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Facing change, with ambition

One does not need to be a clairvoyant to know that profound changes lie ahead of us in our society. Some people fear change, others eagerly await it. As a research institute for the construction sector, we have always anticipated potential changes and have always been enthusiastic and pragmatic about them. This approach is the most compatible with our mission: stimulating innovation through applied research and supporting its implementation, in order to give contractors the opportunity to increase the quality and efficiency of their work.

We are confronted with an unprecedented mobilization of citizens for the climate. Prices are under strong pressure due to foreign competition. Housing remains a challenge for young families. Thanks to research and innovation, we are able to take up these social challenges. The construction sector remains the largest consumer of raw materials and the largest producer of waste. Although its impact has already been reduced thanks to certain measures, the sector remains responsible for 30% of all CO₂ emissions. The heavy fragmentation of the construction process means that we also lag behind in terms of productivity (on average 30% lower than in other sectors). Today, however,
we have the opportunity to make a difference. During the World Economic Forum on the 4th Industrial Revolution in 2016, it became clear that the tsunami of technological progress is particularly positive for the construction sector, perfectly preparing us to meet the challenge of transformation. Will this transformation be characterised by massive robotization and digitisation? Far from it! The human aspect and know-how of the ‘craftsman 4.0’ remain the cornerstones of the construction industry. They form the real wealth of the sector, a source of inspiration for passionate construction professionals like us.

This annual report with an overview of our 2018 activities has also undergone a metamorphosis. It is perhaps less comprehensive than usual, but it highlights a number of projects that closely match the current challenges: sustainable and smart buildings, modern technical installations, construction 4.0, new information and organisational techniques, building materials and systems, safety, health, hygiene, environment and circular construction. We have also provided more room for the human aspect. The added value of the BBRI is mainly the result of the talent and the enthusiasm of our 257 employees!

Johan Willemen
Chairman
There is no holding back the digital revolution in the construction sector any longer. Buildings are being transformed into smart and connected structures that interact with their users, and gradually also with one another via the energy network and other service providers. The desire to provide services for residents and building owners will completely change the sector.

Various devices and domestic elements can be operated from anywhere via Wi-Fi, 4G and soon also 5G. This includes household appliances, lighting fixtures, heating installations, air conditioning systems, televisions, computers, gates, windows, doors, access systems, cameras, etc. Information exchange between these different devices allows buildings to adapt to their residents’ wishes and behaviour patterns.

All building professions are involved in the smart trend. Many opportunities exist for our companies through partnerships between different trades, but also by providing solutions and new services.

Making buildings gradually smart (i.e. gadget per gadget) should not become an end in itself in this revival of home automation. Therefore, the BBRI supports contractors in producing smart buildings for the benefit of their residents, but also in striving for a greater sustainability. The smart evolution also needs to contribute to a more sustainable society.

The internet of things (IoT) is also finding its way onto the building site. This technology makes it possible, for example, to follow the drying process of screeds or to remotely monitor the hardening of concrete. The Institute will be examining all the possibilities that the IoT offers.
Standards improve the quality, safety and durability of buildings

Peter Wouters, Director Development and Valorisation
Georges Klepfisch, Director External Relations for Standardisation and Certification

Standards reflect expertise and take into account the environment, sustainability, consumer safety and other requirements. They help construction companies to improve the quality of their work in a competitive environment.

The application of standards offers many advantages, including:
• cost savings through more efficient and higher-quality building processes
• promoting export by making products and services more easily accepted in other countries
• promoting innovation
• higher quality and customer satisfaction
• environmentally friendly, safe and sustainable products.

Reasons enough for the BBRI, as a competence centre for the construction sector, to pay attention to standardisation. We do this primarily through prenormative studies to develop scientific and technical bases for the drafting of relevant standards. Every year, we perform around ten prenormative studies for the Belgian Bureau for Standardisation (NBN) and the FPS Economy. In addition, we have a seat in about 20 standardisation committees, in which we offer our expertise in the development of standards for the benefit of construction professionals to the NBN.

Another important activity is our Standards Antennas, set up with the support of the FPS Economy to inform companies (especially SMEs) about the interpretation of standards and their application in practice. We currently manage 12 Standards Antennas on different building topics.

Our members can download around 1,200 standards via bbri.be
A new website that grows with its users

Jörg Wijnants
Director Information and Companies support

For more than 10 years now, the BBRI’s website has been the cornerstone of our digital communication strategy. Thanks to this website, we are able to make our knowledge available to contractors and other sector professionals in an efficient way. In today’s digital age, bbri.be has become an important service.

Our website is adapted regularly to meet the expectations of our target audience. At the beginning of 2018, the site underwent a thorough review in order to be able to respond to certain fundamental changes in the user search behaviour. For example, most users end up on bbri.be after a specific search in Google, only rarely starting their search from the site’s homepage. To be at the top of the search engine results, we therefore needed to optimise our website.

Another important evolution is that more and more visitors are surfing on mobile devices. The new website was therefore developed in a mobile-friendly fashion to guarantee an equally good experience on mobile devices. The login procedure has also been simplified significantly.

The results were quick to follow. We noticed an increase of almost 15 % in the number of sessions, while the bounce rate (visitors leaving the website without any action) decreased by 5 %. At the same time, the number of downloaded documents has increased by 35 %, indicating that users can find their information faster and more efficiently.

Surf to bbri.be!
Technical installations
Technical installations: the challenges for the contractors

It is a building’s technical installations that enable it to meet the needs of its users. For example, heating is used for thermal comfort. Artificial lighting supplements daylight to provide visual comfort. Ventilation systems guarantee a good air quality, while sanitary installations ensure good hygiene. And in the summer, active and passive cooling systems (together with shading devices) ensure comfortable indoor temperatures.

For important aspects, such as the choice and the design of technical installations, it is important to take into account the comfort objectives of the building. In this way, the energy consumption and consequently the CO₂ emissions of the installations can be limited through good dimensioning and a correct installation.

New systems and types of technical installations are constantly being developed and installed in our buildings. Keeping up with the latest developments is not only a major challenge, but also a necessity for installers. Some examples:

• combined loop systems (increasingly used in collective installations in apartment buildings)
• LED lighting installations with direct current via network cables (Power over Ethernet)
• energy storage: thermal storage in the building’s structure, hot water tanks, execution of phase change materials, ‘sorption’ or electric batteries
• hybrid ventilation systems: mixed (to improve natural ventilation) or seasonal (combination of basic ventilation and summer cooling).

While technical installations were previously separate from each other and were installed by different specialists, we now observe a strong tendency towards integration. For example, the installations for heating, hot water, ventilation and electricity are increasingly interconnected, and are linked on the one hand to the building and environmental parameters, and on the other to external networks.

This tendency towards integration is expressed in the following ways:

• the introduction of hybrid systems (e.g. a gas boiler in combination with a heat pump)
• through close interaction between the technical installation and the building and environmental parameters (e.g. detection of the need for heating and ventilation)
• through the connection with external networks (increasing interaction between the technical installations and the electricity or heating network).
This challenge requires a global approach, focusing on the entire building, the neighbourhood or even the city. Such a global approach requires more cooperation between the various parties and other forms of partnership.

The digitisation of our society is in full swing: smartphones, smart cars, smart watches, etc. Our buildings and their installations are also part of this evolution. Technical installations are increasingly interconnected, particularly thanks to the possibilities offered by the internet of things. Sensors and switches are increasingly present in new, but also in existing installations. We have more and more information at our disposal about the status and the functioning of the system. As a result, more and more companies are developing IT solutions to process these data and, for example, to enable predictive maintenance.

For contractors, the use and processing of data to better manage installations is one of the many challenges. Being smart for smart’s sake makes no sense at all. Smart systems must be used in the right way to ensure comfort, deliver real savings and offer new services to the customer. It is also necessary to make full use of the energy flexibility of the building and its installations in order to use or store energy when it is available.

The challenge of ‘smart’ is causing the building professions to evolve. The mere execution of an installation is no longer enough: it must also be serviced during the entire useful life of the building. Installations increasingly have to comply with performance obligations, such as a certain comfort level or a maximum energy consumption. It is therefore important that the installers, with the support of the BBRI, prepare themselves well for this evolution.
Central heating installers and plumbers are having to abide by increasingly strict energy requirements. With the VIS project ‘Instal2020’, we wanted to support these craftsmen in designing more efficient sanitary installations and heating installations for both new constructions and renovation projects. Other important criteria, such as the desired comfort, safety and health of users, have not been overlooked. It simply makes no sense to design energy-efficient installations that fail to meet customer expectations.

In this project, we compared and assessed various installation concepts for different types of residential buildings. Which is the better option in a particular case: a central combined loop system, or individual installations? Which dimensioning method should be used in which case? And what about the risk of legionella? These are just a few of the questions examined during this project.

Together with the installation industry, we looked for answers to important challenges in the short and medium term. A first challenge is the increasing strictness of the energy performance requirements of new and existing buildings and their installations. A second challenge is the complexity of the technological facilities (production, storage, distribution, emission, regulation) and the multitude of (often small) companies involved. All this called for an integrated approach.

A series of technical data sheets on various installation components (condensing boilers, underfloor heating, heat pumps, etc.) was drafted, setting out the operating principles, the application possibilities, the design criteria and the calculation rules. A specific data sheet was prepared for combined loop installations equipped with heat exchangers.

