

Waste (CDW)

Concrete is very durable and can outlast individual human lives. However...

.... with human needs/wishes changing constantly, concrete still ends up as waste easily.

Waste (CDW)

CO₂ Emissions
Energy consumption
Primary raw material depletion
Water use
Land reclamation
Fine dust
Waste

Construction industry is responsible for
ca. 30% of Europe's total waste production

ca. 78% of Europe's CDW is CBTC.

STEP 1

- Make LESS concrete!

STEP 2

- Make LESS concrete!
- Use LONGER! (design, renovation)

STEP 3

- Make LESS concrete!
- Use LONGER! (design, renovation)
- RE-USE as much as possible!

STEP 4

- Make LESS concrete!
- Use LONGER! (design, renovation)
- RE-USE as much as possible!
- RE-CYCLE the CDW

STEP 5

- Make LESS concrete!
- Use LONGER! (design, renovation)
- RE-USE as much as possible!

- RE-CYCLE the CDW
- REPAIR / RESTORE the DAMAGE of the PRODUCTION



WE CANNOT SOLVE OUR PROBLEMS
WITH THE SAME THINKING
WE USED WHEN WE
CREATED THEM

- Albert Einstein

Source: internet/images

recycling products should

- Absorb CO₂ (from making and use!)
- Generate Energy
- Clean the water
- Clean the air
- Cool our cities
- Last longer
- Improve health conditions
- Improve quality of life

“restore by design”

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Making Workshop TUDelft-AR0036-Spring18



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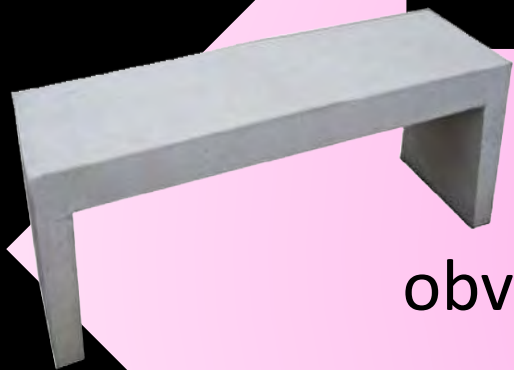
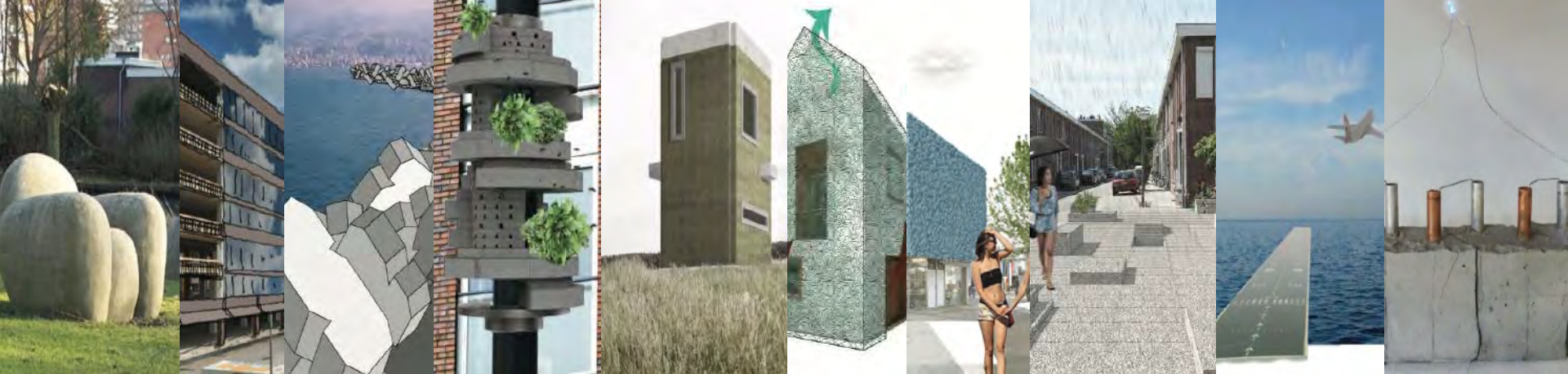


Making Workshop TUDelft-AR0036-Spring18

5/6 July 2018, Delft meeting

24 concepts for SeRaMCO's innovative CPP's

| | | | |
|----|-----------------------|-------------------|----|
| 01 | Obvious | Porous Pavement | 13 |
| 02 | Urban Furniture | Reef Block | 14 |
| 03 | Saving CDW | Salty Concrete | 15 |
| 04 | Living concrete | Fine Paving | 16 |
| 05 | Ventilating | Floating Deck | 17 |
| 06 | Retrofitting | Cooling | 18 |
| 07 | Bouldering | Energy harvesting | 19 |
| 08 | Structural Planter | Energy storing | 20 |
| 09 | Prefab infrastructure | Dust absorbing | 21 |
| 10 | Soaking | Floating | 22 |
| 11 | Sound absorbing | Rammed | 23 |
| 12 | Sound resonating | Mycelium concrete | 24 |



obvious



visionary

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lay-out
Joran Kuijper
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Project Meeting in Delft, 5/6 July 2018



