

New Realities and Emerging New Tasks in Building Construction Teaching

The New Realities within the Environment of Construction Teaching

Teaching construction is subject to constant change. The main reasons are

- Changing practices in building construction with a shift towards the implementation of manufactured products
- The rapid developments in Informatics, providing new means of planning, design and communication
- The European environment we all live and work in and the common European perspectives we all share
- Global factors, mainly the globalization of production, economy and labour.

Developments in Building Construction Technology

The percentage of industrial products within the building process is steadily increasing, supplanting manual construction. This fact is evident even in the less industrialized regions of Europe. Prefabrication, meanwhile, comprises not only elements and components, but also entire structural systems (Pictures 1-4: Structures, 5-8: components).

The transition from labour to product oriented construction effects dramatic changes in building practice. The main arguments for this product dominated building construction are:

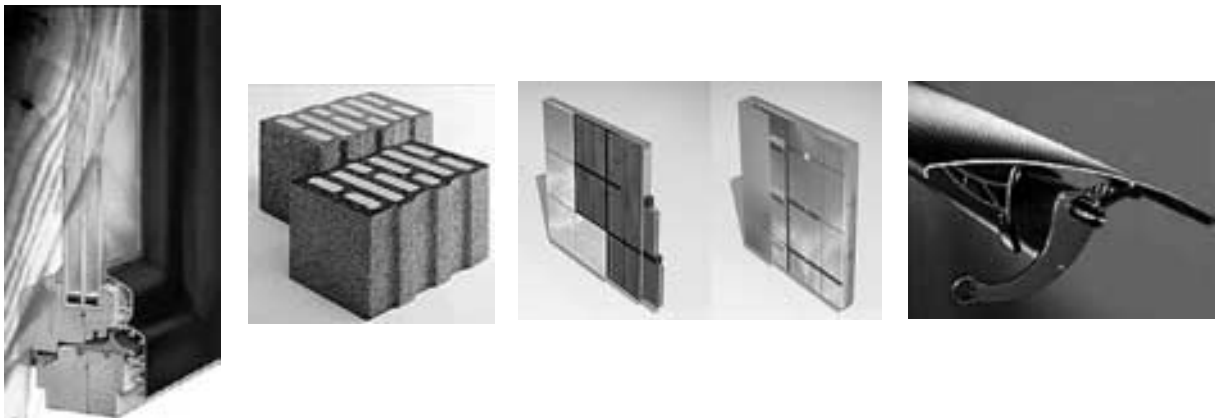
1. The planner is able to acquire sufficient information about the product, so as to conclude on its adequacy, its applicability and its performance.
2. The quality and efficiency of a product can easily be tested and certified on the production site.
3. The efficiency of the product is known beforehand.
4. Constructive perfection guarantees more accuracy in the mounting process

Thus, the design of components and buildings becomes a process following two distinct directions:

- a. Industry affects building design and building practices: This is, to a lesser or greater extent the main tendency in building practices today.
- b. Construction design shapes a (new) product. This is the less trodden path, yet the most desirable target to aspire to in architectural education.



Pictures 1 – 4: Examples of ready-made structures provided by private firms



Pictures 5 – 8: Various high-performance building components

New Media and Aids for the Architect's Education

New aids are offered to designers, planners, teachers and students by computer technology. Media provided by computer technology and the development of networks are radically transforming planning processes. The advantages of these aids are obvious:

1. Co-operation between engineers via local or global networks.
2. Availability of architectural construction and mounting details, based on specific products.
3. The feasibility of many successive adjustments at a low time or material expenditure, due to Computer Aided Design.
4. New presentation methods allow for easier understanding and accurate briefing among designers, contractors and clients.
5. Several types of software assist optimization of the building process

A Common European Perspective

A common European perspective imposes upon new architects a common level of skills, to meet the needs of a common European market. The E.U.'s policies emanate from economic - political considerations, as well as from various factors inherent to the profession of the architect.

The economic - political considerations deal with the optimization of the cost to need relationship, the use of human capital, public health and also questions of energy consumption. This latter parameter is seen at the moment within a geo- political context, i.e. dependence on fuel imports implies economic as well as political dependence. To this end, the European Union issues a series of guidelines with regard to quality control, product performance, mounting, controlling various environmental parameters. In certain middle-European countries, governments subsidise energy-efficient building design (passive houses).

A Global Perspective

This emerges from the globalization of economy, competition and the opening of markets.

In this context, moral issues are brought to the foreground, dealing with the commitment of the architects as an independent and conscientious profession to future generations, inspired by and in accordance with the U.I.A. Declaration of 1993 and the Kyoto Protocol of 1997.

