

INSURANCE AND REUSE

LEARNING FROM CASE STUDIES AND PERSPECTIVES



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Foreword

The content of this summary comes from several sources:

- Working meetings involving BELLASTOCK, CSTB and ROTOR.
- Three workshops aiming to consult the practices of various groups of stakeholders involved in the act of construction: technical controllers, insurers and contractors. During the meetings, they shared their experiences and stated their expectations in terms of insurance and reuse.
- Eleven case studies covering three of the four partner countries: Belgium, France, and the Netherlands. However, given that the project team working on this deliverable is mainly comprised of French members, projects taking place in France were prioritised. Only two of the eleven cases of the panel are linked to Belgium and to the Netherlands.¹

Before presenting the learnings from the case studies, this summary describes the context of insurance and reuse, and attempts to list all of the works that aim to describe the performance of reclaimed materials.

¹The case studies are presented separately on the website of the FCRBE project (<https://vb.nweurope.eu/fcrbe>). Each case follows a relatively similar structure. The context, the chronology of the projects, the origin of the projects or of the activities of the companies involved, are presented. Then, the process for controlling technical-insurance risks is examined and the conclusion presents the good practices related to insurance.

Introduction: Reuse, a niche market

In the countries of the European Union, CO₂ emissions linked to the construction sector decreased by 35% between 2005 and 2020 resulting from the regulatory changes linked to the energy efficiency of new and existing buildings (European Environment Agency, 2022). Despite this progress, the objectives set for 2030 and after may not be achieved without advancing renovation policies and integrating products and materials that are more environmentally friendly. This latter action also addresses other issues. Indeed, natural resources are being depleted, requiring adopting practices that reduce the consumption of raw materials. At the same time, it has become essential to reduce the environmental impact linked to the extraction of these raw materials and to the energy required for manufacturing materials, by encouraging an extension of material service life. For this, integrating secondary raw materials coming from the recycling of materials as well as reused materials, are substantial levers.

However, the market for reuse remains marginal in the building sector since the quantity of construction elements reused after first application amounts only to 1% (FCRBE, 2018). This situation is the result of a lack of organised value chains, but also from the frequent absence of a recognised requalification process which would lead to securing practices, increasing the reliability of the information delivered to the market and as such reassuring the stakeholders in a construction/renovation project. The absence of a process which certifies the performance of most of the product and material categories for reuse constitutes a major barrier in terms of insurance and an obstacle to reuse.

Construction insurance and reuse

Objectives and characteristics of construction insurance in Belgium, France, and the Netherlands

The ELIOS report (CEA and CSTB, 2010) which strived to describe the national construction insurance systems within the European Union, showed that insurance mechanisms differed greatly from one country to another, but the ultimate purpose of the legal systems and the objectives pursued coincided.

In these three countries, systems have been set up to protect the client (in particular, the household owners) and oblige those responsible for construction, in particular architects and contractors, to obtain professional insurance which makes it possible to cover the damages affecting the structures after they have been delivered. In all three countries, the duration of coverage is ten years.

Since 2018 in Belgium, the architects, design offices, and contractors are obliged to take out a 10-year liability insurance policy for residential projects only. This insurance policy is limited to claims that endanger the solidity, stability, and leak-tightness of the housing unit. Moreover, since 2019, the law requires intellectual professions (architects, etc.) to have civil liability insurance.

In France, this obligation of 10-year insurance for contractors, architects, design offices, exists since 1978 (Spinetta law). It covers all types of construction. Coverage for damage extends beyond stability and solidity of the structure and incorporates unsuitability for use.

In the Netherlands, it is the contract drawn up between the parties that specifies the responsibilities of the contractor. In the U.A.V (Uniforme Administratieve Voowraarden voor de unitvoering van werken) contracts, which are the most common, contractors are liable for ten years. The contracts cover the claims that jeopardise the stability of the building and include unsuitability for use.

