Corporate Social Responsibility
and Activity Report 2022
Anticipate the buildings and cities of tomorrow while supporting and securing sustainable construction and renovation projects, to improve the quality of life for users. 
Scientific excellence
To meet these challenges, the CSTB has been undergoing change for several years and is now fully capable of responding to the issues facing public authorities, and, more broadly, the entire construction sector and real estate community.

Thanks to its knowledge and expertise, the CSTB fully intends to wholeheartedly play its role as a hub of scientific and technical knowledge in the construction sector. It is humbly and calmly taking on the status of adviser, assigned to it by the law and the government, in order to mobilise all forces and provide solutions to the problems that the different actors will have to face. It intends to develop, maintain and make available scientific projects and assets to achieve this goal. It is also with this perspective in mind that, together with the entire sector, it has developed the French National Buildings Database (BDNB), which contains several hundred items of information for every building in mainland France.

Beyond the assets that the CSTB is able to mobilise for the research projects in which it participates, this pivotal role can only be envisaged if it maintains its level of scientific excellence. It has organised its activities around four strategic areas of action:

- **an ambition**: buildings and neighbourhoods that promote harmonious living;
- **an imperative**: buildings and cities facing climate change;
- **projects**: renovation, making the act of building more reliable, and innovation;
- **resources**: the circular economy and resources for the construction sector.

For each of these areas, following extensive consultation, the CSTB has developed a scientific and technical roadmap that defines the knowledge to be developed and the tools to be created in the coming years. A total of 21 research programs have been launched for this purpose.

The importance of innovation
Societal transformations will enforce a certain frugality and austerity upon us, far removed from the years of abundance that we have known in recent decades. This will require a new way of thinking, and indeed has already been initiated by all players. Experience has shown that the “price signal” alone often leads to rejection and to a new divide in an already weakened society. This frugal approach will only be tolerable and acceptable to society if it is introduced gradually, and explained well.

However, the environmental and societal emergency is already upon us. Collectively, we will only be able to really grasp what frugality means by designing other more sober ways of doing things without dramatically degrading the quality of each other’s personal or professional lives. How can this be achieved? Through innovation. The CSTB intends to mobilise all its resources to support players wishing to innovate so that new ways of building and renovation emerge, and so that construction techniques, products and systems can evolve to reflect this new context.

The world is changing, so our points of reference also need to evolve and adapt. What was good yesterday may be much less so in an environment that takes upcoming transitions, and thus the environmental impact and ease of implementation, into account. The CSTB has long been one of the main certifiers of construction products and systems, attesting to their suitability for use, as well as to their ability to be incorporated into buildings and to participate in the safety of properties and people. It will continue this mission of enhancing performance and promoting trusted third parties within an ecosystem flooded with information that is unverified and therefore not necessarily very reliable.

Gradually, and after consultation with the players in this ecosystem, the CSTB would like to upgrade its certifications so that they continue to attest not only to the product’s suitability for use, but also to its ability to contribute to addressing the major environmental and societal challenges that we will collectively face in the years to come.

In light of the importance of structural transformations linked to our living environment, the CSTB is harnessing its strengths and will continue to mobilise its efforts for the future that we’re building.
All of us need to take human and environmental issues into account in order to have a positive impact on all our projects and actions.

SYLVIE RAVALET
DELEGATE GENERAL DIRECTOR - DEPUTY CEO

DELEGATE GENERAL DIRECTOR - DEPUTY CEO

Who are we?
The CSTB is proud of its teams, proud of their wealth and diversity (age, culture, professions), and proud of their expertise and know-how. It strives to support them throughout their career with the company, in particular, through training and sharing. As a learning company, we are developing a knowledge management approach to more easily share and transfer our knowledge and know-how.

The CSTB is committed to equal opportunities and warmly welcomes work experience trainees and work-study students of all ages to help them discover and join the world of work; not to mention recruiting around twenty new PhD students every year.

A scientific enterprise in the construction sector and yet gender equality in the workplace? The effects of the actions taken to ensure gender equality in the workplace can be seen in our shared spaces. The results are measured by the increase in the company of the portion of women, or the positive development of the processes in order to improve their efficiency.

In 2023, we also intend to focus our actions on recruiting our waste, and to paying particular attention to reducing waste at source.

A collective commitment, driven by our brand and our employer brand.

Kind regards from CSTB! CSTB & You!

SYLVIE RAVALET
DELEGATE GENERAL DIRECTOR - DEPUTY CEO

Due to their intrinsic complexity related to the various risks that they must protect us from, buildings represent a highly challenging object of research, right from their very conception.

HERVÉ CHARRUE
DEPUTY CEO IN CHARGE OF RESEARCH AND DEVELOPMENT

Austerity! In the middle of July 2022, it sounded somewhat incongruous to talk about reducing winter energy consumption when Europe was about to experience the hottest summer on record, potentially superseded by the summers of 2023 and 2024. It may well have been rather surprising. But on the contrary, it was merely an anticipation of the future, based on realistic forecast data in the face of the relative availability of electricity, the rise in the price of fossil fuels, and more than probable changes concerning climate projections. It has become obvious that the recurrence of extreme events, particularly in the summer, calls for a collective awareness that is now shared by the majority. As a result, each and every one of us felt concerned by such events, even if we were not all directly affected by them. However, the result lived up to expectations, and ended by an adaptation of uses, an undeniable change in behaviour started to emerge following the different crises and their economic impacts. However, mainly because of global warming, extreme winter events are a feature of the last century.

The IPCC has repeatedly referred to austerity in a very broad spectrum of analyses that go beyond the energy issue, by addressing the requirements of 2050 and 2100. The question is no longer about meeting the expectations, and aided by an adaptation of uses, an undeniable change in behaviour started to emerge following the different crises and their economic impacts. However, mainly because of global warming, extreme winter events are a feature of the last century.

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THREE QUESTIONS FOR:

**Buildings and neighbourhoods that promote harmonious living**

SOFIE MOREAU  
DIRECTOR STRATEGIC AREA OF RESEARCH

Designing and developing pleasant and peaceful neighbourhoods that foster social ties is one of the priorities of your strategic action area. How were your research efforts structured around this topic in 2022? We articulate our thinking around three structural areas that ask “why”, in the dual sense of causality and purpose, and “how.” So, we question the place of citizens through local initiatives that contribute to the development of a more collaborative and involved society. We observe their effects in improving the living environment and social ties, and we study the coordination of these actions with the institutions. Furthermore, we question traditional methods of urban analysis based on sustainable development standards and guidelines, by contextualising them, and objectifying the benefits of the various decisions of contracting authorities and local authorities. This approach gives rise to assessment methods that are better suited to the definition of strategies, decision-making and monitoring of actions undertaken over time. Finally, we explore the benefits of the digitisation of practices and the use of data in developing services for city stakeholders and users. This work, carried out using a systemic approach, highlights the multidisciplinary aspect, and is based on thematic scientific foundations that we are continuing to explore in greater depth.

The quality of interior environments is also at the heart of your research. Which types of interior environment do you consider most problematic? We observe their effects in improving the living environment and social ties, and we study the coordination of these actions with the institutions. Furthermore, we question traditional methods of urban analysis based on sustainable development standards and guidelines, by contextualising them, and objectifying the benefits of the various decisions of contracting authorities and local authorities. This approach gives rise to assessment methods that are better suited to the definition of strategies, decision-making and monitoring of actions undertaken over time. Finally, we explore the benefits of the digitisation of practices and the use of data in developing services for city stakeholders and users. This work, carried out using a systemic approach, highlights the multidisciplinary aspect, and is based on thematic scientific foundations that we are continuing to explore in greater depth.

Which main areas of the research project are devoted to the health and safety aspect of buildings, which includes exposure to pathogens, in the event of an epidemic or pandemic, and biological contamination? Has the recent pandemic played a role in the development of the project? We have been working for many years on the connections between buildings and health. In 2022, we continued the work undertaken on identifying health risks, including for example the assessment of exposure to ultrafine particles, the analysis of fungal development dynamics and the identification of sources of endocrine disruptors in nurseries. We have also carried out research into exposure to micro- and nano-plastics in indoor environments, as well as dental research into the health impact of recycled materials, in connection with the “Circular economy and building resources” strategic research action. Work on prevention and remediation will include research into particulate emissions from wood-fired heating, and original research into active substances and attractive surfaces to combat pests, including bedbugs. The Covid-19 pandemic obviously guided our research, but this field is not new to the CSTB since this subject had already been explored during the influenza A (H1N1) epidemic, in 2009. The scale of this health crisis has nevertheless led to this research being prioritised again from 2020. We have structured a specific project, adapted from upstream to downstream. This project is leading to numerous collaborations with players in medical and health research (Institut Pasteur, the French Agency for Food, Environment and Occupational Health Safety, etc.).

Buildings and cities facing climate change

ALEXANDRA LEBERT  
DIRECTOR STRATEGIC AREA OF RESEARCH

Taking action to mitigate climate change by reducing our greenhouse gas emissions is a compelling obligation. What new measures were taken by the CSTB in 2022? In May 2023, the CSTB and the administration of the Sustainable Building Plan submitted the low carbon roadmap for the construction sector to the French government on behalf of the sector. This brought together a large number of professional organisations. In 2022 to formulate 25 levers for action and propose 120 measures to be implemented by actors or public authorities. It includes many subjects addressed by the CSTB, some of which are research subjects accompanied by the doctoral programme. This roadmap thus highlighted the need for shared data about the load of the whole sector and the quantification of greenhouse gas emissions at the level of the French building stock, in order to prioritise public action and that of the major players, in particular landlords or local authorities. It is also worth noting that “Action Logement” is working with the CSTB on a detailed characterisation of emissions from its building stock. In order to build operational decarbonisation trajectories, considerable work needs to be done on the collection of data in order to qualify, using the French National Buildings Database (BDNB), the stock belonging to different stakeholders, simulate action plans and monitor the evolution of emissions. These subjects involving the characterisation of the building stock and renovation projects to mitigate climate change are also at the heart of the strategic action area “Renovation, Innovation and Reliability in the Construction Process.” In addition, the CSTB is continuing its engagement with Efficacity, through the provision of agents from the Institutes for the Energy Transition, co-supervised theses and the development of two tools: UrbanPrint, a software tool which allows urban planners to assess the environmental impact of their projects, and PowerDSL, which draws on the CSTB’s Dimosim urban energy simulation calculation engine to analyse different energy scenarios for specific areas.

Lastly, at the level of the buildings themselves, we have a flagship project: “Circular.” The aim is to prepare the development of this future reference tool for calculating the energy and environmental performance of new and existing buildings. We are currently gathering different stakeholders together around the following specifications to meet the needs of the players. The mission of the CSTB is to enable each of them to assess their decisions from a circular economy perspective, i.e. by understanding the current state of the products, buildings or development projects, and also by translating the national carbon budget into targets that can be read by each player.

