

Facilitating the Circulation of Reclaimed Building Elements:

a review of 5 years
of methods
and experiments
in North-West Europe

WELCOME TO THE FCRBE OFFICE!

With this first poster, discover what the FCRBE project office could look like and find all the deliverables. As you read on, you'll come across other issues that refer to it, so keep your eyes peeled!

Summary

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The FCRBE project brought together eleven organizations that worked together for five years. United by a common goal - to facilitate the adoption of material recovery and reuse practices in construction - these organizations worked on different aspects of the topic and produced numerous and varied results (as suggested by poster “Welcome to the FCRBE office”).

Some of these results take the form of written documents (often richly illustrated and quantified): analysis reports, guides, practical recommendations, or technical documents on materials. These tools have in common that they address a key challenge in our view: making reuse compatible with the textual and numerical devices used in construction.

Before it exists in reality, a building first exists as a set of written instructions (the specifications), quantified estimates (the measurement), and drawings (the plans). Similarly, what signals the start of construction work is first and foremost a tender (written), possibly containing objectives (quantified), to which bidders will respond with an offer (written and quantified), leading to an award report (written), and the signing of a contract (written)

for a specific amount (quantified). The same applies to most other areas of construction activities (insurance, technical studies, regulations, etc.).

Anyone wishing to initiate reconfigurations in the way we build and maintain the built environment must necessarily immerse themselves in these textual and numerical devices. It is indeed essential to understand them and carefully study their effects in order to propose credible alternative avenues to construction professionals.

This is certainly one of the strong orientations of the FCRBE project. Because it operates under somewhat different logics than those currently in use for industrially produced new materials, reuse indeed requires a rethinking of most of the devices currently in use in the sector. To achieve this, the project relied on a partnership with varied and complementary skills, with organizations convinced that material reuse is a highly promising avenue for reducing the environmental impacts of construction.

The challenge is also to succeed in developing a form of prosperity for the benefit of regions while preserving the cultural dimensions conveyed by existing materials. Partners have worked to inject these concerns into a series

of tools and procedures commonly used to organize demolition, renovation, or construction work.

This has resulted in the deployment of tools and methods for carrying out pre-demolition audits, a procedure for awarding architectural and construction contracts, including quantitative evaluation criteria, and methods for specifying materials and tools and procedures for modelling the environmental impact of buildings. Just as many devices that the partners of the FCRBE project closely analyzed and for which they proposed additions, changes, or alternative methods better suited to organizing the reclaiming and reuse of materials through these different frameworks.

However, it would be misleading to consider these as the only results of the project. The project did not simply produce documents. It also involved intensive fieldwork, rich in encounters and exchanges.

Consider the hundreds of visits to reclaimed material dealers, the thirty-six pilot operations, or the countless workshops, webinars, and other communication events. The FCRBE project was also about contacts with numerous stakeholders and, indeed, numerous materials!

In the context of the project, these encounters were essential for several reasons. They allowed us to understand the needs and practices of professionals engaged in reuse practices - or willing to engage in them in a sustainable manner. They also provided an opportunity to present the solutions developed by the partners of the FCRBE project to these professionals, at various stages of development.

How all these visits and encounters have enriched the work and what results they have produced is what you will discover by reading this report. This report is intended to serve as a guide to navigate through the multiple intricacies of the FCRBE project. It also aims to serve as a memory to preserve some of the instructive experiences lived by the partners during these five years of learning.

Because, of course, this is also one of the main functions of writing: to preserve in order to better share. And if that required producing yet another document, it was a risk that we deemed worthwhile!

5 years of
collaborative
efforts
to promote
reuse:

what we've
learned,
what remains
to be done.

Your journey in the FCRBE project begins now. Welcome!

In this first part, we provide an overview of the work we've conducted over the past five years, collaborating with 11 partners to promote the reuse industry in Northwestern Europe. Here, we will introduce the tools we have developed and will share the insights we have gathered throughout this endeavor. You will discover the story behind the project's key deliverables, the motivations driving their production, and the issues they address.

As we write these lines, the reuse of materials continues to be surrounded by various misconceptions: deemed too complicated to implement, suitable only for exceptional situations, or considered unreliable. If these notions sound familiar to you, this initial leg of our journey should provide some refutations. We will endeavor to demonstrate that reuse can be applied today in numerous projects, including large-scale projects and within contexts considered complex, without compromising quality standards—quite the opposite!

Follow the guide; it will lead you down several paths to navigate the wealth of resources available, gradually embracing the principles of material recovery and reuse in construction projects.

We hope that the work we have undertaken will enable you to view buildings and the materials they comprise from a different perspective, even if only temporarily donning the glasses worn by the FCRBE project partners—perhaps even adopting them as a sustainable practice.

Starting from an existing sector

Reusing materials is sometimes portrayed as an emerging industry, just beginning to take shape. This notion overlooks the fact that there is already a network of companies in our regions actively engaged in material recovery and reuse. Lack of awareness about these entities deprives many project owners, designers, and building contractors of potential allies in achieving their reuse goals.

Behind the term "reuse" that we primarily use here lies a broad semantic field: antique materials, demolition materials, secondhand materials, reclaimed materials, reusable materials, second-hand materials, and more. It would likely be futile to try to impose a single term and unequivocal definitions. These nuances, in a way, reflect the diversity and long history of these practices.

AN INSPIRING SECTOR...

A significant number of companies actively involved in material recovery and reuse do indeed exist, and in some cases, they have been around for quite some time. On the one hand, this is good news because it means we are not starting from scratch. Many companies already practice reuse, driven by opportunity, conviction, or both, either as their primary focus or as a complement to other activities. Sometimes, they may not even use the term "reuse" to describe their work. The longevity of these businesses demonstrates that viable economic models exist, at least for certain material streams, offering a foundation upon which to build and develop new sectors.

...YET LACKING VISIBILITY

On the other hand, it is undeniable that, despite their obvious role in transitioning towards a circular model in construction, these companies remain largely unknown to professionals in the construction sector. This observation may raise eyebrows, especially considering that reuse currently holds a prominent place in discussions at all levels¹. The FCRBE project started with the premise that the models and expertise developed by these companies are as valuable as they are inspiring in shaping the future of reuse practices. In this regard, they would greatly benefit from increased visibility. Several tools have been developed for this purpose.

SUPPLIER DIRECTORIES...

During the FCRBE project, salvoweb.com and opalिस.eu directories were enhanced to include documentation of nearly 1,100 dealers in the project area: 500 in the UK and Ireland (on salvoweb.com), 270 in France, 153 in Belgium, 176 in the Netherlands, and 1 in Luxemburg (on opalिस.eu).

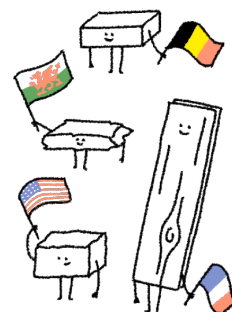
To shine a spotlight on this sector, what could be better than a well-documented, mapped, beautifully illustrated, and freely accessible directory? This is the goal of the online directories Opalis.eu and Salvoweb.com, which list over 1000 companies active in material reuse located in France, Belgium, the Netherlands, the United Kingdom, and Ireland. These directories make it easier to find partners capable of salvaging materials from demolition projects. These same companies can also supply materials for reuse in construction and renovation projects.

¹ : Reuse figures prominently in a large number of political programmes on the circular economy, from the *European Green Deal* and its national transpositions to local and regional development plans.

These directories primarily serve as gateways to the world of companies active in this field. They cater to both professionals and individuals curious about the subject—don't hesitate to explore them and perhaps discover a supplier right near you (19).

To compile these directories, several partners of the FCRBE project conducted an extensive field survey. Over the course of three years, we traveled across five countries to meet with these companies. These journeys were filled with numerous adventures, allowing us to explore unfamiliar territories. Most importantly, they fostered incredibly enriching encounters, not only in terms of our research goals but also on a human level. Here are some insights that emerge from this extensive survey:

- The companies are predominantly small and medium-sized enterprises (SMEs).
- Emerging initiatives coexist with companies that have been active for several generations
- Under the rather broad term of the "reuse sector," there are organizations with diverse activities and motivations: demolition companies with stocks of materials recovered from their sites, suppliers of second-hand technical equipment, specialized antique dealers in vintage materials, second-hand construction material stores, social and solidarity economy actors, flea market vendors... Their common denominator? Their activities keep materials and construction elements that can be reused in circulation.
- Many resellers undertake the necessary steps to prepare products for the market: disassembly, sorting, cleaning, repair, storage, transportation... For the most part, they exhibit a high level of professionalism and a strong knowledge of materials and associated craftsmanship. This enables them to ensure smooth operations.
- Some companies can meet relatively high requirements in terms of material quality, available volumes, and delivery times. This is



STATISTICAL ANALYSIS OF THE SECTOR

notably the case for certain vendors of road pavers, radiators, technical floors, wooden elements (flooring, planks, cladding...), tiles, etc.

- Nearly 80% of companies specializing in material recovery and resale operate with materials that travel less than 100 km between the point of recovery and their reintroduction. The reuse economy in Northwestern Europe exhibits a strong local presence.
- There are many similarities among businesses in the European countries involved in terms of business typology, geographical reach, materials recovered, and socio-economic models. However, local specificities are influenced by regional resources and construction cultures. For instance, the reuse industry is well-established for bricks in Belgium, for parquet and oak or spruce beams in Eastern France and the Alps, and for slates in Wales.

· A small fraction of reused materials follows more distant trajectories. This includes certain architectural antiques, highly sought after by affluent classes on multiple continents; specific road pavements prized for their durability in certain regions of the United States; some technical equipment reused in contexts with lower energy efficiency and regulatory standards; as well as barn wood, often imported from North America and Eastern European countries, and certain so-called "exotic" wood elements imported from Southern countries (often linked to the colonial history of European nations).

The absence of quantified data on the reuse sector is one of the reasons for the observed lack of visibility, particularly among public authorities. The field survey was therefore considered a means of gathering necessary data from resellers to establish the first international statistics on the sector¹.