In 2018, we also developed a number of calculation tools. These tools are intended to help installers to select, design and dimension installations efficiently and in accordance with the applicable standards and regulations.

All project results can be found on the project’s website. The most important results were already highlighted in various articles in our magazine the CSTC-Contact.

All project results are available on the project’s website: www.instal2020.be
The sanitary tower: high-level innovation

For over 60 years, the BBRI has three main tasks: research, development and information. To enable the sector to further evolve, we are investing heavily in extensive research and advanced laboratories. One of these, the sanitary tower, was completely renovated recently and is ready for the future.

Custom sanitary test set-ups

Our 22.5 m high sanitary tower is one of the few installations of its kind in Europe. It is used to carry out all kinds of hydraulic tests on all types of sanitary installations in and around buildings. Drinking water distribution, use of rainwater, waste water and rainwater drainage; the studies carried out in this tower relate both to supply and drainage installations.

The tower works according to the water tower principle. Water from a 10 m³ reservoir is pumped into a smaller 1 m³ reservoir at the top of the tower, where a constant water level is maintained. From this reservoir, water is distributed to test infrastructures on the various floors. This makes it possible to test at constant pressure. Moreover the tower has a modular structure.

Testing in real-life conditions

In the past year, research was done on the development of the legionella bacteria in sanitary installations. Full-scale research was carried out into the possibility of lowering the sanitary hot water production temperature from 60 °C to 45 °C, without increasing the risk of legionella development. The project examined which thermal shocks (temperature, duration and frequency) are needed to control legionella development. 60 °C shocks proved insufficient. A weekly shock of 65 °C for 24 hours was sufficient for an installation in normal use. Further research is now needed to extrapolate these results to larger and more complex installations, such as in residential care centres and hospitals.

The tests that are currently being conducted mainly support our own research. One example is a temporary test set-up to determine the drainage capacity of gutters. Nevertheless, the number of development tests being carried out for producers is on the rise. Good examples are the tests to check the efficiency of water softening devices and tests to determine the capacity of the gullies of water evacuation installations under pressure. The inclusion of the latest flow measurement and control equipment in the recently re-piped sanitary tower, enables us to carry out many development tests. In this way, the BBRI disposes of a high-tech laboratory, ready for the future.
The EPB legislation, which has become a household name in the construction world and among consumers, has substantially contributed to the realisation of more energy-efficient buildings.

With developments in the construction sector advancing at a rapid pace, the research into the calculation of energy consumption is never complete. The ‘NEPBC’ research project (Next-generation building assessment methods towards a carbon-neutral building stock) closely monitors these developments, and wants to create a framework for the energy performance regulation of the future. The research group consists of various research partners, including UGent, KU Leuven, Pixii and of course the BBRI. We add to this our past experience and our knowledge of the construction sector.

It is important that the BBRI is involved in the development of these new calculation methods. During the development of the current EPB method, maximum uniformity was sought between the regulations in the various regions, to avoid that construction companies would be confronted with different regulations across regional borders.

In the context of ‘NEPBC’, we are also examining the options for incorporating BIM (Building Information Modelling) into energy performance regulations.

The research project started in 2017 and runs until 2021. Last year, a study was conducted into the impact of heat pumps and PV panels. All of the research currently being conducted can ultimately contribute to developing regulations that reflect the technological changes in the market.

"The EPB needs to evolve in pace with technological innovation"

Peter D’Herdt
Head of Laboratory and EPB coordinator
The ‘In-Vent-Out’ research project is attempting to provide an answer to this question. An important issue, because everyone likes clean air, especially indoors.

This at first sight simple question has been dragging on for several years. Although certain basic rules exist for installing the air outlet (as high as possible in the roof, as far away as possible from the air supply), few people have tried to approach this problem scientifically. The BBRI is ready to undertake this challenge.

To develop the ideal implementation method, we perform both numerical simulations and measurements in different buildings. For the on-site measurements, we use CO₂ sensors which were especially developed for this purpose. We are now in the process of gathering the data.

If we succeed in our mission, we shall soon be able to issue a number of useful recommendations for installers of heating and ventilation systems. The possible consequences of these recommendations for the execution and the cost of these installations must also be considered.
Will batteries no longer be needed in smart systems?

Christophe Delmotte
Head of Laboratory

Modern heating or hot water installations are usually equipped with sensors and connected to our smartphones. The power supply needed for these ‘smart’ systems is often supplied by batteries.

Replacing empty batteries is a considerable limitation but may soon become a thing of the past. The ‘Delta-T’ research project aims to develop a self-generating electrical device. In this way, the systems can supply themselves with electricity, and batteries become a thing of the past.

This, in fact, involves the development of small modules that produce electricity through the thermoelectric effect. When placed on a heat source (such as a radiator supply pipe), they produce electricity from the generated heat. Such modules are already available on the market, but their large-scale use is currently precluded by the high cost of the materials used (e.g. bismuth-tellurium). The challenge of the ‘Delta-T’ project is therefore to make these modules affordable by producing them from an alloy of iron, aluminium and vanadium. In this way, we produced our first thermoelectric module together with our project partners in 2018.

At the same time, we worked on the valorisation of these thermoelectric modules. We have started to develop a cast-iron element that can be installed on a medium capacity module. This element can be used to provide energy to the boiler control system or the circulation pump.
The new Standards Antenna ‘Lighting’

The standardisation with regard to lighting is both abundant and complex. Various institutions are working on the development of standards concerning natural lighting, visual comfort adapted to different applications, measurement methods, product properties and the energy performances of the installations. The Standards Antenna (SA) ‘Lighting’ developed by the BBRI, in collaboration with Volta, aims to coach the players in this sector (SMEs in particular).

One of the objectives of the SA is to provide regular updates on the applicable standards and regulations. The information is disseminated through various channels: publications, seminars and especially the website. This information needs to be disseminated in such a way that the standards become more comprehensible for a broad public and easier to apply.

Furthermore, companies sometimes need individual technical support, for example when problems arise with the interpretation or application of the criteria of a certain standard. For example, the new European standard on daylight in buildings (EN 17037), published at the end of 2018, defines the various factors that play a role in the qualification of daylight in a room. The standard also contains recommended target values. It is our mission to improve the understanding of these criteria and to help companies find solutions to meet these criteria (e.g. automatic blinds to prevent glare).

Another example are the special applications in swimming pools, where the risk of glare is particularly difficult to control (reflection of light on the water surface). On-site measurements under real exposure conditions were essential for a good diagnosis. For this purpose, the Standards Antenna called upon the Institute’s Lighting laboratory, which is fully equipped to characterise the indoor climate. The laboratory proposed the best technical solutions and assisted in choosing the type of sun protection.
Technical advice

Vincent Jadinon
Senior Chief Advisor

As engineers from the Technical Advice division, we sometimes investigate cases concerning water damage at the request of the companies involved. The costs of such damages are often very high and we systematically receive questions on possible preventive measures. In some cases, we recommend the use of special modules to detect water leaks quickly and efficiently, thereby avoiding significant damage and costs. These electronic modules, which are linked to the building management system, continuously monitor the water consumption. The data is collected by a central server and can be accessed remotely. In the event of a leak, the module will sound an alarm via SMS and take the necessary actions (e.g. automatically shut off the water supply).

The use of special leak-detection cables can be recommended in data centres, laboratories, technical rooms of hospitals, etc.

These are placed under and around technical floors, installations using water, or water pipes. These also permit a very precise identification of the location of the leak. Simpler systems exist for residential homes. For example, by placing a special meter, it is possible to monitor the water consumption. In the event of irregularities, the customer is informed automatically.

Other systems use small, wireless sensors placed at high-risk locations in a building (e.g. next to the washing machine). These sensors detect water in the event of flooding, but can also monitor other parameters, such as water and ambient temperature and humidity. In certain cases, the main tap can be closed off automatically by the control centre or via other home-automation equipment.

As from now, damage caused by water leaks is preventable
Construction 4.0

- Training courses: 312
- Projects: 17
- Advice - assistance: 620
- Published pages: 522
- Downloaded publications: 6,190
Digital developments offer enormous opportunities for contractors, even if it can at times be difficult to see the wood for the trees. There are so many applications and possibilities, but which are the right ones for which company and which project? To inform contractors about all these digital developments, the BBRI organised for the second time the Digital Construction Brussels trade fair at Tour & Taxis (Brussels) on 24 and 25 October 2018, in collaboration with Confédération Construction.

BIM (Building Information Modelling or Building Information Management), 3D scans and drones are just a few examples of new digital applications that are already being used in the sector. At the present, these technologies are mainly used by large and medium-sized companies, but also small businesses could benefit from these technologies to work more efficiently. They were able to obtain information at Digital Construction Brussels, a trade fair with information sessions, lectures and demonstrations. During these two days, around 3,000 interested people visited the 80 stands. About half of them participated in at least one of the 30 lectures organised.

And that is not all, because the third edition is already planned: Digital Construction Brussels 2019 will be taking place on 23 and 24 October at the same location. For us at the BBRI, this is very important, as digitisation brings opportunities for all our members. It allows everyone to work faster and to reduce the margin of error.
The BBRI is currently working on the ‘BIM4SUB’ project, together with a private sector partner specialized in turnkey properties. The intention is to improve the cooperation between the contractor and its various subcontractors during the entire construction process. In this context, BIM is considered as the ideal ‘tool’. Building Information Management allows companies to create 3D models and to store and share information such as the geometric, technical and physical properties of the various components.

