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CONCRETE DESIGN BOOK ON *plastic*-OPACITY

INTERNATIONAL
CONCRETE DESIGN COMPETITION
FOR STUDENTS
2006/2007

CONCRETE DESIGN BOOK ON *plastic*-OPACITY

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INTERNATIONAL CONCRETE DESIGN COMPETITION

JÖRG M. FEHLHABER, INTERNATIONAL COORDINATOR

Concrete Goes Dessau

Eight years ago representatives from several European countries first talked about a new student competition. At the time nobody knew whether the competition would ever be held or what it would be like. Now two competitions have been completed and preparations for the next are underway.

The experiences of the past two events have been cause to maintain and strengthen the nature of the competition. It will remain an international event staged through national jury selection and with national winners. The theme of the competition, which changes every time, is abstract and refers to a material property of concrete. After the first event, entitled ROBUSTNESS, came *plastic*-OPACITY. Communications take place through the internet and English is the language used. In addition to a publication and prize-money, the awards consist of participation in a week-long master class, a truly international event in which all national winners work together.

The second edition of the master class was all the more special because of its venue, the Bauhaus in Dessau. It was no coincidence that the event took place in the same year the institution celebrated its eightieth anniversary. For all participants and visitors it was a wonderfully inspiring experience to work, eat and, for some, to stay in a building that is an important piece of world heritage.

For seven days a total of 43 students from eight countries, but of several more nationalities, designed and discussed their concrete contributions to the theme. Curator and head of the master class was Hanif Kara, structural engineer on Zaha Hadid's Phaeno Science Centre in Wolfsburg. He called for innovative applications and solutions in a seven different assignments. Among the presented projects were swimming isles, mannequins as fountains, and garbage columns that addressed environmental issues. After the initial draft designs the formwork was made with timber and foam under the experienced guidance of Guido Lau, head of the wood workshop at FH Anhalt. Students also went to department stores and building markets to buy materials for their various concrete structures. Even rubbish was taken from garbage bins and put into the formwork.

During the concrete workshop experts from the cement and concrete industries prepared high-strength and fast-compacting concrete mixtures. In addition to special in-situ mortar, the self-compacting Duracrete concrete from Schwenk Zement KG Bernburg was used. The formwork was prepared and finished for casting with help from Michael Drewniok, head of the concrete workshop at FH Anhalt,

The competition, sponsored by eight European cement and concrete organisations, will continue. The current team members hope to involve more countries and organisations to expand the competition. Representatives from the Netherlands and Germany organised and coordinated the first two events, while the next competition will be organised by the Belgian representatives. Who knows, perhaps this will lead to concrete that resembles Brussels lace.

We would like to thank everyone involved in facilitating and organising the master class in Dessau, and in making it a success through their contributions. Most of all, we would like to thank the eager students who were never too tired to work for days and nights on their designs and concrete objects.

plastic-OPACITY

HANIF KARA, CURATOR
COMPETITION BRIEF, 22 JULY 2005

‘concrete is as concrete doesn’t’
Massumi

Recent developments in concrete such as high strength concrete and self-compacting mixtures have improved its strength and processability. These new properties are bringing a different level of inspiration to architecture students and practitioners alike by generating new possibilities in themselves, which are much more than technical solutions to design ambitions whose motivations come from other sources. Already explorations of concrete’s inherent qualities such as mass, weight, density, strength and durability are leading to innovative applications. But new possibilities could open up an imaginative field if one could experiment with the degrees of opaqueness offered by concrete. If so, concrete would finally be able to add ‘transparency’ to its obvious plasticity, combining the two great characteristics of modern architecture in one material.

Various developments are engineering a shift in our notions of transparency and lightness in architecture. Ever more rigorous physical (or environmental) demands will reduce the surface area of glass in buildings, but advanced technologies mean this will not necessarily result in less transparency. Computing power allows us to identify structural ‘cold spots’, which can be ‘dematerialised’, and there are seemingly unlimited techniques for generating form. This opens the way to move from a ‘material transparency’ towards a ‘spatial transparency’ in which formal issues as depth, void and matter meet with material properties like texture, weight and solidity, offering experiences and interpretations of transparency that are generated by the opacity of the material. Paradoxically, exploiting concrete’s property of opacity offers the potential to experience and increase transparency, but it is a transparency in a ‘relative’ rather than an ‘absolute’ sense.

Concrete’s plastic characteristics – from fluid to solid, allowing for the production of complex forms, - combined with its mass and resilience allows for ‘free’ transformations while efficiently resolving structural and physical demands. We can envisage a truly three-

dimensional architectural operation (even within the material itself) instead of a one- dimensional 'see-through' performance. So *plastic*-OPACITY infers a spatial transparency, opening up to intricate engagements of shadows and light, tactility, relief and introducing techniques like weaving, punching and folding. It leaves the realm of the purely visual, and opens the door to programmatic, environmental and physical aspects as well as investigations of specific experiences of spaces, context as well as other architectural issues.

The discipline of design demands a reciprocal relationship that can move from idea to materiality as well as in the opposite direction moving materiality to idea. The dual or combined notions on *plastic*-OPACITY tap directly into some of the basic properties of concrete. Similarly it offers contextual, theoretical and pragmatic design considerations that are seemingly contradictory. This perhaps unnerving or slightly confusing quality needs to be imaginatively resolved by all entrants. Insights and interpretations that may very well differ completely from presented notions on *plastic*-OPACITY are welcomed and expected.

This competition seeks to investigate through research and design, any notion of *plastic*-OPACITY in or with concrete. It asks participants to embrace and explore opportunities implied by the dual and combined qualities of plasticity and opacity without particularly pinning down the literal or exact meaning of each property but allowing the pluralistic and phenomenal implications of both. Results of these explorations have to be presented through proposals that are 'design-led' – be it architectural, structural or otherwise – in order to reveal their relevance and merits by application. The proposals may range from objects, furniture, buildings and architectural details to housing, landscape interventions and other large-scale projects. 'Traditional' design criteria as programme, location, context, scale and so on, may be added freely by participants in order to structure their research and enhance the potential of their application. These can be derived from recent school projects such that the competition aims blend with current curricula as basis.
The judging criteria for entries will be framed by both the goal and means of the proposals.

32 AWARDED INTERNATIONAL ENTRIES

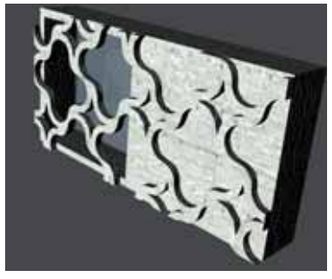
AG024

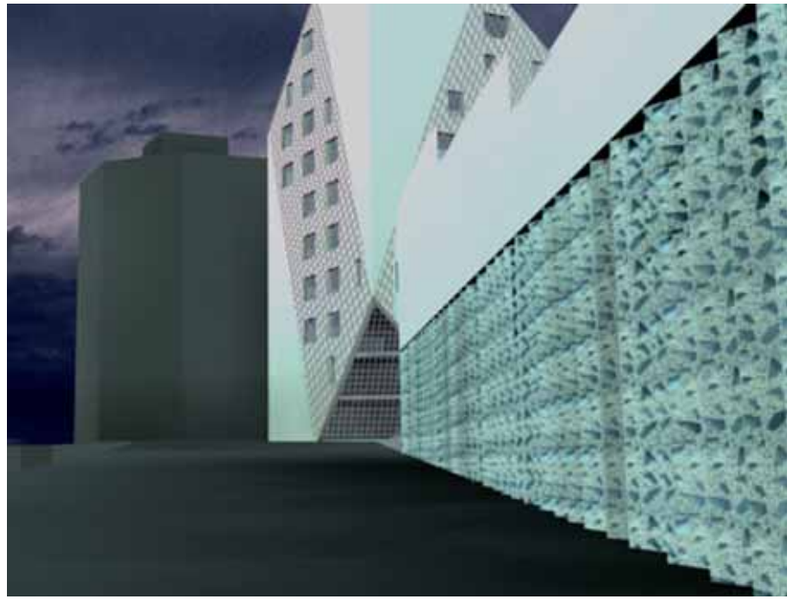
ITALY – SECOND PRIZE

Annalisa Torta – Faculty of Architecture Politecnico, Turin

'The theme for the design project is a multi-ethnic cultural centre, for all kinds of art. The city is Turin, Italy. A place where many different ethnicities co-exist, and in need for a location for meetings between the different cultures. A place for peace.

The experiment aims for different degrees of concrete's opaqueness. By means of using a fibreglass reinforced concrete, we gradually introduce holes inside the concrete since the resistant mass can be reduced. By introducing pieces of broken glass in different sizes we can move from an opaque structural wall towards translucent panels and play with the degree of opaqueness of the material.
The reinforced concrete (GRC) allows for the ability to create very thin structural elements spanning long distances without conventional steel reinforcement.'





AS106 – FRACTAL UNDERGROUND
SWEDEN – FIRST PRIZE

Sara Eriksson – Chalmers-A, Göteborg

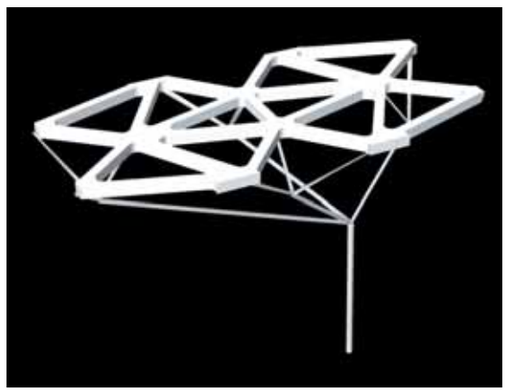
'Taking construction as a starting point this project sought to find a precise method of manufacturing a seemingly irregular concrete structure. The structure also had to solve the situation of lack of daylight. The result became an abstract forest of concrete and steel. The structure is built up by a reinforced concrete frame work system where every individual frame distributes the pressure from above down to nodes, from where a steel tree structure takes the load down to a pillar. The framework repeats itself and forms a concrete grid that stretches throughout the station. The framework system has few visible joints and thanks to the plasticity of the concrete, the grid achieves a soft, simple and homogenous expression that could not have been performed with a steel grid.
Depending on how the tree structure is designed – number of branches and levels, the grid will appear differently. By stretching the tree structure itself the system can find a rhythm and a spatial relation to its surroundings. The concrete frame and its steel tree structure are meant to be manufactured frame wise and then to be put together at the very location.
All along the station runs a mezzanine level, which could be described as a walk in the foliage, with the sky present behind a glass roof. Directly above the mezzanine level the grid needs to be reinforced with crossing beams that distribute the pressure to the nearest tree structure node. The grid will be lit up by artificial lights and cast effective shadows on the platforms.'

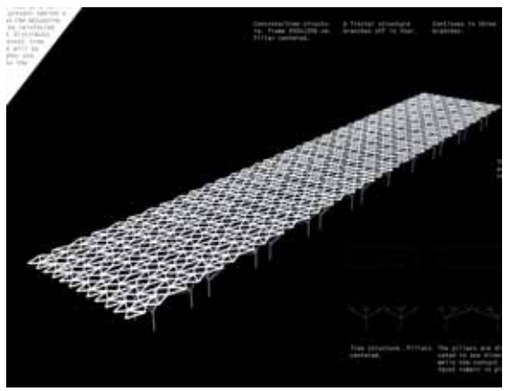
[Swedish National Jury] 'This entry has worked out a way of covering an underground railway station with a concrete grid that permits daylight to penetrate into the station as well as artificial light from within to effect the surrounding streets in an interesting way.

The concrete framework carries a glass roof, and is supported by a tree-like system of steel pillars. The framework is regular and prismatic, but the shapes give an organic and soft impression that shows interesting use of concrete, illustrating the plastic quality of the material. The effect of light penetrating the stylized concrete branches would be beautiful. Manufacturing the grid in precast pieces as suggested by the entry seems quite feasible.

The jury is fond of this concept that shows inspiring ways of developing concrete structures. The idea might be possible to develop further by making the grid 3-dimensional and the roof curved.

An elegant and beautiful entry. '

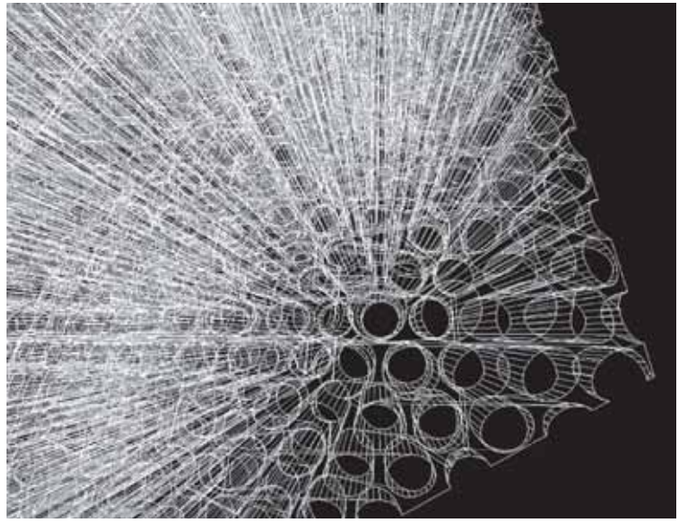


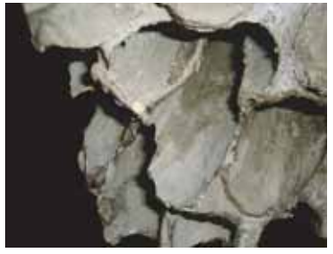


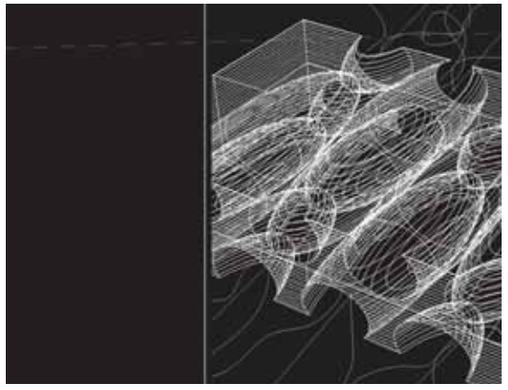
AS189 – DESIGN FOR A CONCRETE SKYSCRAPER
UNITED KINGDOM – HONOURABLE MENTION

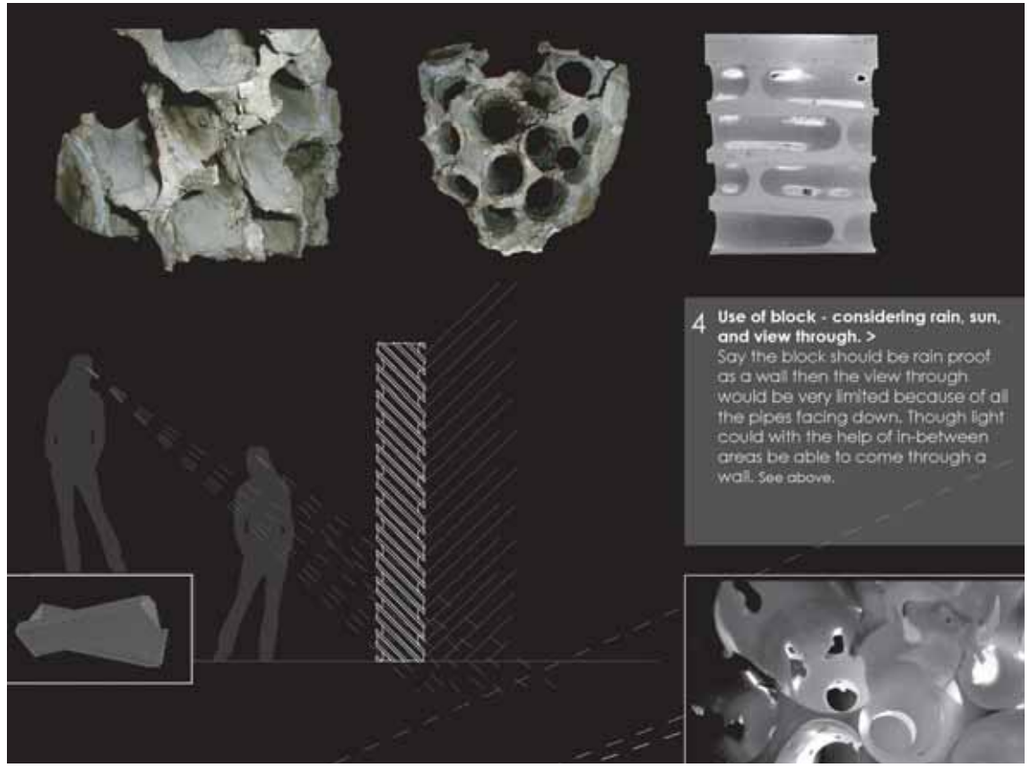
Anna Schepper – Architectural Association, London

‘Beginning with an investigation of concretes possibility to provide possible opacity and transparency in a small scale and from that changing the scale in to the absolute biggest – a skyscraper. Inspiration came from starting the project with an outset in industrial use of empty space inside concrete casting.
As an alternative to normal casting using inflated objects a non parallel cut is being used, creating a lighter effect, and giving more openings to the back. Further more the inflated objects (in this case bicycle tubes) are placed closer to make some areas to touch and thus providing contact between the resulting tube holes. It was also attempted to cast with more than one size object to gain a variation. Say the block should be rain proof as a wall then the view through would be very limited, because all the pipes would need to face down. However the light could with the help of in-between areas be capable of coming through the wall.
In order to go up in scale, the weight of concrete becomes a very important factor. After the destruction of a concrete model, the gaps being at an angle of 45 degrees and weak corners appeared to be the problem. Making it important to realize that the area between the tubes can work as columns or beams.
Thickness, directions and density of holes provides for the possibility to control the major factors in the skyscraper, the light and climate and thereby the function and program within.’



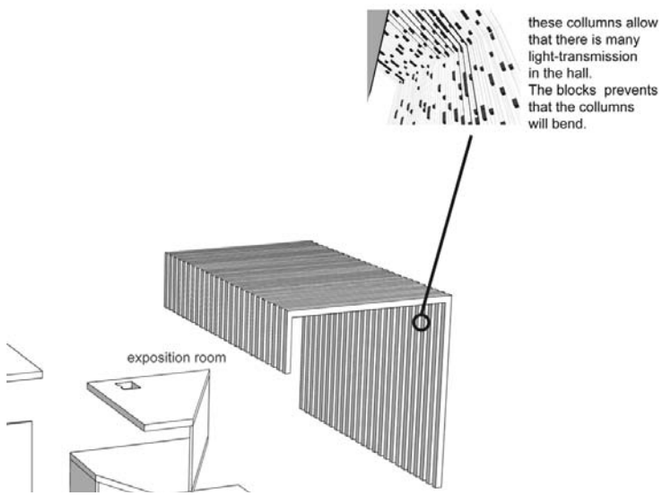


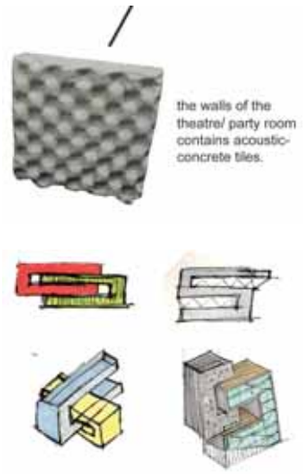


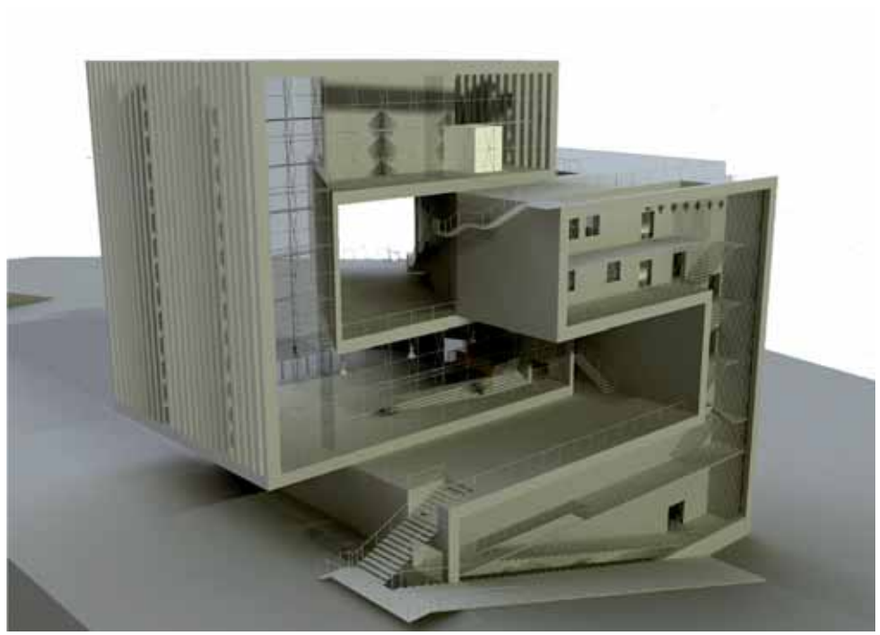


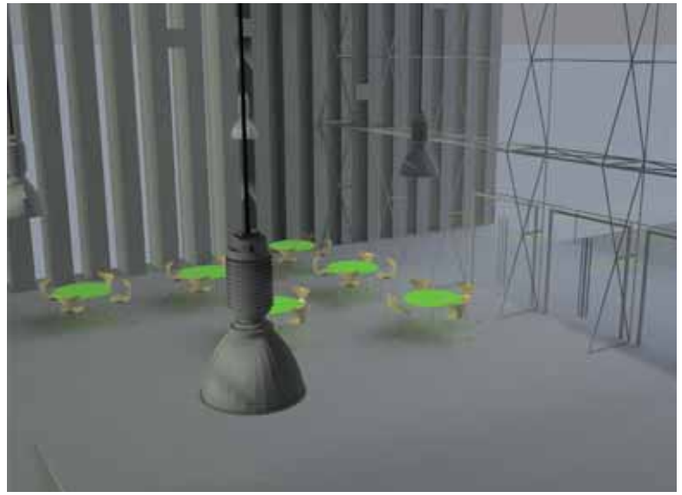
BE187
BELGIUM – HONOURABLE MENTION
David Berkvens – St.-Lucas, Brussels

'The idea for the cultural centre was to use its initials as basic form for the building. The opacity I tried to explore was not in the texture but more in the use of existing concrete structures. By using plates in combination with walls it was possible to make open spaces in the building. These are considered as 'corridors' and create a dualism between in- and outside. The composition of plates and walls is a bit like Mondriaan's paintings and generates a fluid space.'









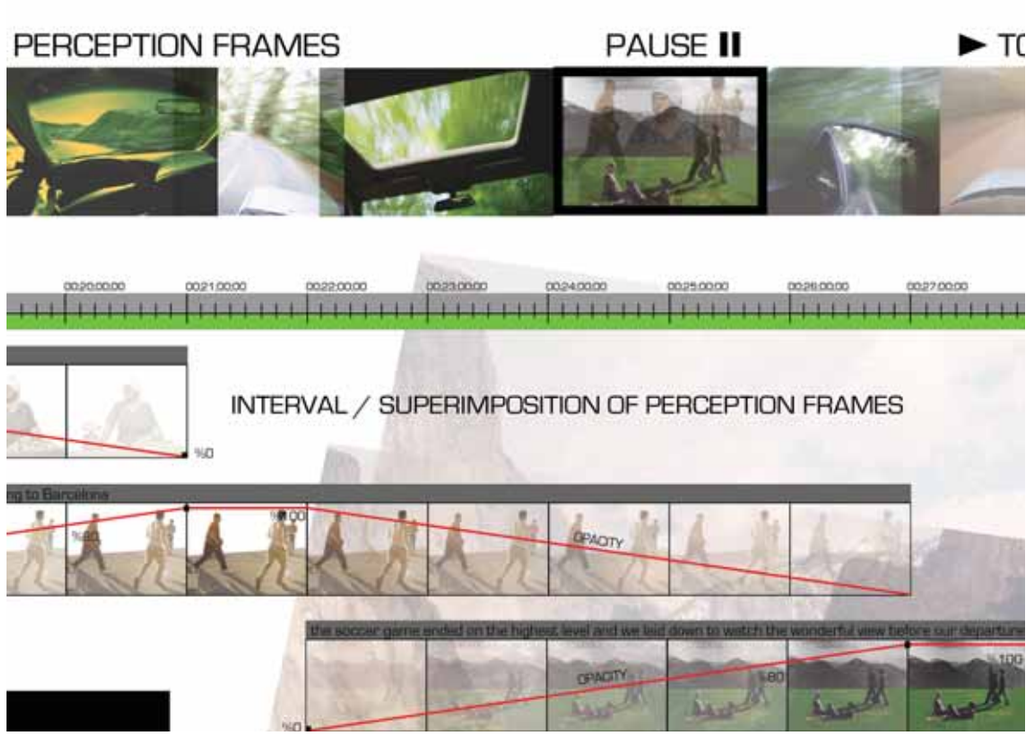
[Belgian National Jury] 'This project develops a form relying strongly on the traditional aesthetics of concrete. In this it is extremely explicit and therefore unconventional. One overall, significant view of the building is missing. The jury remarks that the graphics are correct but quite flat. The presentation lacks any emphasis.'

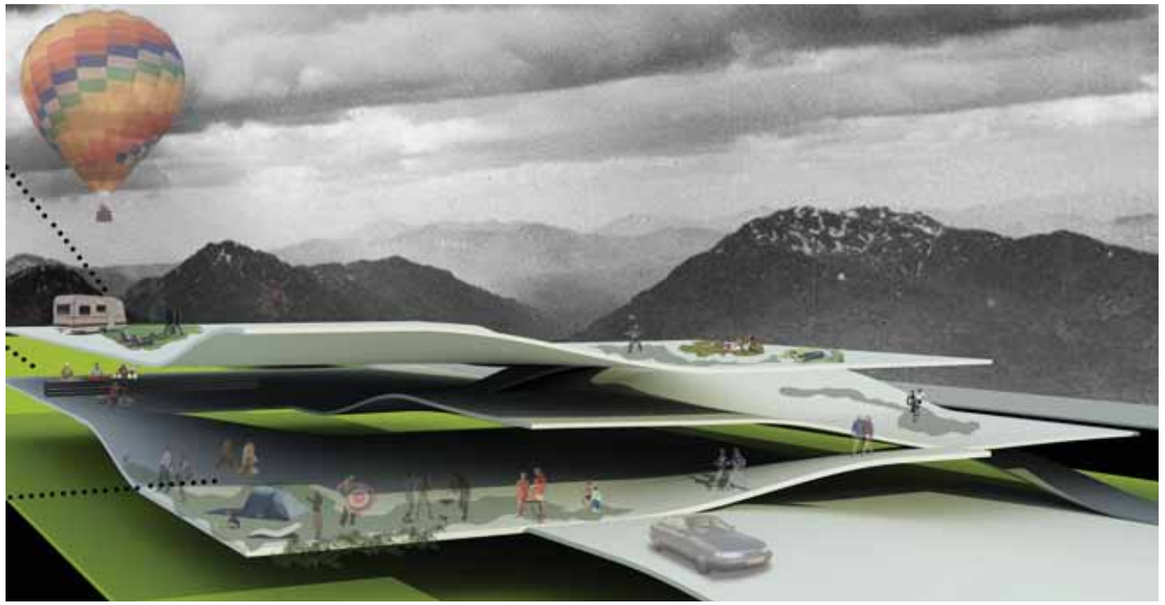
BE358 – INTERVAL [CONCRETE PLANES]
GERMANY – JOINT WINNER

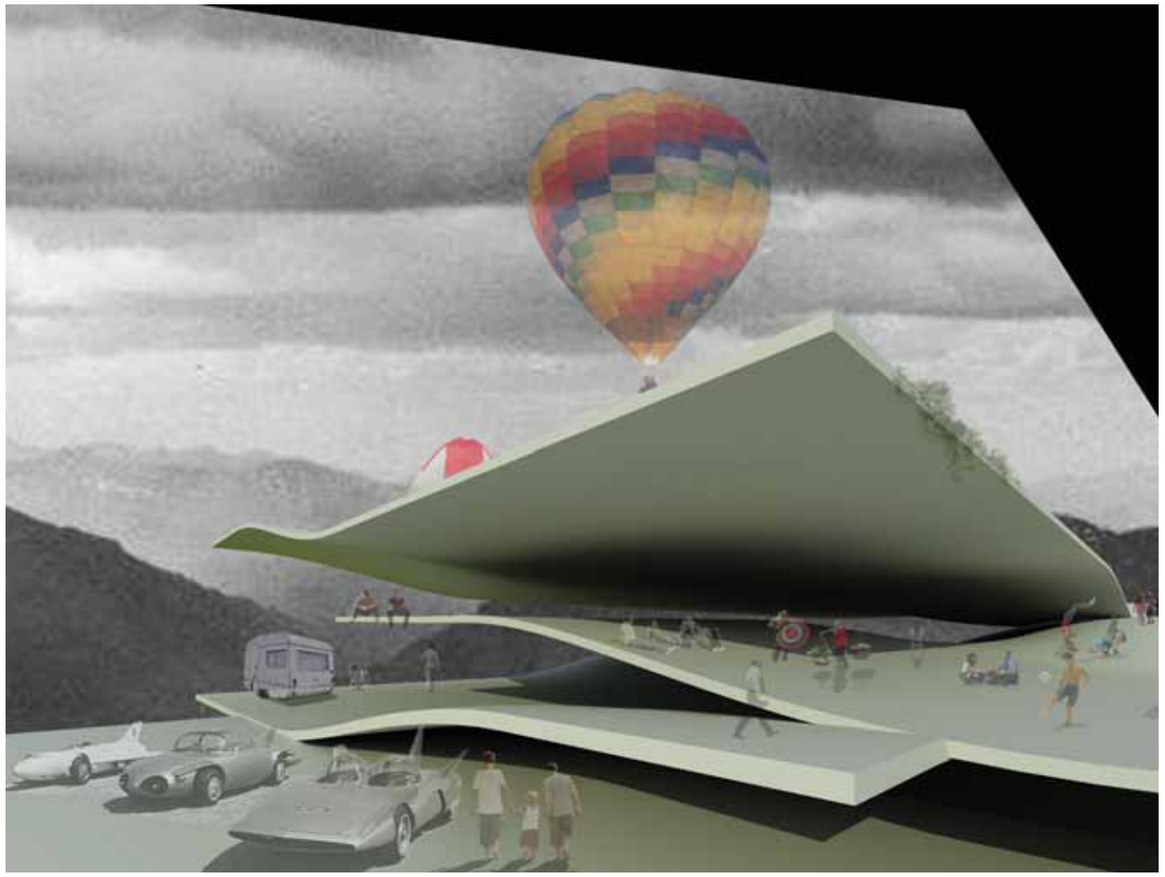
Emre Cetinel – Brandenburgische Technische Universität, Cottbus

'Interval [Concrete Planes] is a prototype of space experimentation for intervals on highway drives. During the journey from one city to another city, one experiences physical environment with different layers superimposed by the effect of different speed levels. Perception becomes blurred and memory is created up to duration of perception frames and their **opacity levels.** Interval [Concrete Planes] is designed to create a supplemental perception frame between journey durations. The plastic form of concrete planes enables people to flow inside smoothly and conceive all layers combined with different opacity. It allows all perception components of the interval to be superimposed and make one [interval frame] of the journey.'

[German National Jury] 'The parking lot at the highway as program and theme is used to show the dynamic possibilities designing with concrete and its plastic and space moulding potential. The situation is a poetic approach of a built structure in the transition to a natural landscape. It traces topography in various levels. By shifting the different levels the plastic abilities of concrete are emphasized. The site, playing with light and shadow, and the experience of different brightness in an open space is used in the sense of modified opacity. In this sense the parking lot with its various dynamic curved levels is the attempt being a part of the natural landscape.'