Regarding the objective of climate change adaptation, what were the major breakthroughs? The CSTB is working on three areas to enable adaptation of the building stock. The first concerns the characterisation of future risks with the aim of gauge adaptation needs with a shared framework, enabling them to design and renovate while taking the climate of tomorrow into account. The second challenge is to share an assessment of the vulnerability to various risks of buildings and housing units. Finally, there is the question of evaluating the different solutions – technical or otherwise – so that the best ones can be deployed on a massive scale.

In 2022, we continued our research into the characterisation of the effect of the urban heat island with, in particular, exploitation of satellite data (Sat4BDNB project) and knowledge of summer comfort within buildings, by rolling out measurement campaigns in residential buildings (Nonoptim CEE project) and consolidating our NHTM model to individualise the modelling of summer comfort and, ultimately, make the connection with the health risk. We are also making progress in the construction of weather files, adapted to the building environment, so that actors can simulate the behaviour of their buildings according to future heat waves. The En-Rêve project, stemming from the PROFEE programme, provides initial indicators reporting on the vulnerability of buildings to these crises. We are also undertaking work to calculate the costs involved in adapting the building stock. At the same time, we are continuing our work on characterising the various solutions (greening, low-albedo materials, water cycles, etc.) to provide players with robust and specific information enabling them to carry out their building projects while taking climate change into account. This work, supported by this programme and the “Buildings and neighbourhoods that promote harmonious living” strategic research action, is carried out through partnerships with academics, associations and manufacturers.

The main guiding compass today is carbon, but analysing other components impacting the environment is also essential... The CSTB systematically tries to approach the subject in a cross-cutting manner. We have helped to make the life cycle analysis (LCA) more accessible to all. It is an accurate reflection of the various pressures exerted on the environment, from depletion of resources to water pollution, from biodiversity loss to waste generation. The “Circular economy and building resources” strategic research action focuses on resources management, whether in terms of extracting raw materials or of managing waste, and places the subject of water consumption at the heart of concerns. The “Buildings and neighbourhoods that promote harmonious living” strategic research action focuses on biodiversity, from its characterisation in urban environments to the qualification of its effect on micro-climates.
Three Questions for Renovation, Innovation and Reliability in the Construction Process

ROMAIN MÈGE
DIRECTOR STRATEGIC AREA OF RESEARCH

How has the French National Buildings Database (BDNB), developed by the CSTB and in operation since the start of 2022, enabled progress to be made in terms of knowledge of the existing building stock, essential to the widespread adoption of renovation?

Developed by geospatial cross-referencing of some two hundred nationally available databases from public bodies, the French national buildings database (BDNB), structured as “building” level, makes it possible to better understand the existing building stock and to monitor its development, including renovations. Based on this information, which is regularly updated, we are currently working to produce expert knowledge, by associating each building with its typology. The renovation potential of the buildings is thus determined, in terms of both energy consumption and carbon gain.

In addition, the RénoStandard project, which became “Restore” during the second phase of the PROFEEL programme, makes it possible to study global renovation solutions for many types of private homes through replicable innovative solutions developed by professional groups.

This data, which is derived from knowledge of the existing situation thanks to the BDNB and from feedback from renovation projects, is useful for actors in the sector (developers, landlords, local authorities, project managers, contracting authorities) at several levels, to enable them to develop their renovation projects: pre-assessment of expected gains and costs, pre-filling of digital models, estimation of volumes of materials and labour or estimation of the potential associated with renovations per territorial area. With the help of the BDNB, we have initiated numerous studies with various partners, such as housing associations and local authorities, to analyse and study the carbon trajectory and the potential for renovating their building stock that they can define the most appropriate renovation strategies. These studies fall within the scope of the sustainability and building resources

How should the actual performance of buildings be monitored and maintained throughout their life cycle after renovation?

Before this stage, it is necessary to check that the renovation project has met its target. This is the role of the SATINE system, which is also supported by the PROFEEL programme. Focused on the energy consumption and thermal comfort of private homes, it objectively measures the effectiveness of the work by comparing the situation before and after renovation. Independently of the behaviour of the user, and makes it possible to identify and correct any defects in the design or construction.

Other work, backed by SERENE, is under way to cover all the buildings and improve efficiency: extension of the project to include apartment buildings, and reduction of the duration of measurements and their procedures so that they are as non-invasive as possible for users, in particular through the use of connected equipment. We are also working to measure criteria other than thermal ones in order to make quick and multi-criteria diagnosis by merging the knowledge acquired from many CSTB research projects (structures, indoor air quality, acoustics, building digitisation, etc.).

Finally, the performance of a building is not limited to its condition at the end of the work. It must be ensured that this condition is maintained over time. In this respect, we are conducting research to qualify heating systems or photovoltaic devices over time by including their maintenance and monitoring. Users also have a role to play. It is important to make them aware of future climate changes, and also of the fact that their habits can have a positive or negative impact on their consumption (water, electricity, gas), the carbon footprint, air quality or the sustainability of their building. Training and informing the general public of these parameters and also of eco-gestures, is essential. Much of our work now includes these components, enabling those concerned to take ownership of the results.

The circular economy and building resources

ALEXANDRA LEBERT
DIRECTOR STRATEGIC AREA OF RESEARCH

In order to guarantee the construction sector a degree of sustainability and of the use of materials, it is essential to massively expand practices around the circular economy, and in particular, to recondition and use building materials and components.

Absolutely, like other sectors, the building industry is going to have to face increasingly difficult access to natural resources. The circular economy, thought-out in all its dimensions, allows us to design and deploy solutions to meet this challenge. It scrutinises our needs for resources (quantity, type) by striving for material fragility, replacing secondary raw materials with virgin materials, designing projects with objectives in terms of performance sustainability, ease of maintenance, ability to change use or to be reused or recycled.

The circular economy means considering the existing building stock as also being a bank of materials for future needs. In order to move from concept to established practice, several projects need to be carried out to understand how to measure the performance of products and systems, recognising the performance of products that have passed through a reconditioning centre, deconstruct products with the objective of reuse or recycling, put together players looking for these products or making their levels, to gather feedback from economic models.

Where these subjects are concerned, the CSTB is involved with operational players in research projects, demonstrators and working groups with the aim of making methods, guides, tools and data available to all. It should also be reiterated that the circular economy is a lever for decarbonising the building sector – a mission carried out by the “Buildings and cities facing climate change” strategic research action – and for meeting our national objective of climate neutrality.

What are the main actions to be taken?

Implementing the circular economy requires the building of trust and confidence. Beyond shared ambitions and common terms, the definition of common metrics will enable players to engage in dialogue built around quantifiable objectives, monitor and communicate their results.

In its quest to extend useful lives, the circular economy must at the same time ensure that the design projects are developed and working methods as well as the demonstrator projects to be analysed. As for the CSTB is concerned, the aim is to improve and share a place-based knowledge of the flows of resources and waste, to encourage communities of actors to experiment and take part, to build consensus to standardise practices, particularly reuse, to spread the news about these practices widely and, finally, to understand their appeal but also their obstacles where the actors are concerned in order to enable the sector to overcome them.

In its daily lives, the circular economy scrutinises the ageing of products, materials and components that are required to be used several times in succession in ever-changing climatic conditions. Better knowledge of their durability ascertained through natural or artificial ageing tests in laboratories, is essential.

Dramatically reducing pressure on the environment, and in particular preserving water resources, is a major challenge for your strategic research action. What are the means envisaged to achieve this?

In March 2023, the government put forward an action plan for the resilient and concerted management of water, consisting of 53 measures, ten of which concern the building sector directly or indirectly. At the CSTB, the Water Department and the Water Management project look at the various issues related to the preservation of this resource. Knowledge of the components of our water consumption is being re-examined and updated, and the performance of cost-effective equipment is being characterised. In order to streamline our use, enable water to be used as a cooling solution to adapt to climate change (by means of natural solutions such as those studied in the “Buildings and neighbourhoods that promote harmonious living” strategic research action) and prepare for changes in the way we access this resource, our role is to make greater water circularity possible. The aim is to be able to implement systems for reusing treated wastewater, or more generally, to increase the use of non-conventional sources of water at the building scale. The success of these projects is based on the integration requirements of the proposed technical solutions, on their reliability and durability, on reconciling technical and health-related performance and on techniques that are often unproven, or even completely new. We are committed to observing and analysing demonstrations at different scales.
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THE PERSPECTIVE OF

Innovation needs to be easy to implement

STÉPHANE HAMEURY
OPERATIONAL DIRECTOR, BUILDING ENVELOPE DEPARTMENT

We are collectively aware that our planet is a finite space, the fine balance of which can be threatened by every one of our actions. The effects of climate change and the ensuing environmental crises are here to remind us of this, and are exemplified by the water shortages that our country has been experiencing since the end of 2022.

In this context, rebelling against the rules in order to overhaul our frames of reference is an invitation to call into question the standards established to meet these challenges. By challenging preconceived ideas and daring to think differently, we are creating experimental ground dedicated to change and innovation. If we perceive this as a form of “constructive rebellion”, it can open up new perspectives. Innovators defy the limits, refuse to conform to expectations and therefore explore new territories. Innovation in the building sector needs to enable new technologies and approaches to be developed in order to mitigate climate change and adapt to its consequences. Innovative solutions such as renewable energy, bio-sourced and geo-sourced materials, sustainable buildings and environmentally friendly transport are helping to reduce greenhouse gas emissions and preserve natural resources. Innovation also needs to promote education and awareness of climate issues, encouraging and accelerating the adoption of sustainable practices and the implementation of effective environmental policies such as the National Low-Carbon Strategy and the implementation of the decarbonisation roadmap for the building sector. All of this must involve the development of disruptive methods for assessing and measuring the environmental performance of buildings.

Take, for example, Ecoscale, the CSTB’s service for carrying out environmental assessments of circular designs. Its objective is to characterise the circularity potential of construction products, equipment and materials in a robust and independent manner.

We also need to strengthen experimental learning approaches in order to assess the feasibility of innovations. This will involve stepping up experimentation, monitoring it and building on the experience gained so that innovation can be made accessible to all and thus expanded on a massive scale. This is the challenge of the reform of Technical Experimentation Assessments (ATEx), initiated by the CSTB.

Finally, let’s keep in mind that innovation needs to be easy to implement so that it can be adopted on a wide scale. Non-quality in the construction sector is a major source of waste. Errors in design, materials or workmanship can give rise to defects and construction problems requiring costly corrections, and lead to irreversible environmental impacts. To reduce this waste, it is essential to invest in rigorous quality control processes, adequate training and effective communication between stakeholders.