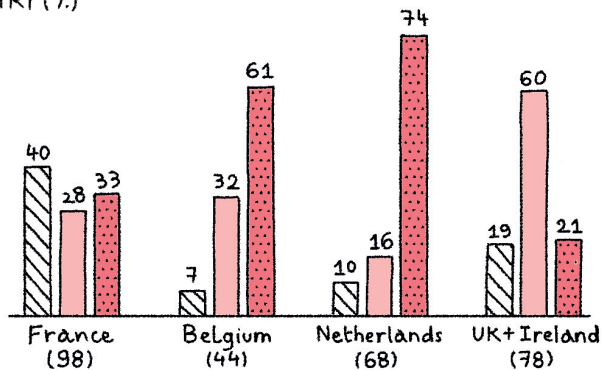
1 : Interreg - North-West Europe FCRBE, "Statistical analysis of the building elements reclamation trade in the Benelux, France, the UK and Ireland", published in September 2021 and available on [nweurope.eu/fcrbe](https://www.nweurope.eu/fcrbe)

- The main measured data included:
- Number of jobs involved
 - Company sizes
 - Quantities of stored materials
 - Average distances traveled by the materials
 - Trends in company development.

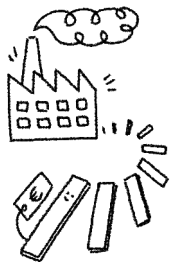
These initial results aim to serve as a reference for future studies aimed at measuring the evolution of the sector over the coming decades.

DISTRIBUTION OF DEALERS' PROFILE IN EACH COUNTRY (%)

- ▨ antiques
- mixed
- reclaimed



HOW TO SUPPORT THE SECTOR?



A series of interviews with resellers confirmed certain hypotheses, particularly regarding their challenges in anticipating the evolution of their activities and expanding beyond a limited market, even a niche market for some.

The factors are several:

- Competition from newer materials that are more competitive due to mass production and/or being imported from countries with comparatively lower labor costs.
- Access to land (most resellers are constrained to store materials in peri-urban or rural areas).
- Uncertain and unpredictable demand for materials.
- Barriers related to formalized procedures in public procurement.
- Hasty demolition practices preventing the recovery of otherwise reusable materials.
- Evolution of construction practices involving materials and/or techniques that are not

- suitable, or only marginally so, for recovery and reuse: irreversible assemblies, adhesives, cements, toxic substances, etc.
- Difficulties in ensuring the continuation of activities when current managers retire.
- Exhaustion of certain material streams around which some companies had specialized.

While these companies play an essential role in establishing a truly circular economy, it's evident that their development is not straightforward. Increasing their visibility is a crucial initial step, but it cannot end there. In the context of the FCRBE project, we've identified other levers that can contribute to the growth of these virtuous practices. These levers operate on two fronts:

- On one hand, efforts can be made at the level of construction project management. These efforts primarily concern project owners, architects, engineering firms, and construction companies, and subsequently, all organizations involved in such projects.
- On the other hand, structural changes need to be orchestrated by public authorities to overcome more systemic obstacles.

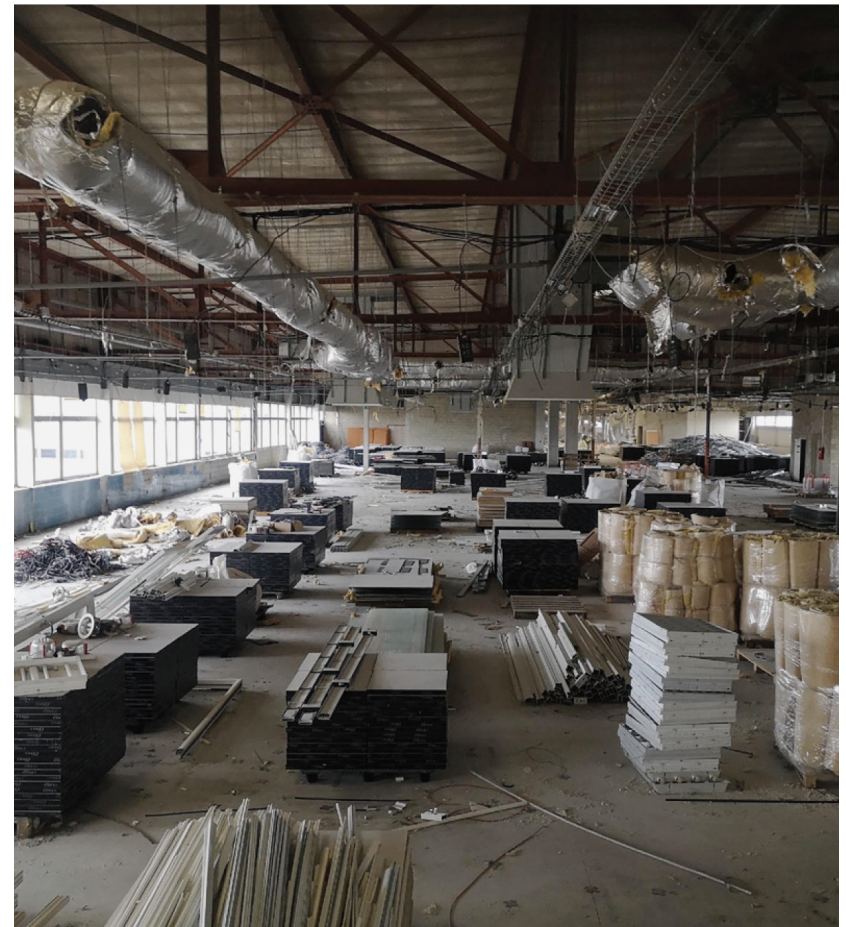
Recovering and reusing materials

At the scale of small construction projects, and with a bit of common sense and goodwill, reuse typically finds its place quite naturally. The proximity between different participants (who may sometimes be the same person in the case of self-construction), the modest quantities involved, and the low degree of formality all tend to favor relatively spontaneous forms of reuse. Things get more challenging when we transition to more complex projects involving more professional actors, higher levels of formality, and larger quantities of materials.

However, these types of large-scale projects can have a positive impact on the development of reuse material streams, especially when they involve significant purchases from reuse material suppliers. Public procurement can be a powerful engine for supporting and stimulating emerging sectors. It wields significant influence in implementing best practices and plays a considerable role in a nation's economies.

To make room for recovery and reuse in these contexts, it's essential to evolve visions and working methods. Reuse involves different ways of mobilizing local actors and resources, designing projects, sourcing materials, organizing procurement processes, and even conceptualizing project economics. In short, an entirely new construction culture shall be encouraged.

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Reuse of interior elements of the offices of the Centre National des Arts Plastiques (Pantin ^{FR}) for off-site reuse. © Bellastock

In 2023, public procurement accounted for over 16% of the European Union's GDP1 (C.Ratcliff, M. Wosyka, B.Martinello, D. Franco, "Fiches techniques sur l'Union européenne", avril 2023).

For this purpose, new tools need to be developed and widely adopted. This is the task that the FCRBE project has undertaken, resulting in a toolbox offering various solutions for recovering and reusing materials in all types of projects. Let's take a closer look at these tools.

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ASSESSING THE REUSE POTENTIAL OF MATERIALS BEFORE DEMOLITION

In Europe, the annual quantity of waste generated by the construction sector amounts to nearly 385 million tons (75 million for France, 70 million for the United Kingdom, 24 million for the Netherlands, and 21 million for Belgium). In terms of per capita mass, the countries in the FCRBE project zone are among the largest producers of construction waste in Europe. If these 385 million tons of waste were piled up in one place in a conical heap, it would be 5 to 6 times taller than the Great Pyramid of Giza! Despite prevention efforts mandated by existing regulations, statistics indicate that these figures are on the rise in several Northwestern European countries. Within this waste stream, the inert fraction, including masonry, concrete, and natural stones, is by far the heaviest. Other fractions, although less massive, pose different issues, notably hazardous waste.

PROMOTING THE REUSE OF MATERIALS EFFECTIVELY IN CONSTRUCTION AND RENOVATION PROJECTS

Many perfectly reusable materials are still discarded when buildings are demolished, often due to a lack of foresight. This waste could be prevented by better exploring waste prevention strategies. It involves asking, as early as possible in the planning stages, whether the original fixtures and fittings can be preserved, at least in part. Alternatively, consideration should be given to whether materials slated for removal can be salvaged for reuse. The FCRBE project has primarily focused on addressing this latter question.

To achieve this, there is a relatively simple yet potentially transformative process known as "diagnostic resources" in France, "inventaire réemploi" in Belgium, or "pre-demolition audit" or "salvage assessment" in English-speaking contexts. Regardless of its name, the principle remains the same: it involves identifying, before starting construction work, all elements that could be reused and ensuring they receive distinct treatment to preserve their potential for reuse (careful dismantling, storage, etc.).

Such an approach raises several questions. How do you recognize a material suitable for reuse? Through which channels can reuse be activated? Where is the demand for these materials? What information should be collected to maximize the chances of materials being reused, and to what level of detail? How can this process be integrated with other preliminary studies? When and by whom should this process be conducted? The FCRBE project has delivered a method that aims to address all these questions. Presented as a manual¹, it offers a step-by-step approach and provides users with working document templates, tutorials, and examples of inventories¹.

Recovery efforts may prove futile if, once dismantled, the materials are not effectively reused. To "close the loop," construction and renovation projects must stimulate demand by prescribing the reuse of materials, whether they have been salvaged on-site or elsewhere. This ambition requires

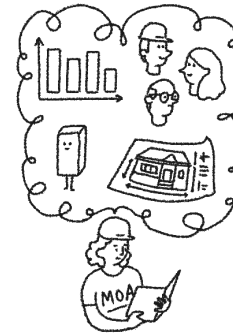
making material reuse an explicit objective in construction projects. This objective can, of course, be combined with broader goals of reducing environmental impacts throughout a building's lifecycle. There are various ways to formulate such objectives, and they all influence how contracts (for architecture, construction, etc.) are awarded, particularly in the context of public procurement.

