Anders Kruse Aagard

- Background/Previous work

Diploma project

Workshop

- PhD-project

Research topic

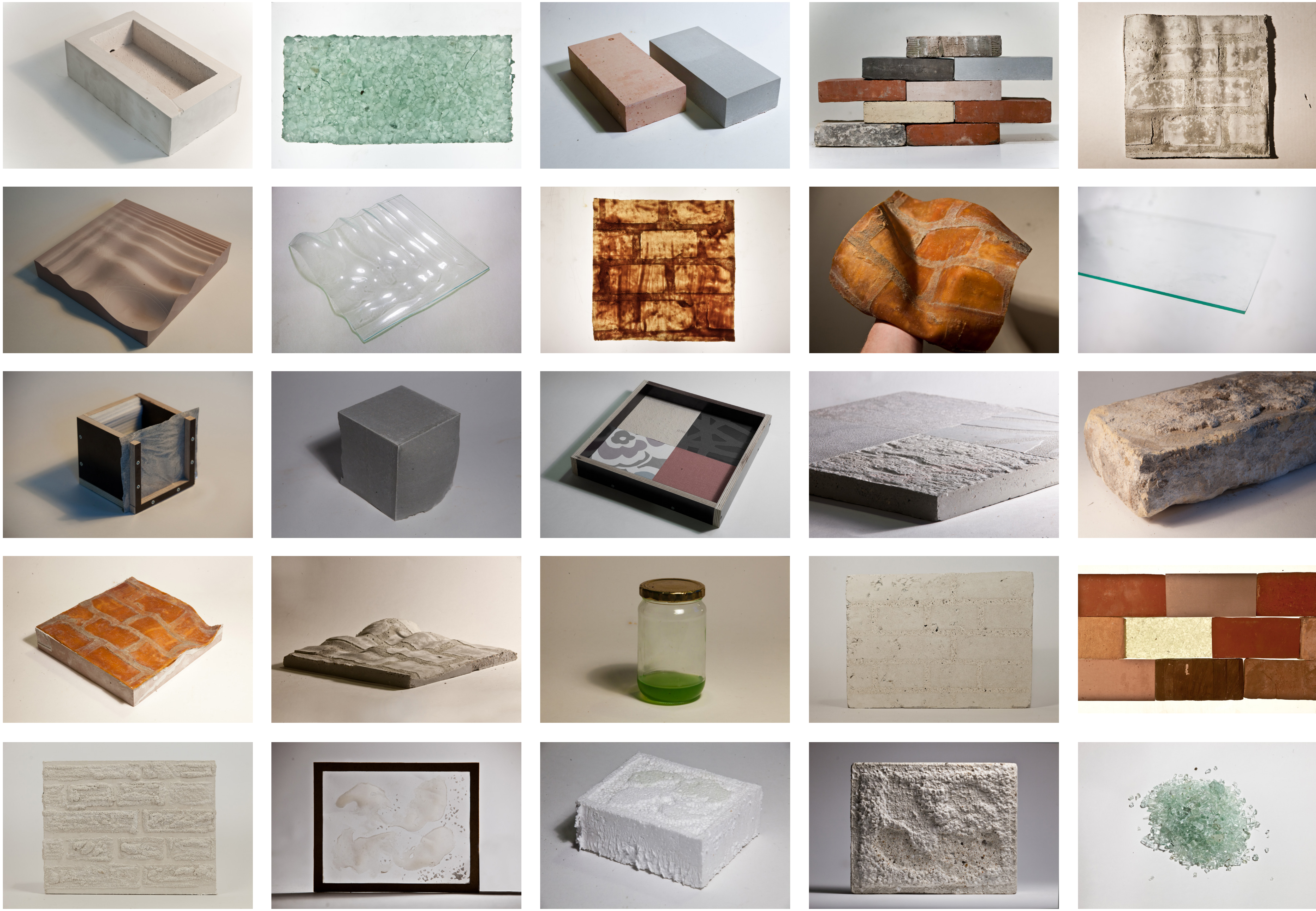
Study frame

Experiements

Future

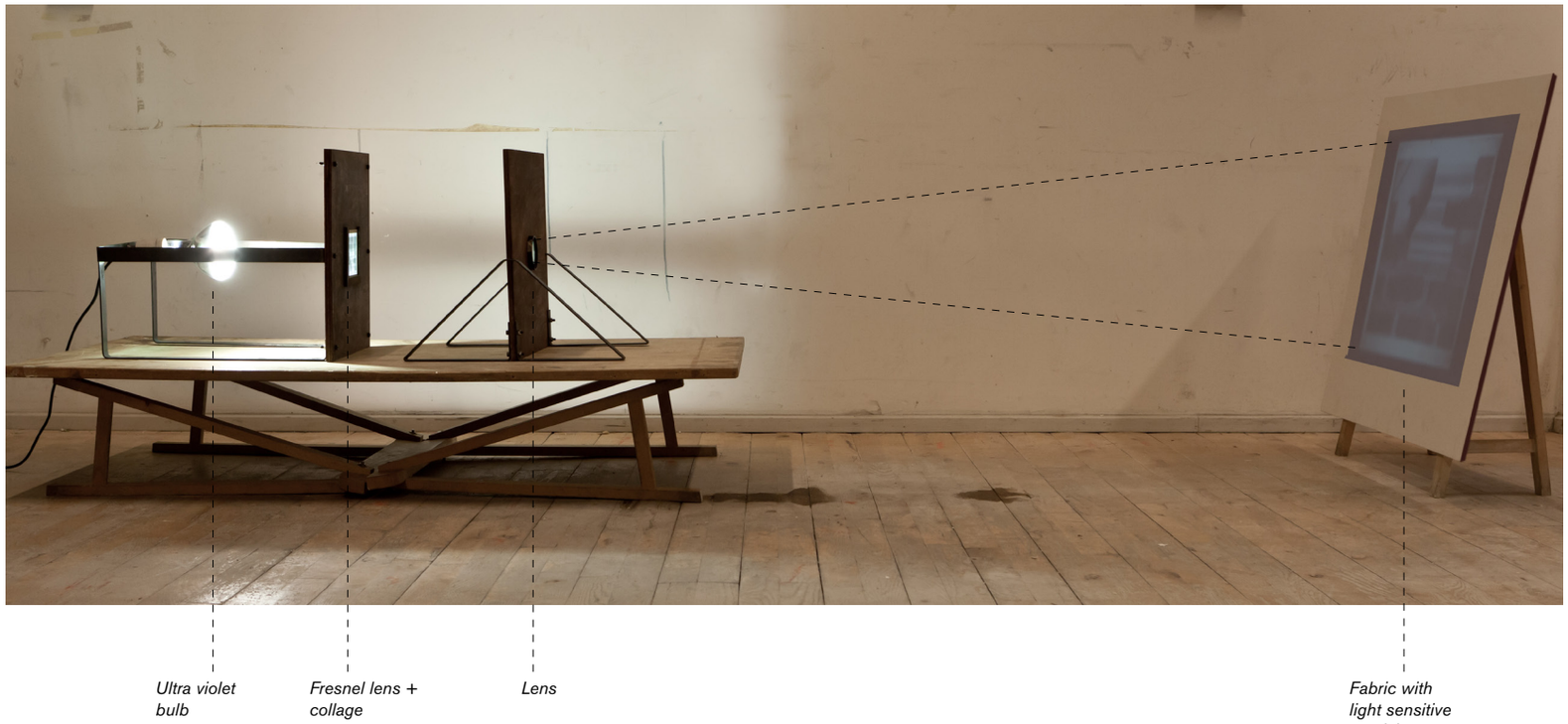
BACKGROUND

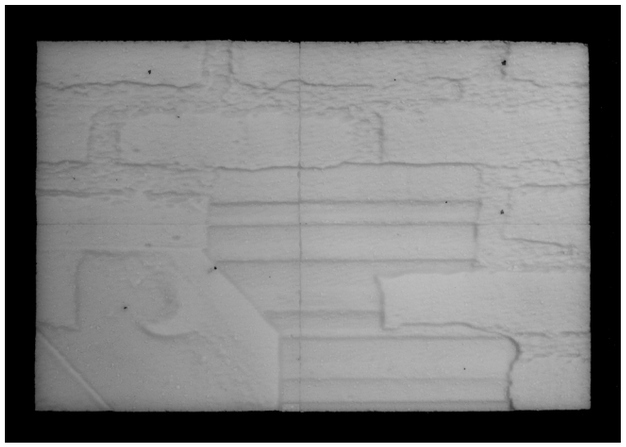
