

# **The Building Process - challenges in a changing environment**

Tore I Haugen, professor  
BEAM - Building Economics and  
Architectural Management  
Norwegian University of Science and Technology

## **Introduction**

The building process is changing due to technical development, organisational and legal changes plus a constant focus on business improvements. The business improvements are driven by the industry itself trying to increase profits, and by clients demanding «more value for money» by lower costs and a more customer driven process.

The objective in the building process is to produce good quality buildings and constructions - architectural, functional, technical, environmental and operational - within agreed time and costs. The building process aims to achieve the main objective in the most efficient way without unnecessary use of resources.

The most important means in achieving the objective are:

- good competence in the whole value chain / all links
- co-operation between all participants involved
- well defined responsibilities for all participants
- project management focusing on lean production and minimisation of bureaucracy and formalism

Is this description reflecting the general situation in the building process and the relation between the participants ? Unfortunately, the most correct answer is NO.

## **Conflicts and bad reputation**

In 1998 the Norwegian building industry had another «Annus Horribilis». A number of large projects were presented in the media as nearly continues disasters. Romeriksporten, a large rail tunnel project in Oslo, will be delayed by approximately one year and the budget will be exceeded by billions of NOK. The new state hospital in Oslo is another example from the public sector, creating serious discussions at the top political level. The situation in the private sector is not very much better, but only a few projects are discussed in the media. These situations leave the industry with a bad reputation among most people, and with a big problem in recruiting good young people to the building and construction sector. Unfortunately again, the situation in Norway is not extraordinary compared to other countries.

There are many explanations for why a project get the public reputation of being a disaster. The media focus on no control over time and budgets. Underlying explanations are:

- lack of proper planning and design leading to changes during the process and lack of functionality in use

- no, or not sufficient, management and control regarding time and costs - even if we have increasing documentation, control and quality systems
- lack of quality in construction works

These factors can again be explained by a very fragmented building process with many participants, with lack of trust between the parties in the process and in general contract standards focusing more on conflict solving than creating a good building process.

### **Improving the building process**

The needs to improve the productivity and to get a more customer oriented process have been argued in a number of studies in different countries during the last 10 years. Studies have been carried out in England (Gray 1996, Latham 1993), Denmark (Dræbye 1993, Høgstedt 1998), Finland (Lahdenpera 1995) and in Norway (Haugen 1996, Hurum 1998, Eikeland 1998).

These studies have pointed out a potential for improving the productivity by a factor ranging between 10-50 % compared to today's practice. These studies have resulted in several large research and development projects in the construction industry, and some projects have proven to be successful. One example is the NORSOK-project (Hurum 1998) with an objective of reducing the costs in Norwegian offshore projects by up to 50 %. The goal has been achieved by developing new concepts and solutions, and by developing different forms of partnering models and a more simplified design, planning and control process. Good results have been achieved, even if there are discussions between the major participants whether there was win-win situation for all.

One project we have been involved in, is the «Integrated Building Process» (SIB-Samspeilet i byggeprosessen) carried out by a joint consortium from the industry together with the Norwegian University of Science and Technology. The project with support from the Norwegian Research Council, was started in 1996 and will be finished in 1999.

The project has two main objectives:

1. Increased productivity by improving internal efficiency of the building process, and
2. Contribute to the market development through improvement of the external efficiency.

The perspective referred to as internal efficiency implies that constructions are adjusted to standard elements and equipment including simple and safe construction and installation work. The planning process can be rationalised by reuse of information, and by simplifying the sharing and use of information between the parties participating in a building project. Internal efficiency focuses on "doing things right" to obtain cost efficient deliveries and improved productivity.

Improving external efficiency, «doing the right things», means to get a more customer driven process, focusing on better value for money for the clients. Aspects here is to understand better the clients and users needs, and to develop knowledge and tools for handling the user needs and participation during the process. One important issue for the industry is to understand who the clients are !

The SIB-project started with the same general background as described above, and recognised that the largest potential for improving productivity lays in better co-operation between the different participants and the use of more integrated solutions for information handling and communication. Focus on better co-operation has led to development of partnership models, mainly between different parties in the supply chain but also partnerships between industry and clients.

The research and development have been carried out as pilot projects focusing on:

- Reorganising the building process by improving design management, production planning and logistics applying to all kinds of products, services and information. An important part has been organisational development focusing on team building, leadership and enterprise modelling.
- Development of information structures for building specification and development of networks (WEB) for the exchange of data (drawings, reports etc.) between participants in a specific project, and for communication between industry and public authorities.

A major result in the SIB-project is that we have managed to implement low cost IT-solutions (standard WEB applications from the Internet) that give better handling of information and communication in the building process.

However, the major challenge for the industry will be to change life-long attitudes and get real co-operation between all participants involved : to change from conflict based processes to co-operation and a win-win situation. We have in our pilot projects focusing on better integration and teamwork, experienced up to 15 % increase in productivity (Gjersvik 98). One hypothesis raised is that a good co-operative building process is resulting from relationships based on confidence (Paoli 1999).

To create a shared understanding of the parts and the relationships of the building process we have used enterprise modelling. Enterprise models are images which emphasise certain aspects of the organisation or project that we agree are important. These models are used to develop a common frame of reference, a common platform for communication, and a common way to navigate in information. In the SIB-project we have developed a method for joint or participatory construction of an enterprise model, the Modelling Conference.

## **New organisational structures**

The rapid developments in information technology changes the way we handle information during the building process, as well as changing the way the different participants communicate during the process. We also see that information technology changes the production process, both in design and in production stages.

Compared to other industries, however, most of the building and construction industry are slow in picking up and adapting the potentials of information technology. Building production is still mostly craftsman based where we mainly use information technology to improve the individual tasks, less to improve to whole production chain.

The development of information technology and the business process re-engineering in the building sector are changing the way we organise a building project. The traditional way of organising the building process with specific phases, tasks and participants are fading away as new enterprises and more flexible processes are becoming more dominant. Smaller companies

are merging into larger companies which integrates both design, construction and facilities management.

This is driven from two positions; one where the traditional contractor expands into selling a total package (design, production and management) like in a BOOT - contract (build, own, operate and transfer).

Another trend is more owner and consultant driven development, where the planners and designers (architects and consultants) are refining their product and focus on planning, concept and early design. This is all part of an iterative process where you still have the possibility to make changes and you still can influence the real value of the project. In some cases we also see that consulting firms are moving into being responsible for the main contract and in that respect are taking over smaller contractors.

We also see a greater diversity in the type of contractors and that technical enterprises are moving into a stronger position regarding construction management. This reflects that we are constantly moving towards more technically complex buildings.

## **Challenges**

We have to:

- Develop a better understanding and relations to the clients, and be open to a more customer driven process. To achieve this we have to develop deeper knowledge and experience in process- and enterprise modelling.
- Develop partnership models with other consultants, contractors, suppliers and clients. These partnership models raise a need for other agreements and contractual procedures than traditionally used in building projects.
- Redefine the structure and traditional phases of the building process. The new building process has to reflect the practice of concurrent engineering and a whole life perspective to buildings and constructions.

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