



Heijmans creates a circular concrete circle in Amsterdam

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The Concrete Agreement visits leaders from the concrete industry and concrete construction. This time it is Simone Bel present at Heijmans. She looks at the pouring of circular concrete at the new one underpass at the Contactweg in Amsterdam. This project attracts our attention because of the application of this innovative circular concrete mixture in a reinforced concrete construction element that separates the road from the bicycle path. Betonhuis works together with the Concrete Agreement to advance pioneering stories.

Simone Bel spoke with Marc Ottelé, materials specialist at Heijmans and assistant professor at TU Delft, and Adrie van der Burgt, adviser on Sustainability and Circularity of Heijmans. It soon becomes clear that both are driven to get the most out of it cabinet to become more sustainable step by step. They are fully committed to this innovation. It soon becomes clear that this project with circular concrete is special.

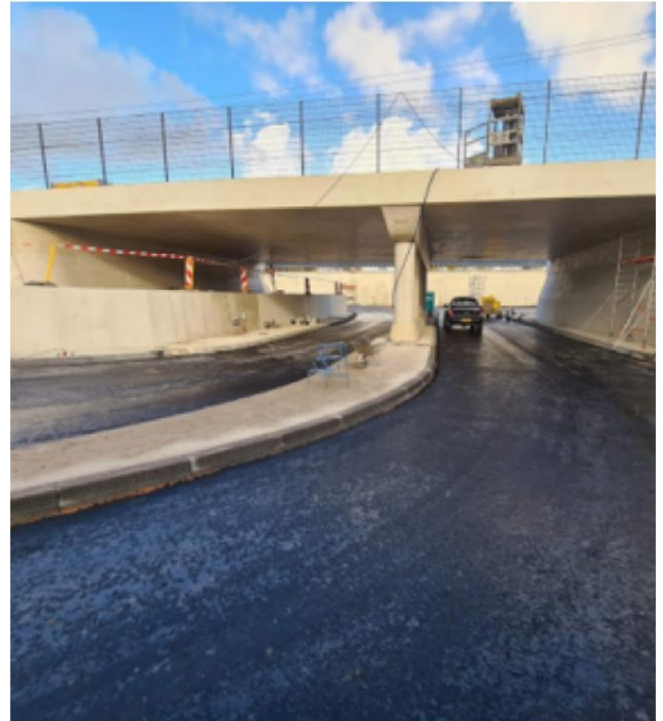
The secondary raw materials used come from the Buiksloterham project in Amsterdam, where Heijmans is preparing the industrial business park for housing.

A beautiful Amsterdam circular circle.

Memorable moment

Marc Ottelé and Adrie van der Burgt take advantage of the pouring of the circular partition wall to tell their story. At first glance, we see no difference when we compare it with the pouring of regular concrete. The dumping crew does its job; only this time watched by all sorts of curious faces. Nevertheless, it is a memorable moment that could only have arisen because the chain partners ProRail, the Municipality of Amsterdam and Heijmans have taken a step forward together.

What is special about this project is that after the award, space has been found for this circular application of concrete. "It is only with the enthusiasm and willingness of clients that these kinds of initiatives get off the ground. If it succeeds, my heart will beat faster there," says Ottelé enthusiastically. Sustainable action is not yet self-evident in the construction industry, which is why such successes and exemplary projects are necessary. In this



Composition circular concrete partition wall

The circular concrete used in the partition wall consists of 100% recycled gravel, 50% recycled sand and 15% recycled binder. Chain partner and concrete supplier for this is the Rutte Group, which with the innovative separation technology (Slimbreker) has become a secondary composition comes from 75%; an MKI of 11 per m³. This is expected to be project 27% CO₂ and 26% on the MKI. This project in Amsterdam is in line with Heijmans circular ambitions to be able to produce 100% circular concrete by 2023 process and apply it in all building assignments by 2030. It also fits in with the Rijksbrede Roadmap to use 50% less primary raw materials by 2030. Heijmans works among others together with the Rutte Group.

Circular circle in Amsterdam

The combination of two Amsterdam projects gives an extra shine to this circular concrete application. In addition to the underpass, Heijmans is also working on a project in Buiksloterham for the Municipality of Amsterdam. Here Heijmans takes care of the demolition, remediation and preparation of a number of plots in the area on the northern bank of the IJ. "We can link project-transcending concrete residual flows here," says Ottelé. To make the circular concrete, they work together with concrete supplier Rutte Groep, who takes care of the processing into pure raw materials. "We don't produce the concrete here ourselves, but cleverly tie things together. Moreover, the circular concrete is also used here in Amsterdam

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made. That completes the circle." A long-term integral (learning) process was completed with various parties involved, a suitability study was carried out in laboratories in order to ultimately be able to apply the circular concrete in a reinforced construction part."