Today, project participants often enter the same information several times in different software during the construction process. This is both inefficient and it increases the risk of errors. There still not yet exists a ready-made platform to reliably share and check information from different software. Therefore, we are developing an experimental digital environment that allows sharing between the general contractor and its subcontractors.

A first version of an automatic control module of the BIM model was demonstrated to our partner in 2018. We received very satisfied reactions on the expertise we displayed. And what’s better than a satisfied customer?

The development of specific digital tools for the construction sector will simplify the construction process and make it more effective. We are convinced that this will not only make it easier for large companies, but also for SMEs, to switch to BIM, which will also enable them to work more efficiently.
The BIM protocol helps construction professionals to get started with BIM

Contractors have since discovered the many benefits of BIM and are gradually starting to adopt it. Collaboration with other project partners is essential and starts with making mutual agreements. Who is responsible for which data? How are the data exchanged? Who takes care of the planning?

The Belgian BIM protocol helps construction professionals to draft good agreements and it ensures uniformity during the implementation of projects. This document, created thanks to intensive teamwork between construction professionals from different fields, was launched on www.bimportal.be in February 2018. Through various articles and lectures, we publicised this national BIM protocol. Meanwhile, the Belgian BIM protocol is well-known by many construction professionals and is already being effectively applied to various BIM projects. This is an important first step to support the rise of BIM in Belgium.

Even though the document was received very positively, the work on BIM arrangements has not yet been completed. There is a need for a supplement to the BIM protocol, describing how the arrangements can be implemented in practice. That is why a lot of effort was put into drawing up the BIM implementation plan, thus providing an additional tool for small and large companies to apply BIM step by step.

Download the BIM protocol on www.bimportal.be
The drone as the ideal means of transport for measuring equipment

Paradoxically, the most innovative technologies are often used for renovation work. Last year, various old buildings were examined by laser scanners and drones to perform 3D measurements. At the BBRI, we are working with these modern tools to facilitate the lives of contractors responsible for renovation projects. In 2018, in collaboration with the Flemish drone federation EUKA, the project ‘Drones as on-site aids’ was started to investigate the possible uses of drones on building sites.

Drones are mainly used as a means of transport, though they are not (yet) able to transport building materials or tools. We are investigating the possibilities, but that is, for the time being, still some way in the future. The most important application at the moment is the transport of measuring equipment to take photos or scans in difficult-to-access places, like unstable roofs, high façades and other inaccessible locations.

The initial applications are currently being tested by the BBRI as part of the ‘Icarus’ project. This project will allow us to deploy our own drones on building sites to conduct research and provide technical advice.

We are also helping contractors to process and convert images into 3D models or to analyse them. Last year, we organised a photogrammetry workshop in Brussels and published various articles on the possibilities of 3D scanning and how 3D scanning can be integrated into a BIM model. A complete monograph on this subject will soon be available on the BBRI’s website.

Contractors with more specific questions about innovation can turn to the BBRI for assistance. The objective of the Institute is to support companies in their innovation projects and to allow the rest of the sector to benefit from the results. Thanks to Innoviris, Brussels-based construction companies and other construction professionals active in Brussels can also count on the innovation support service of the BBRI (C-Tech).
In 2018 we put lean on the map

By lean building we simply mean more efficient building. The hype may be new, but the principles certainly are not. The BBRI’s Management and Quality division has specialised in lean in recent years, so that our experts can assist both large and small contractors. By experimenting with ways of performing tasks more quickly and easily, we can propose more efficient working methods.

We notice that construction companies are gradually picking up the principles of lean. This approach requires involvement at all levels: the management must support the philosophy, but people in the workplace are the ones who must identify and address inefficiencies. And that is also the strength of lean: all layers of the company are involved, ensuring a broad support for possible improvements.

In 2018, we reached a large number of construction companies through various information sessions and training courses. There were information sessions for beginners: although many construction professionals had heard the term ‘lean’ before, they were not well acquainted with the philosophy. In collaboration with the professional organisations, we also organised half-day on-site workshops on lean planning at the construction companies. The most extensive training is a guidance programme in five parts, in which we explain certain techniques and methodologies.
Building materials and systems
We want to fine-tune a test that can be carried out between the spraying of the PUR and the execution of the screed

Loredana Moro
Project manager

Nowadays, sprayed PUR is one of the most used insulation materials under floating screeds, mainly because of the user-friendliness and the speed of this solution. However, subsidence of the PUR can sometimes occur, but it is not yet clear what is causing this. And although acceptance tests exist, none of them is fast enough or suitable to be performed during the period between the spraying of the PUR and the execution of the screed.

Over the past two years, we have tried to identify the causes of subsidence in sprayed PUR by collecting information at a number of building sites. We also performed analyses in our laboratories on different types of PUR. In collaboration with four contractors, we experimented with the proportions of the mixtures, the processing temperature, the number and the thickness of the layers, and the waiting times between the different layers. As soon as we have mapped out all the parameters, we can make suggestions in order to adjust the usual testing methods. We are also keen to develop a reliable acceptance test that can be performed immediately after application.

The current results have not yet led to unanimous conclusions, but they do allow us to consider other directions of thinking and analysis. To continue and expand the investigation, a two-year extension was requested.
Modul’Air: prefabricated façade modules for accelerated renovation

Apartments built in the second half of the 20th century exhibit deficiencies in terms of energy performance, comfort and their impact on the health of their residents. Possible reasons are poor thermal insulation, poor airtightness of the building’s envelope, the presence of thermal bridges, etc. The ‘Modul’Air’ project is looking for innovative ways to renovate the building’s envelope, using prefabricated façades and integrated ventilation systems that can be installed from the outside. This solution offers a better execution quality, is faster than a traditional renovation and causes less inconvenience to residents.

To bring this renovation mission to a successful conclusion, an ‘innovation partnership’ was set up. This includes a new procedure for innovative public procurement in Belgium, with both a research and development phase as well as a commercial phase.

The BBRI’s expertise was called upon to validate the technical feasibility of the project and to prevent problems with implementation. A thorough investigation on an inhabited social housing block was used to map out the technical requirements for the innovative renovation. More specifically, the building was fully scanned in 3D to provide detailed geometric information. At the same time, a number of important parameters relating to comfort, energy performance and safety were monitored, and this has contributed to the drafting of the tender documents.
Geotechnics laboratory: our expertise goes on-site

The Geotechnics laboratory uses the most recent and innovative measuring techniques to conduct preliminary research on foundations. The laboratory specialises in live scale tests and long-term monitoring campaigns. They provide a solid basis for construction projects in multiple ways.

A solid basis for every construction project

Deep foundations of various sorts, such as pile foundations, diaphragm walls, anchors rods and soil mix, are subject to very high loads. These foundations are used for large infrastructural works or in soil with poor load-bearing capacities. As such, they are often implemented at great depths, from 10 to 15 m, and sometimes even deeper than 40 m. We are specialised in advanced instrumentation techniques, such as optical fibre technology, that are integrated into this type of foundation. The laboratory also disposes of hydraulic equipment to subject such elements to loads of up to 2,000 tonnes. The laboratory itself also performs mechanical tests on on-site removed drill cores.

The execution of deep foundations is a fairly complex task, mainly due to the depth and the unique nature of each project. It is therefore difficult to integrate advanced monitoring devices and ensure their accurate functioning at great depths. With the large amount of experience that we have accumulated, we succeed in this task – despite of the difficulties.

Hyperspecialized tests

Last year, the laboratory was elected to carry out a number of remarkable test campaigns. For the BAM (Beheersmaatschappij Antwerpen Mobiel, in charge of mobility projects in Antwerp), a large-scale load-bearing test campaign was carried out, in collaboration with various partners, to study the load-bearing capacity of diaphragm walls (40 m deep) in Boom clay. The results will be used for the design of the foundations of the stacked tunnel construction for the Oosterweel connection in Antwerp.

The objective of other tests, in collaboration with a soil mix contractor and the Department of Mobility and Public Works, was to investigate whether soil mix technology can be used to stabilise the dikes along the Scheldt. This research was carried out both on-site (via a full-scale test) and in the laboratory to determine the properties of soil mix walls. The on-site test campaign already showed that this innovative technique could offer a highly economical solution.

The hyperspecialized tests that we carry out are not only an important service, but they also allow the BBRI to acquire a great deal of knowledge in real situations, which is then made available to the entire construction sector.
In 2018, we received various reports on damage to zinc roof coverings. In each case, it involved non-ventilated zinc roof structures with a coating on the bottom side. Despite this coating, corrosion sometimes occurred from the bottom side of the zinc, which in most cases resulted in perforated zinc strips. The damage was serious, but the cause unknown.

In such situations, the engineers of Technical Advice division always conduct on-site visits to make the necessary observations and measurements, and to collect as much information as possible to determine the causes of the damage. This was however not always possible, and further steps were needed to support these contractors.

One of the tasks of the advisors of the Technical Advice division is to discuss new problems in the working groups or Technical Committees. The observed damage was therefore discussed extensively by the Technical Committee Roof Coverings and by the working group that was drafting the new Technical Information Note 266 on metal roof coverings and façade cladding. This document states that coated zinc is very sensitive to moisture in the roof complex. Based on the current knowledge only the tried and tested systems and materials can be used.