Project Meeting in Delft, 5/6 July 2018



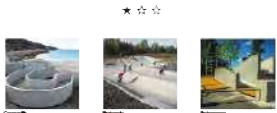
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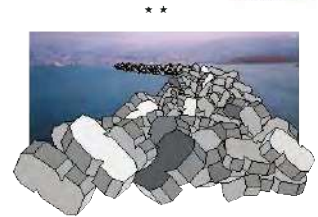


02 Urban furniture

17

13

15 Salt concrete



18 Cooling

17

12

21 Dust absorbing

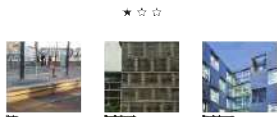


20 Storing energy

17

11

24 Mycelium concrete



01 The obvious

16

11

10 Soaking



04 Living

14

9

06 Retrofitting



22 Floating

Joker

9

23 Rammed



Obvious / Urban Furniture

Innovative

Obvious / Urban Furniture

- 01 Hollow Core Slab
- 02 Insulated Precast Double Wall
- 03 Retaining L-element
- 04 Collision Blocks
- 05 Traffic Guidance
- 06 Bench
- 07 Pavement Tiles

Obvious / Urban Furniture

- 01 Hollow Core Slab
- 02 Insulated Precast Double Wall
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First set = really obvious

Second set = designed product
line SeRaMCo

Innovative

- Living 01
- Retrofitting 02
- Soaking 03
- Salt Concrete 04
- Cooling 05
- Storing Energy 06
- Dust absorbing 07
- Floating 08
- Rammed 09
- Mycelium concrete 10

Obvious / Urban Furniture

01 Hollow Core Slab

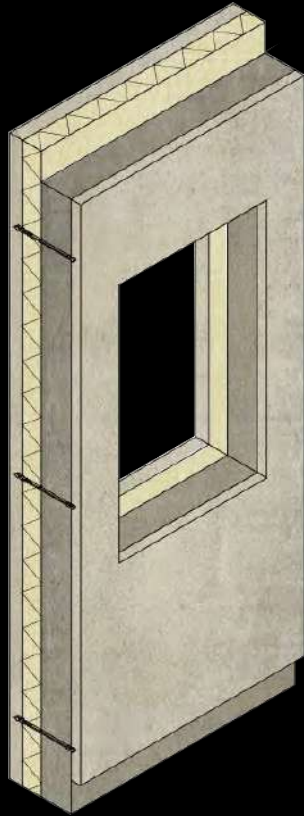


Benefits:

- Market Share
(popular in Northern Europe)
- Material Efficiency
- Standardisation
- Installation Speed

Obvious / Urban Furniture

02 Insulated Precast Double Wall

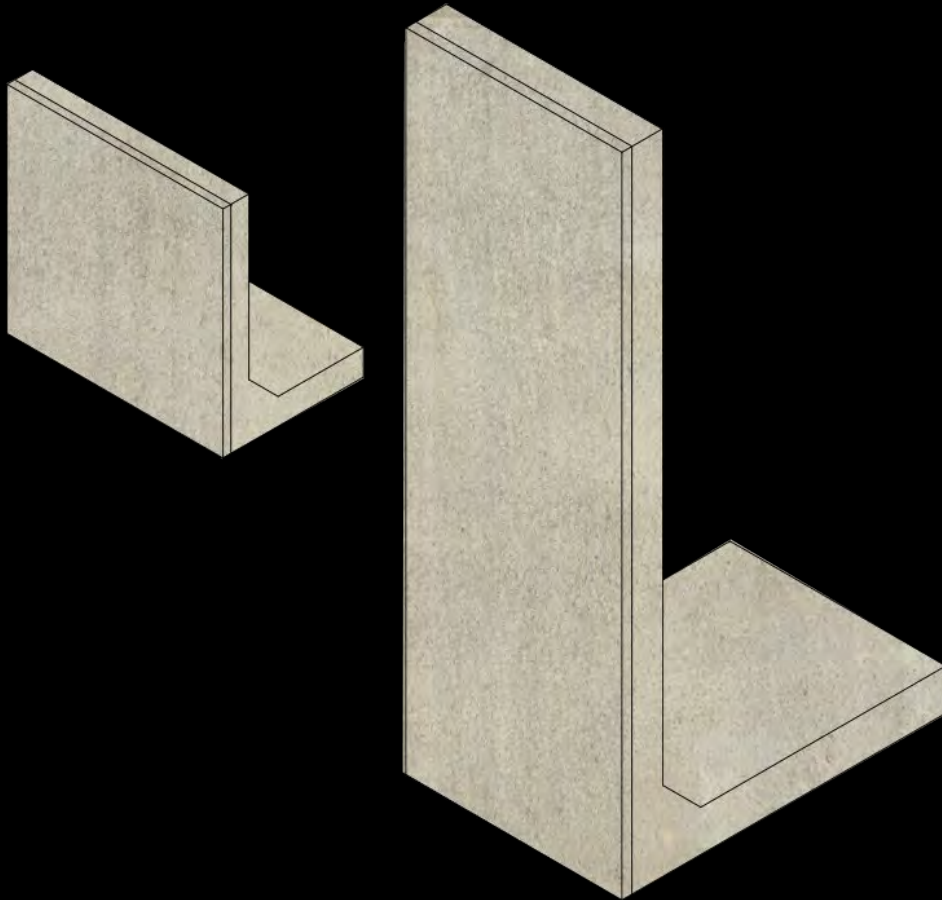


Benefits:

