

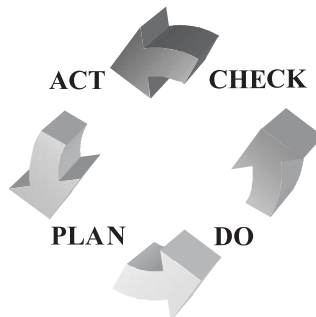
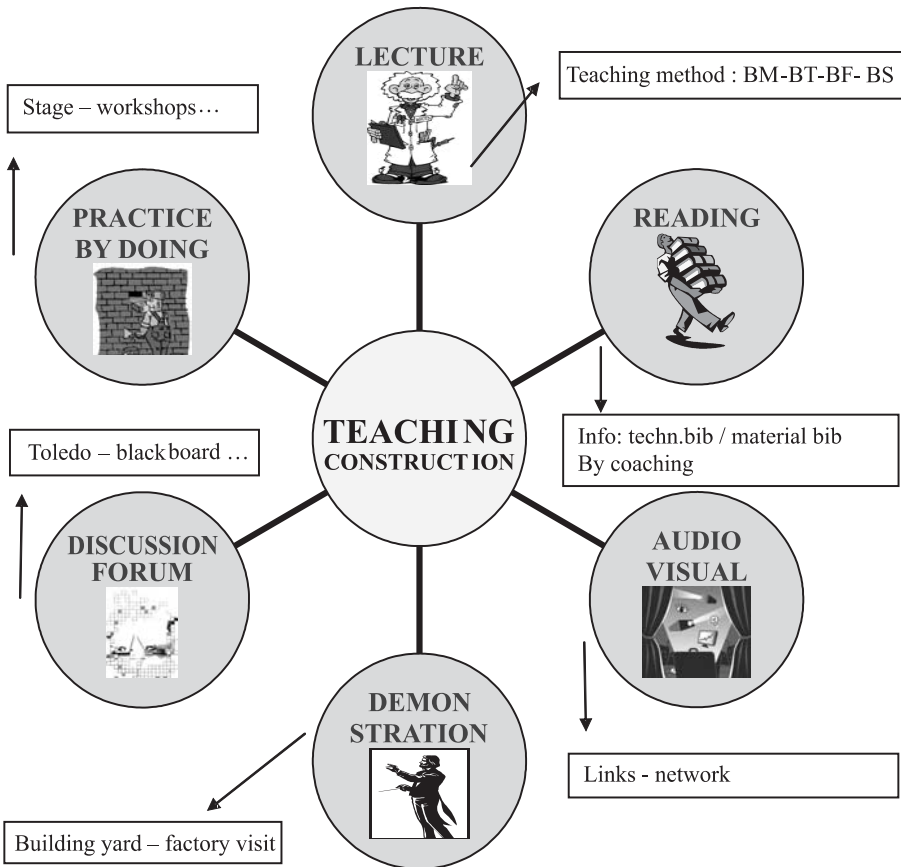
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In Search of Restructuring Construction Teaching

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Teaching in the new digital era produces an enormous population that is able to surf worldwide to information, but who is not able to distinguish what is worth to be read! So the teacher is guidance and coach. He opens the door, but the student must enter by himself.

