Factsheet

Circular construction with recycled concrete

Recycled concrete: a key building block in circular design and construction

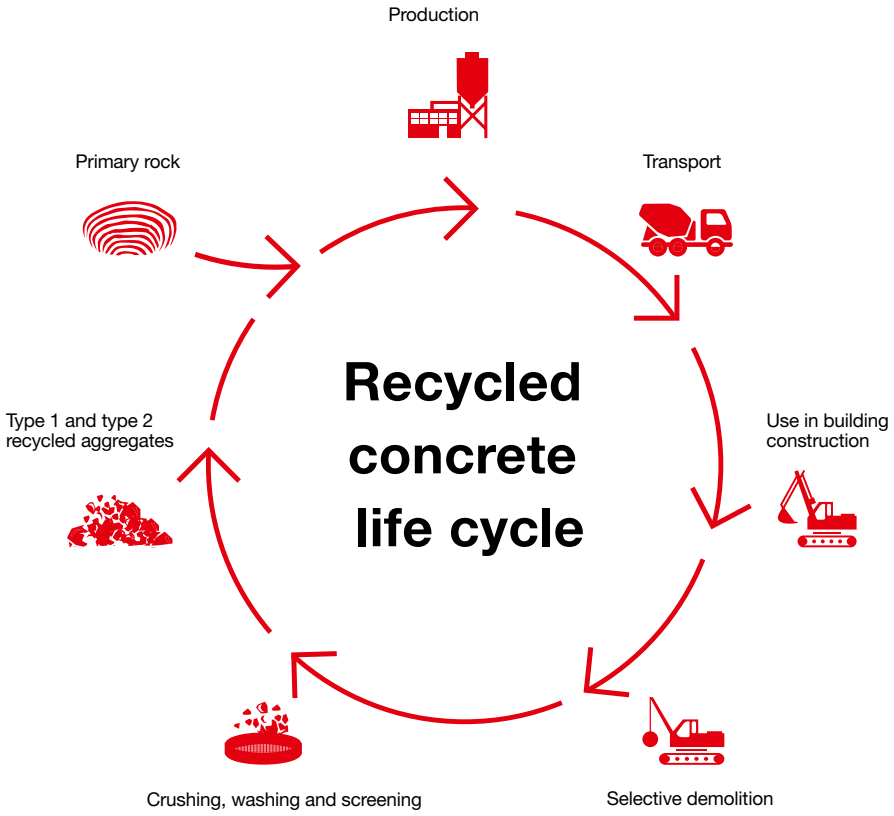
STRABAG and ZÜBLIN commit to resource-saving building materials

Recycled concrete is concrete that is produced with a significant proportion of recycled concrete aggregate. It is an important measure to help save resources and protect the environment. The production of recycled, resource-saving concrete involves the use of recycled construction aggregates, for example from concrete waste and building rubble, instead of standard raw materials such as gravel, sand and crushed rock.



Important step on the way to closed material cycles

Recycled concrete contributes to systematically reducing the consumption of previously heavily exploited primary resources. The use of recycled concrete in building construction is also a decisive step towards circular design and construction – ideally with closed material cycles. For the STRABAG Group and its German subsidiary ZÜBLIN, recycled concrete is a key building block for the resource-saving realisation of construction projects. The increased use of recycled building materials brings us one step closer to our goal of making the construction of tomorrow more sustainable and future-proof.





1 ZÜBLIN used 18,000 cubic meters of recycled concrete for the construction of the new Köln-Deutz high school and the adjacent office and sports complex.
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Short transport distances for increased environmental quality

The distance travelled is a key factor in the carbon footprint of recycled concrete. Shortening the distances between demolition, processing and reinstallation reduces the carbon footprint of resource-saving concrete. Short transport distances are therefore essential for the environmental quality of recycled concrete. The appropriate infrastructure exists primarily in large urban areas.

Use in building construction also possible for load-bearing structures

Recycled concrete offers considerable potential in building construction, where it can also be used for load-bearing components. Moreover, a significant proportion of the concrete types used in Germany are suitable for recycling as concrete aggregate. Their specific properties can be accounted for in the production process through technological adaptations. As a result, there are no restrictions with regard to exposed concrete qualities or the installation and processing of recycled concrete on the construction site.

The recycled aggregate should contain as high a proportion of crushed concrete as possible in order to ensure a sufficiently high compressive strength of the recycled concrete. There are different national specifications in this regard. In Germany, for example, two different types of recycled concrete aggregate are commonly used: crushed concrete aggregate (type 1) must consist of at least 90 per cent pure concrete rubble and may contain no more than 10 per cent from bricks or calcareous sandstone. In the case of building rubble aggregate (type 2), on the other hand, the masonry content may be up to 30 per cent.



Aggregate from the quarry (primary raw material)



Type 1 recycled concrete aggregate: crushed concrete



Type 2 recycled concrete aggregate: building rubble



2 New Construction on the Neckar: The resource-efficient construction of the new Esslingen District Office using recycled concrete was based on a circular construction concept. © Ed. Züblin AG / Niels Schubert

Construction waste: recycling vs. downcycling

A large part of mineral construction waste is already recycled for a variety of purposes, albeit predominantly at a lower quality level, in road construction, e.g. in unbound frost protection layers and base courses (downcycling). The circular use as an aggregate for recycled concrete in building construction (recycling) is still an exception in some countries, including Germany. However, the increasing number of pilot projects with recycled concrete that ZÜBLIN has recently implemented with various clients (e.g. Landratsamt Esslingen, Factory 56, Sindelfingen and a secondary school in Cologne Deutz), indicates a reversal of the trend.

Widespread use requires appropriate framework and parameters

The necessary prerequisites for the widespread use of recycled concrete include, in particular:

- a sufficiently large volume of construction waste
- regional processing capacities (supply is expected to grow with increasing demand)
- up-to-date standards that permit in practice what is also technically feasible
  – With the revision of the current DAfStb guidelines (DIN 1045-2:2023), the scope of applications for recycled concrete approved nationwide has been significantly expanded. Whilst recycled fine aggregates remain subject to restrictions on their use, the use of recycled concrete in civil engineering structures (bridges, tunnels, etc.) is no longer ruled out, unlike in the past. The permissible proportions of recycled aggregate in concrete depend on the concrete class, exposure conditions and the relevant technical regulations.

Based on its experience, the STRABAG Group advises its clients about the options for the increased use of recycled concrete on a selective and needs-oriented basis in order to promote the transition towards a circular construction economy.

Cover Factory 56, the carbon-neutral Mercedes-Benz production facility in Sindelfingen, was built by ZÜBLIN on a turnkey basis. The façade of the building consists of recycled concrete. © Mercedes-Benz Group AG / **3** Crushed concrete (type 1 recycled concrete aggregate) consists of at least 90 per cent pure concrete rubble and is a base material for the production of recycled concrete.



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