TITLE:

GLOBAL ISSUES
Research Demands

IR. HENRI VAN BENNEKOM

DELFT UNIVERSITY OF TECHNOLOGY

Interreg
North-West Europe
SeRaMCo
EUROPEAN UNION

TUDelft
BK Bouwkunde
Department of Management in the Built Environment

Replace Primary Raw Materials

of Concrete Precast Products

Replace Primary Raw Materials

of Concrete Precast Products

With high-quality Materials from

Re-cycled Construction Demolition Waste

> ➢ Develop new, innovative prefab concrete products

> ➢ With EU market potential

> ➢ Show opportunities for recycled CDW material
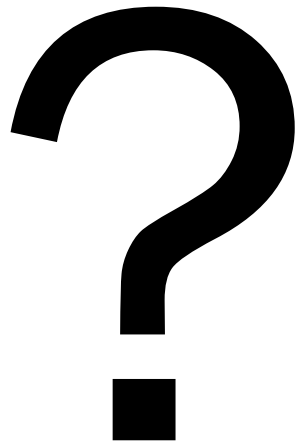
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- WORLD IS UNDER THREATS OF CLIMATE CHANGE AND OTHER GLOBAL ISSUES

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Impacts of production

Peak oil

Energy crisis

Fossil fuel dependence

CO_2

Global warming

Sea level rise

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Deforestation

Overexploited fisheries

Extinction of species

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Henri van Bennekom

20 Jan 2021
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Waste

Contamination

Acid rain

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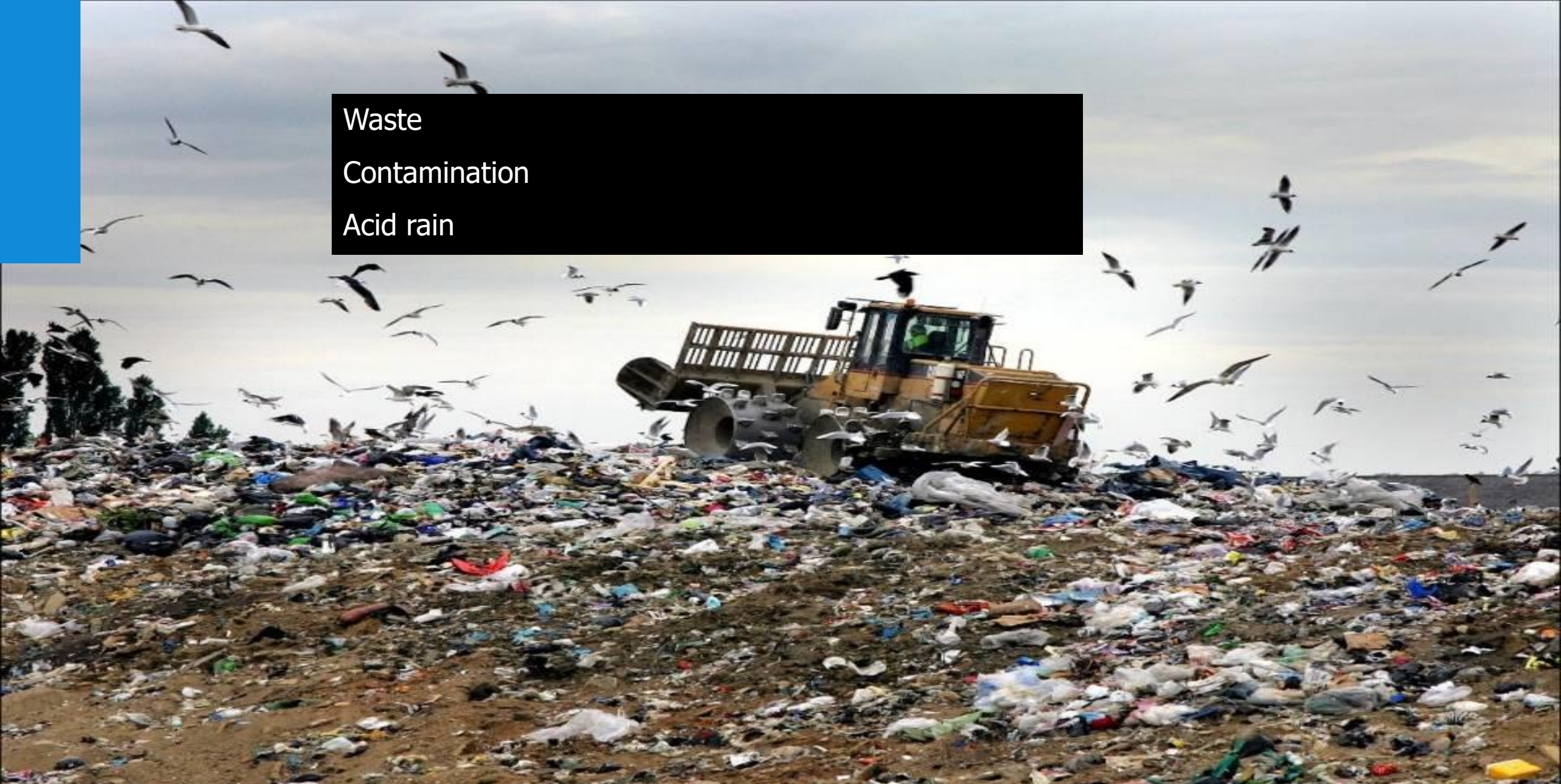
© Chris Jordan Foundation for Deep Ecology