Diploma Project: *CONCRETE 21-21 51 AVENUE, QUEENS 11101*

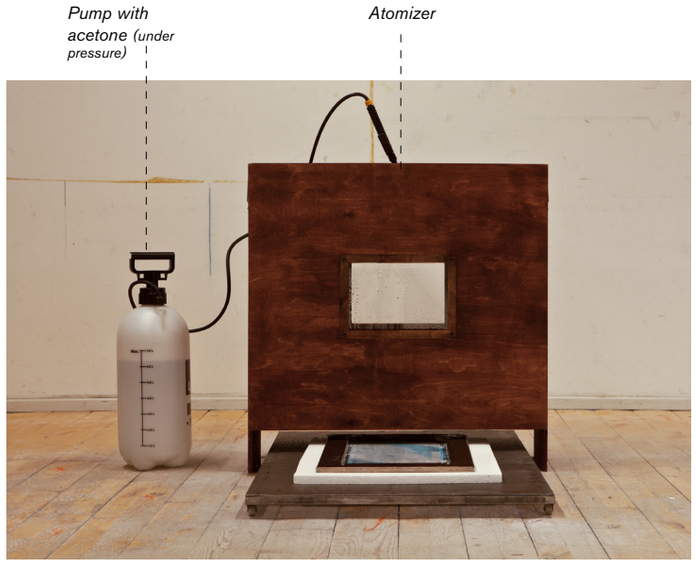


BACKGROUND

Diploma Project: *CONCRETE 21-21 51 AVENUE, QUEENS 11101*







KEYWORDS: *Exploring and controlling materials and processing of materials. Translations between the two- and the three-dimensional.*