Ultimately, thinking of innovation as rebellion on a large scale is a driving force for sustainable progress. Innovation encourages the calling into question of established standards, paves the way for new ideas and technologies, and promotes large-scale distribution and adoption. Rebellious (constructive) minds are agents of change and the creators of a better future.
CREATING AND SHARING KNOWLEDGE

Reuse as a lever in the low carbon roadmap for the construction sector

The CSTB and the administration of the Sustainable Building Plan have been mandated by the French government to co-chair, with the support of the General Directorate for Planning, Housing and Nature (DGALN), the development of the road map for decarbonising the building life cycle value chain. The fruit of a long-term project, the road map was submitted to the public authorities on 24 May 2023.

Drawn up by all players in the sector as part of a dialogue and consultation exercise required by Article 301 of the Climate and Resilience Act, the roadmap for decarbonising the building life cycle value chain lists 25 levers for action and proposes just over 120 measures with the aim of contributing to developing the future French strategy for energy and climate (SFEC).

Decarbonisation objective
In accordance with Article 301 of the Climate and Resilience Act of 22 August 2021 on combating climate change and strengthening resilience to its effects, several road maps have been drawn up jointly by representatives of economic sectors, the government and representatives of local authorities for each sector that emits large amounts of greenhouse gases (GHGs).

The increase in GHG emissions plays an undeniable role in accelerating climate change. With 153 Mteq CO2 in 2019, the building life cycle value chain alone accounts for 25% of France’s annual carbon footprint.

Therefore, the building sector is a contributor to climate change, but is also responsible for finding solutions to achieve carbon neutrality by 2050.

Collaborative work
To this end, dialogue has been established with all stakeholders in the sector (manufacturers, public and private contracting authorities, project managers, companies, operators, etc.) to share their vision of decarbonisation and identify the common actions to be taken. Led by a steering committee of 23 representative professional organisations, some fifty working meetings, involving over a hundred organisations and more than 200 participants, were held throughout 2022.

The CSTB took part in the work with the aim of drawing up an inventory, identifying and prioritising the levers to be mobilised with regard to the estimated potential savings of GHG emissions, characterising the levers used and, finally, quantifying the carbon impact of some of them. Some thirty CSTB employees from five different departments (“Research and Development”, “Building Envelope”, “Energy and Environment”, “Economy and Resources”, “Safety, Structures and Fire Performance”) have been mobilised to provide cross-cutting and comprehensive expertise.

Four thematic working groups
The development work was organised according to four thematic working groups, supervised by actors in the sector, designated by the co-chairs:

- WG 1: Components of structures, supervised by the Strategic Committee for the “Construction Industries” Sector (CSP IPC) and the Social Union for Housing (USH);
- WG 2: New constructions, supervised by the French Building Federation (FFB) and the Federation Syndicale Liberté du Travail (FSLB);
- WG 3: Renovation of existing buildings, supervised by the Confederation of Crafts and Small Building Enterprises (CFEPI) and the National Council of the Order of Architects (COAG);
- WG 4: Operation and use of buildings in their environment, supervised by the Federation of Real Estate Promoters (FPI).

Low carbon roadmap for the construction sector: the 25 levers
The low carbon roadmap for the construction sector proposes 25 levers for action, i.e. more than 120 measures, with the aim of contributing to the French strategy for energy and climate (SFEC). For each lever, the stakeholders in the sector have endeavoured to contextualise their proposal, identify any existing obstacles, and determine the R&D needs, but also needs for new skills and additional jobs. They have also proposed concrete measures for implementing each of the levers, distinguishing between actions related directly to their respective missions and proposals for changing public policies (regulations, taxation, financing, etc.).

The low carbon roadmap for the construction sector was submitted to the French government by the CSTB and the administration of the Sustainable Building Plan on Wednesday 24 May, in the presence of Christophe Béchu, Minister for the Ecological Transition and Territorial Cohesion, Agnès Pannier-Runacher, Minister for the Energy Transition, and Claire Couturaud, Delegate of Cities and Housing.

As part of the research funded by the CSTB, the “Economy and Resources” and “Floors and Coverings” departments have been working on an initial methodological guide for reusing carpet tiles. In this context, discussions have taken place with contracting authorities, and visits to several reconditioning platforms have been organised to better understand how this approach is articulated out in the field and what the CSTB could provide.

Since 2020, the CSTB’s Health and Comfort department has been able to conduct tests to characterise emissions of volatile organic compounds and formaldehyde on reused carpet tiles. These were the first investigations of their kind, with the CSTB fully committed to the subject of the circular economy.
Supporting concrete industry players in their environmental transition

Through its support of low-carbon concrete manufacturers, the CSTB is the gateway to recognition for new materials or processes with a reduced carbon footprint before they are put on the market. Around ten Technical Experimentation Assessments (ATEX) have been issued to date and others are currently being evaluated.

This support came into being in 2018 to meet the demands of low-carbon concrete players. In order to successfully complete their environmental transition, many professionals in the sector are developing innovative binders or aggregates in the formulation of low-carbon concrete, or rethinking their products to achieve material or alloy savings (reinforced concrete, pre-stressed concrete, etc.) or to promote reuse. The CSTB’s expertise is helping them to move from the level of the material to the scale of the entire building, and to test the mechanical performance. Obtaining a Preliminary Technical Evaluation of Material (ETPM) provides a solid basis for recognition of the material on the market. “The aim is to ensure that innovative structures and semi-structures meet all chemical and environmental mechanical requirements, and that they comply with the conditions of use,” explains François Boutin, Project Manager within the Mechanical Studies and Tests division of the CSTB’s Safety, Structures and Fire Performance department.

Ensuring the sustainability of the works

The carbon weight of concrete is highly impacted by the choice of cement. Portland cement is one of the more carbon-intensive binders, in particular due to the clinker production process (needed to 1,450°C and decarbonisation of limestone during this heating process). Innovations include new lime-based binders for blast furnaces, fly ash, clay, natural pozzolana, etc.). Beyond the impact on environmental performance, these changes in composition mainly have an impact on the structure: shrinkage, creep, adhesion of reinforcements, shrinkage, stress, reaction to fire, etc. These different behaviours sometimes require practices to be shaken up, both on site and during the design process. “Our mission is to reiterate the fundamental assumptions set out in concrete calculations and the Eurocodes, adapt the calculation code and, if necessary, support the players in deferring the construction measures to be taken in order to ensure the sustainability and safety of the structure,” continues François Boutin.

“For example, if low-carbon concrete setting kinetics are slower, longer foreword times will need to be considered, and the site, and training of workers will need to be reorganised. Similarly, less anchoring of the rebars can have repercussions on the dimensioning of the concrete or on the reinforcements. In terms of carbon weight, the question then arises as to what is the carbon gain if the concrete requires an increase in the density of the reinforcement?”

Issuing Technical Experimentation Assessments (ATEX)

We propose two technical assessments: one for the material (ETPM) and the other at the scale of the entire building (ATEX) for each part of the structure (floor, wall, slab, etc.). “We offer as many assessments as there are processes in which the material may be used. With ATEX, we rely on an identity card for the material and its properties, established during the ETPM, while specifying the control plan to ensure quality during its production,” says Étienne Pratt, Evaluation Engineer in the CSTB’s Safety, Structures and Fire Performance department. We are currently focusing on ATEX case A (refers to a product or process applied at different worksites for a given limited period) or ATEX case B (concerns an identified material or process applied at different worksites for a given limited period). “We are the main point of contact for other CSTB laboratories or outsourced external service providers. We are the gateway,” comments Étienne Pratt.

In 2018, Hoffmann Green Cement Technologies was the first player to benefit from this support. Other major players in the cement industry have been using this service over the past two years. “We are growing in terms of applications, and this is also forcing us to restructure ourselves.”

A WORD WITH AN EMPLOYEE

Karine Hecquet,
Sales and marketing director

“Conscious of the need to reduce the carbon footprint of their material, and aware that we have to do so, concrete and cement manufacturers are offering highly innovative solutions such as clinker-free or non-standardised cement. I am very aware of environmental issues and share a sense of the need to act quickly. So I’m delighted to take part in their projects as a dedicated point of contact for sales, promoting coordination. The CSTB’s support of these players requires quick and nimble work which I particularly enjoy. It’s also quite complex because it calls for a wide range of skills and services from the teams. Good planning and the responsiveness of each individual are key factors in speeding up the time it takes to get these products on the market in complete safety, and, ultimately, in reducing the carbon impact of the construction industry. Therefore, the CSTB is fully committed to helping the sector transform for the benefit of us all.”

A WORD FROM THE EMPLOYEES

François Boutin,
Engineer, Project Manager

Safety, Structures and Fire Performance department

“We are focusing on ATEX in order to support the CSTB in the process of evaluating their construction materials and processes with a reduced carbon footprint. As the first point of entry for these players, the Safety, Structures and Fire Performance department has been able to adopt itself in order to offer them the support and skills of our various business lines (assessment, expertise and experimentation) and to position the CSTB as an essential link in the development of these new materials which meet the challenges facing our society.”

Supporting concrete industry players in their environmental transition

Over the past two years or so, the objective of attaining carbon neutrality by 2050 has led many construction and cement industry players to ask the CSTB to support them in the process of evaluating their construction materials and processes with a reduced carbon footprint. As the first point of entry for these players, the Safety, Structures and Fire Performance department has been able to adopt itself in order to offer them the support and skills of our various business lines (assessment, expertise and experimentation) and to position the CSTB as an essential link in the development of these new materials which meet the challenges facing our society.

In terms of Technical Appraisals and Technical Experimentation Assessments, more and more evaluations (studies, tests, etc.) are focusing on the performance of bio-sourced materials. New bio-sourced materials such as straw or recycled materials, such as cellulose wadding, are regularly tested in thermal insulation systems. The assessment focuses on the durability of these materials – for example, their settlement over time. For these materials that are sourced from living organisms, it is important to regularly check, in situ, the absence of fungal development and the possible absence of water inside them (or in their direct environment due to the effect of condensation) caused by hygrothermal transfer hygrothermiques.

Supporting innovation

Set up in 2021 by the Research and Innovation department of the French Ministry of Ecological Transition and following four years of preparatory work, the “National Project Terre Crue” (National Raw Earth Project) aims to enable the large-scale deployment of raw earth construction. In this context, and following calls for proposals launched by ADEME and the French National Research Agency (ANR), the CSTB is heavily involved in three research projects, the main objectives of which are to study techniques for implementing raw earth (cob, rammed-earth, adobe, light earth, packed earth blocks, render, etc.), to better understand its behaviour under different types of constraints (mechanical, acoustic, water, fire, etc.) and to study the durability of the structures.