Waste…
We throw used items away.
But, where is 'away'?

© Peter Essick/Foundation for Deep Ecology

There is no such thing as away!

© Cotton Coulson/Keenpress Foundation for Deep Ecology

© Master Sgt Bill Huntington

© Zak Noyle/Foundation for Deep Ecology

© M.R. Hasasn/Foundation for Deep Ecology

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© M.R. Hasasn/Foundation for Deep Ecology

Is this the world we want to give to our children?

Is this the world we want to give to **ourselves...!?**

Resource Depletion

Air Pollution

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Chemical pollution

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Fresh Water Scarcity

2017

2018

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Biodiversity Loss

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Climate Change

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P

$$M + E = P$$

$$M \quad + \quad E \quad = \quad P \quad + \quad E \quad + \quad W$$

Materials   +   Energy   =   Product   +   Emissions   +   Waste

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Materials   +   Energy   =   Product   +   Emissions   +   Waste

recycling

?   ?   ?

Materials   +   Energy   =   Product   +   Emissions   +   Waste
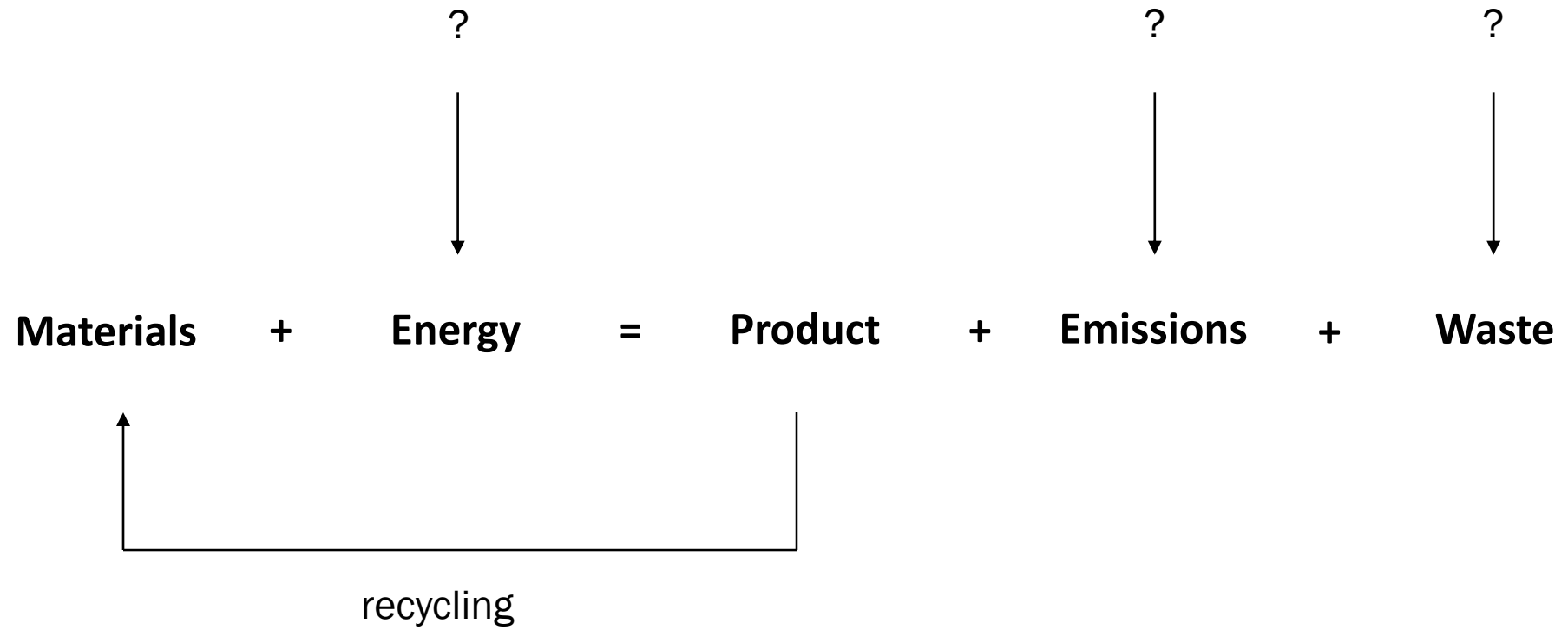
recycling

Re-cycling is one of the answers
to the problem of resources and waste,

but not to other threats caused by
production or the re-cycling process.

