

# Recycling of Concrete

The C2CA project

Delft University of Technology

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# Concrete Recycling: C2CA

An initiative of Strukton and TU Delft

End  
of  
Life  
Concrete

To

Cement  
&  
Clean  
Aggregates

Strukton - Theo Pouw - Heidelberg Cement - Holcim - DV - Laser 2000 - Inashco R&D

TU Delft - Roma - AGH University - ICE-HT - Barcelona - Leiden - TU Denmark

# EU vision

Health, wealth, sustainability, harmonisation

Reduce transport of building materials

Recycle building waste into high-value  
new materials

Create new EU-wide regulation

# EU Project

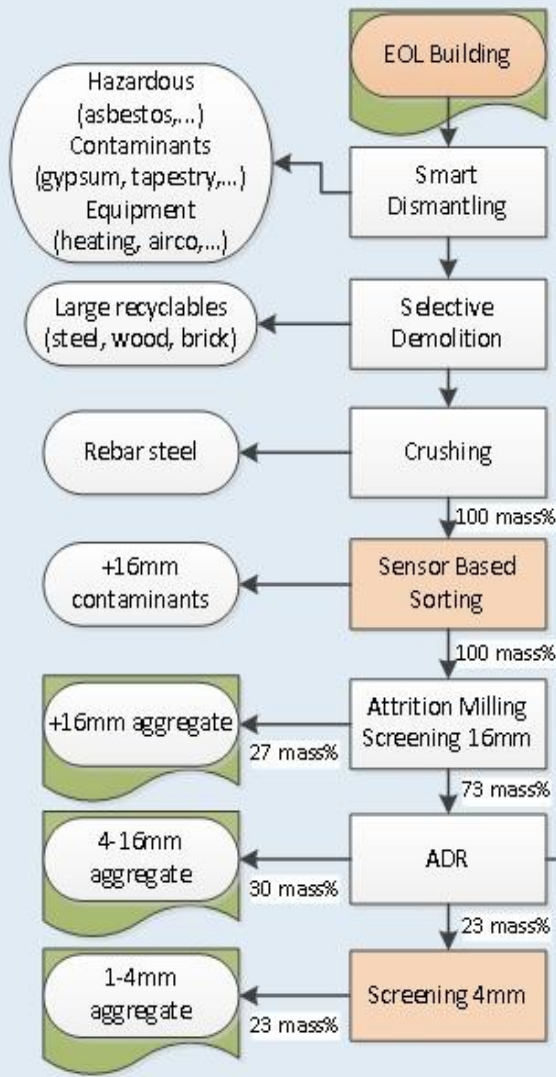
## C2CA: Concrete to Cement & Aggregate

In situ, mechanical, moist process  
(not wet, not dry >>> cheap & safe)