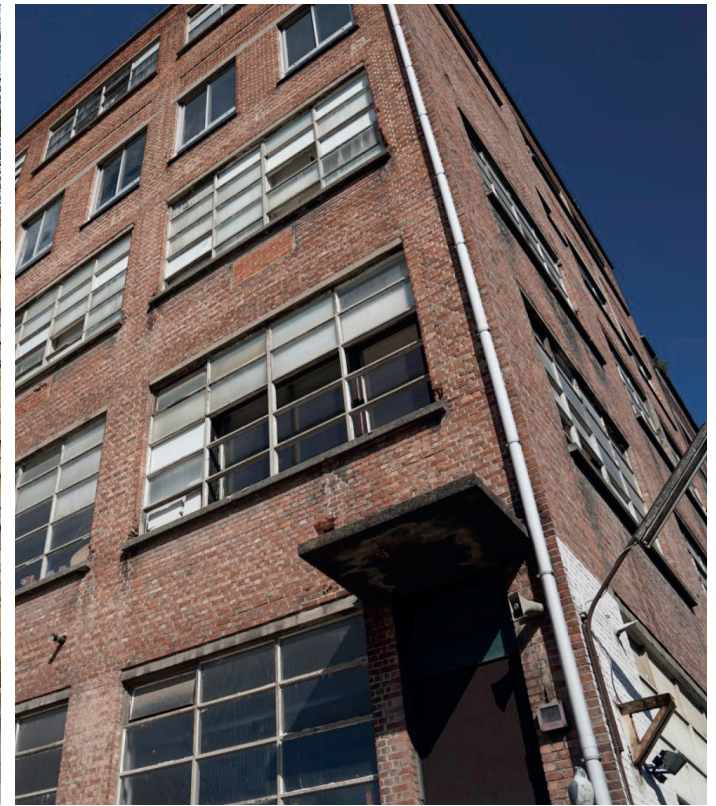
The FCRBE project has developed step-by-step methods outlining several possible approaches to:

- Formulating open or specific objectives.
- Establishing qualitative or quantitative objectives.
- Expressing reuse objectives within the context of an architectural contract, a construction contract (including design-build contracts), or even a supply contract.
- Calibrating objectives based on the level of ambition and available resources (materials, expertise, means, support).

These prescription strategies¹ ⁰³ are accompanied by a collection of informative sheets providing answers to the most common questions that project owners may have. How can reuse be integrated into various contract award procedures? Where can reused materials be sourced? How can the reuse process be effectively implemented throughout the project? What are the roles of stakeholders at each project stage? How can the budget be kept under control?

Our approach in developing these methods has been to integrate them into existing and familiar frameworks. The idea is not to suddenly impose new working frameworks but to evolve the ones project owners are already familiar with. However, effectively tackling this subject requires following some recommendations: thoroughly analyze the local context (actors, materials, available resources), be flexible, start with objectives that align with your





Top left: An overview of the storage facilities of a brick dealer in London
© Est Ensemble / Camille Millerand

Top right: reuse strategy for this disused industrial site with the aim of (re)becoming a lively and vibrant district in Petit île - City Gate II (Bruxelles ^{BE}).

Bottom left: tiles dismantled and packaged for transport (Strasbourg ^{FR}).
© Salvo / Luc Boegly

Bottom right: research into and coordination of the reuse of a metal framework for an outdoor terrace project at La Maison des Canaux (Paris ^{FR})

GATHERING INFORMATION ON REUSED MATERIALS

capabilities, and gradually expand your ambitions based on experience (the incremental approach).

Reused materials are relatively unfamiliar to construction professionals, particularly architects. However, knowing and understanding the specifics of these materials is crucial for drafting appropriate technical specifications in project specifications.

At the beginning of the FCRBE project, finding documentation on reused materials was challenging. Existing documentation was often incomplete (with few materials documented), scattered (with some scattered data on the internet and in books), and sometimes quite basic (with highly uneven quality of information). To address this situation, the project partners developed a catalog of 36 reused material fact sheets^①. Their goal was to facilitate the specification of reused materials by designers. Each fact sheet covers the following topics:

- How to recover, package, and reuse the material.
- Known characteristics of the material.
- Its availability in the market.
- References for indicative prices.
- Examples of inspiring projects that successfully reused this material.
- Sample technical clauses for dismantling and reinstallation work.

37 PILOT PROJECTS TO PUT REUSE INTO PRACTICE

Is putting reuse into practice easier said than done? To answer this question, the methods developed in the toolbox were tested in vivo on a set of thirty-seven pilot projects². These projects helped refine the guidance tools through on-site feedback. The aim of the pilot projects was also to support construction stakeholders (project owners, engineering firms, companies) in integrating recovery and reuse principles into their professional activities. The pilot projects covered various contexts but were none-

These pilot projects supported over 50 organizations, including project owners, design firms, and construction companies, in adopting recovery and reuse practices. Ultimately, these pilot projects contributed to preventing the production of 300 tons of waste and avoiding the production of an equivalent number of new materials.

theless representative of the construction sector in Northwestern Europe. They included renovations of social housing from the 1960s-70s, public infrastructure renovations, industrial building conversions, individual and collective housing, and renovations of worker houses dating back to the early 20th century. Many projects focused on renovation work, but there were also some new construction projects. Some pilot projects concentrated on demolition work, with the goal of maximizing the recovery of reusable elements. Others involved design and/or construction phases with the objective of reusing materials within the projects. A few projects addressed all these aspects simultaneously (particularly through on-site reuse cases).

Here are some notable facts from the pilot projects:

- A social housing provider in Tours ^{FR}, organized the recovery and reuse of over 400 tons of stones as part of a neighborhood renovation.
- In the renovation of its town hall, the city of Manchester ^{UK} reused on-site and on other projects metal structures and wooden frameworks.
- In its framework agreements for the supply of materials for all its road construction projects, the development company for the Île de Nantes ^{FR} emphasized the use of reused local cobblestones and curbstones.
- A social housing provider in Lint ^{BE} planned the recovery of large quantities of bricks through a detailed inventory, complemented by performance characterization tests.
- In Strasbourg ^{FR} a developer organized the recycling of 51 tons of finishing materials recovered during the excavation work of an early 20th-century hospital building. To achieve this, stringent recovery requirements were incorporated into the demolition contract.

Each of the pilot projects has been documented in an illustrated report¹. These reports detail the methods used, the results

1 : Interreg - North-West Europe FCRBE, "Reuse Toolkit : 36 material sheets", published in november 2021

2 : During the project, 37 pilot operations have been carried out by the project partners. Each operation was taking place in an ongoing building project. They aimed at fostering the reclamation and/or reuse of batches of building materials. They are all available on nweurope.eu/fcrbe

1 : For each pilot operation, a detailed report is available on vb.nweurope.eu/fcrbe

achieved, and the lessons learned. These field reports contain numerous anecdotes, success stories, as well as lessons from mistakes made along the way (22).

The reports are rich with advice to maximize the chances of success. Here is a brief summary of the key success factors:

- Anticipate: You increase the chances of success by integrating thinking about reuse from the beginning of the project.
- Raise awareness and unite all relevant stakeholders, also from the project's start.
- Set a clear objective from the project's beginning.
- Do not exclude certain working approaches from the start: consider on-site and off-site reuse, reuse for the same or different purposes, etc.
- Take the time, once the projects are completed, to review the lessons learned to improve for the next project.

In a second phase of the FCRBE project (2022-2023), four additional live tests (21) were carried out in France, Belgium, Luxembourg, and the Netherlands. These tests focused more specifically on how to integrate quantitative reuse objectives into various public procurement procedures. These tests allowed the evaluation of a more general method for using reuse rates (as a percentage of mass or budget) in formulating objectives for construction projects.

TO SUM UP

The results of these five years of the project have shown that reuse is a remarkably versatile practice, capable of fitting into most projects, regardless of the buildings, territories, and configurations involved... From one case to another, reuse can be relatively simple and accessible. In others, it may require overcoming various obstacles (regulatory, cultural, technical, economic), but none of these are fundamentally insurmountable. Last but not least, reuse often proves to be a source of interest and curiosity (if not satisfaction!) for project stakeholders, who can use it as a pretext for more collective, creative, and socially and environmentally responsive practices, both in the project area and worldwide.

A structural framework

to support reuse

The results of the pilot operations have shown that while some barriers to reuse can be overcome at the project level, others depend on more systemic factors such as regulations, taxation, technical standards, and the overall organization of the economy. Changing these aspects requires a comprehensive approach led by public authorities.

PUBLIC POLICIES FOR REUSE

The development of this roadmap is the result of a collaborative approach involving participants from several countries and diverse backgrounds: environmental agencies, local and regional public authorities, public and private project owners, consultants, members of research centers, and academic researchers.

Political will is a key element in the development of the reuse sector. As highlighted by Allwood and Cullen, policymakers have a wide range of possible actions at their disposal, such as "setting and enforcing standards and rules [...], promoting new developments through taxes, subsidies, and investments, supporting change by providing infrastructure, information, and skills, setting an example of good practices in public procurement, and engaging the public and industry through media campaigns and business initiatives."¹

The partners of the FCRBE project have compiled a collection of tangible measures aimed at local, regional, national, and international policymakers². These **35 proposals for action**  are illustrated by examples of best practices encountered in various European countries (and some non-European cases). Here is a preview:

- Adapt taxation for reused construction products (reduced VAT).
- Clarify the issue of CE marking on reused materials.
- Internalize the environmental costs of new products to make reuse more competitive.
- Establish a list of protected materials, i.e., items that should not be discarded during demolition but recovered for reuse.
- Create a harmonized framework for assessing and demonstrating the suitability of reused materials for use.
- Set reuse targets in public procurement.
- Support companies that adopt reuse practices.
- Facilitate access to land for storage and conditioning of recovered materials.

These are some of the proposed measures to promote reuse and address regulatory and policy challenges in the construction sector.

The issue of insurance is one of the identified barriers to reuse. Many stakeholders face significant challenges in adapting their

AN INSURANCE FRAMEWORK TO BE UPDATED

1 : Julian M Allwood and Jonathan M Cullen, "Sustainable Materials: With Both Eyes Open", UTI Cambridge LTD, 2011, p337, available on www.refficiency.org

2 : Interreg - North-West Europe FCRBE, "Roadmap to foster reuse practices in the construction sector", published in January 2023 and available on vb.nweurope.eu

insurance contracts to reuse. Often, the very contours of the problem are unclear, and stakeholders are not well-informed about their responsibilities. In general, the practice of reuse requires building a shared vision of how to assess and distribute the risks inherent in material reuse. To better understand this issue, the FCRBE project has produced a documented collection of 11 best practice case studies on insurance and risk sharing¹ 03.

