



#EUCircularTalks

Closing infrastructure material cycles
through European cooperation



Introduction - Profile

Scientific field

“Integrated sustainability of the building envelope”

Which explores the link and interaction between “environmental footprint” and “durability” on material- and construction level with respect to the built environment.



Who am I?

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Opportunities and challenges for concrete

- **Harmonization** in calculation methods to calculate the **environmental impact** is needed
- The environmental impact (“shadow costs”) caused by building materials should be incorporated in legislation
- **Stimulate** long **service life** (forecast in re-use of prefabricated elements)
- **Embed** that materials can be **separated** i.e. keep waste flows “clean” as possible and **stimulate**
- Try to avoid contamination due to wide spread of different amounts and type(s) of secondary materials which can be potentially used in new concrete mixes with respect to our challenge and drive to strive for circularity and low environmental impact (**EOL phase** again **added value** must be created!!! In view of new developments in separation techniques!)

From the perspective of a circular economy, the question is not what you can do with waste, but how you can ensure that products, materials and raw materials can be effectively recovered and reused in a subsequent cycle.



Maintain
(object level)
Re-use
(element level)
Recycle
(component level)

Opportunities for recycling & modern separation techniques

The real value comes from the **separation of the old binder** extracted from the aggregates. The old binder could potentially substitute primary cement (**research is needed**)

Implementation

1. As a raw material in clinker production process, less clinker needed thus initially reduction of CO₂.
2. As a raw material for blended cements ("SCM" supplementary cementitious material)
3. As an inert filler (**type I addition**) directly in concrete
4. As a reactive filler (**type II addition**) directly in concrete, where it can be used to replace cement partially
5. In combination with (alkali) activation i.e. geopolymer variant.



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What is necessary:

- Passport/fingerprint of products and materials to determine re-use possibilities, recycling and “value” in future (i.e. there is currently a lack of information at EOL, compared to building phase)
- Guidelines in broad sense to re-use products (determination if possible, calculation rules, etc..)
- Stimulation to recycle concrete via up-cycling (i.e. retrieval of old binder) principle instead of down-cycling via traditional RA aggregate replacement and road foundations.
- DETERMINATION methods in order to determine “quality” at EOL stage
- Research how to up-cycle (a variety) of retrieved binders in new mixes regarding performance

