"Quality Programme Bo01" in the Building Process: Two Case Studies of Actors' Approaches to Environmental Requirements

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1. INTRODUCTION

The building industry is often depicted as conservative and slow to change. According to Kadefors (1995) the building industry is subject to strong institutionalisation, which means that flexibility is constrained by the buildings themselves, the work processes and the occupational roles. Still, there are efforts made to defy conservatism and introduce change – such as sustainable building – for example through demonstration projects. Demonstration projects serve several purposes: as a source of inspiration and information about building design for building industry and other interested parties, but also as an opportunity for the actors involved to learn more about sustainable building during the realisation of the building process (Femenías, 2000). One recent example of a demonstration project with sustainable development as its theme is The European Housing Expo *Bo01 City of Tomorrow* that took place in Malmö, Sweden, in 2001. As a means to bring the ideas of sustainability into the building process, and hence the built environment, an environmental programme, *Quality Programme Bo01* (Dalman, 1999), was developed.

Even if there are previous examples of projects where environmental programmes have been used (Pettersson 2001), environmental programmes as a phenomenon are still rather new to the Swedish building industry. Quality Programme Bo01 can thus be considered to represent a novel feature in the building process. The requirements in Quality Programme Bo01 have impacts on all levels of the building process. One aspect yet to be studied is how organisational position and occupation affect how an actor in the building process understands a document like Quality Programme Bo01. The aim of this paper is to show how different groups of actors in the building processes of two building projects at Bo01 interpreted and worked with the Quality Programme Bo01. This study is part of a larger research project aiming at evaluating Quality Programme Bo01.

2. METHOD

The first phase of this study consisted in gaining knowledge about Quality Programme Bo01. In order to gain background information about the Expo and the ideas behind the Quality Programme, open-ended interviews were carried out with three persons in the Bo01 organisation: the Exhibition Architect, the Project Leader who wrote the programme, and the Environmental Manager. Question themes were: background and organisation of the Expo, the Quality Programme and its development, applications and follow-up. The interviews took place at Bo01's office in Malmö in December 2001. Each interview lasted for about one hour and was recorded and transcribed.

There were 17 building projects at *Bo01* – two of the larger projects were selected as subjects for a case study. These projects represented different types of developers and different contracting forms. One developer is a large construction company whose project was organised as a design-construct contract and the other is a local, medium-sized real-estate firm whose project was organised as a general contract. Open-ended interviews were made developers, designers and contractors in the two projects. Interviewees in the large contracting company were the developer's Project Manager, the Design Co-ordinator, one Installation Designer, the Project Engineer, and one Supervisor who also co-ordinated the environmental work. Interviewees in the medium-sized real-estate firm were the developer's Project Manager and Environmental Manager, the Environment Consultant, the Energy Consultant and the contractor's Site Manager. The interview questions were structured into themes: background information about the company, interviewee and project, the Quality Programme and how it was handled and experienced in the design phase and the production phase. The interviews were carried out between September 2000 and April 2001, i.e. during a period when the design was almost completed and the production was in its busiest phase. Each interview lasted 1-2 hours. All interviews except one were made over the phone, and all interviews except one were recorded and transcribed.

3. QUALITY PROGRAMME BO01: AIMS AND CONTENTS

The ecologically sustainable information welfare society was the theme of the Bo01 City of Tomorrow European Housing Expo. As a means to secure that sustainability would become inherent in all aspects of the Expo, a Quality Programme was developed as a co-venture of the Bo01-organisation, the City of Malmö and some prospective developers. People from Bo01 suggested requirement levels and negotiations were carried out with the developers until all parties could agree on the formulations. The reason for bringing the developers into the creation of the programme, was that then they would be committed to the programme when they bought land on the Bo01-area from the city.

The targets of the Quality Programme were to give the developers a common basic standard, to be an operative instrument during the planning and construction of the new district, and to ensure high quality in environmental profile, technology and services as well as in architectural planning and design. The first part of the programme describes the sustainability visions behind the Expo, and the second part contains quality descriptions and requirement levels. There are more than 100 requirements, and for each one, a party responsible for the fulfilment is pointed out: the City, Bo01 or the developers. One goal was that each actor participating at Bo01 would be familiar with the programme. The Quality Programme was included in the development and Expo agreements that the developers had to endorse.

4. CASE STUDY: QUALITY PROGRAMME BO01 IN THE BUILDING PROCESS

The case descriptions show how the programme was used in two projects, and are organised to reflect three groups of actors: the developers, the designers and the contractors.

4.1 The Large Construction Company

This project was the result of an architecture competition arranged by *Svenska Boprojekt*[1] together with NUTEK[2], where the task was to design a multi-storey wooden house. The reason for using wood in this project was not primarily that wood often is argued to be an "environmentally friendly" material, but rather to market the Swedish forest industry's

[1] The organisation that initiated Bo01.