Each project, the duration of which varies between two and four years, involves several partners, both academic and industrial. Characterised by its low environmental impact, raw earth boasts great hygrothermal and acoustic comfort. However, the material also presents obstacles to the widespread adoption of its use such as the re-appropriation of old construction techniques by current players or the guarantee of the performance of buildings over time due to the wide variability of raw materials. Considered as the main stream of inert waste by the construction sector, the earth produced when carrying out earthworks for buildings can also be reused to some extent.
FDES configurator for valves and fittings: a win-win tool

To respond to the increasing demand for environmental and health declarations (FDES) and environmental product profiles (PEP), the CSTB is setting up an FDES configurator dedicated to sanitary valves and fittings and their associated accessories (drains, showers, etc.). It could also eventually apply to fittings in buildings, pipework and other construction-related products.

Contracting authorities and project managers are always asking for more details about the environmental performance of construction products and systems. Manufacturers too are increasingly requesting individual environmental and health declarations (FDES) and environmental product profiles (PEP). Faced with this influx of demands, the lead times are only getting longer. “This enthusiasm is explained by the entry into force of RE2020, but also because manufacturers have clearly understood that, on the one hand, default values are destined to disappear and, on the other, collective FDES, although very useful, do not highlight the individual efforts of manufacturers,” says Florence Wagner, Research and Expertise Engineer in CSTB’s Energy and Environment department and Technical Project Manager for this tool. It is for all these reasons that the CSTB has designed this configurator, which, for the time being, is reserved for sanitary valves and fittings only, and which allows manufacturers to more easily produce their own FDES themselves.

Simplifying procedures

This FDES configurator has been set up to include all materials, components, and processes required to manufacture valves and fittings: brass valves, cartridge bodies, and spouts, energy, modes of transport, waste treatment. The end-of-life scenarios for each element were modelled using plastic, it can create an FDES simulation and then work on its design to the methods introduced in November 2022 have been integrated,” adds Florence Wagner. It is also and above all an aid for ensuring the environmental optimisation of industrial products as it is possible to simulate the impact of a change of supplier or of materials. “If a manufacturer wants to reduce the quantity of brass and increase the quality of plastic, it can create an FDES simulation and then work on its design again,” explains Laurent Rousseau, Head of the Sanitary and Building Equipment division within the CSTB’s Water Department.

A collaborative approach

This configurator is currently limited to valves and fittings. “The Water department was a driver for this project because the market demand for FDES is high, manufacturers are numerous and the potential is real. The components used to make valves and fittings are similar, which makes it easier to fill in the fields using a standard form,” comments Laurent Rousseau. “Moreover, this project was launched at the request of the manufacturers, who expressed the need for support. The configurator was created with the participation of eleven manufacturers from small, medium and large companies. Although they came from competing companies, they all sat around the table together to list the product libraries, validate the blueprints, certify the calculations and produce their own FDES from the configurator.”

“The success of this tool, which is the result of one year’s work, is linked to the joint participation of manufacturers, product specialists and CSTB’s LCA specialists,” adds Florence Wagner. The configurator will be presented to manufacturers in September 2023 and commissioned during the first quarter of 2024. It could then also be developed for other building sectors. Research into the development of other configurators, in particular for pipes and industrial valves, is already underway.

In Brief

RESISTANCE OF Pipes to CHEMICALS

After over ten years’ R&D work, the CSTB has set up several experimental tools to study the behaviour of tubes and other products that come into contact with water intended for human consumption, and that are subjected to chemical aggression from disinfection products.

For example, the accelerated ageing of pipes in a hospital environment leads to many accidents. To respond to feedback from the field, the CSTB has developed test protocols to assess the resistance of pipe materials to chemical attacks by disinfectant products, in particular polymer and elastomer materials used in drinking water supply networks.

The ultimate objective is to provide contracting authorities, design offices, and operators with the necessary information about the compatibility of disinfection products with pipes. This will be made available via a support guide to help choose suitable operating solutions suitable for all products, which it will be possible to use both in the design process by project management teams and when the systems are being operated by water treatment companies.
THE CSTB COMMITTED IN-HOUSE TO CSR

The CSTB has an ambitious waste management plan

As part of its CSR approach, which it reinforces each year, and in line with its involvement in, and dolly support for, projects to preserve the environment, reduce the carbon footprint and develop circularity, the CSTB adopted a global action plan for managing its waste in 2022.

Led by the Economy and Resources Department created in 2020, this project aims to redefine the CSTB’s waste management policy by focusing, in particular, on reducing its volume of waste, developing recycling procedures and implementing centralised and standardised management within its four establishments at Marne-la-Vallée, Grenoble, Nantes and Sophia Antipolis. This project also provides the opportunity to encourage the sharing of feedback and best practices.

A project extended to PEMW for testing and tertiary activities

In order to meet the regulatory requirements for prioritising treatment methods, which constitute the legal basis for waste management with a view to reducing, reusing and recycling waste, the scope of the project has been designed to cover all Products, Equipment, Materials and Waste (PEMW) from testing and tertiary activities at the CSTB’s four sites.

The issues related to this topic are:

• regulatory and contractual, with, in particular, the implementation of the new extended producer responsibility for building construction products and materials (REP PMCB);
• environmental, linked to the desire to favour the most virtuous management methods (prevention, reuse);
• economic, with the possibility of the free recovery of waste, introduced by the REP PMCB;
• organisational, in particular in connection with the optimisation of PEMW management logistics at the different sites.

To meet these various challenges, the project has set itself several objectives:

• redefine the action plan relating to the management of PEMW at CSTB’s four sites;
• bring the CSTB into compliance with the current and future regulatory framework;
• manage the PEMW resulting from the CSTB’s activities, taking into account the processing hierarchy pyramid and ensuring their follow-up;
• raise the awareness of employees and communicate with its employees.

Inventory and outlook: an action plan defined based on the hierarchy pyramid of processing methods

During the first phase of the work, the project team, which is made up of members representing the four establishments and the CSTB’s operational and functional departments, met up monthly to draw up an inventory of the different themes relating to the management of PEMW: a regulatory framework, PEMW resulting from testing activities, management logistics at the four sites, in-house procedures, communication and accountability actions, etc. Based on this comprehensive inventory, the project team was thus able to draw up a plan of action, 29 of which were identified as priorities as part of the PEMW management strategy. To this end, significant human and financial resources were mobilised, with a budget of around €300,000.

The actions that have been identified as priorities concern the CSTB’s tertiary and testing activities, and are attached to the different levels of the hierarchy pyramid of PEMW treatment methods.

This project will include, in particular, the implementation of a “zero plastic” policy for so-called tertiary activities and, with regard to testing activities, a redefinition of the maximum quantities of products delivered for testing. These actions illustrate the “prevention” phase in the pyramid.

In order to develop and consolidate the company’s recovery procedures, it is planned to define a standardised in-house procedure to supervise the sale of products and materials to the CSTB’s employees and to associations.

Finally, for recovery through recycling, the project aims to standardise the management of “sorting at source” of tertiary waste as well as to organise the sorting of plastic waste at the CSTB’s four sites.

Decided upon and developed in 2022, the action plan saw phase 2 of the “execution” phase start in early 2023. This is explained in detail on the intranet page dedicated to the project.

A project involving all employees

In addition to the project team that has been meeting since 2022 to define and implement this new action plan, the CSTB’s PEMW management strategy must involve all its employees. Each employee has a role to play in correctly implementing more virtuous management of incoming and outgoing goods. Using a drinking flask rather than plastic bottles, following waste sorting guidelines and reusing items rather than throwing them away are all everyday actions that will ultimately facilitate the reduction of waste production and the effectiveness of their treatment.

In addition, the project team has set up an ideas box to collect questions or suggestions from each employee via an online questionnaire. One of the plan’s priorities is to encourage CSTB’s employees to take the initiative in managing PEMW and will therefore make it possible to act on the basis of proposals put forward.

THE CSTB COMMITTED TO THE DEVELOPMENT OF SOFT MOBILITY

At the Champs-sur-Marne site, a bicycle shelter comprising 27 bike stands and three recharging stations for electric bikes and scooters was installed during the renovation of the establishment’s head office, in line with the work of the Recovery Plan.

At the Sophia Antipolis site, in addition to implementing a workshop for overhauling employees’ bikes, in connection with the Company Mobility Plan in favour of eco-responsibility, a bicycle shelter has also been installed. At the Grenoble site, the provision of a bicycle repair kit and “metro-bike”: the removal of one of the service vehicles and the possibility of using a car as a car-share form part of the initiatives put in place by the establishment to encourage low-impact mobility. Given the increase in the number of users, the redevopement and addition of a bicycle shelter, and potentially a repair/tyre pumping area, are being studied.

The CSTB participates in collective initiatives

In 2022, the CSTB’s establishments in Grenoble, Sophia Antipolis and Nantes have committed themselves to the “Objectif employeur pro-vélo” (OEPV) or “Pro Bikes Employees Objective” label, which supports employees in promoting active mobility with their employees, and starts with a self-test in order to define the measures to be implemented. The Sophia establishment took part in the Sophia Antipolis Mobility Challenge from 19 to 23 September 2022 to promote alternative modes of transport.

A total of 1,427 kilometres were covered using alternative transport as part of this initiative.

For the fourth consecutive year, the CSTB establishment in Nantes took part in the Mobility Challenge. During this week-long collective challenge, employees from companies and pupils from schools in the region worked together to travel using alternative modes of transport. A 2022 award winner, the company climbed to third place on the podium in the category of 100-499 employees, with 29 participants and 67,290 kilometres completed. Finally, every year, the Grenoble establishment takes part in the Mobility Challenge designed to promote alternative modes of transport to individual cars.

THE CSTB IS COMMITTED TO CSR"
THESE ACTIVITIES MEET THE SUSTAINABLE DEVELOPMENT GOALS:

- THE PERSPECTIVE OF ÉRIC COIGNOUX

Nurturing human capital and placing it centre stage

The challenges facing the construction and urban development sectors in the face of climate change are numerous, as its impacts, both health-related and economic, are significant for building users. Consequently, these challenges are calling us to examine potential levers for decarbonising the building sector as part of a logic of mass renovation, preservation of resources, development of the circular economy and optimisation of the use of buildings. In all these areas, the CSTB is being called upon to assert its expertise and mobilise the multidisciplinary skills of its teams. At the heart of this ecosystem, the Publishing and Training department is responsible for spreading and sharing knowledge with stakeholders in the sector.

