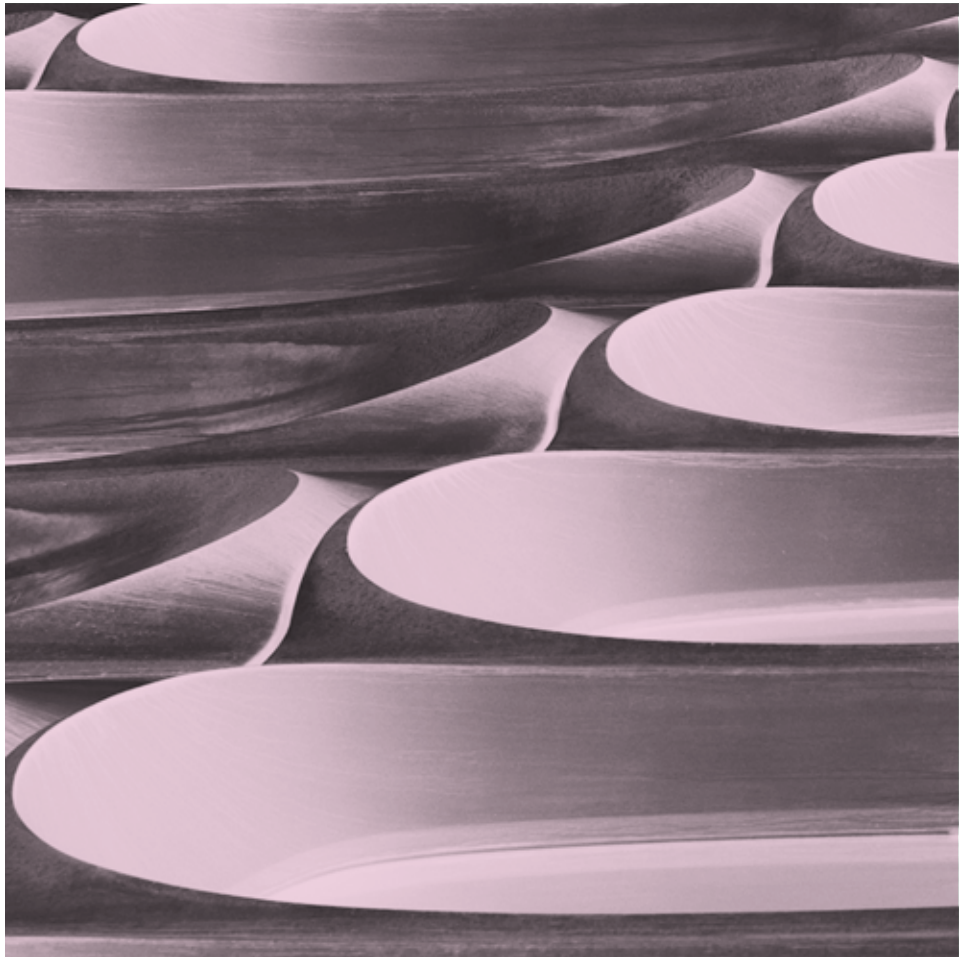
CONCRETE
DESIGN
COMPETITION
2017/2018

TACTILITY



WWW.CONCRETEDESIGNCOMPETITION.COM

FOR MORE INFORMATION

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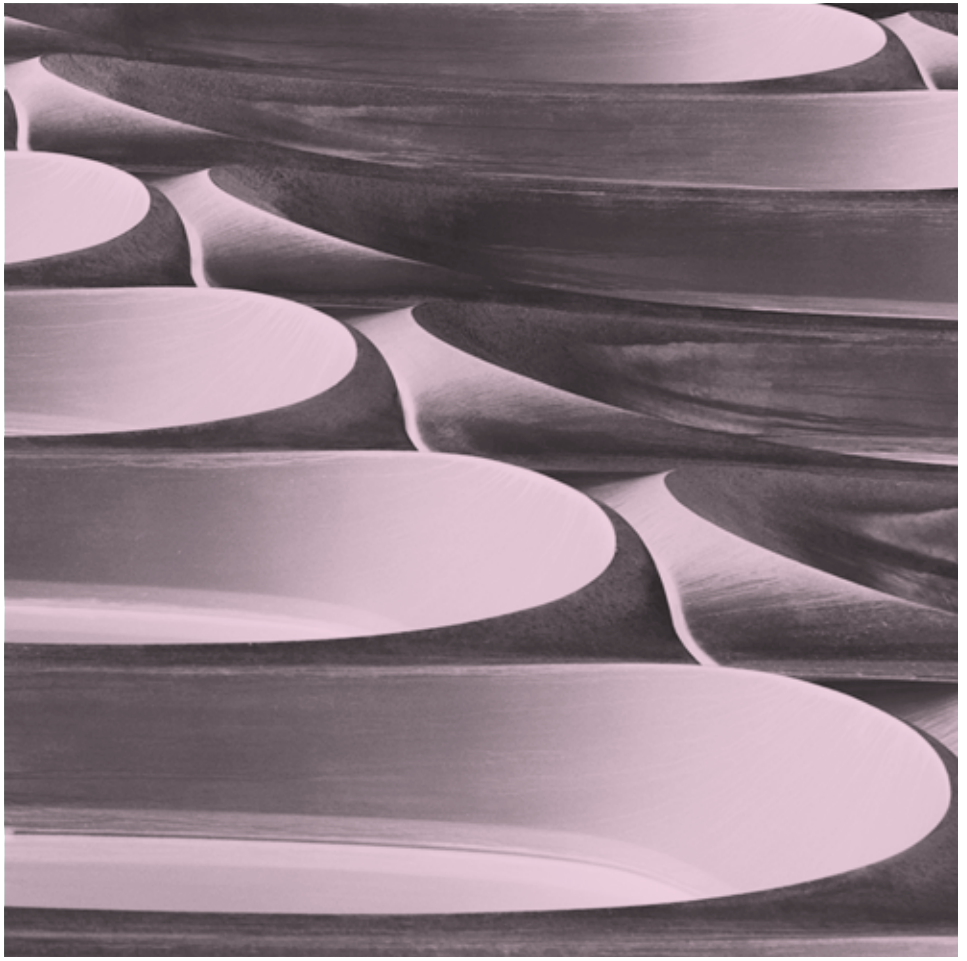
bureaubakker – Siebe Bakker – mail@bureaubakker.com



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THE CONCRETE DESIGN COMPETITION

The International Concrete Design Competition for Students is a biennial ideas and design competition for students in architecture, engineering, design and affiliated disciplines. It is organized and funded by a consortium of European cement and concrete associations and open for students registered in an educational institute in one of the participating countries.

The International Concrete Design Competition for Students aims at promoting innovative design attitudes related to the use of concrete as a material and a technology. It is characterized by its format: each competition cycle is framed by a theme designating a specific property of concrete. Nationally chosen laureates are invited to participate in an international master class. This master class continues the investigation of the theme.

The International Concrete Design Competition for Students is material based. It focuses design attitudes towards material as a design-leading phenomenon. It does not prescribe ‘traditional’ design requirements like programme, location or typology. It asks participants to explore and exploit the potential of the material in a design-led environment. They are invited to approach the material from within its own merits and to push its potential to ‘realise’ developed ideas. It asks to present these ideas through design proposals. Ideas can only show their merits when they are applied. The choice of a design topic or programme is free. It should be chosen such that it presents the participant’s ideas as accurately as possible and can range from building details to large structures, landscape projects or building complexes.

The International Concrete Design Competition for Students is ‘open’ for adaptations. It’s character offers a platform for material research and design that can either be approached individually as a complete assignment or it can be incorporated within ‘host’ design and research assignments and thus becoming part of existing curricula.

The International Concrete Design Competition for Students is an initiative by a collaboration of European cement and concrete associations. Their aim is to promote innovative design attitudes related to concrete. They recognise that the use of concrete as an architectural medium shows room for improvements and development. They see the material not only as a means to ‘solve’ formal design ambitions. Material research and understanding will lead to innovative design and create possibilities for architects, designers and engineers to surpass existing limitations and visions.

The International Concrete Design Competition for Students also recognises the abundant energy, enthousiasm and potential of those studying architecture, engineering and design, the future professionals that will work with concrete. The cement and concrete associations are convinced this competition offers additional expertise alongside the regular education on materials students receive. In order to learn about and understand a material one has to experience and explore its properties, preferably in a design-led environment. This competition including its master class for laureates offers a unique opportunity to be part of future developments and to immerse oneself in conditions where materials are at the core of developments and design.

TACTILITY

Concrete is often perceived as gray, dull and cheap. Indeed it is the most used construction material in the world and thus can be found in many places and applications where economics, speed, and simple and safe constructions are crucial. Nonetheless, concrete is also widely deployed to express specific architectural and aesthetic desires. Concrete's nature of seamlessly copying the formwork in which it is made - in terms of shape and texture -, makes it an ideal material to create many different expressions. Varying from raw and rough 'beton brute', to sleek and slender high-performance structures and ultra-dense maintenance-free surfaces. Concrete provides designers with endless possibilities to create slightly varying repetitions with pre-cast façade elements, truly three dimensional spatially complex building components, and as many surface treatments and textures one can imagine.

Tactility may be viewed as one of architecture's main languages. We all recognize craftsmanship and beauty in cleverly detailed and exquisitely executed pieces of architecture. From sensual wall textures in the works of Ando and Chipperfield, to sturdy and revealing structures of Zumthor and Olgiati. The material, and especially the way it presents itself, might be as important as the work's sculptural and functional presence. In the best examples, these 'come together' and reinforce each other. Material gives meaning to the work and the way it is perceived. When architecture is described as our third skin, tactility should be one of our first areas of attention. Material is where architecture meets our bodies, where the building interacts with our senses.

The 8th Concrete Design Competition on TACTILITY asks students of architecture, design and engineering to explore and exploit the potential of concrete's properties with respect to any notion of TACTILITY. These can be related to inherent material properties, concrete's production process, and its application in new or existing structures. They may address aesthetic desires, structural systems or fabrication methods and comment on economic realities, sustainability demands or social issues.

This competition does not prescribe a specific location or program; participants can choose a context of their own that supports their fascinations and ambitions and that fits an acute presentation of their ideas. Proposals may range from objects, furniture and architectural details, to housing, landscape interventions, complex buildings, infrastructure and structural systems. Competition entries need to address technical and functional aspects as well as formal and programmatic ones – ideas need to be tested through design proposals to convincingly demonstrate their potential. They will be reviewed on the combination of inventiveness in addressing the competition's theme and architectural implications.

The 8th Concrete Design Competition – TACTILITY runs in three European countries during the academic year 2017 - 2018. National laureates will be invited to participate in a weeklong international workshop facilitated by the industry featuring renowned lecturers, experts and critics, further exploring concrete and tactility.

OXFORD DICTIONARY OF ENGLISH

tactile; of or connected with the senses of touch; perceptible by touch or apparently so: tangible; designed to be perceived by touch; given to touching others, especially as an unselfconscious expression of sympathy or affection

THE AMERICAN HERITAGE DICTIONARY OF THE ENGLISH LANGUAGE

tac•tile 1.a. Perecceptible to the sense of topuch; tangible. b. Characterized by or conveyeing an illusion of tangibility. 2. Used for feeling. 3. Of, relating to, or proceeding from the sense of touch; tactual.

SOME REFERENCES ON TACTILITY

Akka Art Gallery
Osaka, Japan, 1988
Tadao Ando Architect & Associates

American Cement Building
Los Angeles, USA, 1964
DMJM Architects

Art Foundation Sachsen Anhalt
Halle, Germany, 2012
AHM Architekten with G.tecz

Atelier Bardill
Scharans, Switzerland, 2007
Valerio Olgiati

Atlantic Wall
Bray-Dunes, Dunkerque, France, 1944

Bunker 599
Culemborg, Netherlands, 2010
RAAAF

Caltrans District 7 Headquarters
Los Angeles, USA, 2004
Morphosis

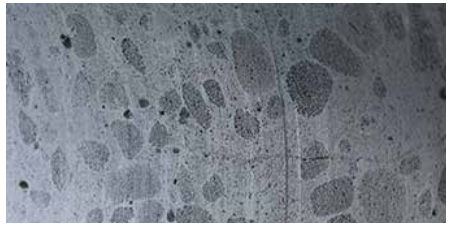
Climbing Wall
Spaarnwoude, Netherlands, 1992
Frans de Wit

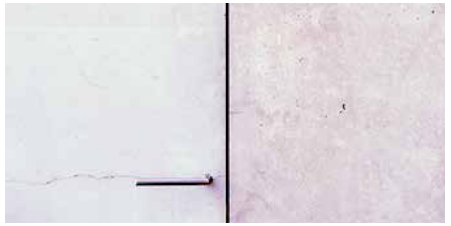
Fürstenwald Cemetery
Chur, Switzerland, 1996
Urs Zinsli & Kienst Vogt

Das Gelbe Haus
Flims, Switzerland, 1999
Valerio Olgiati

Haus 36
Stuttgart, Germany, 2015
Matthias Bauer Associates Stuttgart

Kantine
Berlin, Germany, 2013
David Chipperfield Architects





Kunsthaus Bregenz
Bregenz, Austria, 1997
Peter Zumthor

Kunstmuseum Liechtenstein
Vaduz, Liechtenstein, 2000
Morger & Degelo, with Christian Kerez

Mercedes-Benz Museum
Stuttgart, Germany, 2006
UNStudio

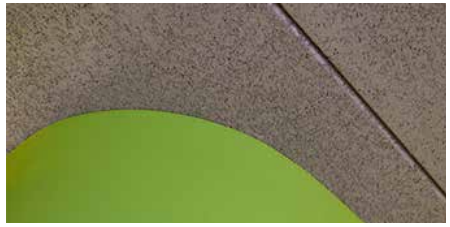
MuCEM
Marseille, France, 2013
Rudy Ricciotti

National Park Centre
Zernez, Switzerland, 2008
Valerio Olgiati

Neues Museum
Berlin, Germany, 2009
David Chipperfield Architects

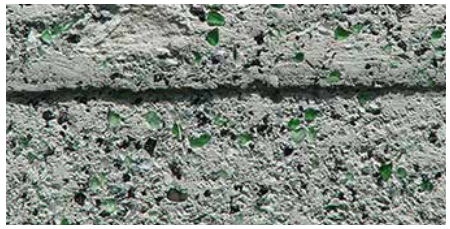
Querini Stampalia Foundation
Venice, Italy, 1963
Carlo Scarpa

Radix
Wageningen, Netherlands, 2009
DP6



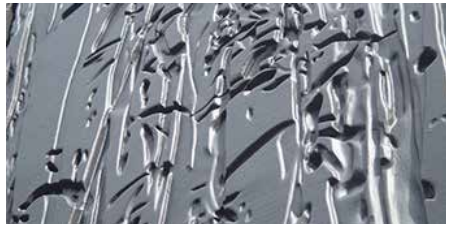
St. Antonius Church
Basel, Switzerland, 1927
Karl Moser

Swiss Re
Rüschlikon, Switzerland, 2002
Meili Peter Architekten



Unité d'Habitation - Cité Radieuse
Marseille, France, 1952
Le Corbusier

Utrecht University Library
Utrecht, Netherlands, 2004
Wiel Arets Architects



INFO & CONTACT

BELGIAN NATIONAL SECRETARIAT

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bureaubakker

Siebe Bakker
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RULES

1 PARTICIPATION

The 8th Concrete Design Competition is open to any registered student in schools of architecture or related disciplines in countries that support the competition, regardless of the participants own nationality.
The supporting countries are: Belgium, Germany and Ireland.
Entries may be submitted by individuals or by teams. Teams may be interdisciplinary and may consist out of a maximum of three persons. All members of a competing team must comply with all of the terms and conditions given in these rules. Entries can only be submitted in the country in which the competitor is studying during the academic year 2017/2018.