The research behind this collection has shown that approaching reuse through the lens of insurance offers at least three opportunities to enrich the project: reconnecting with constructive insights, establishing new forms of dialogue among construction stakeholders, and taking responsibility for actions.

The FCRBE project has worked on the development of the *Truly Reclaimed* label², initiated by Salvo in the United Kingdom. Its objective is to certify that a reused material (or sold for reuse) has genuinely been recovered during demolition work after having already had (at least) a first use. This mark of authenticity helps increase the transparency of reuse chains, which can sometimes be confusing due to the commercialization of new materials artificially aged to mimic the old. Thanks to the Truly Reclaimed label, the public and clients can now distinguish the genuine from the imitation 02.

The label serves other purposes as well, including a more educational one, which visualizes the material's past life. A QR code placed on labeled materials allows you to track their history through their successive uses since their production. This form of traceability helps build consumer confidence in the reuse industry. It is planned that the label will continue to develop to gradually meet other expectations, such as providing information on the environmental benefits of reuse (especially in terms of greenhouse gas emissions).

A LABEL FOR REUSE



Globally, tracking the origin of reused materials and preserving information is a significant challenge. It's easy to imagine the principles of this label being applied in the future to more contemporary materials.

INTEGRATING REUSE INTO COMMON CONSTRUCTION TOOLS

Furthermore, the FCRBE project closely examined how a series of commonly used tools in construction could contribute to the development of reuse practices:

- Labels and environmental certifications for buildings.
- Tools for modeling the environmental impact of buildings 12.
- Digital tools for digitizing and managing information related to reused materials 05.

Finally, the project partners published a collection of seven introductory booklets that provide a brief and educational overview of common questions related to reuse¹ 04:

- How to measure the environmental benefits of reuse?
- How to ensure the suitability of reused materials for their intended use?
- What are the possible surface treatments to give a second life to materials?
- Under what conditions do reused materials qualify as waste, and under what conditions are they considered products?
- How to develop a roadmap to promote reuse through public action?
- Introduction to urban metabolism studies.
- How have reused materials infiltrated the fashion industry?

RAISING AWARENESS AND TRAINING PROFESSIONALS...

While the evolution of the frameworks mentioned earlier holds promise, the adoption of reuse practices will not happen without an increase in the skills of all construction industry stakeholders. With this in mind, the FCRBE project partners have published and disseminated six guides aimed at specific trades: masons, roofers, carpenters, craftsmen, general contractors, and demolition companies². These guides are filled with advice, examples, and lessons learned from companies that participated in various workshops organized as part of the project.

1 : Interreg - North-West Europe FCRBE, "Les bonnes pratiques en matière d'assurance et de réemploi de matériaux de construction : les enseignements de 11 études de cas", published in september 2023 and available on vb.nweurope.eu.

2 : trulyreclaimed.org

1 : Interreg - North-West Europe FCRBE, "FuturREuse: 7 shorts introductions to the world of reuse", published in november 2021 and available on vb.nweurope.eu

2 : Interreg - North-West Europe FCRBE, "Le réemploi en pratique : entreprises générales, entreprises de finition, métiers du bois, couvreur, démolisseurs, entreprises d'infrastructures", published on september 2023 and available on nweurope.eu/fcrbe

...AND FUTURE PROFESSIONALS!

This skill development also applies to the professionals of tomorrow, who are more concerned than ever by these issues. Experimenting with new pedagogical practices to introduce future professionals to material reuse was the goal of the summer school organized in 2021 by the University of Brighton ⁰⁸. Take 72 students from around the world (architects, engineers, landscape architects, designers...), 11 teams of supervisors composed of teachers and reuse specialists, 2 intense weeks of online workshops (due to Covid-19), shake it all up, let it marinate, and serve: that's the *School of Reconstruction*! If you're interested in the story of this experience, the *Digital School of Re-Construction / Reuse Pedagogies* documents this adventure¹.

CONSULT THE RESULTS OF THE PROJECT

An illustrated poster at the end of this book allows you to visualize all the results at a glance (or almost)!

To access all the project's outputs (resellers directory, material sheets, guides, etc.), visit the open-source websites nweurope.eu/ fcrbe and [opalis.eu!](http://opalis.eu/)

Here we are at the end of this overview of the actions carried out as part of the FCRBE project. As you have noticed, the output has been abundant! This stems from our desire to embrace the subject of reuse from as many angles as possible - and these angles are evidently numerous! Indeed, reuse - beyond its known environmental, social, and cultural virtues - questions many of our practices and habits. It is precisely because they compel us to question ourselves that these practices are so interesting.

After providing an overview of the project's results, we now invite you to delve into the behind-the-scenes of this adventure.



Reuse of 360 cubic metres of self-supporting solid tufa stone facades on a site in Tours ^{FR}.
© F.Paillet - Tours Habitat

The
odyssey
of the project:

a unique
form of
international
cooperation

As you may have noticed in the first part, five years of collaboration on the issue of reuse have resulted in the publication of numerous works and the implementation of substantial field studies. This work was made possible by unprecedented international cooperation, bringing together 11 partners from 6 different countries, all driven by the desire to contribute to the adoption of reuse practices.

This second part introduces the project partners. It also aims to reflect on the genesis, successes, and challenges encountered in setting up this collaborative project. From steering committees and numerous related meetings to workshops and travels throughout North-Western Europe, the project was rich in opportunities to meet and learn!

For most of the deliverables, the working method was the same: a core group of a few organizations was responsible for implementing the activities, while leaving time for other partners to contribute. Partners were therefore often engaged in several

activities in parallel, with varying degrees of intensity. This working method enabled complex projects to move forward.

Such a project is, of course, a catalyst for meetings, sharing, and learning, so we will also take the time to introduce you to the profiles of some professionals we met along the way, as well as organizations and individuals who supported, inspired, and encouraged us to complete the project.

Interreg North-West Europe (NWE) is a European territorial cooperation program aimed at promoting balanced development throughout the region, enhancing the resilience of all regions, and contributing to a better quality of life and well-being for all citizens in the region.



Top left: Julien prepares the sections in the workshop as part of the re-use of a metal frame for La Maison des Canaux in Paris ^{FR}

Top right: BBQ organised with all the project partners after a day's work at Rotor (Brussels ^{BE}) in June 2019.

Bottom left: the project team at the final steering committee meeting in Brussels ^{BE} on 19 October 2023.

Bottom right: materials packaged for reuse

The origins

ROTOR'S TAKE

For Rotor, the story of the FCRBE project began around 2016-17. At that time, we were looking for a framework to continue conducting visits to reclamation dealers. We had just completed a nearly 5-year phase of visits to businesses in Belgium and had published the results of these surveys on the online directory Opalis.eu. We wanted to extend this project to neighboring countries, particularly France and the Netherlands.

These visits have always been a significant source of learning for us. Meeting professionals for whom material recovery and reuse are a daily reality helps us to better understand the subject. Furthermore, giving visibility to this sector in the fields of architecture and construction can profoundly change the nature of discussions about reuse. Showing that there are hundreds of businesses perpetuating these practices makes this issue much more tangible. Opalis demonstrates that there are supply chains, expertise, and know-how to build upon. Not to mention being able to answer recurring questions like "what can I do with this batch of tiles removed from my construction site?" or "where can I find second-hand materials for my architectural project?"... We wanted to extend these effects beyond the Brussels region and the borders of Belgium.

Around the same time – around 2017 – we were also finishing the publication and dissemination of a guidebook for public clients¹.

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OUR PARTNERS

This guidebook details, point by point, the possible procedures to facilitate material recovery on public construction sites. We had seen the interest that public clients had in documents that suited their usual procedures.

Two key ingredients emerged that would prove essential for the FCRBE project:

- The interest in having a better understanding of the reclamation dealers' sector.
- The importance of developing strategies adapted to the formalized context of large projects and public procurement.

It was at about this time that we became aware of the Interreg NWE program. This seemed to us to be an appropriate framework to build something based on these initial ingredients.

Over the years, we were certainly not the only ones in this field. Both Opalis and the Vade-mecum had been closely monitored and funded by Brussels Environment. This administration had shown a keen interest in the topic of material reuse and wanted to see these practices develop in the Brussels context.

We had also collaborated with Buildwise (then still called CSTC), particularly for creating tender clauses for a series of five commonly reused materials in the Belgian market.

In 2017, we created the "Platform of Actors for the Reuse of Construction Elements in the Brussels-Capital Region"¹ with Embuild (formerly the Confederation of Construction). The goal was to create a space where stakeholders interested in reuse could exchange their views, share their experiences, and pool their efforts.

So, we had a good base of Belgian and Brussels partners, which was interesting in itself but insufficient in the context of an interregional cooperation project. Therefore, we contacted organizations in neighboring countries whose work we had also been following with interest.

We had known for a long time what Bellastock was doing. At that time, Bellastock was publishing the REPAR¹ reports, with a strong focus on the possibilities of on-site reuse. We were very interested in this approach, even though we were also surprised not to see more mention of existing retailers in the pages of these reports. We made the bet that the FCRBE project could be an opportunity to exchange ideas on this.

The connection with Bellastock logically led us to CSTB, which co-authored some sections of REPAR and was interested in the challenges posed by material reuse, especially demonstrating their fitness for use and assessing their environmental benefits.

We knew about Salvo thanks to several of their publications. We knew they had already tested some ideas in the UK (and sometimes beyond) that we wanted to explore in the FCRBE project. We were happy to benefit from their extensive experience in this field.

Finally, we had already crossed paths with Duncan Baker-Brown from the University of Brighton, who joined the project to take care of the educational aspect, particularly through the organization of a “summer school”.

This is how the initial partnership was established. In early 2018, we together submitted the project application. It was approved in October. Activities started in early 2019 and continued until 2021. In early 2022, two more years were allocated to us to carry out a capitalization phase. Three other partners joined the project on this occasion: LIST, TU Delft, and the city of Utrecht. All of them had already had links with the FCRBE project and shared the same interest in developing practices for the recovery and reuse of materials. Their entry into the partnership allowed us to expand the project's sphere of influence.



Photo with part of the project team at the first meeting with the new partners joining the consortium, in Brussels in March 2022.