Would it be possible to come up with products
that try to cover these climate threats as well?

Take Global Climate Issues as Design Parameter !

- TO TAKE RESPONSIBILITY FOR THE DAMAGING IMPACT THAT PRODUCTION AND USE IN GENERAL HAS CAUSED AND WILL CAUSE

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- WE NEED TO TAKE RESPONSIBILITY FOR THE DAMAGING IMPACT THAT PRODUCTION AND USE IN GENERAL HAS CAUSED AND WILL CAUSE

- OUR COMMON TASK AND MORAL OBLIGATION SHOULD THEREFORE GO BEYOND MERELY USING SECONDARY RAW MATERIALS FOR CONCRETE

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- OUR COMMON TASK AND MORAL OBLIGATION SHOULD THEREFORE GO BEYOND MERELY USING SECONDARY RAW MATERIALS FOR CONCRETE

- THIS IMPLIES THAT OUR DESIGNS NEED TO REPAIR THE INTRINSIC DAMAGE THAT THEIR PRODUCTION CAUSE TO THE EARTH, AND TO US…

Direct/Indirect Impact Built Environment

50-70%
of global resource extraction, mainly sand, cement & steel [1]

38%
of global Green House Gas emissions [2]

40%
of global energy consumption [2]

50%
of global landfill waste [1]

40%
of global water pollution [1]

66%
of global population who will live in urban areas by 2050 [3]

1. Willmott Dixon 2010
2. Global Assessment Report on Disaster Risk Reduction 2015
3. World Bank 2015

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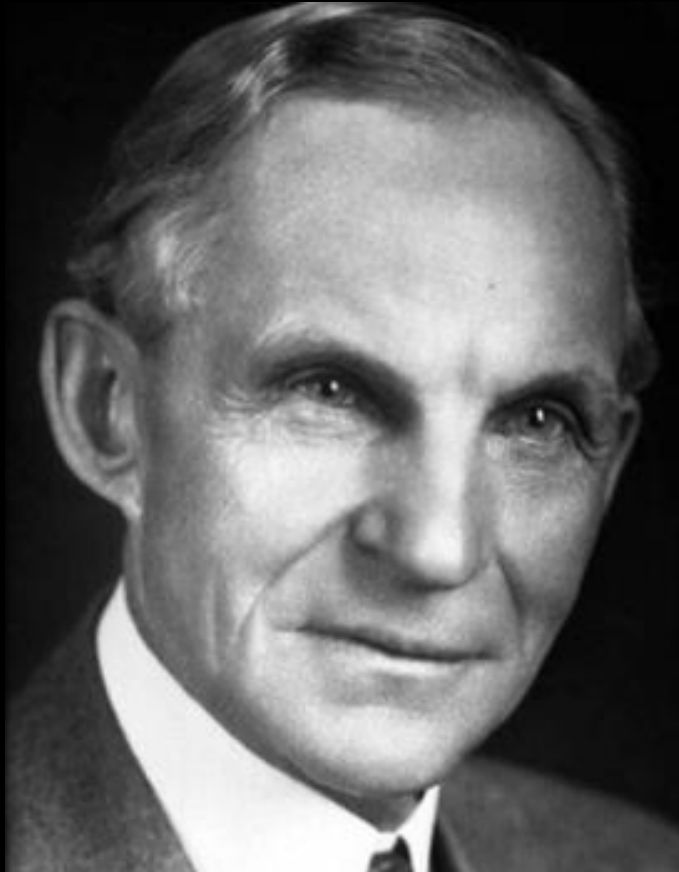
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design parameters for products:

- ✓ Absorb CO_2

- ✓ Generate Energy

- ✓ Store Energy

- ✓ Clean or Retain water

- ✓ Clean the Air

- ✓ Cool our Cities

- ✓ Respect natural resources

- ✓ Improve biodiversity

- ✓ Last longer

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If I had asked people what they wanted, they would have said faster horses….