The French system is also based on mandatory insurance for the client ("structural defects insurance") which leads to rapid compensation of the "*owner and subsequent owners of the structure for damage for a 10-year period*" (Ajaccio, 2016). In the Netherlands, most of the municipalities have made this insurance mandatory in the residential sector so that households are protected.

In Belgium and in France, the provisions pertaining to the liability of the stakeholders in construction, are the result of the application of legal texts. In the Netherlands, contracts are used quasi-systematically. In case of a dispute, the parties involved favour arbitration rather than a resolution provided by a Court of law.

The distinction between common and uncommon techniques

The main concern is the insurance of the products and the methods implemented during the act of construction. Insurance agreements have been set up in order to allow for a risk analysis, know the products and methods and evaluate the degree of risk tolerated by the insurers. These are contractual clauses that specify the common and uncommon techniques. Indeed, the risk of a malfunction is higher for new products than for proven products, which are controlled essentially by the stakeholders in the construction site.

Common techniques concern "*techniques that have extensive convincing feedback*" (Roch-Pautet, 2023). As such, they are included in the general conditions of insurance contracts. For example, they encompass product standards, calculation standards (Eurocode), implementation standards (NF DTU), certain professional rules, etc. In this framework, it is important to comply with the area for use mentioned in the documents (in a DTU for example where it is written: "*this document applies to buildings containing premises with low or average hygrometry*", the presence of hygrometry will render the technique unsuitable).

Uncommon techniques concern specific cases that generate higher risks of claims due to more limited feedback. In insurance contracts, they are therefore subject to special subscription conditions. Insuring an uncommon technique remains possible when the technique has an acceptable hazard. Initially, the insured must declare this risk to the insurer. In a second step, the insurer will examine the risk based on several criteria (Lemerre, 2023):

- The technical justifications of the product or of the technique: they assist the insurer in defining the hazard that they will have to bear.
- The activity, the qualifications (training) of the contractor.
- The financial/legal stake: if the financial amounts concerning compensation for the claim remain low and ultimately have little impact, the risk is more tolerable.

If the risk is proven at the end of the insurer's analysis, using the uncommon technique can give rise to an additional premium.

Reuse of materials and insurance approach

Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 concerning waste defines reuse as "*any operation through which products or components that are not waste are used again for the same purpose for which they were conceived*".

In France, reuse is distinguished from repurposing which concerns "*any operation through which substances, materials or products that have become waste are used again*." (Article L541-1-1 of the French Environmental Code).

For any insurer, reuse is problematic for two reasons. On the one hand, it modifies the traditional line of responsibility of a construction project and on the other hand, it leaves open uncertainty on the project since the technical characteristics of the reclaimed² material are to be defined:

- When new materials are implemented in a project, it is the construction company that is responsible for its works. The manufacturer however is responsible for the material that they sell. Reuse changes the situation since the reclaimed material coming from a deconstructed structure is no longer the manufacturer's responsibility.
- The technical characteristics of reclaimed material and in particular its fitness for use in a new structure are a priori unknown. It is therefore suitable to requalify the material and to demonstrate its fitness for use. This entails providing the proof that guarantees the performance of the material. This implies gathering information on the past use of the material and on the process that was followed between dismantling and the new implementation. This covers deconstruction, transport, reconditioning and storage. The technical qualification obtained after this analysis will determine the use that can be made of the reconditioned material.

The information concerning the materials that will be reused is often limited. This does not offer the possibility to best assess the hazards that could arise by integrating them in a new project. As indicated by SECO and Common Ground (2023), with reuse, we move into a "grey zone" where the information that circulates too often lacks in reliability. This leads both contractors and insurers to make less optimal decisions.

This situation is a problem for any insurer, in that it does not allow for good risk control.

²The term "material" has been used generically by convention. It covers materials, products, and equipment.