“New problems arising on construction sites are being discussed by the Technical Committees"
Thanks to a research project, we know more about the corrosion of zinc

Emmanuel Cailleux
Assistant Head of Laboratory

At the request of the Technical Committee Roof Coverings, we are currently working on a project on the corrosion of zinc roof coverings with a protective coating for warm roofs.

Zinc has been used as a roof covering for more than a century, precisely because it is naturally resistant to atmospheric corrosion. However, corrosion in the form of white rust can occur under the influence of, among other things, persistent humidity and acidity (pH).

We are striving to better understand the processes and the most important parameters of corrosion. In this way, we identify the possible causes of the humidity, we estimate how different materials have an influence on the acidity in the roof and we evaluate the protection that the coating offers. For this purpose, we inspect the affected sites and conduct tests in our laboratory. In 2018, we mainly focused on accelerated corrosion tests. Based on the results, we are already able to assist contractors which are confronted with such corrosion problems in the event of any legal disputes. In due time, we plan to write a number of recommendations for contractors and manufacturers to prevent damage.
Comfort, health and safety
After green roofs, green walls are also making their way onto our streets. Vertical green not only creates a more beautiful landscape, but can also positively impact the environment and the human well-being. Therefore, it makes sense that the construction sector is eager for more scientifically substantiated information on the design and implementation of green walls.

In response to this, the ‘Groen Bouwen’ research project was set-up. Multi-disciplinary teams of scientists, construction professionals, green contractors and manufacturers are examining various parameters, such as acoustics, stability, reaction to fire and air purification, for the design and the execution of green walls.

Our colleagues of the ‘Water Technologies’ laboratory are examining the volume and quality of the water flowing over the walls. How much water do the various green wall systems consume? Is it possible to collect and store the water? And to what extent can the water be reused? We are trying to find answers to these and many more questions.

Therefore, we carried out a series of measurements in 2018 on a test set-up with different green walls, equipped with an irrigation and fertilisation system that we designed ourselves. The intention is to publish recommendations for the design and the execution of this type of wall, thereby stimulating their advance.
Fire safety considerations no longer need to slow down the use of biomaterials

Yves Martin
Assistant Head of Department

The use of bio-related materials in construction is trendy and sustainable, but the flammability of these materials remains an important point of interest.

Within the framework of the ‘Fire-safe use of bio-based building products’ project, various universities and research institutes from all over Europe have combined their research results regarding the fire safety of these materials. The aim of this project was to draw up clear guidelines, safety regulations and recommendations for the fire-safe use of biomaterials in the construction sector.

At the end of 2018, all research results were distributed to the participating organisations.

The most interesting recommendations focus on wooden materials. Timber structures (wood-frame construction, solid wood constructions such as CLT, wooden façade cladding, etc.) are very popular due to their sustainability, but also because the materials are produced locally. If the fire safety of wooden structures can be guaranteed, it can only encourage construction companies and designers to use this material even more. An increase in the use of bio-related materials is not only beneficial for the local economy, but also for a more circular approach to construction.
IDEA: innovative details in interior finishing

Thanks to the ‘IDEA’ project, many innovative details for the broad finishing sector could be developed more quickly. In this way, producers were introduced to various innovative products and new techniques – often during projects co-developed by the BBRI – enabling them to improve their range of products.

To reach installers and professionals, we organised hands-on demo sessions to acquaint them with new products and installation techniques. Designers also gained insights into the new possibilities offered by these innovative systems through various publications and information sessions.

Our team of multidisciplinary researchers guaranteed an integrated approach. We searched for products with multiple technical properties, and developed details that meet various technical requirements: thermally, acoustically as well as in terms of fire safety and airtightness.

The results of this project were published in a report of more than 300 pages, which was classified per product group: partitions, suspended ceilings and raised floors, technical installations, staircases, etc. The most important information was also included in various BBRI publications, particularly in articles on the acoustic performance of partitions and thermal insulation from the inside.

Finally, around 15 renovation sheets were developed in the form of robust 3D details, showing at a glance the most important design parameters for achieving the intended performance levels for acoustic insulation, thermal insulation and fire safety, including installation checklists to guarantee a correct execution.

Consult Les Dossiers du CTSC, a wealth of practical information for achieving the desired performance.
Out2In: filtering outside air pollutants through ventilation

According to classical ventilation principles, outside air is generally regarded as a source of fresh, ‘clean’ air. In large cities such as Brussels, however, the quality of the outside air is often not that good. Concentrations of certain pollutants, including ozone and fine particulate material, are sometimes even cause for concern. Ventilation systems are designed to provide a building with clean air but may also bring these outdoor air pollutants indoors.

The classical filters of mechanical ventilation systems are primarily aimed at protecting the systems themselves. The ‘Out2In’ project therefore investigates the extent to which ventilation systems bring outdoor air pollutants indoors, and how filtration and purification techniques can limit their penetration. We formulate an answer to these questions through laboratory measurements on the filters, on-site measurements on ventilation systems and their filters, and digital simulations at building level.

In 2018, we carried out measurements of the pollutant load of the outdoor Brussels air on a test set-up. The filtration efficiency of different filters for fine particulate matter (traditional filters, advanced filtration and electrostatic precipitators) was measured within a measuring range of 10 nm to 10 µm and will be monitored over time. The capture and introduction of chemical pollutants, including ozone, nitrogen oxides and traffic-related volatile organic compounds, were also considered.

The acquired knowledge will be used to:
• set up a decision tree to select the appropriate technique as a function of the required degree of filtration/purification
• define a risk-management strategy relating to ventilation, in the event of peak outdoor air pollutions
• formulate recommendations on, among other things, maintenance and smart ventilation strategies in an urban environment.
The Acoustics laboratory up to cruising speed

Unique in Europe and beyond; that is how our Acoustics laboratory can be described. Few other sound laboratories are as large as ours or have equally advanced equipment. For example, we have a movable cabin to perform vertical measurements of insulation against airborne noises on floor and roof complexes, which can be placed above the floor or the roof by using a travelling crane.

For several years already, this has made our laboratory the perfect place for measuring the acoustic properties of building elements such as doors, windows, façade walls, floors and roofs. That status was further confirmed in 2018 with a renewed accreditation to the ISO 17025 quality standard, and with a further expansion of our measuring equipment.

Our main activity during the past year was again the extensive support of numerous projects and the execution of related tests. We are also collaborating on the development of a unified European quality label for acoustic laboratories.

In addition, our laboratory also fulfils an advisory role for BBRI members and manufacturers. Contractors call on us for acoustic tests both in the laboratory as on-site. Manufacturers can come to us to get their products tested. Every year, a number of new building materials coming onto the market are validated here in this way. And because we do so much research, we are able to anticipate future developments, which benefits the entire sector. Our customers can be sure of professional guidance from a team of experienced engineers and technicians.

"With 300 acoustic tests per year, we can safely say that our laboratory is up to cruising speed"
Environment and circular construction
The Circular Building label inspires the sector to make well-considered, sustainable choices

Aline Vergauwen
Project Manager

The construction sector is also increasingly realizing the need to take the principles of a circular economy into account. This means that materials must retain their value for as long as possible and must be used to the maximum. For the construction sector, this translates into smart material selection, designs that take into account potential changes in use, reuse and recycling, and even new business models and implementation processes. The overall intention is to reduce the environmental impact of buildings.

With the Circular Building label, we are developing – under the leadership of the Flemish Construction Federation and with the support of Vlaanderen Circulair – a reference framework allowing construction professionals to test whether their projects meet the requirements of circular construction.

In the past year, we have defined the label’s criteria. When does a building earn this label? Which aspects weigh most in the score? We notice that a number of contractors and producers show a great deal of interest in circular construction, but everyone has their own interpretation of that concept. With our reference framework, we provide a broad scope and prepare the sector for the opportunities and challenges that lie ahead.

With the label, we also want to put a number of pioneers in the spotlight. These examples can in turn inspire other construction professionals to get started with circular construction.
The BBRI make innovative ideas come true

C-Tech is the Technological Advisory Service offered by the BBRI, with the support of Innoviris, in the field of sustainable building, ‘construction 4.0’ and innovation. With this project, we are seeking to provide an answer to the specific challenges of the Brussels construction sector in the pursuit of sustainable urban development.

In concrete terms, this means that you can turn to the BBRI for free advice on innovation. In this way, we want to encourage construction companies to get started with innovative ideas, techniques and/or products.

Furthermore, the Technological Advisory Service is tasked with informing the construction sector about sustainable construction and construction 4.0. This can be done at company level, but also through collective activities like workshops and study days.

One of the highlights of 2018 was the first Hackathon for the Belgian construction sector, that we organised together with the Confédération Construction Bruxelles-Capitale and other players, on current topics in the construction sector. During this event, the various teams worked to promote product development, entrepreneurship and innovation. The event was a great success and will be repeated in 2019.

Some key figures from the last biennial:
• 50 interactive workshops on innovative construction technologies, such as 3D photogrammetry, drones, environmentally conscious building, the circular economy in construction, dry ice blasting, etc.
• more than 120 innovation advices
• almost 10,000 contacts with Brussels building professionals.

In terms of innovation support, the BBRI has helped, through its Technological Advisory Service, various companies to concretize ideas and take them to a higher level. For example, one such company was able to develop an acoustically optimised wooden floor system, which we helped refine by means of laboratory tests.