Henry Ford

GLOBAL ISSUES BEYOND RECYCLING

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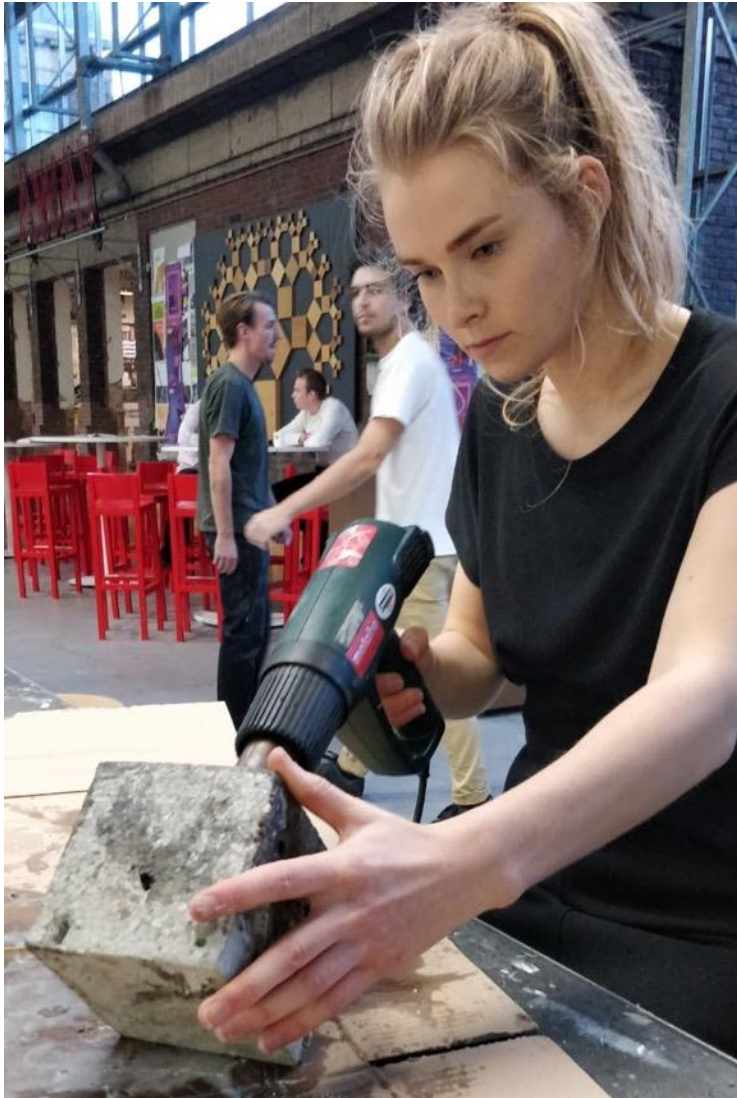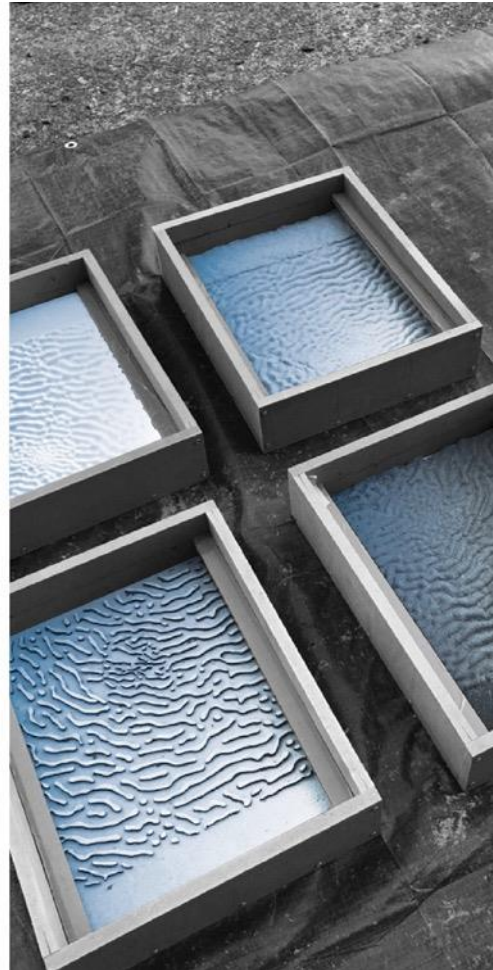
RESEARCH   DESIGN   HANDS-ON   SUSTAINABLE PRODUCTS