BT282
BELGIUM – FIRST PRIZE

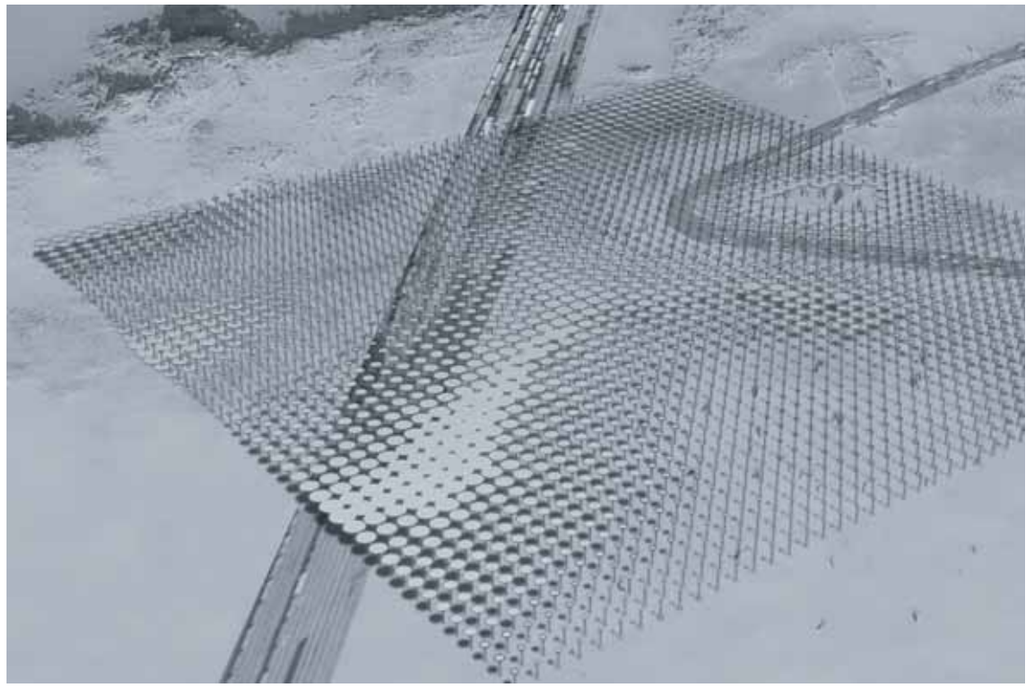
Arnaud Kinnaer – La Cambre, Brussels
Bruno de Veth – La Cambre, Brussels
Valentin Pierron – La Cambre, Brussels

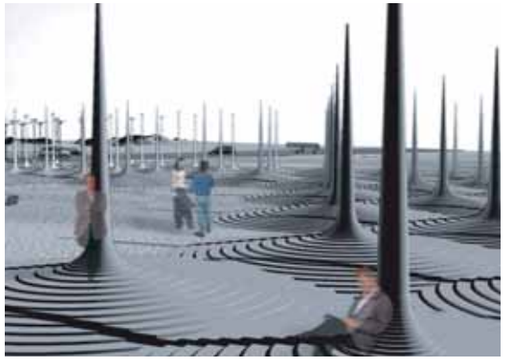
'Transparency can be an inherent property of a material, as in the case of a curtain wall. Transparency can also emerge from a particular mode of organization.

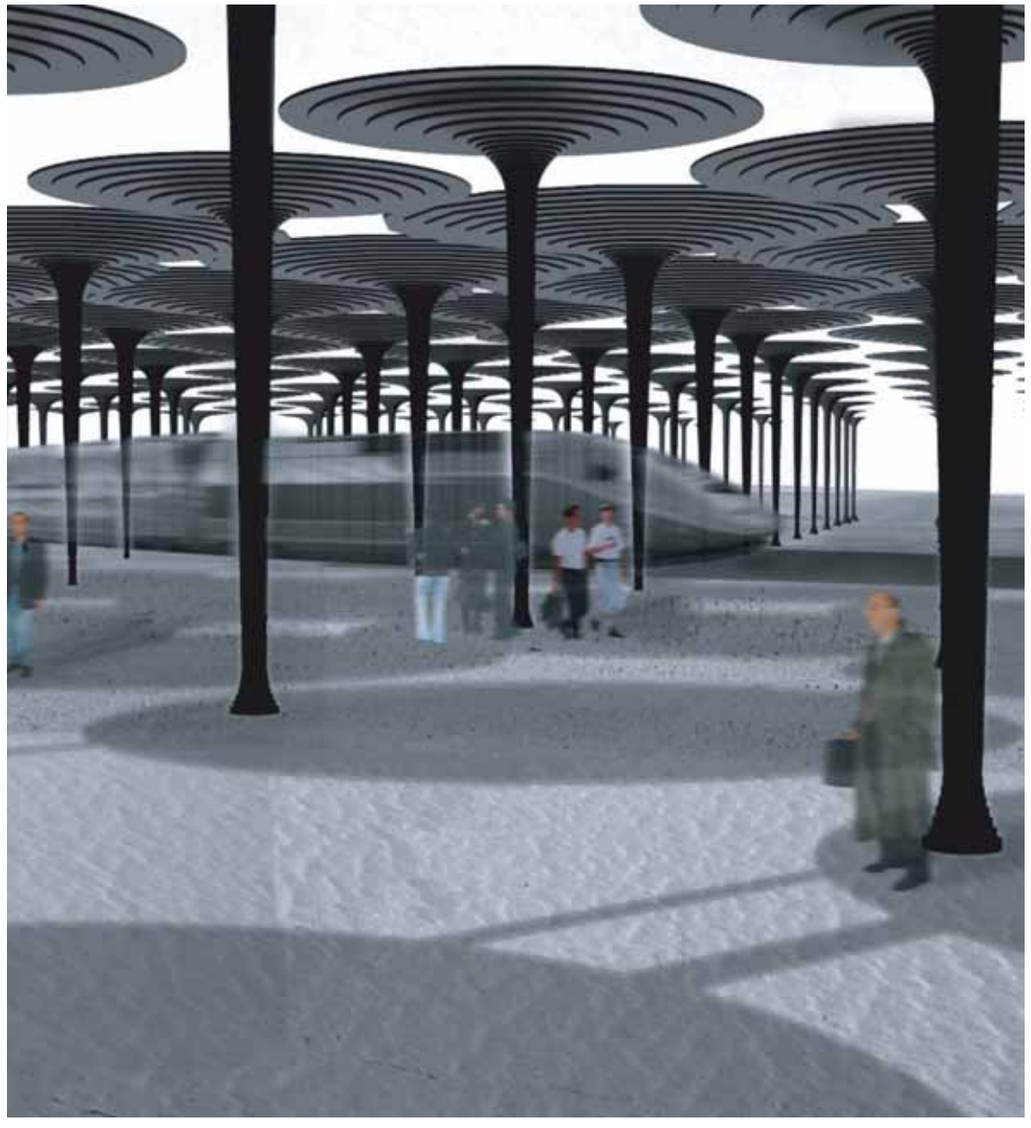
When two or several figures are superimposed, each one of them claiming the common part of both of them, human eye's perception is one of contradiction in spatial dimensions. In order to resolve this contradiction one has to admit the existence of a new visual quality. These figures are transparent in a way, which means: they are able to interpenetrate one another without cancelling themselves out optically. This transparency however proves much more than its visual quality. It even implies spatially a much broader arrangement. Transparency means one will perceive simultaneously various space layers. Such an organization 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 ones self 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.'

[Belgian National Jury] 'The Jury was seduced by this entry which clearly takes up the theme of the competition as a project and as an argument. The entry elaborates on Colin Rowe's conception of 'phenomenal transparency' – linking the notion of transparency not to the properties of a material but to pattern and spatial arrangement. Grid and square are put forward as organizational principles. The project relies entirely on the use of the column (the Johnson Wax's model of Wright) as a constituent. The transformations of this element generate a landscape of patterns. Thus the project makes a shift away from function, via visual perception towards the iconic; it unfolds as a hermeneutics of concrete.'







CC005 – SPACETIME PAVING SLAB
UNITED KINGDOM – JOINT SECOND PRIZE

Alaistair Steele – Royal College of Arts, London
Francesca Maffei – Royal College of Arts, London
Nick Turvey – Royal College of Arts, London

'Opaque, static, impersonal…
Concrete was hated.
Unlike timber, stone and brick, it didn't become inscribed over time with the story of its use, its aging being rarely considered. Aloof and illegible, it frustrated our need to see ourselves reflected in the environment.

A programme of experimental research, challenging preconceptions about the nature of concrete, involved unstable aggregates including frozen peas, salt and firelighters. This conceptual springboard led us to exploit conventional processes of concrete decay, to produce objects that would change controllably over time. Our first application is paving, a major component in the urban environment, and ripe for evolution.

Transparency through legibility, plasticity in time, shaped by use…
Concrete is loved
The spacetime paving slab 1 reveals a pattern of pedestrian use 2 through visual and tactile changes over time, 3 improving city navigability and 4 promoting engagement and involvement with the urban environment.

Spacetime's achievements are obtained through a corrugated lower layer of extremely hard concrete progressively exposed through the wearing down of an infilling upper layer of slightly softer concrete in a contrasting colour. In the heavily used areas, the bumps of the lower layer will protrude further with time and use. This difference in hardness between two layers of the spacetime slabs records the history of the human use of a space.'

CC543 – A GROWING CALM
IRELAND – THIRD PRIZE

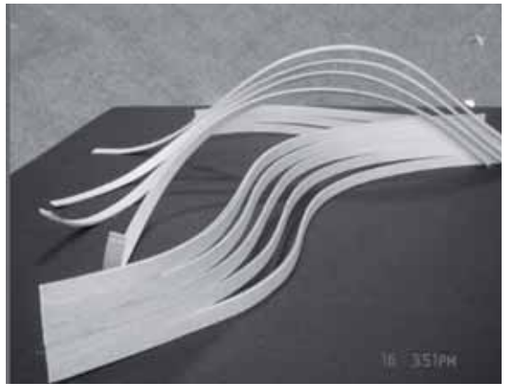
Gerard O'Mahony – Queens University, Belfast
Ian Shek – Queens University, Belfast
Timothy Lee – Queens University, Belfast

'Our proposed site is located at Bankmore Square, Belfast. This urban park goes unnoticed and unused by many passers-by and residents in the area. It is adjacent to a major junction, and so, is subject to the noise and air pollution caused by the large amount of traffic that passes by. This infringes on the park area to such an extent, that it can actually be unpleasant to sit in the western half of the park. On spending almost an hour in the area, we observed only a handful of people entering the park and most of those were simply walking through.

Our sculptural entrance/barrier attempts to address these issues, as well as manipulate the plasticity and opaqueness of the most used, and misused building material, concrete. With its sweeping and graceful curves, we have endeavoured to challenge the preconceptions of concrete as a heavy, dull and lifeless medium.

The inspiration for the form of our structure comes from a blooming flower. On the western side (facing the busy road) a 'protective' barrier is formed, an as-yet-unfurled bud, which allows light to shine through from above and reflect off the pool underneath, while shielding the park-goers from the noise and pollution caused by the nearby traffic. In addition, the water cascades from the horizontal curves further muffling the noise of traffic, and detaching the user from the choking city. From this barrier, stems the group of slender, petal-like curves. They lead inwards and rest delicately on the ground to create structures that can be used to sit on, to stroll through, to play around, depending on the user.'

[Irish National Jury] 'The project is an investigation into the plastic potential of concrete, creating opacity through formal manipulation rather than material innovation. The delicacy of the structure and its rhythmic application evokes most clearly the poetic potential of concrete.'



CH205
IRELAND – SECOND PRIZE

Hala O'Reilly – University College, Dublin
Paul Jeffries – University College, Dublin

'We decided to add a water based compound admixture to the cement to allow us to make the material less dense, thinner and less brittle. Our first thought was to use gelatine as an admixture as it also reacts with water allowing it to set. Our investigations lead us to look at applications where gelatine is used.

The advantage of using gelatine as a binding agent is that the bound asbestos mixture can be mixed with cement in a subsequent process. The resultant block is so hard that the asbestos fibres remain permanently bound and can be disposed of in landfill.

In the near future, gelatine could be a great help in a tanker accident where thousands of litres of oil pollute the sea. Why? The basic principle is simple: oil and water don't mix. By adding an emulsifier such as surfactants, we obtain a suspension of oil in water. As a result, little drops of oil are formed and float in the water. The cold, aqueous phase is transformed into the jelly phase by the addition of the aggregate gelatine.

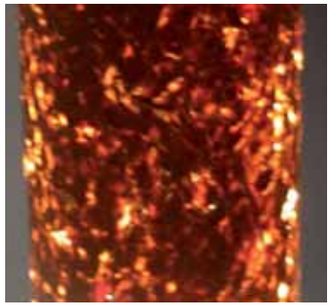
This results in a system that is stable, capable of being cut and that subsequently can be stored for a long period of time. In the event of an oil tanker accident, any oil spillage could be solidified and cut into pieces, hence warding off an environmental disaster.

We decided to use wallpaper paste as an admixture as it was affordable and readily available unlike gelatine. Glass fibres were used as an aggregate as fibre cement is already a known concrete technology. We experimented with different ratios of cement to wallpaper past, making sheets of the material each time, allowing it to dry and observing its qualities.

After we were happy with the material in sheet form we tested different methods of shaping the material. In the first method we used was to compact it within the mould of two different tube sizes. We found this technique to reduce the light transmittance. For the second method we used a tube as formwork and placed the web material upon it and gently rolled it until we got the desired thickness. The tube was then wrapped and allowed to cure until enough strength had been formed to enable us to remove the formwork. The material was then sanded until a polished finish was gained.

Qualities of the material: Light, Opaque, cheap alternative to alabaster, thinner profiles.
Applications: This material can be used in light shades, lighting features, back lit feature walls.'

[Irish National Jury] 'A practical experiment to create a new concrete mix is well described. The resultant hybrid blends an ethereal translucence with the familiar opacity of concrete. The judges were impressed with the sophistication of the product and professional approach to the process and presentation.'

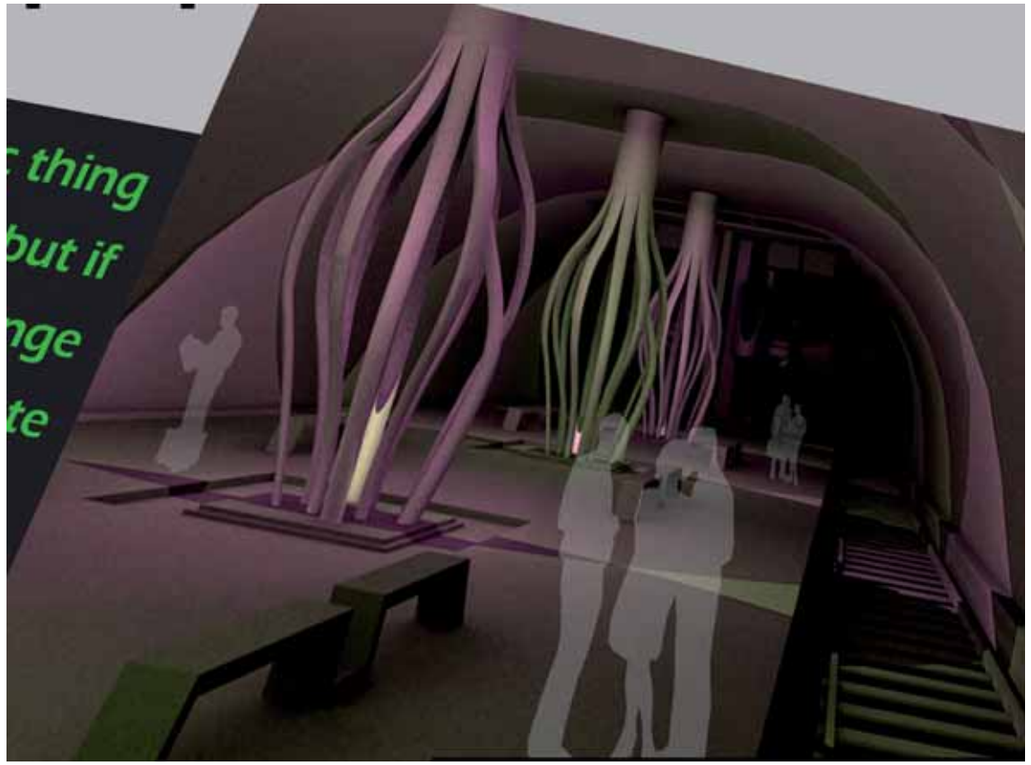


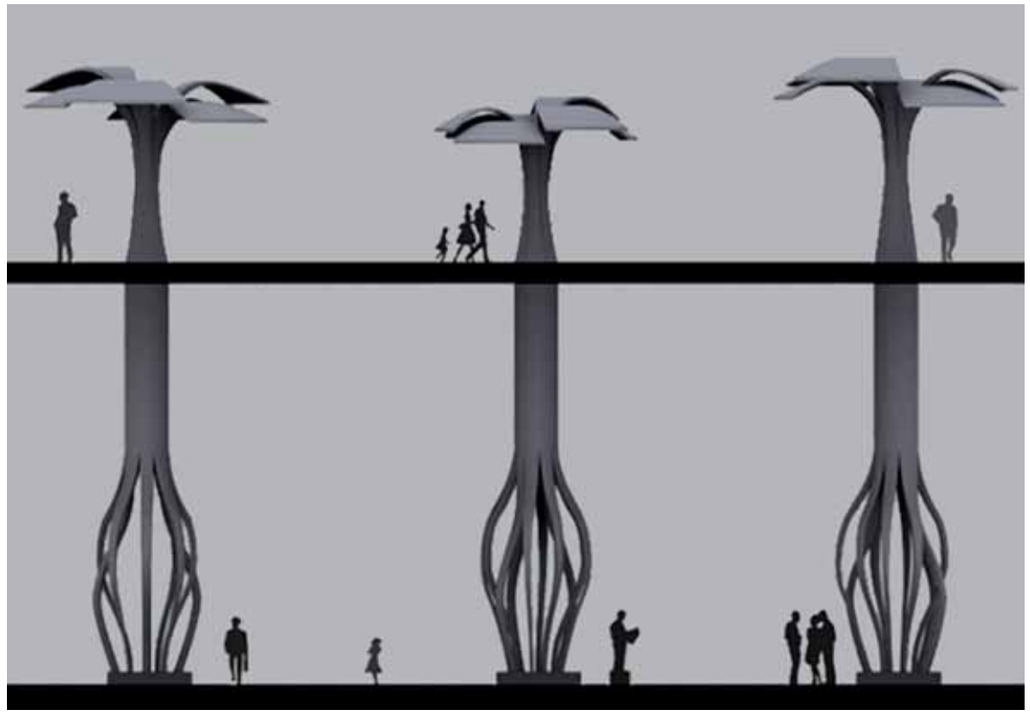
CK357 – CON“CREATE” EMOTIONS
TURKEY – HONOURABLE MENTION

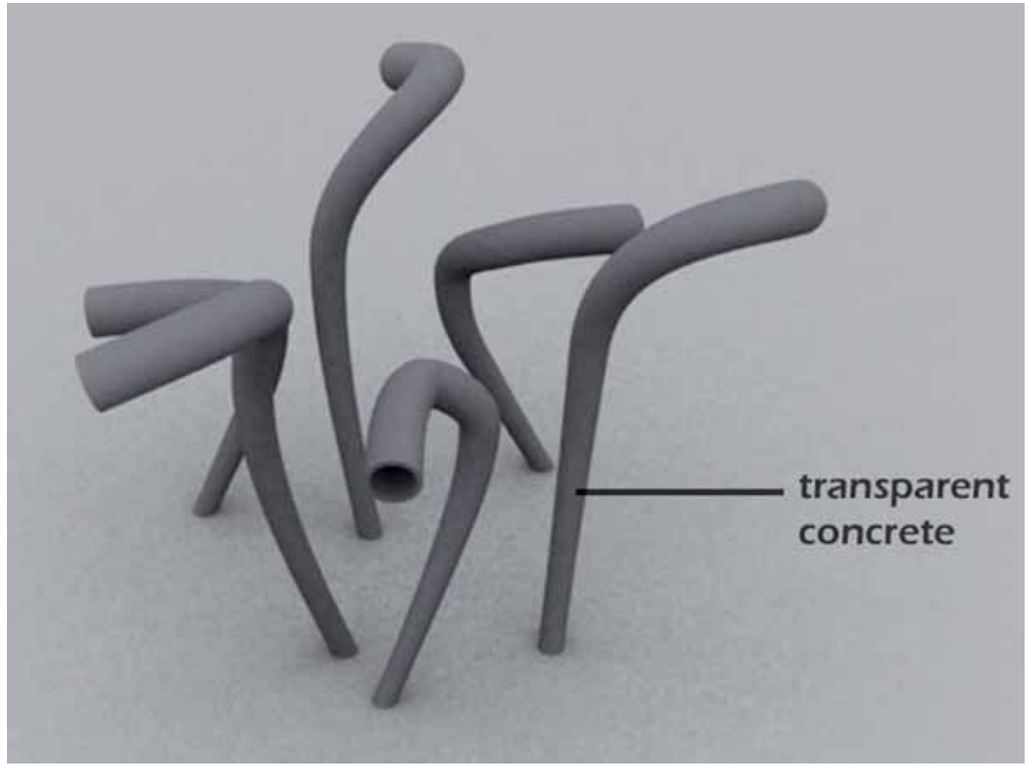
Cem Tütüncüoğlu – Izmir Institute of Technology, Izmir
Keremcan Kirilmaz – Izmir Institute of Technology, Izmir

‘concrete is believed to be an antipathetic thing compared to the creations of the nature but if it is used in the correct way we can change many cults about the usage of concrete.
The main aim of this project is to combine concrete with the nature and create emotions.’

[Turkish National Jury] ‘The project with the pseudonym CK357 was found attractive because of the urban accessories and the technical and aesthetic composition of the project and received the honorable mention award as a result of the pure and qualified expression of this thought.’





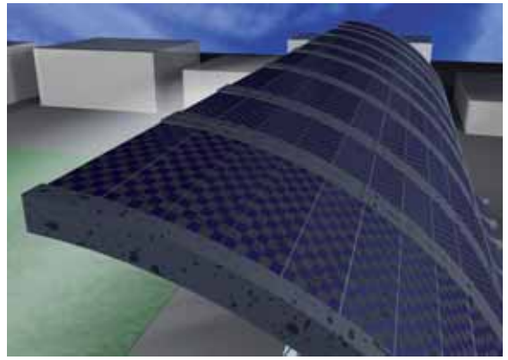


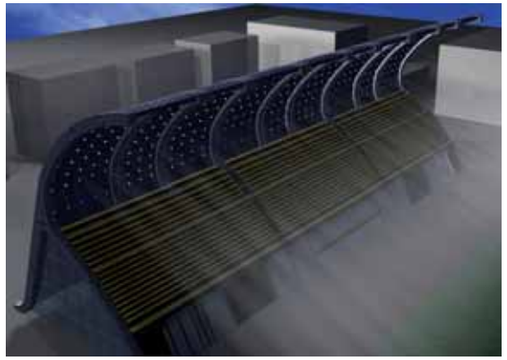
CL583 – A TRIBUNE OF CONCRETE AS A TRIBUTE TO CONCRETE; SHELTERING, ILLUMINATING, AESTHETIC

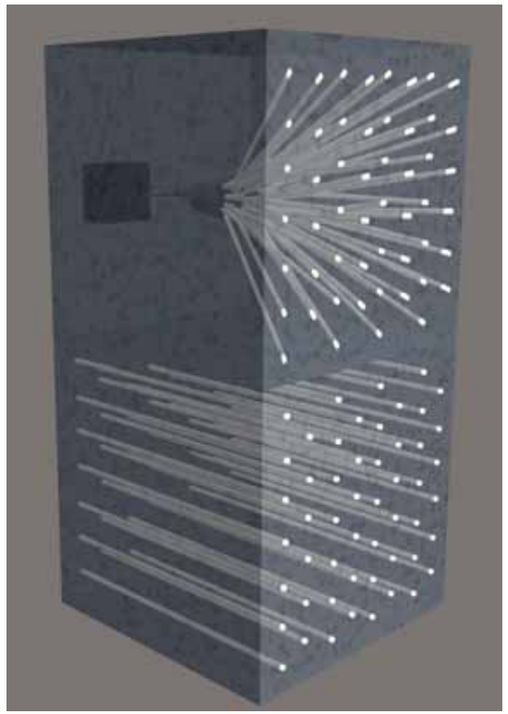
TURKEY – JOINT SECOND PRIZE

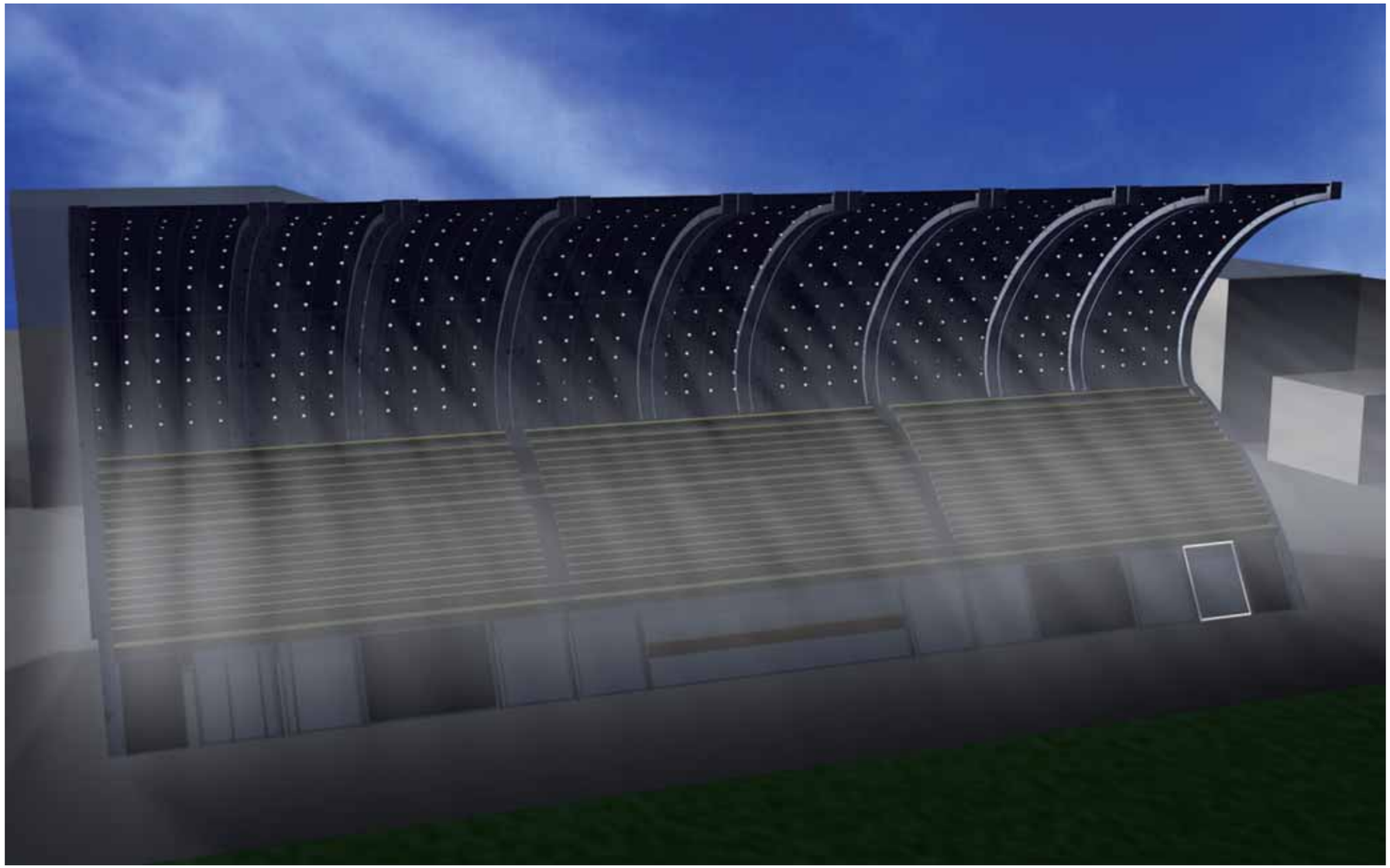
Emre Demerci – Istanbul Technical University, Istanbul
Mehmet Ayaz – Istanbul Technical University, Istanbul
Osman Şahin – Istanbul Technical University, Istanbul

[Turkish National Jury] 'The project with the pseudonym CL583 received the second winner award as it recommended the use of the concrete as a light source by using the solar energy and the fiber optic conductors and as it has materialized this idea by means of a prototype.'





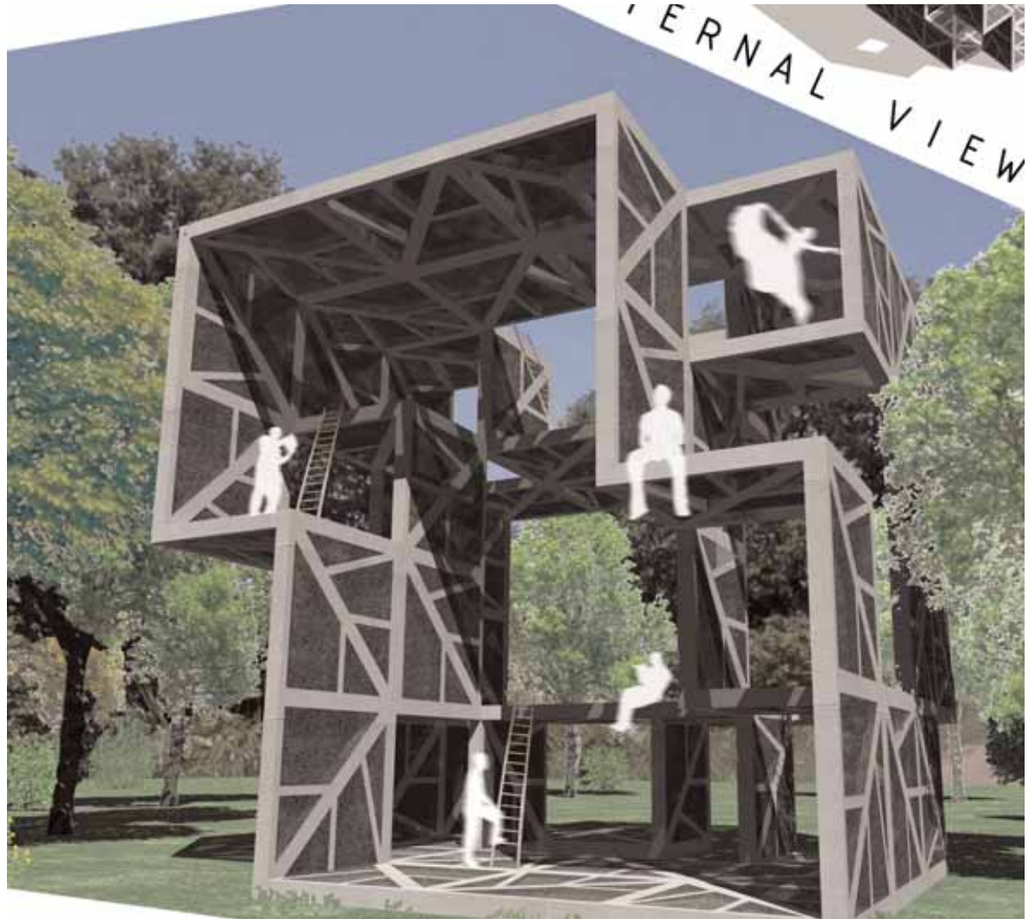




DB616
ITALY – FIRST PRIZE

Aldo Sollazzo – Faculty of Architecture Roma Tre, Rome
Paolo Diglio – Faculty of Architecture Roma Tre, Rome
Paolo Spadafina – Faculty of Architecture Roma Tre, Rome

'The light filters among the fresh branches of the tree, it shines though the thin leaves and then it rest peacefully on the green grass. The same light, a little farther away rises upon concrete walls, it turns with them, it glides among hollows, it shows and at the end it's stops still clear on the light flair. Following the light, you suddenly realize that the feet aren't on the fresh grass, they are now, on a different surface, but it's still alive and it still shakes under the punt form light. You are in the Concrete Leaf Light (CLL). Everything is inside and outside. This is the aim of the CLL; throwing the outside in the inside, separating them so much that they shake together. It allows to get closer to the farthest branches of the trees reaching out an arm to touch them. Indeed CLL is a space where nature and your thoughts meet together. It is not only a simple patio, but a more complex place, where music, art and poetry are met in order to play together. CLL hides in its spatial movement a pure, abstract shape: the cube. The cubical shape is born from the will to insert a formally abstract element to the context, that entrusts only to the own articulation and the material composition the task to relate to it. The leaf is the archetype that produce CLL. The light inside it, shows a structural hierarchy which contains three elements: the stalk, the main element, the nervatures and the blade, the lightest and thinnest layer which is organized around branches. In CLL, these elements became a square module where the bulging is underlined by Litracon, a particular concrete that transmits light, and by opaque concrete elements, inside a concrete bearing frame: the formal and material symbiosis of this module creates the total space. The internal space is created by some bands which curve inwards and create some waiting areas which are connected by ladders that you can move. The position of the bands is repeated in the same way on all the faces of the cube, unless on two, completely absent. Spatial complexity, volumetric articulation, art and game gathers in this place, captured and held with from the light.'