The partners

ROTOR

Rotor is a non-profit organization founded in 2005. Since then, it has been carrying out pioneering work on the issue of material flows and reuse. Rotor tackles this subject through various actions: developing critical positions in publications, conferences and teaching; conducting research; developing tools to facilitate the adoption of reuse practices in the construction industry; designing interior design projects; advising public authorities and supporting project owners. Between 2013 and 2016, Rotor also hosted the launch of the RotorDC project, which aimed to revive material recovery practices in urban environments. At the end of 2016, RotorDC became an autonomous structure organized as a cooperative society, which continues to explore new avenues of reuse.

"It's hard to pinpoint a single highlight in a project that has so many. Spontaneously, I think I would particularly remember moments of conviviality shared with partners in places that were often quite memorable. The warm atmosphere of a Brighton pub after a long day of meetings. Visiting Bellastock's experimental projects on the Île Saint-Denis. Crossing Paris from east to west, on foot, in the rain, on a day of strikes and yellow vest protests. The sunset from the top of the Esch-sur-Alzette blast furnace and the visit to La Petite Maison (a demonstration project for circular construction) the next day. The Opalis green-up in an old Brabant farmhouse. The roundtable discussion organized on a former industrial site undergoing conversion for the study trip to Rennes... And then the dozens of trips to present the project at venues as diverse as construction trade shows, universities all over Europe, industry events... It's a project that made me travel, literally and figuratively!"

BELLASTOCK

Bellastock is a cooperative that has been involved for over 10 years in the environmental and social transition applied to the architecture, construction and urban design sectors. Its team, based in Paris and Marseille, is developing pioneering expertise in France in the reuse of building materials. Bellastock's approach is based on solidarity, frugality and creativity, with a focus on research and sharing. Its expertise in the field enables it to support construction projects with strong ecological ambitions, notably by working on the reversibility of buildings. The cooperative also initiates and supports its own construction, training and awareness-raising projects, such as its annual architecture festival.

What do you remember about this project?
"Among the many positive points, the strength of this project has been to enable partners from different regions to take the time to meet, share and experiment, in order to better understand what's happening elsewhere. There's a before and after to the FCRBE project for Bellastock and its research."

BUILDWISE

Buildwise, formerly CSTC¹, was founded in 1959 by the construction industry. Buildwise's mission is to help construction professionals improve quality, productivity and sustainability, and to open the way for innovation on building sites and in construction companies. Statutory members include over 90,000 Belgian construction companies, mainly SMEs. Buildwise provides technical information, assistance and advice to its members.

During our interviews with the entrepreneurs, we noticed a contrast in the way they approached the reuse of materials: for some it was common sense, for others it was a completely crazy idea!

BRUXELLES ENVIRONNEMENT

Bruxelles Environnement is the public administration responsible for environment and energy in the Brussels Region. Its main mission is to survey the quality of air, water, soil, waste, noise and nature. Bruxelles Environnement is also responsible for defining strategic management plans for improving quality in above-mentioned fields and for launching awareness campaigns for citizens.

What is your best memory of this project ?

"The organisation of the final event in November 2021 was a good memory. For some of the partners it was the opportunity to finally meet people in person after two years of covid !"

DELFT UNIVERSITY OF TECHNOLOGY

Delft University of Technology is the oldest and largest technical university in the Netherlands. 8 faculties offer 16 bachelor's and more than 30 master's programmes for more than 25,000 students. The Faculty of Architecture and the Built Environment at TU Delft educates students to become excellent architectural engineers: brings research and education closer together and has a broad research area, and has a strong international community.

A striking anecdote ?

"We had a lot of good memories of our steering committee meetings in different locations. One of the memorable moments was when we received the email that the FCRBE project has been selected for presentation to the queens of the Netherlands and Belgium."

CITY OF UTRECHT

Utrecht is a city in the geographical heart of the Netherlands, housing over 350,000 inhabitants and growing at a high speed. Utrecht's strong and balanced economic profile, its investments for innovative companies, and efficiency of the labor market gained the Utrecht region the title of second most competitive region of the EU (2019). The city is involved in multiple European networks and projects (Interreg, URBACT) on circular economy, business-modelling and circular construction.

What if we had to do it again?

"I would try to involve the team members from the municipality earlier and give them a more prominent role in the international project meetings, as I think that experience from people that work on tenders and building projects on a daily basis is essential for good connection between FCRBE products and the needs from people on the ground."

EMBUILD

Embuild¹ is the main business organisation, social partner and representative body of the construction industry in Belgium. More than 15000 contractors have joined Embuild, from craftsmen to global players, carrying out all forms of building and civil engineering activities. Embuild informs, supports, represents and promotes Belgian contractors at the local, national and international levels. It has three regional entities for the three Belgian regions: Brussels - Flanders - Wallonia.

A striking anecdote ?

" When the team voted to keep FCRBE name at the very first kick-off meeting, after our UK partner sang Aretha Franklin's Respect. Also because it happened in an old-fashioned room with old portraits of former directors."

LUXEMBOURG INSTITUTE OF SCIENCE AND TECHNOLOGY

The Luxembourg Institute of Science and Technology is an organization developing solutions with a focus on environmental innovation, digitization and advanced materials. LIST1 covers the entire innovation chain and is specialized in fundamental and applied scientific research, experimental development, incubation and transfer of new technologies as well as scientific policy support. LIST provides science-based support for environmental policies at national and European level and gives regulatory support for RDI.

What's the first thing you keep from this project?

"Before we joined the project, we saw circular construction as an elusive dream in Luxembourg. Now, we see that things are moving, the project gave us the ability to convince people that it was possible to adopt new practices."

A striking anecdote ?

"A good memory we have was the steering committee in Esch-sur-Alzette and the visit of the blast furnace."

UNIVERSITÉ DE BRIGHTON

The University of Brighton is a community of 21,000 students and 2,800 staff based on five campuses in the coastal cities/towns of Brighton. The UoB1 possesses a diverse and vibrant research community of over 400 research staff and 300 research students.

A good memory to share?

"It was an absolute pleasure to meet all the partners at ROTOR and then be taken to their warehouse for a very spontaneous BBQ. First we were shown around their amazing collection of building items for re-use, including a range of tiles, paving stones, light fittings, sinks, doors and window frames."

What did you like most about the project?

"The Interreg NW guidance from the start including the initial Project Management training, was very helpful, straight forward and no nonsense, very refreshing. The excellent cooperation between partners and "can-do" attitude of the ROTOR team leading the project also made the project a pleasure to work on."

SALVO

For more than 30 years, Salvo has been a key organisation for the development of the reuse sector, primarily in the United Kingdom. Salvo carries out several activities including: networking information and advising on the trade of reclaimed construction elements¹, providing consultancy to the construction sector and public authorities on reuse practices, conducting reclamation audits, assisting with materials procurement; surveying the sector.

What did you like most about the project?

"As the UK sidled out of the EU, it felt good for Salvo to stride into a project with European partners and work on a shared mission that cannot be achieved without collective action. FCRBE gave Salvo fresh insights to help grow the Truly Reclaimed label and new contacts with UK and Irish architects."

CSTB

Scientific and Technical Center for Building is the French national organisation providing research and innovation, consultancy, testing, training and certification services in the construction industry. The mission of the CSTB is to ensure the quality and safety of buildings, and to support innovation. Its field of expertise covers construction products, buildings, and their integration into cities.

"Numerous people from CSTB worked on this project. We appreciated the collective dynamic, the teams' energy and the quality of the project management. One memory would be the steering committee in Paris host by CSTB during the strikes."



Study trip organised in June 2023 in the province of Utrecht in the Netherlands. The aim was to look at the reuse of construction materials in public space projects.

Associated partners

BUILDING COMMISSIONERS

This category includes building commissioners interested in the various solutions developed by the project. These associated partners were asked to take part in the pilot operations, and several of them actually hosted one or more pilot operations.

Partners in this category are: [Befimmo](#)^{BE}, [Beliris](#)^B, [Circolab](#)^{FR}, [Citydev](#)^{BE}, [De Ideale Woning](#)^{BE}, [Paris Habitat](#)^{FR}, [Whitewood](#)^{BE}, [Ymere](#)^{NL}.

ENVIRONMENTAL AGENCIES AND PUBLIC AUTHORITIES

These associated partners are organizations responsible for waste and materials management at various political levels in the program region. Their interest in the project is to be able to adopt and disseminate the newly developed solutions more widely. In particular, these organizations have been asked to draw up a roadmap setting out a series of possible actions that public authorities can take to stimulate the creation of a favorable context for reuse.

Partners in this category are: [ADEME](#)^{FR}, [DPD/DGO3](#)^{BE}, and [OVAM](#)^{BE}.

In addition to the 11 main partners, the project also involves 17 associate partners. Most of these partners are active in the program area. They can be grouped into the following categories:

SECTORAL FEDERATION

The project benefited from the presence of Bauteilnetz, an organization that has been promoting the reuse of building materials in Germany for over 15 years. Its role in the project was to ensure the transmission of information from and to specialist companies in Germany.

Partner in this category is: [Bauteilnetz](#)^{DE}

ENTREPRISES AND CONSULTANCIES CONCERNED BY REUSE AND/OR ACTIVE IN THE REUSE INDUSTRY

These partners took part in a number of specific meetings and events, contributing their expertise to the project (in some cases, as part of the pilot operations). Their contribution to the development of some solutions was decisive.

Partenaires de cette catégorie : [ARUP](#)^{UK}, [New Horizon](#)^{NE}, [SOENECS](#)^{UK} et [Sturgis Carbon Profiling](#)^{UK}.

OTHER EUROPEAN PROJECTS

Initially, TU Delft, also involved in the European CHARM project, was an associate partner in the FCRBE project - before becoming a full partner for the capitalization phase. This enabled us to benefit throughout the project from synergies with the CHARM project, which pursues similar objectives to those of FCRBE but in the specific context of social housing.

The resellers

Behind the somewhat general term "reuse sector" are organizations with very diverse activities and motivations: demolition companies with a stock of materials recovered from their sites, suppliers of second-hand technical equipment, antique dealers specializing in old materials, second-hand construction material stores, social and solidarity economy actors, antique dealers... What do they have in common? Their activities help keep materials and construction elements in use that would otherwise be discarded during demolitions. We went to meet them!

The specialists

VANDEMOORTELE Zarren^B

Vandemoortel was founded in 1983. Their specialty: reused bricks. Their yard is covered with an impressive quantity of pallets of bricks, ready for sale. They also offer other materials such as tiles, parquet, tiles and clinkers. From their demolition sites, they also recover oak beams, which they have transformed into massive tables. Their range of reused bricks is particularly well documented: each type of brick is the subject of a small descriptive sheet with a brief history, photos, technical characteristics and even addresses of completed projects.