2 INFORMATION / LANGUAGE

All general information will be provided through our website only (www.concretedesigncompetition.com).
All communication will be in English. Proposals have to be drafted in English.

3 ENTRIES

3.1 Items to be submitted
The entries submitted by competitors or teams of competitors comprise a maximum of:
- Two A1- format panels (width: 594mm x height: 841mm) mounted on flat, stiff, strong backings. These must be laid out vertically (portrait) and numbered one and two.
- One A4 size envelope containing:
    - one digital copy of each submitted panel. Format TIF, Jpeg or PDF; 300 dpi on original panel size (A1) and in the original layout of the submitted panels.
    - completed identity form
    - completed ownership declaration
    - a copy of the school registration card for the academic year 2017/2018

3.2 Content of entries
There are no regulations concerning the content of the A1 size panels. They may contain plans, sections, isometrics and so on. Competitors must decide themselves on the most effective ways to present their proposals. Juries will under no circumstances examine any additional documents or models.

3.3 ID-code
Each competitor or team of competitors must choose an ID-code made up of:
- two letters from the Roman alphabet (e.g. AA)
- followed by three figures (e.g. 123)

This ID-code (e.g. AA123), to the exclusion of any other mention, must appear on all documents and wrappings entered in the competition:
- on the outside of any packaging
- on each panel
- on all digital media
- on the sealed envelope containing the identification form, ownership declaration, digital copies of the panels and copy of school registration of the competitor or team of competitors. No other writing should appear on the envelope. On each document, the code must be written in a horizontal frame 25 mm high and 100 mm wide, in the top left-hand corner of the document. The identification form and ownership declaration can be downloaded from our website.

3.3 Anonymity
The panels and the outside of the envelope may not contain any information indicating the identity of the competitors.
3.4 Submission of entries
The date for submission of entries will be set by each national secretary individually. Please check the national secretary section of our website (www.concretedesigncompetition.com) for details.
Entries must be sent carriage paid to the national secretaries. The national secretaries are unable to reimburse any expenses whatsoever.
3.5 Nationally declared requirements
Individual national secretaries may provide additional specifications for submission of entries. Please check the national secretary section of our website (www.concretedesigncompetition.com) for details.

4 OWNERSHIP

All materials received by the organisers become the property of the organisers and may be used in any form for publication purposes. The intellectual property rights of each project are the exclusive property of the author(s) thereof. Results (i.e. objects and drawings) produced during the master class will become property of the organisers and may be used in any form for publication purposes. The same rights for publication purposes are also reserved equally for all participants of the master class. Artistic rights, copyrights or intellectual ownership on results produced during the master class remain the property of all workshop participants and contributors as a group.

5 TIMETABLE

The 8th Concrete Design Competition runs during the academic year of 2017-2018.
The date for submission of entries will be set by each national secretary individually. Please check the national secretary section of our website (www.concretedesigncompetition.com) for details.
The Concrete Design Workshop will run from August … to …, 2018.

6 JUDGING

6.1 National juries
Each national secretary organises a national jury. The Jury members will be announced through our website.
6.2 Competition outcome
The jury's decision is final and not open for debate. Each national jury will designate up to three winning entries, and may or may not specify a ranking. Additionally the national juries may award other entries with a 'honourable mention'.
6.3 Disclosure of competitors' names
No jury member will be made aware of competitors' names until after the judging session. In order to guarantee the anonymity of the entries, competitors may not use their projects for any kind of communication before the national jury results are made public with the exception of regular school requirements.

7 AWARDS

7.1 Concrete Design Master Class
National winners are invited to participate in a 6 day Master Class as an international event. The national secretaries will organise and fund travel, accommodation and programme costs. Travel costs will be funded based on travelling from and to the country in which the entries were submitted. Details on the program will be given on our website (www.concretedesigncompetition.com).
7.2 Publication
All winning, and awarded (honourable mention) entries will be published on our website (www.concretedesigncompetition.com).
7.3 Additional awards
Individual national secretaries may offer additional awards to their laureates. Please check the national secretary section of our website (www.concretedesigncompetition.com) for details.