- Mass Production
- Time Efficiency
(installation speed)
- Monolithic Construction
- Bio-based insulation

Obvious / Urban Furniture

03 Retaining L-elements



Benefits:

- Convenient typical application (such as highways, railways)
- Installation speed
- Cost-effectiveness
- Exposed surface is multifunctional
- Porous layer = Acoustically absorbing

The Obvious / Urban Furniture

04 Collision Blocks



Standard

“SeRaMCo Product Line”

Benefits:

- Mass production
- Broad spectrum of application = large volume of recycled aggregates and cement
- Multifunctional (f.e. fluorescent/ air purifying)
- Safeguard for area

The Obvious/Urban Furniture

05 Traffic Guidance

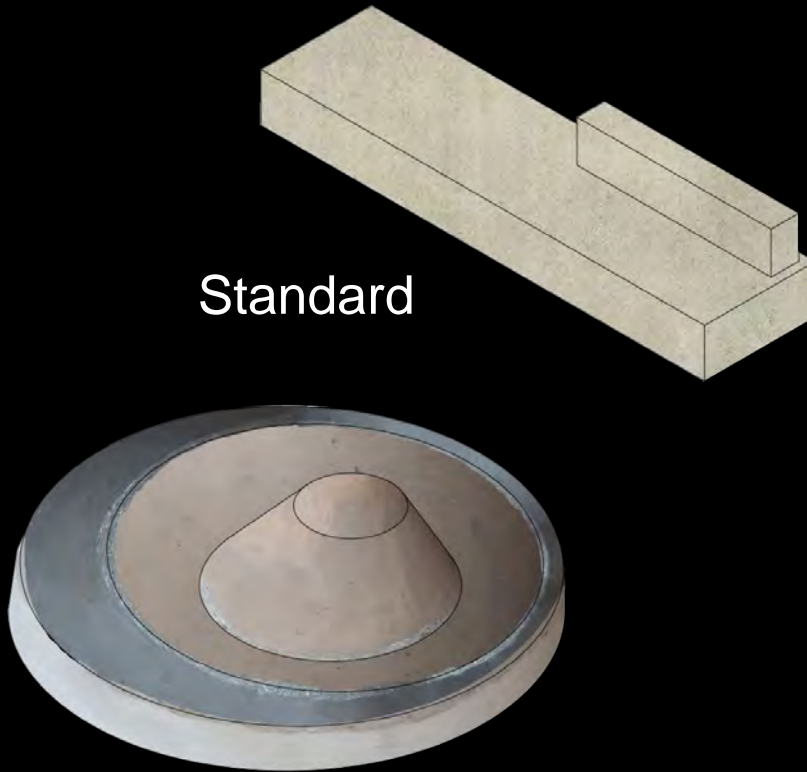


Benefits:

- Mass production
- Broad spectrum of application = large volume of recycled aggregates and cement
- Multifunctional (f.e. fluorescent/ air purifying)

The Obvious/Urban Furniture

06 Bench

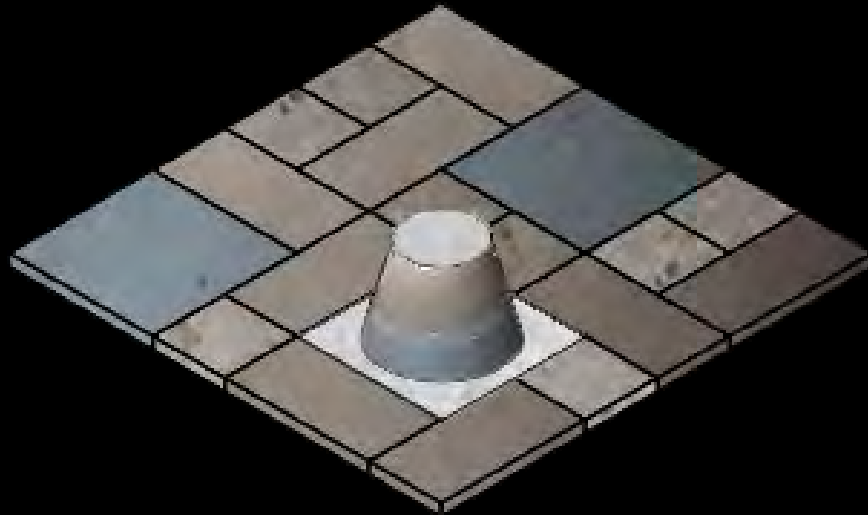


Benefits:

- Involves user (awareness)
- Much used product
- Can expose multiple applications of recycled concrete: aesthetic
- Multifunctional (f.e. fluorescent/air purifying)