+   **+**   **=**

10 weeks

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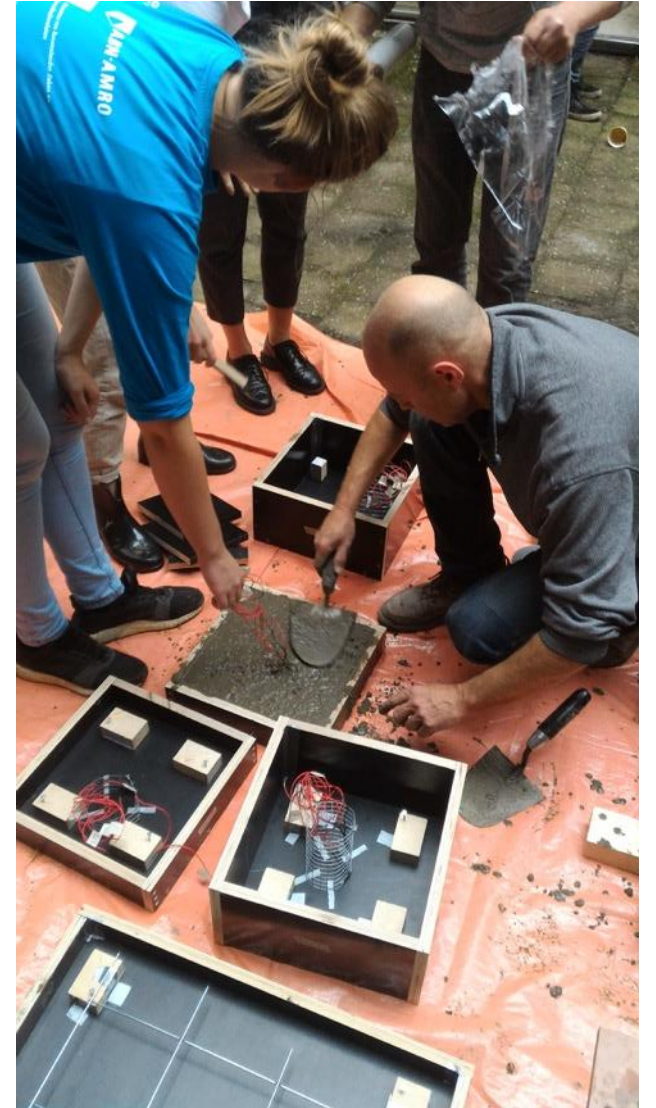