Shaping a Circular Sustainable Future

Module 10

Deconstruction as an Element of a Building Life

Circular Economy in the Construction Industry

This project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 101033740
Summery

Within this module trainees will see deconstruction as a continuation of a building's life cycle. They will delve into different elements within the deconstruction phase such as Pre-demolition surveys, Urban mining and Designing for deconstruction. They will see the value in deconstruction and relate this to Multi-functional Green Roofs Facades and Interior Elements.
Objectives/Learning Outcomes

- 14 – Extract and reuse parts from end-of-life roofs, façades, or interior elements for use in new buildings
- 18 – Collect products and materials for reuse or recycling in roofs, façades or interior elements from the construction industry
- 59 – Compile demolition specifications for multifunctional green roofs, façades, and interior elements and provide them at final commissioning of the building
- 77 - Conduct post occupancy survey and analysis for building with multifunctional green roof, façades, or interior element
Content

• Pre-demolition survey
• Circular Deconstruction
• Urban mining
• Application for Multi-functional Green Roofs Facades and Interior Elements
Pre-demolition survey

When a building is to be demolished the (non-domestic) client (usually the property owner) has a duty to provide pre-demolition information to the designer and contractor. This will involve a pre-demolition investigation and survey.

Before any work commences, a full site investigation must be made by a competent person to determine the hazards and associated risks which may affect the demolition team and members of the community who may pass close to the demolition site.

Source: https://www.totaldemolition.co.uk/pre-demolition-survey/
The Purpose of Pre-demolition survey

The main purpose of a pre demolition survey is to -

• Map the services on site
• Determine if there are any hazardous materials on site
• Carry out a soil and foundations survey

Source: https://www.totaldemolition.co.uk/pre-demolition-survey/
Building Demolition Process

1. Survey the building
2. Remove hazardous materials
3. Prepare the demolition plan
4. Implement safety measures

Source: https://safetyculture.com/topics/building-demolition/
Pre-demolition survey for Circular Economy

Pre-Demolition surveys can be utilised for the circular economy by not only mapping out the three areas identified above but also looking at the materials within the building.

Fittings, furniture and appliances are often removed prior to the demolition process, however, other materials such as concrete, timber and steel can all be reused within the construction sector.
Circular Deconstruction
Circular Deconstruction

Circular Demolition is the demolition, dismantling, disassembly and removal of materials that are released becoming available again for high-value reuse in other projects. This makes circular demolition a vital link in the circular economy.

Source: https://www.metabolic.nl/publications/circular-demolition/
The Importance of Circular Demolition

Out of the 6,000,000 tons of materials released in the Netherlands in 2014 through demolition of residential and non-residential buildings, the majority was recycled (88%).

However, this material is mostly reused in a low-value form, such as filling under buildings or in civil and hydraulic engineering projects.

Only 0.2% was in fact reused at product-level. Low value recycling means that the value accrued during original manufacturing and assembly is lost.

Source: https://www.metabolic.nl/publications/circular-demolition/
This project has received funding from the European Union’s Horizon 2020 Research and Innovation programme under grant agreement No 101033740

Obstacles to Circular Demolition

The use of secondary materials is still insufficient for a number of reasons.

- The demand for secondary materials is still relatively limited
- The price of circular building materials is often higher than their linear alternatives
- The physical facilities for storage and reprocessing are not always adequate
- The quantity and quality of materials from demolition projects offered for reuse are still unsatisfactory.

Source: https://www.metabolic.nl/publications/circular-demolition/
Obstacles to Circular Demolition

In addition, there is still a lack of incentives or obligations for circular demolition, resulting in a market that has not yet fully embraced circular demolition. Take practical obstacles:

- There is no time devoted to planning for inventories and disassembly,
- and opportunities for repurposing materials are not yet clear enough for many demolition workers and builders.

It is vital to promote the demand for secondary materials from demolition in order to combat these issues.

Further, you have to align your reuse process with the deconstruction process. If material becomes available too soon you will have to store these materials. That often happens mostly outside, where they deteriorate.

Source: https://www.metabolic.nl/publications/circular-demolition/
Figure 1: Adapted from 'Circle Economy - Master Circular Business with the Value Hill (2016).'