Identifying risks

Insurers, who lack feedback to assess the risks linked to reuse of certain materials, can only judge on a case-by-case basis according to the circumstances of the projects. In a project that involves reuse, they will conduct a risk analysis before deciding. The presence of certain elements can contribute to reducing risk taking³:

- The organisation of the project and the presence of a client assistant: this point is key since the reuse client assistant is supposed to improve the organisation of the project and raise the awareness of the stakeholders concerning the reuse challenges in the project. The client assistant, however, will have to be correctly covered and not undertake new tasks that are out of the scope of skills declared to the insurance.
- The role of the design team and the way in which it prescribes reuse: the more the specifications oversee reuse, the more accurately the questions of the insurer will be answered and the more the risks will be controlled.
- The insurance of the contractors involved: Contractors who integrate reclaimed materials worry about paying higher insurance premiums and having more restrictive contractual conditions imposed upon them. They thus prefer not to contact their insurance provider to declare the integration of reclaimed materials. As most insurance contracts taken out by companies stipulate that the warranty is limited to common techniques, they risk incurring their 10-year liability for the quality and performance of the materials without this being mentioned in the warranties provided by their insurance contracts. To limit these risks, insurers of clients tend to require nominative insurance certificates from the contractors who install reclaimed materials.
- The product category concerned by reuse: those that affect the safety of persons will be examined with more attention. The same applies for materials of which the impact on the method of construction is substantial. Indeed, they make controlling costs difficult in case of a claim. For these reasons, the structural elements or those linked to the risk of fire will require more traceability documents than finishing works elements.
- The context: the same reclaimed material will not be subject to the same requirements if it is installed in an establishment servicing the public (ERP), in a building subjected to the French Labour Code or in a high-rise building.

³ A major portion of the elements in this section comes from a workshop conducted in March 2023 in line with the FCRBE project and with the main insurers in construction, an insurance broker, and Agence Qualité Construction.

Risk management

Once the risks have been identified, they have to be managed. Five methods for managing risks seem possible for projects that incorporate reclaimed materials (SECO and Common Ground, 2023):

1. The risks are higher, but they are accepted and borne by one or more members of the project team.
2. The risks are avoided through recourse to various actions:
 - Compensatory measures are taken: for example, oversizing a structural element of a construction).
 - Additional tests are conducted to better qualify the reclaimed material.
 - Visual inspections on the construction site are conducted by the contractor.
 - Sufficient documentation is gathered (File of executed works, product sheets, etc.).
 - The materials are downgraded: for example, a fire door is reused as a standard door.
3. The risks are high, but a solution is found to be able to bear them: additional insurance is taken out or the conditions for use are revised downwards (the case for example with single glazing windows initially installed on a fixed frame of a classroom, reused in an external passageway without any objective of thermal performance).
4. The risks are negotiated with the broker or insurance company. This can lead to a change in the format of the insurance policy (for example, the amount of the premiums changes but the purpose of the coverage remains identical).
5. The risks are high and should preferably be avoided. In this case, no recourse is given to reuse.

These various options can be combined. In these scenarios, it is suitable to know when to alert the insurer and when it is necessary to initiate additional procedures.

Towards an assessment of the performance of reclaimed materials

In order to overcome the risks associated with the lack of information that make it possible to assess the performance of reuse products and materials, and to accompany stakeholders in a construction/renovation project while encouraging insurance recognition, methodological guides have been developed or are currently being drafted:

- During the first phase of the European Interreg FCRBE project, 36 material sheets intended for designers, specifiers and construction project teams, were drafted with favouring reuse in mind. These sheets cover five major construction product and material categories (landscaping and paving, the structural works and the building envelope, woodwork, interior finishings, equipment). Each sheet provides details on the main characteristics of the reclaimed materials and describes the rules and the process to follow from identification of the reclaimed building materials (evaluation of the material's reuse potential, dismantling, storage, treatment/cleaning, transport, and delivery). The sheets also specify the characteristics and the fitness for use of the materials ("*the ability of a building material or product to meet the requirements of a given use*", FCRBE, 2021, p.6) and conclude with indications concerning the availability, prices and the carbon footprint of the materials under consideration.
- In the framework of the works of the Fondation Bâtiment Energie (FBE), eight guides concerning as many product categories (bricks, industrialised frames, attached natural stone façade coverings, exterior woodwork, steel frameworks, parquets, suspended ceilings and steel roofs, terracotta bricks), have been drafted to propose a shared operating procedure for assessing performance for the purpose of reuse. Three criteria were covered for each category:
 1. "*The various elements of performance that have to be justified for fitness for future use.*"
 2. "*The methods of proof that can be used to assess each one of these elements of performance.*"
 3. "*The precautions to be complied with from selective dismantling to reinstallation.*"
- In the framework of the REPAR 2 project (Benoit and BELLASTOCK, 2018), BELLASTOCK and CSTB, with the contributions of LERM and BTP Consultants, proposed two technical reference standards on the reuse of concrete products (load-bearing and non-load-bearing wall, floor covering).
- The SPIROU (*Securing Innovative Reuse Practices via a Unified Offer*) project aims, among other things, to develop methodological guides/characterisation protocols for 10 product categories: door units, ceramic sanitary fittings, carpet tiles, wooden

industrial frameworks, water radiators, electrical cabinets and modular protection, lights, lime mortar bricks, mineral cladding, and rigid galvanised ventilation ducts.

- The French water tightness association (CSFE) is currently drafting practical sheets for gravel, slabs on studs and metal cladding elements.
- The European project LIFE "Waste2Build"⁴ which aims to promote circular purchasing policies and structure the value chains in construction that are working on developing reuse, will also offer methodological guides for the reuse of the three most common product categories in the metropolitan area of Toulouse.

These guides/material sheets that are already written or that are being drafted, aim to lift certain insurance barriers concerning reuse. Some of the recommendations or processes described in the FCRBE and FBE guides have already been implemented in projects.

Also, other stakeholders (contractors, clients, design teams, etc.) have moved into reuse even before these guides were written. Insurance questions were raised and solutions were found.

The objective of the eleven case studies drafted as part of this Interreg FCRBE project was to highlight the actions and operational procedures implemented to increase the reliability of the information concerning reclaimed materials, guarantee the performance of these materials and, in the end, secure the approval of insurers.

⁴ <https://metropole.toulouse.fr/institutions-et-territoires/emploi-et-vie-economique/projets-europeens/life-waste2build>

The main findings of the eleven case studies

The three categories of cases

The examined cases can be divided into three categories:

1. Cases focusing on stakeholders, most often generalist or specialised resellers who have sought to systematise the process linked to the dismantling, reconditioning, and storing for several product categories. All of these reclamation dealers have developed an online sales platform for their products, which includes:
 - Raised floor panels.
 - Carpet tiles.
 - Cast-iron radiators.
 - Metal framework structures and locks.
 - Sanitary fittings.
2. Rehabilitation/construction projects that have given rise to reuse in more or less substantial proportions raising different levels of insurance-related concerns. Each case can be distinguished from another by its organisational and contractual aspects that influenced reuse (for example, the presence of a reuse batch, the implementation of a maintenance contract, the launching of a design and build contract). These cases concern:
 - The rehabilitation of a former industrial site at Colombelles near Caen.
 - The rehabilitation of historical building in Paris.
 - The renovation of an office building in Champs-sur-Marne.
 - The design, construction, and maintenance of a garden house in Amsterdam.
3. Two cases focused on innovative services related to reuse:
 - A certificate that provides information on the quality of the process followed during the various phases which precede actual reuse: dismantling, reconditioning and the storage of materials. It aims, via a third party, to increase the reliability of the information that circulates between the stakeholders of the project and as such secure reuse.
 - A preventive maintenance contract for restored buildings proposed by a contractor specialising in the restoration of old heritage buildings is established in order to ensure that the technical choices based on new and reuse materials are durable over time.

The process of controlling technical-insurance risks

This analysis of the process, which extends from selective dismantling to reimplementation, is the focus of most of the case studies. It entailed understanding the means that the stakeholders have implemented to :

- Secure and systematise the practices during all the steps, from dismantling materials, to transport, reconditioning, storage, and reintegration.
- Justify the performance and fitness for use of these reused materials.

