



# CONGRUENCE

## **Congruence**

'kɒŋgrʊəns / noun: congruence

“Agreement or harmony; compatibility.”

## **Concrete**

'kɒŋkri:t / adjective: Concrete

“A building material made from a mixture of broken stone or gravel, sand, cement, and water, which can be spread or poured into moulds and forms a stone-like mass on hardening.”



# **BITS** to **ATOMS**

research and creation Lab for  
architecture & design

## **Manifesto,**

As architects from Beirut, Lebanon, we work on public spaces in developing countries. These spaces are often disregarded, as left overs, when they are not just designed as technical roads with only the cars requirements in mind. This unfortunate situation can be reversed and we are working to provide tools for the civil society to take over and regain calm and kindness to the city. We are working in the direction whereby we would address designing for public space as we would design for interiors, creating for urban voids sculptural and appealing pieces.

Concurrence chair is an outdoor seat which can withstand any weather, it is made from concrete, the only local material that is entirely produced in Lebanon, which has no forests nor mines, but quarries for limestone which is heated using recycled oils into concrete by the local industry.

Extensive research and experimentation were invested into the shape, the material and the finishing of this piece, but most particularly its ergonomics to insure comfort while using only concrete.

The end life of the chair, despite being generation s ahead, is panned: it produces an inert waste, which can be safely used in landfill, concrete aggregate and other because the chair has no metal reinforcement.





## THE PROCESS

Various scale models were made, using 3D printing then our CNC 7 axis robot arm to create prototypes, to check iteration on the geometry and ergonomics, as nothing else but good design would provide comfort on a seat which is only made of concrete.

**Strength** is obtained by geometry; a **spine** and **stiffeners**, smoothly integrated in the sculptural shape, are providing the needed beam height at the structurally logical points.

The master for the mould ( seen on the right ) is worked by hand for a long period using car body paste and all car bodybuilders techniques. Once completed the master was then used to make the latex mold for production.

The top surfaces being at the bottom during the cast: they are the less porous, which will give a long lifespan to it, even in freezing regions. Once the chair is complete, coats of sealant and wax finishing are applied to protect the material and the color.