MATÉRIAUX ANCIENS DU NORD Dourler^{FR}

Family-run Matériaux Anciens du Nord has been selling local antique materials since 2001. Sourcing mainly from partner demolition sites, it offers a wide range of carefully cleaned and reconditioned products: bluestone, ashlar, cobblestones, various types of paving, tiles, radiators... In particular, it has extensive expertise in the cleaning and preparation of ceramic tiles, for which it has developed its own technical solutions. The variety of models and patterns available is impressive, with the majority of products covering the period 1850-1930.



Frédéric Matt's stock of radiators when we visited. @ Bellastock

FRÉDÉRIC MATT Lissieu^{FR}

Active since 1999, Frédéric Matt is one of the pioneers in the renovation of old cast-iron radiators. It buys, restores and supplies several thousand radiators every year. With a 2,000m² storage site, showroom and workshops, the company offers a vast choice of over 4,000 made-to-measure radiators: customers choose the model, height and number of elements to suit their needs and desired heating power.

ASHWELLS RECLAIMED TIMBER Essex^{GB}

Involved with reuse for over 50 years and specializing in tropical hardwood reclamation for the last 20 years with award winning projects, Ashwells are prime supplies of reclaimed greenheart beams and other hardwoods, such as purpleheart, ekki, opepe, jarrah and elm. The onsite sawmill is able to supply a cutting list service for landscapers, architects, designers and engineers.

Generalists



OMGEKEERD BOUWEN Tubbergen^{NE}

Omgekeerd Bouwen was founded in 2015 as part of the demolition and asbestos decontamination company Kamphuis. On their extended company premises in Tubbergen you will find wooden beams, steel girders, sanitation, window frames, doors, light fittings and much more. Each element that is for sale at Omgekeerd Bouwen originates from their own demolition and dismantling operations.

GALLOPS ARCHITECTURAL Powys^{UK}

Specialist dealers in architectural salvage and antiques, Gallops Architectural has over 30 years of experience in sourcing and supplying quality traditional building materials to customers both in the UK and internationally.

Above left: reused doors at Gallops Architectural during our visit.

Above right: an example of the materials used at Glasgow Architectural.

The antique dealers



GLASGOW ARCHITECTURAL SALVAGE^{SCT}

Fireplaces, radiators, doors, windows, architectural antiques, lighting, sanitaryware... Committed to saving beautiful quality fittings and fixtures from old buildings. The Glasgow based business holds an eclectic range of salvaged industrial pieces, architectural antiques and furniture.

VERGNAUD ENTREPRISE Saint-Jean d'Ataux^{FR}

Founded in 1979, Vergnaud is a company specializing in the trade of components derived from the deconstruction of heritage buildings in the Périgord and Gironde regions. The carefully designed arrangement of limestone, granite, terracotta and oak timbers and timbers on long, covered metal racks gives a broad overview of the materials available at a glance. The company has extensive experience in the field of reuse, as evidenced by the technical nature of its facilities and its expertise in dismantling, storing and restoring materials.

Demolition and reclamation companies

DÉMOLITION WILLIAM PERREAULT Chambourcy ^{FR}

Démolition William Perreault is a family business founded in 1960 and headed by three generations of demolition specialists. For the past thirty years, the company has been recovering building components from its sites in the Paris region and putting them back into circulation. They are then stored and resold on a dedicated site in western Paris. This highly-organized storage facility displays deconstructed components to visitors...

CHESHIRE DEMOLITION & EXCAVATION CONTRACTORS Cheshire ^{GB}

Over 30 years experience in the demolition trade family run Cheshire Demolition has one of the largest reclamation yards in the North West area. With the aim to always reclaim as much as possible from their own demolition work, the three acre site offers huge stocks of reclaimed stone, bricks, slates, tiles, flagstones, oak and pine beams.

Stock of stone at William Perreault's home during our visit.



The charity

INTERPROFESSIONNELLE DE LA DÉCONSTRUCTION ET DU RÉEMPLOI Pau ^{FR}

Interprofessionnelle pour la Déconstruction et le Ré-Emploi (IDRE) is a pioneering association in the New Aquitaine region. For just over three years, it has been working to structure the professional sector for the deconstruction and reuse of building materials, and to raise awareness among the general public. In particular, the association provides training on deconstruction sites, and advises and supports building industry players in new reuse practices in the Pau region. A "ressourcerie 3.0" project has been launched with the Compagnons Bâisseurs and their Solibat' platform, as well as with back-to-work companies. The aim is to create a link between the various players involved in construction and deconstruction, offering them support and a meeting place, as well as a place to sell reused materials.

RETRIVAL Couillet ^B

Retrival is a company that deals with "pre-demolition": removing interior fittings down to the building shell. They offer a service rather than a range of reuse products. The company dismantles complete interiors and then sorts the waste. First, they make available what can be reused, preferably on the building site itself. Then, they send the rest to recycling centers. Their range of salvaged products is therefore very varied. It potentially includes every component that can be dismantled in a building.

The new urban reuse systems

MINEKA
Villeurbanne ^{FR}

Minéka is an association created in 2016 and active in collecting, selling, and raising awareness of the reuse of construction elements. Minéka offers a diversity of materials from the events and construction sectors. The association takes charge of collecting elements from deconstruction and offers a simple drop-off service. The products are then collected in the storage area for on-site resale. All items are sold, cleaned, sorted and meticulously referenced in the Minéka'talogue, which can be consulted on the association's website. In addition to facilitating the circulation of reused materials, Minéka offers awareness-raising, advice and support to public institutions, construction professionals and private individuals.

An overview of the materials stock at Tricycle[®], a company that also offers materials management and recovery solutions.



ARTICONNEX
Orvault ^{FR}

Articonnex's mission is to stimulate the exchange and sharing of materials, services and information between artisans and other professionals in the construction industry. The company specializes in the remarketing of building materials that have been excluded from traditional distribution channels, including reused materials. To ensure this remarketing, the company manages a marketplace (digital platform) as well as a stock of reused materials (physical platform). The company invites building professionals to deposit or purchase construction materials, and offers the following services: on-site collection, storage, buy-back, sale and delivery. Each product is carefully referenced in the form of a classified ad on the company's website. At the beginning of March 2021, Articonnex is the national winner of ADEME's AMI Contrat à Impact Economie Circulaire (Circular Economy Impact Contract) for its project to experiment with the re-industrialization of building materials in a large area north of Nantes.

DEPOT LIVE SHOW(S),
A UNIFYING EVENT

In May 2021, the Depot Live Show(s) took place, a 2-week online event designed to bring together the salvaged materials dealers we met during the project with other professionals such as contractors, project owners and architects, to discuss the challenges of reuse in construction. This event, orchestrated by Bellastock with the help of other project partners, closed with a round table discussion recorded at the Maison du Déchet in Paris¹, during which the invited partners (Région Ile de France - Réavie - Agencies and architectural collectives...) discussed a number of themes: the origins and history of reuse, the levers for encouraging its practice, the place it can occupy in rehabilitation projects, and its implementation on a very large scale.



The visits were an opportunity to meet the professionals who work with materials on a daily basis. Their stories are invaluable, and their skills need to be protected.
© Bellastock

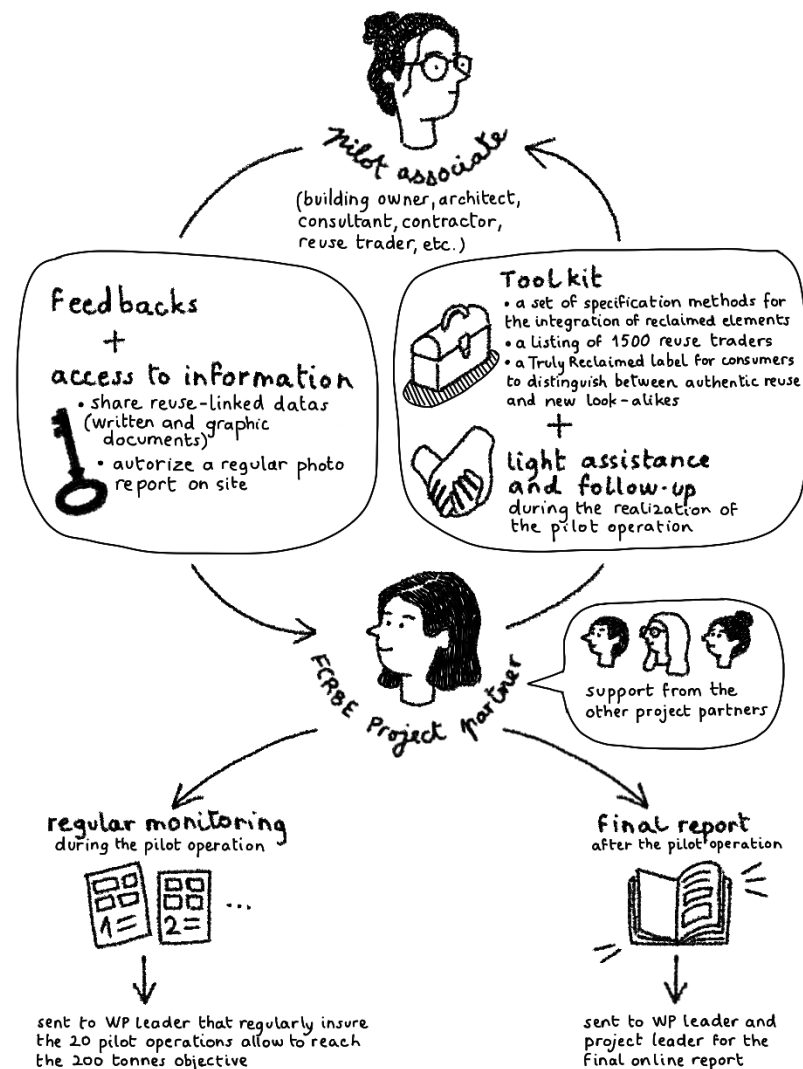
The 37 pilot operations enabled the methods developed by the project to be tested and improved. These operations were carried out in partnership with over 50 professional organizations involved in the construction sector. While building owners were generally our main interlocutors, architects, consultants, construction firms and companies specializing in the recovery and resale of materials were often involved too. These stakeholders were our pilot associates.

