

The reuse of cast-iron radiators

Structure the reconditioning process in order to increase the reliability of reuse and provide a performance guarantee similar to new products



Image source: Opalis.eu

- **Context:** there are no cast-iron radiator manufacturing plants in Europe anymore. New radiators are imported from Turkey and China and are of lower quality than the old ones that are currently operating in existing buildings. The reconditioning of these radiators not only offers environmental benefits but also economic advantages by preserving a stock of high-quality products and a local expertise on the market. The regular presence of modular and high-quality cast-iron radiators in all buildings that are to be renovated has generated a market for their reuse with guarantees equivalent to new products.
- **The challenge:** provide a performance guarantee of reused products through a reconditioning process.
- **Reclaimed materials:** cast-iron radiators

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Stakeholders involved in the cast-iron radiator market

- Cast-iron radiators came out during the second half of the 19th century. Between 1910 and 1960, they were mass produced before production moved towards steel sheet radiators at the beginning of the 1960's. Today, no production plants are still active in Europe. The market is divided between reused products that are recovered, reconditioned and reinstalled by specialised reconditioning companies, and new products manufactured by industrial producers that are most often located in Turkey or in China. The unique aspect of reused radiators is that they are often of better quality than new ones, which makes their reuse market a highly dynamic activity.
- In France, several small and medium enterprises have specialised in this cast-iron radiator reconditioning activity, which largely relies on the quality of the logistics, from dismantling to reinstallation. These companies provide a warranty ranging from 5 to 20 years on radiators that have been refurbished. In case of a malfunction, some provide replacement with a similar radiator. They also provide insurance coverage for collateral damages related to leakage under a 10-year warranty.
- Several reuse stakeholders, particularly general resellers operating a digital platform, have built a partnership with at least one of these specialised companies to ensure that radiators offered for resale come with warranties.



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The process of controlling technical-insurance risks

1/ Careful dismantling and logistics

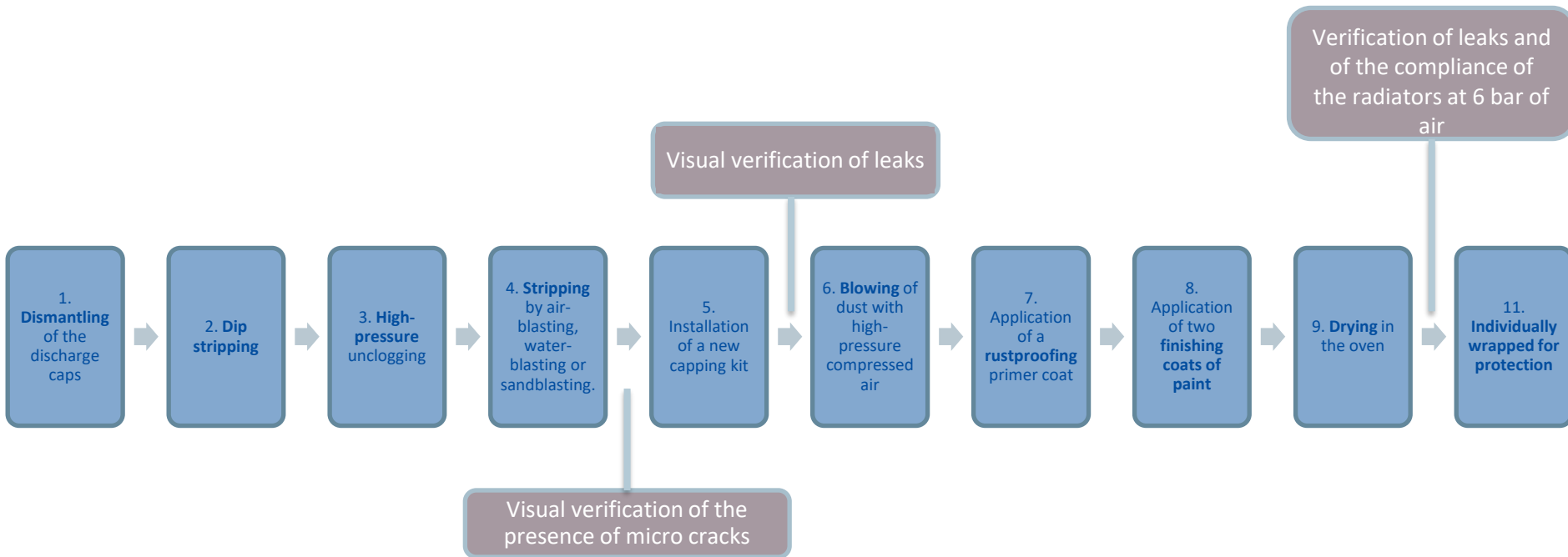
- **Construction site visit:**
 - Objectives: analyse the condition of radiators and identify possible degradation, evaluate the logistics needed on site (forklifts, trucks to provide transport to the reconditioning workshops, etc.). This visit before dismantling is not mandatory but can be carried out if significant quantities are available.
 - Radiators that have excessive degradation are not reconditioned and are resold for cast iron.
- **Dismantling:**
 - For large-size project sites, the radiators are removed in the site clearing phase.
 - Dismantling must be done carefully in order to avoid damaging the product, in particular by dropping it and even cutting it.
 - Due to the weight of the radiators, some companies responsible of removal may cut the radiators in order to be able to facilitate handling. According to the manager of Radiastyl, although this operation is possible since cast-iron radiators are formed from an assembly of elements, it is not always suitable for all radiators and has to be carried out by qualified personnel. This expertise is rarely available on among the dismantling companies (see inset).
 - Reconditioning companies are rarely involved in dismantling. Instead, they typically transport the product from the construction site after it has been dismantled.
- **Transport**
 - Radiators are most often transported in an upright in trucks. As cast-iron is highly fragile and does not offer much resistance to impact, precautions must be taken during transport and delivery in order to limit dents and scratches.

