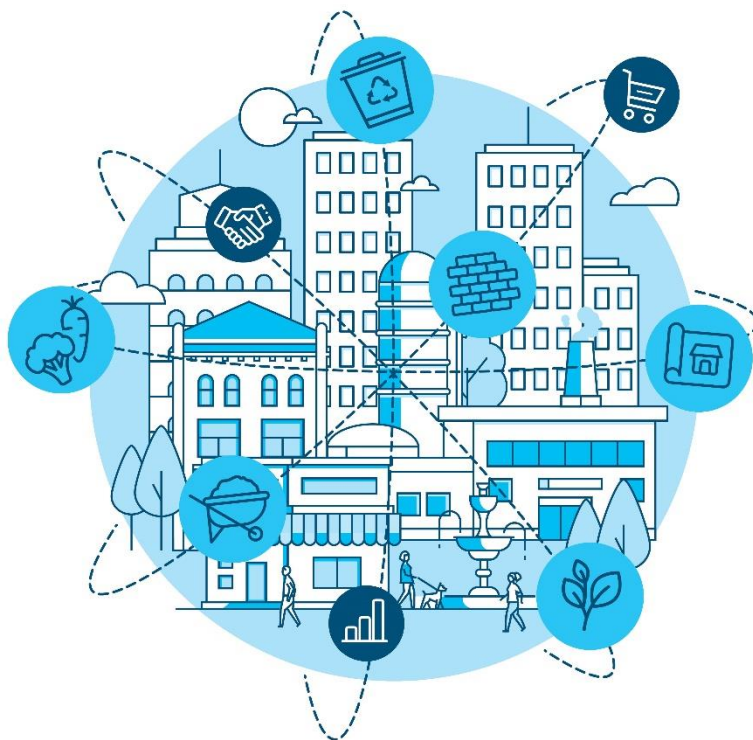




CDW Replication Package 6

Recycling concrete

Capital Region of Denmark | ICLEI Europe



Recycling concrete

Crushed concrete can replace stones and sand in new concrete. In many European countries the regulation allows for crushed concrete to replace 20% of the stone fraction and 10% of the sand fraction. In 2020, Denmark approved the special standard DS/EN 206 DK NA:2020, which allows for up to 100% of the stone and sand to be replaced with crushed concrete. The CityLoops demonstration actions in Høje-Taastrup and Roskilde helped push this development in Denmark.

This Replication Package describes how to replace up to 100% of the stones/coarse aggregate and up to 50% of the sand in new concrete with recycled concrete. It contains a guide describing the process, legal framework, barriers, and opportunities when recycling concrete; interviews with key actors; as well as business cases and descriptions of the activities in two demonstration projects demolishing buildings and crushing concrete for use in new constructions.

This replication package on Recycling concrete is part of a series of nine replication packages, developed by CityLoops. The replication packages address specific actions within the circular construction value chain and how they relate to the work done in CityLoops. The replication packages aim to give cities an in-depth overview of the main elements to consider during each specific step of a circular construction/demolition project. A list of all replication packages can be [found here](#).

Recommendations from lessons learnt

- If it is not possible to procure recycled concrete, the first step is to establish the value chain including the donor of concrete, the demolisher, the transformation actors and the new construction receiving the recycled concrete.
- Reflect on incoming flows as well as outgoing flows regarding concrete: for instance, where do you get the aggregates and for what should the concrete be used? Which recipes do you need?
- Recycling concrete the first time is labour intensive as it demands active management, but this will become less when it becomes a standard procedure.
- Close dialogue and coordination across the value chain: a key factor ensuring the success of both demonstration cases was the willingness of all value-chain actors to engage in close dialogue and coordination throughout the projects, looking to help each other solve the problems rather than placing costs and risk somewhere else.
- Early risk management: This was ensured by up-front dialogue concerning potential risks and how to manage them as well as efforts to clarify the type of documentation each partner required. Roskilde's demonstration action holds a particularly good example of this dialogue and risk management.
- The right expertise: The process behind the production of recycled concrete – including demolition, crushing, sieving and pile building – requires knowledge and attention. The

demonstration projects included actors with prior experience of recycling concrete in these steps of the process, but if this is not possible, it is important to build such experience by following the guidelines.

- Procurement as driver: To create strong business cases and mainstream the use of recycled concrete, it is necessary to increase the amount of recycled concrete procured. Both demonstration cases highlight the considerable opportunity public procurers have in driving this demand. In case that the National or European Standards are not covering the recycling wanted, additional risk may apply.
- Pay attention to meet the demands for End of Waste criteria.
- Support the development of a functioning recycled concrete flow, so you do not have to establish the value chain with donor concrete every time.
- Make sure you properly lay down the info about the concrete in the construction project for future reuse.
- CO₂-savings are much lower when recycling instead of reusing concrete, but the natural resource savings are important. However, you should not transport concrete waste for recycling more than 25 km – then there is no CO₂e gain.

CityLoops instruments

- **Guide: Recycling of concrete – from pilot project to a permanent change in practices:** The guide is aimed at public owners and describes the process, legal framework, pitfalls, and opportunities in Danish cases where the entire process of recycling concrete as aggregate for new concrete takes place on the same location. It includes examples of requirements for recycled concrete that can be directly incorporated into tendering material. The guide is [available here](#).
- **CO₂e calculator for 11 fractions of CDW:** The CO₂ calculator for concrete allows cities to estimate the potential CO₂-reductions in their specific project for “No circular actions”, “Local recycling” or “General recycling”. The calculator can be used when data on the amount of crushed concrete and the distances from the gravel pit, landfill, location for the recycling and the name of the concrete producer is available. The calculator targets 11 different fractions of CDW, including concrete. This instrument is [available here](#).

CityLoops demonstration experiences

- **Roskilde:** In Roskilde they have crushed and used dug-up concrete at the construction site to replace 100% of the coarse aggregate in the new concrete for the foundation of a parking house. Read about Roskilde’s [experience here](#). The business case for using recycled concrete had a positive outcome, saving approximately 50.000 Euro. The Roskilde business case is [described here](#).

- In Høje-Taastrup they used recycled concrete from the demolition of social housing blocks to substitute 100% of the coarse aggregate in the concrete for the foundation of the new City Hall. The concrete had to be driven away, stored, crushed and driven back to Høje-Taastrup. Read about Høje-Taastrup's [experience here](#).
The business case shows that the price for using recycled concrete in Høje-Taastrup was approximately the same as for new concrete. The Høje-Taastrup business case is [described here](#).
- Høje-Taastrup has conducted some interviews to explore the experiences of several actors involved in turning demolished building blocks into new concrete for the city hall in Høje-Taastrup. They share know-how on barriers, the current market for recycled concrete, the tendering process and other aspects worth considering when closing the loop for recycled concrete. Read the [summary of the interviews here](#).

CITYLOOPS

CityLoops is an EU-funded project focusing on construction and demolition waste (CDW), including soil, and bio-waste, where seven European cities are piloting solutions to be more circular.

Høje-Taastrup and Roskilde (Denmark), Mikkeli (Finland), Apeldoorn (the Netherlands), Bodø (Norway), Porto (Portugal) and Seville (Spain) are the seven cities implementing a series of demonstration actions on CDW and soil, and bio-waste, and developing and testing over 30 new tools and processes.

Alongside these, a sector-wide circularity assessment and an urban circularity assessment are to be carried out in each of the cities. The former, to optimise the demonstration activities, whereas the latter to enable cities to effectively integrate circularity into planning and decision making. Another two key aspects of CityLoops are stakeholder engagement and circular procurement.

CityLoops started in October 2019 and will run until September 2023.



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