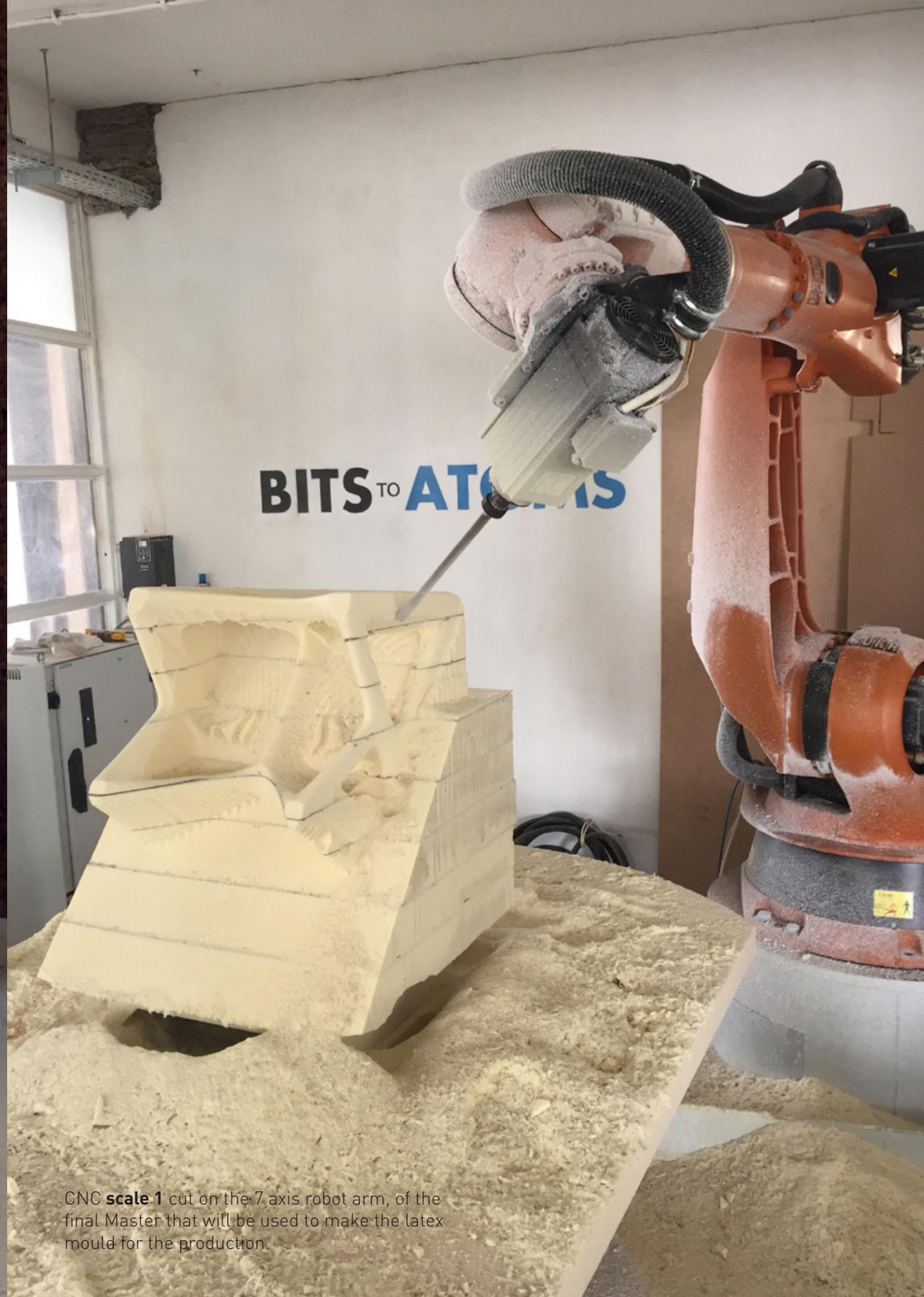
The estimated weight for the chair is about 26kg. It is envisaged as an outdoor chair, but it can also find its place indoor where its sculptural quality can shine.



Final master prototype



CNC **scale 1** cut on the 7 axis robot arm, to check size, proportion and sculptural and ergonomic qualities.



CNC **scale 1** cut on the 7 axis robot arm, of the final Master that will be used to make the latex mould for the production.



## CHARACTERISTICS

The chair is sculptural, low height, generously large, with voluptuous yet structurally logical shapes which have been obtained through generative design.

The chair is entirely made of fibre enhanced concrete; the latter is one of the rare raw materials entirely made in Lebanon.

To protect the flooring underneath, four metal inserts are laid in the mould before the cast; the chair would be sold with two sets of four tips for the feet: one adhesive rubber (for indoor and fragile ground) and one stainless steel sharp pin (for outdoor and soft grounds).

Latex pads ensure a very tight contact with the ground; the latter works to close the triangle and all elements are in compression.

A hole in the water collecting point allows the evacuation of rain water for the chair to support all year long outdoor exposure.



## FINISHES

### For Concrete lovers

A rough concrete finish which can be slightly retouched or kept as is, depending on the user's preferences.

Once the required look is achieved, several coats of sealant and finishing wax are applied to protect the color and the material.



### Concrete variations

Concrete color variations are also available in black and white.

The user will have the concrete's texture, porosity and finish but in different colors which he can mix and match to fit the space's character.



### Homogenous finish

For those who prefer lighter and more homogenous finishes, the chair can also be painted with Acrylic paint appropriate for exterior use.

This variation is a more playful option, as it allows to paint the chair in any desired color.



We have made various researches with **fibre enhanced concretes**.

The **colour, the strength, the porosity** have been worked out in order to give better results on several project we conducted, including a very extensive production of tiles.

Concrete is one of the rare raw material entirely made in Lebanon.

It produces an **inert** waste at end of life, that can be used safely in landfill. But because we use fibres instead of glass, it can also be **recycled** as aggregate in other concretes.