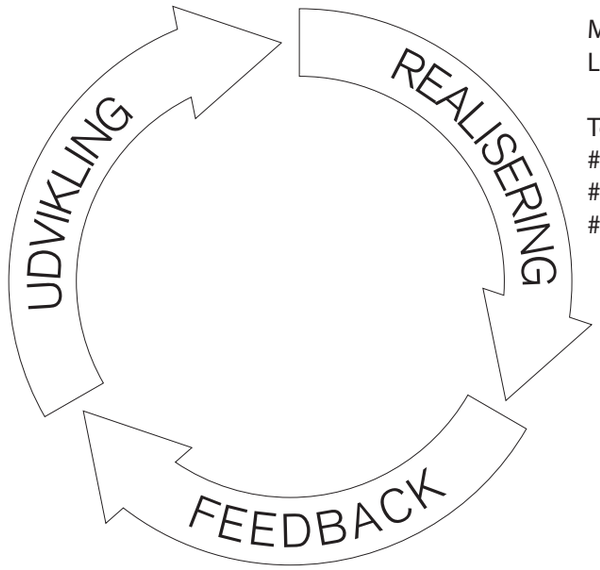
BACKGROUND

Workshop: *THREE-DIMENSIONAL ITERATIONS*

together with Kasper Riis
for 2nd year students

Description:
This course aims to establish an iteration based workflow of designing and realising in scale 1:1. The methodology of iterative project development is introduced through a loop of digital design, digital manufacturing and digital data collection. Each loop will generate an iteration and knowledge consisting of a representation, a realisations and an evaluation. Each iteration will be the take-off for the next.

LECA - WATERJET - 3D SCAN



- Program (konstant)
- Placering (variabel)
- Kontekst (variabel)

Materiale (konstant):
Leca 600 blokke

Teknologi (variabel):
#1: By hand
#2: Waterjet IKC (”2D”)
#3: Waterjet SLD (3D)

- 3D-scan (konstant)
- 1:1 afprøvning (konstant)
- Design evaluering (konstant)

KEYWORDS: *Iterative design.*
Connecting the digital representantion to the physical realisation.
Combining real materials and digital fabrication to as ‘sketch’-like process.

PHD-PROJECT

‘THE ITERATIVE REALISATION’

The project wishes to investigate the potentials of digital fabrication methods within the field of material processing.
The project will focus on three materials - steel, concrete and wood - and explore processing opportunities, property modification and potentials through digital fabrication.

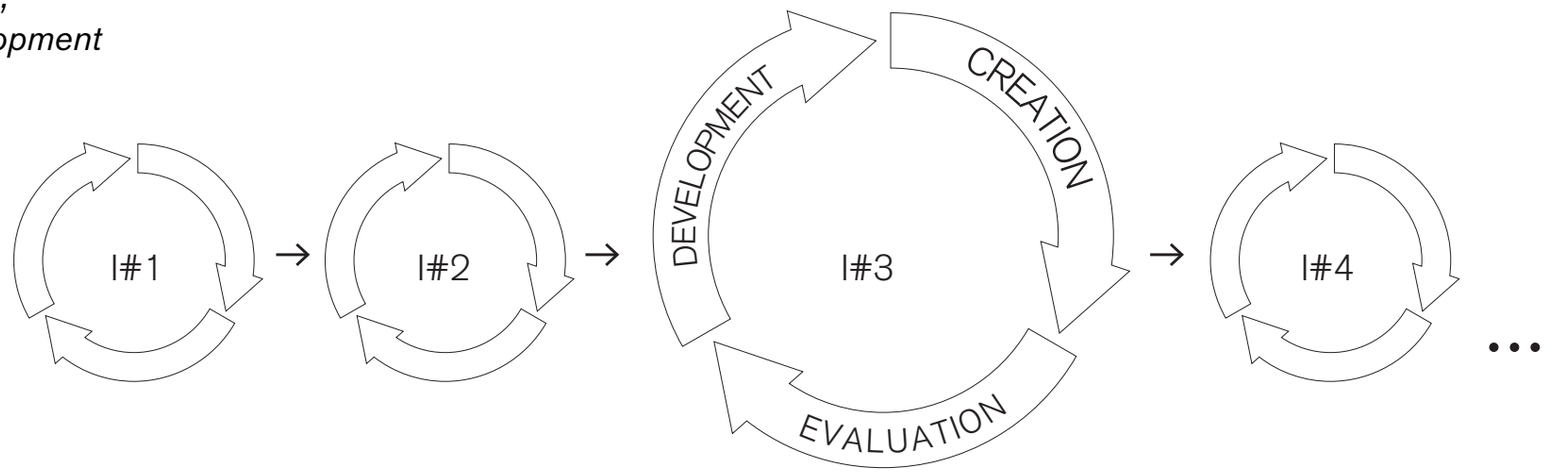
The project revolves around the use of digital fabrication as a generator for a real process of development where design and realisation happens coherent instead of being apart - integrating the digital fabrication tools in the development and sketching process.