Other companies visited our Greenbizz offices in Brussels for an interview, in which we discussed the various technical requirements that an innovative product must meet. We also assist companies with the application for subsidies to develop their products.

Download the publications drafted with the support of C-Tech on www.c-tech.brussels
Concrete is and remains the most used building material for roads, houses, office buildings, etc. Every contractor is familiar with the classic mix of sand, granules, cement and water. However, the material has a major environmental impact. By replacing raw materials with more environmentally friendly alternatives, we are taking a major step towards a more sustainable world. Extending the lifespan of the buildings and the recycling of concrete are also interesting ideas.

Even so, innovations often run into barriers. Therefore, we at the BBRI want to form a bridge between science and practice. Which technology is ready to use and which is not yet ready? What are the characteristics of a new and more environmentally friendly concrete? And what must be taken into account during the execution? ‘CircularConcrete’ has mapped out all these new aspects and brought them together into a state-of-the-art report.

Based on this information, we are testing a number of new technologies in our laboratories to see whether product claims are justified. Furthermore, in 2019 we will take the step from theory to practice with this project. In collaboration with various companies, we will be undertaking a dozen building projects using circular concrete, with the objective of expanding our technical and practical knowledge and demonstrating the many possibilities of this material in practice. Based on these experiences, we want to prepare a manual that will offer support to contractors and other companies that are considering new technologies.
Using TOTEM to objectify the choice of materials based on their environmental impact

Lisa Wastiels
Assistant Head of Laboratory

Making a building as environmentally friendly as possible involves more than efficient insulation, heat pumps and energy-efficient appliances. It is also important to check the environmental impact of such materials before and even after their use in new buildings. What is in fact the use of a building material that consumes more CO₂ during its production than can be saved by incorporating it into a building?

That is why the three regions launched ‘TOTEM’ (Tool to Optimise the Total Environmental Impact of Materials) during Batibouw 2018. Contractors can themselves specify which materials they want to use for both new construction and renovation projects. On that basis, the tool makes an analysis of the building’s environmental impact, allowing contractors to consider and compare different materials and solutions. In this way, their choice of a particular material can be better substantiated and objectified.

The tool, which is freely available to every contractor, is an initiative of the three regions and was created thanks to the collaboration between various research authorities. The BBRI worked out the methodology and built the databases of materials and building elements. Similar international tools already existed, but there was a need for a tool specifically for the Belgian construction sector that takes into account the particular way in which we build and renovate.
Energy

- Training courses: 105
- Projects: 27
- Published pages: 154
- Advice - assistance: 2,020
- Downloads publications: 21,985
Being able to better estimate the real energy performance of buildings

Jade Deltour
Project Manager

Today, we often notice a gap between a building’s theoretical and actual energy consumption. This performance gap needs to be closed. That is why the ‘CoDyNi’ project aims to develop suitable methods to predict more accurately the intrinsic energy performance of a building. For this, we use numerical simulations, mathematical analyses, on-site tests and full-scale measurements with the help of smart sensors that transmit the data via Wi-Fi.

We have worked out various measurement protocols and simulated them internally. At this moment, a protocol is being tested on worksites with a prototype of a self-developed measuring instrument.

Our efforts were also noticed abroad, and we were invited to a workshop in Paris.

Given the relevance of the results for the sector, we have submitted a two-year project extension to further explore the subject. For our members, the result of this project will be a good indicator of the quality of a new building or renovation project. Our method can also be considered as a good alternative or supplement to the calculations for the current energy performance certificates (EPC).
Thermal insulation on the inside of a building

The ambitious targets for energy renovation cannot be achieved without the large-scale insulation of façade walls. Thermal insulation from the inside is sometimes the only feasible solution and is therefore gaining importance. Moreover, the technology is less expensive than thermal insulation from the outside. Using an integrated approach, taking into account different criteria, the BBRI draws up design rules for a reliable and wide-ranging execution of insulation on the inside of existing walls, without moisture or mould issues.

To achieve this, our actions take different forms. An international research project was launched in 2018 with renowned scientific partners, such as the Fraunhofer Institute and the University of Dresden. This collaboration has enabled the BBRI to consolidate its expertise in the field of moisture migration in walls.

Furthermore, there is also good synergy with the professionals in the field. In 2018 a multidisciplinary working group was set up with the purpose of drawing up a Technical Information Note. The content of this Note will be supplied by various research projects, in particular the ‘RenoFase’ project.

The BBRI is also active in the certification of contractor skills related to the execution of insulation from the inside. It was our task to compile the content of the course in such a way that the contractors could successfully pass the exam of the Flemish Region. This certification is required to obtain the Flemish subsidies for insulation from the inside.

Supporting contractors in renovation projects, as proposed by the Technology Advisory Service of the BBRI (C-Tech), enables us to compare theory to practice.

"Supporting contractors in renovation projects enables us to compare theory to practice"
Renewable energy is a hot topic today. Within this framework, geothermics can play an important role as a sustainable source of energy for the heating and cooling of buildings. In concrete terms, geothermics means that soil energy is extracted by means of a heat pump installation and heat exchangers which are installed in drill holes. Shallow geothermics is not rocket science and has been used for decades throughout Europe for new constructions, but also in existing buildings. Yet it remains unknown territory for many individuals, companies, installers, contractors and architects.

‘BruGeo’, the research project led by the ULB and to which the BBRI’s Geotechnics department provides its expertise, wants to change that. The project wants to map out the geothermal potential of the Brussels Capital Region in detail. All results will be brought together in the ‘BruGeo’ tool, an online platform where professionals can obtain information about the subsoil, the legislation and the feasibility of a geothermal project.

The BBRI plays a crucial role in this by helping to determine the thermal characteristics of the soil layers. This is of fundamental importance for a geothermal system. The fact that we are also investigating the potential of deeper, hitherto virtually unknown rock layers is no less than groundbreaking. Along with this, we are also making available the knowledge of our Geothermic Screening Tool. This tool groups similar information about the Flemish subsoil. The Brussels and Flemish platforms will be linked to mutually reinforce one another.
P-Renewal: energy renovation of Wallonia’s pre-war building heritage

‘P-Renewal’ wants to renovate the pre-World-War-1 Walloon heritage in an energetic and sustainable manner without compromising its heritage value. In concrete terms, this project, which will continue for several years, aims to develop a digital guide that – depending on the specific characteristics of the buildings – proposes various ways to optimise energy performance.

In 2018, the BBRI started with a study of five pre-war Walloon houses: a square farmhouse, a long-gabled farmhouse, a villa, a town house and a detached house. The specifics of their construction and hygrothermal behaviour were mapped out.

First, the geometry and architecture of the five buildings were characterised. Using innovative 3D measurements, the entire outer shell and the interior space could be digitised extremely accurately. This technique proved particularly effective in obtaining data that provide a better insight into the buildings.

Subsequently, various tests were carried out and the buildings’ weaknesses were identified using thermography, moisture detection and blower door tests. On this basis an energy simulation model could be developed for each building. These simulations make it possible to virtually combine a series of energy interventions in order to determine the renovation strategy that has the largest impact.

Regular consultations with the sector, through meetings of user groups (contractors, craftsmen, architects and consultancy offices), also ensured the link with real practices.
The engineers of the Technical Advice division (ATA) work on many energy-related projects. This theme was very topical in 2018 and will become even more important in the future. Saving energy and reducing CO₂ emissions must be achieved primarily by renovating the existing building stock. This is not only a challenge for the construction sector, but it is a business opportunity as well.

For this reason, the BBRI wants to support contractors in energy renovation. We want to inform them about the measures they can take to make buildings more energy-efficient. Last year, our engineers collaborated on the training days of the ‘Heritage Energy Desk’, where people can go for advice and technical guidance on energy interventions in protected buildings. The ATA staff is well placed to perform these tasks. Through their daily activities, they are familiar with the problems that contractors face.

Another project in which the BBRI engineers actively participated is the TETRA project ‘KMO Reno’, which investigated the energy renovation of industrial buildings (mainly the building’s envelope). During a first phase, renovation scenarios were drawn up and tested on full-scale models, based on various prevailing façade structures from the 2000s.

On that basis, details were worked out for the junction between the façade and the roof, the wall bases and the exterior joinery. Workshops were organised with small groups of contractors, designers and manufacturers to refine these details and test their practical implementation. These details are now being elaborated and turned into information sheets, indicating the points of special attention. They will then be included in the Construction Details database on the BBRI’s website.

The construction sector faces the challenge of making existing buildings more energy-efficient.
The BBRI participates in the work of various associations related to construction and has even contributed in the establishment of some of them. Dedicated to a wide range of activities within the sector, these institutions aim to support companies as their continuous priority.

**Vlaanderen Bouwt (Vlabo)**
Vlabo (www.vlaanderenbouwt.be) aims to build quality housing at affordable prices with an architecture that forms an enrichment for the environment in less evident places (e.g. towns and city centres). Furthermore, it also strives for an optimal technical quality, sustainability and town-planning coherence. Landowners – both public authorities and individuals – can call upon Vlabo as a project manager.

**Organisatie voor Duurzame Energie (ODE Vlaanderen)**
As a coordination body for sustainable energy in Flanders for 20 years, ODE (www.ode.be) ensures the dialogue between companies and organisations from the renewable energy sector and the public authorities through thematic platforms: heat pumps, photovoltaics, biomass, wind energy, heat networks etc.. Within this context, the BBRI is involved in the integration of renewable energy systems in buildings.