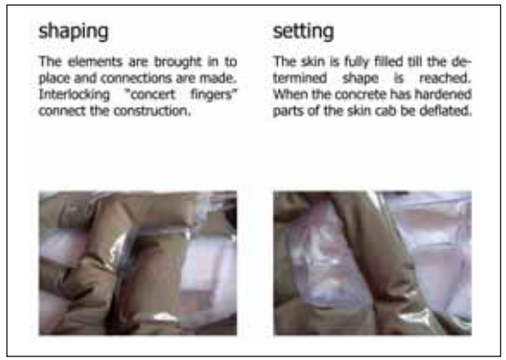


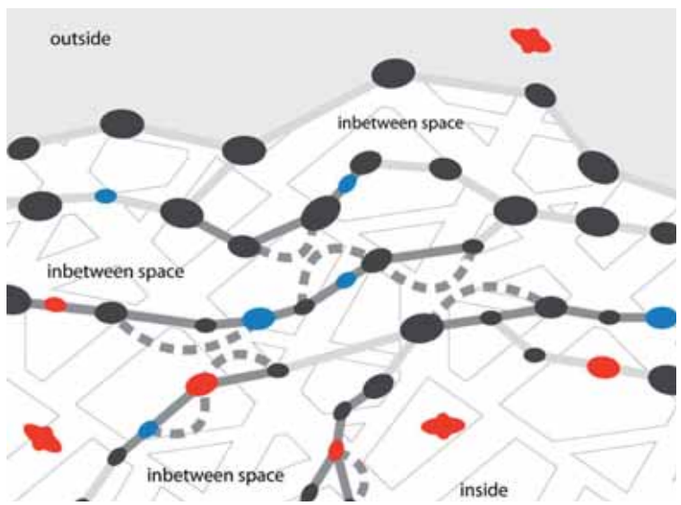
EE333 – MINIMAL SKIN
NETHERLANDS – HONOURABLE MENTION

Eelco Grootjes – Academy of Architecture, Rotterdam

'The minimal skin is an all integrated solution for construction, installations and climatically separation. All these functions are integrated in one mould made of a transparent and flexible foil. The mould consists of several layers of foil which are mounted together. Filling the layers of the mould with different materials determines the overall properties of the skin.

All materials are a fluid or gasiform when the mould is filled. For construction parts are hardening materials used e.g. concrete which after hardening forms a firm skeleton. Installations and climatic separation consists of fluids or a gasiform e.g. water, air which flow through the skin. All fillings are visible and abele to expand and shrink due to the transparent and flexible foil mould.'





[Dutch National Jury] 'The extremely experimental and complex proposal identified a strong spatial approach to the theme in which separate layers define a threshold. The produced mock-ups are encouraging, not in the least in presenting an investigative design approach. The jury acknowledges the proposed children centre as far from resolved. As is the proposal of the 'net' which seems to be more an idea and lacks in convincingly becoming an application in the building. The jury encourages further research into the technical aspects of the moulding techniques, one that deploys foil as formwork. An intriguing development.'

GE584 – PLASTIC-OPAQUE WALL
TURKEY – JOINT THIRD PRIZE

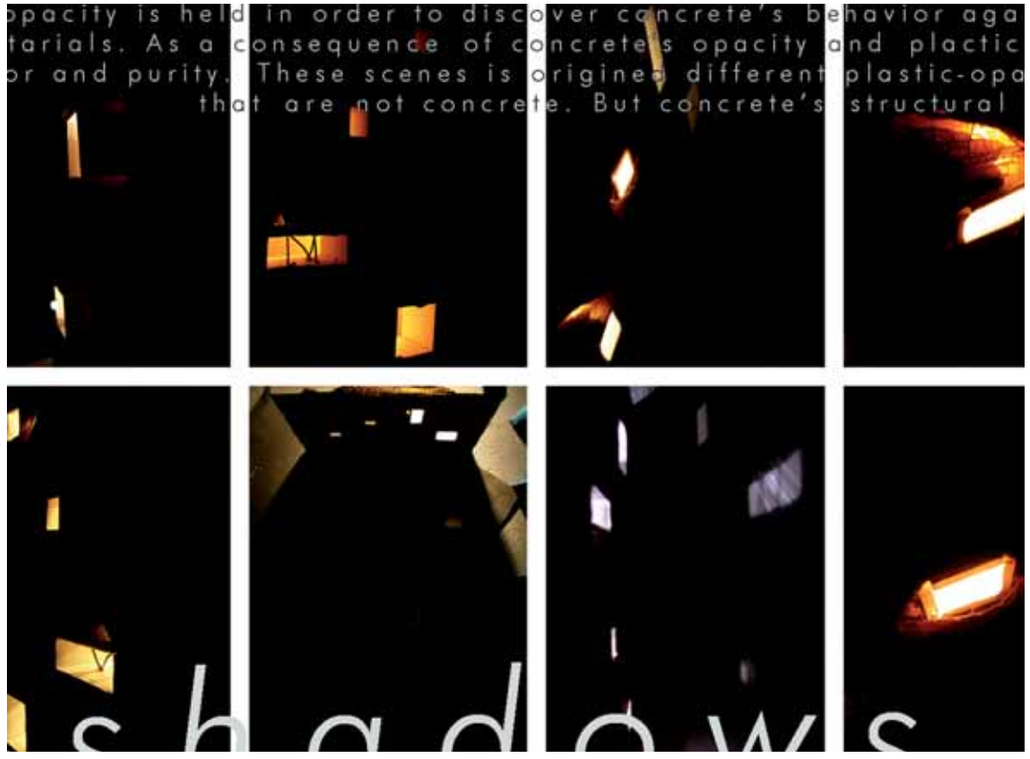
Hakan Demirel – Yildiz Technical University, Istanbul
Seda Kurt – Istanbul Technical University, Istanbul
Onur Tanik – Yildiz Technical University, Istanbul

'This project is an experimental work about concrete characteristics and perception of them. Concretes factual points like plasticity and opacity makes different perceptions on visual and auditory senses and these perceptions can make transitions between senses. Concrete is an opaque material. This is a visual property. By making changes in chemistry of concrete it becomes another material that has similar features with transparent concrete. This project does not carry a responsibility such as this.

Secondly, making pores on concrete shows another situation, which has no opacity, so not concrete. This situation is detected by experimentation about layers, light and shadows. Arranging layers of porous concretes results in different situations of different opacity values. Nevertheless even in this situation variation in opacity of concrete material cannot be mentioned. This is a sensual illusion resulting from visual sense and the human brain.

Finally, it could benefit from auditory sense in transition from opaque to spatial opacity. Because the behaviour of concrete makes a difference depending on its thickness; a situation of increasing or decreasing auditory senses, an absolute difference in perceptions happens. Thus the human can perceive visual-mental situations by hearing. Inner and outer activities can be imagined. This similarity can be thought of as watching a film in a foreign language with subtitles, which is remembered as dubbed. As a result of noticeable plastic and opaque concrete gives rise to existing auditory images in our minds by the way of variable thickness but then these imaginary figures would be reminded as visual objects against pure opacity.'

[Turkish National Jury] 'The project with the pseudonym GE584 received the third winner award as it has successfully integrated the concept of illusion with the theme of the competition.'



GG871 – GAZEBO GRID
SWEDEN – THIRD PRIZE

Albin Ahlquist – SLU/Landscape architecture, Alnarp
Martin Palmlund – SLU/Landscape architecture, Alnarp

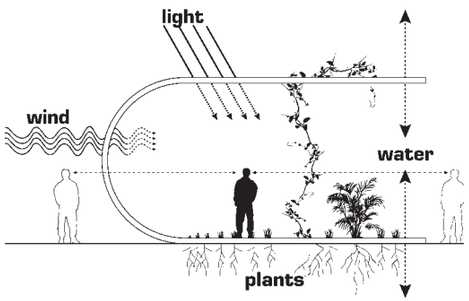
'The Gazebo Grid is simply a folded sheet pierced with holes. The holes follow a gradient in size.

The gazebo's ability to filter the conditions at the specific location in the specific time and in all directions: Back, Front, Sideways, Up and Down makes weather conditions, ground or water surface and plant growth break into the structure. On the other hand activities inside interacts with the life outside.

It will be used as a public room for recreational purposes such as playing, resting or as a viewpoint.

The structure can be multiplied and placed in different patterns and rhythms with others to create different spatial qualities.

The Gazebo Grid is a step towards letting traces of social life and environmental processes leach through built borders.'

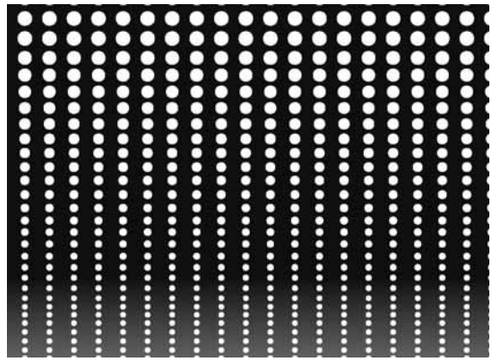


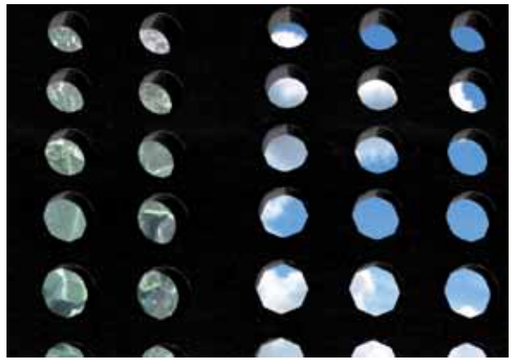
[Swedish National Jury] 'This entry shows a construction to be placed in a park or natural landscape, open to light, wind and water but giving a sense of shelter, a place to gather, take a rest or enjoy the view – a gazebo.

The shape is simple but gives a plastic tension, a bent sheet pierced with holes. Reinforced concrete gives the strength and robustness needed for this type of construction, and the holes and open ends make conditions inside and outside meet – light, wind, water and plants pass through the holes. The pierced construction, neither solid nor open, illustrates the concept of opacity in a simple, self-evident way.

Illustrations show thoughts of combining several constructions in interesting ways. A suggestion from the jury was to insert glass blocks into some of the holes to make the shelter more efficient in our climate. Manufacturing the construction is not considered to be any problem. The question of keeping the gazebo attractive over time arose. Prior experiences made the jury wonder how well it would withstand dirt and wear, open to all kinds of elements.

A Haiku concept.'

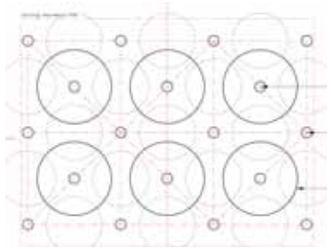


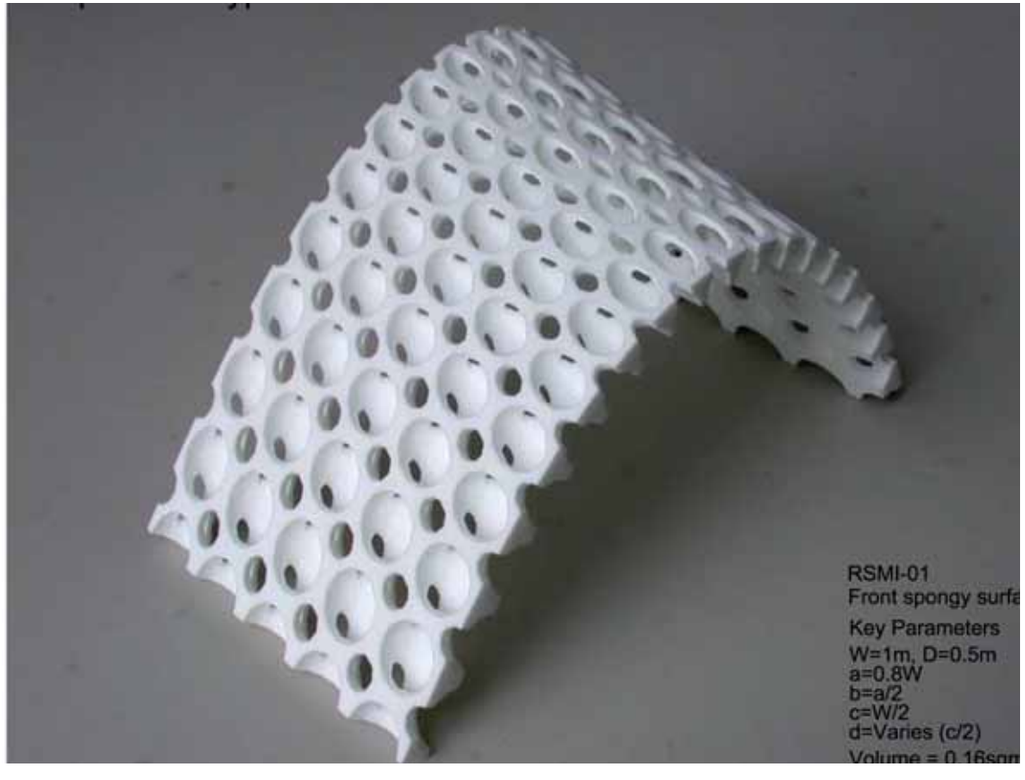


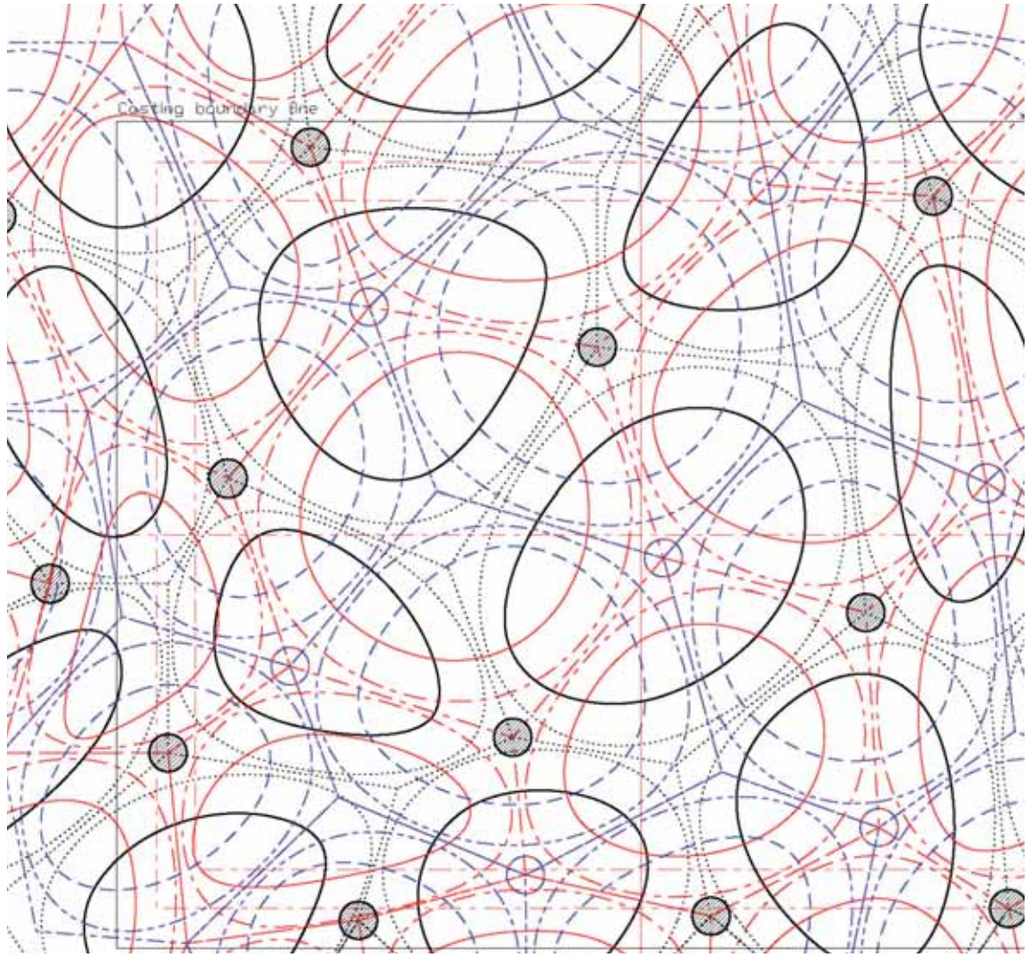
HC369
UNITED KINGDOM – HONOURABLE MENTION

William Hailiang Chen – Architectural Association, London

‘Reef Surface material system is aiming for creating a large scale 3D surface composed of small linear fragments working as a new type of breakwater forming series of intermittent mobile islands. This creation of man-made islands is part of comprehensive coastal management strategies deployed on the costal line along Thailand Andaman Sea. It will not only function as an infrastructure for tsunami mitigation to safeguard Thai Phangnga Province costal line and restore the tourism industry, but also in a long term running for regeneration of mangrove forests. These mangrove forests will provide a feasible environment to local fauna and flora for aquaculture farming in order to help local fishing industry, which was heavily affected by the 2004 Asian Tsunami. It is aiming for a man-made system embedded with the natural environmental system and as incubators for the local culture and economy to achieve sustainable socio-ecological systems in a very similar way to how a reef becomes a life centre for the fish that inhabit it. (Project is still undergoing and is trying to explore the porosity characteristic of fabric-formed casting concrete.)’





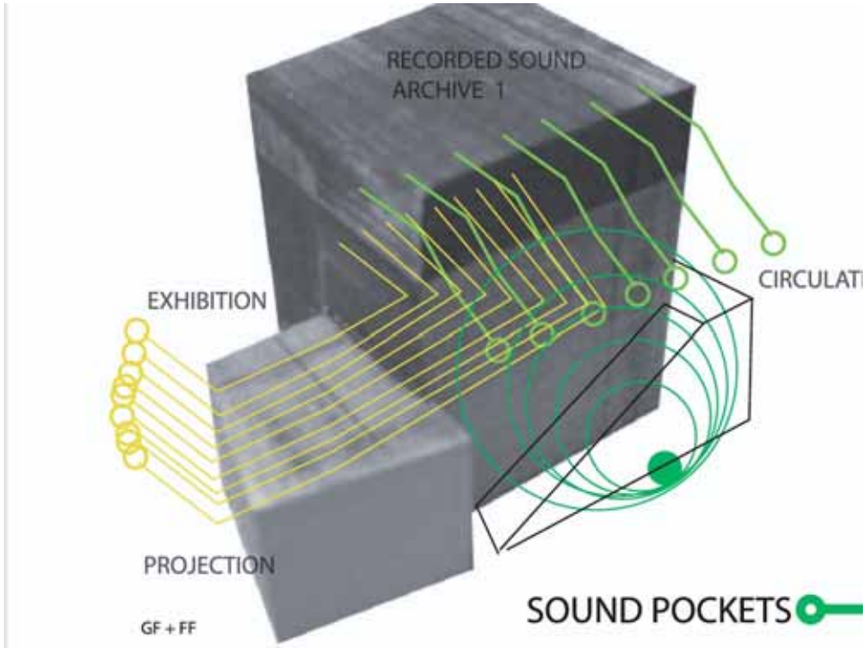


LU001
IRELAND – FIRST PRIZE
Louise Souter – University College, Dublin

'The proposal: a walled landscape situated overlooking the Aran Islands, a space for the spoken word – like an Aviary. The strategy of the project consists of two complementary buildings. The first, a timber –lattice barn mad from reclaimed shuttering, where sound and people may flow out onto a limestone plateau – allowing for the celebration of culture. The second, a tower, rises above the walls recalling a landscape once full of tall structures. The tower houses an archive and radio station.

The materiality of the project draws upon the ancient tradition of homogenous 'knock-the-gap' walls that characterise the islands. The gap is developed to house existing audio-cassette collections. Future fibre-optic sound technology is accommodated by the structure of the wall. These two conditions allow for the development of different 'knock-the-gap' walls. The wall is perforated using timber shuttering and a tilt slab system. Internal 'sound pockets' are made wherein the 'gap' is burnt out – offering different qualities of opacity over time as the wall dematerialise. The accumulation of cassettes rematerialises and alters the transparency of the wall. Light is delivered to sealed sound spaces through opalescent acrylic rods – referring to fibre-optic technology and digital media.'

[Irish National Jury] 'This project set on the exposed Aran Islands off the west coast of Ireland takes from its context and interprets the brief in an innovative way. Using an intriguing building method to make reference to the traditional stonewalls of the area, this entry achieves the objectives of the competition, creating a structure that is plastic in the formal sense of moulding and setting to make a structure that has levels of opacity in both sound and light. This project stood out not only for its architectural quality but also for its inspired response to a familiar material.'



MG111 – CONCRETE POTENTIALS
GERMANY – JOINT WINNER

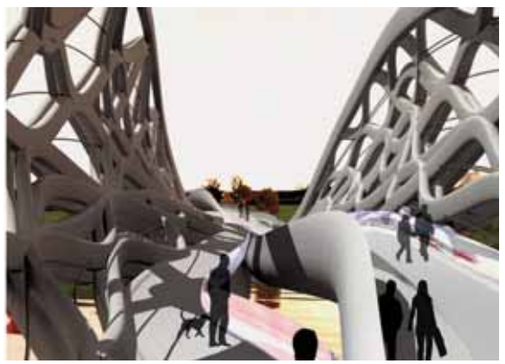
Gergana Stavrera – Universität Kassel
Matthieu Götz – Universität Kassel

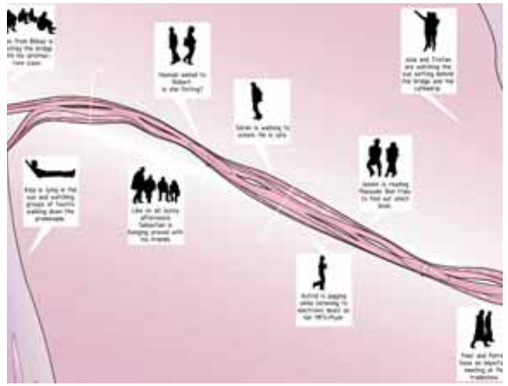
'The two most inherent things to a bridge are the passing between a number of points and facilitating different views. The moment of passing is a moment of suspended time – an in-between moment. The notion of the Fluid Bridge is to tackle the potentials of a generic model by varying diverse situations along its length. Through interlacing, combining or merging the possibilities are being liquefied, blurred to solidify in moments of unexpected experience. The plasticity of the material and the curvature allows for subtle relations directed by the organizational lines. Along them a new level of complexity emerges by adding a vertical articulation of visual connections and hindrances. The sections are similar structurally but differentiated in their spatial qualities forming multiple spatial situations.
The different shades of opacity - porous on the outer surface, continuous for the inner structures – respectively create an open connection to the surrounding and intertwine the internal encounters.
The bridge structure is a decorative concrete space frame. And analysis of the surfaces helps to map the lattice at the right areas and thicken its lines at the weak spots to offer better support. The finite element solution is being translated in an aesthetic language.'

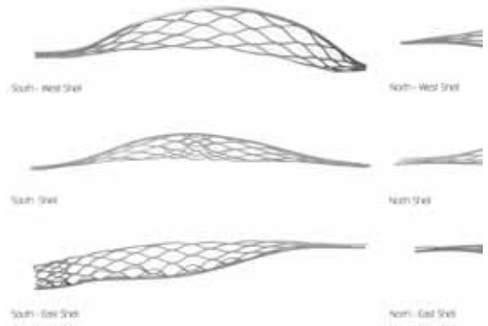
[German National Jury] 'The self invented design putting traffic lines and nets together in a plastic bundle forming a bridge creates a sculpture which is not only connecting places but stimulates human beings to communicate as well. The strength of the design which is based on the vision of the dematerialization of concrete is related to the integrated idea which is to be seen in the net as well as in the structure of the city, and as in the design of the bridge itself. The ambitious design asks for a highly developed (yet utopian?) technology to be realized.

While the form of the bridge is corresponding in its ambiguity and complexity with a city the design tries to use simple details. Whether the proposed connections are functioning or not (glue/ tie rod) is doubted. With regard to the graphic presentation the Jury is impressed by the two dimensional sections ("flying carpets") while the spatial representation is less convincing. Most strikingly was the contradiction between immovable and movable elements and its scale in relation to the size of the whole design.

The traffic traces, which are bound with the city and become a separate form are the trigger for the changes of the city. Here the material sets the conditions for the movement, but shows the limits of its realization too.'





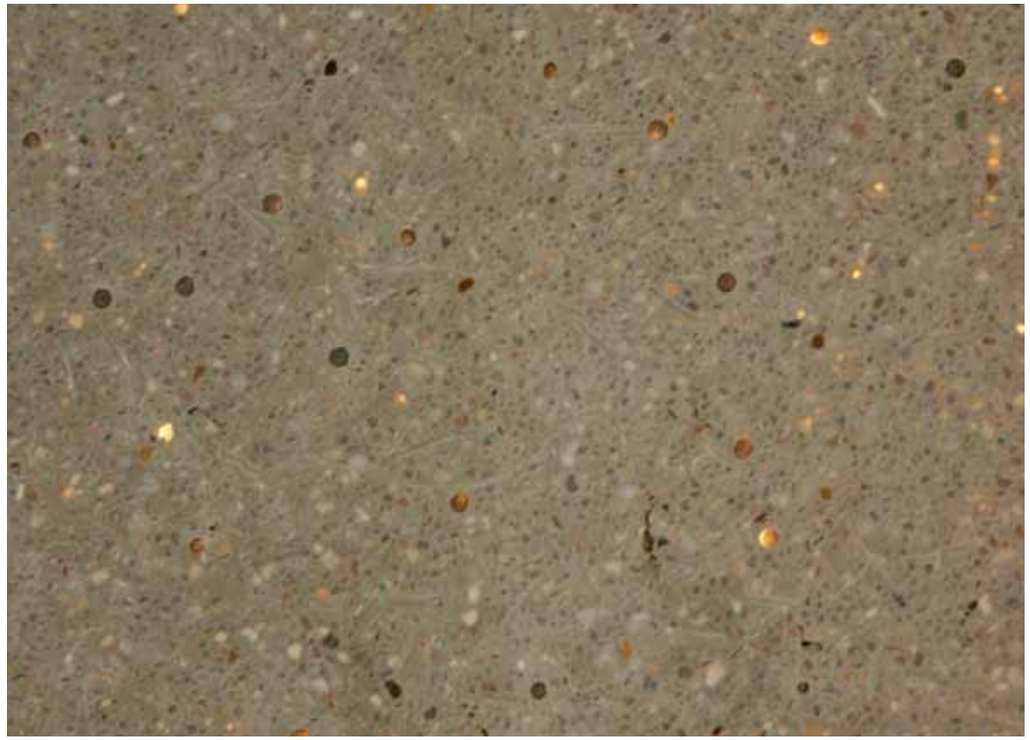


MR979 – CONCRETE LIGHT
NETHERLANDS – HONOURABLE MENTION

Marieke Rongen – Sandberg Institute, Amsterdam

'The unique combination of concrete and light inspired me to design this lampshade. This design is made of partially transparent concrete. By turning on the light, little spots of light appear in the concrete. The shape of the lampshade descends from traditional lampshades, but the interesting combination of material and size, give you a complete innovative design.'

[Dutch National Jury] 'This proposal stands out because of its challenging approach in which a familiar form is reworked questioning issues of scale as well as the use of specific materials in an unconventional situation. The entry panel itself lacks in clarity on how exactly the technical issues of the proposal are resolved. The jury supports the idea to further investigate these issues, e.g. is it possible to 'lose' the steel frame. Also a formal and material research into maximizing the 'concreteness' of the object seems more than relevant. Overall MR979 raises fundamental architectural themes in a promising way that deserves a continuation of the research into relations between form, material and scale. The entry shows the potential of deploying these relations to generate spatial/emotional tension.'



MY717 – CULTURAL FRUIT
BELGIUM – HONOURABLE MENTION

Lotte Mattelaer – St.-Lucas, Brussels

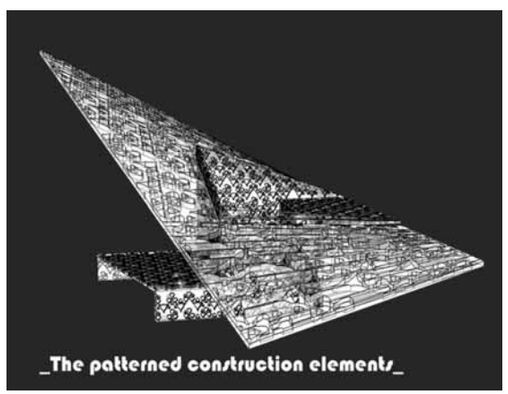
'Underneath an open folded slope in Laeken awakes a socio-cultural-centre which looks totally closed. In the middle of the fruit is an S-shaped atrium situated. The atrium serves as a passage from a higher part of the cité model (the square) to a lower part of it (the street. the supermarket). This way it also leads people who don't aim to go the cultural centre right through the heart of the building. On the other hand it forms the beating heart of the building, which is totally enclosed on the outside *as a fruit*. All the areas that need *light, air and view* are directed towards the atrium, those who don't (like the *performance room*) lie on the outside. The main entrance is situated on the middle floor.

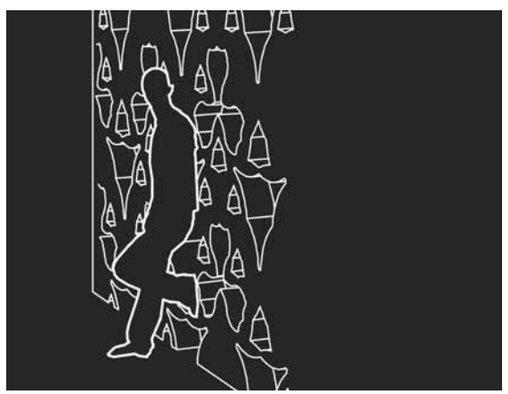
The skin of the atrium is made out of concrete: it has gaps in accordance with a pattern, like an *Islamic jail*. It allows light to enter while it forms a structural element. It is capable to –together with the outer walls- hold the entire structure without additional columns. It filters the light and activities from inside to outside and from outside to inside.

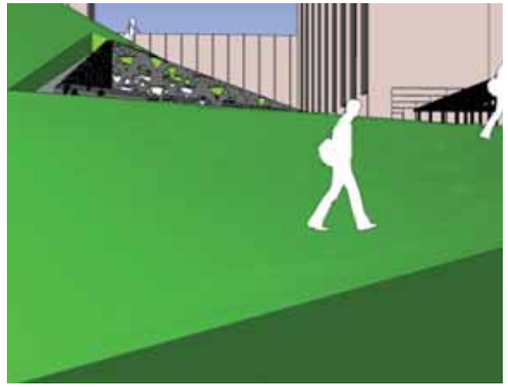
The roof is double curved, like a *hyper-plate, that* way it can link up with the slope of one side of the building, be horizontal at the square and cover the theatre tower in the opposite corner. Here again the pattern is applied so that it can work as a joist plate. The roof is a *greenness* roof and is open to the public.

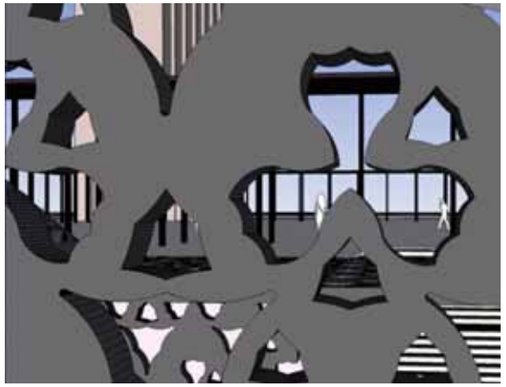
These elements give every area on the inside and the outside a different shape and different *experience,* and besides, it will differ on every moment of the day, and the whole year through.'