PREVIOUS CYCLES

7 CYCLES

2003/2004 **ROBUSTNESS** - curator: Michael Speaks

2005/2006 *plastic*-**OPACITY** - curator: Hanif Kara

2007/2008 implicit performance - curator: Juan Herreros

2009/2010 **MONOLITHIC** - curator: Valerio Olgiati

2011/2012 ENERGY

2013/2014 Elegance

2015/2016 **METAMORPHOSIS**

11 COUNTRIES

19 NATIONALITIES

1907 PARTICIPATING STUDENTS

1476 COMPETITION ENTRIES

82 PARTICIPATING SCHOOLS

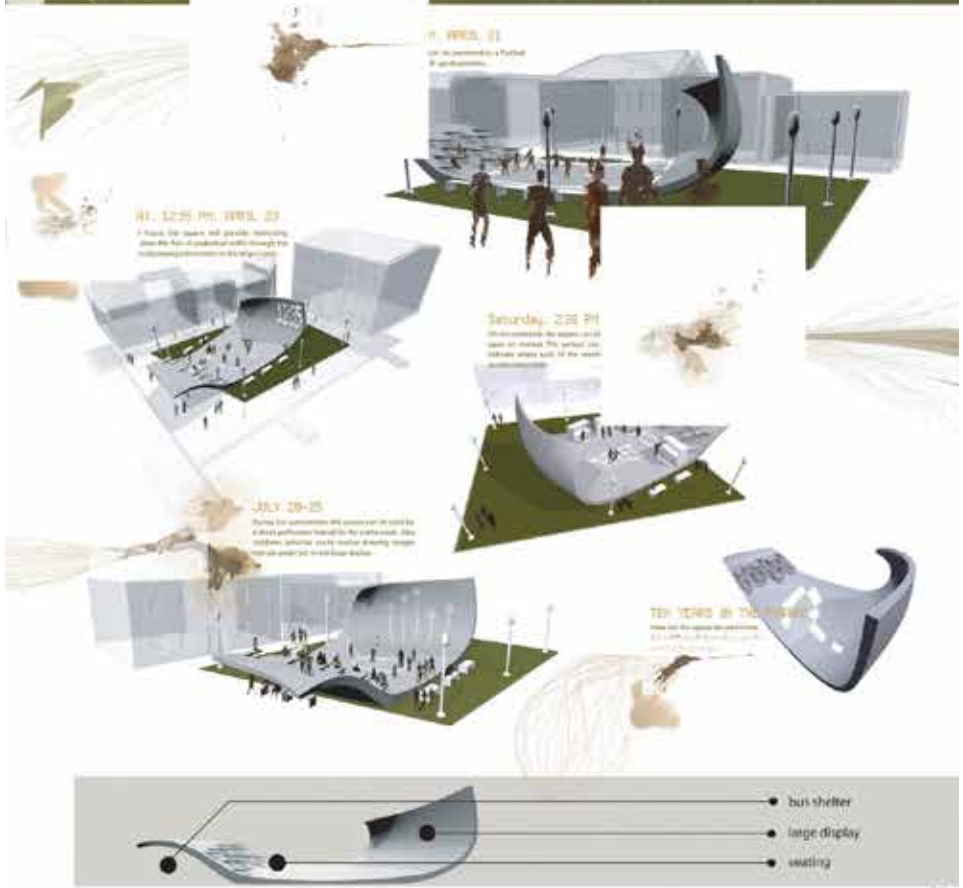
239 MASTER CLASS PARTICIPANTS

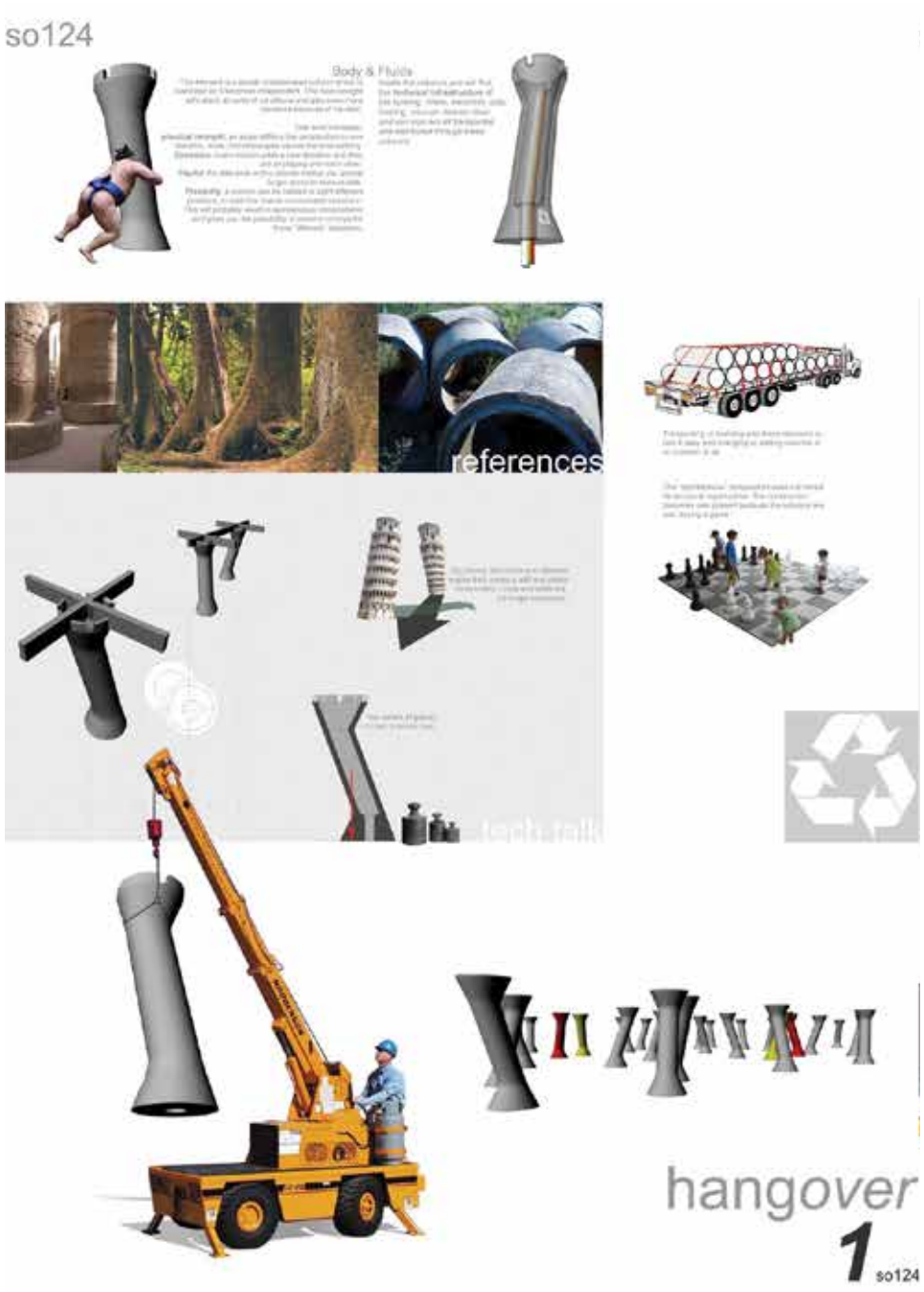
SELECTION AWARDED ENTRIES PREVIOUS CYCLES

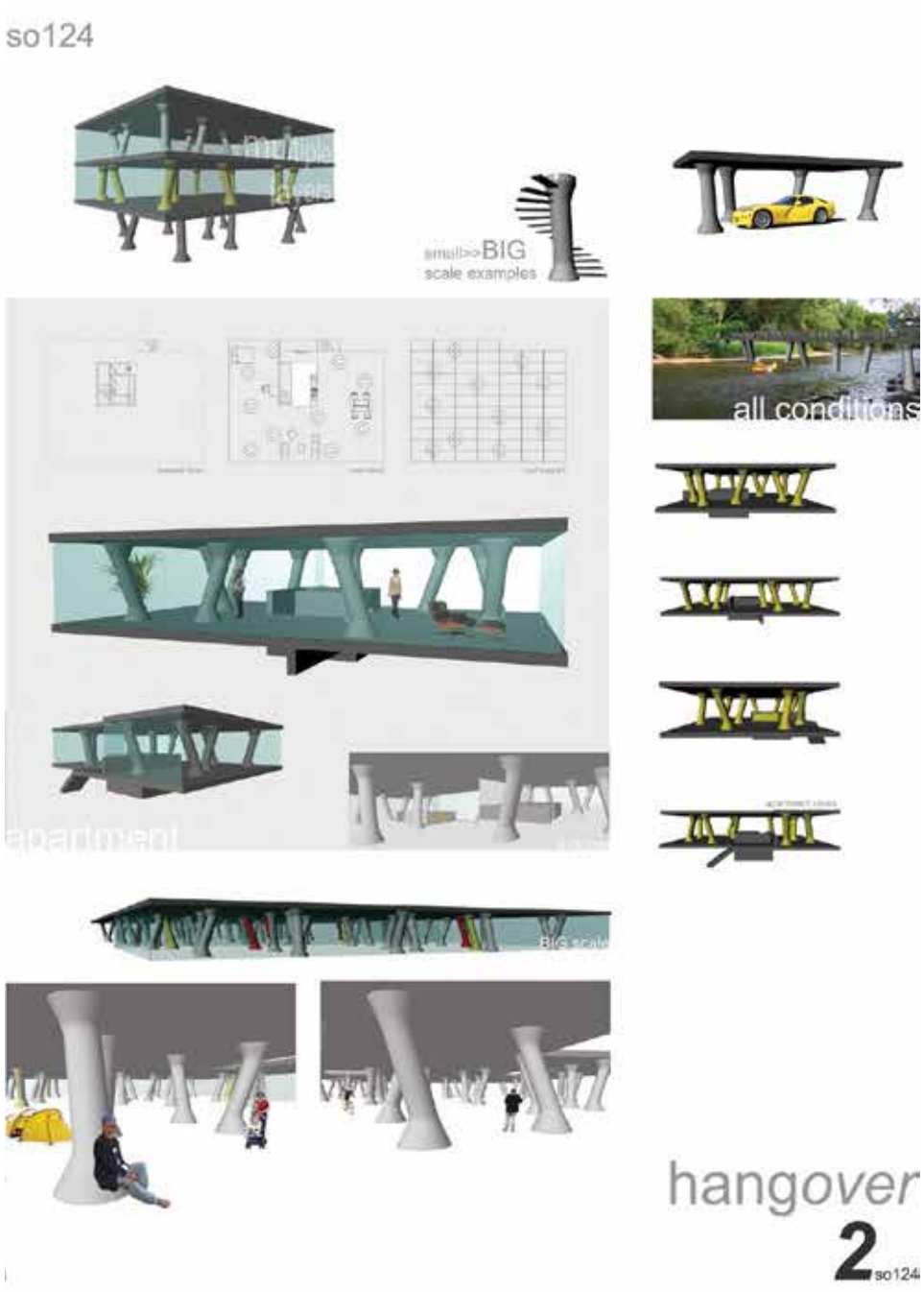
community and environment

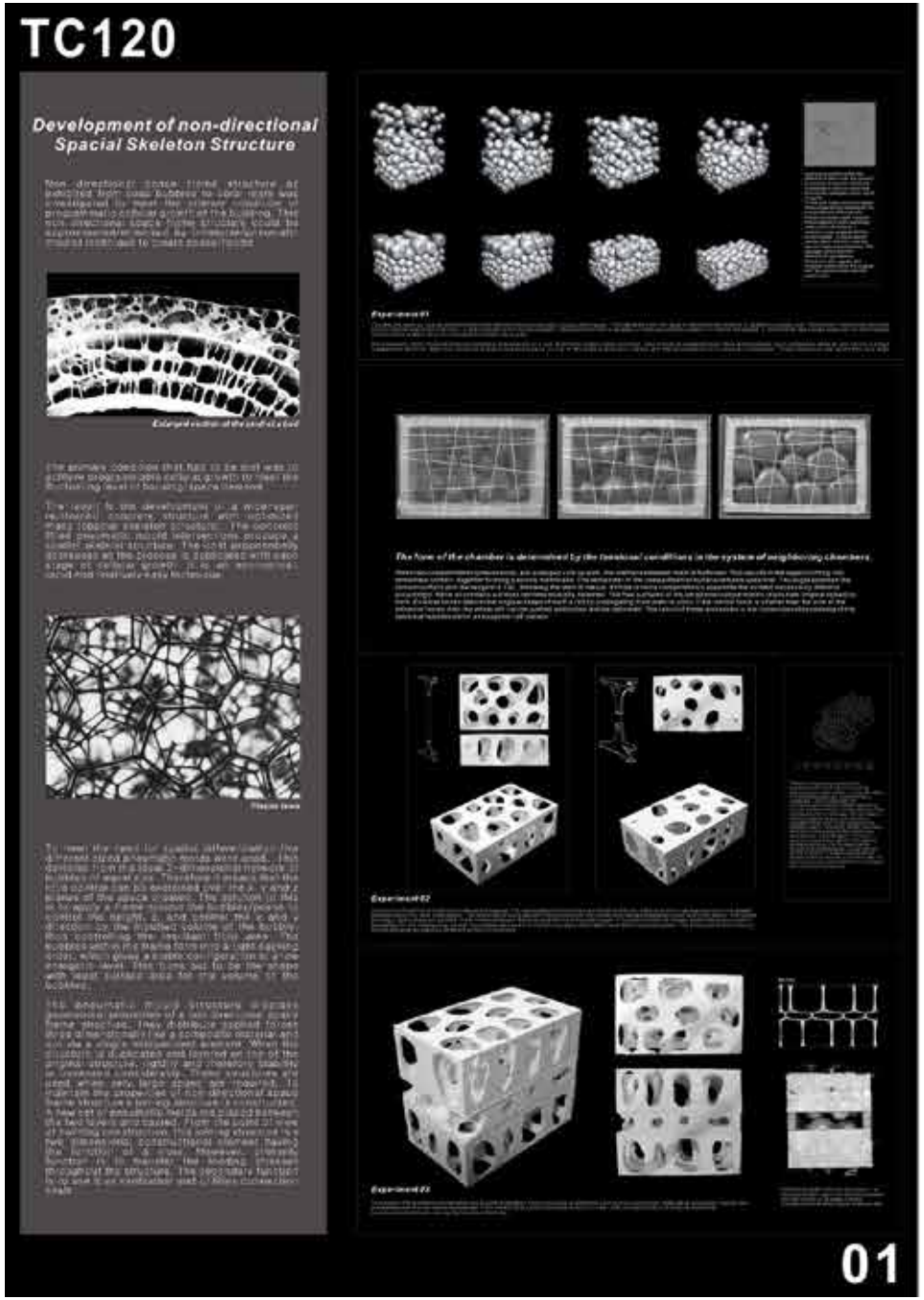
what is open source?

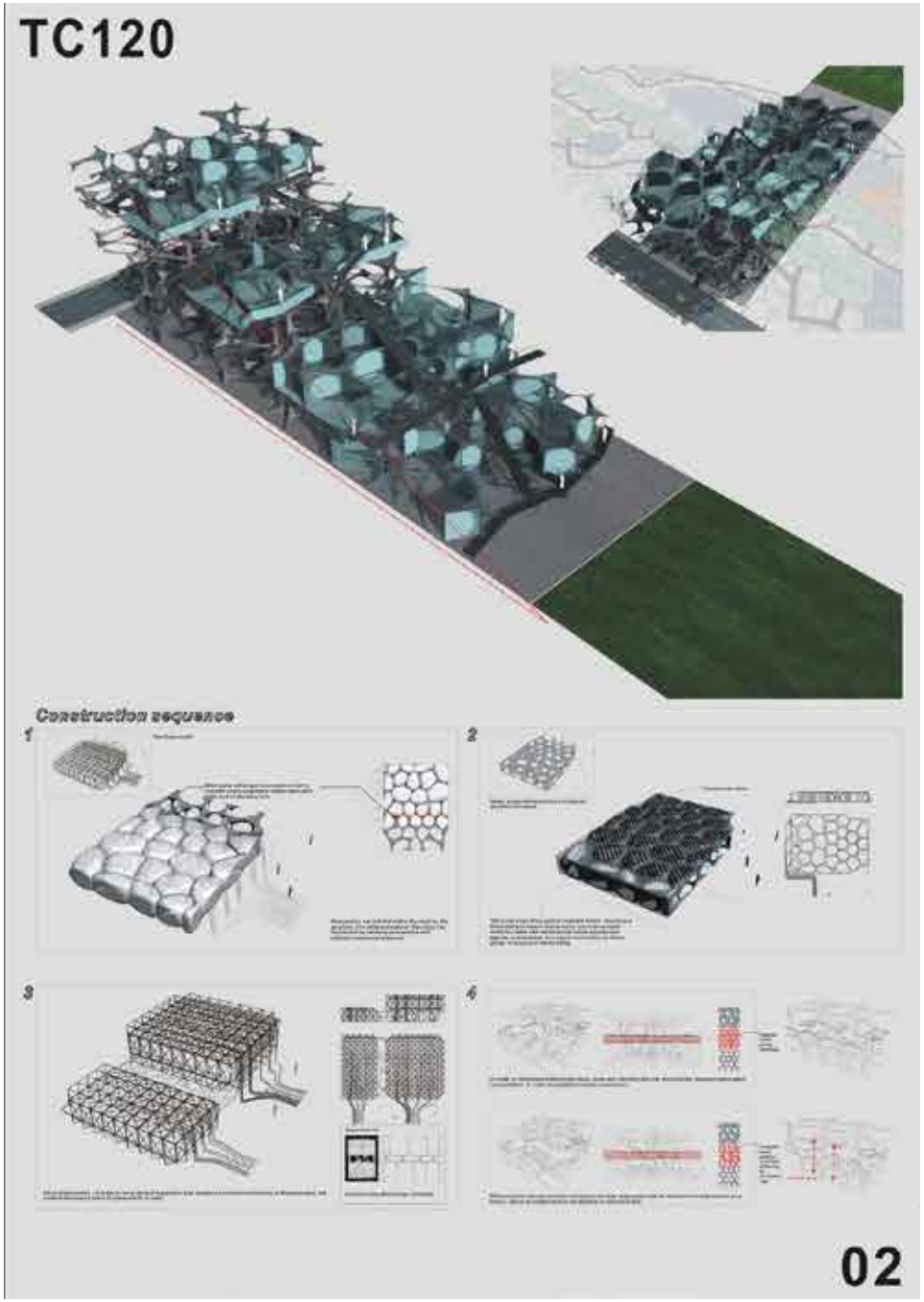
concrete innovation




so124
Body & Fluids
references
hangover
1
so124

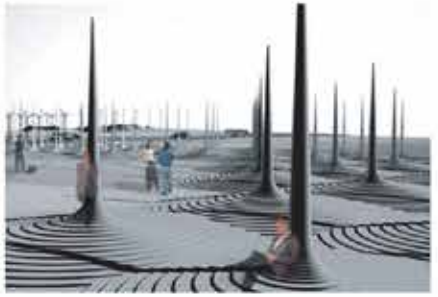

so124
small>>BIG
scale examples
all conditions
apartment
hangover
2
so124


TC120
Development of non-directional Spacial Skeleton Structure
01


TC120
Construction sequence
1
2
3
4
02

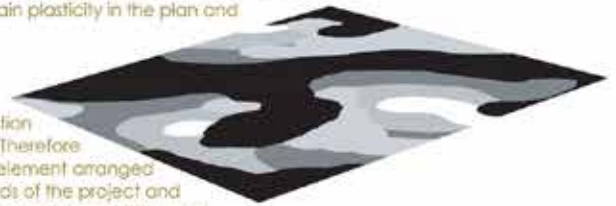
Arnaud Kinnaer, Bruno de Veth & Valentin Pierron

BT282

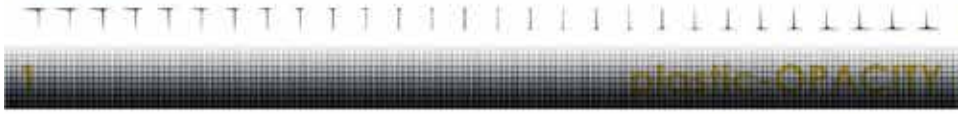


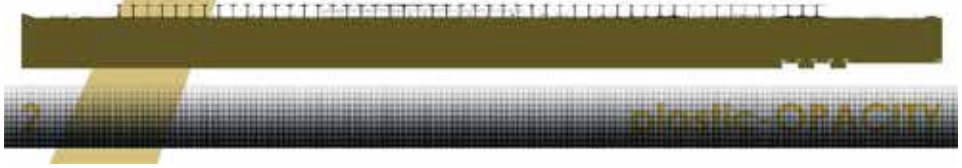
Transparency can be an inherent property of material,as in the case of a curtain wall. Transparency can also emerge from a particular mode of organisation.

When two or several figures are superposed one to another, each one of them claiming the common part to both of them, human eyes peception is one of contradiction in spatial dimensions. In order to resolve this contradiction, one has to admit the existence of a new visual quality. These figures are transparent in a way, which means: they are able to interpenetrate one into another without cancelling themselves out optically. This transparency however proves much more than its visual quality. It even implies a spatial much broader arrangement. Transparency means one will perceive simultaneously various space layers. Such an organisation pushed to extremes obviously induces a certain plasticity in the plan and the visual perception that it offers.



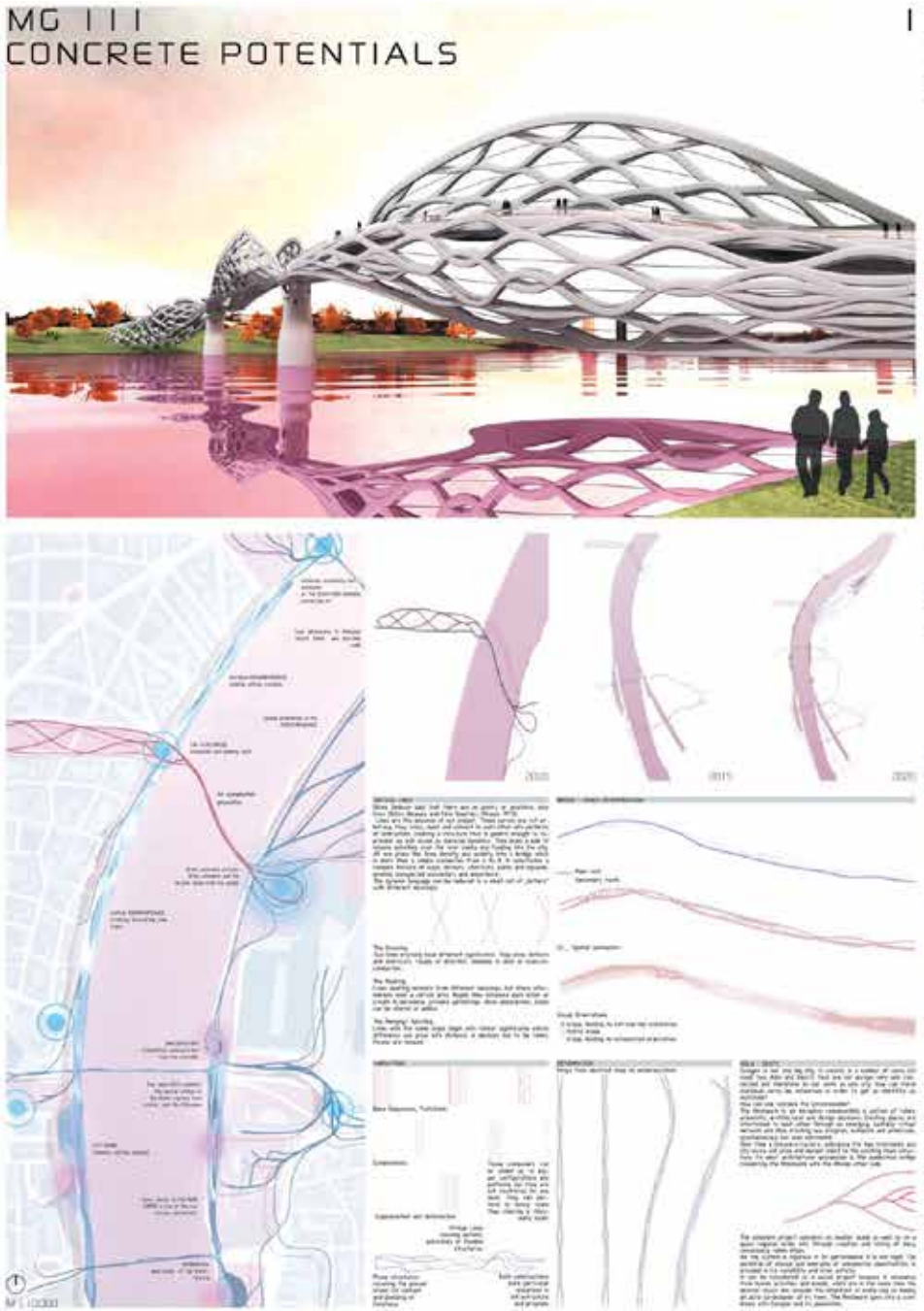
Because of its intrinsic properties, concrete easily allows the production of similar elements on large scale. Therefore one can base oneself on a single element arranged and offered according to the needs of the project and this makes it possible to stick to the creation and the use of only one mould.