The Obvious/Urban Furniture

07 Pavement Tiles



Benefits:

- Involves user (awareness)
- Much used product
- Can expose multiple applications of recycled concrete: aesthetic
- Multifunctional (f.e. fluorescent / air purifying / soaking)

Innovative

- Living 01
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- Mycelium concrete 10

01 Living



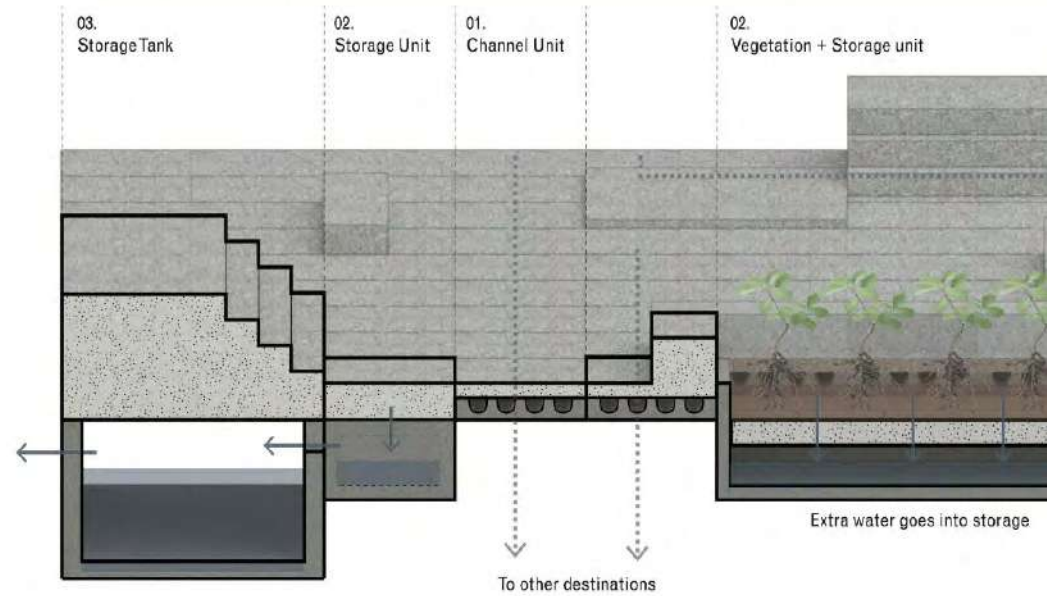
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02 Retrofitting



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03 Soaking

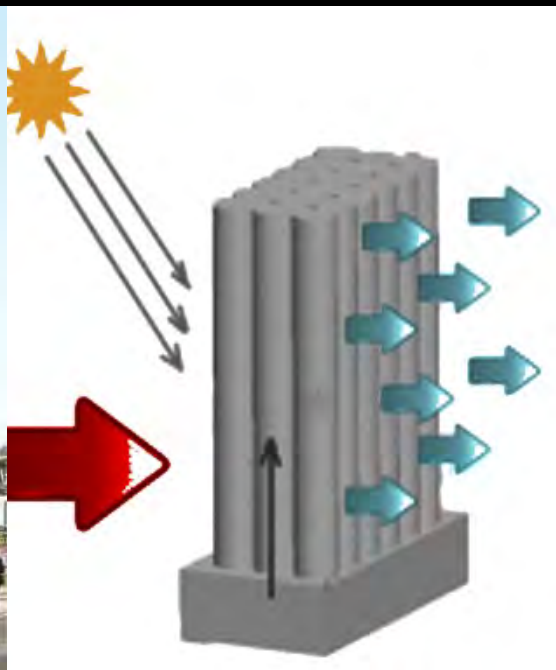


04 Salt concrete

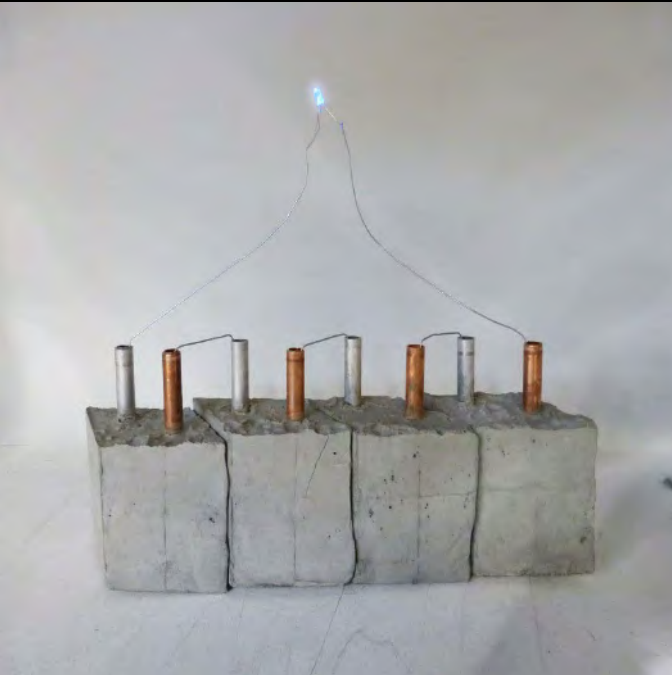


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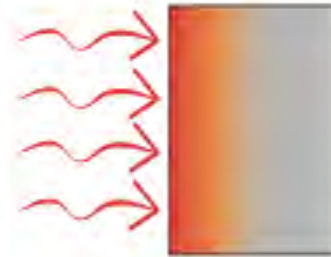
05 Cooling