**Quality Centre for Sustainable Energy Technologies (QUEST)**
QUEST (www.questforquality.be) develops, with the sector, Construction Quality and BCCA, quality procedures and technical reference documents for the application of small-scale renewable energy systems (heat pumps, thermal and photovoltaic solar installations). In 2018, work was done on the Technical Specifications (STS) for heat pumps. QUEST is also policy officer within RESCert for the certification of renewable energy system installers, essential for certain technologies in order to obtain subsidies.

**Belgian Centre for Domotics and Immotics (BCDI)**
BCDI (www.bcdi.be) describes itself as a study and information centre in the field of automation integrated into the residential environment/building automation. Themes such as personal assistance, smart cities and intelligent buildings are also part of the BCDI’s area of expertise. In recent years, the centre has collaborated on various national and European research projects, as well as on various conferences, forums and workshops.

**Belgian Construction Quality Society (BCQS)**
BCQS (www.bcqs.be) trains and advises professionals involved in a labelling and/or certification process (quality management (ISO 9001), safety (VCA) and environment (ISO 14001, for example). Privileged partner of BCCA and Construction Quality, BCQS also supports companies that have signed up for the quality programmes set up by these two associations.

**Belgian Construction Certification Association (BCCA)**
BCCA (www.bcca.be) is one of the leading Belgian certification bodies in the construction sector and has, thanks to this status, an accreditation from the BELAC office. This non-profit making association has supported the collective ‘Construction Quality’ label for several years and regularly performs production controls within the context of CE marking.

**Tradecowall**
The objective of this society is to look for solutions for the processing of inert waste and excavation soil from construction and demolition sites (www.tradecowall.be). In 2018, new channels for recovering construction waste were examined: Tradecowall continued, together with the BBRI, a research project relating to the recovery of aerated concrete waste.
The BBRI’s activities are guided by fifteen Technical Committees. While eleven of the Committees directly represent a construction trade and are composed primarily of contractors, the others focus on subjects of interest to several trades. In order to guarantee this bottom-up approach, each Committee defines the actions that will be carried out in the following year, via the work plans, submitted to the Standing Committee of the BBRI for approval.

Rough Structure and General Contractors

**Chairman:** X. Braet  
J. Van Steirtegem, E. Vandewiele, A. Vermeyen, G. Xhonneux  
**Engineers-leaders:** N. Huybrechts, B. Parmentier  
**Engineers TAC:** A. Van der Auwera, S. Vercauteren, J. Wijnants

Heating and Climate Control

**Chairman:** D. Peytier  
**Engineers-leaders:** C. Delmotte, P. Van den Bossche  
**Engineers TAC:** I. De Pot, V. Jadinon

Paintwork, Flexible Wall and Floor Coverings

**Chairman:** S. Magnée  
**Engineers-leaders:** E. Cailleux, E. Nguyen  
**Engineers TAC:** M. Ghislain, H. Vercoutere
Hard Wall and Floor Coverings

**Chairman:** M. De Bes (†)


**Observers:** C. Arnould (since May), P. Holierick, T. Verstaen

**Engineer-leader:** T. Vangheel

**Engineers TAC:** L. Firket, J. Van den Bossche

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Glazing

**Chairman:** A. Sanchez

**Vice-chairman:** J. Jacobs


**Engineer-leader:** V. Detremmerie

**Engineers TAC:** F. Caluwaerts, G. De Raed (until September), R. Durvaux, L. Lassoie

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Sealing Works

**Chairman:** R. Evens


**Engineers-leaders:** E. Mahieu, E. Noirfalisse

**Engineer TAC:** D. De Bock

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Roof Coverings

**Chairman:** C. Vandermosten


**Engineers-leaders:** F. Dobbels, D. Langendries, C. Mees (until July)

**Engineers TAC:** D. De Bock (since October), L. Geerts, O. Vandooren (until October)
Sanitary and Industrial Plumbing, Gas Installations

**Chairman:** P. Deweer

**Members:** K. Beenaerts, M. Blondiau (since April), J. Braibant, B. Claessens, M. Decat, G. Diericx, J.-P. Geerts, G. Gronsfeld (since September), J.-P. Janssens (until January), E. Maertens, L. Martin, J.-F. Minne, E. Motmans (until May), C. Nonneman, D. Peytier, M. Spector, G. Tiquet, M. Van Der Beken, K. Van Dingenen (since January), C. Van Dinter, P. Van Rompaey, B. Verstraete, G. Wouters, K. Wuyts

**Engineers-leaders:** B. Bleys, V. Jadinon

**Engineer TAC:** I. De Pot

Joinery

**Chairman:** W. Simoens


**Engineers-leaders:** V. Detremmerie, E. Kinnaert, Y. Martin

**Engineer TAC:** F. Caluwaerts

Stone and Marble

**Chairman:** H. Vanderlinden


**Engineer-leader:** D. Nicaise

**Engineers TAC:** L. Firket, J. Van den Bossche

Plastering, Jointing and Façade Work

**Chairman:** D. Verhaegen


**Engineers-leaders:** I. Dirix, Y. Grégoire

**Engineers TAC:** S. Korte, M. Lignian
Building Physics, Comfort and Safety

Chairman: E. De Kempeneer
Vice-chairman: M. Ruebens
Engineers-leaders: L. De Geetere, X. Loncour, J. Van der Veken, Y. Martin
Engineers TAC: A. Acke, S. Eeckhout, G. De Raed, J. Goovaerts, M. Lignian

Hygrothermy

Chairman: E. De Kempeneer
Engineers-leaders: X. Loncour, J. Van der Veken
Engineers TAC: A. Acke

Acoustics

Chairman: E. De Kempeneer
Engineer-leader: L. De Geetere
Engineers TAC: J. Goovaerts, M. Lignian

Fire Safety

Chairman: / 
Engineer-leader: Y. Martin
Engineers TAC: S. Eeckhout, G. De Raed
TECHNICAL COMMITTEES

Architects

Chairman: J. Beke
Vice-chairmen: R. De Lathouwer, C. Bourgeois
Engineers-leaders: S. Eeckhout, D. Langendries, P. Wouters

BIM & ICT

Chairman: T. Vandenbergh
Engineers-leaders: N. Cauberg (since October), M. Huerdo Fernandez (since October), B. Ingelaere (until October), O. Vandooren (until October)
Engineers TAC: R. Durvaux (since May), V. Jadinon (until February), S. Vercauteren

Smart & Sustainable Constructions

Chairman: R. Van Boeckel
Engineers-leaders: R. Delvaeye, J. Vrijders
Engineers TAC: K. Janssens, S. Vercauteren
FINANCE

The accounts department aims to give a true picture of the financial situation of the Institute and justify the management decisions made.

Affiliated members
On 31 December 2018, the BBRI had 89,471 members, including 63,592 one-man businesses. The graph on the right shows that this number increased by 12.58% over the course of the last 10 years. If we take the indexation and the adjustment into account, the increase in fees collected for this period amounts to 22.44% in constant value.

Operating revenues and expenditures
The graphs below illustrate the evolution of the different revenues and expenses in relation to the total. These show that the fees of the members represent on average some 58% of the total revenues. Personnel costs – the largest item in the expenditures – amount to 62% of the total.
Destination of expenditures

The graph below shows the revenues and expenditures which result from the activities of the BBRI, after distribution of the structural costs. The latter represent not only the costs relating to the buildings and equipment, but also the administrative costs. This illustrates that all available resources benefit, directly or indirectly, construction companies.

Indeed, while 88% of the total budget is directly invested for the benefit of the sector, 12% of that is used for research activities under contract that, in the long run, will also benefit construction. Consequently, all our resources are devoted to improving the quality and competitiveness of the sector, which is ultimately the founding mission of the Institute.
The BBRI makes great efforts to improve quality in construction and to strengthen the skills of professionals in the sector. This task is far from easy, given the fragmentation of the building and the diversity of the partners involved.

To accomplish its mission and to anticipate technological evolutions, the BBRI relies on a dynamic and multidisciplinary team. Our personnel ensure that the fruits of scientific and technical research conducted by the Institute are used to benefit building contractors, as well as other professionals (architects, consultancy offices, chartered surveyors, administrations, etc.).

The experience and pragmatism of some staff members combined with the innovative vision of others, make it to publish practical reference works, provide customized technical advice, and even courses and training sessions corresponding to the actual needs of the sector.