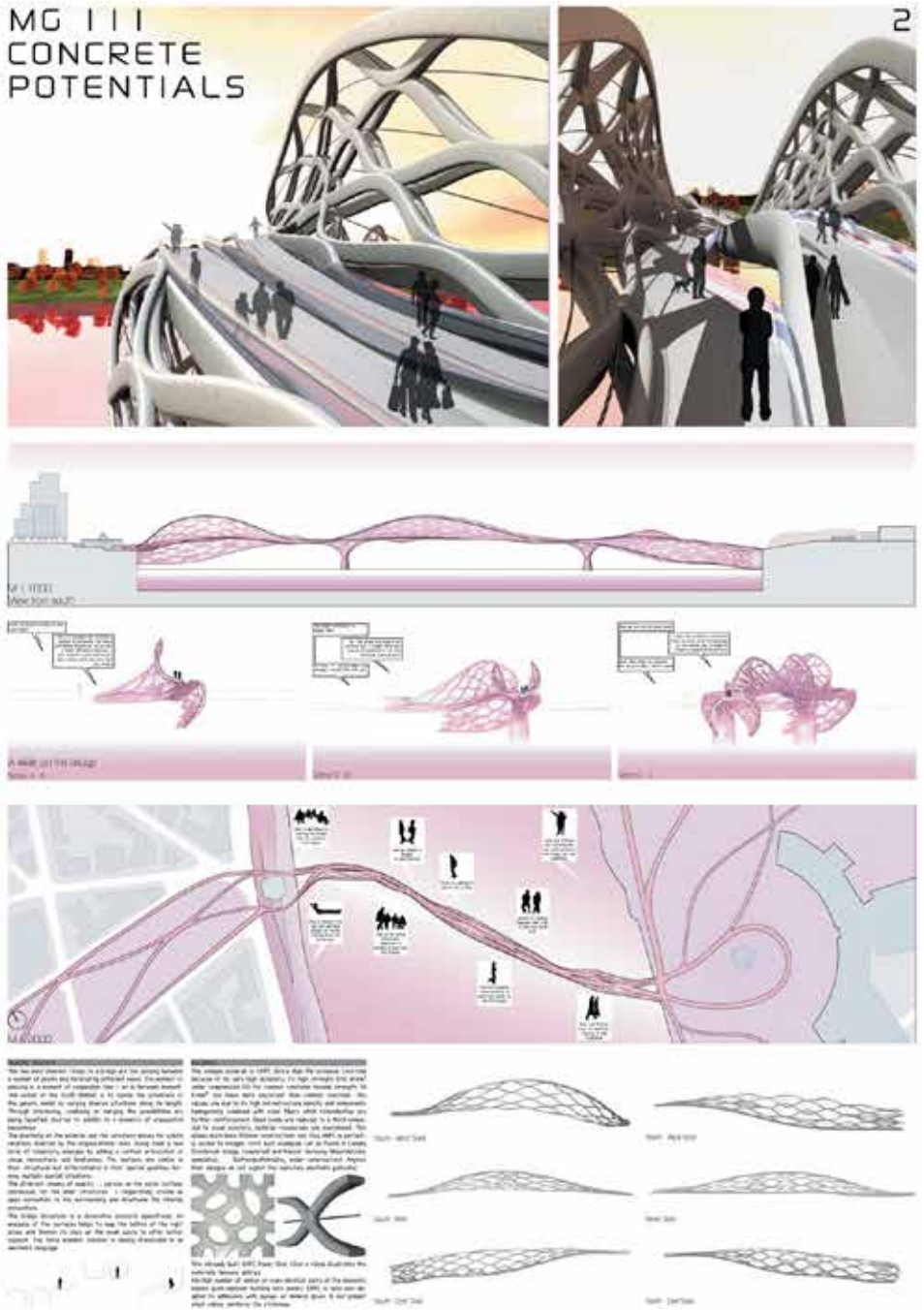





LUOO1
01
SOUND POCKETS


LUOO1
PHOTOGRAPHIC EXHIBITION - LIGHT


MG III
CONCRETE POTENTIALS
1


MG III
CONCRETE
POTENTIALS
2

DC 288 | WHON..... 01

Las Palmas de Gran Canaria

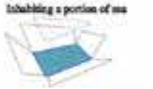
Forms Sea

Model of Proof

Section (Steel-Calcium Carbonate)

Superficial Texture

Inhabiting a portion of sea

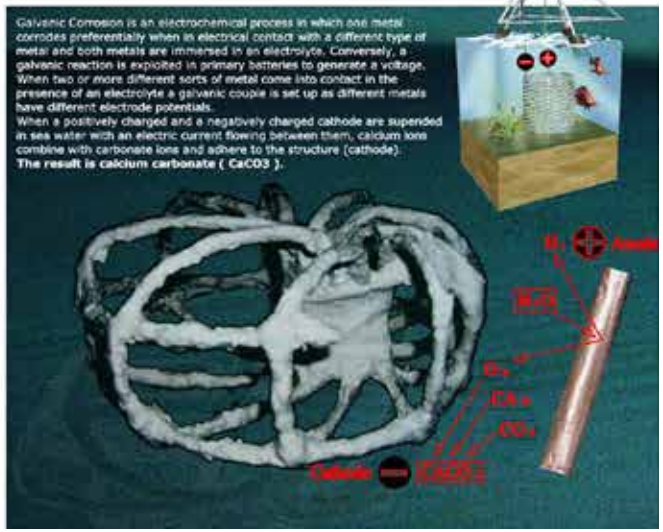


WHY...?

Increasing the density, relying on the existing

The project idea is to live in a marine object. An object build under water (ecosystem submarine), but that is intented to be inhabited by people outside of the sea (human ecosystem).
The structure consists of 10 ribs that generate livable empty inside. These are linked through the closing, that unify the architectural object, and that they all work for skin.
The organicity of the geometry comes from their own forms generated at sea, as the living unit purpot to be faithful to constructive process under water.

HOW...?



DC 288 | WHON..... 02

WHERE...?

"La Puntilla" is one of the most important strategic locations on the "Las Canteras" beach. It operates as the hinge between landscape beach and rocky landscape. Hence, its undeniable link to ocean.

1/30

WHAT...?

The definition of housing unit of 40 m_2, is based on the geometrization of two circles decentres. The service area of the unit is in part compressed and the rest set a versatile space continuum

Wireline Steel Structure

Coral Structure

Foreign Skin

Fossilized Internal

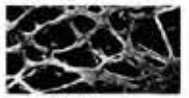
WHO...?

WHEN...? References cell minimum

Jean-Louis Chanéac

Buckminster Fuller

Pascal Hausermann



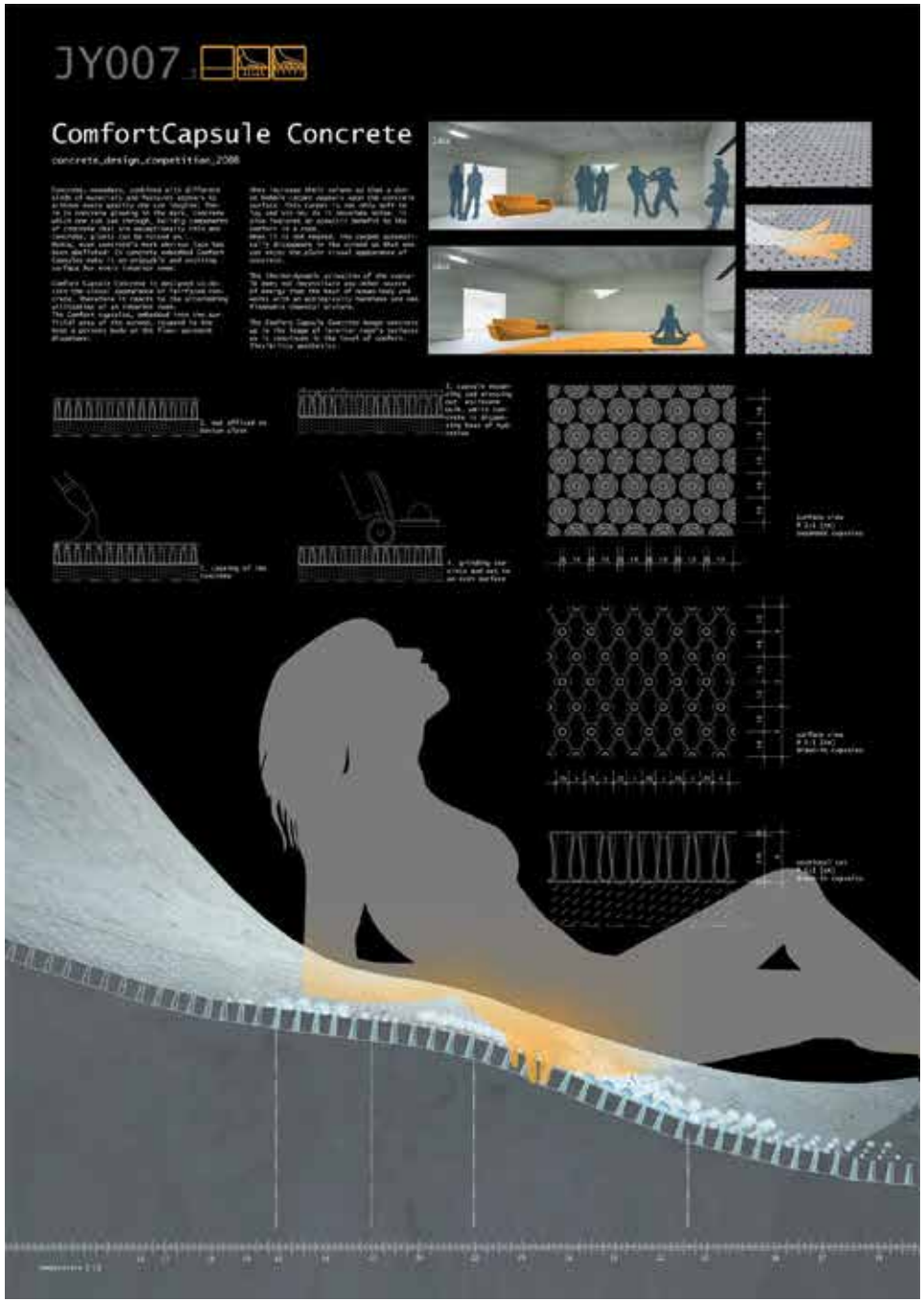
Le Ricolais

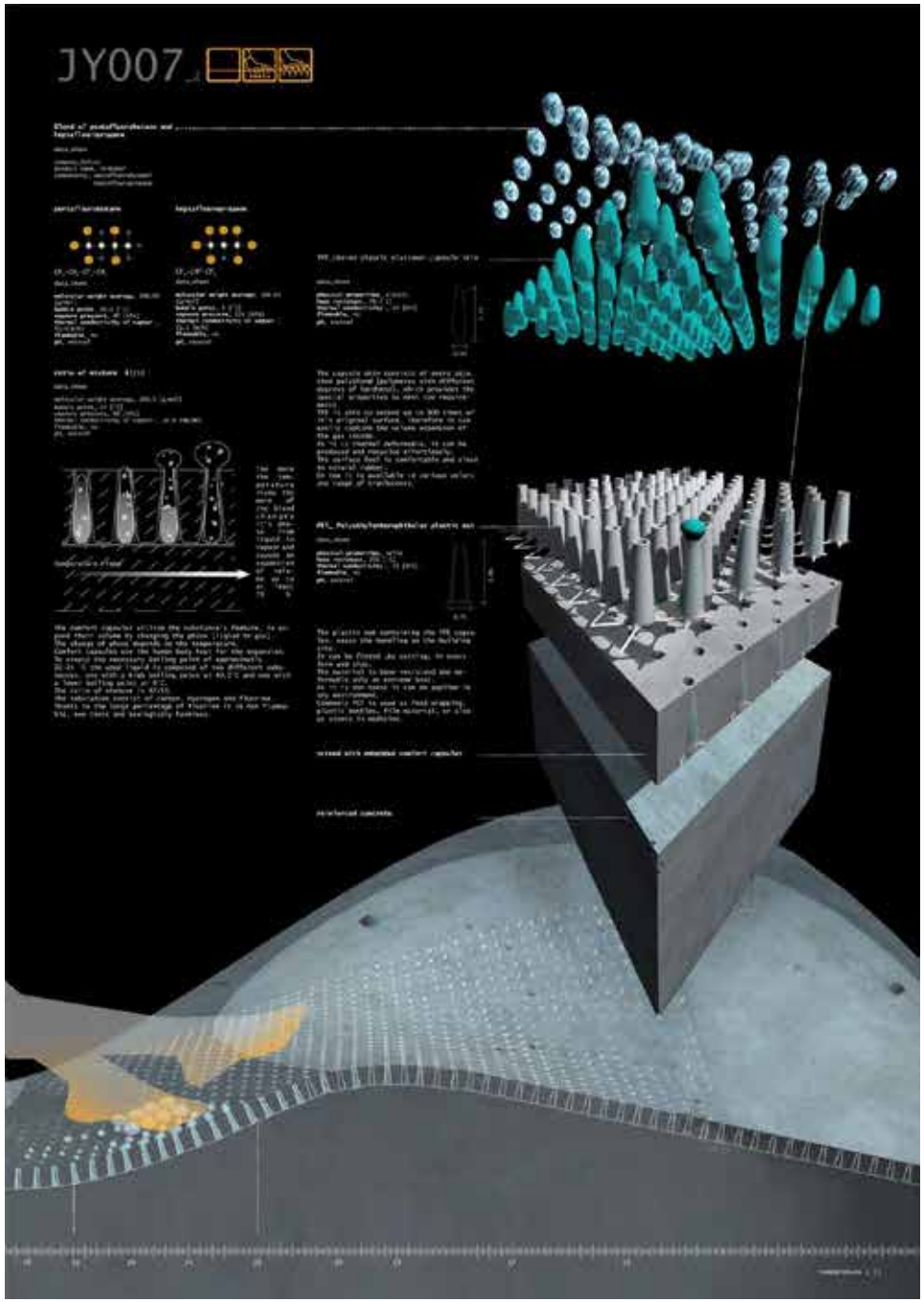
Frederick Kiesler

Jean Maneval

JY007 - ComfortCapsule Concrete

Yü Chen, Juliane Greb





SZ595

Urgent Performance

Problem: To provide cheap, adaptable housing for displaced long
Method: Examinin'g multifunctional, massproduced concrete me
Concept: "instant-concrete" mesh sheets.

For most people around the world, living in poor housing conditions and lacking infrastructure, the urgent architectural need is still to fulfill basic housing necessities.
This is especially the case for millions of refugees. Having been chased from their land and neighborhoods, they leave behind friends and family,property, and their old communities.

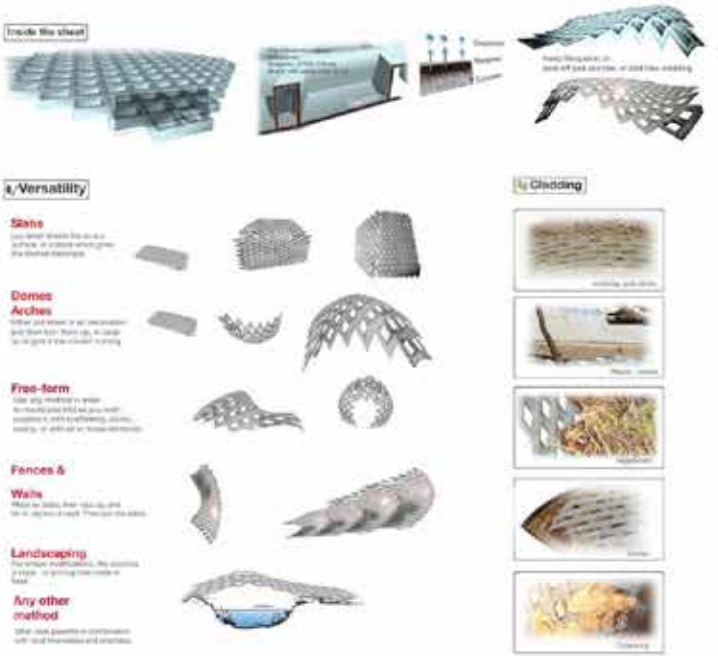
The first relief aid given refugees are often UNs standard tents (see upper left corner.) They are lightweight, simple and cheap, and can therefore be shipped quickly in vast amounts when a crisis hits. Although they are completely unfit for permant residence, but unfortunately their use is often far more prolonged than is intended.
Climatical they can get too hot in the summer, freezing in the winter, and get easily blown away or tore down by monsuns or heavy winds.
So as many refugee-camps become prolonged settlements, the need for a more permanent solution is urgent. Often little holser-up sheltering is provided, even as many camps grow into local communities with tens of thousands of residents, who are to live and work there for often as long as 18 years.

