

Reuse of concrete granulate

Although concrete can almost entirely be composed of secondary raw materials, concrete granulate is rarely used in high percentages. This is partly due to the negative impact of cement stone residues in the new concrete mix. Fortunately, innovative recycling methods are significantly improving the quality of the granulate. In order to facilitate the use of this concrete granulate, the CROW-CUR Recommendation 127 has been established.

INNOVATIVE RECYCLING METHODS

The reused material, utilized in the extensive research by CROW-CUR, is obtained from two innovative recycling methods currently commercially available in the Dutch market. These methods use friction to re-separate the raw materials sand, gravel, and concrete fines.

CONCLUSIONS

- The development of compressive strength, as shown in the graph at the bottom right, and the elasticity modulus of granulate concrete are largely at the same level.
- The use of concrete granulate affects drying shrinkage. The impact on creep is significantly less.
- The lifespan of granulate concrete is comparable to traditional concrete.

Conclusion: With high percentages of high quality reused concrete granulate, the quality of the concrete is guaranteed. NEN-EN 1992-1-1 remains applicable.

APPLYING CONCRETE GRANULATE

Bases on the findings of CROW-CUR Recommendation 127, a method for calculating the quantity of granulate that can be used has been developed. In the case of sand replacement, the figure rises to a replacement percentage up to 60%, while for gravel replacement it can reach 100%.

The method is based on the correlation between water absorption and the quantity of cement stone present in the granulate. Consequently, when the amount of cement paste, and thus the absorption rate, is low, the amount of granulate that can be used is increased.

ENVIRONMENTAL BENEFITS

The reuse of old concrete in a high-quality manner results in reducing the use of scarce raw materials to a significant extent. This is in accordance with the objective of 100% high-quality reuse by 2030, as set out in the Concrete Agreement.

With the use of blast furnace cement, high-quality granulate, and rainwater, concrete can consist of up to 80% secondary material.

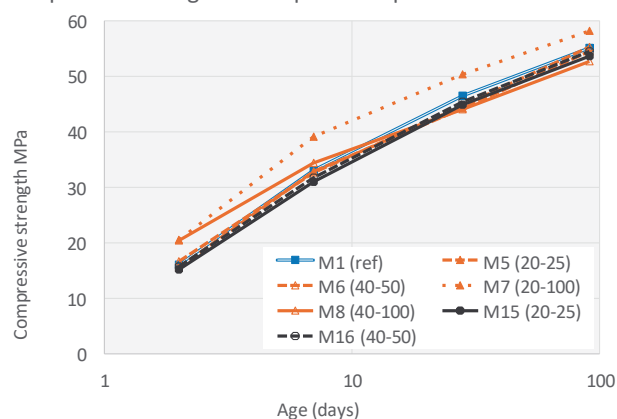
For more explanation or specific advice, please contact [Mark Verbaten](#).

Crushed concrete rubble



Powder, gravel, sand

Compressive strength development: replacement of fine + coarse



For the research of CROW-CUR Recommendation 127, 17 mixtures and one reference mixture were made (M1-M18). The numbers in parentheses refer to the percentages of coarse and fine aggregates replacement.



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