

FROM HIERARCHY TO TEAM—BARRIERS AND REQUIREMENTS IN RELATION TO A NEW ORGANISATION OF BUILDING SITES¹

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ABSTRACT

The transition from a hierarchical organisation of building sites to a team-based organisational structure calls for a change in management style and a new approach to people. The middle manager becomes the pivotal point in the change process, playing a key role in terms of ensuring successful change. If the middle manager is not willing to leave his or her previous role as a planner and controller to become an active coach who pushes developments in the right direction, all change attempts will by all accounts fail.

Change management will be a key concept in the new understanding of building site organisation. All parties involved in the building process and in the building industry certainly need to break away from set patterns of behaviour and fixed attitudes.

This article illustrates problems related to a shift from hierarchical to team-based organisations, outlining specific knowledge about team-based management. It describes the new roles of middle managers and crews and formulates training requirements.

KEY WORDS

Changed organisational structure, Middle manager role, Lifelong learning, Change management, Autonomous crews.

INTRODUCTION

The Danish building sector is undergoing a change of paradigms - a change which has been in progress for a number of years in other sectors, but is now beginning to manifest itself in the building sector as well. It is a change away from hierarchical structures to a system that sets up a general framework and defines common goals for the work to be carried out. This development has progressed for a long time in, for example, industry, public sector governance and not least the education sector, where the post-war generation has become familiar with group work and social networks and will consequently break down current norms.

Traditionally, building sites have been organised in a very hierarchical way with contract-

based division of functions, narrow communication channels and suboptimisation of own contracts. In recent years, a more varied picture has emerged, and a more team-based type of organisation developed. It could therefore be argued that a shift towards a more collaborative organisational structure is transpiring.

In the building sector, Lean Construction is the key to the transformation away from hierarchical structures.

The use of Lean Construction requires a change in management style towards management of people rather than management of processes. This type of management calls for a new approach to people. Construction workers should not only be seen as the arms and legs required to construct a building but rather as resourceful, competent problem solvers with ideas, commitment and a

¹ This paper is accepted as a practitioner paper only, not an academic paper

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sense of responsibility for the work they perform. In brief, individuals with a mind of their own who can apply their experience and knowledge and thus contribute considerably to increased productivity and efficiency.

The change process requires management to delegate responsibility and empowers workers to plan and control their work. Thus, the immediate superior of a work team becomes a key person who is crucial for a successful outcome of the change. If the middle manager is unwilling to leave his or her previous role as a planner and controller to become an active coach who pushes developments in the right direction, all change attempts will by all accounts fail.

TRANSFER OF INDUSTRY'S EXPERIENCE TO THE CONSTRUCTION SECTOR

Within the industry a change of paradigm has been in progress for a number of years. The fundamental principles in Lean Construction come from Lean Production, and it is therefore obvious to attempt using the experiences from the industry when implementing Lean Construction.

The construction sector differs greatly from industry on one point: to a great extent industry is based on mass production, while the typical output in the building and construction sector is a one-off product. This fact imposes some limits as to how much of the experience gained in industry can be transferred to the building and construction sector. Yet there are several general issues relating to the change process that apply to the building and construction sector as well.

The new roles of middle managers are problems that are applying to both the construction sector and the industry. Through the 1960s, 1970s and 1980s a number of middle managers were taken on in the building and construction sector. As a result of the technological development there was a drastically development of the building sector. This resulted i.e. in a division of the working functions and gradually it became customary practise with smaller teams than before. On the educational front development headed towards that construction engineers did not have a workmanlike background as was the case before. At the same time a number of rules regarding working environment and quality control, which among other things caused more paperwork, were implemented.

These development features can be viewed as some of the reasons for the employment of middle managers. Previous working tasks of the con-

struction workers as e.g. planning and control became tasks of the middle managers, and the workers' responsibility was reduced to execution only. Gradually, the middle managers became a natural part of the building process.

In this way the building and construction sector became similar to the industrial sector where mass production entailed detailed management control of work and eliminated independent thinking in production. The construction workers assumed the roles of sources of energy and physical manpower.⁴

Because of this we think that there is good reason to make use of the experience made by the industrial sector regarding how the building and construction sector can benefit the most from Lean Construction.

IDENTIFICATION OF THE PAPER

This paper is mainly based on three case-stories: two from the industry (Lean Production) and one from construction (Lean Construction), about experiences in practice, related to organizational theory about management by hierarchy and by teams. The references to these cases makes the paper a few pages longer than usual. "Conditions for successful implementation" and "Barriers and requirements..." points out the authors recommendations in relation to a successful change, getting full profit of Lean Construction.

The purpose of this article is to attract attention to the changed roles of the various players in the change process—the role of middle managers as well as the role of work teams. What must be done to prevent a situation in which the middle manager becomes a stumbling block for development? How should the tasks and competencies of the work team be redefined? And what requirements should be made to ensure a seamless process?