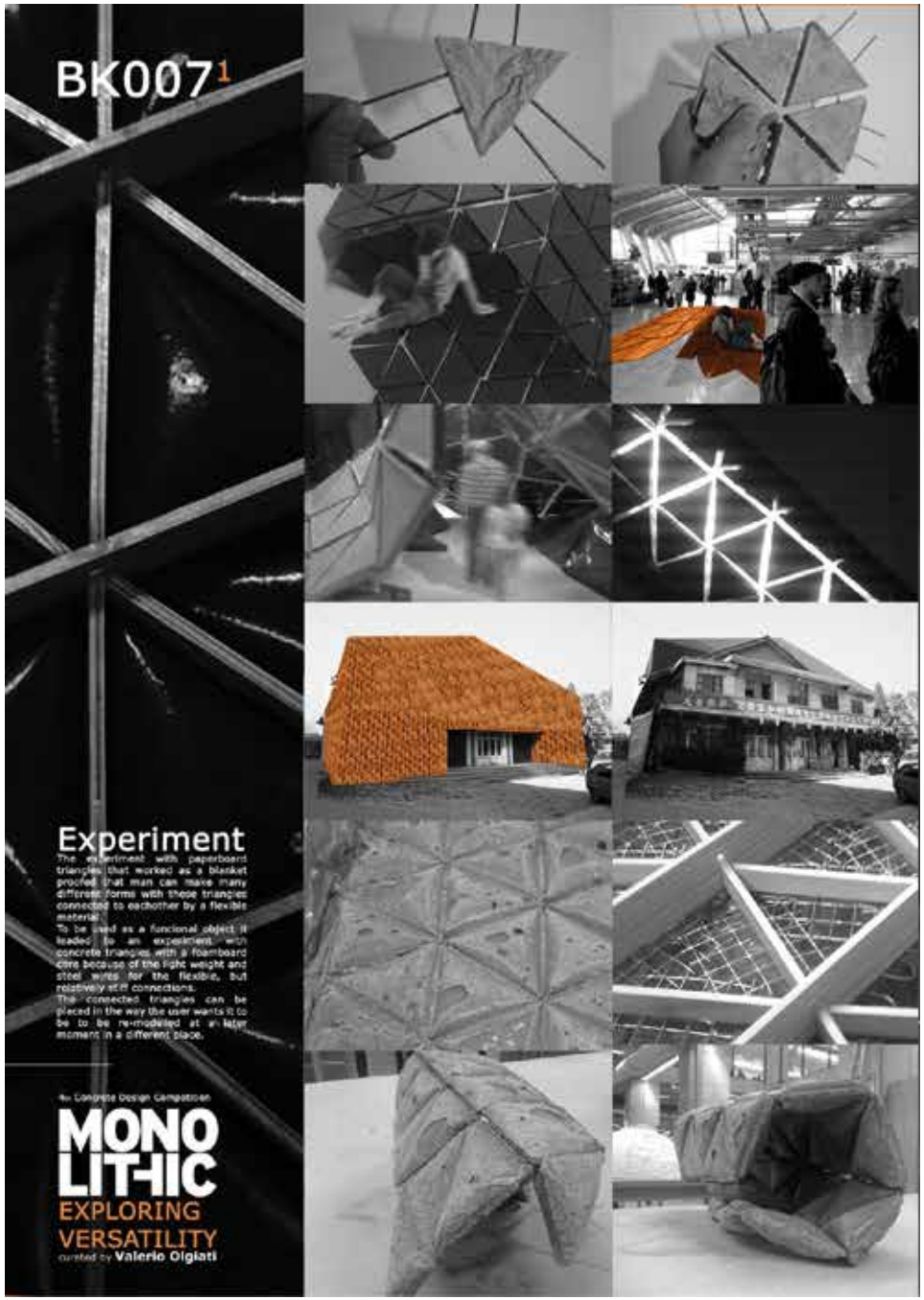
As refugee camps often are crome and overpopulated - the risk of violence, theft, and physical abuse of women and children can grow unbelievably high. Tents cannot provide sufficient privacy or security, and increases these risks.

Refugee camps are highly diverse when it comes to climate, topografi, population and needs, and one standard shape can hardly meet the various needs.
But where resources are scarse, simple easy-to -use design can make a big impact on peoples living-conditions. And by not prescribing a strict given form hopefully this concrete building method adapts to a rich variety of conditions, and is easily combined with local knowledge and materials.
By being an open-end design, it empowers the local community and each individual to decide which design they want themselves, and how to best **collectively shape their own new neighborhoods.**

SZ595

ng-term refugees.
houlds.

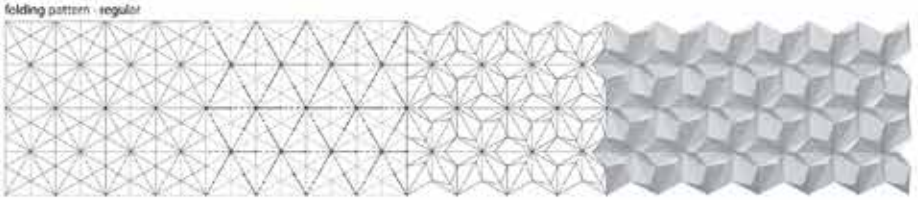



BK007[1]
Experiment
The experiment with paperboard triangles that worked as a blanket proofed that man can make many different forms with those triangles connected to eachother by a flexible material.
To be used as a functional object it leaded to an experiment with concrete triangles with a foamboard core because of the light weight and steel wires for the flexible, but relatively stiff connections.
The connected triangles can be placed in the way the user wants it to be to be re-modelled at an later moment in a different place.
4th Concrete Design Competition
MONOLITHIC
EXPLORING VERSATILITY
curated by Valerio Olgiati

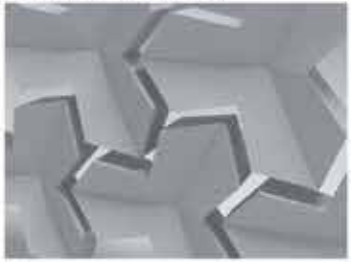

BK007[2]
pliableCRETE
Nowadays monolith-like buildings and objects are growing in numbers very fast. Often it is done with other materials than concrete because of the heavy weight of it. That is of course a big mistake. Not only can concrete be carried out in 'lightweight' material, it can also be fabricated as prefabricated elements. Elements which mostly are standard and which are full of preperation before it can be used on a building or object. Concrete should not only be associated with the dump, disproportionate and massive material which takes over every form the formwork has. With the most complicated formwork it can be poured in every form we like, but we can do it also by draping. Without the formwork.
Facade
As shown in the picture (orenge facade) on the left, it is easily to transform a building as a assembly of many different materials into a monolith-like object on a bigger scale. This concept is inspired by the famous artist Christo Vladimirov Javacheff whose wrappings are creating monolith-like objects from every object and so every form.
Small furniture
The same simple 'blanket' of concrete can also be used for small furniture. The concrete triangles are all connected with eachother by a stainless steel wire so that it can be modelled in every way the user want it to be. You can drape it over an existing object so that the blanket takes over the form abstractively, but it can also be modelled as an independent object. Picture it in a urban landscape where people can relax and having a chat with eachother.

LY 012 01

folding pattern - regular



modular system

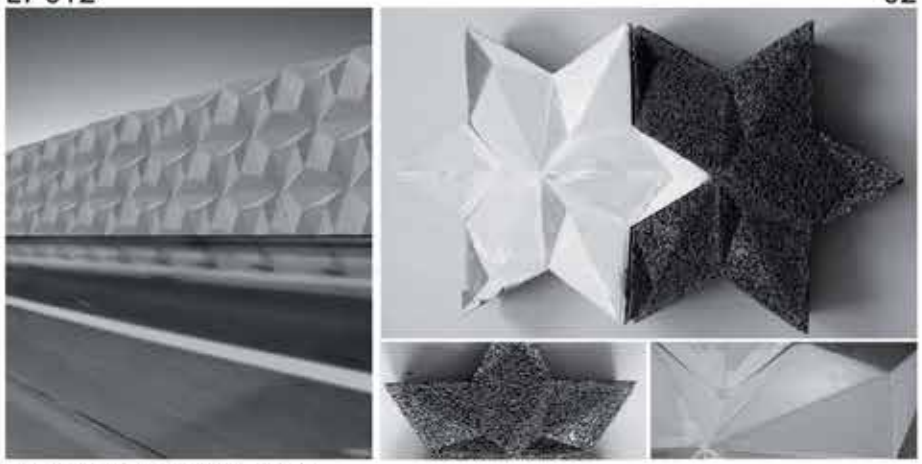


module variations

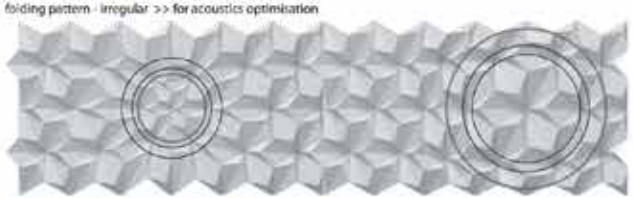
material

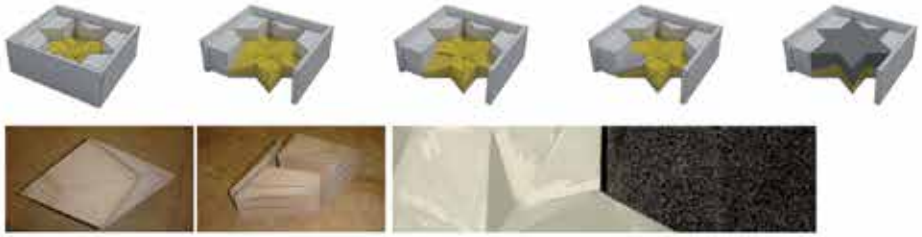
UHPC, ultra high performance concrete - light, thin structure and reflective surface

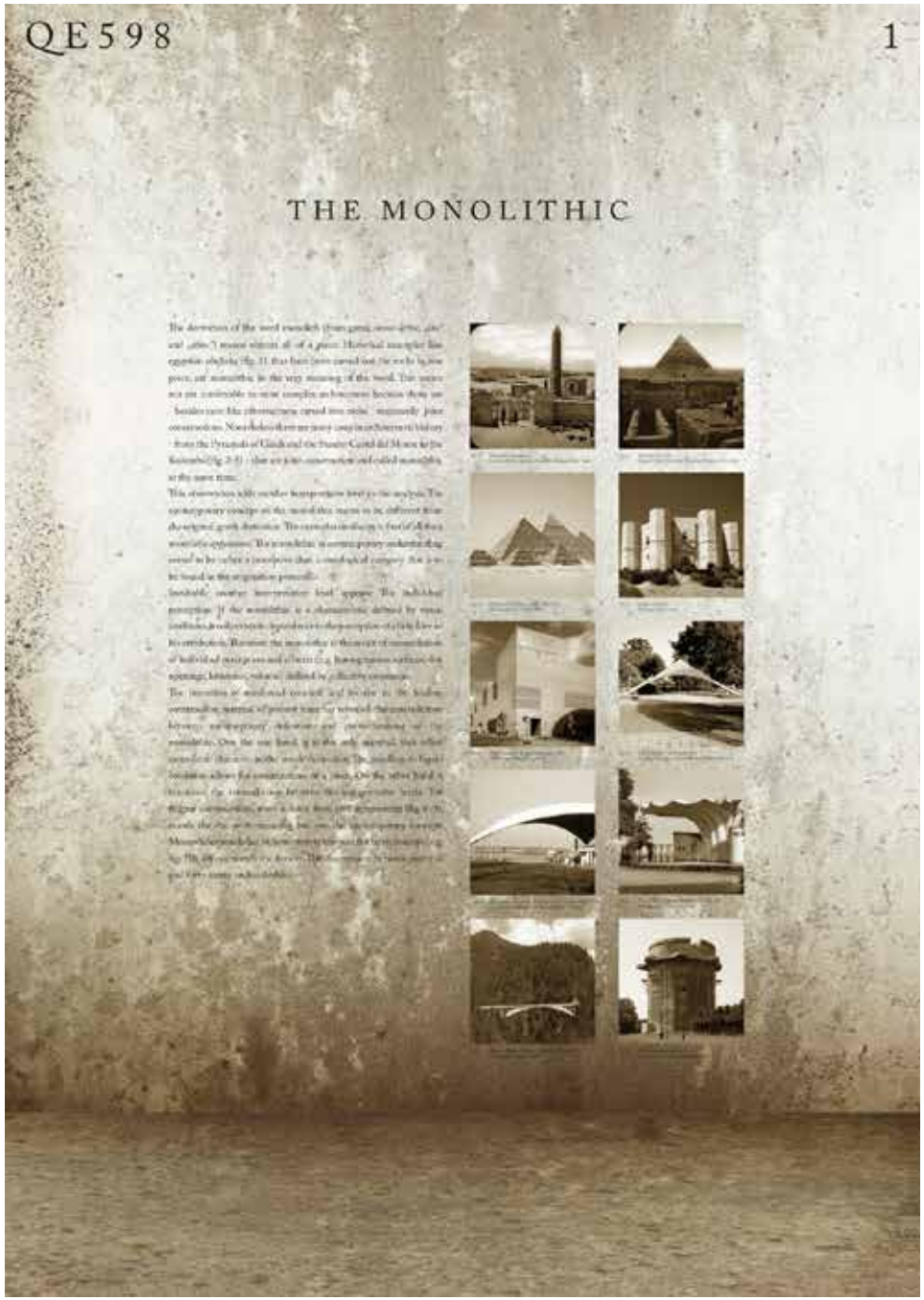
LY 012 02



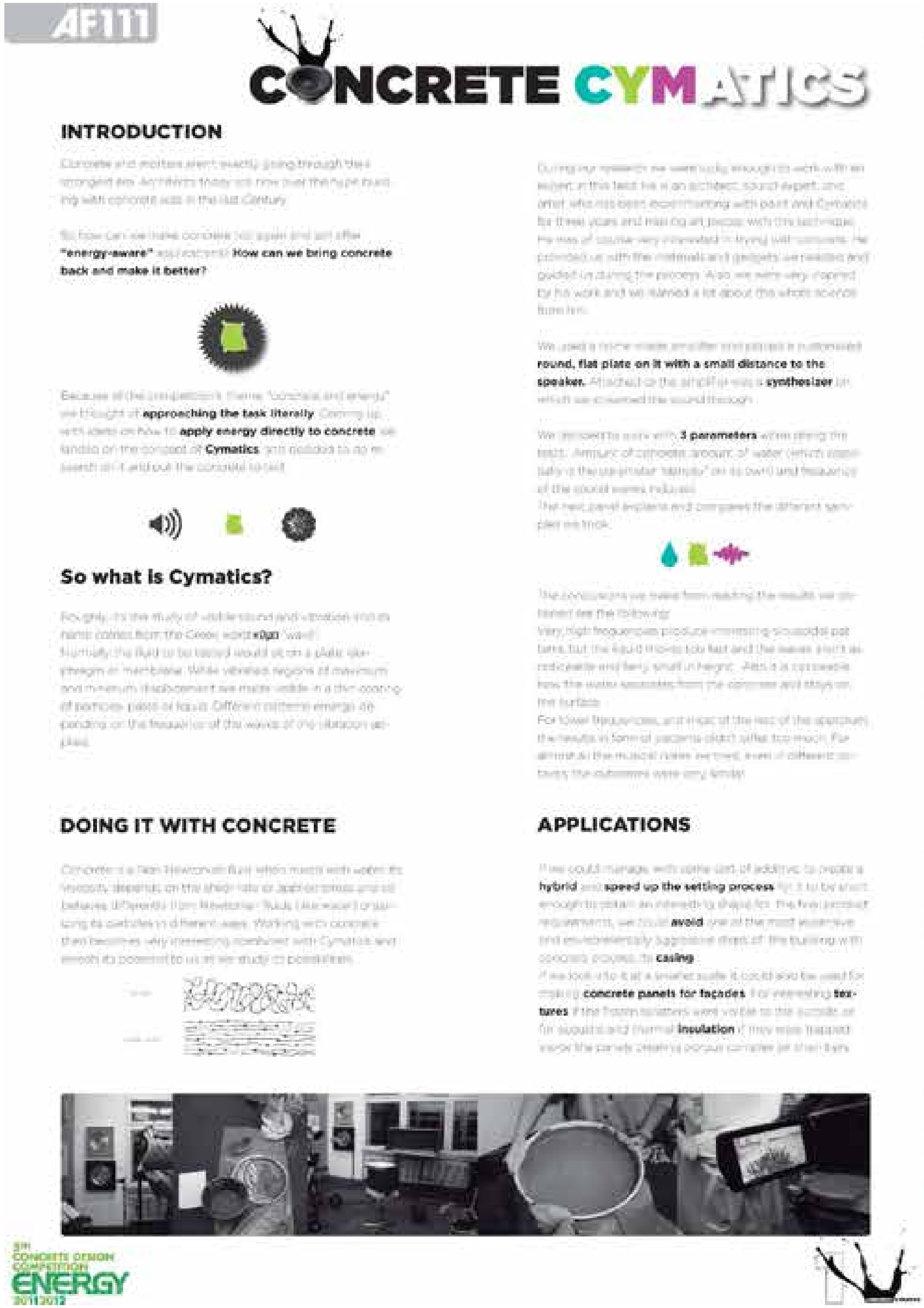
folding pattern - irregular >> for acoustics optimisation