Given the growing complexity of these needs and the increased interest in areas such as sustainable and smart construction, industrialisation and BIM & ICT, a further increase in personnel numbers is expected in the coming years.
During the meetings of the General Council of the BBRI on 24 April 2018 and 20 November 2018, the composition of the General Council and the Standing Committee was approved as follows:

**General Council**

**Chairman**
J. Willemen

**Vice-Chairmen**
P. Depreter, E. Devos, C. Golinvaux

**Honorary chairmen**
J. Gheysens, R. Lenaers

**Members appointed by the Confédération Construction**

**Members coopted by the Confédération Construction**
J. Bosschem, A. De Bie, E. Devos, B. Heiderscheidt, D. Holemans, C. Peeters

**Members appointed by the Bouwunie**

**Member appointed by the FEB**
C. Golinvaux

**Members appointed by the Federal Public Service Economy**
R. Collette, G. Jansens

**Members appointed by the Flemish Region**
S. Faignet, L. Van de Loock

**Member appointed by the Brussels-Capital Region**
O. Eugene

**Member appointed by the Walloon Region**
P. Villers

**Members appointed by the workers’ organisations**
P. Cuppens, V. De Meyere, B. Hilami, J. Vandycke

**Auditor**
J. Lembrechts, B. Tasiaux

**Company auditor**
HLB Dodémont-Van Impe

**Standing Committee**

**Chairman**
J. Willemen

**Vice-chairmen**
P. Depreter, E. Devos, C. Golinvaux

**Members**
J. Biesmans, R. Collette, R. de Mûlenaere, J. Lembrechts, L. Mohymont, M. Ruebens, E. Vandewiele, F. Verkest, J.-P. Waeytens

**Observers**
L. Van de Loock, P. Villers
A-LIGHT – Intégrant les concepts légers dans le domaine de l’acoustique (FPS Economy and NBN)

A-LIGHT II – Intégrant les concepts légers dans le domaine de l’acoustique (FPS Economy and NBN)

Ad usum navigantium (VLAIO - Flanders)

AN Acoustique (SA Acoustics) (FPS Economy and NBN)

AN Béton-mortier-granulats (SA Concrete-mortar-aggregates) (FPS Economy and NBN)

AN Détails constructifs (Smart Connect) (SA Construction details) (FPS Economy and NBN)

AN Eau & Toitures (SA Water and Roofs) (FPS Economy and NBN)

AN Eclairage (SA Lighting) (FPS Economy and NBN)

AN Eléments de façades manuels et motorisés (SA Manual and motorized façade elements) (FPS Economy and NBN)

AN Energie et climat intérieur (SA Energy and indoor climate) (FPS Economy and NBN)

AN Eurocodes (SA Eurocodes) (FPS Economy and NBN)

AN Géotechnique (SA Geotechnics) (FPS Economy and NBN)

AN Parachèvement (SA Finishing) (FPS Economy and NBN)

AN Prévention du feu (SA Fire prevention) (FPS Economy and NBN)

AN Qualité de l’air intérieur (SA Indoor air quality) (FPS Economy and NBN)

AN Tolérances et aspect (Eye Precision) (SA Tolerances and aspect) (FPS Economy and NBN)

ATISOL C2C – Système constructif comportant une membrane biosourcée pare-vapeur et d’étanchéité à l’air couplée à une isolation pour les bâtiments neufs à ossature en bois et pour la rénovation par l’intérieur, en suivant la démarche Cradle to Cradle (Vapour barrier and airtight membrane construction system paired with insulation for new wood-frame structures and interior renovation, following the Cradle to Cradle initiative) (Greenwin- Wallonia)

B-LCA II – Cadre méthodologique pour la réalisation de LCA dans la construction. Modélisation belge et ajustement du cadre européen. (Methodology framework for the execution of LCA in the construction sector. Belgian modelling and further development of the European framework) (FPS Economy and NBN)

BBSM – Le Bâti bruxellois : source de nouveaux matériaux (Brussels’ Buildings: a source of new materials) (ERDF-Brussels)

BCCC – Brussels Construction Consolidation Centre (Innovation Brussels)

BE REEL – Belgium Renovates for Energy Efficient Living (EU LIFE - European Union)

BIM 4.2 (VLAIO - Flanders)

BIM MENUISERIES – Outil intégré BIM-compatible sur les exigences des menuiseries extérieures et les performances des châssis en bois (Integrated BIM compatible tool for the requirements of outdoor joinery and the performances of wooden frames) (BBRI)

BIM4SUB – Développement d’une interface de collaboration basée sur l’open BIM en vue d’optimiser la collaboration avec la sous-traitance (Development of a cooperation interface based on open BIM with the aim of optimising the cooperation with subcontractors) (DG06- Wallonia)

BIMy – BIM in the city (Innoviris - Brussels)

BIO-BASED – Fire safe use of bio-based building products (COST - European Union)

BIO-CLAY-MASONRY – Cadre normatif pour l’argile non cuite et les produits de maçonnerie biosourcés (Normative framework for unbaked clay and bio-based masonry products) (FPS Economy and NBN)

Bloclso – Blocs constructifs isolants en pied de mur; performances mécaniques de maçonneries ‘composites’ (Isolating building blocks at the base of walls: mechanical performances of composite masonry) (BBRI and BCCA)

Bouwhubs – Logistique in de bouw (Logistics in Construction) (VIL and VLAIO- Flanders)

BruGeo – Valorisation du potentiel géothermique de la Région Bruxelles-Capitale (Exploiting the geothermal potential of the Brussels-Capital Region) (FEDER- Brussels)

BUILD4WAL – Démonstrateur Construction 4.0 (Demonstrator Construction 4.0) (Digital Wallonia and DG06- Wallonia)

C-BRIDGE – Stappenplan naar ontwerp, regelgeving en constructie van composietbruggen in Vlaanderen (Step-by-step plan for the design, regulations and construction of composite bridges in Flanders) (VLAIO- Flanders)

CAPIASOL – Développement d’une sous-couche acoustique à base de granulats de caoutchouc recyclé (Development of an acoustic under layer from recycled rubber aggregates) (DG06- Wallonia)

CeComStruct – Textile reinforced cementitious composites for a high-performance, fire-resistant, sustainable building system (VLAIO- Flanders)

Centrum Bouw 4.0 (ERDF - Flanders)

CIMEDE 2 – Constructions industrielles de maisons évoluées durables et économiques (Industrial construction of flexible, durable and economical houses) (SPW and Greenwin- Wallonia)

CircularConcrete – Beton meer circulair maken (Making concrete more circular) (SIM Flanders and VLAIO- Flanders)

Clean.ETICS – Guide pour le nettoyage des ETICS (Guide for the cleaning of ETICS) (BBRI and BCCA)

CLEARPOWER – Coatings pour le stockage d’énergie issue de productions renouvelables (Coatings for energy storage from renewable sources) (ERDF and European Union)

Cluster BIM (VLAIO- Flanders)

CODEC – Communication framework for digital construction (FPS Economy and NBN)

CODEC II – Communication framework for digital construction (FPS Economy and NBN)
CoDyNi – Détermination in situ des performances énergétiques réelles des bâtiments à l’aide de tests de coheating dynamiques et de mesures non intrusives (On-site determination of the real energy performances of buildings using dynamic co-heating tests and non-intrusive measures) (FPS Economy and NBN)

ConCure – Mise au point d’une méthode et de critères robustes pour déterminer l’efficacité des produits de cure (Development of a robust method and criteria to determine the efficiency of curing products) (FPS Economy and NBN)

Construire adaptable (DG04 - Wallonia)

CORROSION-ZINC-TOITURE-CHAUDE – Cas de corrosion des complexes non aérés avec un revêtement en zinc protégé par un coating en sous-face (Corrosion of non-ventilated complexes with a zinc covering protected by a zinc coating on the bottom side) (BBRI)

Déchets de construction Bruxelles – Chantiers pilotes pour la Gestion des Déchets de construction à Bruxelles (Pilot projects for the management of construction waste in Brussels) (Bruxelles Environnement - Brussels)

DeepCrete – Réalisation de parois coulées : spécification du béton et contrôle de la qualité (Execution of cast walls: concrete specifications and quality control) (FPS Economy and NBN)

DeltaT – Dispositif d’autoalimentation électrique d’installations thermiques par effet thermoélectrique (Electrical self-supply system for thermal installations using thermo-electric effect) (Innoviris - Brussels)

Digitale transformatie van de bouw (SCOPE - Flanders)

Drones – Drones als hulpinstrument op de werf (Drones as an on-site tool) (VLAIO - Flanders)

Duurzaam Betonherstel – Nieuwe technologieën, producten en inzichten voor een duurzame herstelling van betonstructuren (New technologies, products and insights to sustainably repair concrete structures) (VLAIO-Flanders)

EcoCities – Groenwanden en -daken als bron voor ecosystemdiensten in onze toekomstige steden (Green walls and roofs as a source for ecosystem services in our future cities) (FWO - Flanders)

EcoRen – Energetische renovatie van Vlaamse representative eengezinswoningen en appartementsgebouwen (Energy renovation of representative Flemish single-family dwellings and apartment buildings) (VLAIO - Flanders)

ETICSiv – Doorgedreven implementatie van innovaties binnen ETICS met harde bekledingen (Extensive implementation of innovations for ETICS with hard coverings) (VLAIO-Flanders)

FiSaF – Fire Safety of multi-story building façades (with combustible materials) (FPS Economy and NBN)

GABI – European network for shallow Geothermal energy Applications in Buildings and Infrastructures (COST-European Union)

Gela Via – Critères de résistances des bétons de routes au gel/dégel en présence de sels de déverglaçage (Freeze/thaw resistance criteria for road concrete in the presence of de-icing salt) (FPS Economy and NBN)

GEOCHAPES – Chapes isolantes en géopolymères (Geopolymer insulating screeds) (BEL and SME - Wallonia and Flanders)

GEOCONSTRUCT II – État limite de service de structures géotechniques : Méthodes de déduction des paramètres de déformation du sol, de calcul des déformations de structures géotechniques et directives relatives aux déformations admissibles (Service limit state of geotechnical structures: Methods for the deduction of the ground deformation parameters, the calculation of the deformations of geotechnical structures and directives on the admissible deformations) (FPS Economy and NBN)