However, faced with these new challenges, skills and know-how are destined to transform themselves. Fully aware of this, the CSTB must keep pace with these developments. This is why it strives to bring together the various players involved to create synergies and offer content adapted to these changes. Raising awareness of project management thus remains its main objective through its training actions. Continuous vocational training is also a major component of the appropriation of knowledge at the CSTB: theoretical and notional training on themes concerning innovation, but also on regulatory subjects (fire regulations, acoustics, environmental regulations, etc.). The aim is to always stay ahead of the game where developments in the sector are concerned, as “CSTB Formations” training courses have done with the BIM and the digital model, or by supporting the E+C label and the appropriation of the RE2020 through massive open online courses (MOOCs), which have made it possible to train several thousands of people.

To support the rise of the circular economy, “CSTB Formations” also contributed to the development of the repository for the new profession of PEMW diagnostic specialist, for which certification training sessions have been developing across the country for over a year now.

A flagship project for decades to come, renovation requires a skilled workforce to integrate new, more resource-efficient construction techniques. The construction trades are essential to this global renovation initiative. However, the sector is in short supply of competent personnel in this area. Hands-on training, and, in particular, everything we put in place around windows and panes, is an essential lever for ensuring a building’s quality and durability.

The building sector is now in the throes of change, and this raises many questions. The actions of the CSTB are intended to be a response to questions concerning the development of the skills of actors in the sector and, by extension, those of its own employees.

At the cutting edge of innovation, these employees need to master not only their own expertise, but also concepts that interface with them, in order to better understand the building and its environment. The development of skills is in the CSTB’s DNA for everyone looking to open up new perspectives. The teams can access this initiative through the skills development plan, set up by the Human Resources Department, and drawn up in part with the INTER offer of CSTB Formations. The CSTB also welcomes and trains many work-study and doctoral students who play their part in enriching the company’s human capital.

Construction trades are essential to the success of this global renovation initiative.

ÉRIC COIGNOUX
DIRECTOR OF PUBLISHING AND TRAINING
Digitisation of rules and BIM: a question of semantics?

The feasibility of digitising rules (accessibility, fire safety) has been demonstrated by several initiatives. Thus, it is possible to check the conformity of a building’s digital model with respect to a regulatory baseline, or to obtain lists of compliant products for a given model according to its environment. There are many avenues for development, particularly within the scope of the digital twin concept.

The digitisation of professional rules is not a recent development. Indeed, the first expert systems date back as far as the 1960s. “The principle has already been thought out, particularly by certifiers. However, the problem with these approaches is the cost of maintenance, which is exorbitant. This is all the more the case because rules and standards develop and change, and everything needs to be updated,” asserts Bruno Fies, Research and Expertise Engineer in the CSTB’s Information Technology department. Nevertheless, since the advent of so-called “semantic” technologies, the maintenance of such systems can finally be envisaged with more reasonable costs. The first efforts consisted precisely of ensuring the feasibility of the project and of developing a method and architecture that could allow certain parameters to be modified without calling the entire genesis into question. “We didn’t hard-code in the same place. It’s possible to make changes without changing the rules via data management mechanisms,” continues Fadi Lahlou, Development Project Manager in CSTB’s Technical Department.

A design aid tool

According to the CSTB’s Information Technology department, the most notable works in this area date from the Digital Transition Plan in the building (2016), and then from the 2022 BIM plan (2019). The aim was to transcribe regulatory constraints, initially expressed in natural language, into digital language so that they could be interpreted by machines, and to transcribe regulatory constraints, check the conformity of the project according to its environment right from the design phase, or even carry out monitoring while work is being carried out on site. A veritable design aid.

Finding a common language

Among the avenues for development, the engineers of the Information Technology department are seeking to link the digitisation of rules to the concept of a digital twin, which will make it possible to monitor the construction of a project during the building phase and even beyond the duration operation, maintenance and renovation phases. This is particularly interesting because the question of the reversibility of buildings and changes in its use are at the very heart of the issues. “It would then be possible to critically review the elements of the model and adapt the building to its new use, and to change the rules according to how the building is used,” emphasises Fadi Lahlou. Today, the need to find an environment that can host and highlight these digitised rules still remains.

However, the issue is not just technological. The main obstacle to the digitisation of rules remains the development of a common language which can be understood by all. “One concrete example is that of the pathway required to take accessibility into account. However, the concept of a pathway does not exist in the digital model and cannot be transposed in its current state. So it was necessary to establish links between all these vocabularies in order to develop a common lexicon,” explains Bruno Fies. This involves the creation of a panel made up, in particular, of architects, engineers in charge of digital modelling, product manufacturers and certifiers. The aim of this panel will be to enrich and maintain this knowledge base which contains both digitised rules and a universal and cross-cutting lexicon, with the CSTB wishing to remain the leader of this project.

Beyond the control of digital mock-ups, this approach and these technologies apply almost identically to product prescription services. It is thus possible to digitise unified technical documents (DTUs) and offer prescription services for products adapted to a BIM model, presented as a system input. The designer can choose materials or solutions according to regulatory constraints, check the conformity of the project according to its environment right from the design phase, or even carry out monitoring while work is being carried out on site. A veritable design aid.

In March 2022, the European Commission presented its draft revision of the Construction Products Regulation, which includes ecological and digital transitions, in particular. This project will profoundly transform the working environment of the entire construction ecosystem, from manufacturers to entrepreneurs. The CSTB is closely monitoring this project in order to examine the impact it will have on the construction and renovation of buildings, and the ability of stakeholders to respond to the essential challenges that the building stock will have to face in the coming years.

This involves studying the many proposals from the different European bodies which include the European Commission or the European Parliament, and all the stakeholders involved. This collaborative work enjoys a wealth of exchanges with all the parties concerned (experts from the CSTB, manufacturers, professional federations, European counterparts, associated ministries, etc.) to fully understand their motivations and objectives.
**Walk-in showers to improve accessibility**

In 2022, the CSTB published a guide on the implementation of accessible walk-in showers on concrete substrates in private shower rooms in new builds. It presents the technical solutions that exist and the products suitable for designing this type of structure.

Accessibility regulations now stipulate that showers have to be fully accessible. Previously authorised, the difference in level of maximum two centimetres between the shower room floor and the shower area is now prohibited in new apartment buildings and individual housing units. Instead, walk-in showers are now required, the aim of which is to allow access to the shower area for all persons with restricted mobility, both the elderly and people with disabilities. One of the reasons for this new provision is to encourage the elderly to live at home.

To this end, the French Department for Housing, Urban Planning and Landscape (DHUP) asked the CSTB to revise the Guide to Implementing walk-in showers in private shower rooms in new builds, originally written in 2012.

### Technical constraints

The new guide designed by the CSTB, the title and content of which have been amended to comply with this regulation, specifies the general conditions for the construction of accessible walk-in showers on concrete substrates in private shower rooms in new builds, and presents the construction solutions technically evaluated and known to date.

As a walk-in shower is a technically complex structure to build, different constraints must be taken into account such as the flow of water to the evacuation device, the waterproofing of the substrate, the slipperiness of the shower area, the acoustics, and the electrical regulatory requirements. To ensure accessibility, minimum dimensions of 120 x 90 cm must also be observed for the shower area and the adjacent areas (space for using the shower and manoeuvring space).

A working group made up of different actors from the construction process met together over several months to produce the revised guide. The 80 highly committed participants included developers, companies, manufacturers, technical inspectors, insurers and experts. The challenge was to identify the technical solutions that exist and have been validated to date, and also to determine the technical difficulties to be resolved and the products to be developed to improve the solutions available.

### Several technically evaluated solutions

For the two possible configurations, i.e. open shower spaces and partitioned shower spaces, three ways of creating a walk-in shower have thus been identified: shower spaces with masonry walls, shower bases ready for cladding and finished shower bases.

However, the guide does not absolve players from their responsibility to demonstrate the suitability of each type of shower to each different building. In question, while respecting DTU, AFEC or ATES requirements, especially as not all product combinations have yet benefited from feedback in France.

This guide, which is intended to alert designers to the measures to be taken according to the type of installation configuration chosen, is a provisional version which, in the short term, is waiting to be completed by other technical solutions (in particular for finished shower bases) once they have undergone technical assessments.

The CSTB is supporting all professional sectors in this development both by evaluating innovative solutions and by providing certification.
“Window Installation Service” QB certification, a guarantee of quality

The recent “Window Installation Service” QB certification now includes 11 certified companies. Others are set to follow. This enthusiasm attests to the willingness of installers to ensure the quality of their services and stand out from the competition.

Over the past ten years, windows have taken a technological leap forward and manufacturers have not stopped innovating. However, regardless of how effective the window is meant to be, if it is badly installed, it loses all its benefits. This is why companies need to be trained in installing these new products and in the implementation rules. “Window Installation Service” QB certification addresses the concerns of window manufacturers, who see the installation of their products as a guarantee of quality, and who can attest to well-organised work sites and the quality of installation, and thus stand out from the competition.

The importance of the installation

It was in the middle of the health crisis that this certification came into being. Objective: to train companies in installing windows, and to certify the quality of the complete service. These are essential factors, as no compulsory training is required to become an installer. However, a badly installed window can damage the building envelope and lead to heat loss and the risk of a premature end-of-life of products.

According to a study conducted by ADEME, over 40% of air leaks from buildings come from windows, the first cause being connection problems between the window and the structural work, or defects in the window sill.

What about certification?

“Window Installation Service” QB certification attests to the quality of service provided by the company. It is based on three areas: the quality and choice of the products installed, the competence of the installation staff and the company’s organisation of their work sites. Installers and metalworkers undergo regular installation training, with an evaluation of skills acquired at the end of the course. In addition, an audit of the company makes it possible to verify its ability to organise projects and take customer satisfaction into account. “We make sure that the installer has the products and accessories required for a proper installation as well as the appropriate instructions. The content of the technical installation file is verified in particular: implementation schematics, measurement sheets, self-checks during the installation, end of construction report and a window maintenance sheet. We also check the follow-up of the after-sales service. Organisation is an essential element. A well-organised project, with trained and competent staff is the guarantee that the project will be carried out properly,” says Sophie Curnier, Head of hands on training and “Window Installation Service” QB certification within the CSTB’s Windows and Glazing department.

Strong enthusiasm

11 companies are currently certified and six more are in the process of being certified. The goal, by the end of the year, is to reach 25 to 30 certified companies. “Since the end of 2022, demand has increased sharply,” notes Hubert Lagier, Director of Windows and Glazing. “This enthusiasm is explained by the desire of companies to attest to the quality of their service and installation thanks to well-trained fitters.” And this is borne out in practice. According to a survey carried out among the certified companies, this certification is a significant mark of differentiation and offers a competitive advantage, the key being skilled staff and the assurance of a good installation. It also allows companies to lower their insurance premiums and to recruit and retain installers. “This certification is above all a voluntary act by companies wishing to set themselves apart by demonstrating their technical expertise. It requires a limited investment in time and money as the incremental direct costs are estimated at between 2 and 3 euros per window installed,” continues the Director.