Reuse of radiators in the Caserne de Reully rehabilitation project

Although 360 cast-iron radiators had been inventoried, not all were reused due to their initial condition and, more important, due to uncareful dismantling. As such, only 25% of those that could be reused, were reconditioned (50 radiators). The difference is the result of poor storage conditions after dismantling. The radiators were stored on the deconstruction site without protection, they were thus subjected to dust coming from lead removal works. Moreover, several radiators were inappropriately cut, rendering them unsuitable for reuse.

Source: ROTOR and Sixième continent, 2022, *Re-use in the Caserne de Reully project 2013 - 2020*.

2/ Sequenced reconditioning as part of a quality process



3/ Product verification process

In order to guarantee the reconditioned radiators, companies proceed with a series of visual or technical verifications:

- **A first visual examination** is carried out on the radiator before reconditioning in the workshop in order to ensure that the equipment received does not need to be repaired before being reconditioned. As this repair work is expensive, it is not always accepted by the customers. For example, in the DECAPFONTE company, one technician verifies about 30 radiators a day.
- **Verification of leaks after the second stripping:** after the unclogging (step 3 of the reconditioning process), the inside of the elements that form the radiator is wet. The second stripping by airblasting, waterblasting or sandblasting allows microcracks to be seen with the unaided eye that would otherwise be invisible.
- **Visual verification of the paint during dust blowing:** before the application of a coat of paint (steps 7 and 8), while blowing dust with compressed air, the painter carries out another visual inspection under strong light (useful for painting later).
- **Verification before packaging:** a 20-minute pressure test is conducted before packaging in order to eliminate the products whose defects were not detected during the previous three inspections (upon receipt, during air-blasting and after dust blowing).

This quality process ensures that if the radiators are subsequently transported, handled and installed correctly at their destination site, **their performances are equivalent to new products.**

Example of verifications conducted by Décapfonte and the percentages for fault detection on reconditioned radiators

Verification step	Detection of reconditioned radiator faults
Before stripping	37% of the leaks diagnosed
After the second stripping	60% of cracks detected
During dust blowing	1 to 2% anomalies
Before packaging	Less than 1% of defective radiators are detected following this pressurisation

Assessment

- Reconditioning radiators is possible only for equipment that has good initial quality. This highlights the importance of the phases that include diagnosis, removal and storage before transport to the reconditioning workshop.
- The reuse of cast-iron radiators does not seem to carry any major risk when the reconditioning process is compliant.
- The reconditioning process, marked by its essential verification steps, resembles an industrial production process. It enables company that are specialised in this activity to offer a 10-year warranty covering radiator leaks and paint flaking.
- Reconditioning companies operate as suppliers of new products. They handle delivery but not installation. Installation is typically the responsibility of heating professionals, who may not always favor reconditioned products (they are heavier than new radiators on the market and they offer less profit margins).
- This 10-year warranty excludes breakage after the radiator is handed to the customer and leaks resulting from improper installation (the responsibility then lies with either the customer or the heating professional).

Authors: Frédéric BOUGRAIN et Capucine GAUTIER (CSTB)
Reviewers: Victor MEESTERS (ROTOR), Hugo TOPALOV (Bellastock)
Acknowledgment : Jean-Claude BOISSY (Radiastyl)
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