06 Energy storing



Electric energy, using concrete as a conductor

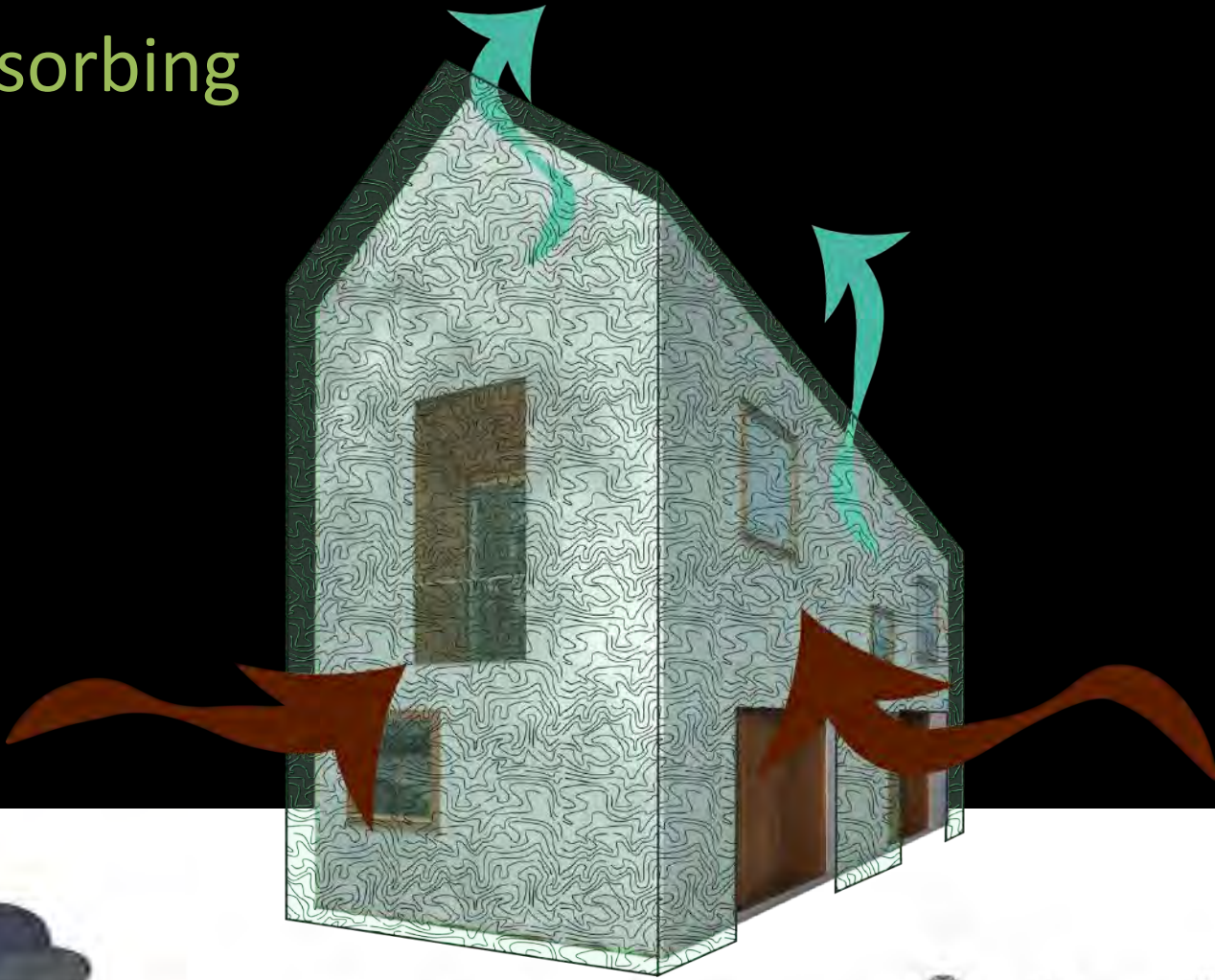


Thermal energy storage, activating concrete

$$E_{\text{kin}} = 1/2 m v^2$$

Kinetic energy storage

07 Dust absorbing