Q: How can digital fabrication tools establish an iterativ process of realisation in a material focused, architectural strategy of development?

PHD-PROJECT
'THE ITERATIVE REALISATION'

The project seeks to integrate the use of digital fabrication into the iterative nature of a ongoing sketching or development process.

AN ITERATIVE PROCESS:
Allows an fast-evolving, flexibel, incremental and intuitive development



DIGITAL FABRICATION WORKFLOW[1]:
Transform the digital representation to real physical object

CAD → Geometry Exchange (.igs, .dxf, .stl ...) → CAM → G-code (.gc, .nc, .iso ...) → CNC-controller → **CNC-Machine** + **Material** } = Object

1 Yves Ebnöther, Industrial Design, Zurich,

PHD-PROJECT

'THE ITERATIVE REALISATION'

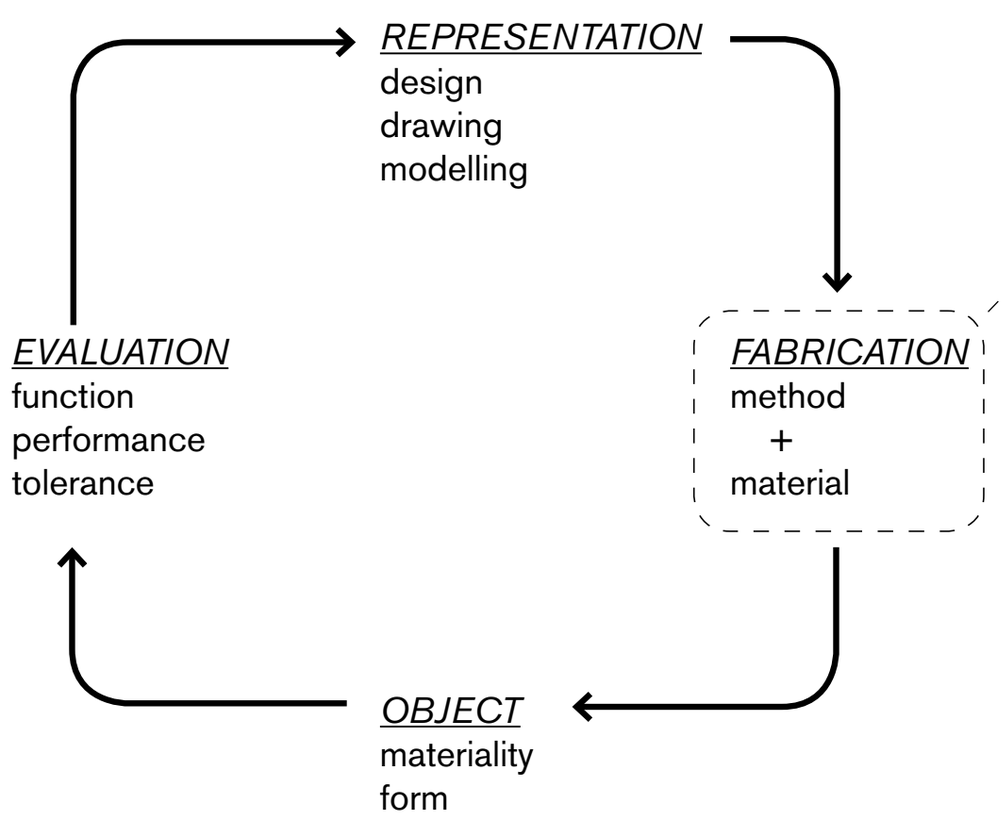
DIGITAL FABRICATION IN AN ARCHITECTURAL DEVELOPMENT PROCESS

POTENTIAL:

- Existing design and representation tools - CAD - initiates the digital fabrication workflow
- Digital fabrication allows large scale and real materials
- Fabricated objects can be evaluated on real conditions and inform further development

→ Architectural representation can be linked directly to realisation. Representation and realisation can inform each other through the design process

ITERATIVE REALISATION:
(under construction)

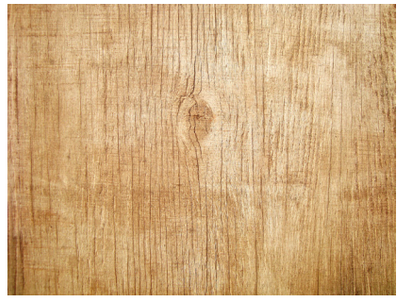


Fabrication is consisting of method/ technology and material. The focus on these parameters will be central for the project, since the realisation and evaluation depends on the fabrication output.

