

Redesigning construction materials towards zero waste society

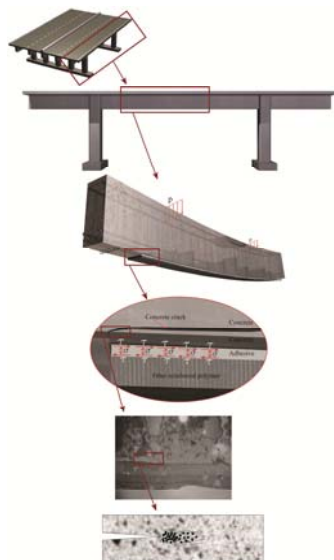
- We place the build environment centrally in a sustainable material cycle of the society
- We focus research and innovation on replacement of natural raw materials with secondary resources
- We rethink building technology and redesign materials for todays and tomorrows demands
- We do not compromise on the quality of construction materials
- We do not compromise on environmental impact

ZeroWaste Byg is an interdisciplinary research team at Department of Civil Engineering, Technical University of Denmark. We have joined forces from all our department sections. Together we think innovative and untraditional to redesigning structures and construction materials to a zero waste society.

For more information please visit www.zerowaste.byg.dtu.dk or contact project leader Lisbeth M. Ottosen (lo@byg.dtu.dk)

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From micro to macro scale.



Tool box for evaluating
new secondary resources

Jacob W. Schmidt

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Electrochemical upgrading of different fly ashes for use in production of bricks and lightweight aggregates



Construction materials, Geotechniques and Geology, Structural engineering

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Hygro-thermal conditions and pollutant emissions from zero waste materials and their effects on humans



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Alternative ashes in concrete – new aesthetics and structural performance

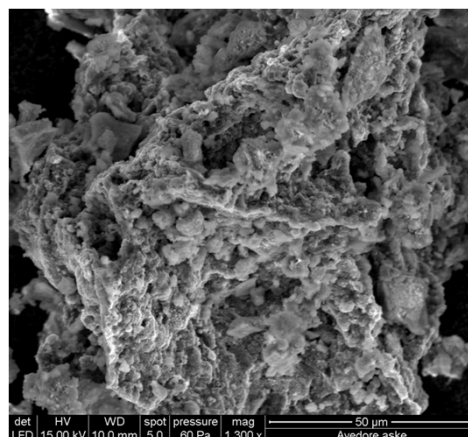


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Upgrading secondary resources – simple processes

Example sewage sludge ash in concrete

- Low content of heavy metals
- Low content of chlorides
- (Low content of sulphates)
- Rather coarse (up to 0.2 mm)
- The large particles are porous
- The phosphorous content is high (7-10 wt%)



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Upgrading secondary resources – simple processes

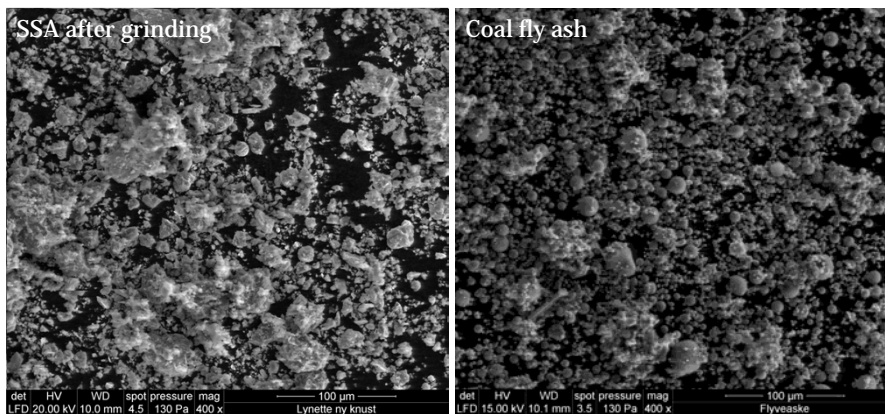
Example sewage sludge ash in concrete



Grinding

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Upgrading secondary resources – simple processes

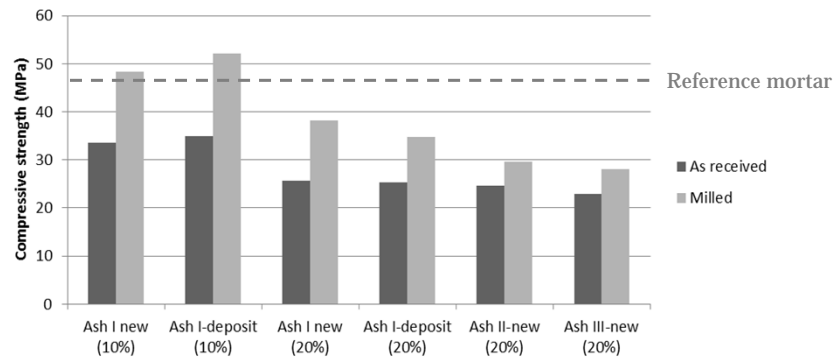


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Upgrading secondary resources – simple processes