Source: [https://www.metabolic.nl/publications/circular-demolition/](https://www.metabolic.nl/publications/circular-demolition/)

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101033740
Circular Demolition Process in 5 Steps

- The timely signaling of demolition projects and making details about them available;
- Making an inventory of products and materials;
- Valuing and prioritizing inventoried products and materials;
- Offering and repurposing;
- Disassembly of the products and materials.

Source: https://www.metabolic.nl/publications/circular-demolition/
Urban mining
What does urban mining mean?

Urban mining is the process of reclaiming raw materials from waste products sent to landfill. On a conceptual level, it looks towards the waste generated by cities and urban environments as a valuable resource, using anthropogenic stocks rather than geological to meet the demands of manufacturing.

Source: https://www.rts.com/blog/what-is-urban-mining/
What does urban mining mean?

It commonly refers to the recovery of metals from e-waste but has been used more generally for the recovery and monetization of any materials from any waste stream, including:

- **Construction and Demolition Waste**: the recovery of wood, paper, card, rubber, metals, and more.

- **Municipal Solid Waste**: General recovery which could include everything from redirecting metals and plastics to commercial composting for resale.

- **Tires**: Specifically, the recovery of rubber and metal from tires and other rubber products.

*Source:* [https://www.rts.com/blog/what-is-urban-mining/#:~:text=Urban%20mining%20is%20the%20process,meet%20the%20demands%20of%20manufacturing](https://www.rts.com/blog/what-is-urban-mining/#:~:text=Urban%20mining%20is%20the%20process,meet%20the%20demands%20of%20manufacturing)
This shows one example of how circular deconstruction may be carried out.

It must be ensured that regained materials do not end up in forgotten storage hubs. It is often better to align earlier with design and build processes where material will be needed, and coordinate in time.

Source: https://www.holcim.com/who-we-are/our-stories/what-is-urban-mining
Why is Urban Mining Useful

1. The age of cheap, abundant raw materials is over
2. Raw material recuperation from e-waste can be done increasingly cost-efficiently
3. In cities all over the world there are still millions of appliances waiting to be recovered
4. For some rare metals, urban mining is gradually becoming the only source
5. Urban mining avoids a substantial amount of pernicious effects on human beings and the environment
6. Classic mining alone cannot meet the rising demand for electrical and electronic appliances
7. The business community and investors are jumping on board the urban mining train

Application for Multi-functional Green Roofs Facades and Interior Elements
Walk the Line - The Scarcity and Creativity Studio - Ritoque, Chile

This project is located in Ritoque, Chile, in the site of the Open City, run by the Corporación Amereida and the School of Architecture and Design of the Catholic University of Valparaiso, which for fifty years has been constructing a town which now houses many of the school’s staff and contains a church, cemetery and many public spaces and facilities.

Source: https://www.archdaily.com/779712/walk-the-line-the-scarcity-and-creativity-studio
Walk the Line - The Scarcity and Creativity Studio - Ritoque, Chile

Walk the Line departed from a study of Le Corbusier’s ‘house for an artisan’ and consists of a small room in which to sleep and work and an elevated gangway for observation of the Pacific ocean and the nearby nature reserve.

Source: http://scs.aho.no/walk%20the%20line.htm

Source: https://architizer.com/projects/walk-the-line/
The Opportunity

The reason I selected this building as the example for deconstruction is due to the fact that this building would be relatively easy to identify in terms of what can be saved and reused from this building.

Take a few minutes to note down what can be reused and repurposed from this project.

Source: [http://scs.aho.no/walk%20the%20line.htm](http://scs.aho.no/walk%20the%20line.htm)
EXTRA READING/STUDY
EXTRA READING/STUDY

For Further Case Studies and Training Material Please Follow the Link Below

https://docs.google.com/spreadsheets/d/1DTte4Ph8pQ4lKzYG Ft2_S-d1Z_Rmd9- i/edit?usp=sharing&ouid=112148808974461842163&rtpof=true&sd=true
EXTRA READING/STUDY

Embodied Carbon

https://www.igbc.ie/what-is-embodied-carbon/
This project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 101033740