MATERIALS:

From homogeneous to heterogeneous
From the solid to the liquid

STEEL
solid, homogeneous

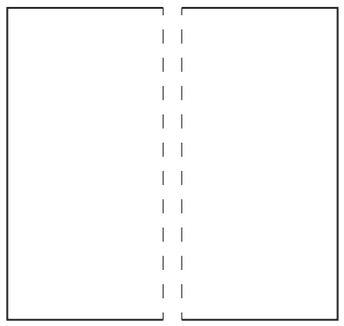


WOOD
solid, heterogeneous

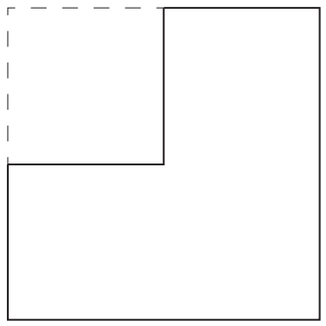
CONCRETE
liquid, homogeneous

PROCESSING METHODS:

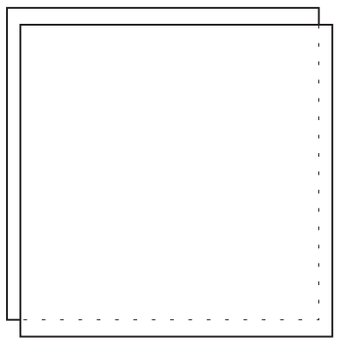
The methods are derived from tangible digital fabrication machinery, but are not necessarily seen as machine specific or limited to machine processing.



DIVIDE



SUBTRACT



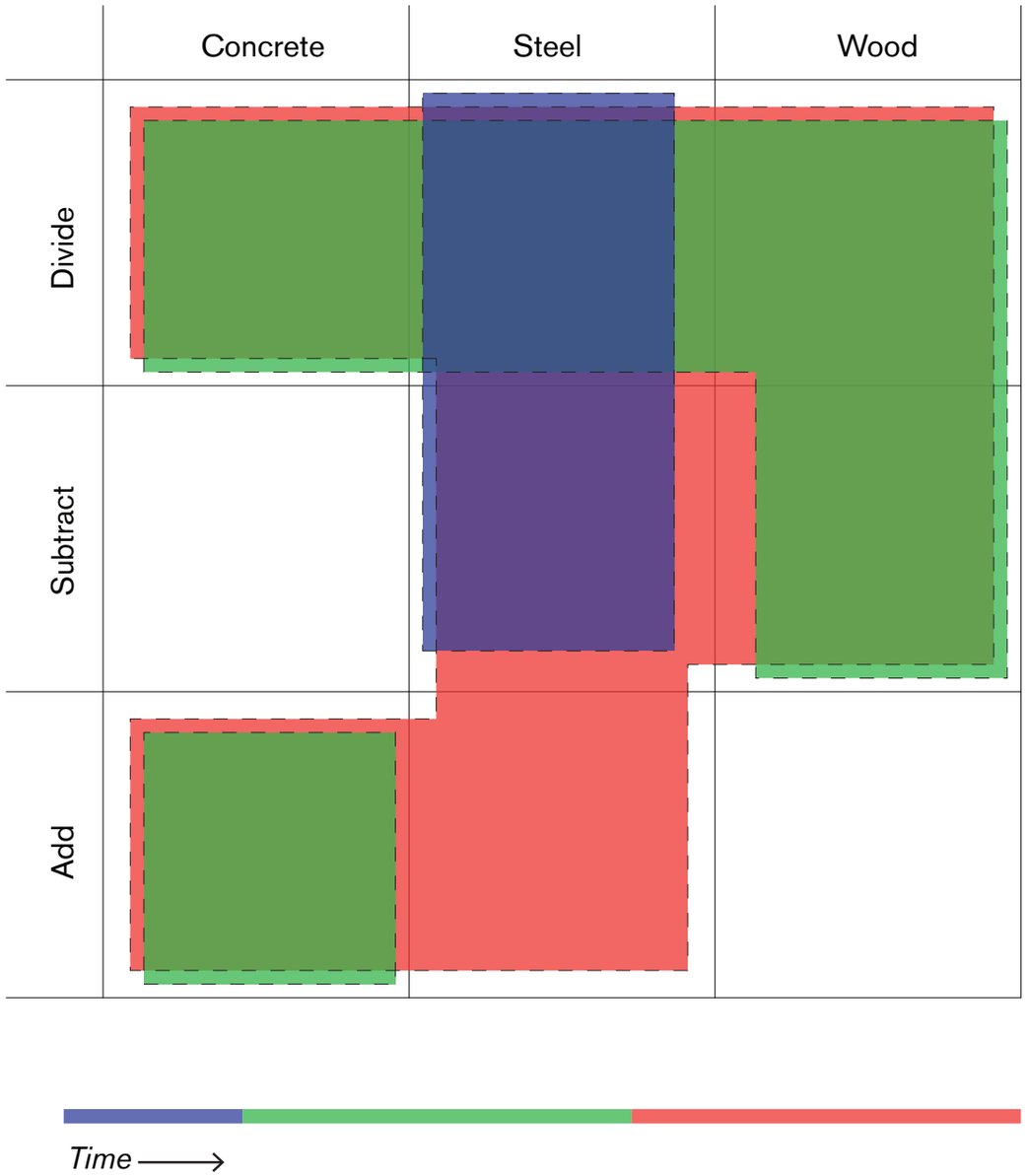
ADD

PHD-PROJECT
'THE ITERATIVE REALISATION'

STUDY FRAME AND STUDY SPACES:

Materials and processings methods together forms a matrix - a study frame - with study spaces planned inside. The study spaces have different composition of materials and methods, different levels of complexity and different design agenda.