The process developed by reclamation dealers

A systematic approach from dismantling to reimplementation

The reclamation dealers involved in the case studies sought to systematise the process, from dismantling to reintegration and follow a quality approach similar to that developed by manufacturers of new products. However, not all resellers participate in dismantling. When they do not intervene in this phase, they verify the materials upon receipt at their reconditioning workshops:

- The complete activity of re-qualifying raised floor panels installed by MOBIUS is based on a process that covers the activities of diagnosis, dismantling, collection, conditioning, transport, and delivery. Reconditioning has even been industrialised now with the development of a mechanised assembly line.
- The process for reusing metal structures developed by General Metal Edition is equally rigorous. Upstream, expertise is carried out on the deconstruction project in order to ensure that the careful dismantling is economically and environmentally appropriate. Then, the installer carpenter is involved in all the steps: careful dismantling, transport, storage, shaping.
- The process of reconditioning cast-iron radiators also has its milestones of unavoidable verification steps, which include diagnosis, dismantling and storage before transport to the reconditioning workshop. This systematic approach is followed by all the specialised companies working in the cast-iron radiator resale market.
- Carpet tiles that have been dismantled are also sent to ORAK's reconditioning platform, where they are cleaned and tested.
- The condition of the sanitary fittings is examined as they arrive on Cycle-Up's new reconditioning platform, then various chemical treatments intended to clean them are applied. Before they are packaged to be protected during transport, inspections are conducted in order to ensure that the functionalities correspond to market expectations.

In each one of these cases, the company's expertise and know-how are essential, especially in the visual diagnosis phases, before initiating the reconditioning process. It is indeed crucial to check the quality of the dismantled materials as soon as they arrive on

the reconditioning platform in order to judge the technical and economic feasibility of reconditioning.

Tests to guarantee performance

During the reconditioning process, tests are conducted to guarantee some of the performance of the reused materials and demonstrate their fitness for use:

- Mechanical load and deflection tests and reaction to fire tests are conducted in the laboratory on a given sample in order to check in particular the mechanical resistance of the raised floor panels.
- Pressure and tightness tests are conducted on the radiators at the end of the reconditioning chain in order to eliminate defective products.
- Carpet tiles intended for ERP (Establishments servicing the public), for common areas of offices and places of living are subject to a new fire report.
- At the end of the cleaning of the sanitary fittings, an inspection is carried out to guarantee the quality of the product and to ensure that the functionalities correspond to market expectations.

Technical sheets for better information traceability

The information linked to the process that was followed between dismantling and the new implementation is most often gathered in documents intended to maintain information traceability. The potential customers of a platform can thus better assess the quality of the reclaimed materials sold:

- Technical sheets describing the composition of the raised floor panels, their performance (reaction to fire, impact noise with or without carpet, transverse electrical resistance, weight) and their mechanical characteristics are developed and available on the online sales platform.
- The metal structures sold on General Metal Edition's platform are accompanied by a detailed sheet that gives their characteristics (weight, dimensions, volumes, price, etc.). For the more complex elements, files in DWG format are published. The DWG files are produced and guaranteed by the construction company.
- A manufacturer's technical sheet is developed for resale of carpet tiles. They are also marked with a QR code that states the technical characteristics of the reused product and are recorded in a database.
- The main characteristics of the sanitary fittings are presented on Cycle Up's platform but above all a confidence indicator ranging from 1 to 3 has been created to inform the purchaser of the quality of the products.

The process developed by the stakeholders of renovation/construction projects

Specialised reclamation dealers follow a quality approach characterised by applying a process that is identical for all the materials of the same category. The quantities and the characteristics of the salvaged materials make it possible to initiate this systematic approach for all high-quality reclaimed materials.

In the case of a renovation/construction project, the client and design team can decide to call upon these reclamation dealers. However, they can also opt for a specific organisation for the material categories for which the reconditioning value chains are not yet developed or seek to encourage same-site reuse or reclaimed materials that have been identified in neighbouring deconstruction projects.

