

Abstract
Structure - Materials – Production:
A five-week course for first year
students

For the last six years the Aarhus School of Architecture has introduced the first year students (there are about two hundred students admitted each year) to structure, materials, design and production through a five week course in collaboration with a group of local companies.

The school spends about US\$ 33,000 on the collaboration with these companies. The purpose of the project is to break barriers between the school and the field of production, and to give the students an understanding of the connection between design, structure, production and finances.

In 2001 the Aarhus School of Architecture admitted about two hundred students who were divided into four classes. Each class had a five-week course in structure, materials and production.

The Aim

The aim of the course is to give the students a basic structural understanding, and to introduce them to the professional treatment of materials and details in close collaboration with local companies, in order to give the students an understanding of the connection between architectural form, materials, structure and production.

The Course

After six days concentrating on basic structural understanding where the students are designing and building structural models, the class is divided into ten groups each with four or five students. Each group is given one material, one company and a budget of US\$ 660, and from this each group has to design and build a structure that could hold an object in a certain position over the ground (this year it was a concrete-cylinder, previously it has been a "water-container" that holds fifteen litres of water or a steel cylinder, - basically anything with a weight will do).

The structure has to be designed with respect for the inherent qualities of the material, and the conditions for production in the company. Furthermore, there has to be an interplay between form, forces, and the characteristics of materials in an efficient and stable structure.

Together with this process, each group has to examine the physical and the aesthetic qualities of the given material and hand in a report of ten to fifteen pages about the material, as well as the registered process of production in the company. Finally the ten structures are lined up and presented at a crit.

Structure

When the students come across statics for the first time, theories and methods of calculation easily become a barrier to the understanding of structure. Between the student and the structure there is an obstacle demanding all attention from the student. Instead of investigating the structure, testing it and trying to understand it, the students tend to fall back to their earlier high-school manner of practising mathematics and focusing on making acceptable calculations, etc. In order to avoid this trap the students are not expected to make calculations, but rather test models designed and built by themselves, and through discussions of the patterns of fracture achieving a physical structural understanding.

Lessons in statics, strength and elasticity are mainly conducted as demonstrations on physical models supported by a textbook to be read by the students themselves.

During their design process the students are assisted by experienced engineers from local firms of consulting engineers.

Educational Principles



Structures

Materials

In building practice, there is a vast number of different materials, and it is impossible for the students to know them all. During a few weeks' course, even the most willing attempt cannot give more than a superficial knowledge and little help for the design process. Therefore, the students have to concentrate on the materials they have been given and focus on the characteristics and data of relevance to the design. It is of course just the beginning of a lifelong study of materials, but if the students themselves are able to explore the two materials and sort out the physical and aesthetic qualities relevant to the design, we hope that they will afterwards be able to explore any material.

The study of the physical qualities is mainly based on literature supported by information from the companies and their craftsmen. The study of the aesthetic qualities is on the other hand related to buildings where the materials have been used.

Production

The students do not need to learn the different crafts - on the contrary. The students have to learn to collaborate with craftsmen, to get an insight into modern methods of production, and experience how conditions for production and collaboration with good craftsmen can be a good inspiration for the design, and can enrich the quality of the final product.

Furthermore, the students experience what it is like to create design within a fixed financial frame (max. US\$ 660) and in this way get a feeling of a heavy parameter for everyday practice.

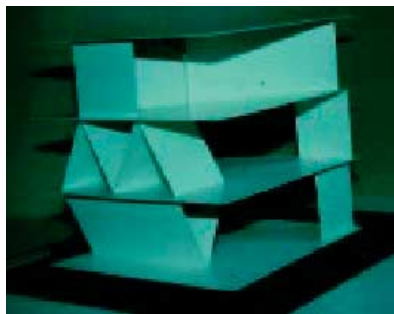
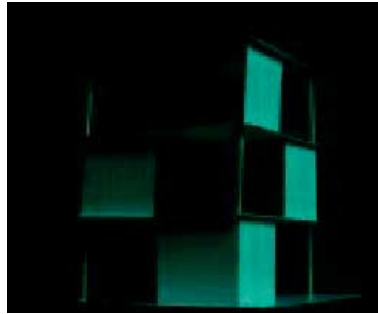
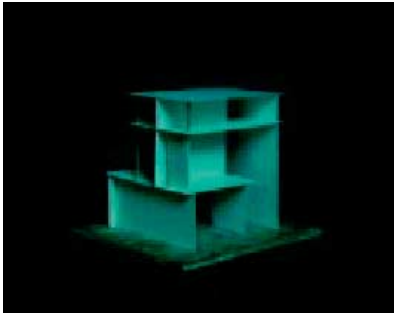
Collaboration with companies

As desires change the School is free to take in new materials and new companies, and in this way provide the education with a special kind of dynamic and realism.

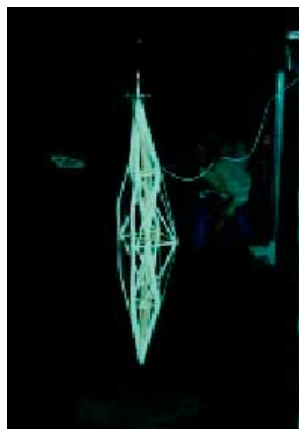
Evaluation

After the students have made tests of models of structure, most of them understand the basics of simple structures. Furthermore, in spite of the fact that the students are only in their first year of study, they generally demonstrate considerable maturity, independence and ability to collaborate with the companies, to explore the materials and in a short time reach fine results within a defined financial frame.

When we started the first course in 1995 with all that money and collaboration with companies, we were nervous how first-year students would handle it - but all scepticism has been superfluous!



*Investigation shear-wall
systems columns and beams*



*Courses in statics strength
and elasticity*