Outlook

Four training platforms are currently spread across the country: Grenoble, Saint-Thibault-des-Vignes in the Paris region, La Rochelle and, since March 2023, Toulouse. Other sites in the region could emerge in the coming years in order to offer an even more fine-meshed network. Changes to this certification are being studied. It could thus include a worksite audit being carried out to check the actual installation. It could also take the environment into account with monitoring of site waste management. While it is still too early to comment on these prospects, the main objective will remain the same: to promote and support companies in improving quality without introducing administrative complexity or excessive constraints.

SEREINE: FOCUSING ON THE ENERGY PERFORMANCE OF BUILDINGS AFTER RENOVATION

Stemming from the PROFEEL programme, and led by the Construction Quality Agency (AQC), the SEREINE project brings together around forty scientists with the aim of developing innovative solutions to effectively measure the actual energy performance of housing units and provide a snapshot of this after renovation. A pioneering, reliable, quick and simple method available for new builds and renovated private homes since the end of 2023, SEREINE makes it possible to establish a complete diagnosis of the envelope and the energy systems.

The device is easy to implement: the tested building is prepared in the same way as for an air leak test. After blocking all the air intakes, cutting off the controlled mechanical ventilation and closing the roller shutters to prevent the sun from disrupting the measurements, mobile heaters are installed in each room to inject a controlled thermal input into the interior environment. Sensors are installed in and outside the housing to observe the building’s behaviour.

Once the measurements have been carried out, algorithms are used to deduce a standardised indicator which characterises the overall level of the actual Insulation. This indicator is very close to the Ubat indicator, well known among heating engineers.

Adapting the method to apartment buildings

SEREINE measurements are currently carried out throughout the country. In order to capitalise and share feedback on the actual energy performance of new and renovated private homes. At the same time, the SEREINE project is continuing its development and is preparing, in 2024, for the provision of a suitable energy performance assessment system for apartment buildings.

Thanks to all its tools, SEREINE will promote the development of skills in the sector and secure the renovation (the widespread adoption of which is essential) and construction market by providing guarantees on actual performance.

SEREINE, a project stemming from the PROFEEL programme

Find out more

SEREINE is a programme supported by professional building organisations and funded by the French state’s Energy Savings Certificate (CEE) which aims to foster and improve the upgrading of energy efficiency in existing buildings in order to meet the challenges of the energy transition.

1. PROFEEL, a programme supported by professional building organisations and funded by the French state’s Energy Savings Certificate (CEE) which aims to foster and improve the upgrading of energy efficiency in existing buildings in order to meet the challenges of the energy transition.
The CSTB committed in-house to CSR

Objectives of the CSTB’s HR policy: to develop well-being and corporate cohesion

Ensuring the well-being and safety of employees, while maintaining their commitment and strengthening the corporate culture, was one of the CSTB’s priorities for 2021, a year still marked by the health crisis. In 2022, the sharp decline of Covid-19 enabled the return and the initiation of many opportunities for sharing and social cohesion, thus consolidating these objectives. The CSTB also emphasised quality of life in the workplace and a willingness to engage more with young talent.

In 2022, the CSTB reached the symbolic threshold of 1,000 employees spread across all its establishments in Champs-sur-Marne, Nantes, Grenoble and Sophia Antipolis. This recruitment dynamic, which accelerated in 2021, is explained in particular by the strengthening of the newly created Energy and Environment, and Economy and Resources departments. “The activity of these two entities focuses on two fundamental principles that underpin the various developments underway in the construction sector: the availability of resources to feed it and the existence of sustainable economic models,” explains Rémi Leteinturier, Director of Human Resources at CSTB. “Their essential expertise must meet the major challenges related to limiting environmental impacts and developing the circular economy.”

Quality of life in the workplace

This increase in the workforce was accompanied, at the same time, by an improvement in the working environment of employees through the Recovery Plan, a major programme for upgrading energy efficiency, initiated in 2020. With the initial objective of reducing energy consumption and carbon emissions, this work also contributes to modernising three out of the four CSTB sites. In Sophia Antipolis, the replacement of all windows, French doors and lighting in the three buildings has improved the working conditions of employees by providing them with better thermal and visual comfort.

In Grenoble, the main building has been retrofitted, like the Champs-sur-Marne administrative building, which was completely restructured in order to be transformed into the establishment’s head office. In its approach to improving and modernising its working environments, in order to make progress, the CSTB is relying on and calibrating itself with the Dow Vallée label, developed by its subsidiary, CERTIVEA. These two renovations will thus meet the requirements and expectations of this label, which promotes the transformation of workspaces and working methods to meet the needs of companies.

To help the teams take ownership of these new workspaces, delivered in the course of 2023, many hands-on workshops were held with the support of the Kartham group, which specialises in change management, the layout of professional spaces and the choice of suitable furniture. A large proportion of the future occupants were thus able to participate in the layout of their respective work areas according to their needs, the naming of spaces and the definition of the rules of conduct. These exchanges also provided the opportunity to prepare them for the “flex office”, set up for the first time at the CSTB. “The establishment of the ‘flex office’ in this new building in Champs-sur-Marne logically follows the signing, in 2021, of a company agreement allowing up to three days of remote working per week as well as the digitisation of our working practices,” explains Rémi Leteinturier. “These two organisational methods are at once complementary and beneficial: the first makes it possible to provide employees with diverse, user-friendly workspaces that are better suited to each person’s needs and uses, the second allows a good balance of personal and professional life, while maintaining real proximity to the teams, a strong collective dynamic and a shared corporate culture.”

Health and well-being

Once a year, a day for raising awareness of a health issue is organised for employees from all establishments. On this occasion, three workshops focusing on sleep were organised: sleep and nutrition, understanding your sleep and introduction to “micro-napping” in your chair. On the agenda for 2023: the principles and benefits of nutrition.

A health application, Humano, has also been deployed for employees. This digital health coach offers over 3,000 sessions grouped into three themes: physical activity, diet and mindfullness, and over 500 recipe ideas. Thanks to these various sporting and connected challenges, Humano also makes it possible to create social ties between colleagues. “Over 25% of the CSTB’s employees have started using this fun tool,” says Karin Desmazères, Head of Occupational Health and Safety. “The statistics relating to connections for the application and content viewed showed a strong interest on the part of employees in sports sessions in the morning or at lunchtime, and relaxation sessions in the evening.”

Corporate cohesion

Many moments of discussion and sharing to strengthen social cohesion also marked the year. Under the banner of “living well together”, the annual CSTB Day took place simultaneously at the four sites on 24 June 2022. Various events were organised on this occasion: a parapent tournament, artistic workshops, cooking classes, a chess tournament; a concert and an introduction to the Fresque du Climat programme. In 2023, the circular economy will be showcased at this special company Day.

In an effort to strengthen onboarding or practices, the first day of collective onboarding for new recruits was inaugurated on 26 July 2022. Employees who have just joined the CSTB were given a presentation of the company in the presence of the CEO, Etienne Crépon.

Fun activities, team workshops, a visit to the Floors and Coatings laboratory, a yoga break and a joint lunch completed their introduction to the CSTB environment.

“Labo chrono” workshops were also organised throughout the year. Designed for all employees, these workshops are intended to promote and help employees better understand the trades and activities of their co-workers. In addition, mini-business conferences are also regularly organised. Spontaneous “Cafés de la rentrée” meetings allowing direct exchange between employees, the leadership and the members of the Executive Committee around breakfast, took place for one week in September 2022.

Initiatives in favour of young talent and older workers

As a committed employer, the CSTB is demonstrating its desire to get involved at a local and regional level. In particular, this has meant joining the network of committed companies of the Val-de-Marne. Proactive in recruiting young talent and integrating work placement and work-study students, the CSTB participates in numerous job fairs and forums. Experts regularly visit schools to present the activities of the CSTB and, in parallel, the company frequently opens its doors to allow many students to visit its laboratories.

All these initiatives, whether they concern the well-being of its employees or its commitment to young talent, have allowed the CSTB to be recognised by several labels. For the eighth consecutive year, the company won the title of “Best Employer 2023”. It ranks third in the list of results drawn up by the magazine, Capital, in the “public research” category. The CSTB has also been certified “Happy Index® at Work”, a label that rewards companies where employees are happy and motivated. For the first time, it also obtained the “Happy Index® at Work Seniors” label, which distinguishes companies working on the employment, and development, of older workers, highlighting the implementation of specific measures for end-of-career development within the context of a company agreement.
As a public industrial and commercial company, the CSTB strives to carry out its missions ethically and independently, both in-house and in its interactions with its key audiences. Impartiality, transparency and sharing, as well as confidentiality, are principles that underpin its actions and help reinforce its exemplary nature.

Revised and standardised in 2022, the CSTB’s ethics charter is based on values dear to the company, namely excellence, scientific and technical rigour, impartiality and transparency, openness, social and environmental responsibility as well as attentiveness and customer service.

Mindful of its customers’ expectations and the need to constantly improve the service provided in terms of quality of service and responsiveness, the CSTB set up a sales and marketing department in 2021. Among the priority areas identified in line with the business plan are customer relations and satisfaction. Aware that its multi-disciplinarity is a source of wealth but that it can sometimes also be an obstacle to providing a complete and rapid response to its contacts, the CSTB is continuously mobilising and challenging its teams. The challenge: to be more available and responsive in order to propose targeted and coordinated solutions to the problems encountered.

Also with the aim of improving customer satisfaction, the CSTB has recently modernised its methods by acquiring a new IT management tool for its certifications, the SIPP database. Ensuring the reliability of in-house information and facilitating access to external data are the watchwords of this website which has been designed for publishing certificates issued by the CSTB.

At the same time, the CSTB is adapting its offer by developing new services. With Ecoscale, the environmental assessment of the circularity of construction products and equipment, it is supporting manufacturers in recycling their products to meet the challenges of the circular economy.

As part of its activities, the CSTB also responds to citizens’ concerns by producing tools for the various actors of the sector in order to advance scientific debate and dialogue, and to improve the living spaces and environments of users. Examples of this are the PROHEL programme or the deployment of the French National Buildings Database (NDB) in 2022.

Strengthening the mastery of knowledge and providing expertise and a good understanding of regulations, standards and best practices is also part of its mission. Thus, the CSTB disseminates reliable tools, media and methods to ensure the quality of construction systems. In 2022, the creation of guides on installing accessible walk-in showers on concrete and wooden supports in private shower rooms, for example, made it possible to alert the designers to the measures to be taken according to the installation configuration chosen for this type of structure.