Pilotis of Teaching Construction

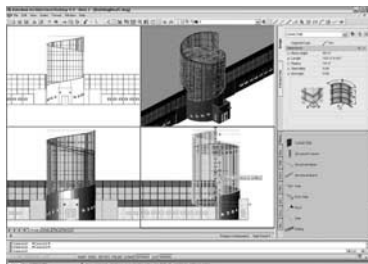


Some Objections of the Teaching Staff

The content axis

1. What must be the corpus of construction knowledge nowadays?

- Elementary principles of BM (Building Method) – BS (Building Stability) – BT (Building Technology) – BP (Building Physics).
 - Elementary principles of stability are - and will always be - the core of a well-balanced construction course.
 - New materials and production modes will definitively alter our way of dealing with construction issues.
Knowledge of materials is important and the properties of these materials (view, stability, dimensions...) The objective for which the materials were brought on the market must be part of the elementary principles.
 - The ability to calculate complex structures is widening our horizons already. It became possible to calculate highly complex structures, to create and evaluate simulations before building them. We are indeed entering a new era. So any technique we can come up with to make our buildings better will be interesting to know more about. Therefore, these new techniques may be compulsory to the elementary ones.
- Base: materials – elements – configuration
 - materials
 - physical & structural properties of contemporary building materials
 - strict classification (will provide framework for full content): masonry – concrete – steel & alloys – wood & derivatives – glass –plastics & composites – membranes
 - relevant distinctions must be clearly defined (e.g. isotropy-anisotropy)
 - elements
 - based on above, and preparing next
 - classification according to above / availability paramount
 - configurations
 - resulting from fusion of structure & elements of construction
 - analysis of today's archetypical configurations (mass active / vector active / hybrids etc) fully case based & documented
 - classification based on 1/ materials classification & 2/ typological classification, thereby allowing for scale-related aspects to be introduced



AutoCAD Architectural Desktop

2. What are the new subject areas which will have to be included in the new construction teaching?

- First we have to teach an Attitude and a Working Method to solve an architectural problem.
 - There are no new subjects areas. There are only new materials. Materials are able to be used for other aims than for which they are devised to be. E.g. : A large evacuation tube can possibly also be used like a flower barge. More and more new materials are fully used, particularly plastics. This involves in fact a basic knowledge of chemistry in function of these material leathers.



wall made of carpet tiles
(Lucy's House -S. Mockbee)

- Even more importantly and exactly this way are new production techniques important to discuss, e.g. rotation mould ...
 - Permanent update is essential / significant shifts in evolution (e.g. glazing technology) and breakthroughs in materials technology must be integrated without delay.
3. How will these new areas coexist within and be organized around the given educational curricula?

- Clear sequence of "must know" (# 1) can be directly transposed to bachelor structure (1-2-3) ; superseded and outdated distinction between structure and construction must be abolished.
- We must ask external specialists who have knowledge of these areas. It must be part of the curricula.
 - Company visits are a good manner to make knowledge with the production processes. Because you pick up at such a visit more (sometimes other matter) than postulated, both it includes this formal and informal leather.
 - Workshops on school (cooperation with design studio) which examine the possibilities of materials. F.e.: How do you link two materials ? How do you make an invisible connection?

4. What will the prioritization mechanisms and criteria be for classifying modules as compulsory or optional?

- Bachelor-master structure is instrumental in this distinction : "must know" – "want to know" typological approach of built situation allows for personal choices to be made, once "must know" part has been accomplished.
- Nature and basic principles will never change. The law of gravitation will exist to continue. Main point and side issue always exist to continue. A nail hangs to the finger, the finger to the hand, the hand to the arm, the arm to the shoulder, the shoulder to the back bone.
 - Optional matter is possible in function of certain current tasks in the studios. (Within a 'traject'*.)
 - 'Trajects' are coherent entities of theory - and practice professions of which the topic is commonly socially relevant or dovetails the research competence present within the institute. 'Trajects' are therefore really interdisciplinary and they form a means for the integration of education, research and designs. These 'trajects' can be taken as several tracks along which the student can graduate. A 'traject' is as it were an angle from which a field of architecture approaches.
All 'trajects' within the master in architecture have equivalent end aim (an architectural design in its complete meaning) and the same general final attainment levels.
By 'trajects' there is a separate formulation of the specific final attainment levels where the required development level and return are specified each time.

5. What forms of collaboration with other subject areas will have to be invented in this new context?

- see above : materials technology – structure – construction must be fully integrated; any artificial distinction must be abolished at once.
- Design studio. Collaboration with laboratory's of the university.