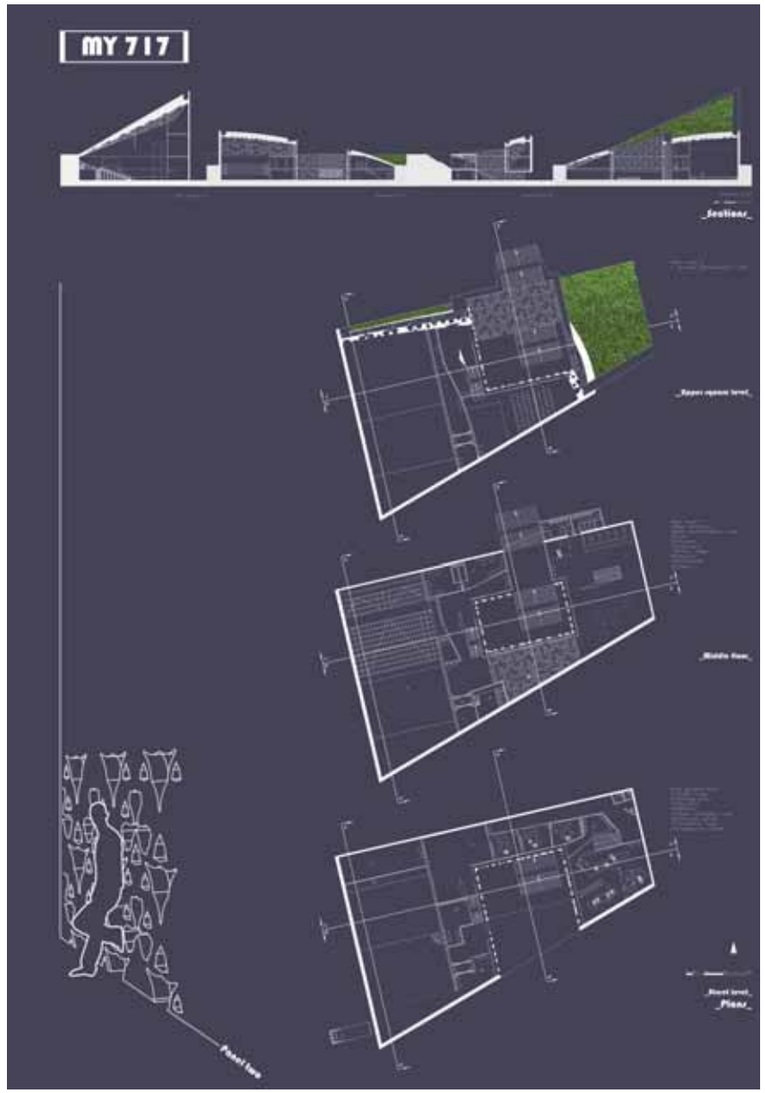
.[Belgian National Jury] 'This low-tech project appears to the jury to be simple but significant. Concrete shells are perforated and load bearing; they generate some sensitive inner spaces. The jury remarks that the graphics are disappointing '











NI385 - LAYERS OF DIFFERENT SCALE
SWEDEN – SECOND PRIZE

Lars Höglund – Chalmers-A, Göteborg

'Looking through a window it is evident that every scene is one of 100% opacity. Looking up towards the emptiness of the universe there is the notion of something else. Starring into space could be staring into transparency. When there is no limit or the deepest layer cannot be perceived – there is transparency. Opacity and transparency cannot be understood without each other.'

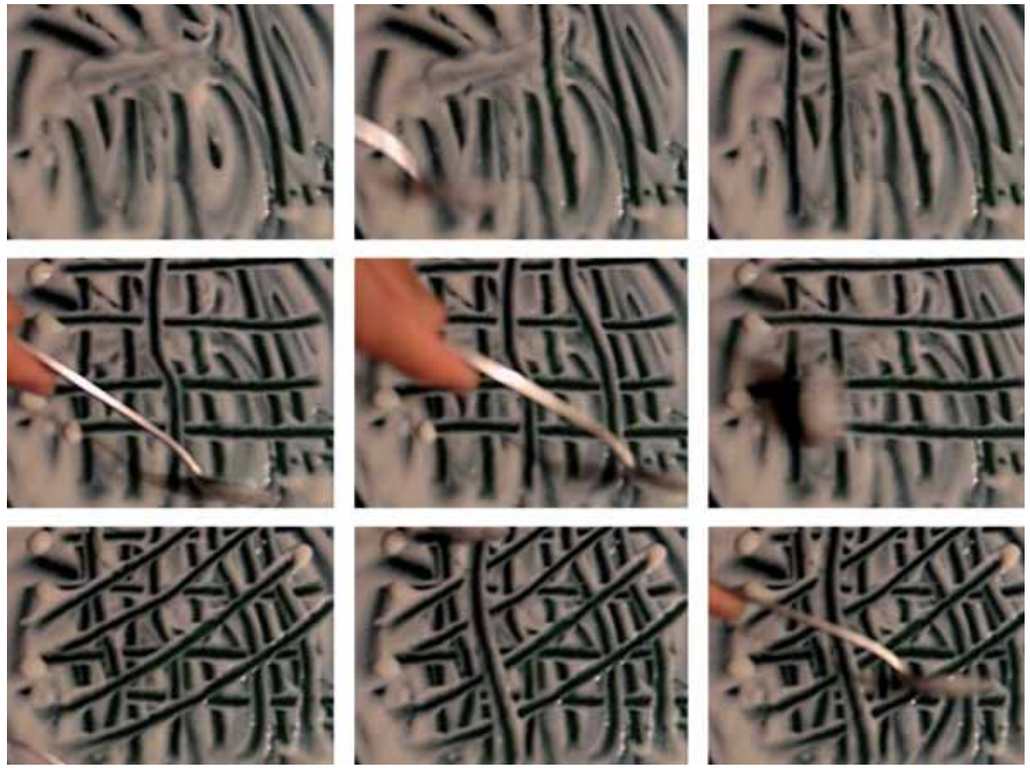
[Swedish National Jury] 'This entry suggests a way to produce concrete that partly would be able to transmit light. This would be made possible through inserting intersecting layers of transparent plastic material into the formwork, and letting the concrete fill the voids of the mould.

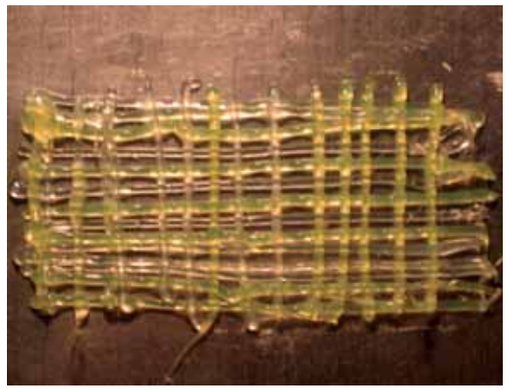
The entry does not suggest that this is a finished product, and has chosen not to display any examples of use – in order not to limit any ideas for future development.

This experimental approach has captured the imagination of the jury and triggered lively discussions. The theme of the competition was certainly treated in an interesting way by this entry. The design possibilities are intriguing. (Members of the jury roughly conceived interior wall panels, blocks or decorative elements where the plastic fabric gives a relief structure as well as a pattern of light, or constructions that are partly translucent where the mesh of plastic material has been placed…)

The jury did feel, however, that the entry is a bit unfinished – it would have been stronger if some examples had been presented and explained.

A creative entry that triggers the imagination.'





NS014 – “CONCRETE AS A SOURCE.”
TURKEY – JOINT SECOND PRIZE

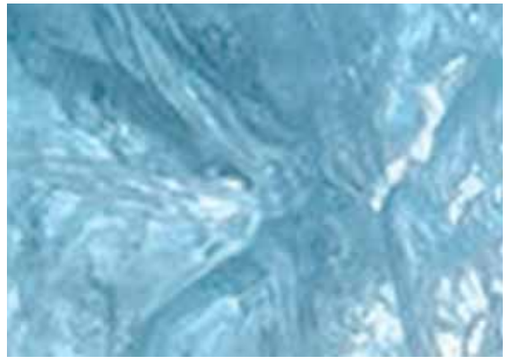
Sami Metin Uludoğan – Istanbul Bilgi University, Istanbul

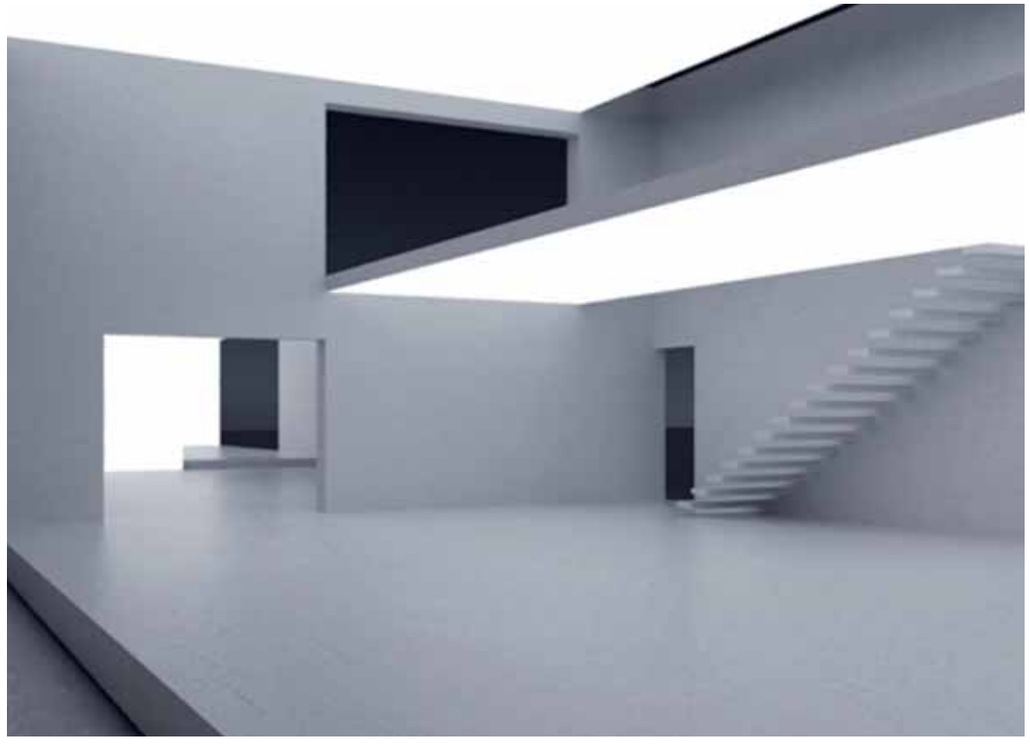
‘The main idea of this proposal is to investigate if it is possible to think of concrete as an energy source. This source provides heat and light to the space without any additional unit. Every unit is casted in concrete. The structure is insulated, heats the space and provides a special light that acts like daylight. This source uses energy with an optimum level. The Earth needs alternative energy sources. This concrete structure gains its energy mostly from sun, and other renewable energy sources (geothermal, wind, etc.)

There are 2 inspirations for this design one of them is; there is only one element that can gradually define its opacity and its source of life ‘water’. The first layers of the iceberg transmits not only light that is coming from the sun, but also the skylight to inner layers as well. The first question is: Is it possible to reverse the situation and so that this logic makes the concrete the light source of the space, by this way pure space is formed…

The other question is: is it possible to think the space and the environment as one according to lighting. By this way during a day every colour of the light can be a part of the space. The amount and the colour of this light are directly related and mostly identical with sky and sunlight. When the weather is cloudy the light that is coming from windows is united with the newly formed light by concrete structure. So that walls, ceilings whether they’re load bearing or not, become light sources. Light is where it is needed, the amount and its location are totally adjustable. Besides becoming a light source, the structure can provide heat during winter and in summer sunlight is stored to produce light and heat energy. In this way energy is used to its optimum level.’

[Turkish National Jury] ‘The project with the pseudonym NS014 received the second winner award as the nature was used as the source of inspiration and it recommended the use of the concrete as a heat and light source by making use of the renewable energy resources.’





NZ573 – IN SEARCH OF A NEW DEFINITION
TURKEY – JOINT THIRD PRIZE

Burçin Yildirim – Istanbul Technical University, Istanbul
Pinar Gökbayrak – Istanbul Technical University, Istanbul

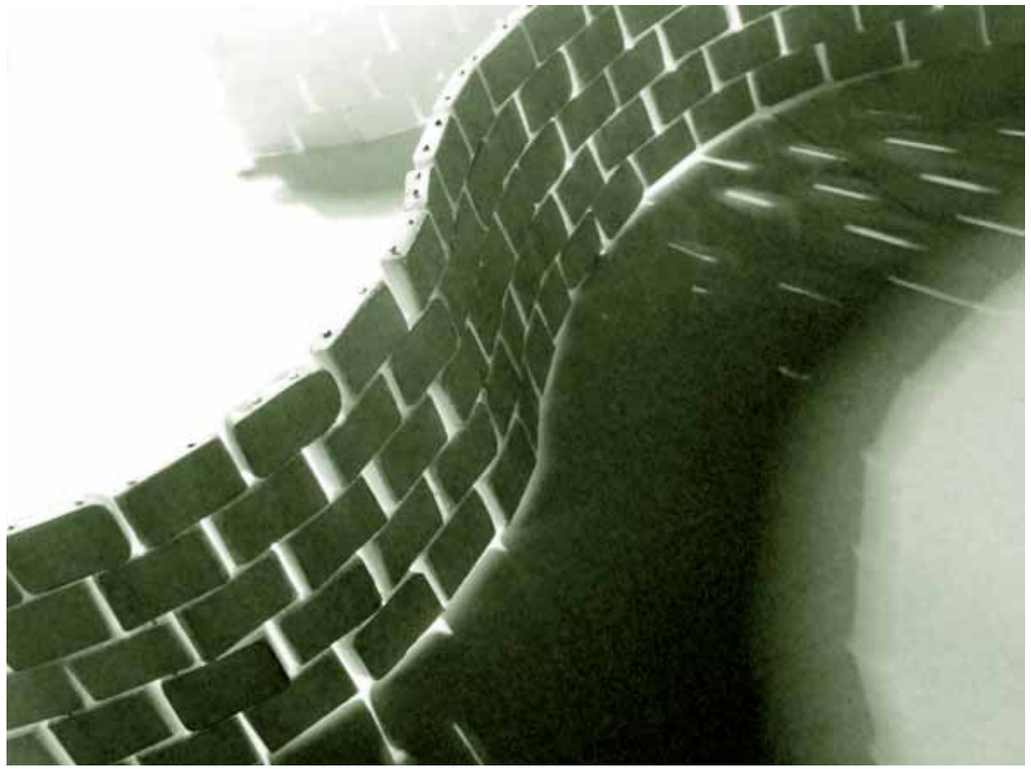
'Concrete seems to be a very familiar material with its vast possibilities for use and application but indeed its unexplored characteristics are as many as its familiar aspects. Opacity and plasticity are two of the most crucial aspects of these unexplored attributes of concrete. A search of a new definition of plasticity and opacity will also mean a search of unperceived limits of concrete.

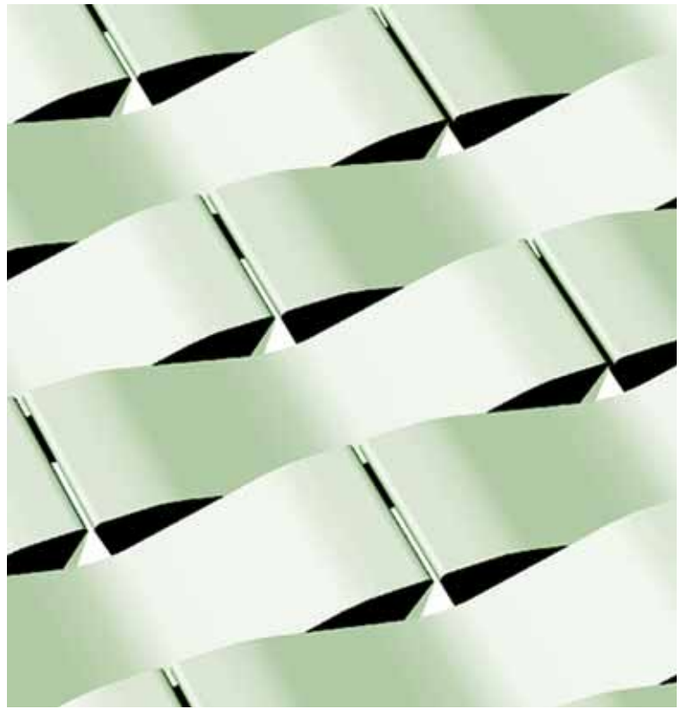
Concrete has a unique character of having the ability to retain its shape after it is cast. Although this brings to designers a wide range of possibilities for working on plasticity, one should realize that since this unique characteristic is used over and over again, none has asked the question of attaining a different way of plasticity with concrete ever again.

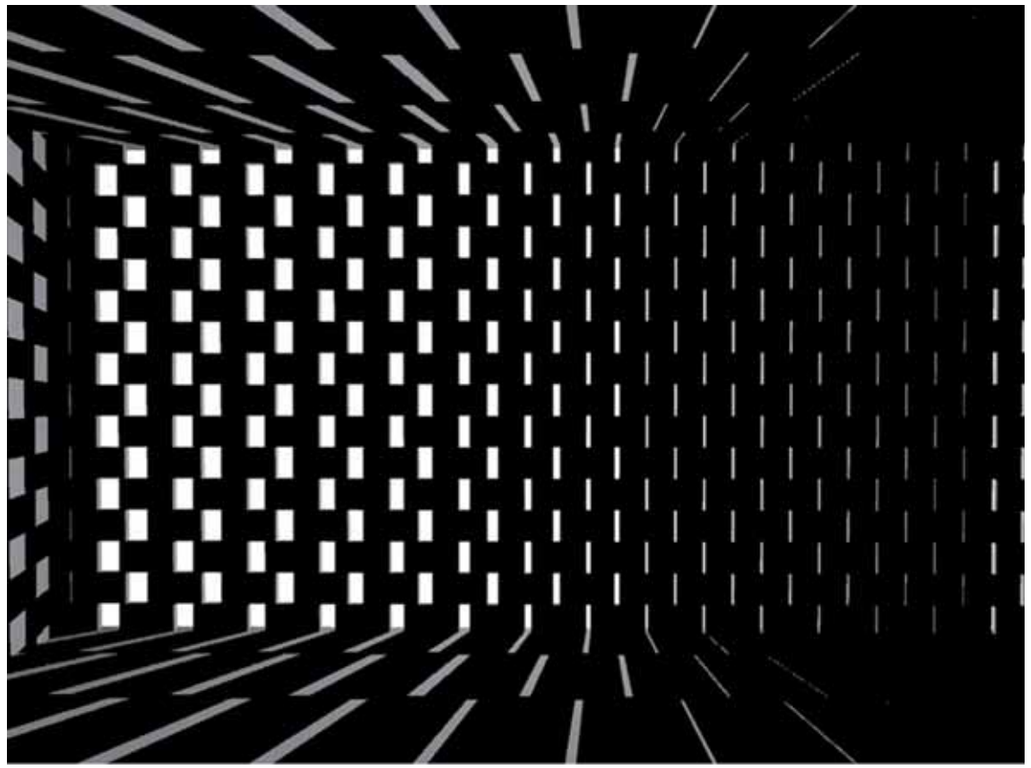
Can plasticity only be attained by frozen, static, monolithic, still and statuesque forms?

If plasticity has also a definition as 'the capacity to vary … according to changing conditions', then why shouldn't we question what plasticity is itself and try to push the limits of concrete further?'

[Turkish National Jury] 'The project with the pseudonym NZ573 received the third winner award by presenting the project in a qualified way and by recommending a modular system which allows generating rich composition possibilities.'







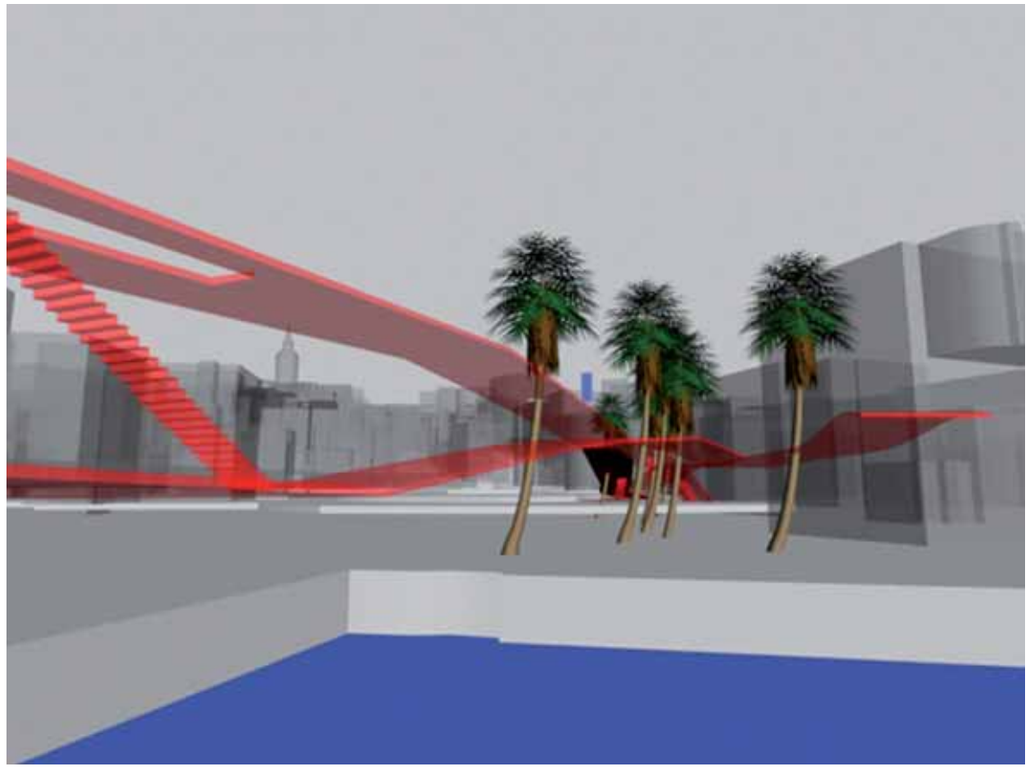
OZ070 – MCDELTA T CONCRETE PROJECT
TURKEY – HONOURABLE MENTION

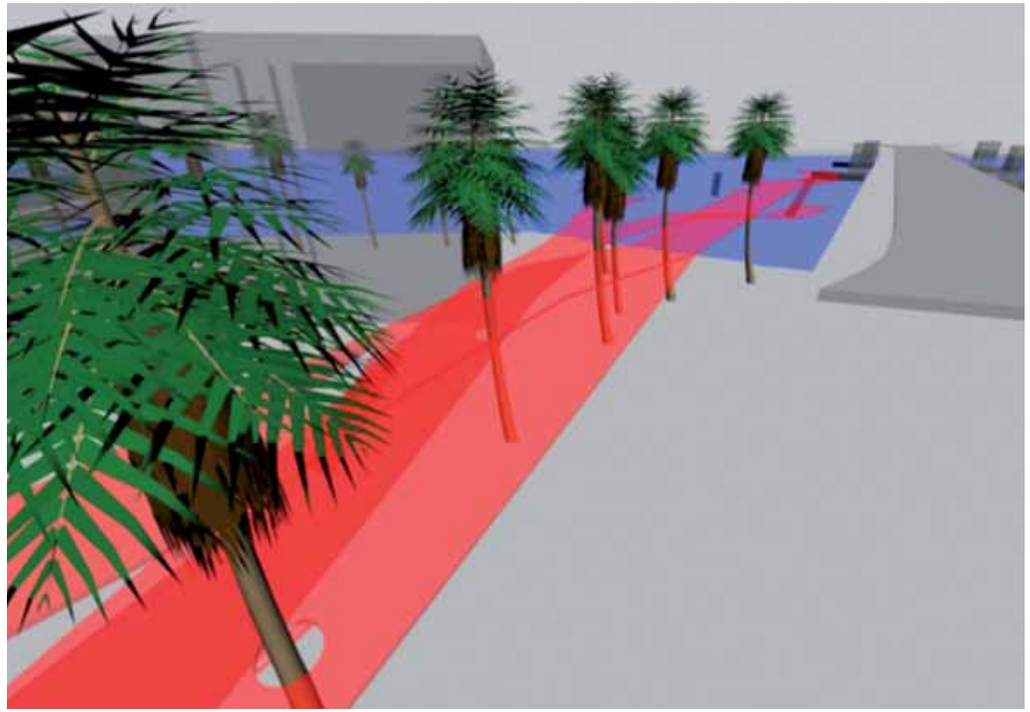
Oya Okumus – Istanbul Technical University, Istanbul
Zeynep Ademoğlu – Istanbul Technical University, Istanbul

'Post-Opacity is a return of concrete to its essence and a combination of its opaque and transparent usages. It is used in a system of superimposed ramps which are directed according to the not only 3D but also 4D spaces.
Circulation is supplied by the connection of ramps with stairs.

McdeltaT defines how the opacity property of concrete changes by the mass which is applied to a certain area of surface. In fact, it is the heat factor that makes the concrete surface more opaque with the help of mass. When someone walks on the ramp, the transparent concrete becomes opaque, in addition, the degree of opaqueness increases according to the mass as a huge scale from white to black.'

[Turkish National Jury] 'The project with the pseudonym OZ070 received the honorable mention award as it was deemed as an installation composition for the future use of the concrete with conceptual and artistic interactions and as this thought was purely expressed in a qualified way.'

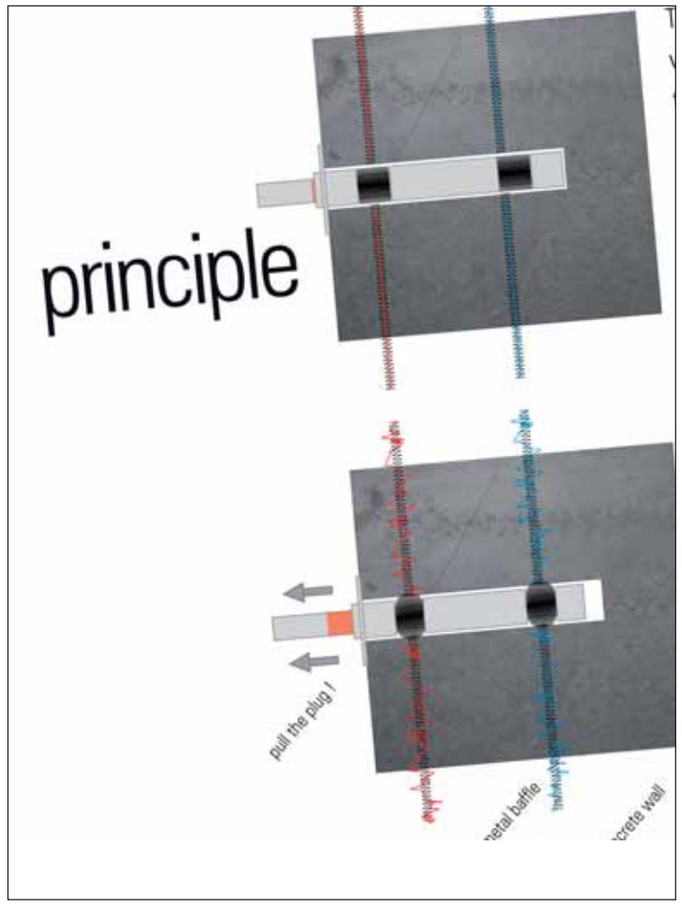




PC100 – E.CONCRETE
GERMANY – HONOURABLE MENTION

Carlotta Werner – Bauhaus University, Weimar
Philipp Böhm – Bauhaus University, Weimar

'Fair faced concrete is widely used in modern architecture. There are lots of advantages for the use of concrete such as a maximum of material flexibility and perfect surfaces by using self-compacting mixtures. These positive properties are opposed to the difficulty of add-on electricity in terms of practical handling and aesthetics. Electricity cannot be added afterwards without causing an obvious difference in the concrete skin in texture, colour and surface quality. Power supply lines have to be planted in advance or hidden behind a suspended ceiling.
The concept of e.concrete gives the opportunity of a flexible access to electricity everywhere, like a tab it provides power right out of the wall. The integrated power supply offers new creative possibilities with a minimum of damage and a maximum of flexibility. Our interest is focused on the changing needs of illumination in modern living spaces, such as galleries, private homes or lounges.'

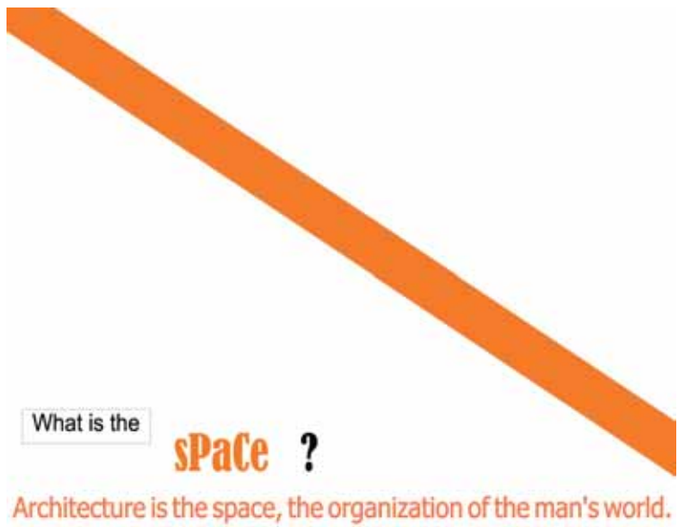


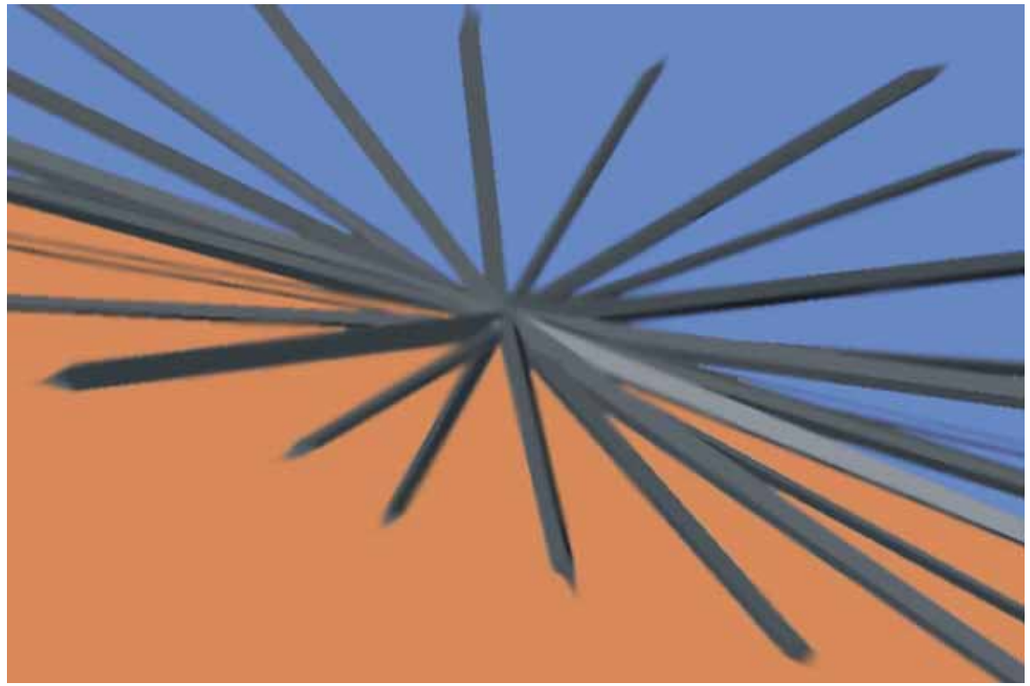
[German National Jury] 'The idea isn't directly related to the theme but is fascinating by the pragmatic solution of an everyday problem. Fair faced concrete as part of a living space opens up with the "plug in" new possibilities for a wall. The gist of the suggestion is limited to the use of energy and concrete for (artificial) light.
The project should be developed further on and should deal with details like getting light by lines and shafts and how to bundle it.'