In the four projects examined, the stakeholders have set up ad-hoc approaches that addressed the constraints of their project. These projects fit different organisational patterns. Yet, the stakeholders gave great importance to the process ranging from dismantling to reimplementation and in three cases, they strived to compile dossiers proving the quality of the reclaimed materials.

- The reuse in the Grande Halle de Colombelles rehabilitation project was structured around a reuse batch responsible for ensuring the quality of the process ranging from locating the reclaimed materials, to dismantling, transport, reconditioning and storage. A performance verification methodology, validated by all the stakeholders, was established and adapted for each material. Additional tests were sometimes conducted in order to ensure regulatory performance of products (for example, the case of tests on thermal conductivity, resistance of insulation to humidity). Finally, a reuse file intended for insurers allowed for the documentation of all the information concerning the reclaimed materials and provided good information traceability.
- The rehabilitation of Maison des Canaux also led to the unfolding of a process aimed at securing each one of the steps ranging from dismantling to reintegration. The materials were characterised precisely as early as the diagnosis phase. Methodologies for dismantling, storage and transport were defined. The reintegration was validated by the client, the design team and the technical controller.
- The same-site reuse conducted during the renovation of a CSTB office building in Champs-sur-Marne was also based on a precise methodology developed by the client assistant. The process covered searching for material outlets, careful dismantling, the prescriptions to be incorporated into the works contracts, storage, and reconditioning. A methodology for evaluating the performance to be justified has been developed for each reclaimed material concerned by reuse in order to guarantee the maintaining of the performance of same-site reuse. The objective was to gather information linked to the past conditions of use and the performance tests conducted.

- The construction of the Tree House in Amsterdam, based on more than 90% of reclaimed materials, relied on the architecture team that simultaneously carried out the procurement of reclaimed materials, design, transport and construction. This approach allowed for good information traceability.

The attestation intended to provide information on the quality of the reuse process

The "Safety in Circularity" attestation set up by SECO is part of the same logic as that developed by the reclamation dealers and stakeholders of the studied projects. The objective is to assess the quality of the process, which includes deconstruction, reconditioning and storage of the materials and to increase the reliability of the information delivered to the stakeholders of a project, and especially for insurers. This entails an assessment of the professionals involved in one or even several of the steps that come before reintegration or reinstallation.

Reuse and the contractors specialised in restoring old heritage buildings

Companies in charge of restoring old heritage buildings make use of reclaimed materials on a regular basis. Intervening on a historical building designed using materials manufactured before the development of the industrial era explains this situation for the most part. It seems that lessons can be drawn from their experience. The case with the TMH company may not be generalised, but it illustrates certain common practices in this area of restoration. TMH commonly reuses materials, but its approach is less systematic and codified than that of reclamation dealers. It is based on traditional know-how (know-how that is recognised by insurers) and knowledge that is often tacit. The reclaimed materials, such as tiles, come from the original construction site and internal stocks. For same-site reuse, it is the skilled labour that judges the fitness for use of the tiles based on their know-how and experience. Knowledge of the material combined with the presence of the construction company over the entire renovation process allows for risk control. Despite the precautions taken, this contractor deems that these works must be supplemented on a regular basis by a maintenance contract in order to guarantee the durability of the structures (primarily the structure and roof).

Actions implemented to limit risks

The reality of the construction site has led stakeholders to develop certain actions to better manage the risks associated with material reuse:

- The implementation of compensatory measures: in the Maison des Canaux project, the reuse of structural metal elements led to oversizing the constructions. At Colombelles, it was possible to reuse fire doors because smoke detectors were added.
- Less demanding conditions for use: the prescriptions for current regulations (thermal, electrical) often set aside the products coming from prior periods. These products are dominant in deconstructed buildings. In this context, choosing zones for reuse that are not subject to or less subject to current regulations is a possible option. For example, lighting fixtures used in the offices were placed in technical rooms in the case of the renovation of the office building in Champs-sur-Marne. It is therefore the future use of the material that must guide the conduct and scope of the tests. Not all of the performance aspects need to be tested. However, the process that ranges from dismantling to reintegration has to be closely tracked in order to provide the information to the purchasers and to the installation contractors.
- Implementation of maintenance and servicing contracts: in order to foster the durability of the structure over time and limit the risks, it is possible to offer clients maintenance and servicing contracts based on a regular verification of the structural elements of the building and the enclosed and covered areas (tiles and slates, for example). This is the case with the TMH company, which has created a new service provision based on an on-site diagnosis and two preventive interventions per year, combined with cleaning. Likewise, in Amsterdam, a maintenance and servicing contract was offered for the Tree House, a construction built with 95% reclaimed materials. The purpose of this type of contractual approach is to ensure that the building ages well and to avoid disorders.

Relations with the insurers

Insurers consider that it is imperative that they be contacted upstream of the project and that too often, they are contacted late although they are partners in the project. The upstream intervention of insurance companies provides more fluidity to the project. According to insurers, the absence of shared information forms the first barrier to reuse⁵.

In the case of the renovation of CSTB's office building in Champs-sur-Marne, the client indicated to their property damage insurance provider that same-site reuse would be implemented in the building while specifying the adopted process and the concerned product categories. They then required that the selected contractors concerned by reuse provide nominative insurance certificates stating that same-site reuse, linked to certain product categories, was provided for in the project. A similar approach was used in the Maison des Canaux where the City of Paris made sure that the artisan's CCTP (special technical specifications) included the use of reused metal beams and requested a nominative insurance certificate from the latter for this project. In each case, the contractors turned to their insurers and easily obtained their certificate without any extra premium.

The reclamation dealers (MOBIUS, ORAK, GME and Cycle Up) also quickly contacted their insurer in order to better supervise the sales process. This led them, in most cases, to adopt quasi-industrial reconditioning approaches and to improve the quality of the information pertaining to the resold materials. The creation of a technical sheet for reclaimed materials contributes to this information traceability and encourages the control of risks linked to reclaimed materials.

⁵This observation is also valid for the building technical controller who also has to be informed right from the start of the project.

Outlook

The various cases examined indicate that some value chains are becoming structured and that the stakeholders are becoming aware of the importance of information traceability.

In order to assess the fitness for use of the materials, the stakeholders have defined and have delimited each step of the process, ranging from careful dismantling to reintegration. The creation of an attestation aimed at increasing the reliability of the information related to deconstruction, reconditioning and storage, indicates that such an approach seems unavoidable in order to allow for the requalification of the materials. In each case, the followed path is almost identical. The points of divergences concern the implemented means at each step, means that are specific to each material category considered.

Although the path to take in order to secure reuse is known, the development of new value chains is also largely based on the stakeholders' capacity to exploit the reclaimed materials in substantial quantities. This increases the profitability of the implementation of a reconditioning chain and makes reclaimed materials competitive compared to new materials. The logistics organisation revolving around deconstruction activities, which form the origin of the reclaimed materials and supply material collection points, conditions the development of the value chains. It seems important to recognise the technicality linked to deconstruction activities and to qualify them similar to what the SECO technical control office offers with its "Safety in Circularity" attestation.

The success of material reuse and the lifting of certain insurance barriers are based on a change in the practices of the stakeholders in a construction project:

- **The manufacturers** are notably absent from thought given to reuse. In a scenario with new materials, the industrial company is responsible in case of defects with the materials sold. This responsibility disappears when the materials are reused. The carpet tile market is an exception to this. The reconditioning process developed by the servicing and maintenance company ORAK is recognised by various industrial stakeholders (Interface, Milliken) who undertake to extend their product warranty for carpet tiles treated by this provider. For example, a new Interface carpet, with a 15-year warranty and used for 5 years, will benefit from another manufacturer's 10-year warranty if it is reconditioned by ORAK. The manufacturer's involvement in this market bears witness to the shift from a linear model to a circular one. However, such change is still relatively rare among manufacturers who favour developing the market for new products.
- **The design team** plays a central role in selecting materials. In three out of the four projects analysed, the design team displayed great flexibility by adapting their project to the characteristics of the reclaimed materials that were sourced and available in sufficient quality and quantities. This approach, which secures practices and a priori decreases the risk of future hazards, must be further disseminated within design teams.