(Study spaces, their agendas and names are not frozen yet)



Space 1 - ***Gradient***

Q: How can a sheet of steel be processes to gradually, fluidly change materials proporties?

Space 2 - ***Interchange***

Q: How can concrete, steel and wood meet each other in a interchange of material properties and qaulities?

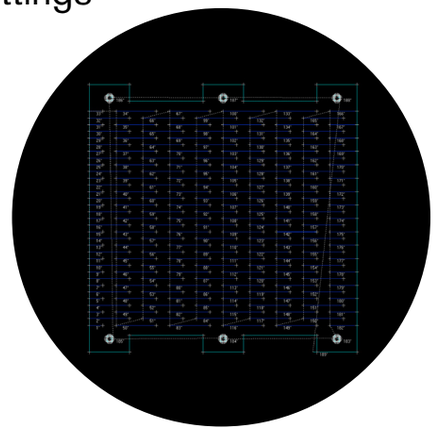
Space 3 - ***Composite***

Q: How can a combination of concrete, steel and wood be processes to wholes where the induvidual material proporties support each other?

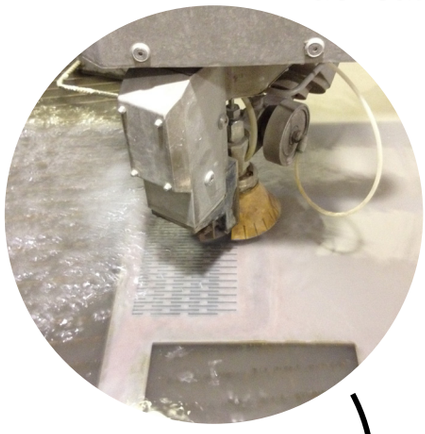
PHD-PROJECT
'THE ITERATIVE REALISATION'

STUDY SPACE 1 - GRADIENT
Construction an iterative realisation process.