6. Will new specializations emerge from these collaborations?

- Definitely. These changes and shifts can already be observed in the field, where a new division of tasks is emerging.
- This seems inevitable, but also unforeseeable. There was a time that we could weld no metal, and that figures were cut by models and not with software.

7. How could the new content in construction teaching reinforce the relationship between design and construction?

- Preseding the main point: Teaching construction: can it be disconnected of teaching design?
Christian Schittich (DETAIL) distinguishes six different types of construction details. No doubt the architect/designer first has to decide which type he prefers before he proceeds to the construction.
- This is a sensitive area: cooperation is fully dependent on willingness on behalf of teachers in charge of studios.
- Construction matters are an intimate part of the overall design process. Construction matters are not "added" to the building.
 - By indicating that construction is an absolute component of design. But that is not new. In the Art Nouveau e.g.. they could take part in a conversation about that.



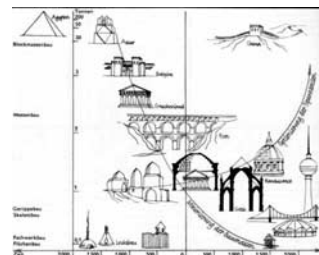
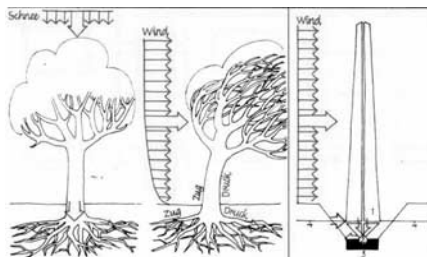
1. Balat (Royal serres)

Photos: Christine Bastin & Jacques Evrard voor Lannoo
Author: F. Dierkens- Aubry & Jos Vandenbreeden



2. V. Horta (House Van Eetvelde)

- By discuss constructions from a relevant context. This offers tasks within the design studios. For example: the link between nature and structure or the link between the old construction methods versus the new.



Buttner Hampe : Bauwerk Tragwerk Tragstruktur.

- By giving exercises which are more linked to construction (including structures).
- Of course it is the intention that our students learn to apply the most essential aspects of construction in a creative manner. For up to that point, I emphasise the importance of well-accompanied (developed by the students themselves) case studies. The manner in which the books BIRKHÄUSER EDITION DETAIL are built, we find exemplarily. If we would use these books as a "handbook" (where several teachers stipulated components of the learning substance for them account) in the Bachelor years, then "valuable case studies" incorporated in parallel with design projects would lead to remarkable results.

8. Would the design studio serve as the appropriate milieu or should other niches be defined?

- It is the preferred environment for application, not for acquiring knowledge / these are clearly different tasks.
- It is obvious that the design study is the test area and also feedback of the construction. But the construction as separate discipline must continue to exist. But there must be more bridges laid between the disciplines. We would formulate it differently: the civil engineer remains in existence, the architect will continue to exist, but the architect-engineer is a duality which must become incorporated in each designer."
 - E.g.: in our school 'construction studio' is already an answer on rather pragmatically an approach to the design. The design can grow from material. There attention is given on technical details, taken into account to realise the project.



R. Rogers Airport Madrid

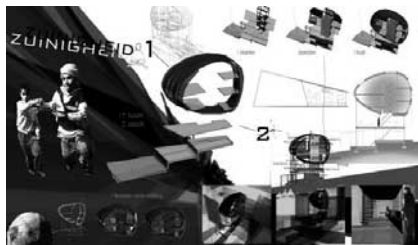
9. How can the teaching of construction incorporate the continuous developments in innovation?

- Achieving this aim is fully dependent on dedication and commitment of teachers in charge of construction. It's a 24/7 commitment, no way round.

- As it was described earlier: to continue as feedback of the design studio, without losing itself as a discipline. By making a network over Europe with this item.