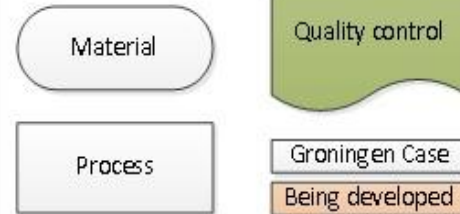
On-line certification of aggregate

Reuse of old cement paste in new binders

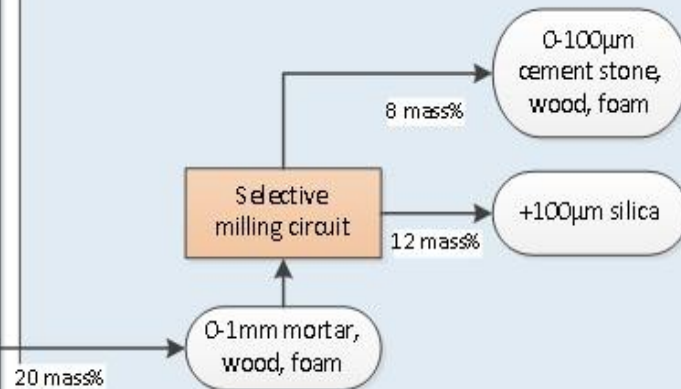
## In Situ



## Legend

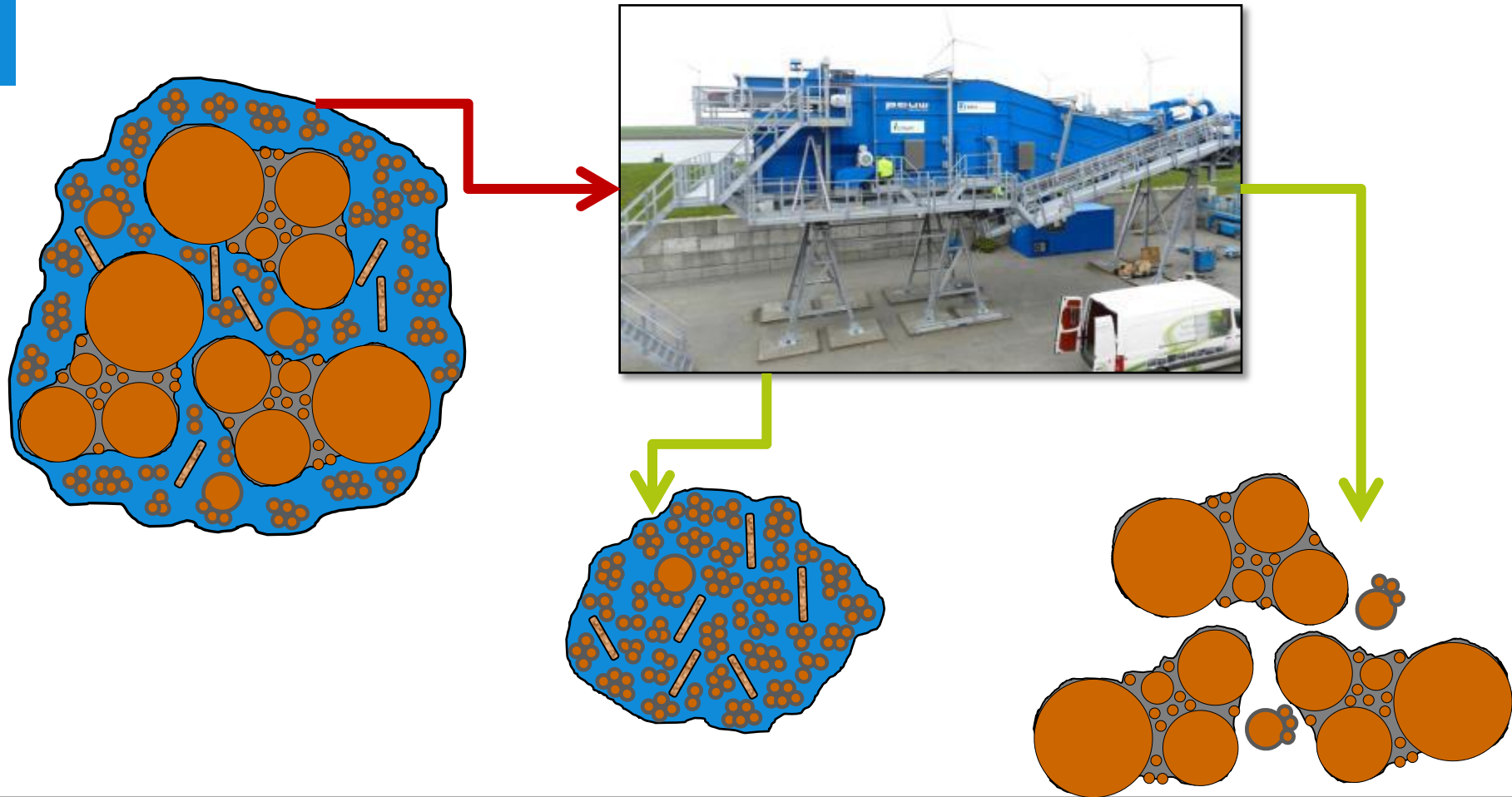


## Ex Situ



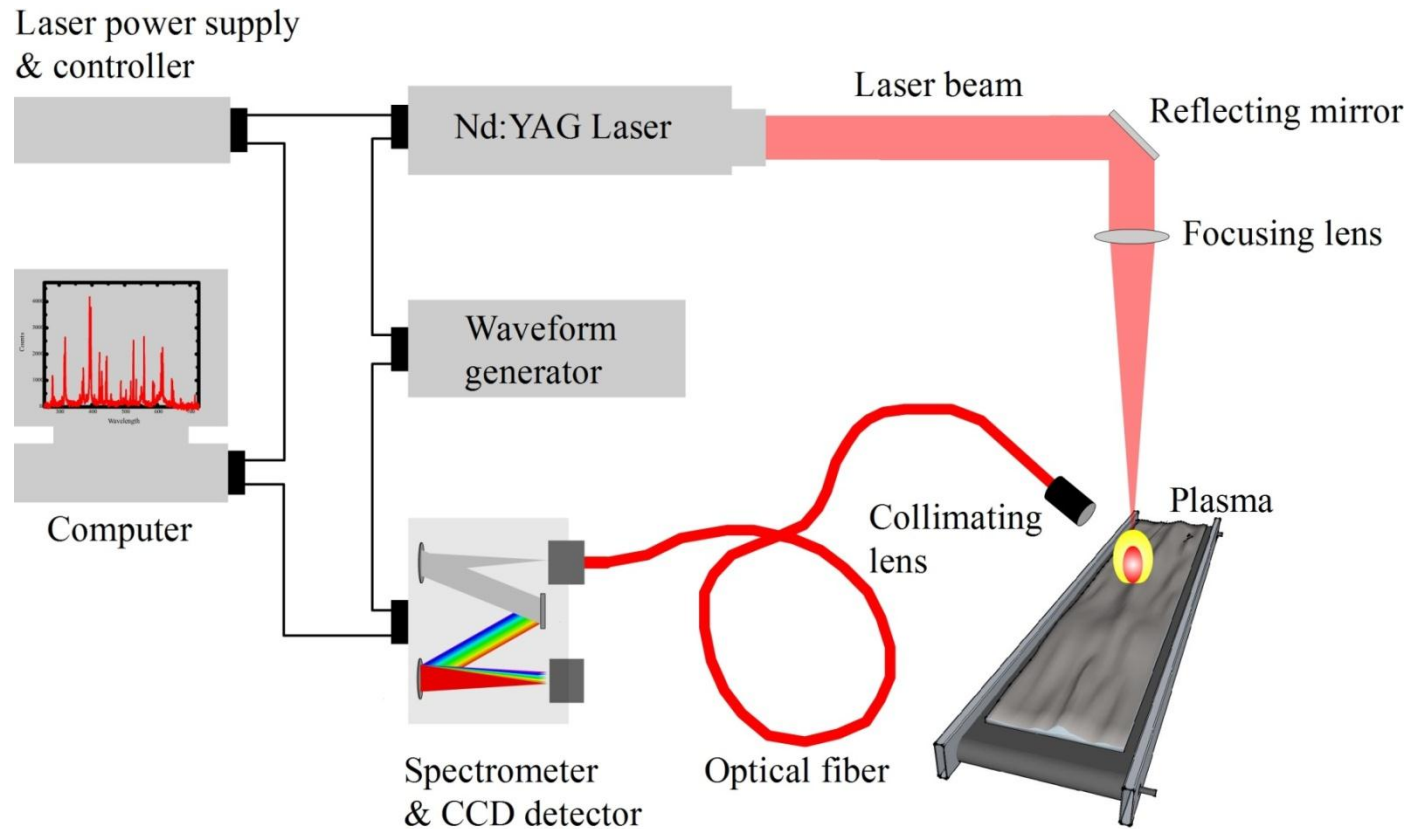
# ADR classification

Removal of fines and contaminants from aggregate



# On-line certification of aggregate

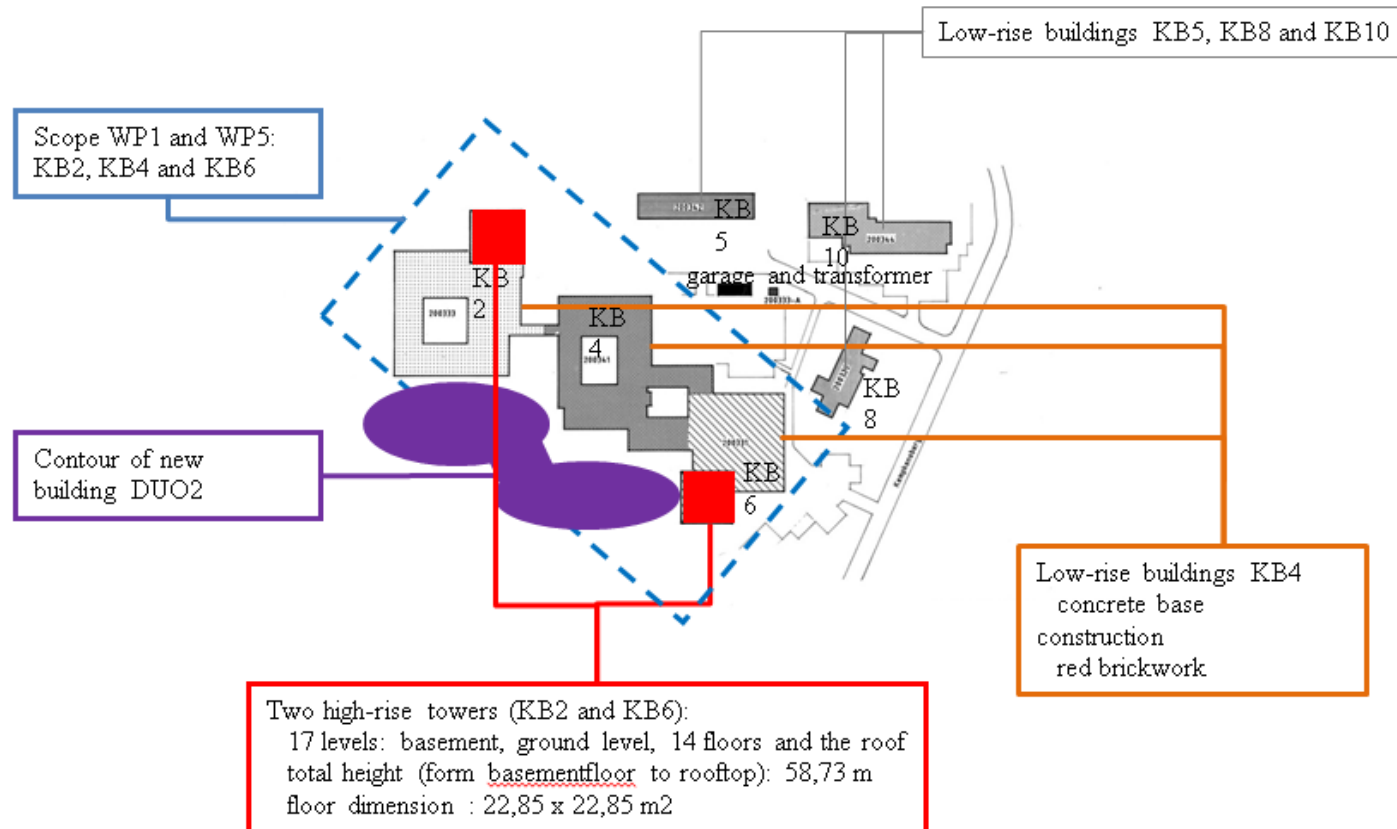