CAM
Fabrication preperation
Tool settings

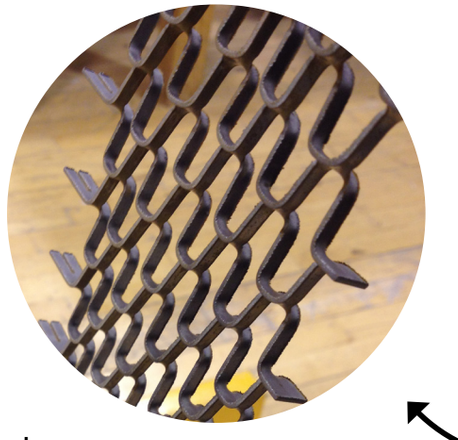


CNC-machine
Fabrication

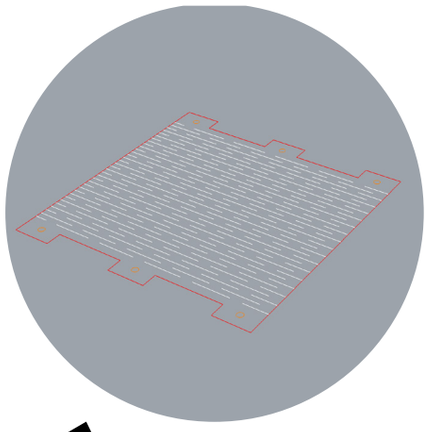


Postprocessing
Object activation

Evaluation
Geometry analyse
Tolerances, function, performance
Problem mapping



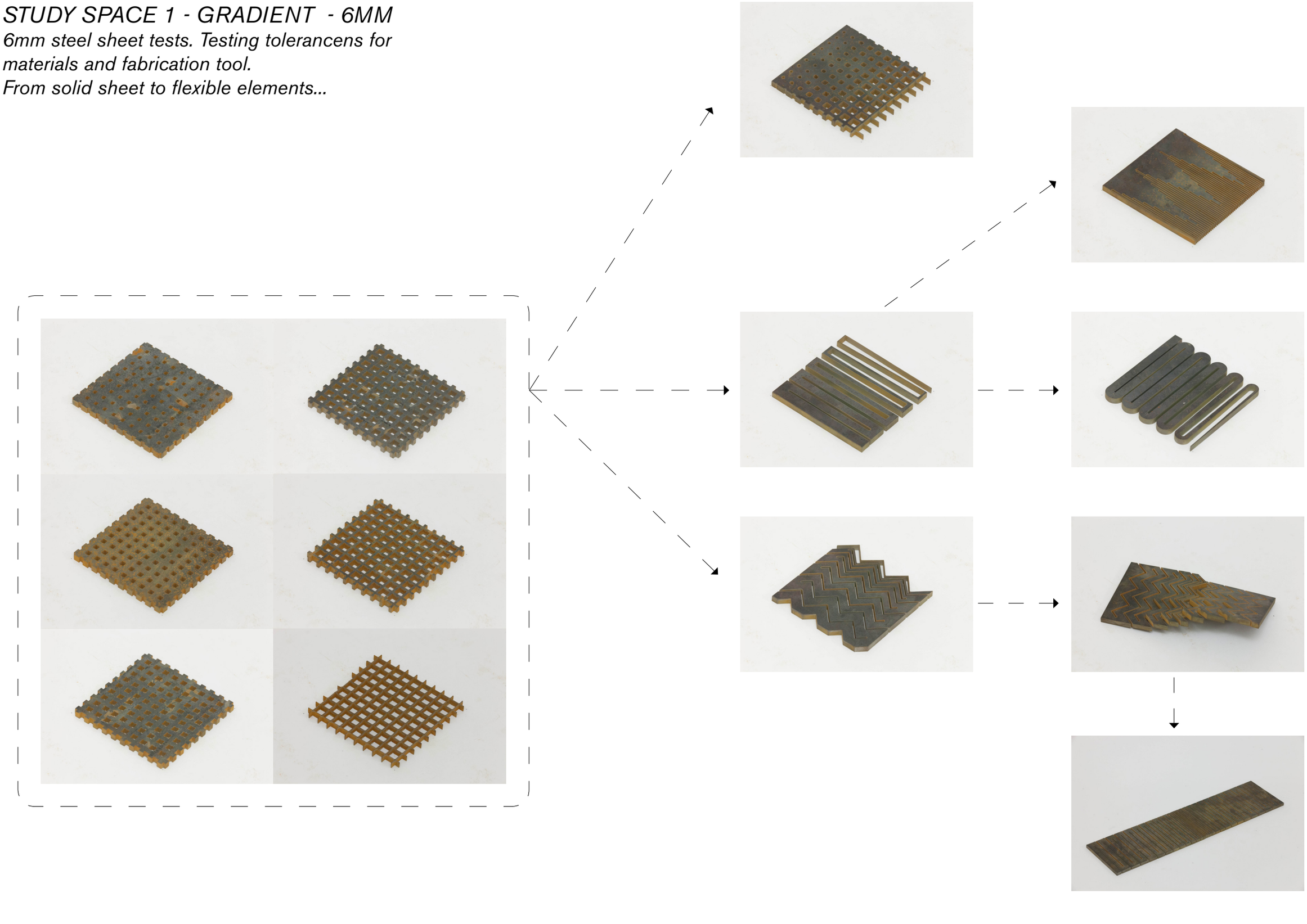
CAD
Geometry design



PHD-PROJECT
'THE ITERATIVE REALISATION'

STUDY SPACE 1 - GRADIENT - 6MM

6mm steel sheet tests. Testing tolerancens for materials and fabrication tool.
From solid sheet to flexible elements...

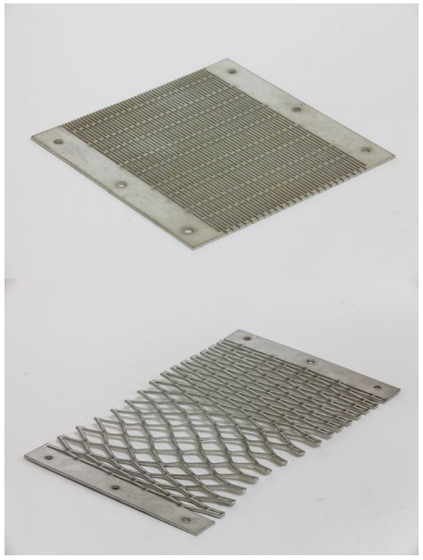


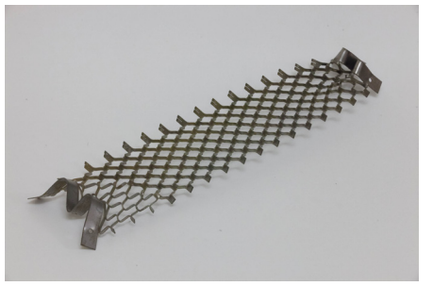
PHD-PROJECT

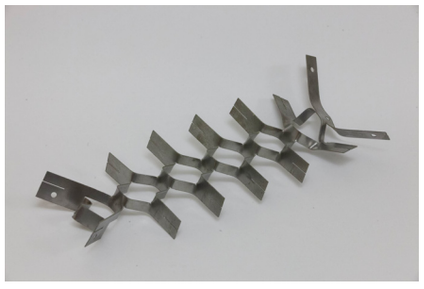
'THE ITERATIVE REALISATION'