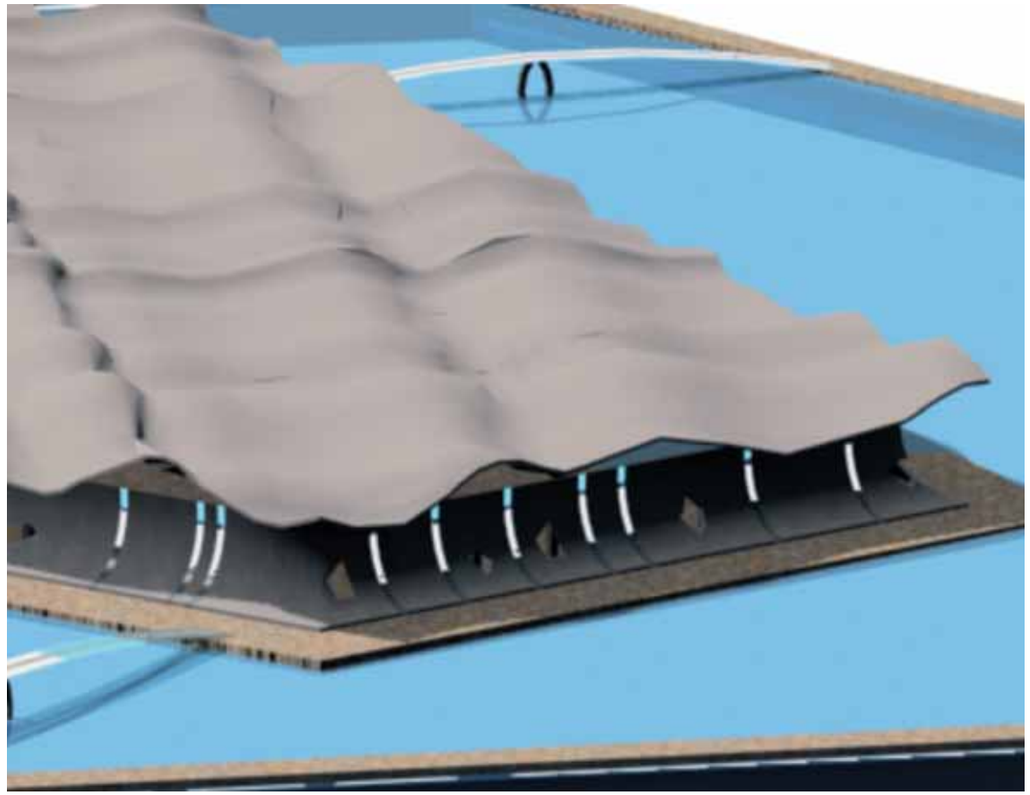
PO009 – LIGHT SPACE WATER
ITALY – THIRD PRIZE

Daniele Ghiglione – Faculty of Architecture Politecnico, Milan
Stefano Serventi – Faculty of Architecture Politecnico, Milan

'The objective of my work is demonstrating that even such a heaving, tough, inflexible material, such as concrete, can take various shapes and act as a glue with the surrounding environment. And thus to become whole with it, the building, hanging between water and air in the blue of the sky and the red of the sunset, seems to loose its features.
The same happens with water and with the concrete that become elements of the project and give concreteness to the transparent walls, taking space from the external.
The structure designed and hooked up by light glass flying bridges reinforced by a concrete core. It's the example that leads to notice the delicate relationship between design and materials and between the characteristics and the ethics of architecture.
The cover of reinforced concrete seems a mild fabric shaken by the wind, leans softly on the structure without overburdening it and letting it float on the water.
The materials (glass, concrete) are therefore deprived of any cultural or interpretative influence, so that the border between internal and external becomes a simple transparent and porous shell.
The building does not dip into the water but floats lightly as if it were hanging between sky and water. My aim is to transform the building in the environment that surrounds it and to highlight space, light, water and matter (the concrete) and to underline that it is not architecture that establishes the material that it is the material that influences architecture.
The audience watches works made of landscape and matter, buildings that enclose the environment and report the vanishing of the human eye.'





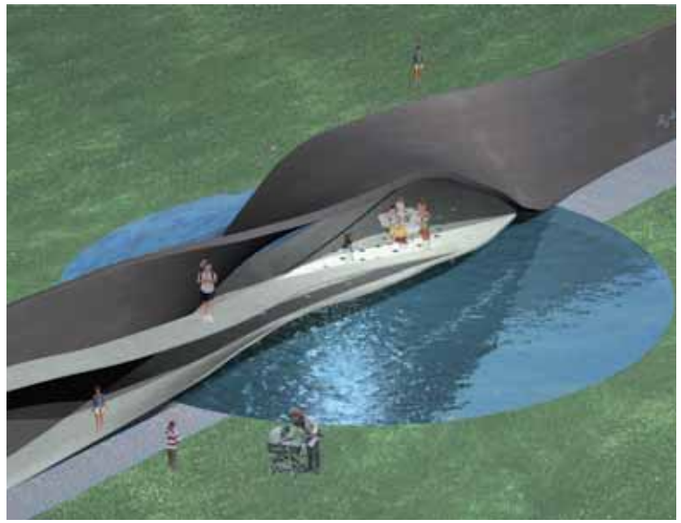


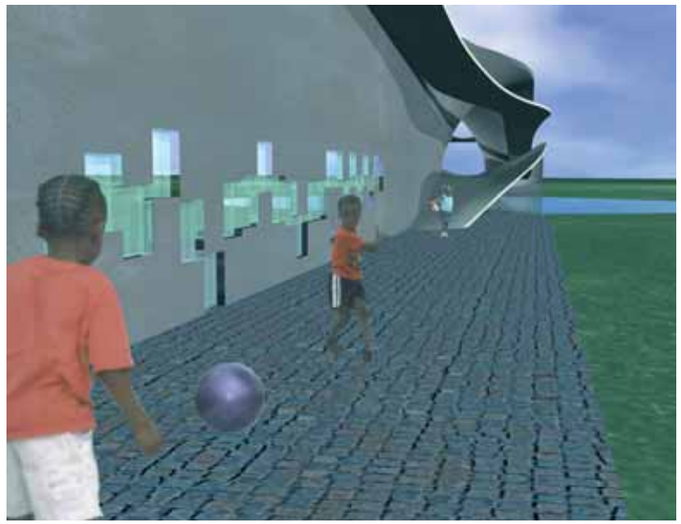
RJ973 – SHARING IN THE WORLD
TURKEY – HONOURABLE MENTION

Reşat Yilmaz – Izmir Institute of Technology, Izmir

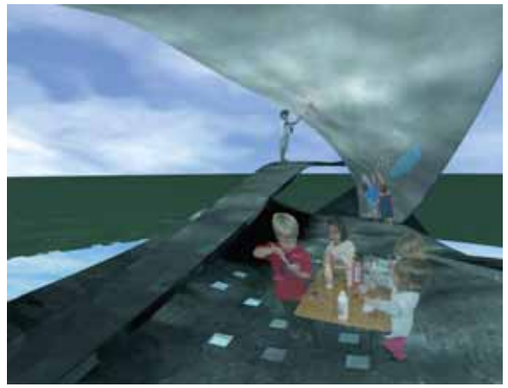
'The main subject of this project is the concept of boundary. From a critical point of view, the project aims to question where and how the boundary walls between two allies or enemies should be.

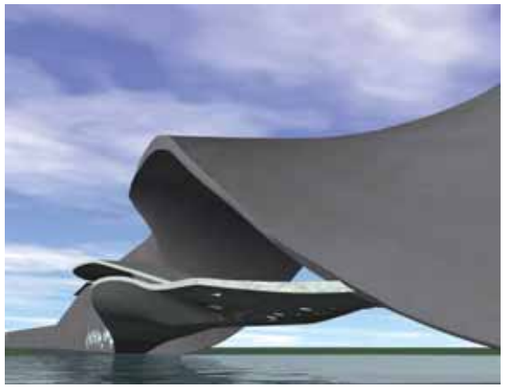
The sites are selected due to their opaque character. The design offers children who share a boundary, space through which they can communicate and participate in different social activities. In other words, the children will create themselves their own play spaces.'

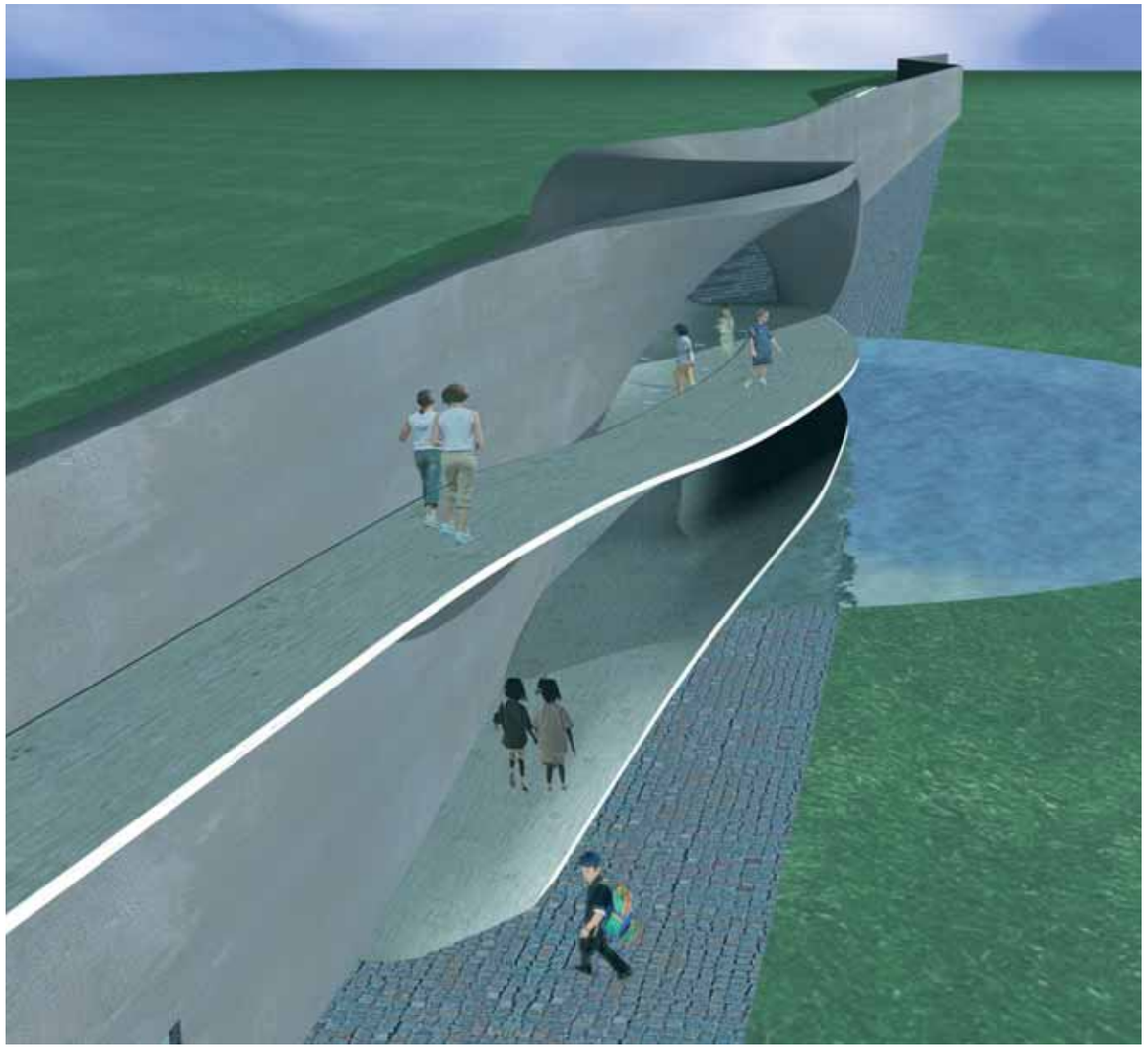




[Turkish National Jury] 'The project with the pseudonym RJ973 received the honorable mention award as it has taken an important social and political problem of today: "artificial borders within the societies" in an emotional way and provided a good quality solution for that.'



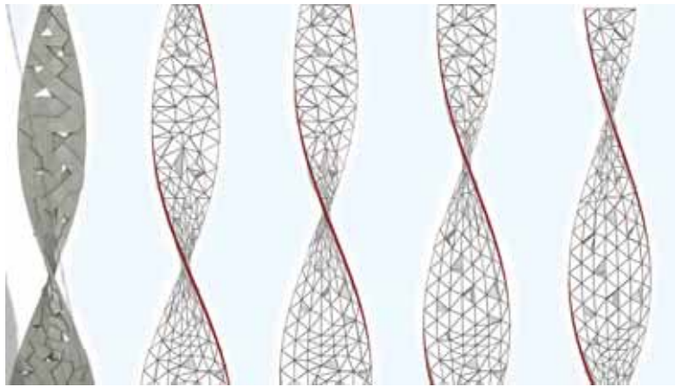


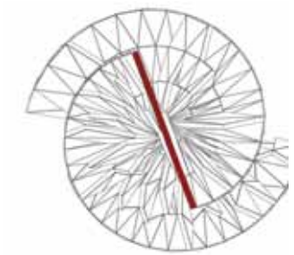


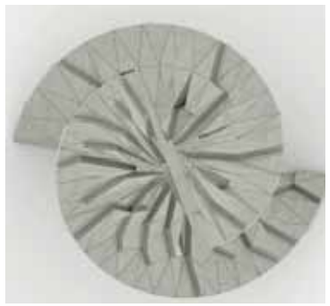
SB013 – CLIMBING TOWER
TURKEY – HONOURABLE MENTION

Bahar Bayrak – Osmangazi University, Eşkisehir
Cihad Oğuz – Osmangazi University, Eşkisehir
Şeyma Suyabatmaz – Osmangazi University, Eşkisehir

[Turkish National Jury] 'The project with the pseudonym SB013 received the honorable mention award as it has a modular fiction which allows rich composition options, and as it is a design which can undertake a sportive function in the urban venues.'







SS823 – PLATINUM PROPORTIONAL EXPERIMENTAL CONCRETE FRAME
TURKEY – FIRST PRIZE

Selahattin Tüysüz – Yildiz Technical University, Istanbul

'Perfection at arts had found its form with gold proportion, but the only missing part of this perfection is that, the gold proportion is only for 2 dimensional arts. This project is a research of perfection on 3 dimensions. The basic point of the research is he Fibonacci numbers arrangement: 0-1-1-2-3-5-8-13-21-34-55-89-144-233-610-987… By use of these numbers and the Golden Section, the concept was found, which allows the flexibility, the endless opportunity of combinations. It is called "Platinum Proportion". If we calculate the hypotenuse of the rectangle "Y X 1.68Y" we find "1.9Y". Then if we take the mirrors of this distance horizontally and then vertically, we find the measures of the structure which reveals the 3rd dimension, then to obtain an endless combination of the Fibonacci numbers to this modules that, the module does have as specific measurement, but consecutive two numbers of this arrangement can form the measurement of the structure as example. By the use of 3cm – 5cm modules we can design jewellery or by the use of 610cm – 987cm modules can design habitation units, and as being the lowest part of the opacity, we feel transparency by the use of this structure.'

[Turkish National Jury] 'The project with the pseudonym SS823 received the first award as it has a multidimensional approach, as the architectural design, the theoretical knowledge, technology and the materials was used in the modular fiction in a functional and aesthetical way and this recommendation was explained by a high level expression technique.'

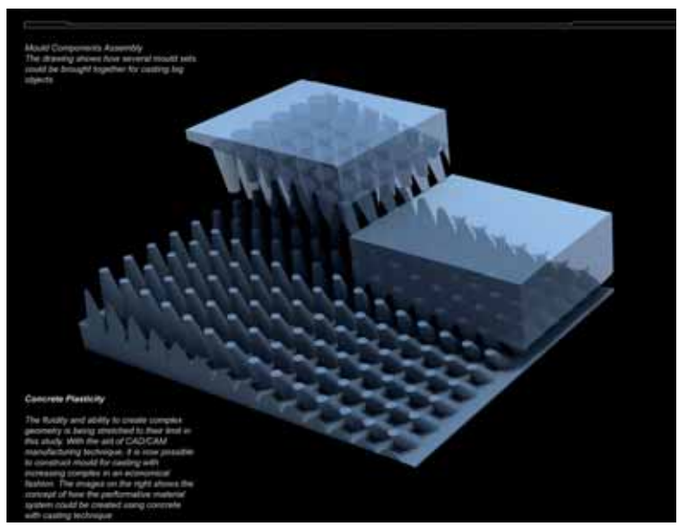
VY816

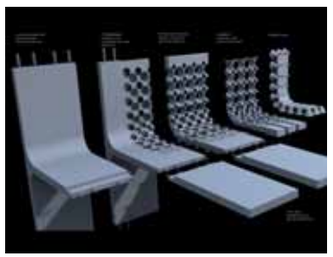
UNITED KINGDOM – JOINT SECOND PRIZE

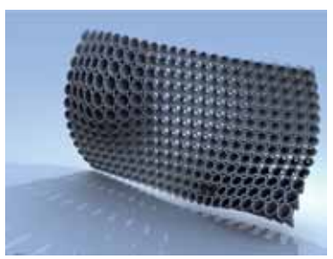
Vincent Young – University College London, London

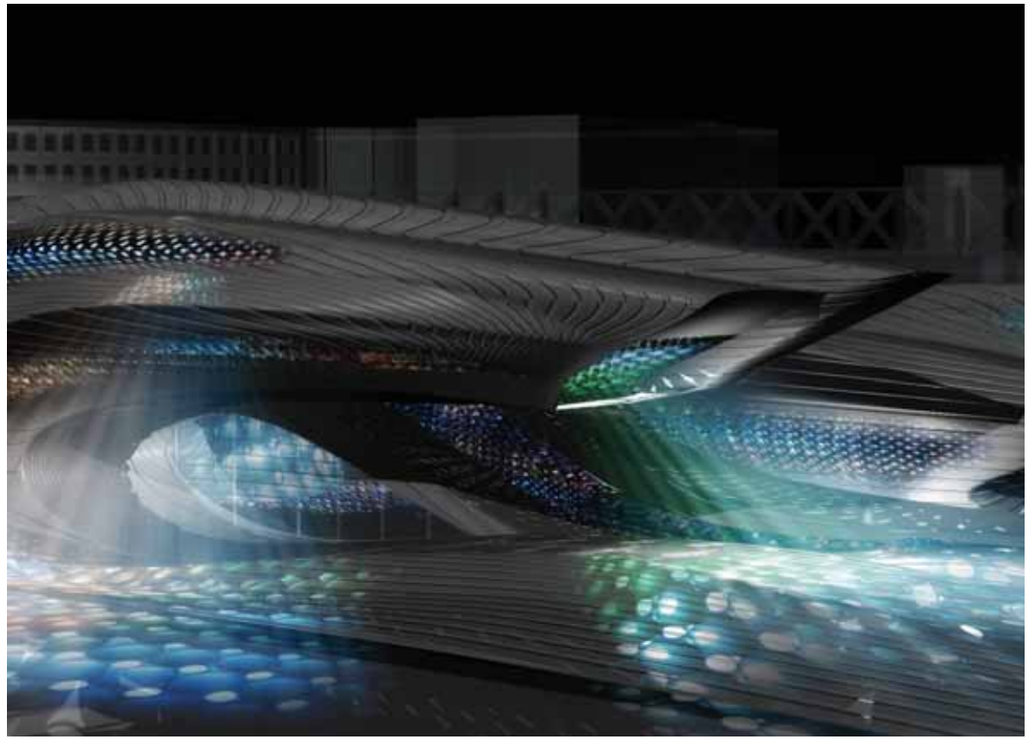
'Using a performative material system developed for the new Museum of the Moving images (MOMi) in London as a case study, the goal of this investigation is to explore the boundary of buildability using concrete as a construction material to manipulate ones perception of movement and spatial opacity with the assistance of various digital manufacturing techniques. In short, the performative material system is an optical filter created by endless variations of directionality, thickness and modular size that is capable of adopting to any surface condition. It is constructed with two layers of interlocking cones, designed to create different moments in spaces that simulates and impedes individual's reception of movement through manipulating of light and intensity and views.

The investigation also focuses on researching digital prototyping and manufacturing techniques that allows for increased levels of repetition and difference in the context of mass customization. It discusses the possibility of fabricating cohesive heterogeneous components (elements that are similar in typology but all different) in an economically viable fashion through exploring different existing digital manufacturing techniques with a critical study of their possibilities and constraint's.'









WF004 – FABRIC FORMED COLUMN
UNITED KINGDOM – FIRST PRIZE

David Ralph – University of Edinburgh, Edinburgh
Kyeong Keun Han – University of Edinburgh, Edinburgh
William Flint – University of Edinburgh, Edinburgh
Yongcchun Kim – University of Edinburgh, Edinburgh

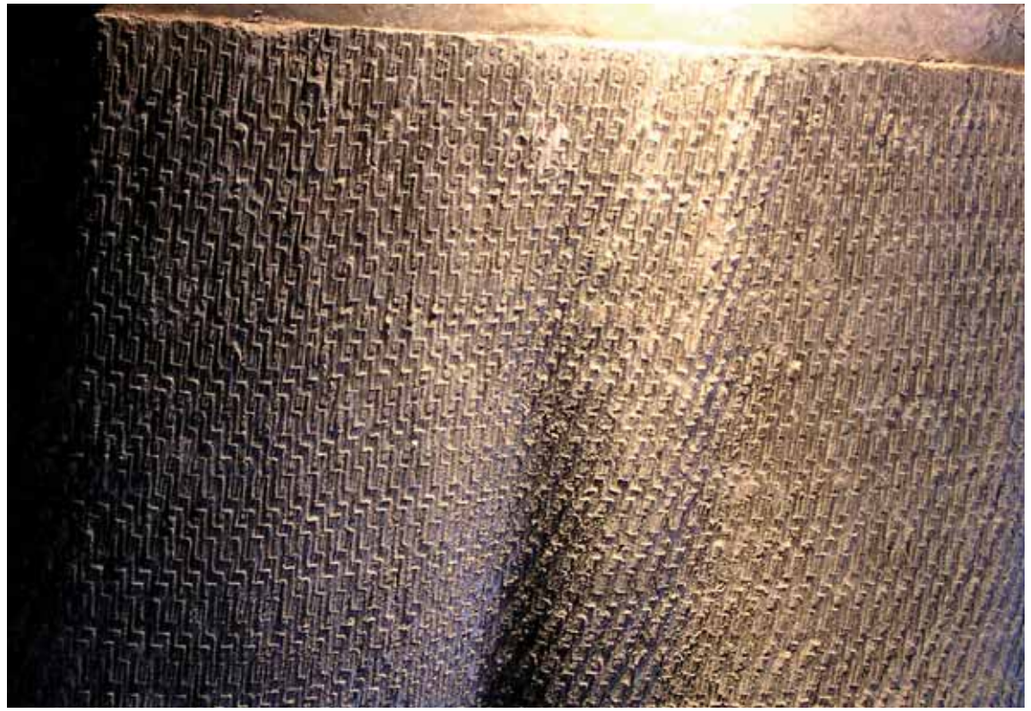
'Our pieces uses the elastic material properties of woven fabric in conjunction with the fluid properties of liquid concrete to produce an organic concrete form. This expresses concrete's dual contradictory states of fluid and cast solidity.

We used a variety of fabrics to generate different forms and textures; cotton fabric produced rounded organic forms with a very fine surface detail, whereas nylon geo-tec fabric produced less bulbous forms with a course grained surface texture.

Using fabric instead of conventional rigid framework allows the concrete to 'breathe' during the casting process and excess water is allowed to escape as the concrete sets; this gives a high-quality concrete finish that is more durable and weather resistant than conventionally cast concrete.

We focused on producing different varieties and combinations of concrete columns, developing a joining detail between columns that allowed complete creative flexibility in generating innovative variations of form and texture for the central shaft of each column Using this technique we could therefore fully investigate concrete's potential for the dual (and contradictory) qualities of plasticity and opacity.

In conventionally formed concrete the final form of the piece is pre-defined and absolutely controlled by solid framework, in fabric formed concrete the fluid/viscous/liquid properties of the concrete are allowed to speak in conjunction with the elastic properties of the fabric bag. The final cast piece is therefore inherently expensive of its plastic casting process.'



WM001 – LET THERE BE LIGHT
GERMANY – JOINT WINNER

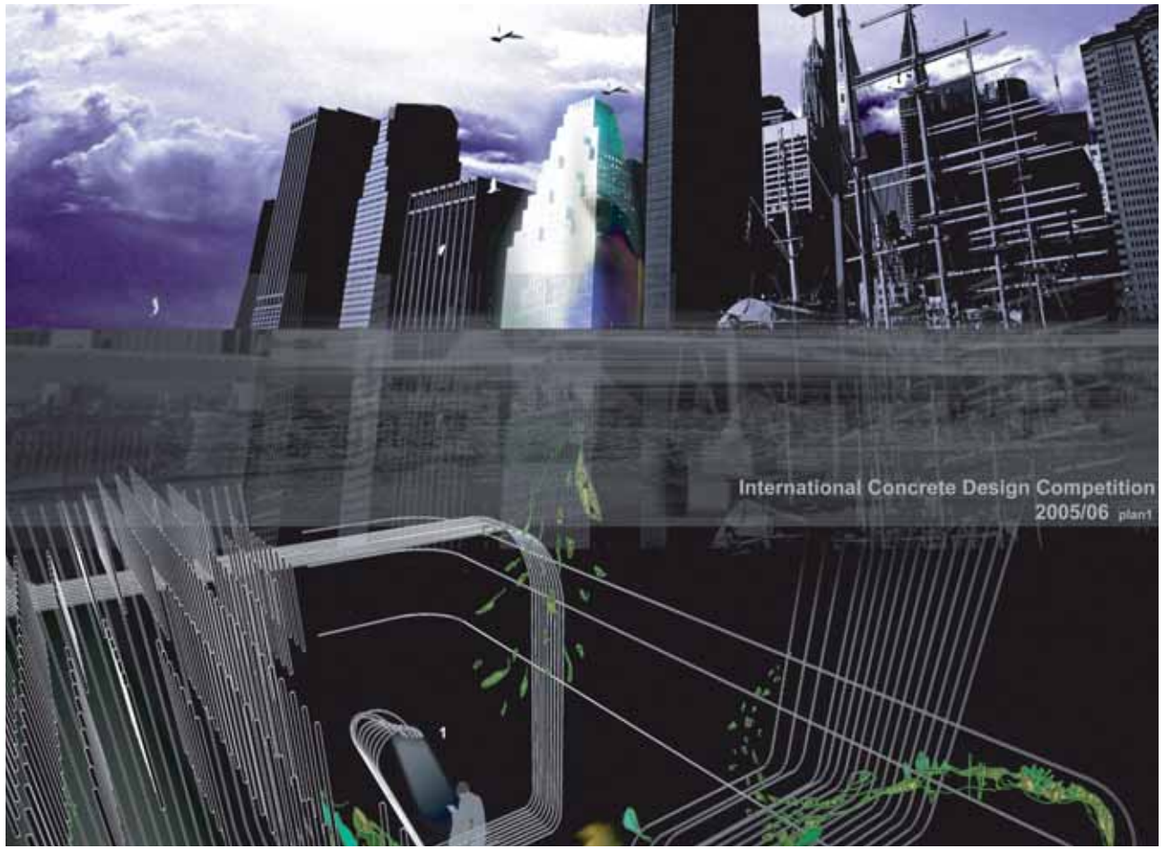
Mark Philipp Gabriel – TU Dresden
Wei Sun – TU Dresden

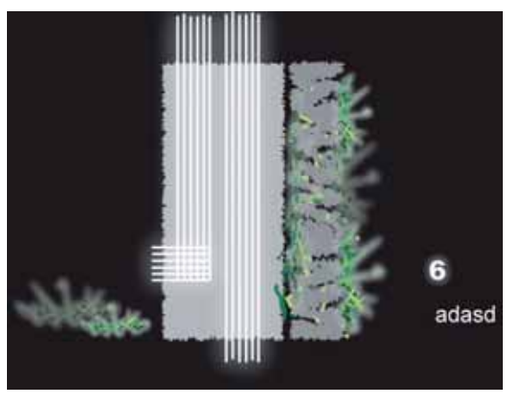
'Our aim is to provide living spaces for both a well-functioning human society and a largely self-sustaining bio-system – a biopolis. Mutual advantages should be raced down and consciously boosted wherever possible in the frame of coexistence.
Here concrete in its thinkable varieties seems to be the pioneering material: based on natural resources processed by humans (limestone and clay made into cement and flint serving as an aggregate in its earliest form), it embodies the concept of fusing natural strength with human intelligence in order to create something even more powerful. Unfortunately, during its production cement releases great amounts of carbon dioxide, so developing concrete further into a cutting-edge building material has to go together with making it more environmentally friendly. One way of dealing with this is to replace cement with other materials such as waste substances from the oil industry that do not involve additional CO2 emissions.
Others are to apply air-filtering coatings containing titanium dioxide surfaces or to add fibre armouring for lighter structures reducing the amount of used material. All these are commendable attempts to adopt the material to growing economical and ecological demands. In long-term perspective though, we will also have to keep rethinking and reinventing the practical application of the resources that physically determine our built environment and therefore our very style of life. The awareness of our origins rooted in the physical world where the powers of nature are ruling is vital to understand how we fit into the surroundings that we were born into. Today, if done well, buildings are made to meet the needs of the people that occupying them; the next step is to meet the needs of the people stepping into the world after these buildings have seized to be.

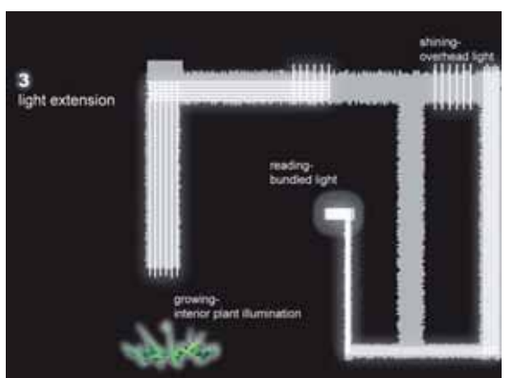
Opacity sheltering the hesitant advances of plasticity. '

[German National Jury] 'The design develops in connection with the material new chances for concrete and gives some original thoughts to the competition theme *plastic*-OPACITY. The proposal is a program as well and shows further developments and prevailing conditions how concrete can be used vividly and actively for solutions of outward problems.

The normal way is left and concrete is used as carrier of daylight. A world of concrete is created which has the function to mingle the exterior with the interior. More information about some details (surfaces, admission and outlet of light) were desired.'







MAKING ‘PLASTIC-OPACITY’

INTERVIEW WITH HANIF KARA BY OLV KLIJN

In late 2004 I spoke to Hanif Kara, engineer and co-founder of engineering firm Adams Kara Taylor (AKT) in London. As a member of the English jury, Kara was involved in the selection of the English winners of the first International Concrete Design Competition with the theme ROBUSTNESS. I asked him what he saw as the most important developments in his profession. ‘Thanks to computers, I see the beginnings of more mixed disciplinary approaches that could lead to a new understanding of engineering. But there are still difficulties to overcome. If you look at it in the long term, certainly engineers, but probably architects too, will have to develop a cross-disciplinary way of thinking, or else they simply won’t survive.’[1] Almost two years later and I’m sitting opposite Kara again, this time to talk about the second International Concrete Design Competition and succeeding master class. Kara curated both events. It was time to look back on his earlier comments and ask how he now sees the situation. But I started by asking about the theme he formulated for the competition and master class: plastic-OPACITY.

HK: When I was asked to be curator I realised that to follow the work started by an architecture critic (Michael Speaks) with an engineer would alter the nature of the competition and workshop. I am of the view that it helps to design more from an intuitive idea about material. And so, for a theme, I looked for the obvious material properties of concrete.
Concrete is actually a very old material. The Romans even used it. But it’s still contemporary. Recent developments concerning the strength, weight and durability are prompting innovative applications of this material. One property of concrete that has hardly been studied is its transparency. Transparency not in the literal sense of a property possessed by glass for example, but transparency in the spatial sense: opacity.
As far back as the 1970s the notion of transparency was taken from painting and convincingly linked to depth in architecture by Robert Slutzky and Colin Rowe. They, too, did not speak of literal transparency but of a phenomenological transparency that could lead to what they call a ‘continuous fluctuation of interpretation’.[2] Taking as examples the Bauhaus building in Dessau by Walter Gropius and the Villa Garches by Le Corbusier, Slutzky and Rowe explain what they mean. Because: ‘The Bauhaus reveals a succession of spaces but scarcely a contradiction of spatial dimensions’[3]

Regarding the design by Le Corbusier, they note: ‘The reality of deep space is constantly opposed to the inference of shallow space; and by means of the resultant tension, reading after reading is enforced.’[4]
Apart from the historical reason to reconsider concrete opacity, there are more contemporary issues such as insulation and sustainability to be introduced, parameters that are reopening the chapter in ‘opacity’ with contemporary architecture. In most cases this is achieved by working with various types of glass and metal, but I think it should also be possible by using concrete.
Combining such a notion of opacity with the inherent plastic character of concrete could lead to an interesting play in which spatial definitions such as dimensions, depth and orientation could be linked to material properties such as weight, colour and texture.