- **The contractors** who are getting involved in reuse hesitate to spontaneously inform their insurers that they are using reclaimed materials. Although the reuse of materials, which today is considered as an uncommon technique by insurers, is not provided for in their contract. Hence, they risk incurring their ten-year liability without adequate coverage. Furthermore, this approach is detrimental in the long term for reuse. Hiding recourse to reuse is depriving oneself of good or bad feedback that contributes to the insurers' statistical databases and allows them to judge the number of disorders actually linked to reuse. Closer collaboration between contractors and their insurers is highly desirable given that feedback has shown that reuse has not given rise to any extra premiums when it is part of a rigorous and controlled process that covers dismantling to reintegration.
- **Maintenance companies** also have a key role to play. Establishing maintenance contracts following renovation/construction actions contributes to securing reuse. This path, without a doubt, must be explored further. Indeed, the stakeholders in charge of servicing and maintaining buildings are among the best qualified and in the best position to characterise the performance of products (new or reuse) used in buildings and assess their conditions of ageing.
- **The client** is the party commissioning the construction project which is intended to satisfy a need linked to their main activity. As such, the client defines the program, sets down the financial envelope, ensures financing, chooses the process according to which the structure will be carried out and concludes the contracts that concern the studies, executions of the works and the operation of the buildings. The involvement of the client in favour of reuse must not stop with the prescriptions in the specifications for construction/renovation projects. From an insurance standpoint, it seems essential that they take all measures to secure reuse and foster information traceability during the project. This entails regular dialogue with the insurer and the contractors that are responsible for reinstallation of reused products. The awareness of the latter must be raised as to insurance concerns. Moreover, even before the completion of the works, this entails a declared willingness to strengthen maintenance activities in order to monitor the long-term performance of the parts of the building integrating reused elements. In the Netherlands, clients allocate reasonable financial means to maintaining their assets. This is less the case in other countries, such as France, where operating maintenance budgets are often subject to budget adjustments, and therefore are frequently called into question in particular for public management. Ensuring the performance of reclaimed materials by strengthening the servicing and maintenance activities therefore seems possible only if clients accept to finance these activities and allocate operating maintenance budgets.

References

Ajaccio F.-X, 2016, *L'assurance construction*, Guide Pratique Droit & Construction, CSTB.

Benoit J., BELLASTOCK, 2018, *REPAR #2, Le réemploi, passerelle entre architecture et industrie*, 548 pages, ADEME.

CEA, CSTB, 2010, *Liability and insurance regimes in the construction sector: national schemes and guidelines to stimulate innovation and sustainability – Special report on liability and insurance regimes in 27 EU Member States*, 30 April 2010. [Access page](#)

European Environment Agency, 2022, *Greenhouse gas emissions from energy use in buildings in Europe*, [Access page](#)

European Parliament, 2008, Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives, , *Official Journal of the European Union*, 22 November 2008.

Fondation Bâtiment Energie, 2020, *Méthodologie de diagnostic et d'évaluation des performances pour le réemploi des produits de construction*, Atelier FBE Economie Circulaire des Bâtiments.

FCRBE, 2021, « Fiches réemploi – Fiche introductive – Introduction générale », *Interreg FCRBE, Reuse Toolkit*, [Access page](#)

Lemerre T., 2023, « Retour d'expérience : assurabilité et gestion des sinistres » *Webinaire L'assurabilité des nouveaux modes constructifs*, Batylab, 2 mars 2023, [Access page](#)

Roch-Pautet, 2023, « Le principe des techniques courantes / non courantes », *Webinaire L'assurabilité des nouveaux modes constructifs*, Batylab, 2 mars 2023, [Access page](#)

SECO, Common Ground, *Assurabilité Construction Circulaire*, Study Trip du 26 avril 2023, Bruxelles, FCRBE.