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08 Floating



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09 Rammed



10 Mycelium concrete



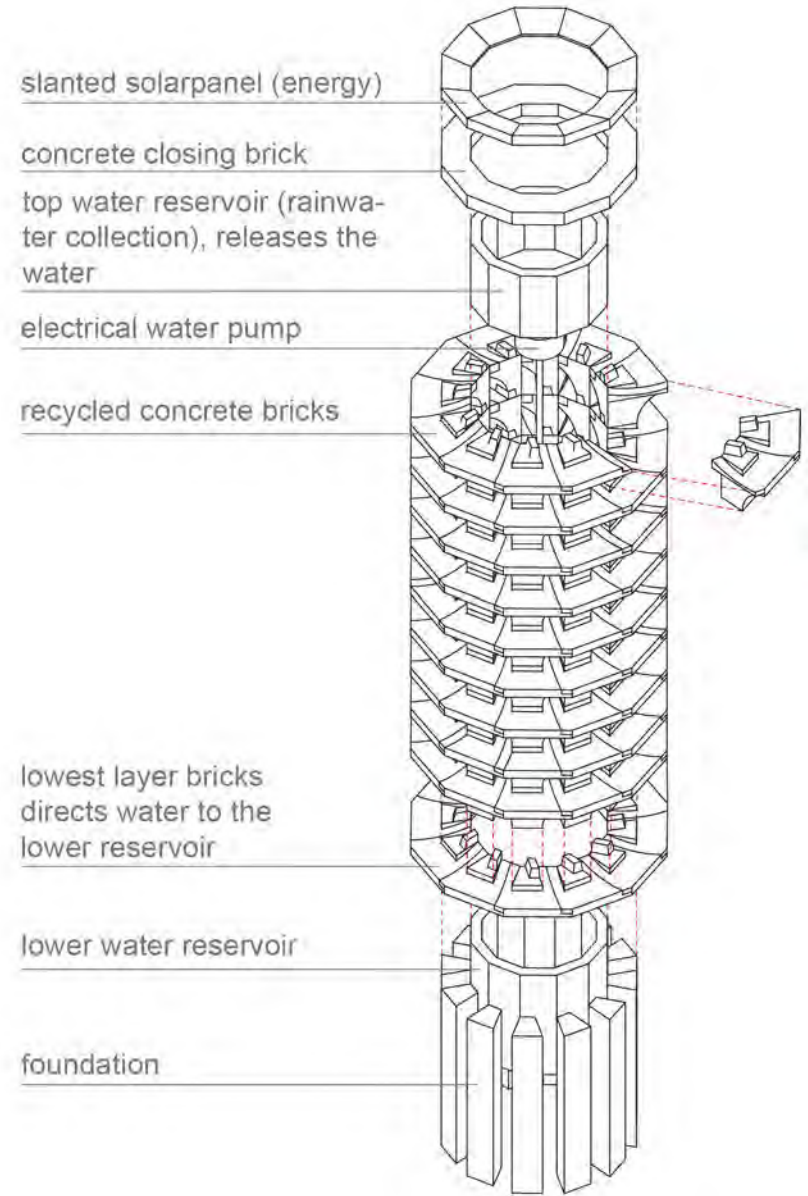
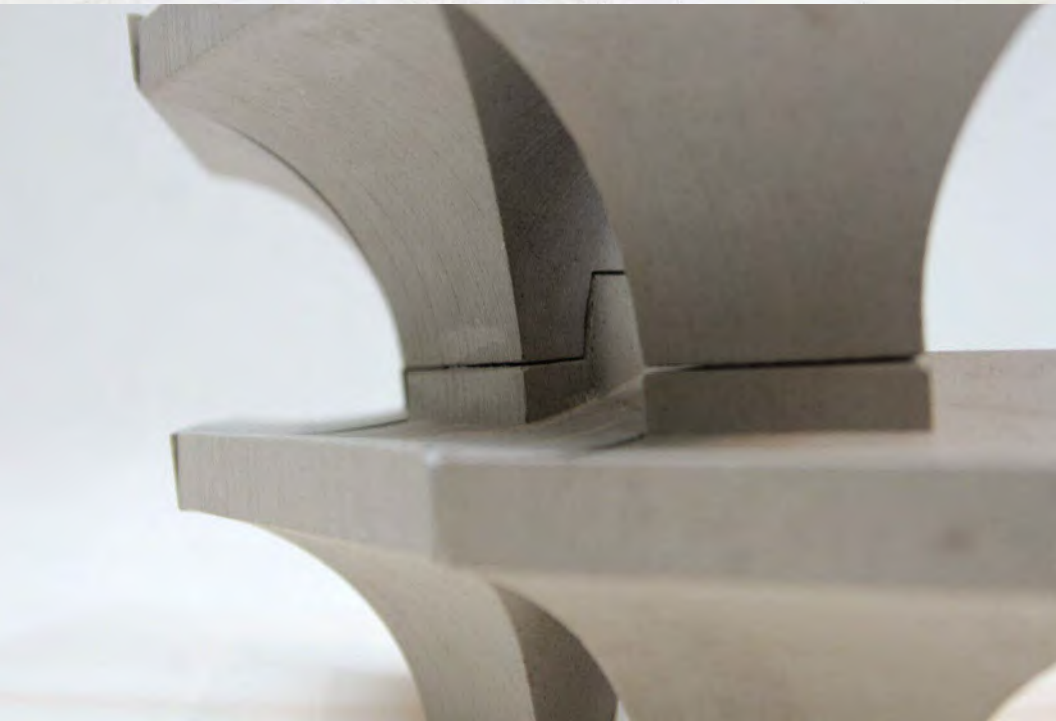