Groen bouwen – Groene gevels voor duurzame gebouwen en steden (Green construction – Green façades for sustainable buildings and cities) (VLAIO - Flanders)

Groen Licht Vlaanderen – Samenwerken rond digitalisering van verlichting (Collaboration on light digitalisation) (VLAIO - Flanders)

GT Ecoconstruction et Développement durable en Région de Bruxelles-Capitale – (TAS Eco-construction and Sustainable Development in the Brussels-Capital Region) (Innoviris - Brussels)

HAMSTER – Heat, Air and Moisture real scale Test facility for building elements (FEDER & Innovirus - Brussels)

HETREFORT – Développer des éléments préfabriqués de petites et moyennes dimensions pour construction bois composés de panneaux contrecollés CLT (Cross Laminated Timber) en hêtre muni d’une couche extérieure isolante et d’une couche intérieure en argile (Developing small and medium-sized prefabricated elements for wooden constructions made from CLT panels in beech with an external insulating layer and an internal clay layer) (SPW- Wallonia)


ICARUS – Innovative Collaborative Applied Research on UAV Scanning for buildings (BBRI)

IDEA – Innovatieve details in de binnenafwerking (Innovative details in interior finishings) (VLAIO - Flanders)

In-Vent-Out II – Positionnement relatif des ouvertures d’amenée d’air par rapport aux évacuations d’air et de fumée des bâtiments (Relative positioning of air supply openings in relation to the exhaust air and fume discharge openings) (FPS Economy and NBN)

Instal2020 – Integraal ontwerp van installaties voor sanitar en verwarming (Integral design of heating and domestic hot water installations) (VLAIO - Flanders)

Intelilicht – Intelligente lichtregelsystemen (Intelligent light control systems) (VLAIO - Flanders)

KalkHennep_VL – Ontwikkeling van ontwerp- en uitvoeringsondersteuning voor de toepassing van kalkhennep in de Vlaamse bouwsector (Development of design and execution support for the application of lime hemp in the Flemish construction sector) (VLAIO - Flanders)

KMO RENO – Renovatiescenario’s voor KMO-gebouwen (SMEs RENO – Renovation scenarios for SMEs’ buildings) (VLAIO - Flanders)

Label Circulair Gebouw (Circular Building Label) (OVAM and Vlaanderen Circulair - Flanders)
LCC ECOTOOP – Life Cycle Costs als economische succes-factor (Life cycle costs as a factor of economic success) (VLAIO - Flanders)

Living Labs Brussels Retrofit (ERDF and Innoviris - Brussels)

Material world – Sensörische ervaring en duurzaamheid als strategie bij materiaalkeuzes voor winkelinterieur (Sensory experience and sustainability as a strategy when selecting materials for commercial interiors) (VLAIO - Flanders)

Modul’Air – Module de façade préfabriqué pour la rénovation accélérée de l’enveloppe et des systèmes de ventilation (Prefabricated façade module for a faster renovation of the envelope and the ventilation systems) (ERDF and Innoviris - Brussels)

Mutatie+ – Mutatiewoningen harmonieus geïmpregneerd met modulaire technieken in functie van levensloop, leefcomfort en energiebesparing (Homes undergoing transformation harmoniously upgraded with modular techniques according to life cycle, living comfort and energy savings) (VLAIO-Flanders)

NEPBC – Next generation building energy assessment methods towards a carbon neutral building stock (VLAIO-Flanders)

Off-Site Construction en Bouwindustrialisatie (VLAIO-Flanders)

Onderhoud Schrijnwerk – Onderhoud van de afwerking van houten buitenschilderijen (Maintenance of the finishing of wooden outdoor joinery) (FPS Economy and NBN)

Out2In – Impact of filtration- and luchtzuiveringstechnieken op het binnendringen van buitenluchtvervuil en luchtverontreiniging via ventilatie (Homes undergoing transformation harmoniously upgraded with modular techniques according to life cycle, living comfort and energy savings) (VLAIO-Flanders)

OVERS©HOT – Optimiseren (chemisch) verontreinigd sloop hout (Optimisation of (chemically) contaminated wood from demolition sites) (MIP and i-Cleantech-Flanders)

P-RENEWAL – Renovation energetique du batiment wallon d’avant-guerre a valeur patrimoniale (Energy renovation of prewar Walloon heritage buildings) (DG04 - Wallonia)

PEPSE – Conception, développement, validation et mise en service d’un poste d’essai semi-virtual pour le test de systèmes de production, de stockage et de distribution d’énergie (Design, development, validation and commissioning of a semi-virtual test station for the testing of energy production, storage and distribution systems) (FEDER - Wallonia)

PREMANAT – Performances requises pour les pavages de voirie en pierre naturelle (Required performances for road paving in natural stone) (FPS Economy and NBN)

PREVENT II – Ventilation des logements : critères de performance et règles de conception des systèmes (Ventilation of dwellings: performance criteria and rules for the design of ventilation systems) (FPS Economy and NBN)

Prio-Climat – Priorisation et optimisation des stratégies de rénovation dans le logement social : vers un meilleur climat intérieur (Prioritisation and optimisation of renovation strategies in social housing: towards a better indoor climate) (ERFD and Innoviris - Brussels)

ProReMat – Procurement of Reused & Recycled Materials (Circular Aankopen - Flanders)

RAINROOF – Cadre normatif pour l’étanchéité aux pluies battantes des toitures inclinées (Standard framework for sloped roofs resistance to driving rain) (FPS Economy and NBN)

RecyBeton II – Utilisation de granulats recyclés dans le béton prêt à l’emploi. Ouvrabilité et granulats mixtes (Use of recycled aggregates in ready-to-use concrete. Workability and mix aggregates) (FPS Economy and NBN)

Revêtement chape – Pose de revêtements de sol résilients : maîtrise de l’humidité des chapes (Execution of resilient floor coverings: moisture control in screeds) (FPS Economy and NBN)

Sand2Sand – Hoogwaardige toepassingen voor gerecyclerde zanden in beton (High-quality applications for recycled sands in concrete) (MIP and VLAIO-Flanders)

SB4SC – Smart Buildings for Smart Cities (BBRI)

SILENCEVENT – Voorspelbare stromingsakoestische prestaties van ventilatiesystemen in woongebouw (Expected acoustic-flow performances of ventilation systems in residential buildings) (VLAIO-Flanders)

Silenthalpic – Ventilation décentralisée silencieuse et intelligente avec récupération de chaleur sensible et latente (Silent and intelligent decentralised ventilation with sensible and latent heat recovery) (DG06 - Wallonia)

SMART AGE-FRIENDLY HOUSING (BBRI)

Smart Buildings in Use (VLAIO - Flanders)

SmartPower – Capacité correcte pour le chauffage des bâtiments (Correct capacity for the heating of buildings) (FPS Economy and NBN)

SoilmixWal – Développement d’un nouveau procédé soilmix dédié à de nouvelles applications géotechniques durables, rentables et respectueuses de l’environnement (Development of a new soilmix process for new, sustainable, profitable and environmentally friendly geotechnical applications) (SPW - Wallonia)

SOL-isPUR – Cadre normatif et critères d’utilisation pour isolation de PUR projeté sous chape (Standard framework and usage criteria for sprayed PUR insulation under screeds) (FPS Economy and NBN)

STEPWiSe II – Safety of Temporary Works (FPS Economy and NBN)

STOCC – Stockage de chaleur et par matériaux à changement de phase (Storage of chemical heat and via change of phase) (ERDF - Wallonia)

TASSEMENT CELLULOSE – Tassement des isolants insufflés et en vrac (Subsidence of blow-in and loose insulation) (BBRI)

TERRASSE EN BOIS (BBRI)

VENT TOITURES – Résistance au vent des toitures. Evaluation en labo et in situ (Wind resistance of roofs. Laboratory and on-site evaluation) (BBRI and BCCA)

VETURES III– ETICS avec revêtements durs et increuse (Required performances for road paving in natural stone) (FPS Economy and NBN)

Vezelversterkte dekloeren (BBRI and BCCA)

Vlaams Kennisplatform Woningrenovatie (VLAIO-Flanders)

Wash II – Constructions étanches : vers des exécutions efficaces et robustes (Impermeable constructions: achieving efficient and robust executions) (FPS Economy and NBN)
In order to meet the requirements of the sector, the BBRI collaborates on various research projects and awareness initiatives. These projects are supported by the following bodies:
Researches • Develops • Informs

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Research and Innovation
The introduction of innovative techniques is vital for the survival of an industry. Oriented by the construction professionals, contractors and experts sitting on the Technical Committees, the Institute's research activities are closely aligned to the day-to-day needs of the sector.

With the help of various official bodies, the BBRI encourages companies to innovate, by offering advice in various fields that is tailored to the current challenges.

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At the request of public or private players, the BBRI also works on various development projects under contract. Actively collaborating in the activities of the standardisation institutes – on the national (NBN), European (CEN) and international (ISO) levels – as well as in those of bodies such as the Belgian Union for Technical Approval in Construction (UABtc), the Institute is ideally placed to gain insight into the construction sector, and thus to better respond to the future needs of the various construction trades.

Dissemination of knowledge and support to companies
The BBRI makes extensive use of information technology in order to efficiently share the results of its work with all companies of the sector. Its website, adapted to the diverse needs of construction professionals, contains the publications of the Institute as well as more than 1,000 construction standards.

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