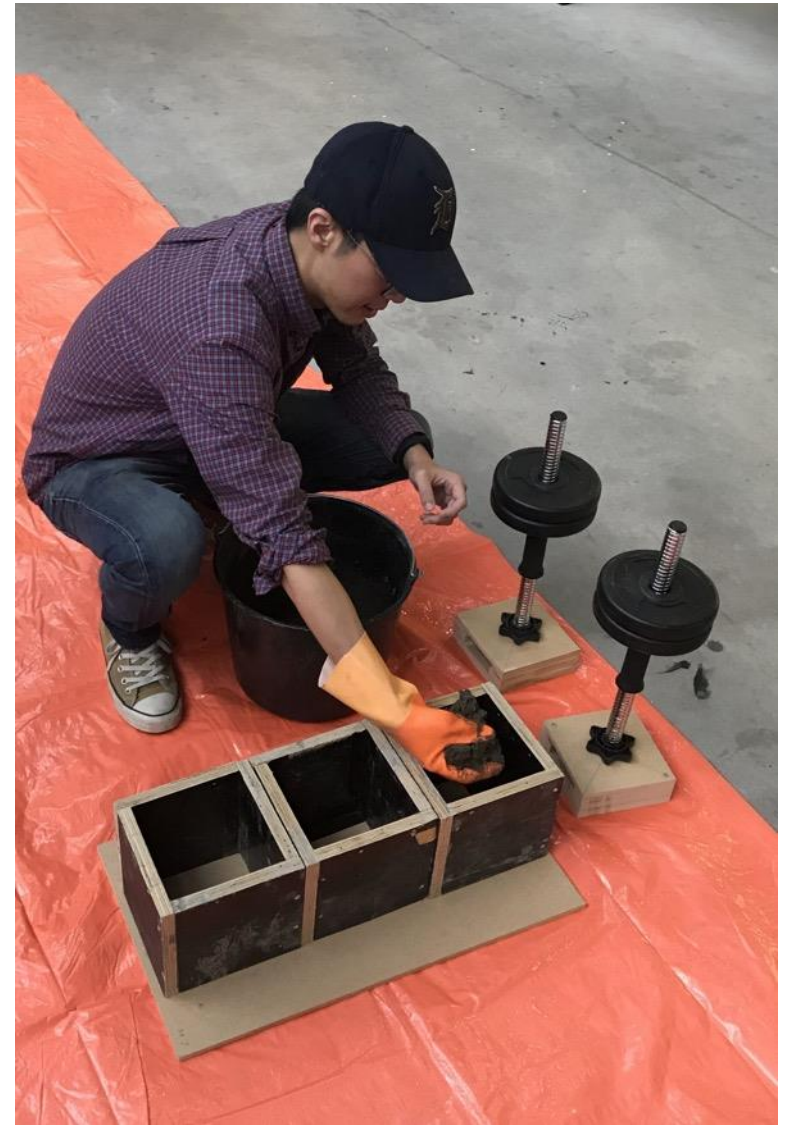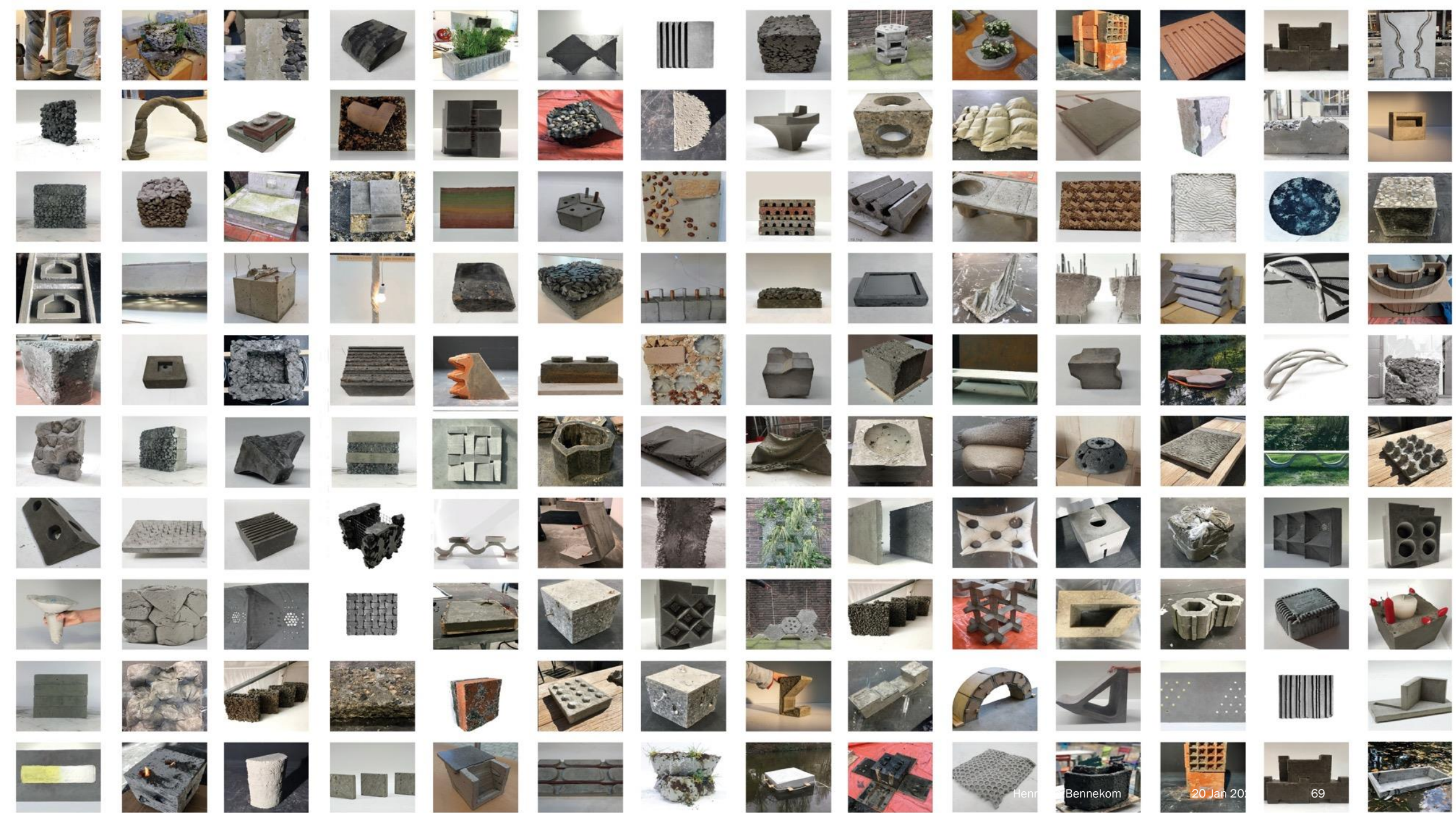
24 PROMISING PROPOSALS