All these developments, actions and new services illustrate the desire to improve the service provided to customers and stakeholders involved in the construction process, while always respecting the CSTB’s ethical principles which include rigour, impartiality, transparency and sharing as well as confidentiality.
Making the right renovation choice with the aid of the BDNB

The French National Buildings Database (BDNB) is the first reference database for French property data open to the public. Diagnosing, simulating, targeting and assessing are the strengths of this tool, the aim of which is to become the basis for all French property data in the future.

The French National Buildings Database (BDNB) was created in 2019 as part of the Go-Rénove and PROFEEL projects. Launched in early 2022, it now lists residential buildings (which tomorrow will no longer be residential), located in mainland France. It represents a true picture of the state of the French building stock at any given moment.

Simulating the effects of renovation on the building stock

The database currently contains 27 million buildings, each with an identity sheet containing 400 items of data and information, such as the date of construction, the 3D geometric model, surface areas by orientation, the shape of the footprint, characteristics, uses or the structure of the building, glazing, technical equipment, meter consumption data, performance indicators, etc.

“Thanks to this database, it is possible to diagnose, simulate and target the performance of the buildings and assess the impact of the actions carried out,” announces Lionel Bertrand, Deputy Director of the Energy and Environment department, responsible for the development and positioning strategy at the CSTB. Two online services provided by the “BDNB have been in operation for more than a year for housing association landlords (bailleur.gorenove.fr) and private individuals (particulier.gorenove.fr). The database is the same for both services, but the uses and features are different. Private individuals can become more aware of the renovation process; depending on the address of their building, they can find out about the energy label of their home, simulate an Energy Performance Diagnosis (EPD), or this has already been entered in the database, and obtain an urban heat island risk indicator. They will also discover whether the label they could obtain in the event of renovation, find out about the benefits generated in terms of energy consumption, compare their building to those in the neighbourhood and calculate the revaluation of their property on the market following renovation work.

For landlords, the principle is the same, except that access is regulated and not open to all. Once connected to the database, landlords have access to a dashboard for all their property. They can view the number of buildings, housing units, square metres, EPDs, and simulate the label that the building could obtain once fully renovated – its “green value”. This is another helpful tool for promoting renovation strategies. A third intangible object, the Go-Rénove Lab, is used to support the public authorities in the development of public policies by simulating the impact of a regulatory measure or an aid scheme in real terms. “We couldn’t keep working on the existing building stock with the tools of the past, having very little knowledge of them. We needed to map out the current situation and draw up a diagnosis, hence the creation of the BDNB,” summarises Lionel Bertrand.

Several players have taken advantage of this tool to manage their building stock strategies. For example, Action Logement relies on the BDNB/Go-Rénove platform to build an information system shared by all its subsidiaries and aimed at sharing data and standardising building performance estimates.

It also serves as a support for many public initiatives such as Mission Connaissance and France Chaleur Urbaine, etc. “Widely accessible to all players and transparent in the calculation methods used, the BDNB is the reference base open to the public. Tomorrow, it will be the basis for all the data for the French building stock, i.e. 38 million housing units and nearly one billion square metres of territory premises,” concludes Lionel Bertrand.

Outlook

Three BDNB services are currently in operation and two more are being planned: one for the local authorities, which will be made available in autumn 2023, and another for housing buildings, which will be accessible by the end of the year. The BDNB is the basis for capitalising on the knowledge of existing facilities. Beyond energy and carbon issues, the scope of the topics that it covers will gradually expand as the various areas of expertise of the CSTB and its partners are added. These include the topics of comfort and health, water consumption as well as the area of risk control, whether climatic, natural, technological or fire-related.

Based on these new parameters, the BDNB will offer the same services as today: drawing up an inventory of the building stock, helping with decision-making, targeting buildings, and measuring developments and trends. Together with the National Institute of Geographic and Forest Information (IGN) and the French Agency for Ecological Transition, the CSTB is responsible for developing a single repository of buildings BATO. “Cross-referencing between different databases – more than 30 of which from public bodies – is difficult. They are not structured in the same way and are not interoperable, which prevents creating a detailed description of the buildings and therefore hinders monitoring of any renovations carried out. We are in a process of ensuring the reliability of this repository so that it reflects reality as far as possible,” comments the Deputy Director. “However, the data is getting very close to that now, and we are improving every day,” he says, reassuringly.

In the coming years, the integration of artificial intelligence and machine learning will improve the reliability of this national database.
The choices made during the initial product design phase structure most of the impacts the products will face over their entire life cycle, from production to end-of-life management. Therefore, integrating the ecological transition requires an in-depth overhaul of design practices as well as of the role of the different actors and the economic models that connect them. In response to this major challenge, the CSTB is expanding its activities around eco-design, one of the pillars of the circular economy.

In order to facilitate the transition to a low-carbon economy and the widespread adoption of reuse and recycling practices, it is essential to take into account environmental and circularity aspects right from the design phase of buildings, construction products and materials. With this in mind, RE2DO introduces carbon thresholds not to be exceeded for new builds, and since 1 January 2023, the anti-waste law for a circular economy (AEIC) has put in place the Extended Producer Responsibility (EPR) scheme for construction materials or products in the building sector intended for private households or professional use. At the heart of this scheme, eco-design makes it possible to anticipate and promote the virtuous management of the end of life of a product and the waste it generates.

Traditionally positioned in certification and evaluation activities covering a very technical scope, and focused on the safety of goods and people, the CSTB must now meet the growing needs of contracting authorities in terms of new criteria such as low carbon solutions, economic performance and the social conditions under which goods are produced, health aspects, security of supplies, activation of local resources as well as the circularity of products, materials and equipment.

**Supporting Innovation**

To encourage eco-design, the CSTB offers support at different stages of the product design and development processes.

Upstream, work to support planning in the building sector could be envisaged in order to clarify pinpoint the issues that will impact each type of player, and to identify the main developments needed to address them. During the conceptualisation or development stage of existing technical solutions, multi-criteria support can be provided to characterise the potential impacts (carbon, circular economy, technical or sanitary performance, etc.) associated with each product family (to identify the priorities for action) as well as with each proposed development. This requires an in-depth overhaul of design practices as well as of the role of the different actors and the economic models that connect them. In response to this major challenge, the CSTB is expanding its activities around eco-design, one of the pillars of the circular economy.

Finally, the securing of performance and the justification of suitability for use involve evaluation or certification activities such as Technical Appraisals (ATec) and Technical Experimentation Assessments (ATEA), and the securing of the performance of products resulting from reuse. In 2022, shared and recognised practical guides on the evaluation of performance with a view to reuse were developed through the SPIROU (Securing Innovative Reuse Practices through a Unified Offer) research project. These guides will be presented to insurers in order to be able to guarantee the insurability of buildings resulting from reuse.

With the lengthening of the material cycle and the development of recycling, supply chains are becoming more complex, and the CSTB has put in place tools to secure the consistency of the quality of the recycled material throughout the value chain. For example, QBR certification secures the performance of products containing recycled plastic materials in PVC window profiles. Through its CSTB Lab, the CSTB is also supporting several start-ups that offer varied and innovative solutions to meet the challenges relating to preserving resources in the building sector.

Ecoscale, the CSTB’s environmental assessment of circularity to characterise and optimise eco-design, the CSTB carries out environmental assessments, such as individual environmental and health declarations (FDES), or develop FDES configurations, and can help manufacturers identify the main areas for improvement. Furthermore, in order to strengthen the consideration of the circularity of construction products and equipment, the CSTB is implementing an environmental assessment, based in part on the FDES, allowing a more complete analysis of the use of resources and circularity. The work was carried out within one of the CSTB’s scientific and technical research roadmaps: “Circular economy and building resources”.

The evaluation is structured around four indicators reflecting the circularity of a product and highlighting the manufacturer’s efforts for eco-design:

- **content indicator for recycled and renewable materials**: evaluation of the quantity of recycled and/or renewable materials in the product;
- **dismantlability indicator**: ability of the product to be dismantled without damage, in order to facilitate its reuse or recycling;
- **reusability indicator**: the ability of the product to be used again, at the end of its life cycle, for a new use identical to that for which it was designed;
- **recyclability indicator**: ability of the product to enter a recycling channel at the end of its life in order to be recycled.

Each of these indicators is designed based on several qualitative or quantitative criteria, which have been identified as levers. The criteria are then weighted according to their degree of importance, to make up the overall score for the indicator. Ultimately, each product is awarded one of five ratings (A, B, C, D or E), depending on the score it achieves for each of the four indicators. The results of the assessments are entered into a database which is accessible to the public, so that construction industry players can be assisted in identifying circular economy products and equipment.
Off-site construction involves many changes in the way that a construction project is carried out, from the design of the building through to its implementation. This is all the more true for buildings built with 3D modules, the most elaborate version of industrialised prefabrication, since the fully equipped modules are made in the factory before being transported, lifted and assembled.

This type of construction, which has to meet the same regulatory requirements as constructions built with traditional techniques, requires a review of the whole process (contracting, project implementation, planning), and questions the principle of shared responsibility between stakeholders involved in the construction process. “Such stakeholders are a little lost and find themselves in a vast sea of the unknown, without knowing precisely how to approach these construction methods: insurers don’t have enough data to assess the risks, inspection offices can no longer carry out their assignments in a traditional way, and specifiers and contracting authorities need prior and reliable information in order to embark on a more extensive prescription of this construction method... There are many questions,” notes Valérie Gauvry, Head of the Safety, Structures and Fire Performance department at the CSTB. These questions have led to a request for recognition of the quality of products and services from the Association of Industrialised and Modular Constructions (ACIM) and the creation, by the CSTB, of the Modular QB certification, launched at the Batimat trade fair in October 2022. The certification is also a guarantee of trust, performance and maintenance, and aspires to technical quality. It is an important step in promoting this construction method. But it is also more than that. For manufacturers, it’s also a tool for improving their products and their production, design and assembly processes. “The devil is in the detail. Applying scientific expertise makes it possible to advance more quickly than waiting for feedback.”

Certification adapted to products for all building trades
Is this construction method really innovative? The components of certain modules are covered by DTUs and could be considered traditional. However, the DTUs are no longer the only way to design, and do not take into account the interfaces such as the transport, assembly and lifting of these elements which pass through the hands of several trades during the production stage. Other modules often use new components that are not covered by DTUs. “Production is controlled in the factory, industrialised processes and controls are more advanced, and this ensures proper execution and reduces the margins of error. It is then possible to make materials that are more sensitive to use (such as bio-sourced materials that require protection on site) or to modify the construction methods (such as very low-sloped steel roofs). Industrialisation makes it possible to better control risks and improve execution tolerances, and this is also how we save materials,” adds Arica Cronopol, Manager of the Structures, Masonry, Partition division of the CSTB’s Safety, Structures and Fire Performance department. The Technical Appraisal applies instead to parts of the structure and to the construction processes. The certification covers every level, from materials to the entire building. It is thus an innovative certification for buildings which they themselves are also innovative.