OK: When did the *plastic*-OPACITY competition and workshop really start for you?

HK: The thinking started right from the moment I was asked to be curator and formulate a theme. It was important to start with a combination of properties so that the design process could take a new direction based on the material itself. But there was a possibility to present the chosen properties in a wider context as a challenge rather than considering them as limitations. Only considering two material properties is for most architecture students too abstract to get enthusiastic about. The challenge, therefore, was to open up the theme of *plastic*-OPACITY to a wider audience of design students.

I found much of the answer to this question in the composition of the workshop programme. Apart from the chosen theme it was possible to encourage the direction of the workshop by choosing the people who we could improve. I’m talking here about all the people asked to guide the students and to give lectures or provide technical support. Starting from home, I felt that having a co-curator from our own p.art group (who we are from other disciplines) would give the benefit to the students of an old head and someone from the new generation of designers, so all along I worked with Adiam Sertzu. In making choices I tried to bring together a wide range of interests and disciplines. Ciro Najle, someone who focuses on the theoretical side of design, who provides a new and fascinating framework for his way of working in **‘Ultra-Disciplinary Architecture’** would provide a freshness that would be good for the experiment.
In addition to a theorist and researcher, I thought it would be a good idea to involve a visionary architect of the new generation, someone whose chief interest isn’t materials or techniques but who is already working on future tasks for architecture. Someone who boldly reinvents and tries to capture ‘the big picture’ of contemporary architecture: Bjarke Ingels. He expresses his vision for a new architectural task in **‘BIG Ideas’**.
I am a real fan of the work of Japanese architects and the way they have always used materials and there are good examples of practical and beautiful architecture to be found in Japan today, I wanted to invite someone from that country. Unlike in Europe or

America, most Japanese architects don't hide behind theoretical arguments but work in an extremely pragmatic manner on ideas about space, colour and material. Moreover, in light of the increasingly global field of work of designers, it is good for students to learn about the differences between Western and Eastern ways of thinking about space and design. Searching for an inspiring designer for this input I came across Akihisa Hirata (through the kind recommendation of Toyo Ito). He outlines his ideas in '**Sky-Like Architecture**'.

Apart from the possible contrasts and similarities between Western and Eastern architecture, the last two speakers would also give the students a closer view of how new generations are operating. After all, both Ingels and Hirata are at the top of their generations and better than some from previous generations in my view. That puts them closer to the world of students, to whom they serve as role models. By giving young designers the chance to speak, I wanted to show how important it is now that young designers develop their own ideas and position and if they are good, don't have to escape to other fields.
In addition to the theme and structure, it was important to ensure that we would generate enough material so that students and speakers – everyone who gave a lecture also doubled as a visiting critic – would have enough material to talk about with others. To provide an incentive in this area, we felt it would be useful to ask the students to think about 'scale' to explore a range of scales. Firstly, because this allows possibilities of many disciplines to participate and secondly, more importantly, it leads to many more opportunities, to explore. The range of scales and disciplines means there would be more to take on the work into realities in future.
In an attempt to ensure that the big scale would be present in the workshop, we decided on the idea of the 'Pod', a large concrete object that could only exist because of its form and test the engineer's tools. The Pod allows the technological examination of what is such an old material as concrete to be highlighted with modern techniques.
In short, all the considerations and choices that formed the foundation for the *plastic*-OPACITY workshop were geared to organising a week that would be about not only concrete but also spatial opacity, about working with various specialists 'theory and practice,' interpreting technical limitations and possibilities, learning about and discussing architectural approaches from the western and eastern worlds, and stretching the students but most of all, about teamwork.

OK: In this set-up one can detect a strong desire to connect designing and making objects – buildings or otherwise – again in a more direct manner. Is that correct?

HK: My view is that there is now an increasingly bigger distance between the creative designer and the making of the product that he or she designs. There is an increasingly thicker 'layer of' consultants and software that severs the relation between architects and what they design. Of course the division between designing and making has existed in building for a long time, but the distance is now so great that the architects are in danger of losing all sense of the notion of 'making'. Some architects will only conceptualise, but they know nothing about the delivery of their design in terms of materials. They no longer test their ideas. If you look at artists you see that they still have that ability, but many architects work with digital simulations only.

OK: Particularly when working on the Pod, students had difficulty thinking beyond the complexity of the object. Students were so struck by this object that they tended to take the calculations of professionals for granted and no longer worked on the development of an individual idea. Did that surprise you?

HK: The key to innovation lies in the ability to develop an idea and turn it into a feasible project with the help of other specialists. When the students didn't come up with their own ideas for the Pod straight away, I thought there was something wrong with their ambition. It demonstrated a gap in their design and cultural education. The attitude you adopt as a designer when solving a problem has a lot to do with the way in which you're educated and where. During my studies we were always told that most things are possible but that everything had to be assessed with the available resources in mind. That is a totally different design attitude too when you always hear 'behave normally, and don't do anything strange'.
The mentality of the test, and to question ideas with both your mind and your hands using modern technology, is something you see with a number of major architects, among them Herzog & de Meuron (H&dM). That's why I tried to get Harry Gugger – a partner at H&dM – to give a lecture during the workshop. That didn't go ahead unfortunately, but I'm glad his ideas about '**Producing Architecture**' are included in this publication that resulted from the workshop.

The testing of ideas by architects is of itself not enough to actually make architecture. Interaction with other specialists is also necessary. The knowledge and information now at our disposal in realising a design can be so impressive that one forgets to actually design. In other words, some young architects are influenced too much by digital technology. The art is therefore to deploy technology critically in the design process. Otherwise, technology will determine the design. As Cedric Price once aptly said: "If technology is the answer, than what was the question?"
In today's world it is vital that architects develop a critical stance vis-à-vis technology and experts like engineers. This latter group do test but they are not so concerned with 'creating'. An engineer tests whether an idea is feasible. Obviously an engineer offers an architect advice along the line of 'if you change this it will work better'. But optimisation is not the same as creation.
In short, when architects are not critical enough of technological innovations, then our built environment will be no more than what the software used has calculated. You see that happening already in design schools now that simple calculation models for forces, heating and ventilation are incorporated in architectural software.
To illustrate this aspect of the combined strength of the architect, various expects and technology, and to show that I'm not the only

one who feels this is important, fellow engineer Joop Paul, director of Arup Netherlands, outlines his views in this publication in '**Dream Teamwork**'.

Besides the more specific story from Paul about learning to work in a design team, it's also important that everybody learns to collaborate with people of all nationalities and to discard their own cultural shackles. It was amazing to watch this process unfold during this workshop. Initially everyone worked within their own group and in their own way, but at some point midway through the week the mood changed and people started to learn from one another.
Apart from nationality, educational background also played a role in this process. It is very interesting to see how students with a background in art can aim for a certain effect without any reservations while students of architecture are often more cautious because they start by thinking of possible limitations and risks.
But coming back to our previous conversation about the ROBUSTNESS competition and master class, I've already noted that inter-disciplinary work is becoming more important. Now that I myself had the chance to provide the theme and structure I naturally tried to integrate this issue into the competition and master class.
My concern was not that architects should learn how to do calculations on a structure but that they could work as professionals within a group on something that the group members couldn't imagine, never mind make, individually.
To highlight the main aspects of this experiment in cultural cross-pollination and mutual professional interest, Christian Schittich, editor-in-chief of German periodical Detail, outlines their effects in a piece entitled **'No Star Status for Architects in Germany'.**

OK: Should this desire for inter-disciplinary action have any effect on regular education?

HK: Judging by what I see in schools in England and the US and hear from colleagues abroad, I think there's a crisis in current design education. Everyone seems to be looking for something new but nobody is finding it. After the master class a number of students told me they'd learned more in a week than in the entire previous year. In other words, an educational event such as the *plastic*-OPACITY workshop and the educational model we set up for a week can complement the current system and produce potentially amazing results.
But if you try to implement a more material-based form of teaching and learning within regular education, you encounter a big barrier: the construction industry. Students and teachers are usually so far removed from the construction industry that it's practically unthinkable that manufacturers would collaborate on testing and realising the ideas of students.
Most architects face the same problem. For they, too, have to make do with what the industry produces. Only very big and renowned offices like Herzog & de Meuron and Norman Foster sometimes succeed in developing a new product. But the risks are usually too great. In the end we're talking about a matter of cost, and values of which a good designer must incorporate in this creative process. Just like he does aesthetics etc.

Another, more structural change I would like to see implemented, or better said reintroduced, is for students of architecture and engineering to work for a while during their studies in an office belonging to the opposite party. So architects would work for a period in an engineering firm and engineers for an architecture firm. AKT has recently reached an agreement with the AA school in London, but many more offices should follow suit.

OK: What do you think the students learned from this workshop?

HK: One thing the students learned was to complete a project from start to finish within one week. They experienced what sort of non-linear movements you have to make if you want to realise a project. The importance of collaboration, of criticism and of testing ideas became clear to everyone during this process. Of course they also learned how difficult concrete is. Although it wasn't my intention, as we didn't complete the Pod the students learned how complicated it is to work with this material. What I think is important is that this realisation didn't turn into some sort of fear of concrete. Instead, it increased their desire to plan better.

OK: Did you learn anything yourself from this workshop?

HK: The most important thing I took away with me was the enthusiasm of the students. The intensity and productivity with which they kept at it for a week made me realise that this is a form of intensive teaching can be put to good use. By chance, subsequently I was asked by Victor Mani of the Berlage Institute in Rotterdam, who heard about this workshop, to head a workshop on steel, which I couldn't fit in this time. I think it would be great if there were workshops devoted to other materials besides concrete. Eventually I think that the people from AKT who were involved in the workshop developed a soft spot for that ancient but always interesting material concrete.

1 Klijn, Olv, *Another level of preciseness*, interview with Hanif Kara, Concrete design book on Robustness, ENCI Media (2005).
2 This definition is taken from the republished version of the original text *Transparency: Literal and Phenomenal*, by Colin Rowe and Robert Slutzky, Architecture and Urbanism, no. 365, p. 21- 45, (2001)
3 Idem, p. 40.
4 Idem, p. 39.

ULTRA-DISCIPLINARY ARCHITECTURE

INTERVIEW WITH CIRO NAJLE BY OLV KLIJN

Ciro Najle (CN): architect

I graduated in Buenos Aires in 1991 and practiced and taught in this city for a period of eight years in the late eighties and early nineties in which I worked in different offices and by myself. I was involved in projects for single and collective housing and in high-rise apartment buildings. As a counterpart to these private commissions I worked on a series of public competitions, mostly public buildings and open spaces. In parallel I started my teaching at the University of Buenos Aires (UBA). The teaching at UBA is closely intertwined with the career, so it commonly provides the opportunity to expand the learning process into a research, creating a sort of investigation tank and enabling the development of individual pursuits, sometimes linked to larger theoretical networks. In this sense, the university was for me a space to configure and mature theoretical interests and to integrate them with my interests as a practitioner. In this dual context a third line of work developed during those years, half way between theory and design. It consisted on a series of speculative projects, realistic to a certain extent but broader than what the usual constraints of the practice demands, intensely methodological and abstract pieces of writing, techniques, briefs for design studio courses and prototypes in which the technical aspects of a research were mixed with open interpretations on programs and sites. This third line helped me integrate my thoughts and in time it took over as a form of practice in itself.
I was almost thirty when I decided to move to New York City and study at Columbia. There I started to synthesize these different lines of work, especially under the influence of people like Jesse Reiser, Stan Allen, Keller Easterling, Sulan Kolatan, Evan Douglis, Sanford Kwinter, Manuel De Landa and others, in the context of a research environment that was at its peak in the mid nineties at Columbia. Gradually after that, I moved more decisively into a teaching practice, as a way of giving an institutional ground to this investigation. Teaching became the core of my activities, starting with an initial experience at Cornell University, with Jesse Reiser. In this period I read philosophers such as Henri Bergson and Illya Prigogine, to give consistency to the platform of ideas on which I would work on the coming years. After my first teaching at Cornell I met Alejandro Zaera- Polo and Farshid Moussavi in London, with whom I taught at Columbia and with whom I learnt to establish tighter connections between an otherwise conceptual apparatus and a set of very concrete operative techniques.
The influence of Jesse and Nanako on the one hand, and of Alejandro and Farshid on the other in those years of incubation was very important for me, particularly in the content of my teaching at the AA that started in 1998. I became interested specifically in developing new forms of practice, new modes of understanding the architectural project and new methods and techniques associated with this. Retrospectively I can now describe my teaching/practice as a single research evolving from this platform and aimed at creating design procedures, consistent on a technical and a theoretical level.

OK: I think you know Hanif Kara, the curator of this years master class, through your teaching at the AA in London. In what way was Hanif influencing your new understanding of the architectural practice?

CN: I met Hanif in my early years at the AA through Alejandro and Farshid. With increasing frequency Hanif became a guest at my Unit. I am not sure how exactly the seed of a collaboration was sawed, whether it came from his side or mine, but for me it started as a curiosity in structural engineering as a field of constraints. Hanif's expertise in engineering gave me the opportunity to introduce consistent material restrictions to the geometries that I was working on. After a year of frequent visits to the Intermediate Unit, in 2000 Hanif and I started the Diploma Unit in a series that was called 'life engineering'. The unit operated during four years and concentrated on developing tectonic systems as consistent architectural organizations that could operate at a set of scales and that could evolve into the production of adaptive prototypes, or 'life prototypes' as we called them. In short what we were trying to do was to engineer the material life of architectural systems assembled in prototypes.

OK: Can you explain more exactly what these 'life projects' were about and how you organized the teaching between yourself and Hanif?

CN: The prototypes often had an enormous ambiguity in their status, which I considered productive as a way of establishing continuity between material behaviours, structural systems, and organizational systems. Life engineering involved the development of a set of organizational techniques in such way that their rules were rooted in material behaviours so that new construction systems and technologies could be truly integrated in the generation of the project, giving it robustness to work on a scope of physical, economic, environmental and social conditions.

OK: I assume it was a deliberate choice to link a structural engineer and a theory oriented architect in one educational team. What were the difficulties and challenges that you encountered? And maybe more importantly, what were your goals?

CN: I am not a theory-oriented architect but rather a designer trying to develop techniques and thinking of new modes of practice as thoroughly as possible. Seen like this it is easier to understand the instrumentality of the affiliation. The Unit was a way of building up a methodology as well as a theory of practice. We wanted to establish a medium between disciplines and produce a system of productivity. The idea was that the engagement with the new demands of production would require and potentiate the integration of structural knowledge into the technical apparatus of the discipline. This meant that the language of the organizational diagram had to integrate architectural conventions and constraints coming from structural engineering.
Hanif and the engineering from Adams Kara Taylor (AKT), as well as the developers, artisans and technicians that collaborated with the Unit not only brought their own knowledge, but also an expectation of what architectural knowledge is about. It was then important to establish new forms of dialogue that could ground enough complexity in the production and sometimes even be more familiar to engineers than to architects. For instance we borrowed some of their techniques of exploration and methods of evaluation, including software, and we used them as generative tools. The role of the architect to a certain extent was invading the space of expertise of engineers, with the possible banalizations that one can easily imagine. But what was important here was the fact that this incorporation widened the organizational potentials of the projects and gave us precise constraints to work with. Given the conditions that force the practice to be collaborative (or highly materially skilled), fast and agile, I think that more important than engaging with other fields, is to absorb them in disciplinary terms, far beyond the more immediate purpose of lubricating production. To empower the instruments of the practice without loosing procedural consistency is for me the challenge. It is not enough with engaging with other fields or merely establishing new forms of communication. This is the reason why I am now interested in an ultra-disciplinary discourse as opposed to the fetichizations of interdisciplinary frameworks of the nineties and to the fascination towards adjacent disciplines of the two thousands. I am radically conservative in this sense. I believe in the importance of internal consistency. Ultra-disciplinarity then means a will to introduce more content and precision in our techniques, but neither for the sake of precision per se nor with the aim of simply mixing disciplines, but for the purpose of developing architectural traditions further. In my current teaching at Cornell this is becoming more focused and systematic.

OK: In the lecture you gave in Dessau, you showed some of the work of your current students. I do agree that there is ultra-discplinarity in them. I think most European students lack this. Here the teaching is still focusing on mixing disciplines. Do you also see that?

CN: I feel that this is a general trend yes. I think it is a general misunderstanding of the potentials of contemporary practice: blurring its specificity for the purpose of being more productive. I enjoy academic and professional contexts where the architect is

educated as an organizer with an artistic role based on technical expertise. However I do not know if the problem is about Europe. Actually I think it is more related to the scission between continental and maritime environments. In constructing a productive integration between the two there is a big potential: to overcome the opposition between the browsing novelty and the resistance to change by engaging technology as a medium to hold nonlinearity rather than as an aim to celebrate or criticize.

OK: I think you are making an interesting link between environment and mentality. Do you think this also explains why the influence of the computer as a design tool seems to be more prominent in the (maritime) US than in (continental) Europe and why different discourses now seem to develop on either sides of the Atlantic?

CN: In general I would agree to this explanation. But there is also a counterpart to it, which has to do with the different tradition of engagement of construction technologies in the design process and with the role of technique in general. During the 20th century technology was highly mystified in the Anglo-Saxon world and representationally absorbed in classical continental architecture. This implies a different form of mediation that makes the first one agile or smooth and the second overstratified by representational traditions. In turn this produces a different type of absorption of technology and a different modality for its mediation when absorbed. I believe both in a radical engagement with technologies - of no matter what kind or degree - and in an equally radical process of mediation in the construction of the discipline as a dynamic but consistent field. Representational attitudes about the engagement with computing technologies are important not 'in advance' but 'after the fact', or better 'during' their incorporation, as a medium where the design process is mediated at the same time as it unfolds. I think that perhaps now it is again tactically relevant to think representational to a certain extent, since the procedures are expanding too rapidly in relation to their absorption in the discipline.

OK: To finish our interview I would like to talk about the actual master class in which at least two aspects were important. First the linking of thinking and doing, and second the theme of *plastic*-OPACITY, addressing material qualities as the outset for architecture. How relevant do you think these two aspects and their linking within a workshop are in the current education of architects?

CN: Well the first one is a condition: do first, think during, or after. Do not think of your practice as the material output of a set of concepts, ideas, strategies or ideologies. Rather think through and during the material process. Think of the material as a software, use it as a mediator for developing organizations and then constitute your aims along its lines of differentiation. Adjust the mediator to accelerate its own trends and simultaneously refine your aims. Equally, think of technology not as a given object but as a moment of crystallization that you can engage with and reconfigure from

very primitive levels of material behaviour, moving up along the chain of complexification.
About the theme of the master class, I consider it a productive metaphor. It creates a space of ambiguity in which quality operates both at a material and at an expressive level. There is also a hint of ideas of collaboration in the theme of the master class. However, as I have outlined before, I think of collaboration as being more productive (and structural to our practice) when operating within the discipline and at an organizational level, before it falls in expressive ones, which I would regard as by products. Seeing the results of the master class one can recognize the productivity of triggering explorations quickly and thoroughly. At a more general level, workshops like these can create a field for the study of a particular material technology in the terms that we discussed. These fields can then be pursued more systematically and their complexity expanded. So in this sense one should look at the results not as final objects but as seeds. The master class also helps to create a certain ethics of the intertwined relationship between design thinking and actual work within the body of students: operative thinking. And finally it recreates what I think is a useful question: how do you start from material conditions rather than from a 'context' of conditions? Or else, what do you regard as an architectural material and how do you nurture its productivity?

BIG IDEAS

INTERVIEW WITH BJARKE INGELS BY OLV KLIJN

Bjarke Ingels (BI), architect

I started my studies at the art academy in Copenhagen with the idea of becoming a cartoonist. Once I got to the academy it turned out easier to switch to the architecture department than to the department for cartoonists, because in Denmark the latter falls under the department of autonomous art. I told myself that I'd eventually become a cartoonist via architecture, but that never materialised. During my architecture studies I spent a period studying in Barcelona. After graduating I went to OMA and worked on the Seattle Library. There I met Julien De Smedt (B). Around eighteen months later I set up an office with him in Copenhagen called PLOT. The name refers to different things in architecture. What interested us was the meaning of the plot within the context of a story. Because although the plot of a narrative can take many forms, it's the thing that ties everything together. It's the same in our architecture. Instead of assuming that function dictates the form of architecture, we started with the idea that within each project we had to search for the determining parameters of a situation: the plot! The search for these parameters is best compared to searching for the volume switch on a big mixing table. The moment you turn the right switch the effect is all too clear. It works just like that in architecture too, if you know how to set the determining parameters of a project simply by turning the 'switch' and releasing a huge amount of energy. In 2005, five years after we started with PLOT, we each decided to go our separate ways, me as BIG (Bjarke Ingels Group) and Julien as JDS.

OK: Is BIG a continuation of PLOT or is it based on a whole new formula?
BI: In terms of content the difference between PLOT and BIG is small. I'm still interested in the same sort of issues. But there is an organisational difference. PLOT came out of a collaboration between two passionate people who worked and slept in one and the same apartment and whose collaboration grew into a group of 35 people. When I decided to go it alone as BIG I also decided to change the infrastructure of this new office drastically. I drew up an inventory of all activities I don't enjoy doing but need to be done. I then hired professionals for all these tasks. As a result I'm free to act as creative director on all projects within BIG. Right now we've

around 100,000 m² of work under construction. And to prevent us drowning under the logistics of all this work and to be able to keep concentrating on what we're good at – developing new ideas – it's absolutely necessary to maintain the infrastructure of a professional organisation.
Although the name might suggest otherwise, our design strategy is not by definition linked to big projects. BIG is both an abbreviation and a synonym for our way of working. We like to think big, and that has more to do with the time in which we live than with scale itself. Thinking big is at odds with the Danish tradition of designing boring buildings with minute attention to materials and details. At BIG we spend relatively little energy on this. Instead, we prefer to look at the changes taking place in the world. We try to work out what the consequences of those changes are for architecture. Moreover, we ask ourselves how, through design, we can extract maximum value from the limited sources of energy that mankind now has at his disposal.

OK: Besides thinking big, one has the impression that there are more clues that legitimise the abbreviation BIG. Could you say that the scale of projects is increasing?
BI: Many of our projects are located in a new twilight zone between 'master piece' and 'master plan'. For example, we're working on a project of 300,000 m² that would have been split up into smaller fragments ten years ago. That doesn't happen any more. Now there are gigantic 'investment banks' that want to carry out a project of such size and complexity as one entity. Previously, 'master planning' was always deployed to guide large and complex projects to a successful conclusion, but the question now is how can you prevent big and complex projects ending up as monotony. In other words, how to weave urbanism and diversity into a large-scale development that is in fact designed and realised as one big building?

OK: Does BIGNESS in architecture also mean the ultimate victory of architecture in relation to the city and its inhabitants? In other words, is this the triumph of modernism and technology?
BI: In addition to a new scale, BIG refers to a number of big problems in society today. The most important of them, to me, is the issue of sustainability. I call it 'ecolomy', a combination of economy and ecology: an approach to sustainability that is not nostalgic. When you succeed in making architecture an instrument in solving large-scale and fundamental problems – big issues – then it acquires new meaning. Architecture becomes a new condition for urban evolution.
Up until the late 1950s architecture was mainly dominated by an almost utopian desire to make a better world with the help of new technology. This aim changed after the first oil crisis and modernism narrowed its aim to building as efficiently and cheaply as possible, and that in turn led to frenetic blueprint planning. But a new enthusiasm can be detected in current architecture. Architects are starting to realise that they're the ones with the knowledge, the means, the technology and the experience to shape our surroundings in such a way that they reflect our way of living instead of having to make our lives subservient to the urban structures that we've inherited from various generations. In other words, after a period of paralysis, we are now seeing the return of big thinking in architecture, but big in a new way.

OK: Despite your relatively short stay in the Netherlands one can clearly see the influence of OMA in your work and attitude. Do you see more examples?
BI: I started studying architecture in 1993, shortly before SMLXL (1995) was published. In other words I knew Koolhaas before I'd even heard of Le Corbusier. Just like many of my generation I consider Koolhaas a fundament of current architecture. Through Koolhaas there is also a relation with the work of a generation of architects described in the Netherlands as SuperDutch. The bond with these architects is not so much aesthetic but cultural. After all, the difference between Danish and Dutch society is small. The biggest difference is that Dutch society is essentially based on a trader's mentality. Many of the arguments of Dutch architects can be traced back to cold calculation. Danish society is by origin, much more than Dutch society, a welfare society. You can see this in our projects by their total lack of sarcasm. Of course there is humour, but it never has the ironic undertone of many Dutch architects. The ironic thing is that we in Denmark are now known as agitators, as angry young men. But the cliché of an angry young man is that he couldn't care less about the world outside and just does his own thing out of personal dissatisfaction with the situation. That's not how we work, however. We will always try to acknowledge and honour the wishes of everyone.

OK: How would you describe your work?
BI: In our work we do not interpret the Danish idea of equality as designing for the average, the common denominator. What we try to do is satisfy the wishes of all the various users in a radical manner, and sometimes that means that our architecture has to be manipulated in a radical manner. The energy in many of our projects stems from our effort to allow various programmes occupy the same space. A good example is our project 'Clover Block' in which we make a proposal for 5000 dwellings grouped in a sort of Chinese wall structure around a number of football pitches. To respect the interests of the players, avoid casting inconvenient shadows on the surroundings, keep within the existing regulations and avoid blocking any historical sightlines, we literally had to wriggle our wall through all sorts of bends. An almost laughable attempt to avoid annoying anybody results here in a spectacularly sculptural block. There is of course a democratic aspect behind this approach. For we simply don't live in an era or a society in which we as architects are the only people who determine what the world looks like. That doesn't mean that users determine our architecture because we incorporate all their requirements. But our architecture does reflect current society. The interesting thing about our view of the role of the architect is that he is someone with the capacity to organise, gather, channel and express the forces in today's society. The architect, in this scenario, is an important intermediary in adapting the built surroundings to the demands of today's society. Our strategy of extreme politeness can therefore also be interpreted as a new meaning of architecture as *gesamtkunstwerk*: architecture as a reflection of society.

OK: The explanation to your projects is often fairly brief. In a certain project there are a number of criteria that, combined and transformed, result in a graphic form. This form eventually produces the main organisation of a building. But I assume that the actual design process is less straightforward?
BI: The Danish philosopher Søren Kierkegaard states that life is lived looking forward, but understood looking backward. It's the same with designing. We start by generating loads of ideas. Some of these ideas multiply, others merge, others disappear. This eventually results in a typology that you transform into a series of revisions and into a final model. With this final model it is very easy to analyse all decisions and choices and to deduce the genesis of a project to a clear story.
Production is very important to us. It's absolutely not a matter of precisely knowing what you're doing or where you're going to end up. But by starting with drawing and model making, we try to discover the important criteria in a project. Thinking is therefore not limited to the head but has to be rendered visible in headlines, sketches and models. In other words we are convinced that creation doesn't happen inside your head but on the table. If team members don't succeed in putting their ideas on the table, those ideas won't be available to others and cannot be worked on. Creativity then becomes a process of choosing.
We work in an almost Darwinist manner. Each team member comes with ideas for a project. At the start of each project we list the most important selection criteria and we then discuss on the basis of these criteria in a number of selection rounds. In analogy with the 'survival of the fittest', the various ideas either survive or die. To continue speaking in Darwinist terms, (sexual) attraction is an important factor in that process. Choices for the most interesting idea are sometimes made on the basis of attractiveness.

OK: Darwinism also contains a strong idea about progression. How does this translate in your architecture? Can you speak of progress?
BI: I don't believe in radical change. Not as Le Corbusier rhetorically asked: 'Architecture or revolution'. I think there is such a thing as evolution in architecture, a slow process of building on previous generations. All revolutions, whether the French Revolution or various religious revolutions, throw so much quality overboard at once that we should see them as stagnation or decline rather than progress. Evolution is a continuous process that is not aimed at a particular goal, but each generation tries to optimise its possibilities in this process.

OK: The idea of building on the knowledge of previous generations turns out to be problematic in education. You often see students doing something just because someone else is not doing it. They don't seem to want to learn from one another. In architecture offices too it's difficult to build up real knowledge. Do you see that too?
BI: In 'Towards a New Architecture' it takes Le Corbusier a whole chapter to explain that he wasn't aiming to break with the past with his new architecture. The proportions of his architecture, for example, were still based on Greek and Roman models.

In an office it's a bit like being at school, except that there's more teamwork. And certainly in our case there are a limited number of subjects we're really interested in. We prevent repeating ourselves by trying to approach these subjects in a different way each time. That's how evolution occurs and how we learn a lot in the end I think. Each subject has its limits, however. We, too, don't end up dwelling on the same subject forever. At a certain moment we know we've had enough and decide to deal with something entirely new. We deliberately set ourselves restrictions along the lines of: 'In this project we're not allowed to make roofs you can walk on', or 'Terraces are out of the question'.

OK: You spoke earlier of the marriage between economy and ecology. What is another subject that you have studied in a similar manner?
BI: We've also done a lot of research into 'programmatic alchemy'. That is about combining programme with added value. It is linked to the idea of radial organisation, instead of serial or parallel organisation. We've looked at this theme in a number of projects on the basis of the view that old answers can evolve into new applications. Think of our design for a hotel in Sweden that's about to be built in Shanghai. The form of this building is actually even older and arose when we were working on a design for the European Patent Office in The Hague. Then we used the typology of the slab that stands on two legs for a competition for a hotel, and so the form will eventually find its real home in China. The idea of recycling concepts also has to do with my idea about production. When you start a new project by reusing various ideas and models from earlier projects, then you've got something to respond to more quickly than when you start with a *tabula rasa*.

OK: Given your way of working, could you imagine not starting with existing concepts or forms but with a material instead, as was the case in this workshop?
BI: The conditions in Denmark are certainly determining for the fact that we as an office haven't been able to deploy a material as the starting point of a design. After World War II the whole construction industry in Denmark started to focus on combining various standard products to make buildings. As an architect you're therefore responsible for choosing the products that make up the building. Legislation is structured accordingly and it costs a lot of time and money to have new materials approved. Clients are therefore reluctant to finance experiments. In that sense we're forced to focus on the larger picture, the big ideas, since we simply don't have access to the small details.

OK: What do you think could be the added value of master classes like this one?
BI: I'm very jealous of people who can work with poured concrete because that's impossible in Denmark. A workshop makes you realise that only a tiny fraction of the potential of this material is exploited in prefab concrete elements. The problem with the construction industry is that it leans strongly on precedents. If you have the ambition to work with product innovations, then you should never try and placate the client by saying 'this has never

been done!' This unnecessary but real fear for process risks means that progress and innovative strength is heavily curbed within the industry. Perhaps a workshop like this can act as a precedent and force new breakthroughs in the innovative application of materials.

SKY-LIKE ARCHITECTURE

INTERVIEW WITH AKIHISA HIRATA BY OLV KLIJN

Akihisa Hirata (AH), architect

I was born in 1971 and grew up in Sakai-shi in Osaka and studied architecture for seven years at the University of Kyoto. In 1970 the World Expo was held in Osaka. Everyone believed in a fantastic future, and people enjoyed life. The rapid growth of the Japanese economy was a cause for the euphoric mood in the 1980s and early 1990s.That was until in 1995 the Kobe region was hit by one of the most destructive earthquakes in living memory. More than 6400 people were killed and 43,000 injured. The economic damage was enormous and estimated to be in the region of 100 billion dollars. Two months later the extreme religious Aum Shinrikyo sect headed by Shoko Asahara carried out a poison attack in the Tokyo subway.[1] *These two events completely changed the mood in Japan and society turned in on itself.*

OK: What does the year 1995 mean for Japanese architecture?
AH: For architecture, too, 1995 was a turning point, but certainly not a disastrous year. It was the year Toyo Ito won the competition to design the Mediatheque in Sendai. Even the way the competition for this building was formulated made clear that this would be a unique building. The idea to combine a library, an audio-visual archive and an art gallery in one building came from the jury chairman and architect Arata Isozaki. The aim was to create a new architecture for the age of information technology. Ito won with his design for a block-shaped volume whose façades were made entirely of glass and in which the floor plates were supported by columns that were almost transparent and were composed of countless slender steel frames.