| THE OBVIOUS | URBAN FURNITURE | SAVING CDW | LIVING CONCRETE | VENTILATING CONCRETE | RETRO-FITTING | BOULDERING CONCRETE | STRUCTURAL PLANTER | PREFAB INFRA | SOAKING CONCRETE | SOUND ABSORBING | SOUND RESONATING |

| DOUBLE SIDED PAVER | REEF BLOCK | SALTY CONCRETE | FINE PAVING | FLOATING DECK | COOLING CONCRETE | ENERGY HARVESTING | STORING ENERGY | DUST ABSORBING | FLOATING CONCRETE | RAMMED CONCRETE | MYCELIUM CONCRETE |
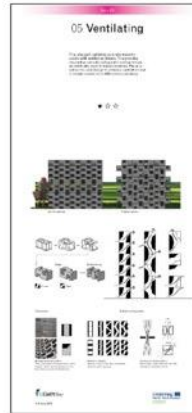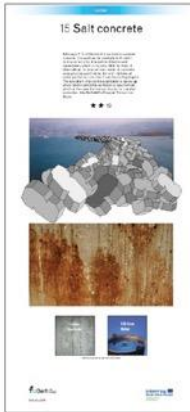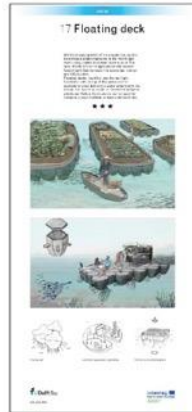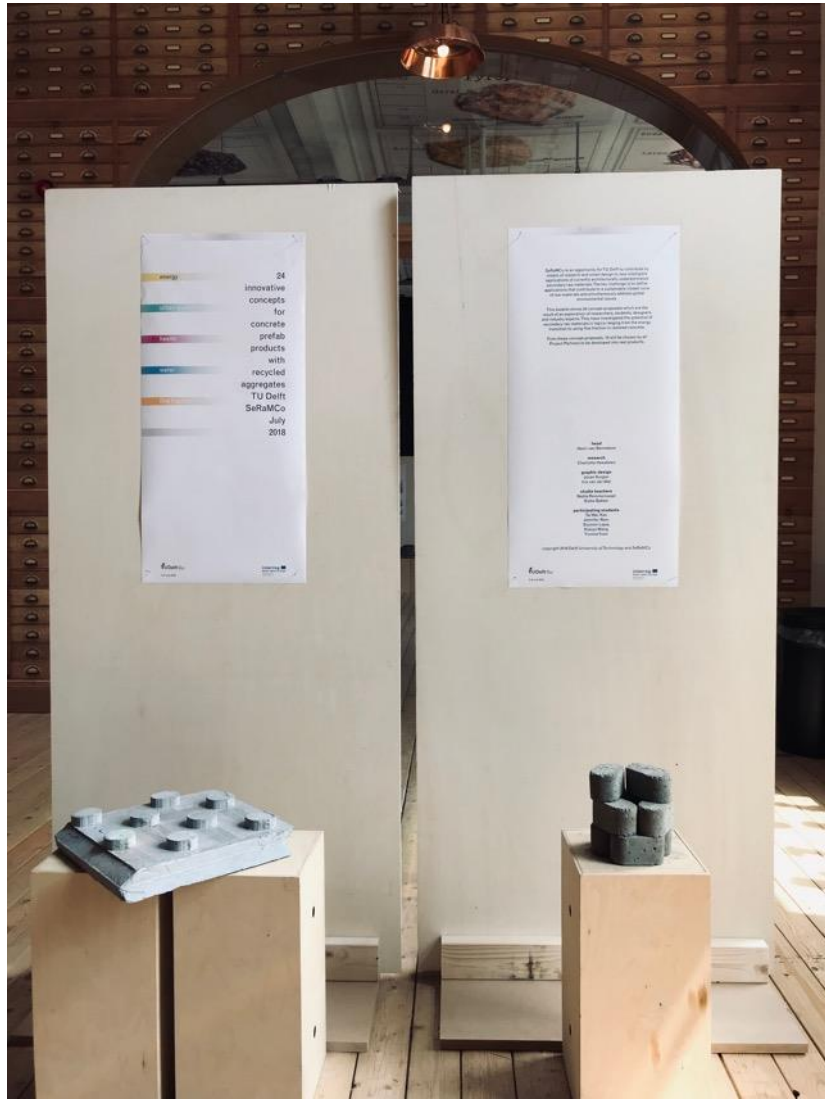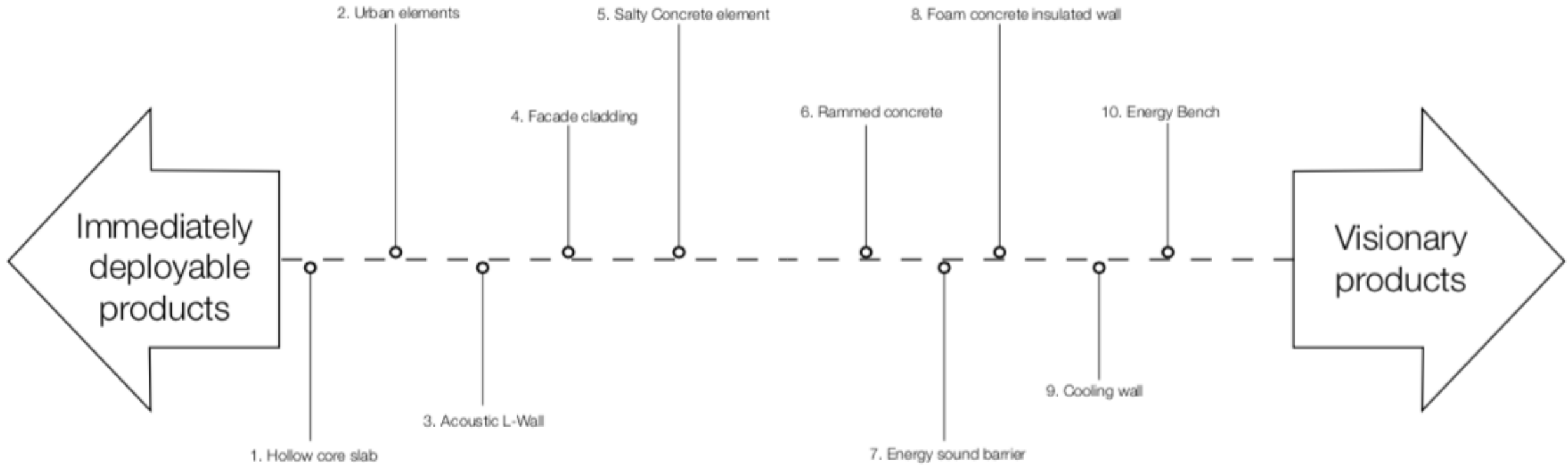
10 CONCRETE PRECAST PRODUCTS