The pilot operations aimed to support pilot associations in adopting recovery and reuse practices. To this end, they were supported by project partners in organizing specific operations within ongoing construction, development or renovation projects. This demonstration by example was an effective way of showing in a tangible way how to go about it.

The pilot operations took place from 2019 to 2021. This period also corresponds to the preparation of the main solutions brought together in a "reuse toolbox" (dealer directories, prescription strategies, audit methodology, catalog of commonly reusable materials, etc.). Pilot associates were introduced to these tools and had the opportunity, during the pilot operations, to provide feedback and suggestions for improvement. Although each operation was followed up by one of the project's partners, other partners were mobilized as required.

The sample of pilot associates includes organizations with a wide range of profiles: private and public project owners, construction companies, architectural firms and design offices. They come from the different regions of the project.

REALIZATION AND REPORTING PROCESS



Fleet management

ROTOR'S TAKE

For an organization like Rotor, taking on the coordination of a project like FCRBE was not straightforward. Initially, we would have liked a more robust and better-organized organization with a larger cash flow than ours to take on the role of lead partner. Since none of our prospective partners wanted to do so, and because we were determined to make this project happen, we decided to step up. We equipped ourselves to meet the requirements associated with this type of funding, especially in terms of administrative and financial management. Once the project was confirmed, we were able to hire more experienced collaborators to help us gain expertise in these areas.

The funding mechanisms of such a project (where expenses are reimbursed based on receipts) put significant pressure on the cash flow of small organizations. During the project, we often used the metaphor of a fleet of ships. Some partners are like sturdy clippers. They are large vessels with deep holds and can sail for several months without needing to set foot on land. Other partners are more like small corvettes. Their tonnage is limited, and these vessels need to be refloated regularly.

The fact that a small corvette like Rotor took on the role of lead partner posed numerous challenges, but it also had positive effects. It instilled a form of rigor and regularity in financial reporting and monitoring. Given its composition, our fleet could not afford to miss the deadline for submitting a financial report. This also allowed for a certain proximity

PITFALLS

between administrative matters and project development. This provided the project with a degree of adaptability and flexibility that may be less prevalent when these issues are handled in separate silos.

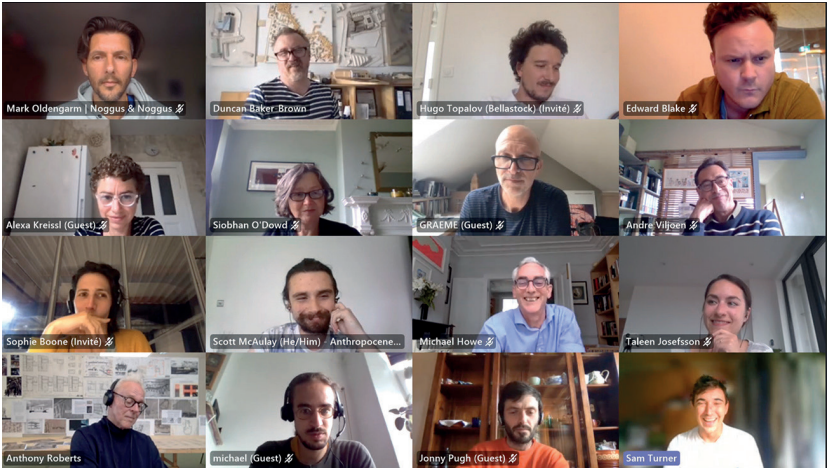
One of the biggest challenges in this project was managing the diversity of backgrounds among the partners – but it was also one of the main strengths of this project. On a daily basis, it was not always easy to understand each other, not only due to the respective languages of each partner but also because of sometimes quite different viewpoints on the subject. The widespread shift to video conferencing certainly didn't help facilitate communication... In this context, the experience of being the lead partner sometimes resembles that of a conductor (but in an orchestra where everyone plays a slightly different style of music...), who must ensure some coherence to the whole.

Over the years, many different people have been involved in the project. From one meeting to another, new faces appeared. Some made very occasional contributions to the project, while others were involved for a longer period. In the end, very few people followed it from the very beginning to the end. As the lead partner, this situation requires some attention, particularly to ensure that each new person can integrate smoothly into a process that is already well underway and into the various tools that have been developed along the way. One of the challenges for the most recent arrivals was to take ownership of all the project deliverables already produced. In exchange, the project also benefited from a constant influx of new ideas, new perspectives, and new approaches.

One of our greatest fears when starting the project was that the framework would take up more space than the content, that administrative requirements would overshadow the actual development of the project, or that indicator-driven logic would lead to a kind of inversion between means and ends. It is clear that these pitfalls were present at certain times. They seem to be inherent to the format of this type of large public grant. However, overall, it seems that we have

managed to avoid falling into these pitfalls. We have, it seems, managed to stay on course to achieve the objectives that mattered most to the various partners, but also, more broadly, to the reuse and construction sectors.

Excerpt from the Kick-off meeting of the project, February 1, 2019, in Brussels.



The project partners have adapted to the particular context of the covid-19 pandemic, but always in good spirits!

Study trip organised in Rennes ^{FR} in June 2023. Meetings and presentation of the project between project owners, sponsors and players in the field of reuse.



The project lasted **5** years

11
partners
together

5 different
countries
Belgium, France,
United Kingdom,
Luxembourg
and the
Netherlands

2
online
directories
produced

1 000
approved
dealers
in 5 countries

37
pilot
operations
and live tests
were carried
out in the
5 countries

88
actors in the
construction industry
were supported
as part of pilot
operations to adopt
new methods to
promote the recovery
and reuse of materials

9 innovative solutions
for managing material resources
more efficiently through reuse
and recovery strategies :

1
online catalogue
of reusable materials
with 36 detailed
fact sheets

1
label certifying
the origin of reused
materials

5
strategies
for integrating reuse
objectives into public
procurement and
large-scale projects

1
method for carrying
out inventories
and diagnoses
of reusable materials
prior to demolition
work

1 method for establishing, monitoring
and communicating quantitative targets
for reuse in the context of public
procurement contracts

During pilot operations carried out between 2018 and 2023 in new development and construction projects:

2 309 TONS

of materials were recovered

321 TONS

of materials were reused

As some of the operations will continue beyond the duration of the project, it is anticipated that other batches of materials will be recovered and/or reused. In total, if all the pilot operations are completed as planned:

8 782 TONS

of materials will be recovered for reuse (thus avoiding the production of as much waste)

19 238 TONS

of materials will be reused

The materials recovered and/or reused during the pilot operations include:

4 017 TONS

of bricks

1 095 TONS

of kerbs

500 TONS

of cut stone

201 TONS

of office equipment and interior fittings

63 TONS

of tiles

21 TONS

of radiators

19 TONS

of wooden framework

6 TONS

of steel structures

4 TONS

of electricity meters

3 TONS

of sanitary equipment

The mobile exhibition was presented at **10** events in **4** different countries.

9

videos were produced during the project, and are available on the project's [Youtube channel](#)

3,1k

views on the first video of the English version of the Youtube channel

400

participants in the webinar organised in September 2023 on insurance and reuse issues

50

press articles

4

academic publications

on the project since 2018

78

932

subscribers on [LinkedIn](#) since the creation of the project account and 292 new subscribers in 2023

1 290

people attended the round table organised at the end of the *Depot live Show* with materials dealers

11 849

emails exchanged in the Lead Partner's inbox in connection with the project since 2018

18

steering committees bringing together the project partners, and numerous meetings, events and inter-partner workshops

600

business cards exchanged

6 949

occurrences of the term reuse in all downloadable deliverables from the project website

79

What
has changed

five years
later?

To conclude, let's take a step back and examine the developments that have marked the reuse sector during the five years of the FCRBE project. Attempting an exhaustive list would be futile, but several trends can be identified.

First and foremost, it's essential to avoid romanticizing this period: most of the challenges that were present at the beginning of the project still exist in relatively similar terms today. There is still a long way to go before reuse practices become widespread.

Nevertheless, progress has been made in this direction. Firstly, there is no denying that a culture of reuse has solidified in Europe. Knowledge has increased, accompanied by a growing willingness to take action. Among the many remaining obstacles, cultural resistance is probably the most potent. Understanding the challenges posed by reuse is an essential prerequisite for taking action, often requiring individuals and organizations to overcome preconceptions about second-hand materials and be willing to change their habits.

Against the backdrop of this progressive cultural shift, structural and conjunctural crises have emerged, highlighting the need to better control supply chains and reshore

certain production activities. This has underscored a previously underexplored virtue of reuse: its potential to enhance the resilience of regions.

Whether structural or cyclical, the reasons to seriously develop reuse are multiplying. To put it simply, it is now less about convincing people of the benefits of reuse and more about studying the conditions for its widespread implementation. To this end, initiatives have multiplied at all levels.

At the local level, numerous networks have been established, bringing together economic actors (material salvagers, architects, businesses, engineering firms, associations) and institutional entities (cities, environmental agencies, schools, and universities). These networks are growing in intensity, diversity, and visibility. They allow for resource sharing (tools, expertise, directories of actors, monitoring of developments, etc.), facilitate meetings, and foster partnerships. They also enable the development of operational reuse strategies tailored to the local territory (heritage, construction cultures) and the specificity of its actors (geographic distribution, number and capacity of reuse actors, public sector support). Locally, it's not uncommon to see

organizations specializing in reuse emerging, playing the role of "facilitators" within these networks. Naturally, these dynamics are accompanied by a growing number of exemplary construction projects that integrate recovery and reuse practices, becoming increasingly ambitious and inspiring local references.

In parallel, many businesses engaged in recovery and reuse have emerged. The evolution in the number of businesses listed in the Opalis.eu directory confirms this trend. Notably, there has been a rise in businesses setting up operations close to urban centers, near construction sites, despite the challenges related to land access. Moreover, numerous experiments continue to expand the range of recovered materials, including materials from the second half of the 20th century that were less frequently reused in the past. Training programs dedicated to the reuse industry are supporting the development of these sectors. More modestly, large construction companies have also shown an interest in the subject.