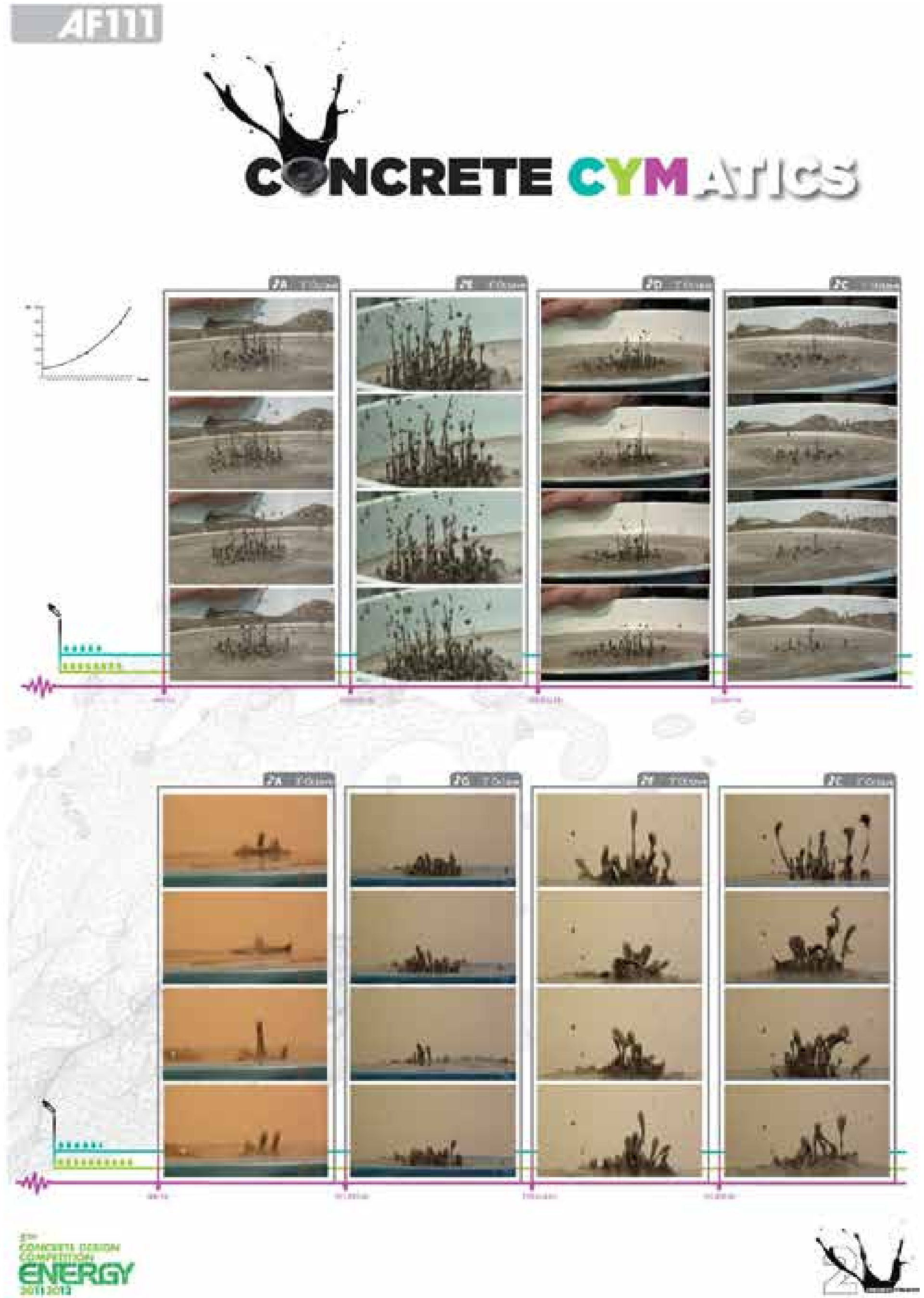





QE598
1
THE MONOLITHIC

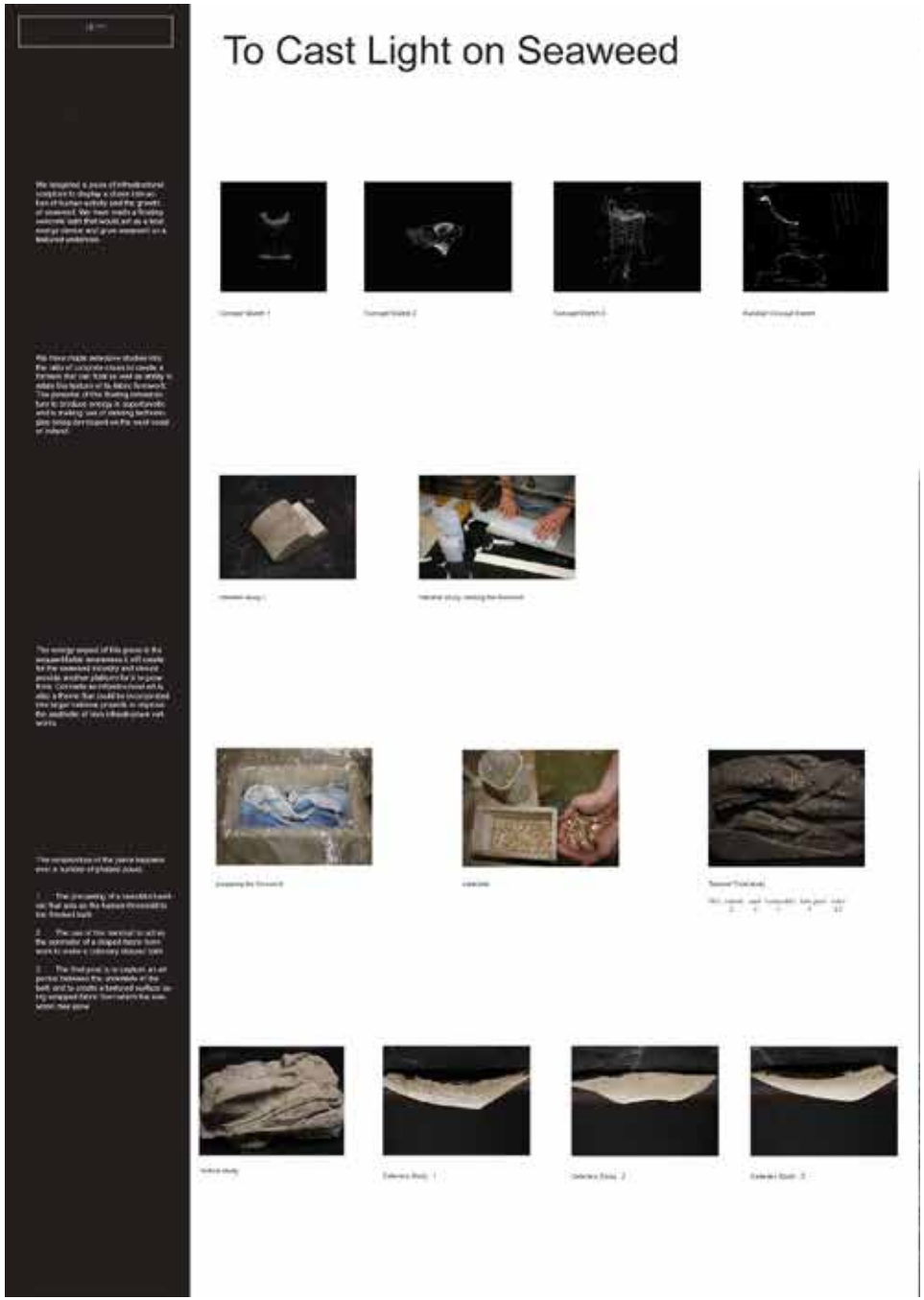

QE598
2

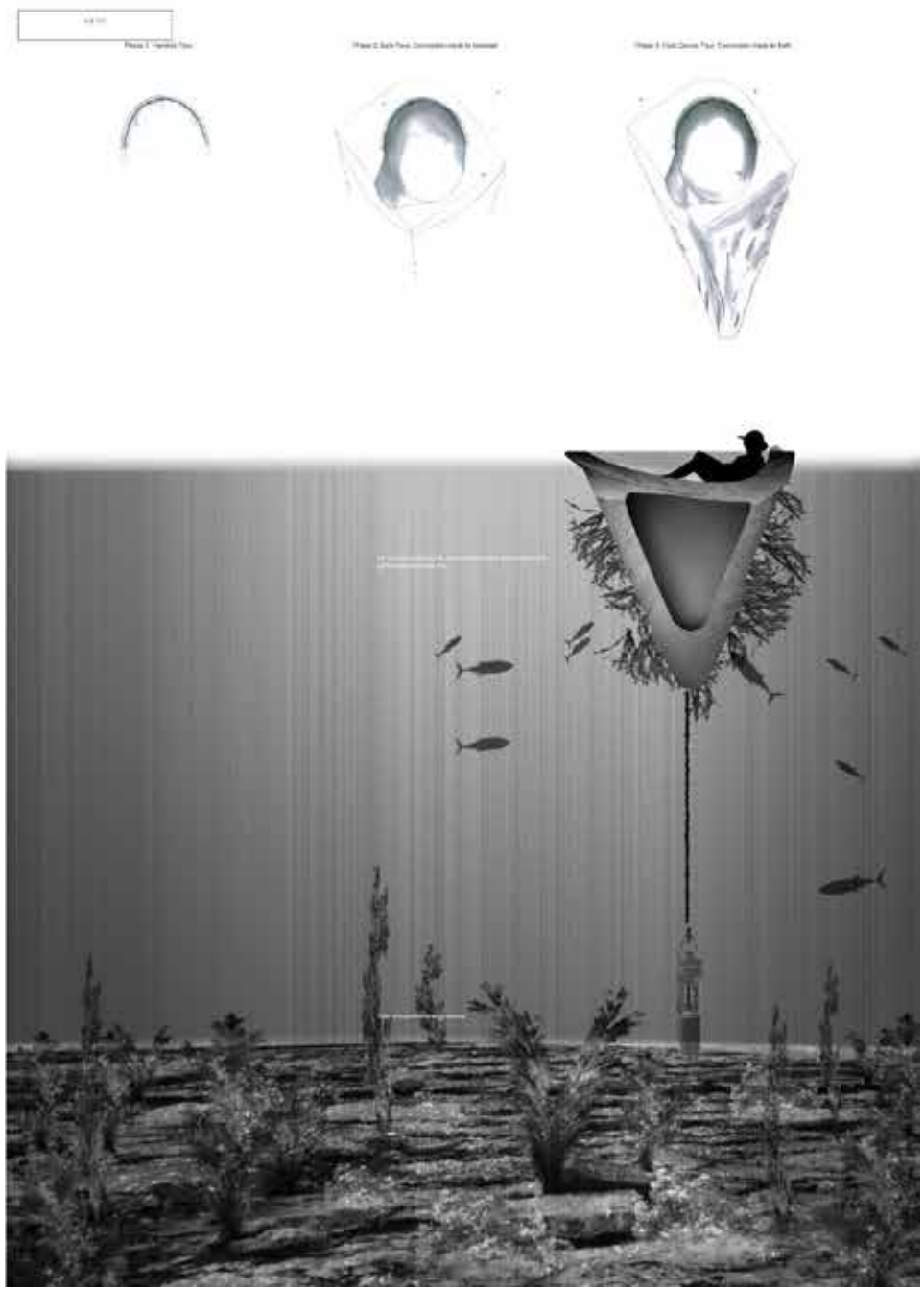

AF111
CONCRETE CYMATICS
INTRODUCTION
"energy-aware"
How can we bring concrete back and make it better?
approaching the task literally
apply energy directly to concrete
Cymatics
So what is Cymatics?
DOING IT WITH CONCRETE
round, flat plate on it with a small distance to the speaker.
synthesizer
3 parameters
APPLICATIONS
hybrid
speed up the setting process
avoid
casing
concrete panels for façades
insulation
ENERGY