Adrie van de Burgt, Sustainability and Circularity advisor at Heijmans You need all the links in the chain, especially if you don't see it as a one-off action. Then you need broad commitment to develop further and you need good partners for that. To accelerate development, clients such as the municipality of Amsterdam and ProRail could include in their tender that a certain percentage of recycled concrete must be used in the new concrete. That also ties into the concrete agreement"

Develop step by step

The development and application of circular concrete goes step by step. At the end of 2020, Heijmans realized a bicycle path in Zwolle with unreinforced circular concrete on the Hessenpoort business park. It is a trial by Heijmans in collaboration with the

municipality of Zwolle. "That was at an earlier stage. Now we are applying it in a constructive application in a large-scale project. That really is a new milestone," said Ottelé.

The next step is already planned. At the end of 2021, Heijmans will pour circular concrete in the Klaverspoor project near Moerdijk along the A16 with six windmill foundations. "We also use 100% recycled gravel and 50% recycled sand there." That's about solid foundations. Heijmans is taking another step in this respect. They will then extract circular raw materials on a large scale and produce the concrete themselves using one of their own mobile concrete plants.



The secondary raw materials come from the Buiksloterham project, elsewhere in Amsterdam. This is a pilot of the Municipality of Amsterdam, ProRail and Heijmans. The collaboration is an important step towards one sustainable concrete chain.

Research

In addition to being a concrete supplier, the Rutte Group is primarily knowledge and business partners with New Horizon's Urban Mining concept. "We help each other further and also conduct joint research," says Ottelé. As a scientist affiliated with TU Delft, he is at the forefront of all kinds of developments and stands for a transparent attitude. "If you don't share knowledge, then the Netherlands, for example, will not get any further." A PhD student is acting under his supervision

research into making the binder component of the cement fraction reactive again to make cement from it.

"There is a certain interdependence

how can we get the most out of it. We are now really researching that."

There is also a major scientific challenge. How can you take this to the next level.

A financial contribution is needed to take fundamental scientific steps.

Rutte Group financially so that TU Delft could appoint this PhD student.

During these processes, a kind of life cycle analysis is made. "We look from raw material to waste processing. We determine what the impact is so that we can also attach numbers to it. This is how we see whether we are going in the right direction in terms of sustainability," explains Van der Burgt. This is a condition for wanting to implement the government-wide roadmap to use 50% less primary raw materials by 2030. for the entire concrete and construction sector

Important role for clients

It is well known that the price is ultimately the dominant factor for the award. This makes it difficult to test new circular applications in practice. Ottelé: "We introduced the option for circular concrete only later and that certainly has financial consequences.

It fits in with our ambition towards 2030 to only process 100% circular concrete. Then it will be possible to find the financial space to take this step." In order to be able to innovate, you need leeway and it also helps if regulations enforce circularity, says Ottelé. "I expect that, regardless of existing regulations, it will take another 5 years before a client starts to set requirements. It is important that clients also realize that if the tender does not change, the market will not move either. Because innovation is not in line with existing regulations anyway. So you should be able to look past that. When I look at our Dutch regulations, the CROW is very important in this, especially if you look at the CROW recommendation 'Moderne

recycling granules' that will become available to the market and also forms the basis for this pilot.



Marc Ottelé.

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Moreover, the circular concrete is also made here in Amsterdam.

That completes the circle."

From down-cycling to up-cycling

It is evident that the net construction volume is greater than what is demolished. How old concrete rubble is released and how much new circular concrete can you realize? The net demand for new concrete exceeds the availability. Ottel : "So you can never complete the cycle, but you can make a nice circular step by actually going from down-cycling to up-cycling. Concrete rubble is gold if you look at a reliable source as a secondary raw material. We see enough contracts coming along that are completely boarded up. Where exactly is written down which shape, material and color should be used, 'but as much as circular'. Then your hands are tied."

Nevertheless, he thinks it is much smarter to think together about the ambition and to determine what the dot on the horizon is. "This way you can discover together how to get there."

Cement is the raw material in concrete that has by far the greatest impact on the environment. By means of Replacing pieces in it reduces the environmental impact enormously. Van der Burgt explains: "Cement has a share of up to 50% in the total CO footprint of concrete. If you can replace 15% of that with a secondary binder, you save enormously." With the upcoming projects, Heijmans is taking extra steps to increase this percentage, in order to also contribute to achieving the climate objectives.

It is clear that the enthusiasm of these frontrunners set the developments in the concrete world in motion. Inventiveness combined with scientific insights means that with this Amsterdam project, major steps forward have been made in the development of circular concrete in one fell swoop.

Pioneering approach, tell your story

In order to achieve the ambitions of the Concrete Agreement, a 'Koplopersapproach' has been chosen. Front runners are those chain partners who can meet stricter environmental requirements with proven innovations than 'the peloton'. They indicate what the peloton should also be able to apply in a few years. How does it work in practice?

Within the innovation program, companies in the concrete and construction sector can test promising innovations in practice and have them validated. This makes them frontrunners who indicate what is possible in the market. The sustainability gains that the front runners manage to achieve will raise the clients to the standard within a few years.

On the Betonhuis website, the front-runner stories and directly applicable knowledge about the possibilities and advantages of using concrete in buildings and unlocked constructions. Knowledge about well-known and perhaps less well-known sustainable properties and performance of concrete as a building material. A website to help you further with the actual application of sustainable concrete in practice.

Also interested?

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