB, aiming to serve all its clients and partners, is made possible thanks to the competency and dedication of its teams, and I thank them for their remarkable work. The researchers, engineers, technicians and administrative staff—all the employees of the CSTB—dedicate their skills to guiding and supporting the construction industry.



Read the complete Editorial and Statements online www.cstb.fr/rapport-activite/2018/en/

# A MULTIDISCIPLINARY APPROACH SERVING STAKEHOLDERS

Through its systemic approach and multidisciplinary offering, the CSTB guides all of the stakeholders of the construction industry as they navigate the environmental and digital transitions.



## The CSTB, supporting the public authorities through digitization of regulations

In late 2016, the CSTB was commissioned by the public authorities to develop a method and tools, together with the industry's trade organizations, to facilitate the digitization of regulations and to ensure that they are properly applied in buildings. The idea was to bridge the gap between regulatory documents and the technical language of digital models. The project, completed in 2018, produced several applications presented on KROQI.fr, the digital platform of the construction industry launched by the French government in May 2018, and developed by the CSTB.

# Partnership with PiveteauBois and Eiffage: analysis and multicriteria design of wood plank flooring

PiveteauBois, Eiffage and the CSTB forged a partnership in 2018 to better understand and optimize the acoustic and vibration behavior of innovative technical solutions for wood plank flooring and contribute to the development and optimization of timber construction projects to reduce carbon emissions.



#### OTHER PROJECTS

## **High Court of Paris:** multidisciplinary expertise of the CSTB.

**OCAPI:** a new service to support applicants for Technical Appraisals.

5 Chinese cities designated
Sino-French Pilot Eco-cities
and engaged in HQE™ development
certification with the support
of the CSTB Group.



product, building, neighborhood and city.

#### Defining methods for energy performance for the renovation sector in the city of Grenoble

In February 2018, the CSTB, with the support of the local authorities of Greater Grenoble Alpes, conducted the first ISABELE test on a private home in the Grenoble area that had received a major energy renovation. ISABELE is the method developed by the CSTB and funded under the PACTE program (French plan of action for construction quality and energy transition) to measure the overall insulation performance of building envelopes.

The results obtained were encouraging, enabling us to demonstrate consistency between what was measured and what had been calculated, which was reassuring for the city. To test the program on a larger scale, the city wants to continue its search for pilot houses.

#### Philippe Bertrand,

Manager of Energy Efficiency/Energy Demand Management projects, Grenoble-Alpes Métropole

#### Characterizing the circular economy in the construction industry - Fondation Bâtiment-Énergie

To understand current environmental challenges in the construction industry, key factors have been identified: energy conservation, reduction of carbon and other emissions, and the circular economy. Although waste management is supported by numerous incentives and initiatives, the circular economy is based on a more global concept that considers the entire building life cycle.

The construction industry, which consumes resources and generates waste, could greatly benefit from this virtuous circle. With this in mind, the Fondation Bâtiment-Énergie launched a research and development project in 2018 to establish the scientific basis of the circular economy. It asked the CSTB to coordinate the study because of its network of experts. The project will run through 2020.



Construction and low carbon development, 2018 advances: preparation of RE 2020, OBEC Program, Efficacity, Quartier E+C-.

Study of the outlook for material consumption for new buildings in 2035 and 2050. Commissioned by ADEME.



of the CSTB meets these challenges, in the form of building science, environmental science, but also – and importantly – social science.

#### Pulse for sensory analysis

Building on its R&D on the taste and smell of drinking water, the Pulse Laboratory makes use of innovative methods developed by the CSTB for the sensory analysis of products and ambient conditions, with the aim of contributing to improving the well-being of users. Pulse is a patented innovation that provides objective and multicriteria assessment based on the unconscious responses of users. It has been adopted by stakeholders for numerous scopes of application: local governments for the taste of water, cosmetic manufacturers to test the effects of skin creams, and automotive OEMs for comfort in vehicle interiors.