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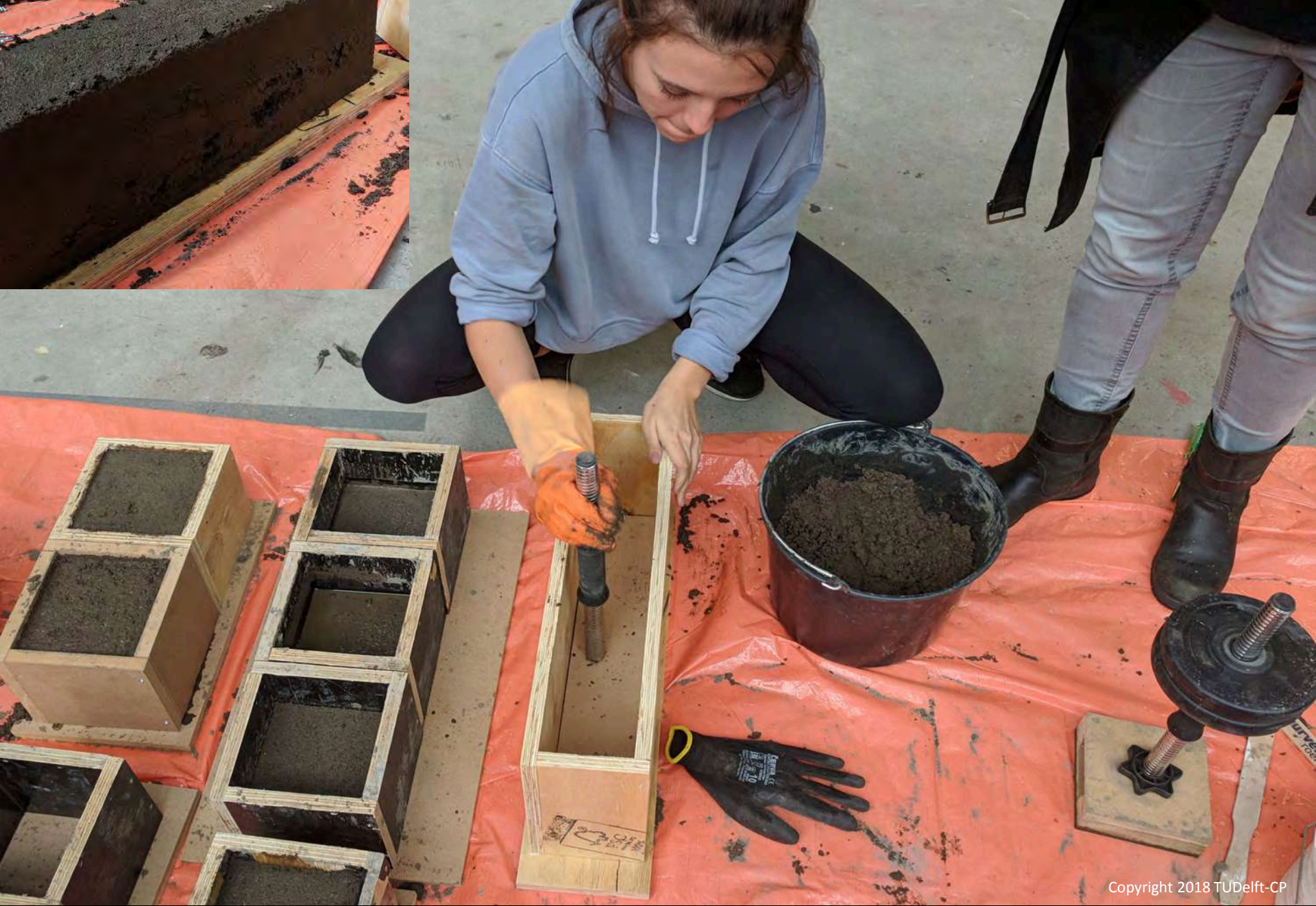
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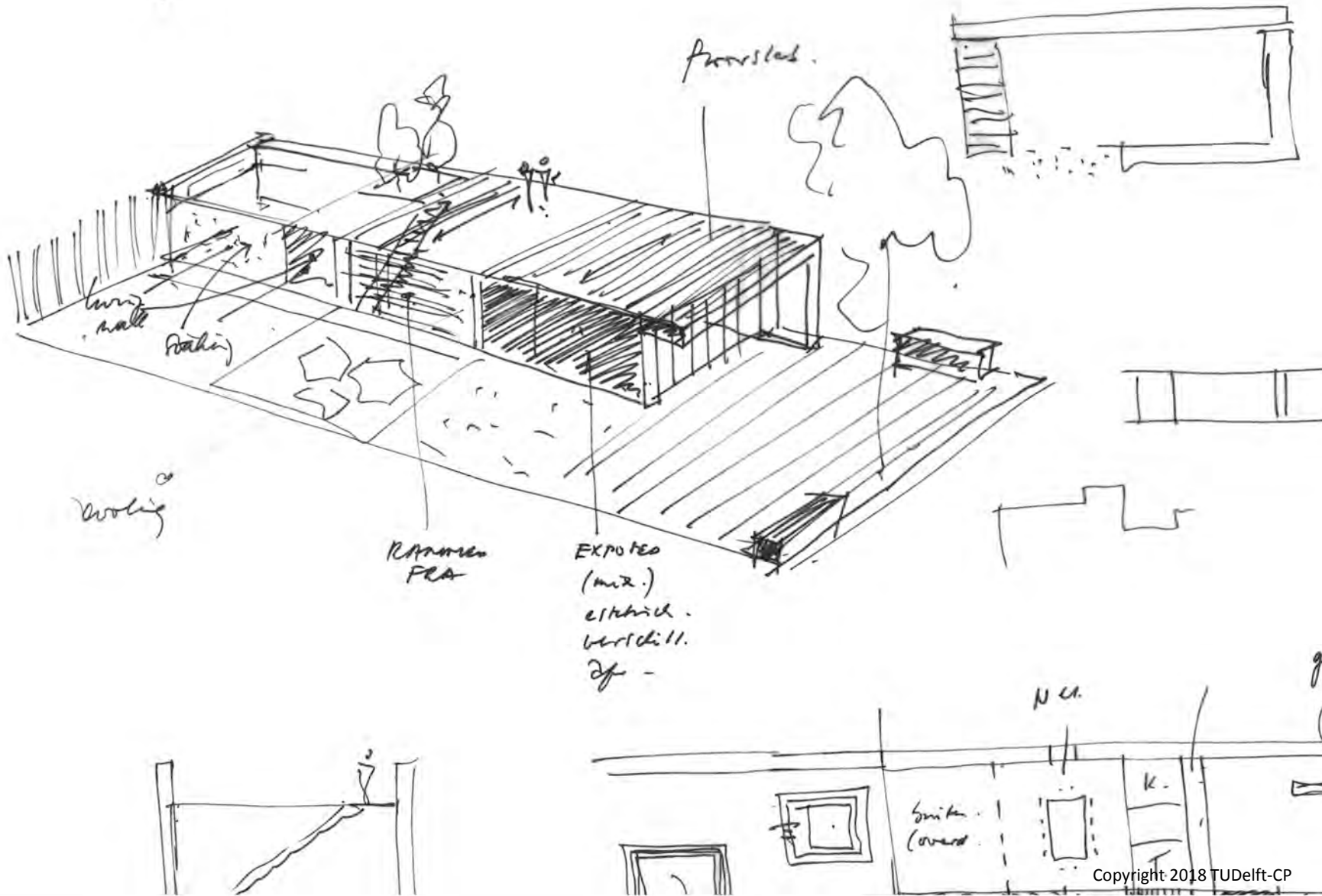
Obvious / Urban Furniture

