Building the Tower of Babylon

a Studentcompetition of the ‘Global Alliance of Technological Universities’ as an Elective Course at the Assistant Chair of Building Structure at the Department of Architecture, ETH Zurich
First discussions took place in the library of Prof. Oechslin in Einsiedeln.
Philosophy

Symbols and narratives last, they ensure continuity and progress in cultural history by conveying knowledge. “Reaching the Heavens”, like climbing stairs, we do not necessarily must only go UP, but we also have to understand and construct the FAILURE, in order to progress from that through COLECTIVE ACTION and CONVERSION. This belongs to one single idea of INFINITY and PERFECTION, which is achieved through questioning accepted norms and paths, through a form of CIRCLE and CYCLING. It is a form of moving and positioning in creation of constant and sustainable, with observing it as mathematical and thinking principle, with uniting knowledge and ourselves as a crucial factor today, leads us to overall concept of TOGETHERNESS.

Design

When thinking about the design of the tower we were looking for a shape that could grow as much as we want. There had to be a link between what we were actually building, and the utopist tower that could be constructed with the amount of paper that is wasted each year on the campus. The message had to be strong and straightforward, for people to understand the huge amount of wasted material. Therefore the built structure is only a measure of scale for the enormous amount of paper that is used in the campus and the city.

Material and Production

Our initial decision in the project was to manufacture our own original and sustainable building material. Therefore we used bricks made of paper wastes which we cut up, mixed with water, shaped into a brick and dried in the sun. No other additives were added to the bricks, so the material was fully recycled and eco-friendly what was our main purpose. To compress paper bricks with sufficient force we build a single-arm lever. Then we made compression test to know what the strength of the brick is and what in fact can be build within this material. The results we obtain were very satisfying – the model brick was stiff and withstand a force of 4000 N.

We managed to gather 720kG in one week during the construction, which was around 144 000 sheets of paper. That represented just a half of one day of ETH waste amount in average with years waste. From that, we built a structure over 2.3m, before we run out of material. Our intention was not only to give a final structure and design, but also with that to spread knowledge, and awareness of possibilities with paper first for the whole ETH and then also for the city of Zurich. From the statistics we have shown structures in scale, one for the ETH, that is 80m high and 180m long that stands on the campus and it represents one year waste amount, and the other one, for Zurich, 500m high and 1100 m long.

Our Tower of Babylon
first prototype of a paper brick
SCHREDDING OF RE-USED PAPER

USING PAPER WASTE OF ETHZ AS BASIC MATERIAL

CONSISTENCY OF MIXTURE WITH TIME

ADDDING WATER

FILLING OF MOULDs

PRESSING OF BRICKS

DRYING AND STORAGE OF BRICKS

STACKING OF THE BRICKS

INFINITE END OF THE TOWER OF BABLE

61 MILLION PAPER SHEETS ARE PRODUCED AT THE ETH PER YEAR

paper brick production
how we pressed the paper bricks
construction of the first layer of our tower at the building site
BUILT STRUCTURE, ETHZ

450 paper bricks
≈ 1/2 of daily
waste paper ETHZ
UTOPIA

≈ 331,000 paper bricks

530t waste paper per year

height 80m
unrolled length 180m
ZURICH CITY

21'300t waste paper per year

UTOPIA

≈ 13'300'000 paper bricks

height 500m
unrolled length 1140m
load test with one of our first prototypes - it could take about 4 kN
CREDITS

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