## Laser-induced breakdown spectroscopy





# Groningen case

## Recycling of two office towers







# EoL concrete recycling at Theo Pouw

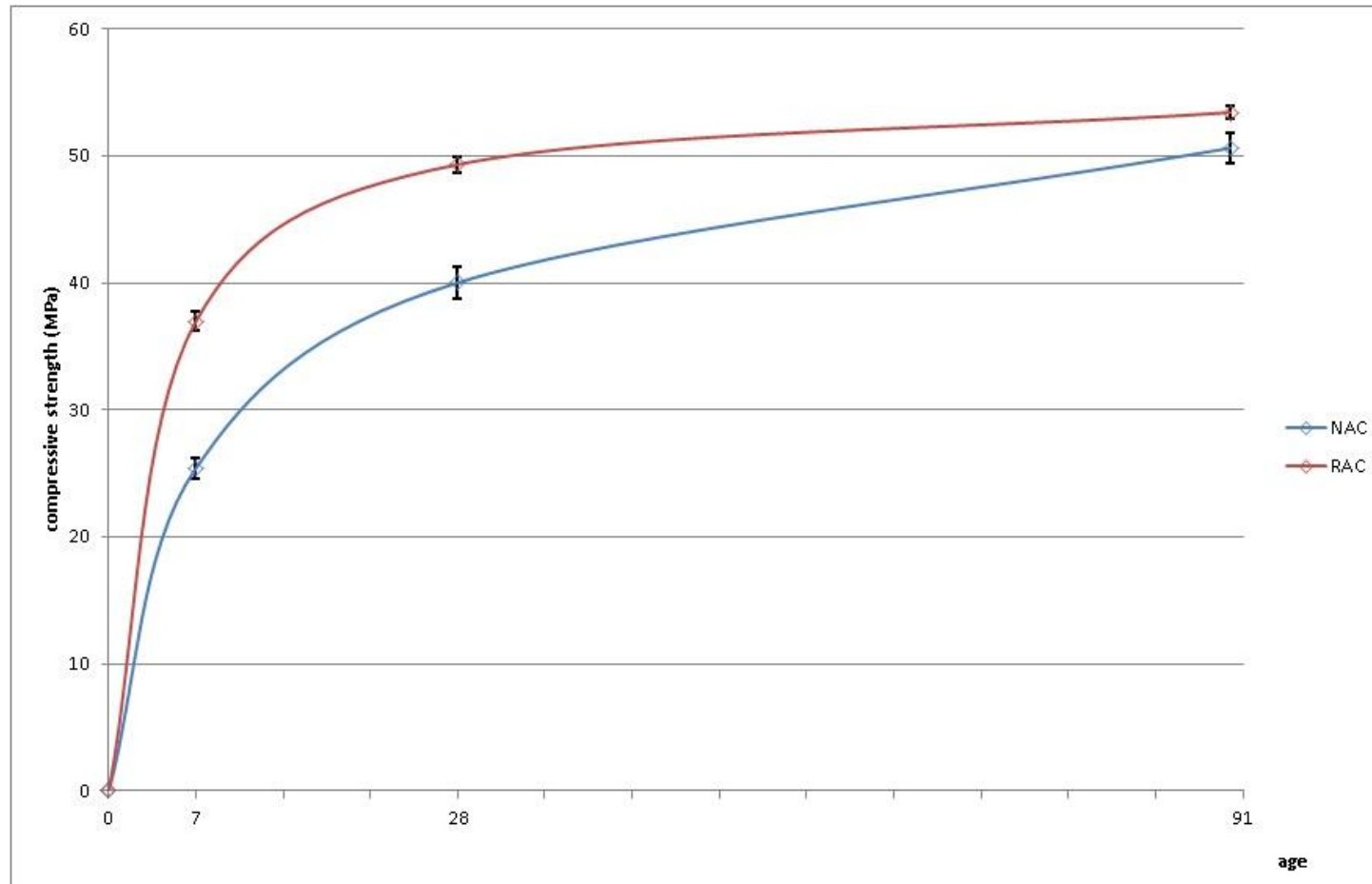


## EoL concrete recycling at Theo Pouw



# Groningen case

Concrete with recycled aggregate (—) is stronger



Results from Prof. Jan Deja and Dr. Radosław Mróz, AGH University, Wrocław, Poland

# Groningen case

## Concrete with recycled aggregate is durable

Compressive strength of samples after freeze-thaw cycle and control samples in water.

Type of concrete	compressive strength (Mpa) control samples in water	standard error	compressive strength (Mpa) after freeze-thaw cycles	stand ard error	Loss of weight [%]
NAC	61,9	1,3	61,5	1,2	< 5
RAC	56,4	0,5	50,6	1,6	< 5

# Reuse of old cement paste

Cement production: ~10% of CO<sub>2</sub> emissions

2000 tons of old cement paste concentrate turned into new cement at ENCI, Maastricht

# Stakeholder issues

## Change

<b>Actor</b>	<b>Change</b>	<b>Risk / Driving force</b>
Recycler	Aggregates for road > Aggregates for mortar	Fight into new market / Market for road shrinks
Mortar producer	Natural aggregate > Recycle aggregate	Quality / Automatic quality control, price
Cement producer	Lime > EOL Cement paste	Less control over supplies, present owner of lime / CO2 reduction
Construction cy	> Secondary mortar	Green product, perfect negotiation position
Public	Less transport	Health, wealth, etc.