10. How does this (new) content affect student competences and skills necessary to practise architecture?

- Again, a very sensitive topic. Design briefs in studios are often by very far remote from the actual building practice, representative only of a very small fraction of present building environment. An error of focus. Yet a shift of emphasis could lead to depreciation.
- By tests, by digital portfolio. Concerning construction: insight in the logical advancement, spatial insight, interest.
 - He is a designer.
He knows the resources.
He has insight and is obvious.
He uses the existing resources in a creative manner, more than a practitioner. As an author with 26 characters makes words and uses this in a certain language, and writes with that a new novel.



Gilles Retsin (Second year project)
WENK St. Lucas Ghent Belgium.

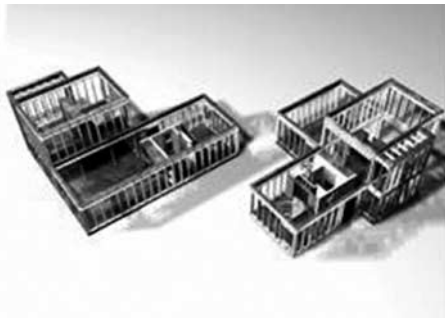
The teaching method(s) axis

1. How do changes in the content of construction teaching affect the teaching process?

- Clearly, evolution in present applied building technology. Anyone concerned should have a very clear understanding of distinction between gradual and fundamental changes in applied technology. This can only be achieved by personal activity and involvement in the field, combined with permanent and accurate analysis through publications and assessment on site. There can be no doubt about this.

2. Do they affect the aims and objectives of the already established modules and courses?

- All the time. Offering State of the Art information on construction is crucial. We've seen enough time wasted on obsolete and/or irrelevant knowledge and technology.
3. Should new teaching methods and pedagogic strategies be invented for this new content to be transferred more effectively to students?
 - The pedagogical methods possible must remain; the education methods may be adapted.
 4. How will new technologies – nowadays indispensable means of transferring knowledge– become even more creative tools for the teaching of construction?
 - Reality-related information is the key. Any means of bringing reality as close as possible to the student must be welcomed. Guided study of the building process in reality, on selected sites, is ideal, but hard to achieve in practice. Everything depends on the number of students that must be taught.
 5. What tools and vehicles will be employed in the new construction teaching?
 - 3-D images of material, if possible a scale-model is made, 2-D picture material and if possible yard visits or direct contact with the material. Mainly the relation between 3D and 2D of the same object show how the student learns to understand a detail.



Lamia El Bouazzaoui
(second year project)
WENK St. Lucas Ghent Belgium

- In the first year we have to try students to learn reading 'constructions' by understanding. By means of projects from 'publications e.g. "detail" ' can infer about what it goes.
Isolate a detail from a project to discuss, to apply in a another project, to give feedback by means of exercise. Make vertical sections of some horizontal sections.
- By making an European network.

6. How will new information on innovation, new materials and construction methods, become known to construction teachers?

- No need to! This is fully the teachers' own responsibility and task. If he/she doesn't respond to that, he/she is clearly not the right person to be in charge.

7. How could this information be taught and disseminated to students?

- Newsletters, provided that they are read. Expo of 'innovations' in technical library/material library.

8. What tools would facilitate this dissemination?

- Any university is nowadays sufficiently equipped to achieve these aims. Let's devote our energies to using these means, instead of wasting our time in studying the means instead of the real aim.
- Technical- and material library with the presence of teachers in construction techniques. Good software to search for information on the Internet. Technical work shop (research application of materials).

9. What tools would respond to this need (software, databases, websites etc.)?

- Access to this sort of information channels is now absolutely universal. One should no longer divert his attention to them. It only detracts from the real activity.

10. What are the necessary initiatives our Network should take towards strengthening this new form of information exchange and towards enriching and improving the process of teaching them?