Three-strand, soon to be four-strand, certification
QB Modular certification calls on a wide range of expertise. Around fifteen people from different departments of the CSTB (structure, façades, openings and roofing) have been mobilised to create the repository. The first version covers 3D modules with a metal structure. Three strands of certification are offered, with several levels of performance possible, as well as an annual inspection interval. The first strand concerns the design of the modules and the final building, the second strand covers production (assembly of the modules in the factory, area of use and performance) and the third strand covers the execution/implementation (transport conditions, assembly and management of individual points).

A fourth strand will be operational in February 2024. This will involve the reconditioning and recovery of modules and their dismantlability. “These buildings, which are easy to dismantle, are sometimes built for a limited duration. They could be used as emergency, temporary housing... The building can be seen as a service, built for five to ten years, with the prospect of it being maintained or dismantled in order to reclaim the land – a ‘read-term building’ in a way,” continues Arica Cronopol.

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Extending the certification
Several changes are being planned. The first is an extension of the certification to include wood and concrete modules. Publication of the standards is expected to take place by the end of the year. In the long term, the certification could be extended to other players involved in industrialised and modular constructions. At the moment, six manufacturers are being assessed and the outlook is pretty optimistic. In fact, the market is buoyant: “Off-site facilities are not yet sufficiently developed in France. Overall, a good dozen manufacturers of 3D modules with steel structures exist; there are much more for 3D modules with wooden structures, and also a few manufacturers of 3D modules in concrete. And the number is increasing, driven by the actions of the public authorities aimed at supporting the development of the off-site construction method and the technological transformation of the construction sector, in order to meet national climate objectives and respond to environmental challenges. QB Modular certification is aimed at all players whose products meet the requirements of the reference framework,” concludes the Manager.

The six environmental objectives set by the European Commission
The SIPP project – Information System for Steering Production Processes for certification – arose from the CSTB’s desire to develop and standardise its operational practices in order to improve the services provided to its customers, and enhance the value of certified products. This led to the creation, in 2022, of “The Database”, a new website for publishing certificates issued by the CSTB. Easier to read and more intuitive, this new interface simplifies access to certificates issued by the CSTB. Certificates relating to sanitary wares and fittings, ceramic tiles and cladding are already available on this site, and other certification standards are to be added over time.

The SIPP project responds to the need to modernise, standardise and secure activities, and also to centralise information in order to provide customers with a rapid and reliable response to their certification requirements.
The CSTB’s ethics charter gets a makeover

In 2015, the implementation of an ethics system led the CSTB to design and roll out its first dedicated charter. It sets out the principles governing the actions of the CSTB, and constitutes a reference framework for its employees. Initially revised in 2018, it underwent a complete overhaul in 2022.

In 2019, the launch of the business project presented the opportunity for the CSTB to redefine and present the values that drive it. As these principles are very close to the ethical principles, the charter needed to be reviewed and standardised in order to make the principles more visible. Changes in the legislative context, particularly with regard to the protection of whistleblowers, were also a trigger for deciding to review the charter.

In terms of content, the ethics charter means:

• compliance with ethical rules, such as respect for fundamental human rights, or protection of the environment;
• respect for public order including in particular compliance with laws and regulations, and the fight against fraud in all its forms, and against corruption;
• respect for the CSTB’s values: namely attentiveness and customer service, excellence and scientific and technical rigour, impartiality and transparency, openness and corporate social and environmental responsibility.

The charter sets out the principles underpinning the CSTB’s actions: rigour, impartiality, transparency and sharing, as well as secrecy, confidentiality and professional discretion. Respecting the charter contributes to the effectiveness of the CSTB’s actions and those of its employees and to its credibility in its relationship with its external points of contact (customers, supervisory authorities, experts, partners, suppliers, users), known as “stakeholders”. It guarantees the protection, integrity and reputation of its staff members in their professional undertakings by serving as a reference framework for them.

A very real collective and concerted effort has led to this new version which, after having been submitted to the External Ethics Committee, was approved by the CSTB’s Board of Directors in June 2022. Appended to the in-house regulations, it is in force, and must be complied with by all company employees.

A WORD FROM AN EMPLOYEE

TOAN DUC PHAM
Research and expert engineer
Safety, Structures and Fire Performance department

Obtaining accreditation to supervise research

The CSTB offered me the opportunity to prepare for a diploma in accreditation to supervise research (HDR), and supported me in this process. I successfully obtained the diploma in May 2022 at the University of La Rochelle, after giving a presentation on the subject of “Improving the design and operation of the energy systems of buildings and their neighbourhoods through digital simulation,” before a jury made up of nine experts in this field in France. The diploma obtained allows me to officially transition from company tutor to thesis supervisor. Previously a thesis tutor at the CSTB, I am now authorised to supervise thesis work. Of course, this means greater responsibility for the conduct and success of theses, and allows the CSTB and myself to benefit from greater visibility in the scientific community. I am taking on this role for the first time at the Mines Paris Tech Doctoral School (ISMM) as part of an Efficacity/CSTB thesis which I started in 2022.

A WORD FROM AN EMPLOYEE

PETER REIDNER
Engineer and researcher
Energy and Environment department

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THE CSTB CONTINUES TO MAKE PROGRESS IN ACHIEVING GENDER EQUALITY

The CSTB’s commitment to gender equality is reflected first and foremost in the score of the 2022 index, which has been maintained compared to 2021, and had increased from 91 to 92 points out of 100. As a reminder, the index had risen by six points between 2020 and 2021, thus rewarding all of the CSTB’s actions over time.

The proportion of women in the company continues to increase at all levels of the organisation. The gender pay gap is narrowing annually and dropped below 3% in 2022. Beyond the figures, the CSTB is actively continuing its awareness-raising actions on gender equality among its teams.

In terms of disability, the rate of direct employment of people with disabilities rose from 3.29% to 3.86% in 2022, out of the 6% required by law. It therefore continues to grow, given the fact that at the same time, the CSTB significantly increased its workforce in the same year. In 2022, the CSTB also renewed its participation in Duoday in partnership with Cap Emploi. The concept: employees volunteer to welcome a job seeker with a disability and present their activity to them. This year, 12 employees came forward to offer to supervise a person with a disability for one day. The CSTB will renew the experience in 2023 and this will continue in the years to come. Other initiatives were implemented or continued in 2022. Para sport activities, identified and organised in connection with the French Para sport Federation, took place as part of “CSTB Day”, which was held on 24 June 2022, on all sites. In Nantes and Sophia Antipolis, members of the Alpes-Maritimes and Loire-Atlantique para sport committees were present to lead archery, wheelchair boxing, blind football and wheelchair basketball workshops. A para sport tournament, with wheelchair basketball and a wheelchair biathlon, was also held at the Champs-sur-Marne site. In addition, for the sixth consecutive time, the CSTB from the Sophia Antipolis site took part in the “Joëlette’ Orientation de Sophia” (JOS) event, a race organised on 17 November 2022 by the association, “Osons la différence” (“dare to be different”) for companies in Sophia Antipolis, as part of the Week for Employment of People with Disabilities.

THE CSTB COMMITTED IN-HOUSE TO CSR

The CSTB’s ethics charter
Snapshot
### 2022 key figures

**HEADCOUNT & LOCATIONS**
(excluding subsidiaries)

1,021 employees at the 4 sites

- **741**: Champs-sur-Marne (Paris)
- **103**: Nantes
- **107**: Grenoble
- **69**: Sophia Antipolis

### 2022 OPERATING INCOME
(excluding subsidiaries)

- **€131.4M**: in operating income
  - **€14.6M**: Property and Construction
  - **€12.6M**: Assessments
  - **€7.3M**: Publishing, Training
  - **€3.1M**: Other income and subsidies
  - **€40.9M**: Contract Research, Evaluation and Testing
  - **€30.6M**: Certifications
  - **€22.3M**: Other accounting transactions (provisions, depreciation, etc.)

### RESEARCH AND EXPERTISE

Total research and expertise

- **€43.92M**
  - **€3.20M**: external subcontracting incorporated into products
  - **€3M**: appropriations for investment in research equipment
  - **€6.14M**: contracts with partners
  - **€1.36M**: European contracts

- **€12.53M**: Contract research and expertise
- **€16.82M**: Contract research and expertise with public stakeholders
- **€14.57M**: Capitalised production from appropriations

### TECHNOLOGY-RELATED ACTIVITIES

- **121** ATCEs
- **823** ETAs (European Technical Assessments)
- **583** CE marking certificates
- **5,705** Product certification certificates

### DISSEMINATION OF KNOWLEDGE

- **25,920** hours of training completed
- **154** training courses, including 6 new or updated
- **17** Cycles, training courses Premium and Become an Advisor
- **32** training courses, all or part digital
- **32,000** active user accounts on Batipedia

- **58**: PhD students
- **217**: researchers
- **5**: patents
- **90**: publications

- **17%** from abroad
- **52%** from abroad

**Customer satisfaction rate**
Scientific and technical roadmaps: Vision 2030

BUILDINGS AND NEIGHBOURHOODS THAT PROMOTE HARMONIOUS LIVING

Good community living means collectively “recognising and respecting all forms of diversity, fighting discrimination and facilitating harmonious coexistence”1. Buildings, which shelter us, enable our activities, and neighbourhoods, which constitute our living environment and form the ties in our societies, contribute to this aspiration in an essential manner.


BUILDINGS AND CITIES FACING CLIMATE CHANGE

Climate change is a major component of our current affairs and even more so, of our future. It already has a direct impact on our daily lives, whether at national level, urban level or in terms of individual buildings. Taking action to mitigate it is a vital imperative. This should lead the construction sector and the various players involved to adopt their practices, their uses and, more generally, the building stock.

THE CIRCULAR ECONOMY AND RESOURCES FOR BUILDINGS

Optimising the use of our resources for construction is essential to ensure their longevity, and to preserve the environment. This means, in particular, extending their useful life, turning to reuse options, and massively developing secondary substitute raw materials resulting from recycling processes.

RENOVATION, INNOVATION AND RELIABILITY IN THE CONSTRUCTION PROCESS

Making the construction process more reliable means ensuring, all along its life cycle, the performance and adaptation of a building to the various changes in its environment in the broadest sense, to its uses and to the expectations associated with it. While new builds potentially respond to this need, renovation of the building stock – the very core of the problem – must be reinvented to achieve this, by calling upon all possible innovations.

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CSTB teams are at your disposal.

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