Example sewage sludge ash in concrete – ash as received and grinded

(1) Cement replacement – 7 days compressive strength

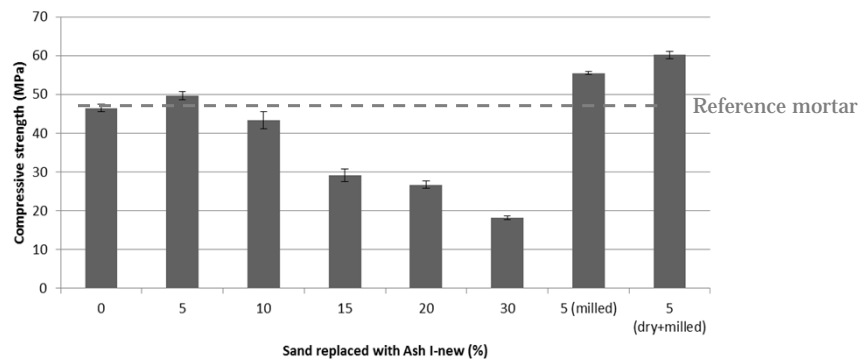


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Upgrading secondary resources – simple processes

Example sewage sludge ash in concrete – ash as received and grinded

(2) Sand replacement – 7 days compressive strength

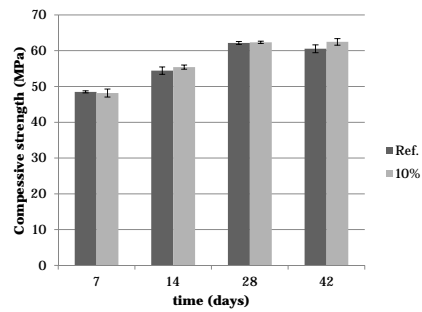


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Upgrading secondary resources – detoxification

Fly ash from municipal solid waste incineration

- Fine grained
- High content of heavy metals
- High content of soluble salts (incl. chlorides and sulphates)



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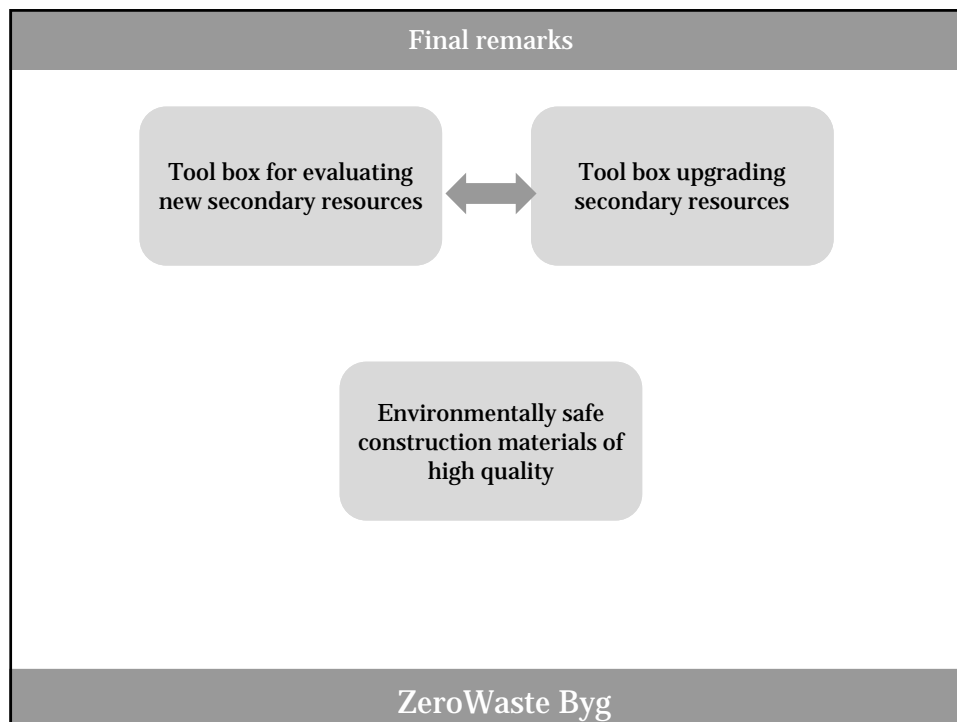
Upgrading secondary resources – not always necessary

Co-combustion wood and straw

- Low content of heavy metals
- Mortar sample without cement →



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Associate prof. Anja Margrethe Bache	Researcher Gunvor M. Kirkelund	Professor Carsten Rode	Associate prof. Jacob W. Schmidt	Researcher Jackub Kolarik	Associate prof. Thomas Ingeman-Nielsen	Associate prof. Lisbeth M. Ottosen
						



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Assistant prof. Anders Stühr Jørgensen	Associate prof. Pawel Wargocki	Professor Per Goltermann	Researcher Pernille E. Jensen	Associate prof. Ruut H. Peuhkuri	PhD students Barbora Krejcirikova, Annemette Kappel, Wan Chen	
						



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