Up to that point Postmodernism, and to a lesser extent Deconstructivism, had dominated Japanese architecture. I was pleasantly surprised when I saw Ito's design. This building was no longer about appearance but about interior, no longer about a clearly defined volume but a seemingly endless space. So I decided work for Ito and ended up working for him for eight years. When I started I was planning to stay for three or four years but because the work was so interesting I was a long time waiting for the right moment to start up on my own.

OK: How difficult is it to set up you own architecture office in Japan?
AH: Technically speaking it's no more difficult or easier to open an office in Japan than elsewhere, I think. The problem is to acquire commissions. That's difficult in Japan. The best way of getting work is through competitions, and sometimes you're lucky to get a private commission. I was fortunate in that I could find a client by a competition, but that's very exceptional.
I cannot compare my situation with that of European or American architects, but even so I think I've been lucky. There aren't that many young people like me who've had the possibility to put their ideas about architecture to the test.

OK: How would you describe your ideas about architecture?
AH: I think of my architecture as 'sky-like architecture'. Air and people have something important in common. Just think of the fact that air, like people, has many different faces: sunny, rainy, clear or threatening. The dividing line between all these faces is difficult to draw precisely, and it's fascinating to see how both the air and man can show different faces using the exact same elements. The same goes in architecture. It's possible to generate space by varying the same elements or conditions.
My idea about sky-like architecture is also about the definition of space. The scientists Leibniz and Newton were disputing the issue as far back as the 17th century. My favourite definition is that proposed by Leibniz: 'Space is the order of coexistence'. In other words, space cannot itself be perceived but only exists in relation to other objects. So there is nothing like 'the empty space' that is later filled by objects; both exist at the same time. Newton was of a very different opinion. He believed that space was an absolute concept that precedes the existence of objects.
Finally, I think 'air' in the literal sense is also interesting for architects. The Chinese character for air also means space and emptiness. In other words, sky-like architecture also has something to do with the concurrence of emptiness and space. Perhaps it sounds romantic or abstract, but that's what I want to achieve with my architecture.

OK: Is the idea of sky-like architecture a typical Eastern approach to space? Or is there no difference between an Eastern and Western way of thinking about space?
AH: My idea that architecture, just like air, can generate itself is to some extent inspired by an Eastern way of thinking about space. Of course I've been influenced by various old temples in and around Kyoto. But I think that a more direct European source than the definition from Leibniz can be discovered. One of the most impressive buildings I saw as a student in Europe and in which I recognised by own fascination for architecture is the Laurentian Library in Florence by Michelangelo. All elements in this building are designed in such a spatially cohesive way that everything seems to stem logically from everything else. Plans, façades and sections generate one another as it were. The result is a spatial play that goes much further than function or use, stronger than a play that could accommodate many functions and uses.

Although my architecture has a certain rigidity, its effect is more ambiguous than most modern architecture. The image I have in mind is the image you get when you cut a cabbage. Imagine you found yourself between the leaves of a cabbage that's been sliced in half. The space lying before you is continuous but you can scarcely fathom its dimensions and forms. If you imagine that there are also other people between the leaves you can also imagine that you can only see fragments of them. For example you might only glimpse hands or heads or you hear voices close-by.
Our usual system of assessing space – made up using pairs of terms like far and near, big and small, hard and soft – would be useless in the case of the halved cabbage. Although the example of a cabbage seems absurd, in reality a long process is in progress in which our thinking about space is changing drastically. Communications technology, for example, has changed our notion of distance. Likewise, I think our architectural thinking in terms of the direct relationship between space and function will change in a similar way eventually. I aim for an 'unrelated relationship' between people and space.

OK: I also associate sky-like architecture with an almost mobile architecture. Is that correct?
AH: My architecture is not literally as changeable as the air. But my architecture, like the air, is based on an almost organic process in which space is generated rather than composed or separated from the outside world. Unlike most architects, therefore, I'm not interested in architecture as an accumulation of apparent differences; rather, I'm looking for an architecture made up of series of differences. In that case, architecture, just like air, is in fact a compilation of the same conditions without, however, becoming predictable. This, to me, is therefore in essence a natural architecture: a natural being.

OK: You mentioned Michelangelo as an inspiration for your architecture. Have you any contemporary heroes?
AH: Like most architects of my generation I grew up with the work of people like Koolhaas, Herzog & de Meuron, Daniel Libeskind and Jean Nouvel. Elements of their work are very inspiring. But a real hero for me is Louis Kahn. I'm fascinated by the way he thought about relations, his analyses of movements through space and the atmosphere he created in his buildings. Just like Kahn I'm also not inclined to think about space in terms of block-like volumes. Instead, I begin by thinking about relations and about how people move. The history of modern architecture in Japan is relatively short, much shorter than in Europe. But I have the impression that important progress is being made at the moment. A generation of architects is emerging who think about space in another way. I think this is also a difference with Europe, where emphasis is still put on programme and material. Thinking about programme, however, is only really interesting if it's also connected to thinking about form. That's what Rem Koolhaas demonstrated with his famous design for the library in Paris. But after that there have been many examples from other architects of diagrams that have been turned into buildings. I don't think that's interesting any more.

OK: I want to talk about the master class you joined for a number of days. In this master class I see that the hierarchy between thinking and doing, and between testing and building, disappears when students have to make their ideas, and what they make then becomes input for further development. Do you also see that happening?
AH: When I was asked to contribute to this master class I had no clear idea what I would find. The theme '*plastic*-OPACITY' sounded abstract to me. But I became more enthusiastic when I understood that they'd really be working with concrete during the master class and that it therefore wasn't the intention to think about the theme in a distant way.
Now I know that what I experienced here was extremely interesting. I think it's great that students are given such an opportunity to take their ideas a step further by trying to make them. It's a way of working that reminds me of the way we worked on the pavilion in Bruges during my time with Ito. In that project it was only after a lot of trying, testing, failing and improving that we eventually succeeded in using aluminium as a sort of paper or even as 'embroidery'. It was an extremely direct way of working in which our ideas about light, space, movement and material became interwoven.
That's why I'm jealous of the working environment offered to these master class students. What's more, when I see what the students produced I think that they prove that the theme devised by Hanif Kara is much richer than I could ever have imagined.
I hope that in the future I too will have the possibility to test materials and designs in such a direct way. Something I'll certainly concentrate on, and something I missed a little in this workshop, is the idea of concrete without reinforcement. To me, discovering that would be the ultimate freedom for the architect.

[1] Twelve commuters died and almost 5500 were wounded as a result of this attack.

PRODUCING ARCHITECTURE

INTERVIEW WITH HARRY GUGGER BY OLV KLIJN

Harry Gugger (HG), architect and partner with Herzog & de Meuron (H&deM)

My background is uncommon. I started my professional life as a toolmaker and carpenter. After that I studied machine engineering. Then I studied German literature and history, and only then I studied architecture. Right after getting my diploma from the ETH Zurich I joined Herzog & de Meuron (H&deM), and in 1991 became a partner. In 2005 I was appointed professor at the School of Architecture, Civil and Environmental Engineering (ENAC) at the Ecole Polytechnique Fédérale de Lausanne (EPFL), where I founded the Laboratory for Architectural Production (LAPA). At LAPA we examine the possibilities of new production technology in architecture.

OK: The work from the early years of H&deM is sometimes described as Swiss decorated sheds. Now the work seems to be more about complex interaction between forms. Is it possible to describe the current position of H&deM?
HG: In the early years of H&deM the architecture of Jacques Herzog and Pierre de Meuron was strongly influenced by the work of contemporary artists who were dealing with questions of perception. Their architectural research primarily focused on turning the façade into a space – a space that could be entered mentally, physically or just visually. The work from back then can perhaps be viewed as a clearly definable position in terms of the 'Swiss decorated shed', but the position of H&deM now cannot be positioned by this description.
Now I think that a project is what determines our position at any particular moment. And since projects differ – different functions, clients, climate conditions – our position also changes. If we do have to adopt a position now, then its best described as the aim to be specific in every project. Specific in terms of the changeable elements just mentioned.
This is actually a traditional view of architecture. It's not about imposing our ideas; it's about being explicit on what a project offers us. Apart from specific, or actually as a precondition for being

specific, we view architecture as a study. We are always looking for the limits of architecture. Now we're in the lucky position of doing projects all around the world, and so we're confronted by highly different conditions that enable us to look beyond those limits.

OK: The description of the position of H&deM as *ongoing* research into the limits of architecture is related to projects, but it also reveals an attitude. Where's the balance?
HG: Our research into architecture is indeed partly the result of an attitude. That attitude is actually very simple. In each project we adopt the same stance: we pretend not to know. So we try to be open for what's new, receptive in the best sense of the word. We try to look at the task like dilettantes but from the perspective of someone whose interest stems from wonder. In other words, we consciously try to forget what we've already done so that the same programme, say a museum, can acquire a different form each time. Starting again each time might sound destructive, but the effectiveness of this as a departure point for architectural research is proven by the fact that we've succeeded in building a number of totally different museums. The Schaulager (2004) in Basel can even be interpreted as a built commentary on the prevailing idea of a museum.

OK: Aren't you ever strongly tempted to re-use or copy an idea?
HG: Ninety-nine percent of architects provide solutions. But one percent produces genuine architecture. From a philosophical perspective alone I don't believe in 'solutions'. Architecture is simply not equivalent to a sum that leads to just one answer. The everyday reality is that architecture depends on so many complex factors that there's not just one single answer imaginable. Accepting this means relinquishing the idea of thinking in solutions. Instead, you could start thinking in terms of values. Design then becomes a matter of ascribing values to certain parameters at the expense of others. The ascribing of these values is a very conscious process and our architecture is therefore a conscious choice to place more emphasis on certain aspects in a project.

OK: Doesn't that make the profession of architect a matter of enlarging personal preferences?
HG: To an extent, but a good architect is an empty-head and a generalist at once, someone capable of gathering, integrating and co-ordinating a lot of different types of information rapidly. A good architect therefore forms the centre of the design, the planning and the execution. Nowadays this central role is precisely what the architect is in danger of losing. That is the greatest threat to architecture. Ever since ancient times the architect has had to relinquish aspects of his position, but we've now reached a critical juncture at which one can ask whether we can still speak of architecture. After all, more and more responsibilities are being taken from the architect, and the ascribing of values to different aspects of the project is impossible without responsibility. As a result it's practically impossible for an architect to establish priorities if he's not responsible for the project budget. Nonetheless, in various countries you're legally compelled to make a

distinction. The result is that the architect has no say in how the money is divided and so he's unable to distribute the funding on the basis of architectural priorities.
The paradoxical thing is that interest in architecture has never been greater. But if you look at which buildings and architects are in the spotlight, then you see it's a very select company. Ninety-nine percent of what's built slips by unnoticed, but you never hear anyone talking about that. In that respect too we've reached a critical juncture. If we as architects don't succeed in increasing the number of buildings that deserve to be discussed and published, then the current media attention can no longer be justified. In other words, architects have to turn the tide and increase their sphere of influence.
I'm positive precisely about this point. Thanks to current developments in design and production technology, the architect has possibilities to reclaim his central role. The greatest gains can be found in the area of 'making'. When an architect can deal with digital design tools he can become a 'master builder'. In addition to inventor, the architect can also become a producer thanks to new production technology.
At H&deM we first saw this possibility in our project for the Olympic Stadium in Peking. There we saw that the data we generated to be able to make drawings and models could be used later to steer the CNC machines that cut the steel for the stadium. That was very different not all that long ago. An architect gave the project drawings to a contractor and he worked out how he'd make it. Now we can cut out this interim phase. Architects can directly supply the data with which machines can produce the components of a structure. Although the importance of this situation has got through to just a few architects, this is a unique situation that enables our profession to consolidate its position.

OK: That's an interesting view of the effect of the introduction of the computer in architecture. Usually this is looked upon with nostalgia, since the computer, many people say, means a loss of concrete character and tangibility in architectural production. Have you ever doubted the computer as a design tool?
HG: In the early years we, too, had the idea that the computer would take something from architects rather than give them something. Now we take the opposite view. Even more so, I think that if architects don't embrace digital technology we might as well forget our profession. But I don't believe it'll come to that. I'm sure that architects will exploit the new possibilities and I predict that within four or five years printing 3d- architectural models will be just as easy as printing drawings.

OK: How are digital drawings deployed within H&deM now?
HG: The workshop where we make our models was the heart of our office for a long time. And because of the workshop's central role it wasn't difficult to expand the capacity of the workshop by bringing in complementary digital production techniques. As I said, the project in Peking was a turning point in this regard. If I remember correctly, we were invited to take part in the stadium competition on December 22, 2002. The closing date for entries was the second week of February 2003. Given that no work is done during the

Christmas holidays in good old Switzerland, we had just six weeks. Obviously we started straight away, but time was short even for the thought process behind such a complex assignment, never mind the production process. But the competition regulations required numerous drawings and at least one scale model. It turned out to be impossible to produce this model by hand, so the only option was to 3d-print a computer-aided model. Since we didn't have the technology in house, we had to commission it out, and the result was awful. Despite that, our design convinced the jury. We won the commission and since then we've invested heavily in new digital techniques. Now we've everything in house so that we can produce models independently and really test our ideas.

OK: Has that also influenced your teaching?
HG: Yes. My chair is called 'laboratory for the production of architecture' and that implies precisely that part of the profession we've just been discussing. Within the university I also advocate acquiring the same sort of digital techniques we use at H&deM so that students can get familiar with them while they're still studying. But the influence of this technology goes further than production alone. Right now we're working on an educational structure in which all printing, whether drawings or models, is controlled from one central organ, the 'competence centre'. In future students should be able to print drawings and models of their designs with ease. We're already trying to force students to work with digital production technology for every presentation so that they can print everything they need on the basis of their own data. In the future we'll expand this process to cover actual production and we'll also be asking students to produce a crucial element of their designs at scale 1:1.

OK: At what moment in this virtual design process does the issue of materials and their properties arise? Is that only with the production of 1:1 elements or earlier?
HG: The material is there right from the start. Each project has its own personality, it's something that talks to you and with which you set up a dialogue. You could say that at a certain moment a project knows what it wants to be. I don't believe in a design method in which you only raise the question of what material to use for the façade after the sketch design and the preliminary design. A good project doesn't just pose questions; it also offers answers. A good conceptual model points the way to the right material, no doubt about it. Each design has its own character right from the start, and that character translates in some way or another into material.
That does not mean that the material is a matter of course, or mistakes can't be made. To prevent them, testing is important. Our work attitude at H&deM is one of permanent alertness. During construction we are not only realising our ideas but also testing our design according to the built result, and so it can happen that we decide to change a material at the last minute because it turns out not to work. Certainly now that we are involved less and less with the actually making of our buildings, which are increasingly complex and scattered around the world, testing by imitating has become more important for us. We often try out ideas at scale 1:1 before buildings are constructed. We construct these models ourselves, in house and we test with simple simulations whether a print or pattern produces the right effect. If we're convinced of the potential of a certain idea, we try to produce elements of our design as precisely as possible using the actual materials: 'mock-ups'. For clients these test pieces often seem like expensive tryouts, but we're convinced that mock-ups save money in the long run. Mock-ups are the only reliable elements that actually tell you something about the building because they are not simulations. An added advantage is that if you manage to make a mock-up you immediately have the best specification for the composition and execution of a project, better than any written specification.
To come back to education, I hope, as I said, in the near future to be able to ask students to produce mock-ups. That is good for a better understanding of the effect of their design and for strengthening their position. After all, the architect as maker, as supplier of the data used to put buildings together, is automatically the central figure in the whole process. But before we get that far in education and practice, the construction industry also has to get involved in our plans. That is perhaps one of the hardest tasks, although the *plastic*-OPACITY master class shows that at least there's interest from that quarter.

DREAM TEAMWORK

INTERVIEW WITH JOOP PAUL BY OLV KLIJN

Joop Paul (JP), engineer, country director of Arup in the Netherlands

I started studying architecture in Delft. After just one year I switched to Civil Engineering and I graduated there with a project about steel structures for Shell. I did my doctoral research in Japan and worked for the Obayashi Corporation, a large building firm in Tokyo. I then moved to Arup in Tokyo. During my time in Japan I worked on projects in Japan and around South-East Asia. I then worked for Arup in London and for the past five years I've been head of Arup in the Netherlands. So I've spent the majority of my career outside the Netherlands. One of the most challenging projects we're working on at the moment in the design for Arnhem central station by UN Studio (Ben van Berkel).

OK: In one of the columns you wrote for the magazine *Cement* you speculate about the engineer of the future. If I look at history I see the relation between engineer and architecture growing steadily closer; the division between engineering and architecture is blurring. How do you read history? And is it relevant to your view of the future?
JP: The interesting thing is that the engineer is now an important factor when it comes to innovation. Engineers are now actually unnecessary for many ordinary buildings, but when architects really want to do new things engineers are vital. In the latter case, an architect and engineer make something new together. They chart new waters – in a design team – without knowing exactly where they'll end up. The fact that none of the parties involved know where they're headed can make the process a tense one. Engineers and architects then have to rely on each other. The issue is not so much whether you'll reach your target but when that'll happen. In other words, the dynamics of the design process in a modern team of architects and engineers is largely determined by the time pressure to find solutions that everyone can be proud of.

OK: Within this field of tension to find a design solution on time, how do you see your position as an engineer compared to that of an architect?
JP: I think the architect and engineer play equal but different roles in a team. It's the architect who outlines what his or her ideas are on issues of form, and it's the engineer who then assesses whether those ideas are technically feasible and how they could be optimised. When it comes to design problems for which no solution has yet been found, the team often has to follow a certain line of reasoning and solve the problem bit by bit to discover whether something works or not. It's also necessary to test partial solutions to find out exactly what your target is. In concrete terms this means that engineers are not simply in the process of obediently working out what architects design. Instead, they use their findings as input to look afresh at the design. That also means that in such a design process you seem to start working on the same design problem a number of times. That sounds illogical and it is so when it comes to a problem you already know the solution to. But if you don't know what the answer is, you can only proceed through part-solutions. Design then becomes a game of ping-pong between engineer and architect. There has to be a well-developed sense of equality in order to go through such a game of ping-pong with a team. Everybody has to invest a lot of energy in it to make it a success.

OK: In addition to trust, your description of the design process as a game of ping-pong implies a sense of timing. Isn't it very important that the team of designers and engineers is informed that there's something worth playing ping-pong for?
JP: If you really want something new, then the engineer has to be involved from the start. Otherwise it's always too late. Because although paper is patient and fresh alternatives can always be created, experience teaches us that the minds of designers and others involved aren't so patient. In other words, when you as an engineer get involved in a design process at too late a stage and too many design factors have already been determined in the minds of those involved, then the scope to introduce other variants is drastically reduced. You can only help direct a complex design process as an engineer if you're involved from day one. You can see that in a project like Arnhem Centraal. Arup has been involved in this project from the first sketches, and that's why we're able to complete a very special building with UN Studio.
Incidentally, early involvement is advantageous not just to the engineer. The architect benefits, too, because he's got more opportunity to steer the final result early in the process and encourage the engineer to do new things. Generating and sustaining the dialogue is therefore one of the most important processes within a design team. We try to cater for that when putting together a team.

OK: Is innovation the result of a cyclical process of trial and error? Or is it the result of interaction between different minds – i.e. disciplines – within a team?
JP: Yes, the minds in a team should certainly be different. The most important thing you need to arrive at something new is a combination of different backgrounds of knowledge. The difficult thing is to get these different backgrounds to work together as a team. Another difficulty is that teamwork only lasts so long. If a certain group of people succeed in achieving a fantastic result in a process, that's no guarantee that they'll do it again a second time.

After all, too much collaboration can cause the chemistry between team members to wane; people become too similar. To prevent this, you can keep forming new teams or you can stimulate the individuals within a team to continue to develop as individuals. We operate on both principles at Arup. We try to form teams of individuals we think will complement one another precisely because they differ from one another. In practical terms this means that within Arup we bring together a group of people with the broadest possible orientation in terms of background and education.
In addition to diversity, mentality is also important in our choice of people. I've already talked about trust as an important aspect within a team. You could put this more strongly by saying that the team members have to believe in something. When the people in a team are too inclined to dismiss ideas on the assumption that they're too expensive, too risky or too complicated, you affect that belief and reduce the chances of arriving at an innovative solution. So we also select on the basis of that mentality of daring to believe, even if we're looking for a sheep with five legs: specialists with a strong tendency to collaborate.

OK: Isn't it difficult to keep such a diverse group together, never mind direct them?
JP: Yes that's certainly difficult. Sometimes I have the feeling I'm trying to direct a bundle of cats . It's not easy to extract the best from this way of working. Our aim in most cases is of course to generate that added value, but it doesn't always work out. So we accept that there will inevitably be attempts that fail, but they're limited in number. What's more, not achieving the target doesn't always mean that a project is a total flop. A true failure seldom or never happens. But we, just like architects, produce many more ideas than could ever be realised.

OK: Besides Arnhem Centraal, which you're enthusiastic about, you've also been in China recently working on the design of a spectacular tower. You described the design process for this project as a boyhood dream come true. How was that?
JP: I remember how impressed I was of the new Sydney Opera House as a student. I thought it would be amazing to achieve something like that. And ever since I've had the dream of realising such an impressive building.
The tower in Guangzhou definitely has the potential to be a project like that. The design process began more than two years ago when architects Mark Hemel and Barbara Kuit together with Arup colleague and lighting designer Rogier van der Heide approached me to help with a competition design. With this team we brought together a programme of 100,000 m^2 in a 610-metre tower, the tallest free-standing tower in the world.
The design links an elegant, almost female form to an efficient and supporting structure. By approaching the form of the tower as a series of transformations of a cylinder, we were able to design a supporting structure – made up of columns, rings and diagonals – that transformed with the form of the tower. As a result, the bearing structure could easily be determined with a small number of parameters and their configuration determined. That not only we but also the jury saw the beauty of the design and preferred it to

those by Foster and Rogers gives tremendous satisfaction. But the dream of once working on something impressive remains the major motivation for taking up a challenge like that.

OK: Is it difficult to communicate about the different dreams within a design team? I always assume that not everyone has the same dream, and that has to be resolved, doesn't it?
JP: That can be tricky. To tackle part of this problem and to ensure that team members work on feasible dreams, we work with computer models in which geometric forms are composed on the basis of a number of predetermined rules of mechanics. That means that everything created from these models can by definition be constructed. That also means that you have a free generation of forms that contain a clear reality check in relation to what you can build. This is an essential point to me. I think it's very important that what you think up can also be made. In the case of the tower we started with a standard composition. The only essential thing we changed was the position of the joints. By shifting these points on each level we were able to create an amazingly graceful form.
Possible in this case means relatively simple to build. In the model we used for the calculations we deliberately incorporated limitations for the corners of the elements in each joint so that all joints can be fixed to one another by an ordinary welder. This is crucial to the cost of such a tower. Much of the cost of this project is determined by the number of joints that have to be made and the varieties of each type of joint. The system behind this design ensures that all joints can be made and that the joints do not have to be calculated and controlled individually. That saves time and money too. This financial argument might seem key to clients only, but I think it's also relevant to architects. After all, a client is often prepared to pay five to ten percent more for a beautiful design, but many designs turn out to be forty to sixty percent more expensive and that is hardly ever feasible. And if you can only produce extremely expensive designs there is little chance they'll ever be built and so the innovative effect of these designs is limited. In the end, therefore, it's important whether you're able to think of something that's relatively simple to construct.

OK: Paradoxically, innovation is also about the ability to make. But how do you move from familiar, feasible elements to something new, which is unfamiliar and therefore not yet feasible?
JP: The case of Arnhem Centraal will help explain that process. We've been working on this project for a number of years and construction has already started. But there's still one element we're not sure how we're going to make. It's a twisted form that has to be made of concrete and in which we don't want to have any centre-pen holes. That means we have to come up with formwork into which the fluid concrete can be forced without the formwork walls being connected to one another at regular intervals. This puts high demands on the formwork itself. But there's the question whether and how the formwork can be made as simply as possible. Over the past two months we have had a number of sessions with specialists in which we've developed three principles on the basis of which we think we can make this final piece and so things are looking good.

The way in which we'll eventually make this final component depends in part on who's going to make it.
The luxury of choosing from three possible solutions is of course not always possible, but that's what we're aiming for. That, too, is a matter of mentality and team spirit: keep questioning.

OK: The way of working you describe is similar to the way of working during the *plastic*-OPACITY master class. There, too, the focus was on alternately thinking and doing by testing numerous forms. Is that a different way of working to what designers learn at school?
JP: Starting designers are educated to believe everything that comes out of a 3D program. Practice teaches you to be more cautious. You always have to treat the results of all sorts of simulations very critically. To nurture this healthy suspicion it's very good for young designers to spend a period after study on a construction site to see how buildings are really made. In the end, it's about what a building really looks like, but if you can't manage the process in which the building is put together then you've no control of the final result.
Besides controlling the process of making, designers have to develop experience in managing costs. After all, costs are increasingly vital in determining possibilities.
Although almost all techniques to make forms are related to other industries than construction, the costs of making buildings often depend on local conditions. At the moment, for example, it's almost impossible in the Western world to realise a free-form concrete building like the TWA Terminal by Saarinen in New York (1956-62). Not because we cannot do it technically but because the man-hours involved are too expensive.

NO STAR STATUS FOR ARCHITECTS IN GERMANY

INTERVIEW WITH CHRISTIAN SCHITTICH BY OLV KLIJN

Christian Schittich (CS), editor-in-chief of Detail magazine

I studied architecture at the University of Technology in Munich. After graduating I worked in different offices for a number of years. At some point I started travelling in remote areas of Asia and published a photo travel book. That was my start in publishing. Later I was involved in writing about architecture. I have now been working with Detail magazine for 15 years.
The editorial office of Detail consists of twelve people, two of whom were not educated as architects. Detail is published ten times a year in a German/English edition, and six of these issues are also published in other languages such as Spanish, Japanese and Chinese. Eighty percent of the content and layout of these foreign editions is taken from the German/English edition and the rest is made up of local information. Around the world Detail has a very large, perhaps the largest, readership you could hope for as a professional periodical for architects.

OK: I assume that you as editor-in-chief of *Detail* have a good impression of the state of affairs in architecture, certainly German architecture. How would you describe the current situation?

CS: The situation in Germany does not differ that much from the situation elsewhere in the world. The most important difference is probably that architectural trends in Germany are usually less extreme than elsewhere. That can be explained in different ways. Firstly, German mentality does not accord architects star status. Secondly, very strict building regulations, both technical and aesthetic, apply in Germany. Finally, the liability of architects is much higher in Germany than in many other countries. In other words, when an architect makes a mistake in Germany the consequences are serious, and so it is very tempting to stick to the beaten track. All in all we have only a few real highlights but a very high average quality, above all technically.

OK: Despite these limiting circumstances it strikes me that a number of remarkable buildings have been completed in

Germany recently – the Science Centre in Wolfsburg, the Mercedes Museum in Stuttgart and the Allianz Arena in Munich. Isn't that contradictory?

CS: That does sound contradictory, yes, but what unites all these buildings is that they were designed by foreign architects: Zaha Hadid, Ben van Berkel and Herzog & de Meuron. I suspect that all these 'foreigners' are given more scope to realise such work in Germany. Foreign stars are an exception. These buildings were built with the help of very high budgets as clients such as the automotive industry discovered that star architecture can serve as a marketing tool. What's more, huge budgets were available for the Mercedes Museum, and to a lesser extent for the Wolfsburg building, and certainly the BMW World being built by Coop Himmelblau in Munich.
The Allianz Arena is the most striking of those buildings. It is s a real example of how the inventiveness of designers and the local construction industry can result in a new solution. In this case a façade of air cushions that, in light of its fire-safety vandal-proof nature, is nothing less than sensational for a football stadium. What is typically German about this building, by the way, is that the innovation lays not so much in the form but in the technology applied.

OK: Are there any trend-setting German architects at all today?

CS: The conditions for architecture in general are favourable in Germany right now. And although the impression is sometimes given that there are absolutely no well-known architects – that is not the case. The problem is rather that the work of most German architects is largely structural and technological by nature. The quality of this work is high but it is not striking, not fashionable. As a result, it is in danger of going unnoticed in today's image-fixated culture and an inaccurate picture can emerge. In contrast to other countries I think I'm right in saying that there have been no German star architects for a while. Then again, Germany is very open when it comes to architects from abroad. In few other countries would it be possible for a foreigner – Sir Norman Foster – to design the parliament building. That said, I think the situation is positive rather than negative.

OK: As a maker of an architecture periodical, do you feel forced to choose between following the culture of images and keeping faith in other qualities?

CS: A good mix between both is our aim, and I think we succeed in that at *Detail*. Without reporting every international whim of fashion, we offer sufficient space to follow the most important developments. Our criteria for selecting to publish a project or not depend mostly on whether it is good architecture, not on how fashionable it is.
Proof that our approach is valued is offered by the fact that *Detail* is also issued in other languages, among them English, Spanish and Japanese. This international readership is also a reason why we feel compelled to show the latest trends, but I do not think that's why

architects value our magazine. In the end, most architects value *Detail* because projects are discussed and documented in a profound manner by us and because we are different to other magazines. We always show good photographs, drawings and details of a project. Another reason for the popularity of *Detail* lies in the fact that we show - in addition to international highlights - enough very good examples of every-day architecture as most of our readers do not design museums or football stadiums but work on small residential projects, schools or office buildings. As editors we are therefore always looking for good examples of this category of building so that our readers can identify with the projects covered.

OK: Besides in *Detail* the magazine, I'm also curious about the role of the detail in current architecture. Do you see any particular development in terms of detailing?

CS: Architects are less concerned with the detail than, say, twenty years ago. In education too, certainly in Germany, less emphasis is put on construction and detailing, and designing has become more important.
But I do not believe that this means that the role of the detail is in decline. Only that architects are often more inclined to leave the detailing to others. Personally I do not think this is a good development. I am still convinced that a good detail stems from a good design and that a well-made detail always makes a better building. The simple example of a window-frame explains what I mean. There is a big difference between a frame designed with slender profiles and one with thicker profiles. In construction terms both are fine, however, and only the cost will be decisive. What I mean to say is that it is not primarily about whether a detail meets all technical and structural standards, but about considering the detail as part of the design.
A detail very much determines the character of a building.

OK: Just as attention for the architectural detail would seem to be waning, attention for materials and their application is on the increase. Do you see that at Detail too?

CS: It is certainly so that the importance of the surfaces in the field of architecture has increased and the sensual, aesthetic and haptic qualities of materials play a central role. Another reason: More materials are available than a few decades ago. Never before have so many different materials been available for both the structure and cladding of buildings. But you should also realise that this is a trend that goes beyond architecture. If you look at other design disciplines such as fashion for example, you will also see that new materials are gaining in importance. It's noticeable that in all these disciplines materials are increasingly emphasised.
Coming back to our earlier example of the Allianz Arena, I think this building can be understood as an example of how the application of a new material can result in a new form of architectural expression. In no way does the Allianz Arena remind us of the image of a stadium, which is usually determined by white space frame structures with thin cables attached to big columns.

The museum by UN Studio in Stuttgart is of course another example of the spectacular deployment of materials, in this case concrete. Concrete, however, has been used by architects very often precisely because this plastic material makes so many forms possible. In that sense, the building by UN Studio is no exception. What this building clearly demonstrates are the possibilities that designing with the aid of the computer offers.
In terms of form, I do not think the developments with concrete are all that innovative any more. But in terms of technology, building physics and aesthetics, there are still plenty of possibilities with concrete. We are seeing increasingly lighter concrete, concrete that is stronger, and concrete with countless textures, colours and finishes.

OK: An important idea behind holding a master class devoted to concrete is that testing design ideas with real material can provide architects with new insights. How important do you think is it that students learn to think like this with their hands?

