

Sustainable mortars and plasters from an industrial point of view

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1 Introduction

Sustainability has many facets. We will give insight into the development of sustainable mortars and renders using recycled limestone which attributes to the demand to increasingly replace raw materials from natural resources by recycled materials. Furthermore, we will present newly developed renders with improved thermal insulation properties as a necessity to keep heating energy in our buildings. All along the way, synergies are used by combining findings from university research projects, improvements of the raw materials industry und progress in the dry-mix mortar industry.

2 Development of sustainable renders using recycled limestone

The Swiss raw material supplier zirkulit® AG attains aggregates by recycling concrete demolition, see figure 1 [1].

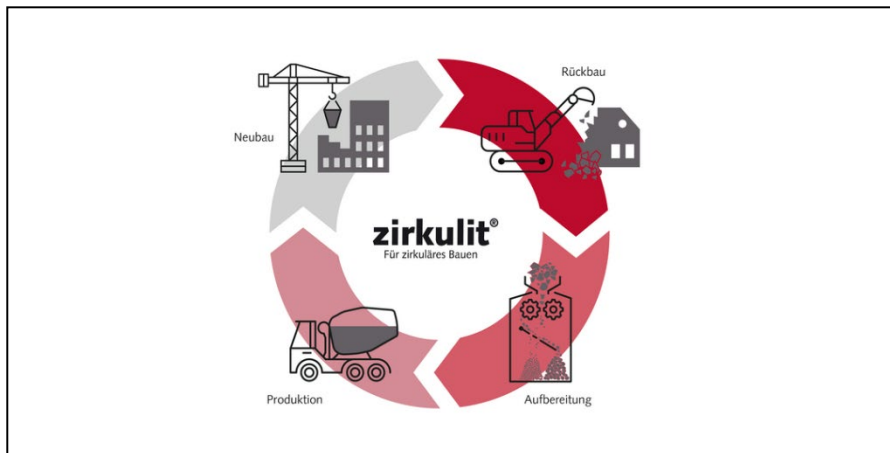


Fig. 1. zirkulit® Loop: demolition, conditioning, production of mortar, reconstruction [2]

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Keeping the focus on aggregates with a particle size of 0.2 – 1,0 mm, we were able to develop the first lime-cement render at the market using recycled aggregates from concrete demolition. In this first phase, we could replace 25 wt.-% of limestone aggregates with the recycled material, name of the render is akurit KIP-it. Z 25 [3]. Figure 2 shows the façade of the first object that was made with akurit KIP-it. Z 25.



Fig. 2. Object JED Schlieren in Zurich/Switzerland, Architect: Baumschlager Eberle Architekten GmbH, constructor: Bruno Neher Gipsergeschäft GmbH [4]

Furthermore, zirkulit® uses CO₂-capturing in the aggregates. The inhouse-developed technology allows to store 10 kg of CO₂ per ton recycled aggregate.

Next step is to increase the replacement level within the lime-cement render as well as developing further products, e.g. mortars for masonry.

3 Renders with improved thermal insulation properties

Thermal insulating renders for outside and inside application are used to decrease the heat loss of houses, especially in renovation cases. Figure 3 shows the installation of the akurit TRI-O-THERM L which is our sprayable thermal insulation render with a thermal conductivity λ_B of 0.049 W/(mK) [5].

In the EASI Zer0 project, which is funded by the EU in the Horizon Europe Program with a total budget of 8 Mio €, we have the ambition to increase the sustainability of thermal insulating renders by using water-glass based lightweight aggregates [6]. Competing to Aerogel particles, these newly developed lightweight aggregates will be produced with a lower GWP.

Figure 4 shows the focused development products of the Easi Zer0 consortium.



Fig. 3. Application of reference render akurit TRI-O-Therm L [7]



Fig. 4. Easi Zer0 Model

References

1. zirkulit®: <https://zirkulit.ch/>
2. zirkulit AG
3. KIP-it. Z 25: <https://www.sievert.ch/anwendungen/weltweit-1-zirkulaerer-leichtgrundputz.html>
4. Photo made by Baumschlager Eberle Architekten GmbH
5. https://akurit.de/DE_de/produkte/produkte/mineralischer-warmedammputz-tri-o-therm-1
6. <https://easizero.eu/>
7. Photo made by Tina Oertel



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