## With OsmoZ by Certivéa, Icade ensures the quality of life of its employees

Human capital is increasingly valued in organizations. To rise above the competition, companies need committed, motivated, creative employees who know how to work in a team. This is why the quality of life at work is now a central goal for companies.



#### Use of plant resources

in overseas territories as thermal insulation materials.

**Light pollution:** the CSTB assisting public authorities.

Certivéa is successful and unique in particular due to the inclusion of human resources in the approach. Usually, human resources are left out of the accreditation process. This approach was very different from the other certifications that we've used in other projects.

#### Jean-Christophe Gentil,

Property Management Director, Icade



## CSTB post-disaster consulting projects

The CSTB intervenes after a crisis occurs, first during the crisis management phase, in order to determine which emergency damage control measures should be implemented, and then during the post-crisis evaluation and analysis phase, to determine what work needs to be carried out to prevent certain disasters from reoccurring, where possible. For example, the CSTB was commissioned by the government to carry out assessments in Marseille and in the French West Indies after disasters occurred there.

## The CSTB is a member of the engineering consortium for crowd evacuation and management for the 2024 Olympic Games

A pioneer of the discipline in France, the CSTB has developed a benchmark engineering method for crowd evacuation and management, and is a member of the consortium of stakeholders working on these issues for future major events organized in France, such as the Rugby World Cup 2023 and the Olympic Games 2024.



#### OTHER PROJECTS

Wind load engineering for the vertical city.

La Samaritaine department store buildings get a major overhaul: 7 Technical Experimentation Assessments (ATEx) issued.

Natural ventilation for Saint-Denis Roland Garros Airport: new challenges to ensure comfort and safety.

## DIGITAL TECHNOLOGIES

The construction sector has begun its digital transition.

The CSTB is actively contributing to the deployment of BIM and digital technologies by developing collaborative tools, partnerships and training courses.

## The CSTB launched the CSTB'Lab, its startup accelerator

Inaugurated in late 2017 by Julien Denormandie, secretary of state to the French Minister of Territorial Cohesion, the CSTB'Lab welcomed 9 new startups in 2018, demonstrating the commitment of the CSTB to supporting innovation and speeding up digital transition in the construction industry.

Being part of CSTB'Lab gives us access to the scientific and technical expertise of a key player in the construction industry.

Tristan Garcia, CEO of WiseBIM



## KROQI: free Web platform for all professionals in construction and planning

Universalizing the digital design of buildings by 2022 is central to the French government's housing strategy as it embraces "construction 2.0" for builders and communities. The government launched KROQI, a free tool for software publishers and their applications, to ease the digital transition and deployment of BIM by all stakeholders in the construction industry, especially VSEs/SMEs and self-employed workers.





The CSTB and SID developed a BIM strategy for management of cultural heritage centered on the user.

**Defining the properties of construction materials** to be integrated in BIM standards.

# CERTIFICATION: ADDED VALUE FOR CONSTRUCTION PRODUCTS AND SERVICES

Certification, a voluntary procedure, attests to the performance of a product and/or a service, according to a standard established with representatives from the industry and society. An accredited certification organization, the CSTB is a key player in the certification of construction products and services, under various marks.

## The Acermi search engine optimizes the selection of insulation based on its use

Because a certified product installed in accordance with industry standards and perfectly suited to the desired application provides optimum insulation, the Association for Certification of Insulating Materials (ACERMI) added a new research criterion in 2018—"end use"—on its website www.acermi.com



# The CSTB, attentive to the needs of stakeholders in the piping market, with QB 08 "Water supply or drainage piping"

In order to respond to the needs of the piping sector and its clients, the CSTB has divided the QB certification into two levels of performance.

The first level deals only with the requirements of the European standards (basic sizing characteristics, 50-year durability, fitness for purpose and use). The second level offers options with more stringent requirements than those of the European standards, to highlight the performance of the products and give them an edge on the market. These options include: better oxidation resistance, which is a crucial factor in evaluating the lifetime of piping systems, and better fitness for purpose of the products at very high temperatures (tests at 110° instead of at 95°).