The Emerging Tasks for Construction Teachers in Architectural Education

With regard to points

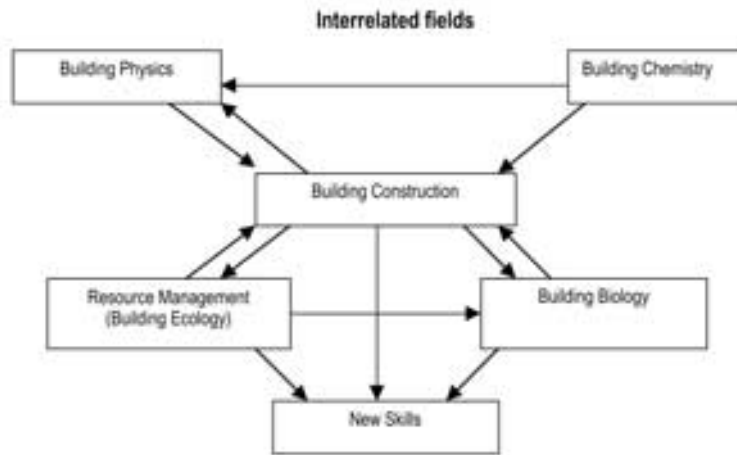
Construction Using Products

- Increasing product -oriented construction imposes a new role on the architect, namely that of a composer and a manager of processes.
- A new architect has to be informed not only about the existence of a product, but mainly about its applicability and features.
- An architect ought to know what to expect of the building in its entirety.
- In addition, the architect is in charge for the proper mounting and the appropriate combination of building compounds. Industry does not always accept responsibility on the building's total performance.

Universities should control information coming from industry and not the other way around. It is the task of the instructor/ teacher to raise the students' awareness on the fact that each building constitutes a specific case and hence there is no such thing as a global applicability of all products in any building.

The above premise leads us to introduce new contents in architectural education. As knowledge in statics and building physics has already established itself as a sine qua non in the architect's education, one should gradually allow other relevant fields of knowledge to enter our curricula, such as building biology and resource management.

The graph following below depicts the interrelation of the various relevant bodies of knowledge with architectural construction:



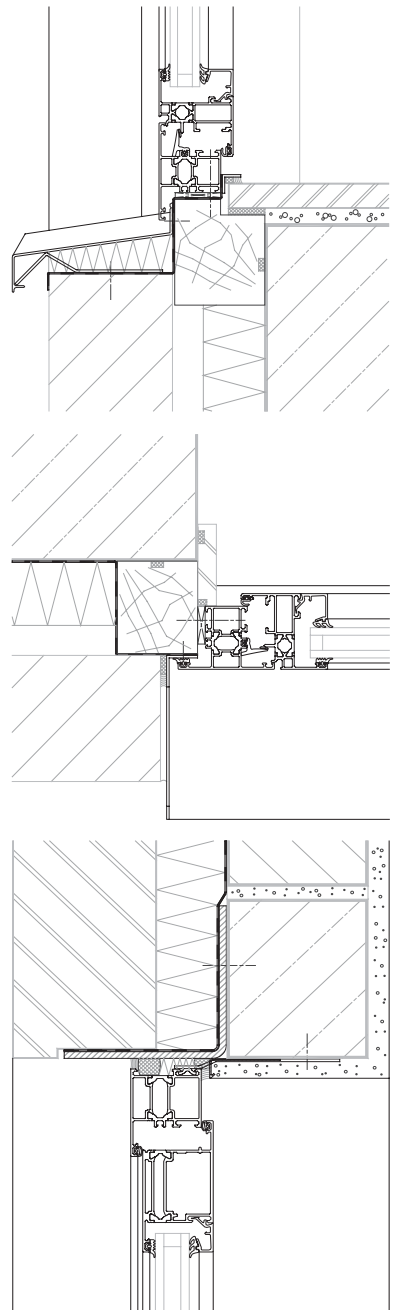
In addition, apart from integrated planning, which gradually and inevitably establishes itself in architectural practice, there are numerous of skills, opening the way to new professions, within and around the architect's profession, such as:

- Marketing
- Facility management
- Consulting
- Soft skills

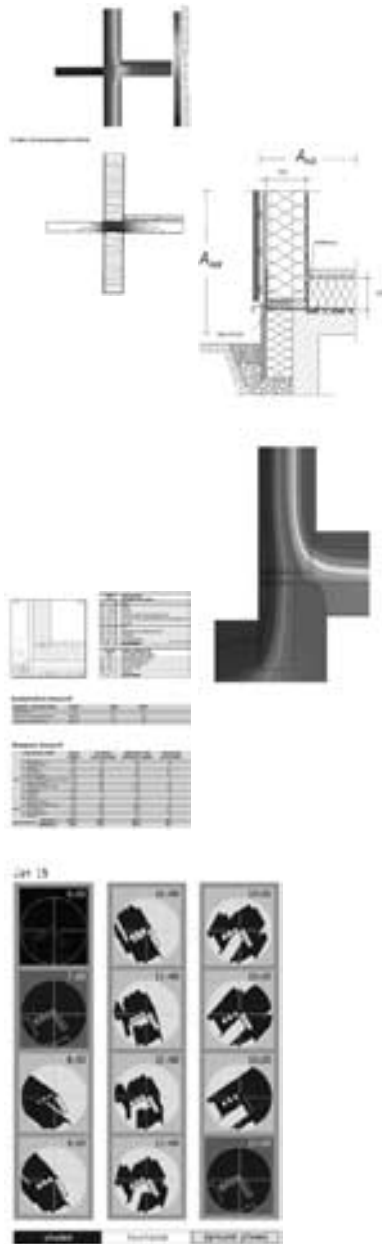
Architectural schools have to keep up to date, regarding these new perspectives and impart knowledge and information to their students.