[2] A Swedish authority working for the development of Swedish industry.

products. As a consequence there were many new wood-related design and technical solutions in this house. The developer organised the project as a design-construct contract, where all actors except the architects belonged to groups within the company. The company was certified according to ISO14001 in 2000, and has its own company-wide environmental tools to be applied in all building projects.

4.1.1 The Developer: With Concern for Economy and Customers

The developing company wants to be recognised as a "safe alternative", that assures its customers of functional and financial reliability. The developer's Project Manager emphasised that this applied also to the Bo01-project, even though the project, as a consequence of the Expo, was more exclusive than ordinary residential property. The Project Manager took part in the negotiations about Quality Programme Bo01, defending the developer's interest of "realistic" – that is financially practicable – requirements. Therefore disagreements occurred when Bo01 at times wanted to view the whole Expo as a gigantic research project. In the end the Project Manager was pleased with the resulting programme and thought that it would contribute to a green and lively housing area with a guaranteed high "lowest quality level". The Quality Programme was part of the development agreement with the City and therefore the requirements were to be followed even though some requirements were weakly formulated and therefore became subject to interpretation. The developer did not "remove" any of the requirements in the programme, but added requirements on the indoor environment, which is something that customers ask for. All in all, the project involved a number of clever, but not really the newest, technical solutions – that did not cost too much.

4.1.2 The Designers: Dealing With Requirements: Material and Technical Solutions

Special about this project, from a designer's point of view, was the ambition to develop wood as a building material – and in that respect this was a developmental project. The documents that directed the design process were Quality Programme Bo01 and the company's environmental management tools, including for example databases on building materials and chemical substances and lists on forbidden materials. Each designer was responsible for environment and quality in his or her work – and also for reading the Quality Programme and single out the relevant requirements. Most parts of the Quality Programme were not directly applicable to the designers; when reading the programme, they focused on the requirements and skipped visionary descriptions. About one third of the requirements affected the design process. When needed, the content of the Quality Programme was discussed at the design meetings. The Design Co-ordinator recognised and understood most of the requirements - the novelty was that the programme comprised so many different areas. Both the Design Co-ordinator and the Installation Designer thought that the amount of text made the programme difficult to grasp, and would have preferred the requirements grouped according to which actor they affected. The Design Co-ordinator stressed that, since environmental issues still is new to the building industry, requirements like these should be concrete and well motivated in order to give guidance to the actors. Neither the Design Co-ordinator nor the Installation Designer thought that the requirement levels were too different from other housing projects.

4.1.3 The Contractors: Work Environment and Quality of Work: Time Pressure

The interviewed contractors - the Project Engineer and the Supervisor – considered the Quality Programme as something that mainly affected the design phase and therefore assumed that the requirements were included in drawings and technical descriptions. The company's environmental and quality systems were conformed with, also in the production phase. The Supervisor was knowledgeable with the programme and was assigned to the task of following up the designer's fulfilment of the requirements. The Project Engineer – who was responsible

for procurement of subcontractors and building material – did not know the programme very well. When time pressure was hard, the amount of text had a deterrent effect – resulting in the programme remaining almost unread on its shelf. The Project Engineer thought it would have been better to concentrate on a few requirements and include them in the contract. Following the company's environmental system, the contracts with subcontractors and material suppliers included the company's environmental requirements on materials and logistics. Quality Programme Bo01 was not included in these contracts. The choice of subcontractors was based on price and work skills, while their environmental work had low priority.

Regular meetings were held with subcontractors and developer - environment did not have its own slot on the agendas of these meetings, however quality did and some of the "quality discussions" had to do with environment as well. According to the Project Engineer, environmental concern at a building site not only has to do with using the right materials, but with quality of work and work environment for the workers. In this project, the work environment was affected negatively by the hard time pressure and the overcrowded Bo01-area.

4.2 The Medium-Sized Real-Estate Firm

4.2.1 The Developer: Trying Something New

This developer is a medium-sized real-estate firm that considers itself a market leader in the Malmö area. The developer's Project Manager viewed the participation at Bo01 as a chance to show the firm's prominence, as well as an opportunity to try out – and receive feedback on – new solutions for future housing. In the project, a number of new technical solutions were combined, and the developer's Environmental Manager was planning information activities to change the residents' environmental behaviour. When discussing Quality Programme Bo01, the Project Manager thought that the requirements in worst case could become a "good-enough level" instead of a "lowest level". However, the Project Manager thought that the aim of participating at Bo01 hardly was to get away with doing as little as possible – especially since building projects at exhibitions like Bo01 hardly are good business in themselves.