#### OTHER PROJECTS

**QB: new products and applications** and the first certified products.

NF window certification campaign.

After Grenoble, the CSTB inaugurated a second training center for window installation in La Rochelle and opened another in the Paris region in 2019.

# SOCIAL AND ENVIRONMENTAL RESPONSIBILITY

Mobilized around the social, environmental and economic challenges relating to its activities, the CSTB is committed to continuous improvement.

Its actions and management system have focused in recent years on cutting its consumption of energy.

ISO 50001 certification: 2011 "Energy management" at the sites of Marne-la-Vallée and Nantes (view the certificate) demonstrates the CSTB's long-term commitment to its **energy performance**. This certification marked the implementation of a system to optimize energy consumption.

The CSTB has also signed the **Sustainable Development Charter** of public institutions and companies. As a result, a range of actions have been implemented, such as reducing business travel, encouraging video conferencing and low-impact mobility for the work commute (Company Mobility Plan).

In Human Resources, the CSTB ranked among the 500 **best employers** in France in the 2018 survey published by the business magazine "Capital". In the general ranking, the CSTB was number 133 of the 500 best employers, moving up 33 places from 2017. In the Public Research segment, the CSTB climbed from 4<sup>th</sup> to 2<sup>nd</sup> place.

The CSTB has signed the **Diversity Charter**, with a commitment to equal opportunity and diversity in all of its areas by means of specific measures such as programs to raise employee awareness, and promoting and applying France's principle of nondiscrimination and diversity.

#### ETHICS

The CSTB Ethics Charter defines the rules of good conduct based on core values. Six fundamental principles apply to all CSTB activities:

- 1. Impartiality of judgment
- 2. Social responsibility
- 3. Transparency
- 4. Sharing and confidentiality
- 5. Duty of alert
- 6. Scientific and technical quality

An external Ethics Committee, comprising six members from outside of the organization, was created to enforce the charter and prevent conflicts of interest.

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TRAINING

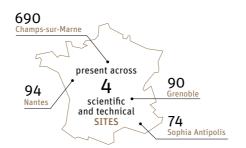
SOFTWARE



#### KEY FIGURES



**EMPLOYEES** 2018 Headcount





114 M€

**2018 OPERATING INCOME** (excluding subsidiaries)



**COLLABORATIVE RESEARCH PROJECTS** 



(Technical Experimentation Assessment)



ADVANCED TRAINING **MODULES TO BECOME** AN ADVISOR

### CSTB SUBSIDIARIES

#### / CONSOLIDATED SUBSIDIARIES



The leading French environmental certification agency for nonresidential buildings, sustainable communities and stakeholders.



Monitoring and diagnosis of indoor air contaminants.



Studies and testing in aerodynamics.

#### / COMPANIES IN WHICH THE CSTB IS A SHAREHOLDER



Climate engineering certification.



International HQE™ certification body. A joint subsidiary of Certivéa and Cerqual Qualitel Certification.



**Testing laboratory** and certification body for solar photovoltaic module performance. A joint subsidiary of LNE and CSTB.



Controlling noise pollution: analyze, recommend, measure, calculate and protect. A joint subsidiary of EGIS and CSTB.



Co-develop innovative solutions and support the construction sector moving towards the greater Energy and Environmental Transition.

# Building the future

As a public enterprise, the Scientific and Technical Center for Building (CSTB) provides support services to its clients and partners, while fulfilling its mission in the public interest. Its ambition is to contribute to shaping the buildings and cities of the future in order to improve the quality of life for all users.

The CSTB organizes its activities into five key areas: Research & Expertise, Assessment, Testing, Certification, and Dissemination of Knowledge. Through these functions, it supports stakeholders at every stage of innovation and ensures the safety of sustainable construction and renovation projects, in keeping with France's goals for the energy, ecology and digital transitions.

With more than 900 employees, the CSTB group, its subsidiaries, partners as well as national and international networks create added value for stakeholders in the construction industry and territorial development, helping them improve the quality and the performance of their products, systems, infrastructure and services.



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