New Aids to Construction Design

- As aforementioned, networks facilitate interactive communication between planners and designers. This is a valuable help for a multi-faceted planning process. Instructors should take advantage of these means to inspire and underscore the notion of integrated planning, which is today an absolute precondition for a project's frictionless materialization, performance and image.
- Private firms issue web pages, some with extensive information, in order to promote their projects. Our schools should also attempt to create their own CAD libraries with components, construction details and guidelines, addressing students as well as contractors and professional planners. Innovative design should be promoted in our schools, if we wish to preempt industry infiltration (Pictures 9 -11).
- There are several non-profit organizations and independent institutes active on sectors related to energy management, indoor climate and sustainable building design. Schools of Architecture have the chance to cooperate with such institutions, in order to supply students with



Pictures 9 -11: CAD – Details provided by private web sites



Pictures 12 -15: Software and catalogues for energy management and sustainable building

planning aids, e.g. on building analysis, statics and construction, building physics, environmental design and resource management, as an incentive for research and developing design skills (Pictures 12 – 15).

A Common European Perspective

Recent developments in today's building construction should not be left to industry initiative alone. The European Commission intervenes with guidelines, standards and codes of practice to control the performance and applicability of a multitude of existing and daily emerging products. Our schools should contribute in this effort. Today the European Union covers several latitudes, and hence schools of each country have to elaborate on particularities in climate, economic and social parameters, in order to expand the applicability of codes and guidelines.

Another point is that European Guidelines are dictated by economic – political rather than moral considerations. We think it is a task for the instructors to supplement directives with other considerations of a rather moral nature, such as sustainability and architectural ethos.

The Global Perspective

To the question, whether the objectives of the Kyoto Protocol are relevant to the architect's work, one should definitely answer: yes. The issue is space, living space in a global sense. The changes in the global climate, the protection of drinkable water deposits, the careful use of ground and materials with respect to the generations to come, should enter the scope of architectural education.



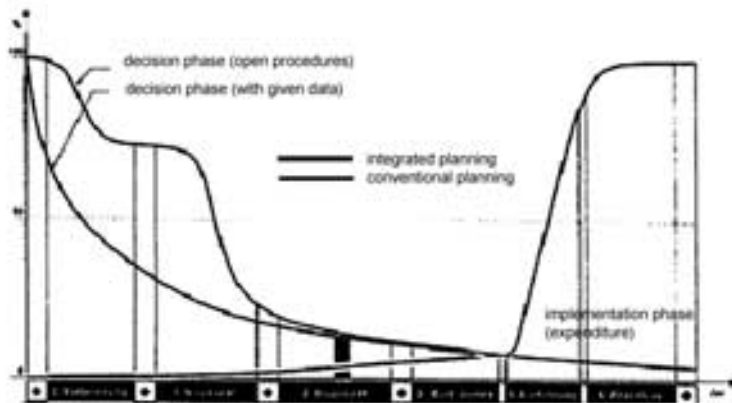
Picture 16: A much appraised and awarded project, which could serve as an example of typical modern architectural ego: Perrault's building, apart from the massive use of tropical wood, also fails to take its own purpose into consideration by endangering books through vast areas of glass.



Picture 17: Piano's Cultural Centre in Nouvelle Calédonie stands out as a remarkable feat of environmental and structural design

The general notion underlying everything aforesaid is that of integrated planning. This as a premise for dealing with all future challenges in social, political and technological developments. Integrated planning may necessitate more time for planning and decisions, but it secures a much smoother implementation process and, what is equally important, it guarantees a better image for the project.

Conclusions on Future Teaching Approaches



Picture 18: This graph draws a comparison of the expenditure required for a project's implementation in two cases:

1. The project follows the conventional planning procedures
2. The project follows the tenets of integrated planning

One can see, that expenditure is larger at the decision phase in the case of integrated planning, yet much lower at the implementation phase, whereas for conventional planning, the curve follows a reversed course

Evidently, integrated planning requires proper schooling during architectural education. Taking this into consideration, we should offer integrated studies, that is, we should organize multi-disciplinary training projects, integrating several subject fields. A single person or a group of persons covering a specific field would not suffice anymore to deal with future challenges. Cooperation among different disciplines, within a common framework is gradually becoming an imperative. This effort should start at an early stage of the students' education, to allow for optimal results. It is needless to underline, that university teachers should be steadily updating their level of knowledge. How this re-thinking and re-structuring of our curricula would be feasible, is a concern all our schools should share.