1. HOLLOW CORE SLAB
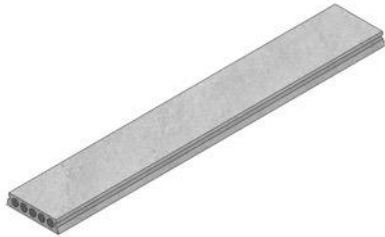
2. URBAN ELEMENTS

3. ACOUSTIC L-WALL
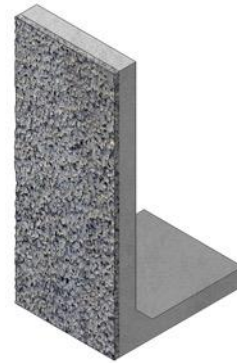
4. FAÇADE CLADDING
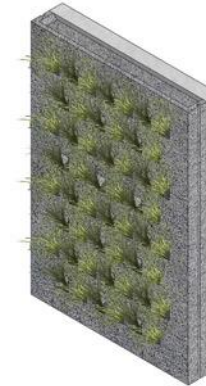
5. SALTY CONCRETE

6. RAMMED CONCRETE

7. ENERGY SOUND BARRIER

8. FOAM CONCRETE INSULATED WALL
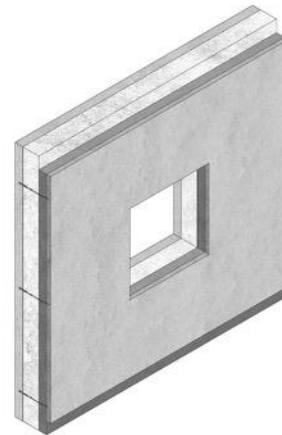
9. COOLING WALL

10. ENERGY BENCH
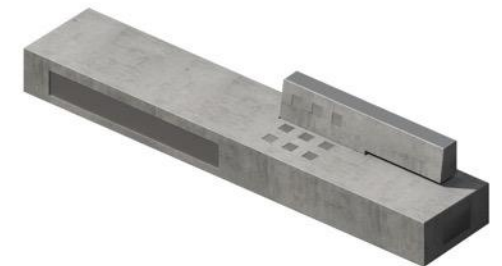
WE CANNOT SOLVE OUR PROBLEMS
WITH THE SAME THINKING
WE USED WHEN WE
CREATED THEM

-Albert Einstein

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The building industry has the power to become a driver of change, that will also impact other fields

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THANK YOU

Take Global Climate Issues as Design Parameters for products…

…because recycling is one action to battle global depletion of resources or scarcity, but does not provide solutions for other global issues.

Research → Vaccin

against global warming and environmental catastrophy