AF111
CONCRETE CYMATICS
ENERGY

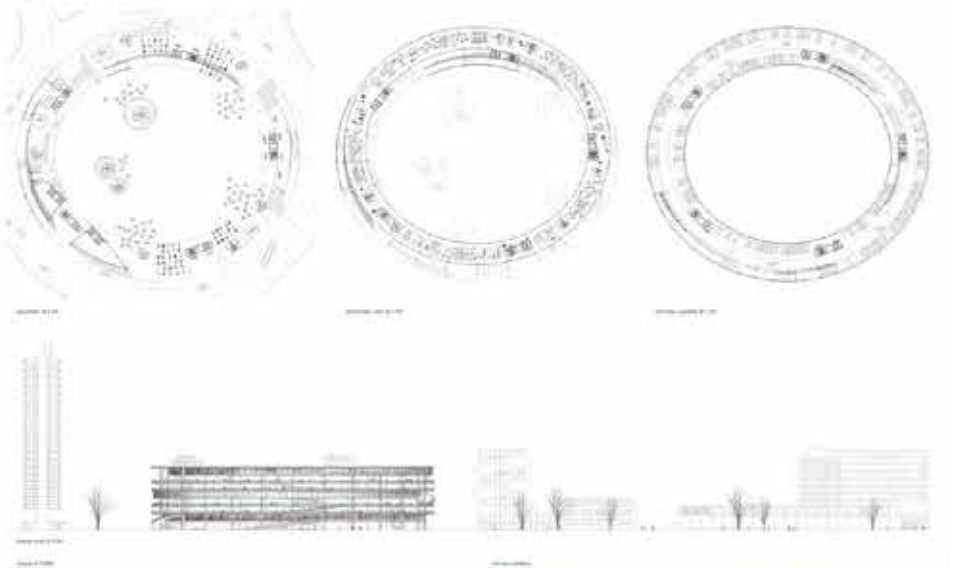
CR777 - To Cast Light On Seaweed

Colin Dorgan & Ray Mc Greal

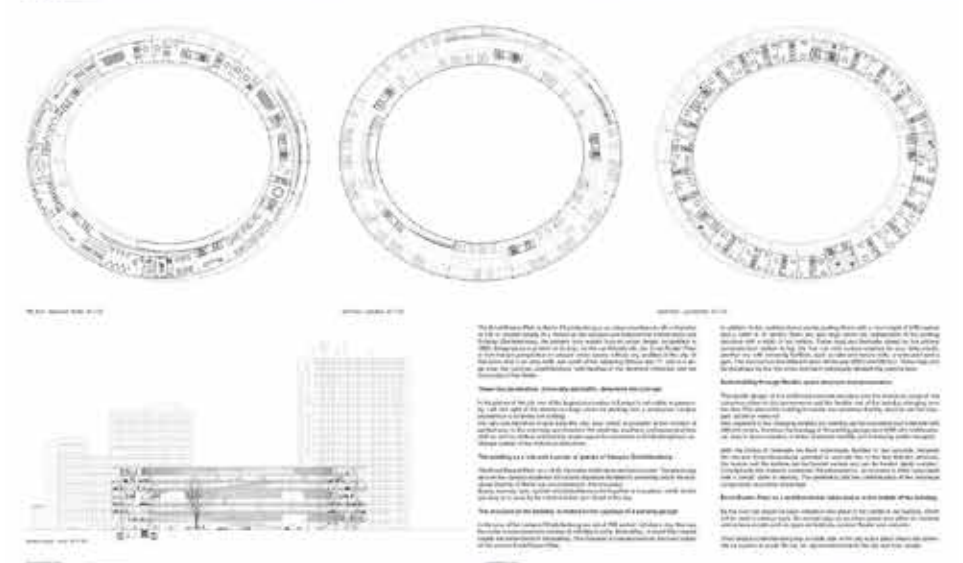


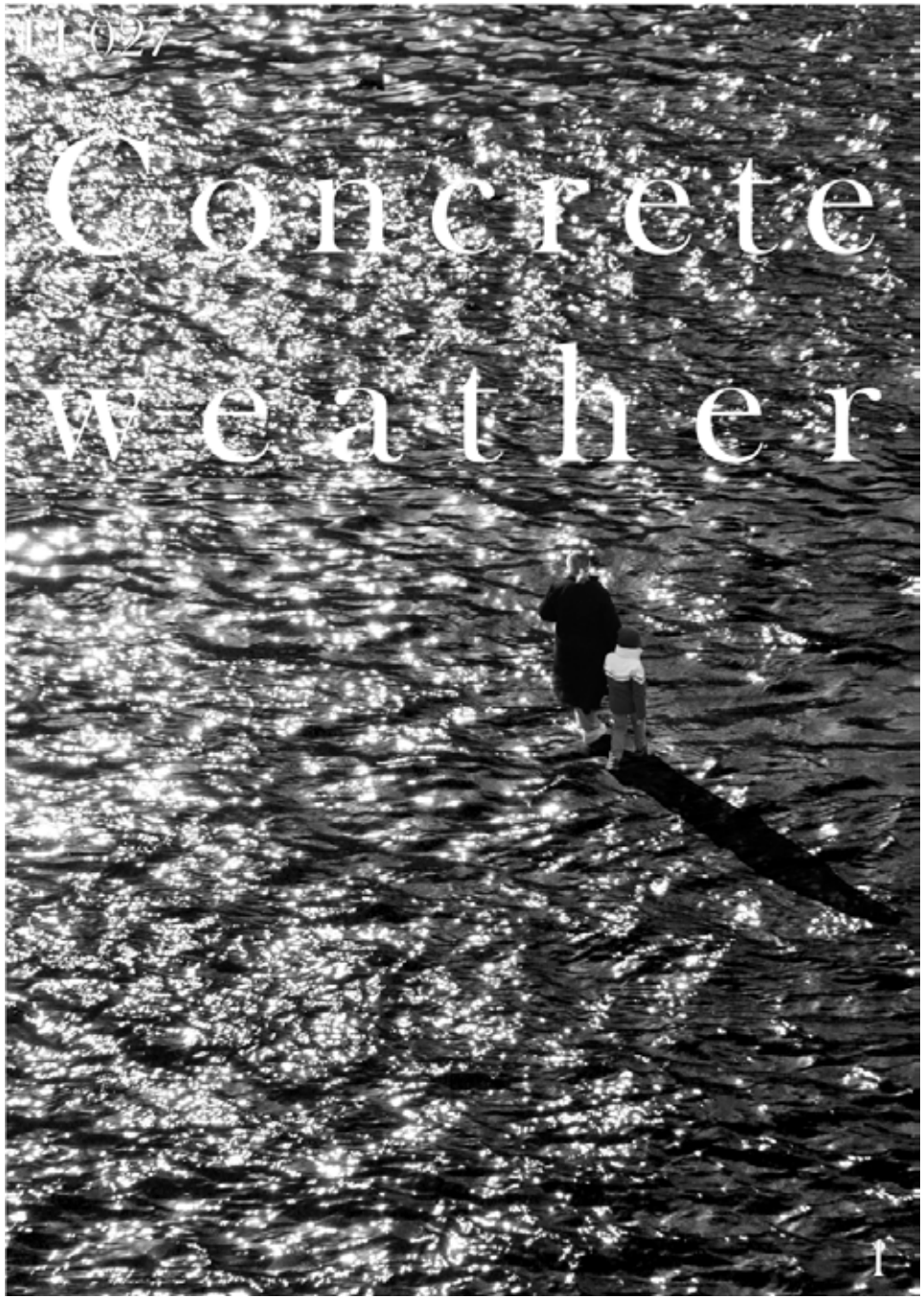



WA628
1

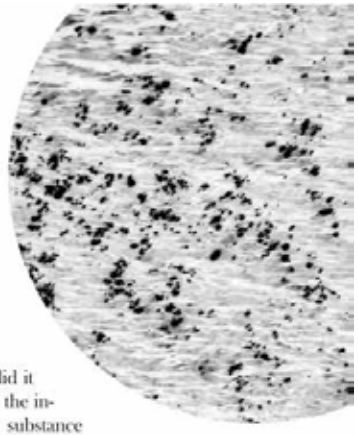



WA628
2



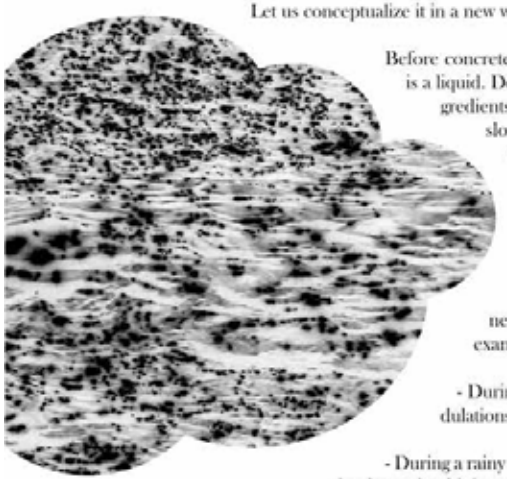


FE027



When I think about concrete I have this image in mind of a solide monolithic and rough artificial stone which has its own silent and powerful presence.

Let us conceptualize it in a new way.



Before concrete turns to solid it is a liquid. Depending on the ingredients this liquid substance slowly solidifies itselft to become a solid stone.

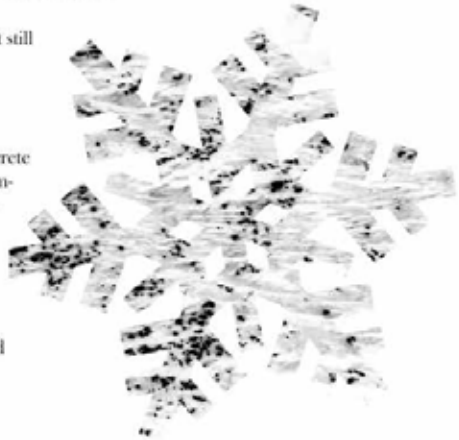
I conceive concrete as a liquid that can and should be reshaped by causes that naturally affect construction materials. More precisely movements that are caused by the wind, the rain or even the sun and the snow. The weather is here a new ingredient that gives life to concrete. Imagine four examples :

- During a windy day it could be marked by a thousand undulations.

- During a rainy day it could have some ripples because of the drops that hit its surface.

- During a sunny day it could be almost smooth but still marked by subtle variations.

- During a snowy day it would seem to be frozen.

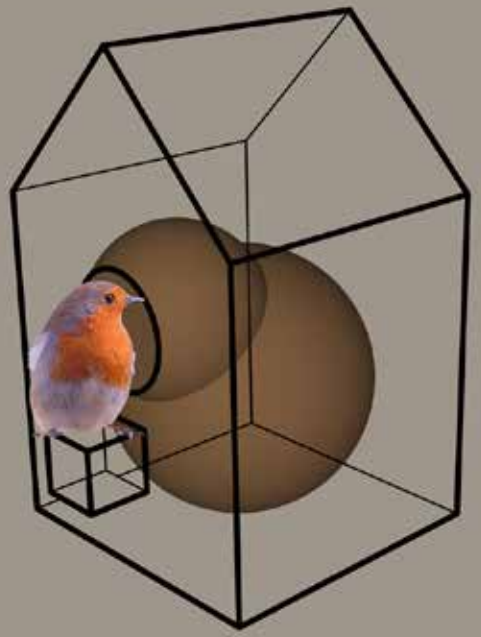


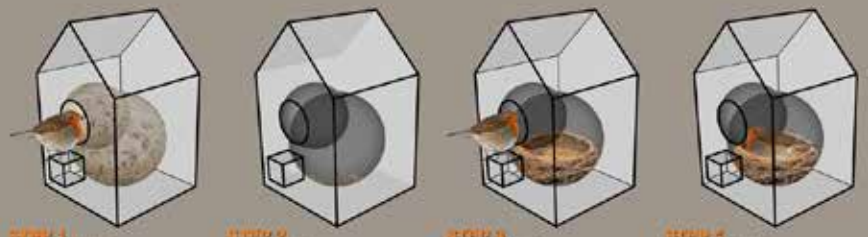
In addition to its features this new idea of concrete could open possibilities for a sensitive and contemporary architecture. It implies an unfamiliar experience for dwellers : a mental and physical reconnection to Nature.

This «concrete weather» is a idea that goes beyond architecture knowledge. It involves cooperation with Artists, craftworkers, chemists and others to become real.

RN040 1

EAT YOUR HOUSE OUT





STEP 1. EATING IN WINTER

STEP 2. EATEN EMPTY

STEP 3. MAKING A NEST

STEP 4. USING THE HOUSE

RN040 2

YOUR ARE LOOKING AT A COMBINATION OF A BIRD-HOUSE THA COULD HE USED BY FEEDING BIRDS AND A BIRDHOUSE THATS COULD BE USED AS A BIRDS NEST.

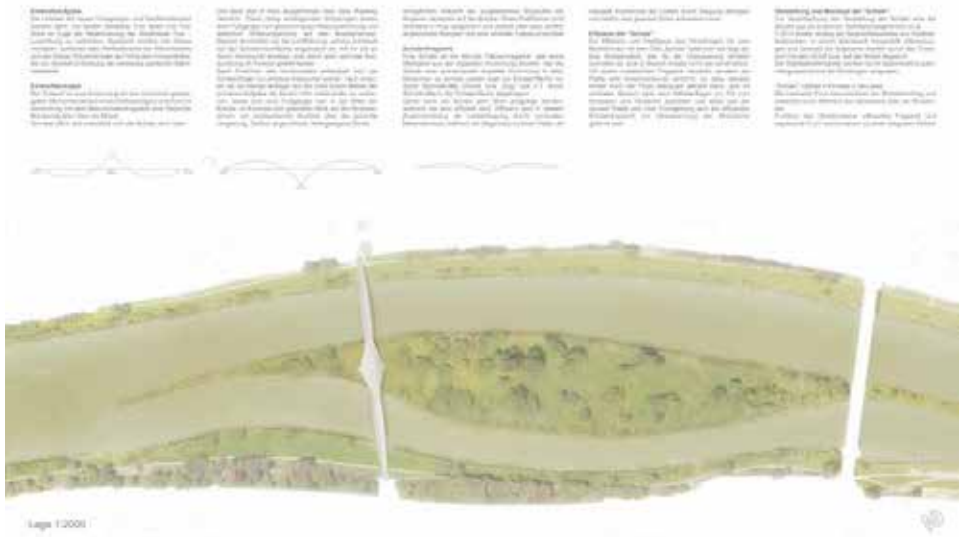
IN THE BEGINNING OF THE WINTER YOU CAN PLACE THIS VERY ELEGANCE BIRD-HOUSE IN YOUR GARDEN. SOON THE BIRDS WILL BE EATING THE BIRDSEED FILL-ING THAT IS EMBEDDED IN THE CONCRETE.

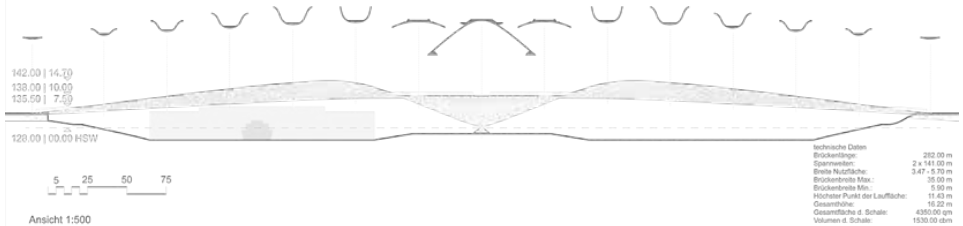
AFTHER EATING A WHILE THE BIRDS CREATE A HOLE IN THE CONCRETE BIRD-HOUSE.

NOW THE FORM OF A BIRD'S NEST IS CREATED IN THE BIRDHOUSE.

WHEN THE WINTER IS COM-ING TO AN END, A BIRD CAN MAKE A BIRD NEST INSIDE THE BIRDHOUSE.

WHEN THE BIRD FINISHED THE NESTING AND THE YOUNG BIRDS ARE FLOWN OUT, YOU CAN REMOVE THE BIRDSNEST AND RE-FILL THE BIRD NEST WITH A BIRDSEED FILLING.





Draufsicht 1:500


FM175
Page 1 "When A Fire Starts To Burn"
Concrete is a monolithic creature.
Concrete. Timber. Fire.
How to they mix? How do they react?
Can you change the fundamental properties of concrete through fire?
Will metamorphoses happen if you try to alter the tendencies of concrete through the means of lighting timber on fire?
These are all questions that have tried to be answered through the following experiments. As designers, we use concrete in every day design, but this was the first time with hands on experience, no books can teach you the same lessons as working directly with a material such as concrete.
MET•A•MOR•
PHO•SIS
FM175 - Page 1 - International Concrete Design Competition

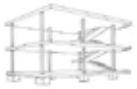

FM175
Page 2 "When A Fire Starts To Burn"
MET•A•MOR•PHO•SIS
FM175 - Page 2 - International Concrete Design Competition

Metamorphosis - to create a specific form in relation to its specific requirements for given purposes.
To apply an analysis to mold a fluid to form a solid. To perfect a specific man-made rock, optimized to his specific characteristics concerning structural performances, architectural aspirations and/or meticulous tectonics.