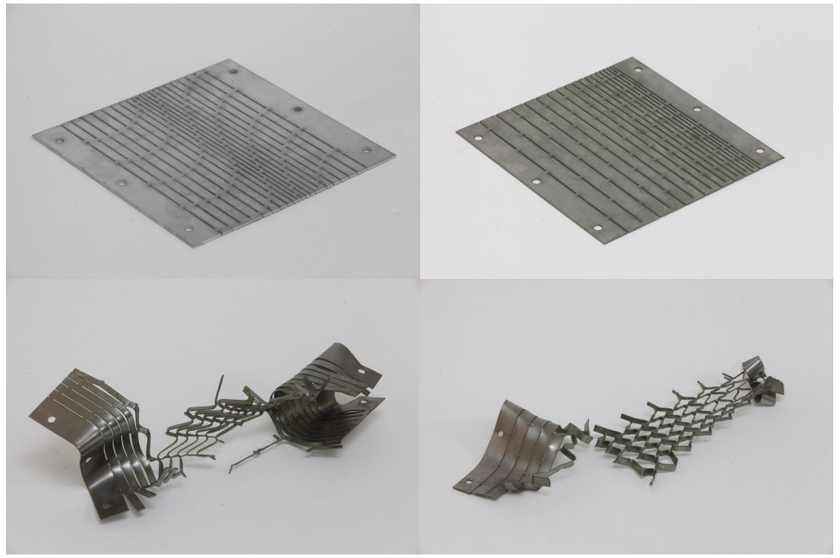
STUDY SPACE 1 - GRADIENT - 1MM

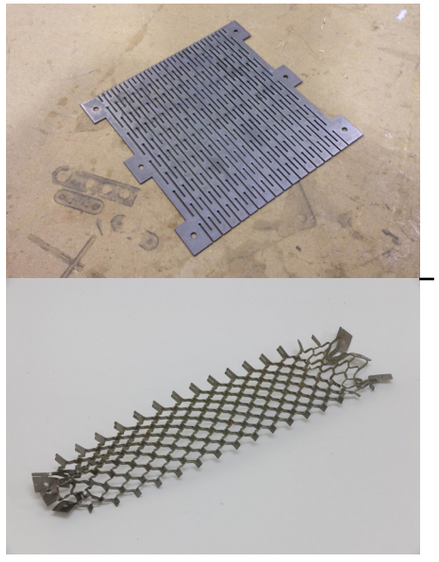
1mm steel sheet experiment.
Stretching geometry.
From thin 2D sheets to stiff 3D structures

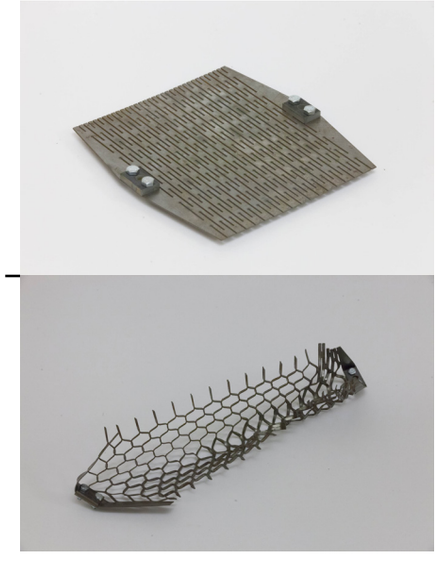


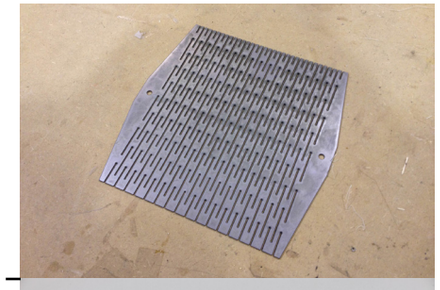


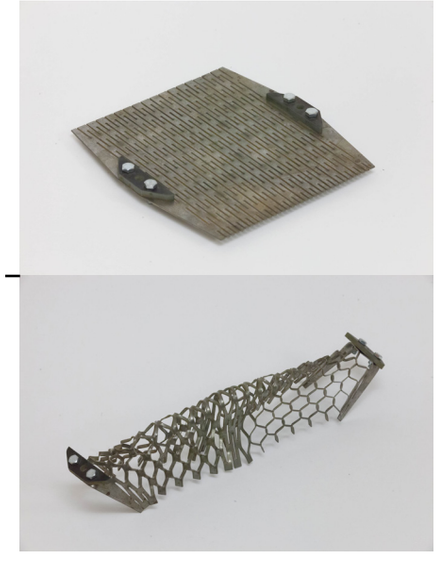


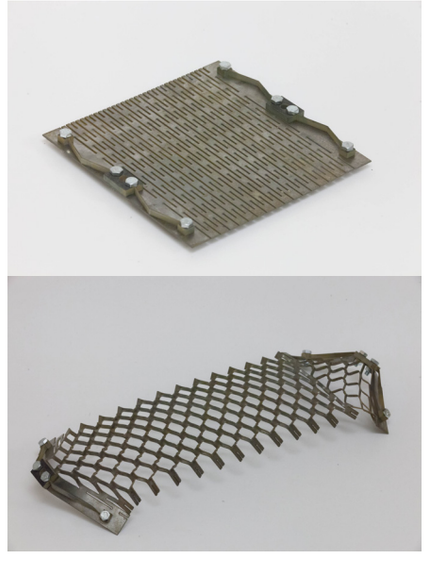












FUTURE:

Experiment (Space 1):
Further development of Gradient experiment.
Gain full control of geometry and postprocessing.
Larger scale.
Develop evaluation

Future experiments:
Refinement of study spaces and their agenda.
Schedule and experiment circumstances

Contextualisation:
Existing experiments and articles
Relevant overalls discussions and meta-layers
Broader discussion of the potetial of digital fabrication in the hands of architects

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