CS: Looking at the situation in German education, I think it is certainly beneficial if students gain more experience with making and more experience with materials. Dealing with one material from design to construction is an important experience. In addition, it is important to deal with input of specialists in such a process.

OK: Would *Detail* write about such a workshop?

CS: In principle, yes, but our focus lies somewhere else. The philosophy of *Detail* is that we discuss completed buildings only. For us the interaction between idea and realisation is very important. Simply said, we want to show what a building looks like as drawn and what it looks like in reality. Naturally we are often asked to depart from this strict policy and to cover competition designs or student work, but we have not done it yet as it is not in line with our concept and there are a lot of other magazines which cover these issues.
A concrete master class like *plastic*-OPACITY might, however, be of interest to our magazine. It is a borderline case that I need to think about a little before giving a definite yes or no. But the decisive factor is whether the physical results of such a workshop are interesting. Otherwise the story remains too abstract.

MASTER CLASS

CONCRETE DESIGN MASTER CLASS ON *plastic*-OPACITY

SIEBE BAKKER, CONSULTANT / COORDINATOR

The Master Class on *plastic*-OPACITY from August 19 till August 27 was the pinnacle of the Concrete Design Competition 2006/07. All national winners of the competition received as part of their awards an invitation to participate in the Master Class. And while in that sense it was the end of the biannual competition cycle it was also a separate investigation of the theme: *plastic*-OPACITY. This theme was adapted by the participants themselves during the competition; their entries were expressions of their individual interpretations of the notions on *plastic*-OPACITY set in motion by curator Hanif Kara. National juries, each within their individual realm of expertise and interpretation, selected the invitees to the Master Class, and from this point onwards the curator's involvement became most visible and prominent.

The Master Class did not seek to continue on the directions implied by the winning competition entries. It was organised as a continuation of a wide-ranging exploration, activating its own medium as a master class. This meant expert support – technical as well as intellectual -, the actual production of objects and foremost an extremely intensive period of teamwork. Teamwork in which the mix of cultures, differences in education – architecture, art, landscape design, engineering -, age and languages were maximised through a sheer explosion of energy and perseverance.

Before the 45 participants from 8 countries started the intense 6-day program at the Bauhaus Foundation in Dessau, they got together for a two-day excursion to Berlin. During this introduction there was ample time to get acquainted in between and during organised tours through the city. Besides amazing architecture and remarkable examples of concrete buildings and objects, a historical notion of Berlin was presented through the expertise of art:berlin guides.

Hanif Kara's intentions for the Master Class were quite straightforward, though challenging and wide-ranging. The scheme, worked out in close collaboration with his colleague Adiam Sertzu, was to produce a wide variety of concrete objects. Through the process of research, design and production, a series of major architectural issues, techniques and top-of-the-line materials would be explored. Working in eight groups, formed to generate an equal spread of expertise, the participants focused on various sized objects, from partial details to a 3 x 3 x 3 meter object. They dealt with producing their results at various scales, from 1:100 to 1:1. And were asked to address a range of architectural interactions relating to the human body, the landscape, interior, structural integration, and so on. Each group was presented with an assignment accompanied by a series of images. The assignments introduced the specific focus for the groups in an open and challenging fashion. Sometimes with just a few words or a set of short sentences to indicate the path of exploration. Each assignment was only really limited by the prescribed sizes of objects to produce, the type of concrete to be used and of course a set of non-negotiable deadlines; or so we thought.

The true spirit of a master class comes to surface through a seemingly hectic and definitely intense and well-supported program. The six-day schedule was jammed with lectures, critics, presentations, ample time for discussions, and featuring an apparently endless line-up of support staff. It involved our hosts from the Bauhaus Foundation and the FH Anhalt, Omar Akbar and Stephan Pinkau. Their staff worked fulltime manning the wood and concrete workshops and offering audio-visual and computer support. We had the pleasure to welcome the more 'hit-and-run' appearances of lectors doubling as critics invited by Hanif Kara: Bjarke Ingels, Ciro Najle, Stephan Engelsmann and Akihisa Hirata. They offered a full and balanced input for the development and realisation of the participant's ideas together with the support from experts from Schwenk Zement KG, PERI GmbH, Adams Kara Taylor and various organizing cement and concrete associations. Not to forget the essential contributions of a score of individual experts appearing as critics and tutors.

It was especially the work involved to realise the ideas and the unrelenting determination of the students that countered both the programmed as well as the unforeseen challenges. Dilemmas originated from enthusiastic ambitions, limited time frames, and 'state of the art' techniques and materials, meeting down to earth applications. It was the atmosphere of improvisation together with conditions of intense collaboration and focus on results that led to an overwhelming outcome. We have the objects, beautiful ones exploring the visual and tactile qualities of concrete. We were introduced to innovative techniques not seen in architectural applications before. Furthermore, investigations have started probing the limits of formwork techniques, concrete mixtures and pouring methods. However, none of the objects could have been achieved without the teamwork, and direct collaboration between designers, engineers and industry; a first time experience for most of the participants. This type of collaboration is seen by many contemporary professionals as the most promising format for innovative design practice. The direct communication between all partners in a design and production process offers a dynamic platform with which constructive criticism as well as early testing can be achieved. The most significant impact was exactly this type of process, the interactive cross-disciplinary development from assignment to results. Starting with refining ideas, managing them

through selection procedures and finally mastering the handicrafts involved in working with concrete. Each group presents their processes, ideas and objectives in a separate part of this publication through their own stories. And it was these processes, for all participants as well as for the staff of the Concrete Design Master Class on *plastic*-OPACITY, which made the encounter unforgettable and rich in emotion and experiences.

The Master Class offered an intense and full platform for investigating the overall theme of the competition cycle. A collaborative platform that would be drastically different from conditions encountered when individually developing a competition entry. In activating its own setting and momentum it triggered a *plastic*-OPACITY of ecology, of spatial experiences and of structural applications; surpassing the expectations of the initiators. The seriousness in which the preliminary hunches were developed into proposals and objects lays claim to a fertile foundation for renewed potential and properties of concrete.

8.21

plastic-OPACITY

8.23

plastic-OPACITY

8.24

plastic-OPACITY

8.25

CONCRETE RECIPES

ROLAND MELLWITZ, SCHWENK ZEMENT KG, BERNBURG & WOLFGANG SCHÄFER, BETONMARKETING OST, BERLIN

There were high requirements for the properties of fresh and hardened concrete at the Dessau workshop. Self-compacting concrete (SCC) of early high strength was to be used with a maximum grain size of 2 mm if possible. The works of art that were produced with this concrete are partly filigree and with a small wall thickness (10 to 20 mm).
The cement "CEM I 52.5 R(fc) – Fastcrete plus" by Schwenk Zement KG - was used for making this SCC. This type of cement is mainly used in precasting plants as a fast cement that allows for shorter stripping times. Its benefit is a significantly higher strength within the first 12 to 16 hours compared to an ordinary "CEM I 52.5 R".

No mineral powder admixtures were used for the SCC recipe.
The content of cementitious material was some 700 kg/m³ CEM I 52.5 R(fc). The water/cement ratio was adjusted to 0.33.
In order to achieve the respective flowing properties, a high-range water reducing PCE superplasticizer (FM 375 – BASF) was used. The amount used was 1.3 % by cement content.
Normal sand for concrete 0/2 mm was used. The total amount of 1380 kg/m³ was measured as dry sand.

The small batches (5 to 10 litres) were made in a bucket mixer, the larger ones in a 75 litre "Zyklos"-mixer (compulsory type mixer). The size of the SCC batch depended on the objects to be casted and the amount of concrete needed.

This mixture is not to be used in practice for more compact structural components because of its extreme development of heat by hydration and high shrinkage.
The actual compressive strength tested on standard briquettes was 60.0 N/mm² after 16 hours; the flexural strength at that point was 6.0 N/mm². At the age of 4 days the compressive strength was 74.0 N/mm² and at 7 days was 82.5 N/mm². The density of hardened concrete was 2200 kg/m³ on average. With a concrete compressive strength of 85 N/mm? at 28 days this SCC can be classified as strength class C 60/75. The flexural strength reached 8.5 N/mm² at the age of 28 days.

For the large concrete sculptures a self compacting concrete (SCC) of early high strength with a maximum grain size of 8 mm was intended to be used as well. The mixture was produced in a ready-mixed concrete plant of "FBA Fertigbeton Anhalt" in Dessau, transported with a truck-mixer to the point of placement (FH Dessau) and cast by means of a pump also used for screed mortar. The mix design was as follows:

Sand	827 kg/m³
Gravel	679 kg/m³
Cement	360 kg/m³ (CEM II/B-M (S-D) 52.5 R – Duracrete basic – Schwenk)
Fly-ash	260 kg/m³
Superplasticizer	9.0 kg/m³ (2,5% ACE 40 from BASF)
Water	174 kg/m³ (w/c-ratio = 0.44)

The Slump flow was measured as 830 mm at the mixing plant. No loss of consistency was determined after 45 minutes although the concrete temperature was 26° C.
The actual concrete compressive strength was 16.5 N/mm² at the age of 24 hours, 41.0 N/mm² at 3 days and 55.5 N/mm² at 7 days. With a concrete compressive strength of 86 N/mm² at 28 days this SCC can be classified as strength class C 60/75.

GROUP 1 – BODY

ARMOUR + MOVEMENT

Investigation of form close to the body

Scale Object: 1:1 / Result: torso related element / Size: max. envelope 0,3 x 0,5 x 0,8 meters

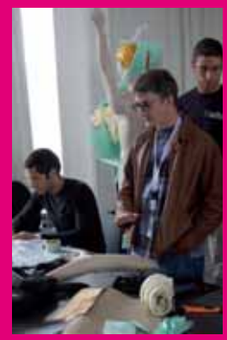
Lotte Mattelaer
Nick Turvey
Paolo Spadafina
Seda Kurt
Stefano Serventi

Our response to the brief: armour + movement, is a lightweight shell of concrete that transforms the wearer into a baroque fountain. The movement involved is that of the water, which travels across the surface of the form as it folds and spirals around the body. Channels and holes allow the water to cross back and forth from one side of the shell to the other, in a play of interpenetrating rhythms.

Structurally, the challenge was to make something light enough to wear comfortably, the target being 20 kg, whilst maintaining rigidity. This meant restricting the thickness of the shell to a maximum of 10 mm, which was achieved by two different means. The shape of the shell is continuously curved in two directions, and its surface is corrugated with a diamond pattern, both of which also serve to channel and modify the water flow.

The construction method chosen was concrete soaked fabric applied to a reinforcing skeleton of wire mesh. A stamping tool was designed and made to produce the corrugations in panels of wire mesh. These were then tailored and curved by hand to produce the form, which had been developed using life-size cardboard models.

Experiments were made with several concrete mixtures, including some containing a small percentage of gypsum, in a search for a consistency and setting time that would facilitate the working method. In the end, the mixture used was 100% cement, with the addition of plasticizer. After coating one side of the form and setting overnight, the shell was rigid enough to handle. The other side was coated the following day, and a layer of thin concrete was applied as paint, in order to ensure full waterproofing.















GROUP 2 – FURNITURE

STACKABLE + DOUBLE SIDED

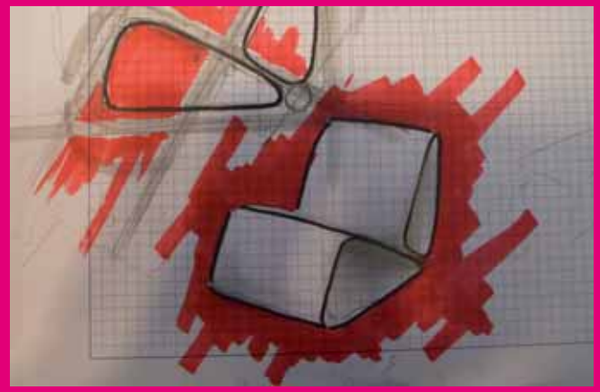
Related to body scale, taking into consideration ergonomics and function

Scale object: 1:1 / Result: 1 furniture piece / Size: max. envelope: 500 liters

Kyeong Keun Han
Marieke Rongen
Pinar Gökbayrak
Timothy Lee
Wei Sun

Five people from five countries in five days… designed and produced the furniture ‘FIVE’.

Given the requirements for the object as incorporating flip-ability, reversibility, multi-functionality, and to be double-sided and stackable, the group came up with the idea of designing a product made up of two units which can be arranged in different ways for different uses. Such as a chair, a sofa, a coffee table, a bench to lie down and for infinite ways of different arrangements. Since the units are hollow, they can be stored easily by putting one inside the other. And with its curved edges, it can be rolled over easily to change its position. Through its form and design details, the weight of the concrete is used as an advantage in the furniture ‘FIVE’ for both indoors and outdoors use.

















GROUP 3 - POD

DEMATERIALISATION

From ergonomics to inhabitation and enclosure where structure and material coincide

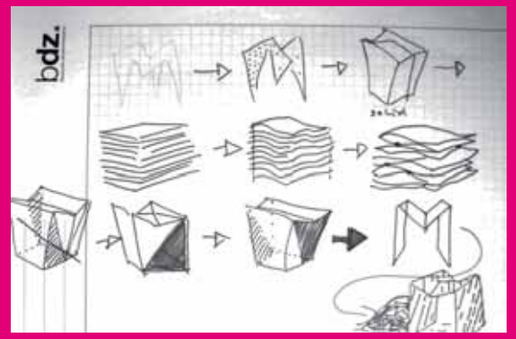
Scale object: 1:1 / Result: 1 POD / Size: max. envelope: 3,0 x 3,0 x 3,0 meters

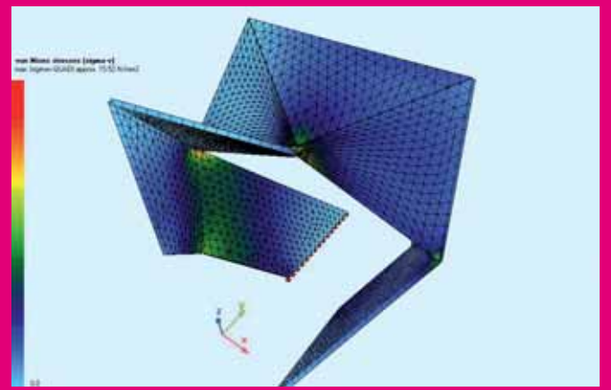
Albin Ahlquist
Annalisa Torta
Ian Shek
Matthieu Götz
Vincent Young

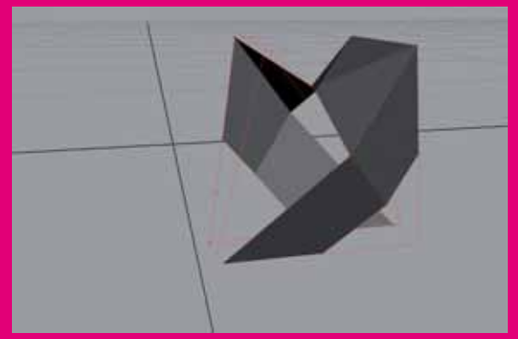
The Pod-Group had to start from an object, from which the form and size (the envelope) was already designed: a closed, facetted object, 3 by 3 by 3 meters, with a wall thickness of 50mm. The actual assignment was to dematerialise this 'whole' object and push the structural and architectural boundaries to their limits.

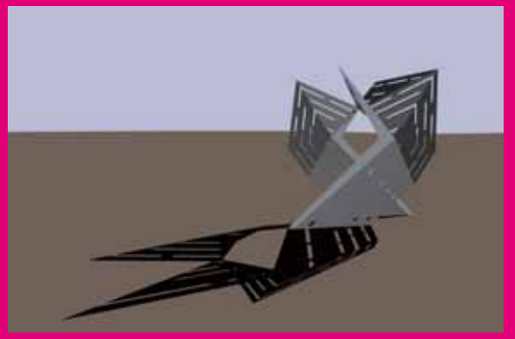
It is always a challenge to add a design on an already existing basis. So the group decided to make as much changes as possible. The planar, closed and heavy object should become light, fragile, immaterial and dynamic. It should not only be positioned at a specific location and be an object. It rather should involve a viewer, a passer-by. It should include the public in a performing action related to the movement of the spectator.
The way in which the group chose to achieve this was to slice up the plates in layers. In a first attempt this was done in a horizontal fashion. Later, due to manufacturing conditions a switch was made to vertical openings.

Structural analysis of the proposals showed were these perforations could be placed. The group however, soon realized that it could achieve much more than just removing material according to a stress-diagram. Since the goal was to bring a new meaning to the object the design could not just follow the stress lines resulting in a pure structural design by taking material away. It had to offer something new. Thus the structure itself was pushed to the limits of stability, creating a performance rather than an object.









GROUP 4 - FACADE

STRUCTURE + LIGHT

Close up of façade as structural serial elements

Scale object: 1:1 / Result: serial piece / Size: max. envelope:
0,5 x 0,5 x 0,5 meters

A Hakan Demirel
Sami Metin Uludoğan

B Daniele Ghiglione
Francesca Maffei
Gerard O'Mahony

C Lars Höglund

A seemingly unlimited amount of possibilities to tackle the assignment led to a trifurcation of this group into distinctly different investigations.

A first line of investigation focused on creating transparency by means of shifting the façade of a building. Separating the façade from the main building volume leads to an in-between space creating the experience of transparency when moving through the complex. Besides making literal openings in the material, a shifted or doubled façade offers a means for transparency deploying the whole complex of a building, while respecting the opaque property of concrete itself.

The second thread of this group explored the inherent qualities of double façades. Whilst traditional double façades seem to create great barriers between interior and exterior this exploration aimed for a system that incorporates both an architectural and spatial dialogue between the exterior and interior, and generates various levels of transparency. The results also allow for the concrete elements to simultaneously offer functional, structural and architectural properties.

The last series of investigations combined a quest for a porous concrete element with elaborate testing of apparently unlikely formwork materials like ice. The main idea behind the introduction of ice as a moulding material for casting is it's opposing physical paths: solid to liquid versus liquid to solid as in concrete.









GROUP 5 - MEDIUM

LIGHT

Cladding secondary to structure. Performative cladding related to conditions, patterns and serial elements

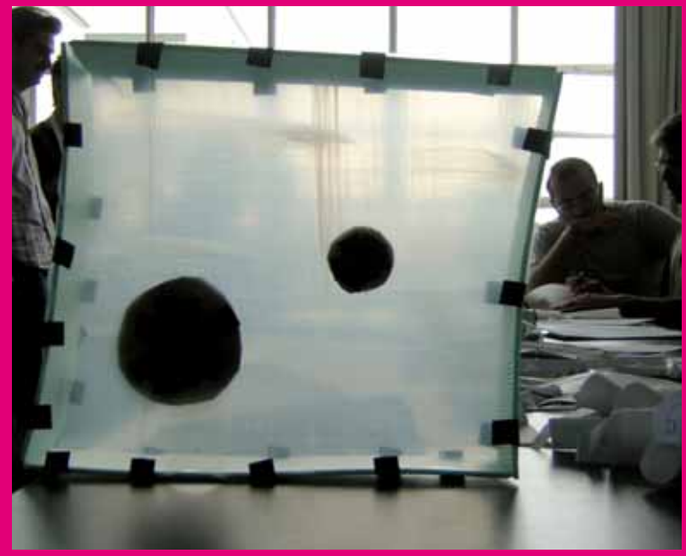
Scale object: 1:5 / Result: serial elements / Size: max. envelope: 0,4 x 0,4 x 0,2 meters

Alaistair Steele
Eelco Grootjes
Louise Souter
Paolo Diglio
Valentin Pierron

Whilst the plasticity of concrete is a fantastic property, it is also one that is very hard to control. We investigated the plasticity by applying flexible moulds for a series of objects. These moulds were based on wooden frameworks, which were mounted on both sides with a flexible foil. In order to create openings in the objects allowing light to penetrate, we pressed the foil together in specific locations. At various pressure points we added pieces of Plexiglas to close the intended holes, and thereby creating waterproof elements.

The first element made, had a very smooth surface, and looked very fluid. In further investigations we applied different ways of adapting the surface structure of the elements. Also various clamps, and ropes were used in combination with the foil to contain the intended forms. In applying different foils with a diversity of structure and elasticity, we further deepened this investigation.

In order to meet the requirements of our assignment - lightweight non-bearing façade elements - a different casting process was tried. Instead of casting vertical, resulting in heavy elements bulging out on both sides, casting horizontally would lead to the possibility of achieving both concave and convex forms with a continuous wall thickness.

















GROUP 6 - LARGE

REINTERPRETATION

Spatial structure. Focus on qualitative and quantitative aspects of complex large scale interventions. Redesign of Sendai Mediatheque, Toyo Ito.

Scale object: 1:20 / Result: model detail / Size: max. envelope:
0,5 x 0,5 x 0,5 meters

Aldo Sollazzo
Arnaud Kinnaer
Emre Demirci
Gergana Stavrera
Onur Tanik
Yongcchun Kim

Our assignment was to redesign Toyo Ito's Sendai Mediatheque in concrete, whilst maintaining it's unique spatial qualities. This led us beyond a pure technical, structural investigation, into analyzing the buildings spatial and programmatic properties. At first sight the Mediatheque's transparent performance, achieved by a linear networked open steel structure, seems contradictory to the opacity of concrete. Faced with this paradox, our investigation focused on the Mediatheque's transparent qualities in relation to its structural system. In Ito's building, structure becomes space whilst maintaining in a very traditional way a system of columns and floors. This apparent separation offers flexibility through neutral floor space, as well as through a partly redundant circulation system. Thus this orthogonal system is dissolved by its transparency.
Our goal was to break with the orthogonal system by introducing the diagonal. Firstly by allowing the utilitarian tubes (networked steel columns) to come in contact with each other, creating a continuous, even more redundant circulation system. Secondly by combining column and floor into a single structural and spatial element. This transformation appeared in two steps, a structural and programmatic one. Of importance was to create a system that supported the spatial and architectural qualities Ito intended. Light and visual connections are among the main issues. Simultaneously the floor / column elements are neighboring neutral areas, thus creating various situations and possibilities for usage, following Ito's original.
The result of our investigation is a complex architecture of continuity and variations held together by a systematic approach. The separation of structure and space is dissolved and even further the orthogonal system is eliminated in favor of variability, multiple potential possibilities and conditions separated from pure neutrality.






















GROUP 7 – LANDSCAPE

CONTOURS + WATER

From volumetric spaces outwards to landscapes and infrastructures. Micro to macro, Local to global. Integration of land conditions

Scale object: 1:5 / Result: interconnected elements / Size: max. envelope: 0,3x 0,3 x 0,6 meters

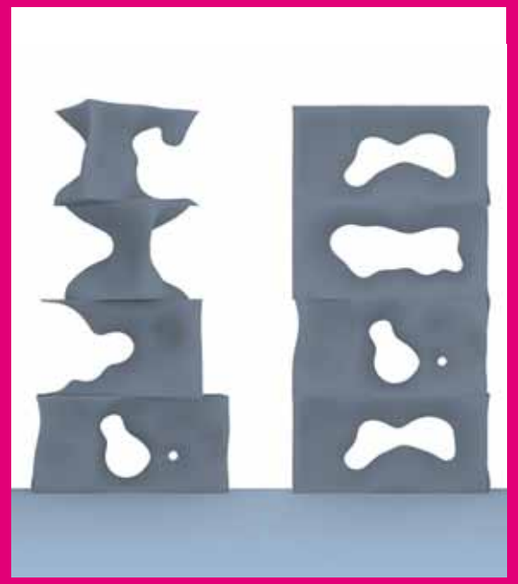
David Berkvens
Hala O'Reilly
Martin Palmlund
William Flint

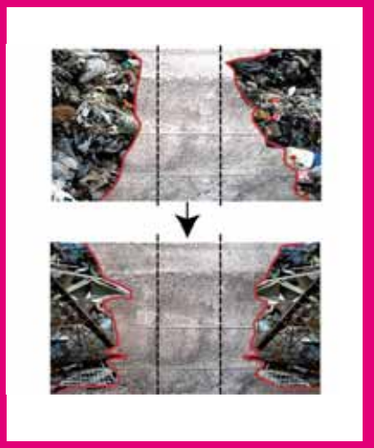
We were briefed to design and construct a retaining wall that worked within the conceptual theme of plastic-OPACITY. We interpreted this idea of retention as an enabling spatial framework or mechanism that allows unusable and inhospitable wasteland sites, such as scrapheaps or landfill zones usable to be converted into enjoyable and well-designed interior and exterior public space. Our ambition was to investigate the architectural, plastic and opaque potentiality of waste.

Main principle: A problematic garbage site is targeted. The garbage is partially cleared using a combination of waste fabrics (old towels, shopping bags, curtains etc) and a re-usable timber framework. This creates voids in the dumpsite, which are used as containers for the concrete pour.
To create the interior formwork a further volume of waste is placed in the centre of each void. Concrete is poured in between the outside and inside waste volumes. This forms a 4-sided garbage retaining shell.

Result: A shell with an exterior surface of imprints deriving from the garbage, inside a space for storing the garbage is created.
The elements are stackable and should be allowed to grow in height to create garbage-informed architectural space. This would clear entire dumpsites allowing accessibility for other purposes and use.
The towers raise awareness of the problem of growing unusable wasteland sites and communicate garbage's archeological quality. They also question the usability and potential of disregarded waste material.
Within the prototypes produced, different materials were used for the wrapping and as garbage bin order to create samples of different possible surfaces.


GMT





GROUP 8 – LANDSCAPE

CONTOURS + WATER

From volumetric spaces outwards to landscapes and infrastructures. Micro to macro, Local to global. Integration of land conditions

Scale object: 1:5 / Result: interconnected elements / Size: max. envelope: 0,3x 0,3 x 0,6 meters

Bruno de Veth
Burçin Yildrim
David Ralph
Mark Philipp Gabriel
Paul Jeffries
Sara Eriksson

Retaining Wall: a wall built to keep ground or water from moving.

Our goal was to create elements containing multiple retaining functions. Besides holding back water and/or earth, the properties of our design would have to incorporate abilities to continue the landscape and introduce new functional spaces. We even wanted to tackle a seemingly contradictory condition by allowing our design to move with water currents and weather conditions.

Depending on the scale of our elements, the new functional spaces could consist out of park areas, swimming pools, and sports facilities. When linked together the elements would form bridges, piers or even inhabitable infrastructures.

We aimed for a module that when applied in a series would form the landscape. Using the simplest shape that tessellates: the triangle. It will offer a choice of routes when the module is reciprocated. The modules are connected with a pinned joint allowing the landscape to move with the force impacting them. The connections allow the structure to be rigid when forming a ring, and let the structure move in the water when connected in a line. The rigid structure creates quiet pools of water, while the long arms that shift make one aware of the changing currents. The modules have the ability to create a plastic waterscapes. These waterscapes consist of elements that contrast and accentuate the opacity of the water, by bringing people in close contact with it.




















COLOPHON

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Hanif Kara — Adams Kara Taylor

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Turkey — TCMA — Çaglan Becan
United Kingdom — The Concrete Centre — Allan Haines

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Marina Scherps, FEBELCEM, Brussels
PERI GmbH, Weissenhorn
Rosemary Tobutt, The Concrete Centre, Blackwater
Schwenk Zement KG, Bernburg
Stylos, Technical University Delft

Competition

National juries

Belgium
Alain Berteau
Bart Biermans
Dirk Jaspaert
Pier Vittorio Aureli
Vincent Brunetta

Germany
Almut Ernst
Christian Schittich
Juan Herreros
Klaus Bollinger
Till Schneider

Ireland
Michele Fagan
Sean Harrington
Trevor Leaker

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Angelo Torricelli
Camillo Nuti
Carmen Andriani
Francesco Cellini
Gabriele Del Mese
Marino Folin

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Jan Peter Wingender
Stephen Bates

Sweden
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Arne Hellström
Lennart Elfgren
Mats Öberg
Pentti Kareoja

Turkey
Kerem Erginoğlu
Murat Tabanlioğlu
Sevki Pekin
Yüksel Demir

National Awards

Belgium
Arnaud Kinnaer
Bruno de Veth
David Berkvens
Lotte Mattelaer
Valentin Pierron

Germany
Carlotta Werner
Emre Cetinel
Gergana Stravrera
Matthieu Götz
Mark Phillipp Gabriel
Philipp Böhm
Wei Sun

Ireland
Gerard O'Mahony
Hala O'Reilly
Ian Shek
Louise Souter
Paul Jeffries
Timothy Lee

Italy
Aldo Sollazzo
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Daniele Ghiglione
Paolo Diglio
Paolo Spadafina
Stefano Serventi

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Eelco Grootjes
Marieke Rongen

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Albin Ahlquist
Lars Höglund
Martin Palmlund
Sara Eriksson

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Seda Kurt
Selahattin Tüysüz
Şeyma Suyabatmaz
Reşat Yilmaz
Zeynep Ademoğlu

United Kingdom
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Anna Schepper
David Ralph
Francesca Maffei
Kyeong Keun Han
Nick Turvey
Vincent Young
William Flint
William Hailiang Chen
Yongcchun Kim

Master Class

Master
Hanif Kara, Adams Kara Taylor

Tutors
Adiam Sertzu, Adams Kara Taylor
Christian Tygoer, Adams Kara Taylor
Henk Ovink, Buro Ovink
Siebe Bakker, bureaubakker

Lecturers / critics
Akihisa Hirata, Akihisa Hirata Architect
Bjarke Ingels, BIG
Ciro Najle
Elisabeth Plessen, Deutsche Bauzeitung
Guy Châtel, SSA/XX
Stephan Engelsmann, Werner Sobek Ingenieure
Werner Möller, Bauhaus Dessau Foundation

Hosts
Omar Akbar, Bauhaus Dessau Foundation
Stephan Pinkau, FH Anhalt

Support
Annekatrin Arndt, Schwenk Zement – concrete expert
Beppe Gallo, Jackal Pictures – video
Botho von Senger und Etterlin, art:berlin – tour guide
Eliana Stazi, A.I.T.E.C.
Gisela Trögele, art:berlin – tour guide
Guido Lau, FH Anhalt - wood workshop
Heinz-Peter Lüdike, FH Anhalt - concrete workshop
Ilona Riske, Bauhaus Dessau Foundation – organisation Bauhaus
Jörg Dietrich, PERI GmbH Berlin – formwork expert
Mario Lietzmann, Schwenk Zement – concrete expert
Michael Drewniok, FH Anhalt - concrete workshop
Michael Fink, Bauhaus Dessau Foundation – computer support
Nicole van der Velden, bureaubakker – video
Norbert Esch – PERI GmbH Berlin – formwork master
Peter Lieblang, BDZ Berlin – concrete consultant
Ric Sai, video
Robert Demel, art:berlin – tour guide
Roland Mellwitz, Schwenk Zement – concrete expert
Sebastian Czerny, Bauhaus Dessau Foundation – av support
Torsten Pauer, Bauhaus Dessau Foundation – av support
Uhle Lehman, FH Anhalt – computer workshop
Wolfgang Schäfer, Beton Marketing Ost – concrete expert
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plastic-OPACITY

'Concrete is actually a very old material. The Romans even used it. But it's still contemporary. Recent developments concerning the strength, weight and durability are prompting innovative applications of this material. One property of concrete that has hardly been studied is its transparency. Transparency not in the literal sense of a property possessed by glass for example, but transparency in the spatial sense: opacity.

Apart from the historical reason to reconsider concrete opacity, there are more contemporary issues such as insulation and sustainability to be introduced, parameters that are reopening the chapter in 'opacity' with contemporary architecture. In most cases this is achieved by working with various types of glass and metal, but I think it should also be possible by using concrete.
Combining such a notion of opacity with the inherent plastic character of concrete could lead to an interesting play in which spatial definitions such as dimensions, depth and orientation could be linked to material properties such as weight, colour and texture.'

Hanif Kara, curator

'The experiences of the past two competition cycles have been cause to maintain and strengthen the nature of the competition. It will remain an international event staged through national jury selection and with national winners. The theme of the competition, which changes every time, is abstract and refers to a material property of concrete. After the first event, entitled ROBUSTNESS, came *plastic*-OPACITY.

Curator and head of the master class was Hanif Kara, structural engineer on Zaha Hadid's Phaeno Science Centre in Wolfsburg. He called for innovative applications and solutions in a seven different assignments. Among the presented projects were swimming isles, mannequins as fountains, and garbage columns that addressed environmental issues.'

Jörg M. Fehlhaber, International Coordinator

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