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innovative

- Living 01
- Retrofitting 02
- Cooling/Soaking 03
- Salt Concrete 04
- (Storing) Energy 05
- Dust absorbing 06
- Rammed 07

designed product line SeRaMCo



1 / 1 / 1

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Sept '18

Dec '18/Jan '19

Feb/Mrt '19

Sept '18 →

Jan'19 → June '19

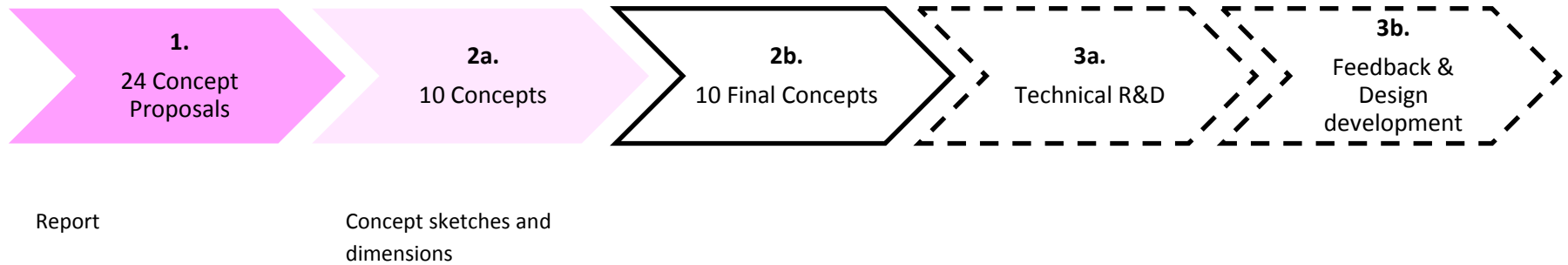
Documented in this report

10 architectural specifications including 2D representation of the product designs

10 architectural specifications including 2D representation of the product designs finalised

Structural calculation and technical development by project partners

Opportunity to sharpen the designs jointly





Secondary Raw Materials for Concrete Precast Products

PP Report contributing to WP T3.A1

Conceptualisation of potential precast products –
EVALUATION OF THE PRODUCT CONCEPT PROPOSALS

Project Partner; TUD - Faculty of Architecture and the Built Environment

Oct-18



Preconditions for (concept) product development:

- Resource availability
- Global relevance
- Architectural and product quality

> will create market demand

THANK YOU

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TUDelft 28nov2018

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