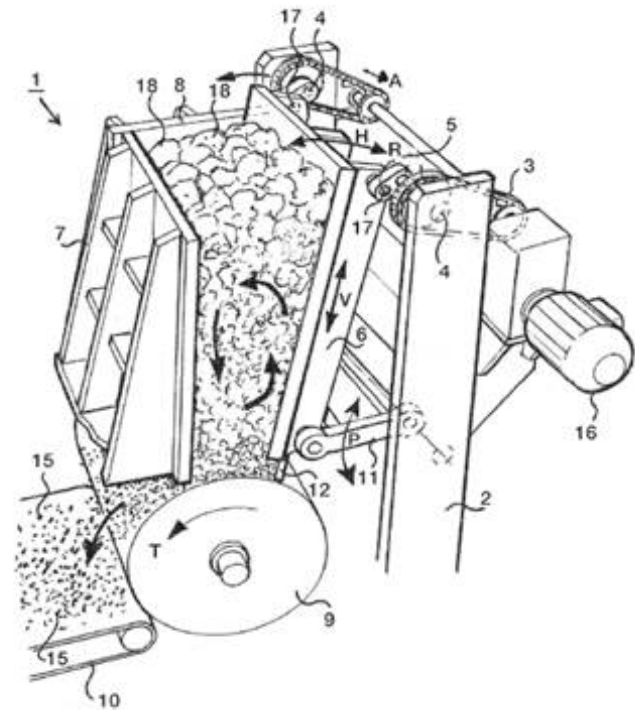


# Smart Crusher

Results lab crusher and Pilot  
installation

October 2013

# Lab Installation



# Lab Installation

## Results of external tests

Summary and conclusions of Technical University Eindhoven (NL):

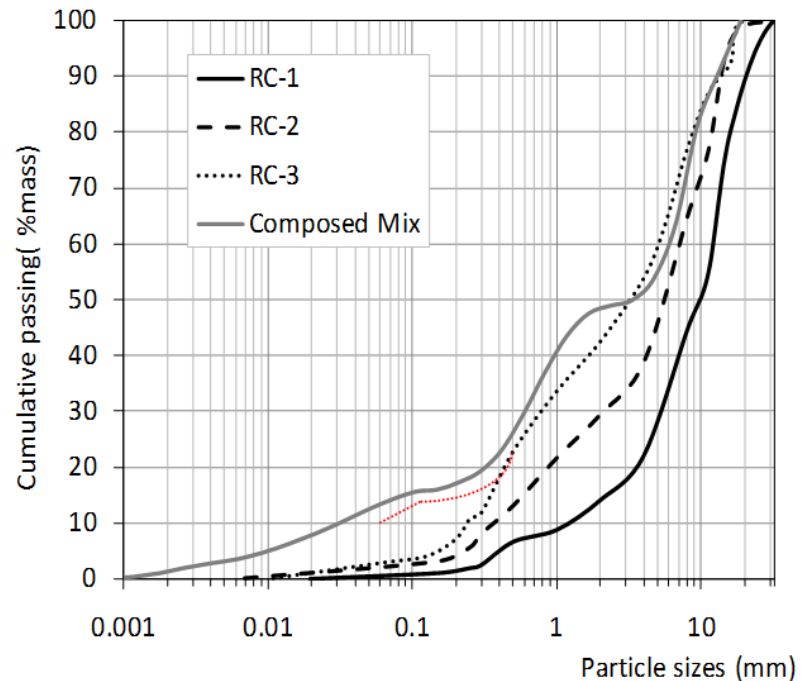
- The smart crushing (SC) method was found to produce much more recycled concrete fines and cleaner aggregates than a conventional crusher.
- The  $\alpha$ -quartz amount of the recycled concrete fines was found to be significantly lower than the one obtained using a commercial jaw crusher.
- The mortar tests showed the suitability of recycled concrete fines as cement replacement in both CEM I and blended cements recipes.
- Thermally treated Recycled Concrete Fines (RCF) (both 500 °C treated RCF and 800 °C treated RCF) showed an activation effect on slag.
- The RCF can be used as either a filler, a cementitious binder with a reactivity similar to commercial fly ash.
- The use of recycled concrete aggregates as a 100% replacement of Norm sand was also tested successfully. The RCS mortar samples obtained higher strength than the reference samples, especially for the early strength.
- Research document:
  - **Smart crushing of concrete and activation of liberated concrete fines**
  - M.V.A. Florea, Z. Ning, Prof Dr. H.J.H. Brouwers
  - Department of the Built Environment, Unit Building Physics and Services
  - Eindhoven University of Technology, Eindhoven, The Netherlands

# Lab Installation

## Results of external tests

Liberation of cement fines, sand and aggregates

- Definitions:
  - RC 1: jaw crusher 1 time
  - RC 2: jaw crusher 10 times
  - RC3: primary crusher and Smart Crusher
- RC 3 is very close to the original's particles size distribution of the mix design
- Red dotted line is the final curve. As cement fines were found outside the collecting basket.



# Smart crusher Pilot installation

## Status Quo

- Located at VAR in Wilp The Netherlands
- SC initially tested in Augustus 2013
- Presently VAR is building process around SC i.e.:
  - Oversized particles should be returned to SC and processed should be optimized
- Preliminary results
  - Expected through put  $\gg 20\text{T/H}$
  - Energy consumption  $\ll 1\text{ kwh/T}$

# Set up pilot installation



# Set up pilot installation



# Set up pilot installation



# Input pilot installation



# Output pilot installation

without commissioning and proces optimisation



Washed only to see results

# Special application

Input & Output steel fibre concrete



99,6% of the steel fibres are liberated

# Pilot installation

- Objective last quarter 2013 is to receive the same or better results as with the lab SC
- This by:
  - Building the process around the SC, returning the oversized particles back to the SC and
  - Finding the optimum settings e.g. throughput, pressure, discharge opening, filling degree etc