Over the past five years, local and regional government administrations have also evolved. It is now rare to find clients who have not included reuse in their agendas. In addition to becoming

more widespread, project requirements are better formulated with ambitious goals in mind.

At the national level, regulations have been evolving favorably as well. In France, a new energy regulation that significantly promotes the use of reused materials in new projects came into effect in 2022, followed by a second law mandating resource assessments before demolition in 2023. In Luxembourg, various national strategies encourage reuse and the circular economy in general. In Belgium, support mechanisms for adopting circular practices on construction sites and service offerings are multiplying in all three regions, particularly through calls for projects focused on "zero waste" and the "circular economy."

It's worth noting the creation of a group of reuse actors in France who have come together to collectively promote their interests: the SPREC. Could these forms of cooperation be expanded on a larger scale to establish a European reuse sector? It's a possibility. The FCRBE project provided a space for meetings and discussions on these issues.

Finally, at the European level, many other projects have approached reuse from different and complementary angles to FCRBE. Among them:

- The CHARM project ²⁰¹⁸⁻²⁰²² focused on more circular asset management strategies in the social housing sector.
- The Digital Deconstruction project ²⁰¹⁹⁻²⁰²³ addressed the topic through the development of digital tools (3D scanning, BIM, material and building databases, blockchain).
- The RECREAT project ²⁰²¹⁻²⁰²⁵, currently ongoing, focuses on the reuse of precast concrete.
- The LIFE WASTE 2BUILD project ²⁰²¹⁻²⁰²⁶, also ongoing, aims to develop new circular construction and public works sectors in the Toulouse region of France.

It's also worth mentioning the European Union's adoption of the European green taxonomy in 2020. It is currently discussing proposals to make reuse one of the conditions for receiving tax benefits in the context of investments in construction and renovation projects. This is something to watch for.

In addition to all these initiatives, there is a growing and context-specific literature on reuse.

This brief retrospective overview clearly shows positive developments that bode well for reuse, provided that sustained and joint efforts are maintained. The FCRBE project,

in its own measure, can proudly claim to have contributed fully to these efforts. Its impact can be appreciated not only through the results achieved today but also over time by the future growth of the seeds it has planted.

Archives

THE 'REUSE TOOLKIT'

A collection of tools and methods to implement reclamation and reuse for contracting authorities, building developers, architects and other building professionals.

L'inventaire réemploi, Un guide pour l'identification du potentiel de réemploi des produits de construction avant la démolition ^{FR}
Décembre 2022

Stratégies de prescription, Intégrer le réemploi dans les projets de grande échelle et les marchés publics ^{FR}
Février 2022

Méthode des objectifs de réemploi, Fixer, suivre et rapporter sur les taux de récupération et de réemploi dans les projets de construction. Une approche commune ^{FR}
Septembre 2023

REUSE FOR CONSTRUCTION CONTRACTORS

A collection of introductory documents targeting specialised construction trades.

Practical guides for specialised trades of the construction industry : general contractors, interior finishers, Woodworkers, roofers, demolishers and dismantlers, infrastructure companies ^{EN}
Septembre 2023

Guides pratiques pour les métiers spécialisés de la construction : entreprises générales, entreprise de finition, métiers du bois, couvreurs, démolisseurs, entreprises d'infrastructure ^{FR}
Septembre 2023

Praktische gidsen voor gespecialiseerde beroepen in de bouwsector : algemene aannemers, Afwerkingsbedrijven, Beroepen uit de houtsector, Dakdekkers, Sloop- en afbraakbedrijven, Bouwbedrijven gespecialiseerd in infrastructuur ^{NL}
Septembre 2023

Een inventaris voor hergebruik, FCRBE. Training programme on reclamation audits for demolition contractors
Octobre 2022

REUSE AND INSURANCE

A collection of case studies on how to insure reused building elements in construction.

Good practices in terms of insurance for reused building materials ^{EN}
Septembre 2023

Les bonnes pratiques en matière d'assurance et de réemploi de matériaux de construction : les enseignements de 11 études de cas ^{FR}
Live Test : reports on 4 operations using reuse targets ^{EN}

Webinaire réemploi et assurances : retours d'expérience et synthèse des travaux. ^{FR}

THE 'TRULY RECLAIMED' LABEL

A label to attest the origin of reclaimed building elements as well as other aspects.

FCRBE, Yours Truly Reclaimed - The new label for authentic reclaimed products
Décembre 2021

Yours Truly Reclaimed, the report
Décembre 2021

POLICY BRIEF

How to stimulate a reuse-friendly context through public action. A roadmap and a state-of-play for public authorities.

FCRBE, A roadmap to foster reuse practices in the construction sector: A collection of inspiring actions for public authorities and policy makers who wish to encourage the reuse of building materials in their area ^{EN}
Novembre 2021

Une feuille de route pour encourager le réemploi dans le secteur de la construction : un recueil d'actions inspirantes pour les autorités publiques ^{FR}
Novembre 2022

Een stappenplan ter bevordering van hergebruikpraktijken in de bouwsector: een verzameling inspirerende acties voor overheden ^{NL}
Novembre 2022

Review of existing demolition tools, policies and resources
Septembre 2019

FCRBE, A statistical survey of the reclamation trade in Ireland, the UK, France, Belgium and the Netherlands
Décembre 2021

Methodology for measuring and extrapolating reclamation stockholdings
Décembre 2021

STATISTICAL SURVEY OF THE RECLAMATION TRADE

A social and economic analysis of the profile of salvage and reclamation dealers in NWE (Belgium, France, Ireland, Netherlands and United Kingdom), and a method to pursue this effort in the future.

FCRBE, Reuse in Green Building Frameworks
Novembre 2021

Reuse in Environmental Impact Assessment tools
Novembre 2021

DIGITAL TOOLS FOR REUSE

FCRBE investigated how digital tools can help conduct reclamation audits. The outcomes are summarised in a report and a series of four articles.

FCRBE, Digital Tools Report (full report), linking reuse and contemporary trends in the construction industry

Digital Tools Report, Articles.
Available in NL

1. « Automatische inventarisatie van interieurelementen in gebouwen met kunstmatige intelligentie »
2. « Hergebruik van gebouwelementen stimuleren met snel te maken digitale bouwmodellen »
3. « Snelle automatische tellingen van elementen met potentieel voor hergebruik »
4. « Versneld gebouwinventarisaties maken met 360-gradenfoto's en kunstmatige intelligentie. »

FUTUREUSE BOOKLETS

7 short introductions to the world of reuse. To get a state of play on frequently asked questions.

FCRBE, FutuREuse: 7 short introductions to the world of reuse ^{EN}
Novembre 2021

1. « The environmental impact of reuse in the construction sector »
2. « Evaluating the technical performance of reclaimed building materials »
3. « Material Surface Treatments for commonly reclaimed building elements »
4. « Product or waste? Criteria for reuse »
5. « How to build a Roadmap. The do's and don'ts of reuse in the construction sector »
6. « Understanding Urban Stocks »

7. « Fashion for reclamation »

FutuREuse: 7 courtes introductions au monde du réemploi ^{FR}
Novembre 2021

1. « L'impact environnemental du réemploi dans le secteur de la construction »

2. « Évaluer la performance technique des matériaux de construction de réemploi »

3. « Entre patine et peau neuve. Les traitements de surface des matériaux de réemploi »

4. « Produit ou déchet ? Critères pour le réemploi »

5. « Construire une feuille de route : Stratégie pour encourager le réemploi dans le secteur de la construction »

6. « La ville comme réserve de matériaux. Comprendre les études de gisement urbain »

7. « Réemploi is the new black. Comment les matériaux de réemploi ont investi les boutiques de haute-couture »

FutuREuse: 7 korte inleidingen in de wereld van hergebruik ^{NL}

1. « Het milieu impact van hergebruik in de bouw sector »

2. « Beoordeling van de technische prestaties van hergebruikmaterialen »

3. « Oppervlaktebehandelingen van materialen Voor courant hergebruikte bouwelementen »

4. « Product of afval? Status van hergebruikmaterialen »

5. « Een stappenplan opstellen. Strategie ter bevordering van hergebruik in de bouwsector »

6. « De stad als materiaal-reserve. Een blik op de studie van stedelijke materiaalstromen »

7. « Hergebruik in de mode. Hoe hergebruikte materialen hun weg hebben gevonden naar haute-couture boetieks »

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The FCRBE project has given rise to many citations and references in the press, appearing in both general public newspapers and specialised journals. Here comes the extended list. Persons marked with a * are from organisations of the FCRBE partnership.

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SOME FCRBE EVENTS

1^{er} février 2019 : Kick-off meeting, Brussels

11-12 février 2019 : FCRBE team meet CHARM, Eindhoven

24 avril 2019 : Workshop with reuse readers, Grimbergen

11 juin 2019 : FCRBE at The London Circular Economy Week, Brighton

19 septembre 2019 : 3 workshops in Brussels: reuse in academic education, inventory and prescription, Brussels

7 novembre au 22 décembre 2019 : « Life under a cherry tree » exhibition and guided visits, Brussels

14 février 2020 : FCRBE team meet CHARM, Westerlo

1 octobre 2020 : Workshop in Brussels on the pre-demolition audit, Brussels

10 au 26 mai 2021 : Depot Live Show(s), a two-weeks online event dedicated to reclaimed materials businesses in NWE, Paris

25 mai au 10 juin 2021 : Mobile exhibition in Paris

24 juin 2021 : Reuse roadmap, first workshop, Online

2 au 13 août 2021 : Digital School of Re-construction, Brighton

15 au 30 septembre 2021 : Mobile exhibition in Brussels

16-17 novembre 2021 : FCRBE Final Event, Brussels

8-9 juin 2023 : Study trip in Rennes

20 juin 2023 : Study trip in Utrecht

VIDEOS

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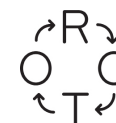
· All the project owners, architects, construction companies and materials retailers who have contributed to the pilot operations carried out as part of the FCRBE project and who, thanks to their invaluable feedback from the field, have helped to improve the approaches proposed.

· All the associated partners of the FCRBE project, who have made themselves available to take part in working meetings, provide references or simply answer specific questions.

· All the organisations that took part in the various working sessions.

· All the people and organisations who agreed to have their images and projects used in the deliverables as examples and illustrations.

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So what does it look like?

FCRBE

Facilitating the Circulation of Reclaimed Building Elements