- Permanent communication will only enhance confusion. Only treated and analysed information can eventually be exchanged. Only then does it really serve a purpose. Quite often today it is only a means of stirring loads of information, instead of analysing and implementing them first.
- Interest for lifelong learning by teachers and students. It is mainly an "attitude" of the staff which must look that information is read and processed. As long as letters, e-mails, circulars, communications by means of the mail box are not consulted or unanswered, as long as you cannot count on a sufficient information and communication.

The research axis

1. What types of research will emerge from the (re)search and redefinition of the content of contemporary construction teaching?

- Means and infrastructure available to Institutions and Universities are indicative of relevant research which might be envisaged. Duplication has to be avoided at all cost. It looks like research on configurations is presently lacking worldwide. Clearly, here is an opportunity to be pursued. A benefit is the relative modesty of means required to conduct relevant research.
- Particularly I don't believe in the research within our institute. We have not the arrangement, people and money. Moreover we see that research mainly comes of the industry. Those have, however, the resources and ambition.
- Energy aspects within the context of the European Energy Performance Directive (EPD). For Flanders this is of application from 01.01.2006: we have also EPB (EnergiePrestatie en Binnenklimaat regelgeving), legislation about obligation of certain comfort aspects (e.g. summer comfort and indoor air quality (IAQ).
- Sustainable constructions: ecological building...

2. What can be researched, experimented and tested in the context of construction today?

- In view of the emergence of new materials, coupled with the development of new elements derived from them, the path to be followed is clear.
- Creative applications of existing material. Therefore in fact, we must force the industry to go further than the utility objectives which first they have put themselves. E.g.: It is possibly the designers who are asked (required) to run on a glass floor. The industry has found the solution.
- Which consequences mean all these new aspects to this energy legislation and environment aspects both in building design and construction?

3. Where can research on construction be published and disseminated?

- Here is a discrepancy between the announced intentions and the means available or the willingness to make use of them. Only a very clear and consequent policy can offer a way out here!
- There are a lot of possibilities to this point. For that purpose we refer e.g.. to the Internet site of the WTCB (Wetenschappelijk en Technisch Centrum voor

het Bouwbedrijf), where is referred to a lot of research work and the manner of distribution. (<http://www.wtcb.be/>)



4. What research results will be useful to advance construction and construction teaching?

- A lead could be established through the approach described above. Obviously, results can be put to use immediately in design studio activity.
- It depends of the results of the research and for which training year.
- Above aspects will mean a revolution in the world of building design; the policy and the colleagues firstly want make free the necessary attention and time for this item.
Also for our department within the framework of the association K.U.Leuven, education must be based on research.
It is an important aspect for further accreditation, of what many teachers apparently are insufficient or in whole not aware.

5. What types of interdisciplinary collaborations and effective research outputs might emerge?

- The abolishment of outdated distinctions between disciplines (see above) will make this question superfluous.
- All disciplines up to and including the historians.
- Given that schools of architecture do not have laboratories, etc... cooperation with universities, other scientific partners (e.g. WTCB) and industry are necessary.

6. Are our institutions prepared, equipped and supported adequately enough to allow research to be included in the new content of construction teaching?

- On the face of it : yes.
- We have to cooperate with universities, scientific partners and industry.

7. Who would be interested in funding research in construction nowadays?

- Architects, the engineering trade, element manufacturers.

- The industry under pressures of the designers.
- All designers, customers and building contractors (because there is new legislation, which will bring many consequences with itself).
- The government, because obligations Kyoto-protocol.
- Our children, grandchildren... because they want also lives in a livable place (environment).

8. What are the necessary initiatives our Network should take towards strengthening the research activities and collaborations among its members?

- Willingness and a clear policy are the main objectives. Talk and intentions will get us nowhere. If no real opportunities are offered to able teachers (not only budgetary, but mainly in terms of time) any initiative will be stillborn.
- We must be sensitised.
- We cannot research everything: therefore specialisation becomes necessary. The results of its own research must carry a discussion at an international level by means of conferences and such.

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