

Pre-demolition audit

Basic principles

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Who owns demolition waste?



In principle, **the owner of the building or infrastructure** owns the materials and components that are becoming waste. He is typically responsible for proper management and will receive any profit from the sale, unless the ownership is transferred to someone else (e.g. demolition contractor).

The owners of the building materials and components **must know what they are responsible for**. This is true especially before demolition or major renovation, when the materials and components may be turned into waste and when the hazardous and dangerous substances will need to be taken care of. Therefore, the owner orders the **pre-demolition audit**.



Did you know that

... waste has a legal status in EU and cannot be directly used in product manufacturing? Waste must fulfil End-of-Waste criteria¹⁾ before it can be used again.

... not all materials and components are automatically turned into waste? Many building components (e.g. doors, radiators) can be dismantled and reused without becoming waste. This possibility might be interesting also for larger dismountable components such as structural beams and panels.

¹⁾ JRC (2008), End of Waste Criteria, Scientific and Technical Report (<http://susproc.jrc.ec.europa.eu/>)

What is a pre-demolition audit?



A pre-demolition audit is an activity **organized by the owner** of the building or infrastructure resulting in the **inventory of materials and components** arising from the future demolition or renovation projects, and their management and recovery options²⁾.

A pre-demolition audit consists of two parts³⁾:

- a) **Identification of materials and components** (both hazardous and non-hazardous) that will be generated during the demolition or refurbishment. It defines both the nature and the estimated quantity of the materials streams that will come free after demolition (high risk or low risk materials)
- b) **Additional information** about which materials should if possible be separated at the source, which materials can/cannot be reused or recycled, and how. It may also suggest solutions for the waste management plan etc.



The audit can be **compulsory** (e.g. because of the legal obligation to report materials and components containing hazardous and dangerous substances) or **voluntary** (e.g. for those seeking BREEAM accreditation⁴⁾).

Did you know that

... pre-demolition audits are compulsory or at least a common practice in most EU countries? According to a study by Deloitte⁵⁾, more than half of the Member States have established rules for pre-demolition auditing.

... a good quality pre-demolition audit can increase the value of the building? According to the EU Waste Audit Guidelines, the quality can be guaranteed by either certified independent auditors and/or material traceability system.

²⁾ European Commission (2017), EU Guidelines for the Waste Audits (<https://ec.europa.eu/growth/>)

³⁾ European Commission (2016), EU Construction and Demolition Waste Protocol (<https://ec.europa.eu/growth/>)

⁴⁾ BRE SmartWaste, Pre-Demolition and Pre-Refurbishment Audits (<https://smartwaste.co.uk/>)

⁵⁾ Deloitte (2017), Resource Efficient Use of Mixed Wastes: Improving management of construction and demolition waste (<http://ec.europa.eu/environment/waste/>)

What to do with hazardous materials or products?



It is important that such materials and products are **identified prior to the demolition work**. Materials and products containing hazardous substances and electrical equipment should be removed first, and then handled and managed separately in a safe manner.

Limitations of the field survey related to access to places have to be clearly mentioned in the pre-demolition audit and waste management plan, because parts of buildings that are not visible, covered or are otherwise unreachable may contain hazardous materials.



The auditor is required to have a good **knowledge of materials and products, building practices and legal requirements** for the correct assessment of potentially hazardous materials. For example, special attention is must be paid to asbestos and persistent organic pollutants like tar.



How is the audit organized?



A pre-demolition audit is a **collaborative effort** of the owner, the (qualified) pre-demolition auditing expert and in some cases, the contractor that will be responsible for the management of generated waste and reusable materials and components.

In the first step, the **presence of hazardous substances** in materials and components is checked. Reporting of some substances might be compulsory (e.g. asbestos), but it is in the interest of the owner to check all the possible hazardous substances to identify potential exposure of hazardous materials in connection to demolition work and to avoid future health or environmental damage.



Then the **inventory of building materials** and components is prepared. It is important to provide as accurate information as possible, especially for those materials and components that are planned to be recovered for reuse or recycling. Low quality of the provided information may lead to the claim from the contractor for the removal of unidentified hazardous waste and or incorrect quantities of hazardous waste.

According to the EU Waste Audit Guidelines²⁾, the audit consists of **five different activities**:

- a) Desk study (documentation research)
- b) Field survey (on-site visit with optional laboratory testing)
- c) Preparing the inventory (assessment of the collected data)
- d) Management recommendations
- e) Reporting



What is reported?



The first part of the pre-demolition audit report should contain all the available **basic information** about the building or infrastructure, its historic use, its owner, the auditor and the contractor. The sources of information, measurement and assessment methods are also listed in this part.

The **presence of hazardous substances** is reported as a “yes/no” checklist. It is essential that the compulsory substances are always listed even if not present. In some cases, additional information about the substance concentration can be provided in order to check the limits of the material hazardousness or recyclability.



The **potential waste materials** (hazardous and non-hazardous) are classified according to the EU List of Wastes⁶⁾ and their quantity is reported according to the EU Waste Measurement Protocol⁷⁾. Apart from the quantity, location, contamination and recoverability of the materials should be reported. Optionally it might be useful to inform about their expected value, environmental footprint and other performance indicators.

The last part of the report contains the summary of all **reusable components** and equipment that belongs to the building or infrastructure. If they still can become waste, the quantities of their materials must be also reported in the materials inventory.



Finally, it is strongly recommended to provide comprehensive **photo documentation** of the building and all the important details such as attachment points of different components, damage or material degradation.

⁶⁾ 2014/955/EU: Commission Decision of 18 December 2014 amending Decision 2000/532/EC on the list of waste <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32014D0955>

⁷⁾ Encord (2013), Construction Waste Measurement Protocol (<http://www.encord.org/>)

A few tips...

Industrial buildings



For industrial buildings it is important to know which activities have taken place, when and at which location(s) in the building. This determines to a large extent the type of installations that can be found and which substances were used or stored.

Hazardous materials



The most commonly present hazardous materials in construction works are asbestos, PCBs, mercury-containing fluorescent light bulbs/tubes, brominated flame retardants, tar, creosote, radioactive substances (e.g. in smoke detectors), mineral oil, impregnated wood containing arsenic, chromium and/or copper.

Asbestos



Asbestos has been widely used for several applications in the 20th century (e.g. plasterwork, flooring). Only professionals with the necessary training are able to recognize all these different applications.

Asbestos (2)



Make sure to evaluate the type of material (bound application or not?) and its state (damage, weathering) to plan the right safety measures during removal.

Reuse



Some building materials can be reused in new constructions. Reuse retains the maximal value of these materials. Some examples of materials that are often reused: clay pavers, cobblestones, clay bricks, wrought iron, cast iron.

Pricing



Include the pre-demolition inventory in the call for tenders. This allows demolition companies to make a more precise price offer.

Concrete



Up to 20–30% of natural aggregates for concrete production can be replaced by recycled concrete aggregates, on the condition that a clean concrete fraction is produced during the demolition phase. Some EU countries have developed national end-of-waste criteria for recycling of crushed concrete in road constructions.

PARADE - Best practices for Pre-demolition Audits ensuring high quality Raw materials



www.vtt.fi/sites/parade
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