From the first roman concrete (opus caementicium) to the revival in the 19th an 20th century by the invention of Portland-cement and introduction of reinforcement components to resist tensile stresses, it has had an enormous impact to architecture, structural design and a broad spectra of industries. The process of designing concrete has been undergoing a lot of change due to divers and upgraded material components, insight about the characteristics and artistic explorations.

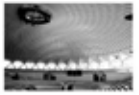
The manifestation of concrete in the architectural and structural practice has known different kinds of archtypes.
A subjective enumeration:

Modern use (example Le Corbusier, Dom-Ino, 1914)



Pre-fabricated elements (example Mark Wiss|NYC, USA| Photo: Anne-Mette Manelius

Cantilevering entities (example 'La Filche', Genie Civil, Expo 1958, Brussels, Belgium)



Grid structure (example Luigi nervi, Palloretto dello Sport, 1957, Rome, Italy

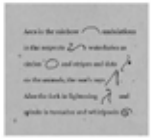
Shell construction (example Heinz Isler, Highway Station, 1968, Deitingen, Switzerland)

Recently the fast technological evolution allows to increase complexity by increasing the quantity of relevant information (environmental, artistic, management, financial, durable, ...) parametrically and provides advanced designing tools. These tools, in return, has changed the design process, the concrete manifestations and thus enrich the intuitive sensitivity towards the material itself.

Catenary arches result from hanging models. Antonio Gaudí used this method to make compression structures. This relation converting one catenary, or combination of tensional elements, into a series of compression elements was a prelude for architects, engineers and designers of the 20th century.

Minimal surfaces in tension-only structures (or the inverted catenary compression-only structures) are biomimic examples of an evolutionary progress of a building system. Because they derive from examples we observe in nature, we intuitively regard them as elegant and fascinating. The minimal surface allows to divide the stresses optimally and thus requires a minimum of materiality.

Deep structure is felt in all of us, informing our everyday interactions and acts of creation. These primal memories are ancient, and as Cecil Balmond explains, inescapable. Here he contemplates how we came to make sense our world and the mysterious power of these very first archetypes.
Deep structure is a drum that beats behind organization – a primal memory of the algorithms that paved the way for survival.
(reference 'Deep Structure' Cecil Balmond, 2015)



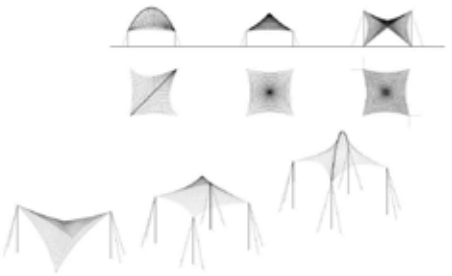
Due to high costs of scaffolding, environmental issue concerning non-reusable components of scaffolding and a possible lack of research and interest, shell structures became rare.

This project (re-)introduces the concept of the membrane-shell structure. A minimal surface based tensional component with internal cables for support which works as a mold and as an active structural member. A concrete shell is sprayed upon a mesh membrane to imitate the shape and over time gives structural compressional support. (Anhalt Universität, IWS, Henning Dörer, Dessau)

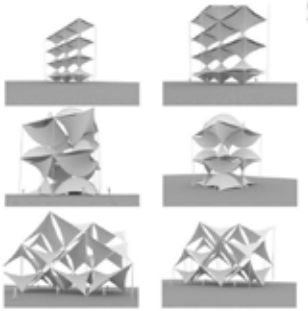
This allows for a synergetic system (ref. Buckminster Fuller, Synergetics, 1975) where both tension and compression members are necessary and provide more than there qualities separately. There has been done research about this method (VUB, Brussels and Anhalt Universität, Dessau) but there has been little response in practice. This project is an attempt to revitalize and expand this system in order to contribute to a more natural formal architectural language, a structural synergetic system which optimises material form in relation to its respective properties. A parametrical system to find optimized concrete shape due to its properties. A Metamorphosis...

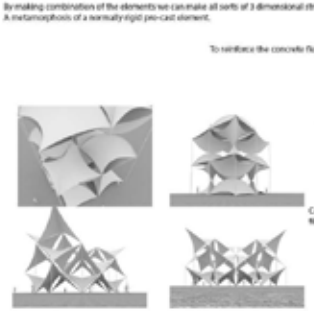
1. One simple element | shell elements based on common membrane typologies

Fabrication - Shotcrete is sprayed on the mesh. To prevent the concrete from dripping off the mesh, the edges could have a stiff profile (as in the image above (HEB100) or a flexible welded edge normally used to guide water towards the lower corner of a common PVC membrane. Depending on the shape and structural analysis, the edge cables, the tie-downcables and stabilizing cables inside the mesh could take tensile stresses after the shell is formed. In this way we optimize the structure to the corresponding material properties. The beams and rings (example arch and highpoint membrane) could be left out depending on the structural analysis. The vertical 'masts' could be left out if the cables are abundant and of the compression could be fully transferred to the shell.



2. Combining elements | The precasted element combination





By making combination of the elements we can make all sorts of 3 dimensional structural configurations.
A metamorphosis of a normally rigid pre-cast element.

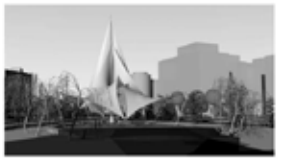
To reinforce the concrete flexible fibers are used.

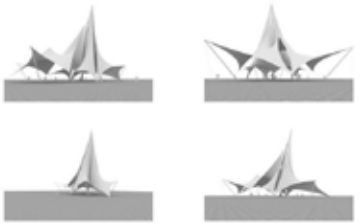
Recycled steelfibers

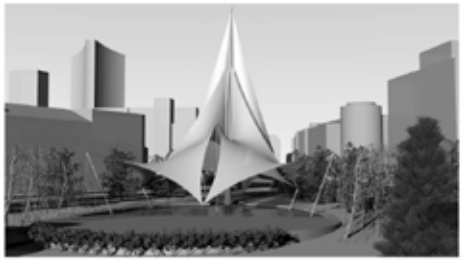
Concrete with fiberglass fibers

Carbon fibers

3. Complex minimal surface membrane shells

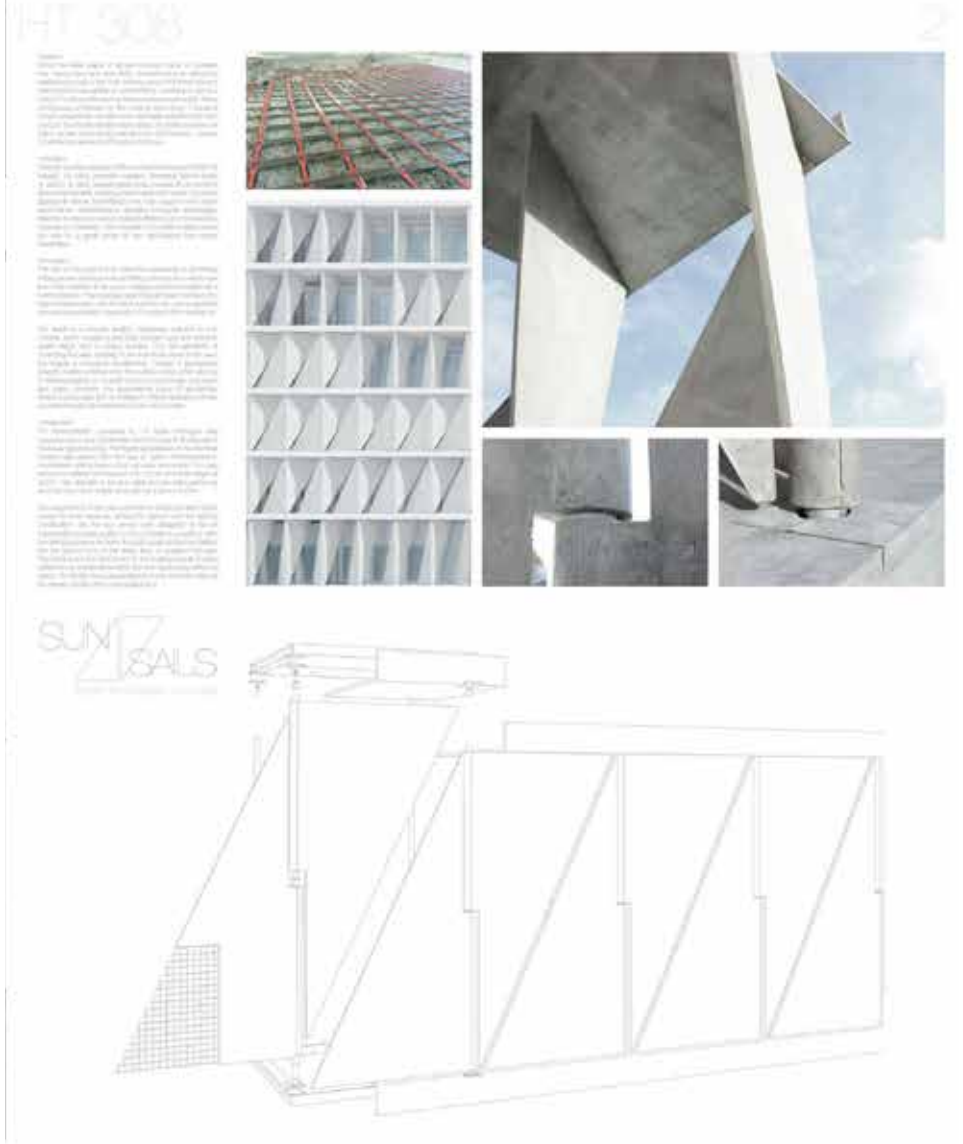






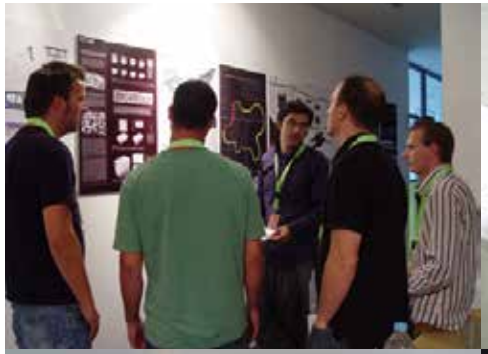
HT308 - Sun Sails

Sebastian Schuch, Michael Wagner, Pol Firmenich, Daniela Repplinger, Lorenz Reiter, Kirsten Verstraeten & Niklas Emmerich



SEVEN MASTER CLASSES

MASTER CLASSES








International Group Work








MASTER CLASSES





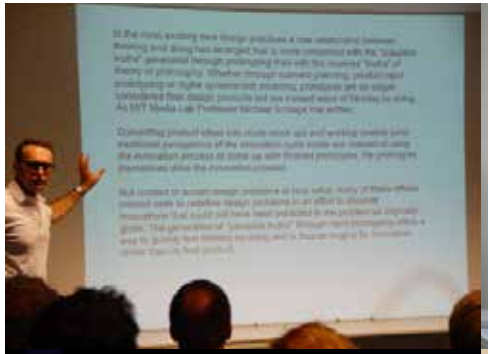



Industry Expertise






MASTER CLASSES








Renown Lecturers







MASTER CLASSES







Critics & Support








MASTER CLASSES







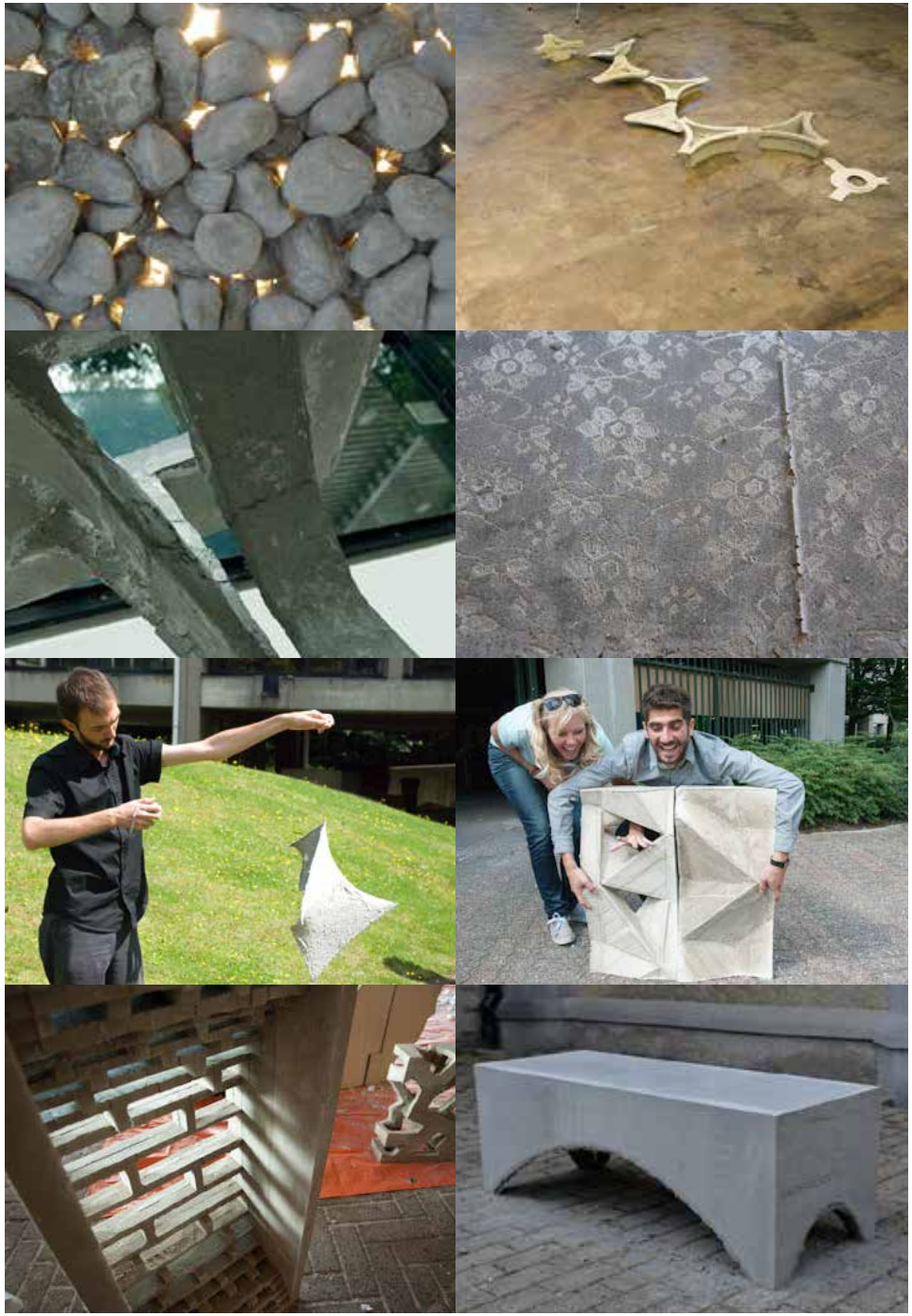

Hands-On Experience








MASTER CLASSES



Concrete Prototyping