4.2.2 The Designers: The Importance of Knowledge: Reformulating the Requirements

All designers, except the architect, belonged to one consultant firm that the developer had previous experiences of working with. Both interviewed consultants - the Environment Consultant and the Energy Consultant – had the impression that the developer wanted something better than the ordinary. According to the Environment Consultant, the resulting building contained materials that were more environmentally adjusted than what is usual. In this project, the requirements of Quality Programme Bo01 were transformed into a project-specific Environmental Programme (Harrysson and Adalberth, 2000) that was valid for both design and production. The programme is based on Quality Programme Bo01, the Real-Estate Firm's environmental policy and Miljömanualen[3] (Miljöstiftelsen för byggsektorn) and contains all requirements in the Quality Programme, but also additional requirements, for example on the indoor environment. The Environmental Consultant stressed that when deciding on relevant requirement levels it is of utmost importance to have knowledge of where to find information. Both interviewed consultants explained how they had compared the Quality Programme to their own experiences, existent standards and findings in research reports and doctoral theses in order to decide on the requirement levels in the Environment Programme. The Environment Consultant emphasised that this kind of requirements must be concretised and that the impact on each actor must be explicitly addressed. Consequently, the Environmental

[3] A tool for environmental decision-making in all parts of the building process.

Programme was formulated to declare the responsible party and motivated the level of each requirement with a background description and sometimes with references to Miljömanualen.

4.2.3 The Contractor: The Importance of "Smart Building" and Work Environment

When the developer choose a general contractor, price was the selection criteria – however all tenders were well-reputed contractors who had their own quality or environmental systems. The Environmental Programme was included in the contract between the developer and the general contractor. The contracting company is a large construction company with an ISO 14001-certificate and thus has its own environmental management system with internal environmental requirements to follow in all projects. In this project, the Site Manager compiled the different requirements into a production-specific programme that was used in the production phase. Regarding the Environmental Programme, the Site Manager felt respect for it, since it showed that it was written by someone with knowledge of construction. As a contrast, the Site Manager found Quality Programme Bo01 fuzzy and difficult to apply to a building project – and thought that the persons responsible probably knew a lot about environment, but not about building sites.

The Site Manager thought that the environmental concern in the building projects at Bo01 generally suffered due to time pressure; that it is impossible to carry out a huge project like Bo01 in 12 months and at the same time take the environment into consideration. If environmental issues are to be considered in production, it is important to "build smart", which in this project was obstructed by incomplete detail solutions on the architect's drawings. The Site Manager viewed the work environment as the most important environmental issue on a building site. Positive about this project was that the co-operation between contractor, developer, and subcontractors worked well. When workers on several other building sites at Bo01 went on strike, the workers at this project stayed at work – a strike would otherwise have increased the time pressure.

5. DISCUSSION AND CONCLUSION

The case studies describe two projects where the developers have had different strategies in, and motives for their participation at Bo01. While the medium-sized real-estate firm wanted to try new ideas, it was important to the large construction company that the project was commercially practicable. Also, the sustainability requirements in Quality Programme Bo01 were handled in different ways in the two projects. In the large construction company, Quality Programme Bo01 existed parallel to the company's own environmental system. The requirements in the Quality Programme primarily came to be used in the design phase where they were incorporated in drawings and descriptions. The drawings and descriptions naturally affected the production phase – where the Quality Programme was, not altogether unknown but at least very remote. However, the company's own environmental management system was in active use, providing environmental management also in the production phase. In the medium-sized real-estate firm, the Quality Programme and other requirements were merged into a project-specific Environmental Programme, which was formulated so that it "survived" – that is, was used – throughout building process. This study does not enable the determination whether one process resulted in more sustainable building than the other, since the actual product – the house – was not evaluated.

There were similarities between groups of actors in the two projects – similarities that probably are due to actor roles and work content. In both projects, it was the designers that worked most actively with the Quality Programme – and who had nuanced opinions about its content. This is natural, since many important decisions – such as choice of systems and

materials – are made in the design phase. The contractors in both projects, emphasised the importance of work environment – because healthy and content workers take more care in their work tasks – and quality of work. This was not at all reflected in Quality Programme Bo01. It may be so that a good level on the quality of work is taken for granted – this is simply what the contractors are paid to do. The contractors in both projects mentioned that the time pressure was hard – which may have obstructed the quality of work.

All interviewees were aware of the existence of a Quality Programme, but even if the requirements were worked into the projects and the buildings, the visions remained largely unknown, or at least were not paid much attention to. The actors looked for the hands-on requirements, and the visionary parts with their embroidered text did obviously not appeal to them. Further, the actors spoke in terms of environment and quality rather than of sustainability. One explanation to this is that the requirements that affected the designers and contractors were ecological and technical. Another explanation is that the concepts of environment and quality have been known to the building industry for some time; clients often request quality and environmental management systems and an growing number of companies gain ISO-certificates. Thus, the issue of environment has entered the building industry and is becoming increasingly known to the actors; this may be an example of an ongoing institutional change.

This study has shown that it is important to consider that different groups of actors in the building process contribute to sustainable building in different ways. It is a long way between a vision of sustainability and a sustainable building – not to say a sustainable society. It is laudable to gather great ideas and present them in written text, but in the building industry this is not enough. How a document such as Quality Programme Bo01 is presented have impact on how its message is received. Therefore it is important to increase the understanding of what sustainability means in different parts of the building process, and to gain insight of how requirements can be formulated to commit – and enable – every actor to consciously contribute to sustainable building.

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