BACKGROUND FOR THE JOINT ARTICLE BY BAT AND MT HØJGAARD

This article gives some examples of how the organisation of a traditional building site can be transformed from conventional control to team-based control in accordance with the principles of Lean Construction. The Cartel of Unions in the Building, Construction and Wood Sectors (BAT) and MT Højgaard have joined forces to write this articles because, representing workers and a contracting company respectively, we have a shared

4 Byggeriets fremtid - fra tradition til innovation (2000). Redegørelse fra Byggepolitisk taskforce. By- og Boligministeriet samt Erhvervsministeriet.

interest in improving and advancing productivity, quality and efficiency in the building sector.

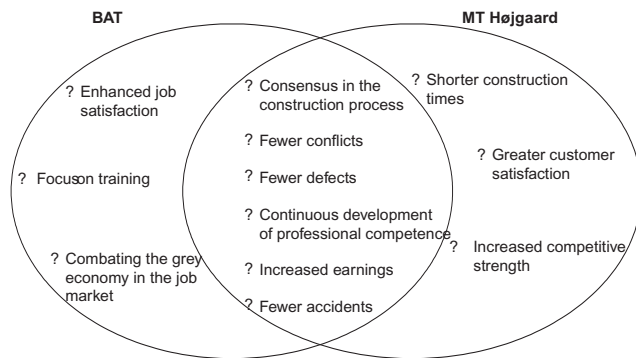


Figure 1: Benefits achieved by BAT and MT Højgaard by means of Lean Construction

The benefits listed below are based on both qualitative observations and effect—and process measurements, especially from MT Højgaard-building sites.⁵ Many of the benefits apply to both organisations, which appear from figure 1 above.

Facts: experiences from MT Højgaard TrimBuild ®

Partly implemented on a 280\$ million budget in 2004:

- Shorter lead time
- Fewer defects at delivery
- Fewer working accidents
- Greater customer satisfaction
- Better co-operation when measuring on the construction site
- Better results for everybody concerned:
 - Up till three times as much coverage margin as on traditional projects
 - Project Management: Steady at a 8% coverage margin
 - Subcontractor coverage margin: + 5 - 15%
 - Crew piece-work: + 5 - 20%

The benefits of Lean Construction for the BAT cartel

- **Enhanced job satisfaction**
Through involvement in the planning and coordination of work, increased focus on information, greater responsibility and increased influence on his or her own work, the individual worker will gain better understanding of and insight into the entire project, which will create a greater sense of ownership – and consequently enhanced job satisfaction.
- **More training and focus on lifelong learning:**
Involvement and empowerment of workers lead to continuous focus on training for the benefit of the workers.

- **Combating the grey economy in the job market:**
Involvement of work teams in the planning of work and delegation of responsibility increase the need to use permanent teams of workers, which will counter employers’ tendency to employ temporary workers, one-man businesses and foreign workers.

The benefits of Lean Construction for MT Højgaard

- **Shorter construction times:**
Better planning and coordination reduce the lead times for activities, thus reducing construction times.
- **Greater customer satisfaction:**
A seamless construction process resulting in greater efficiency and better quality will generally increase customer satisfaction.
- **Increased competitive strength:**
Leaner production will enhance the company’s competitive strength both in relation to established competitors and in relation to new players in other countries. Furthermore, it will enhance the company’s ability to penetrate nearby export markets.

Shared BAT and MT Højgaard interests

- **Consensus in the construction process**
Improved collaboration and better health and safety contribute to the achievement of the ultimate goal of ensuring consensus in the construction process.
- **Fewer conflicts**
Improved collaboration means less disagreement on building sites, which again increases mutual trust and responsibility as well as the respect for each other’s competencies. The work climate will improve, the risk of defects will be reduced, and fewer conflicts will arise.
- **Fewer defects**
When all players involved share the responsibility for quality assurance, the risk of defects at handover will be reduced.
- **Continuous development of professional competence**
Feedback and build-up of expertise from building project to building project will form the basis for continuous development of professional competence and learning.
- **Increased earnings**
Experience gained in relation to MT

5 Results from the pilot project "Gefionparken". See Jacob Norvig Larsen and Birgitte Friis Dela Stang: "Evaluering af forsøg med trimmet projektering og trimmet byggeri", 2005, Danish Building Research Institute.

Højgaard’s construction projects shows that application of the principles of Lean Construction results in contribution margins that are up to three times as high as when conventional methods are used. This means increased earnings both for the company and for the construction workers.

- Fewer accidents
Experience shows that sites based on Lean Construction have fewer work-related accidents than conventional building sites.

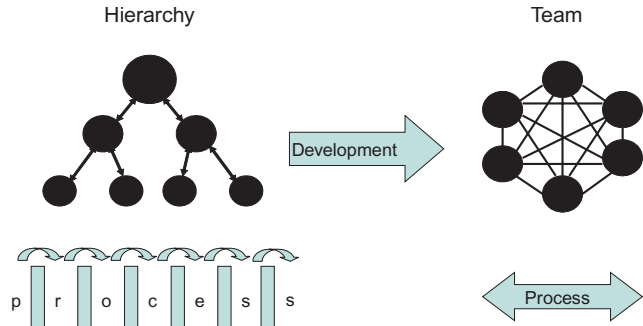


Figure 3: From hierarchy to team-based organisation

FACTS ABOUT THE DANISH LABOUR MARKET

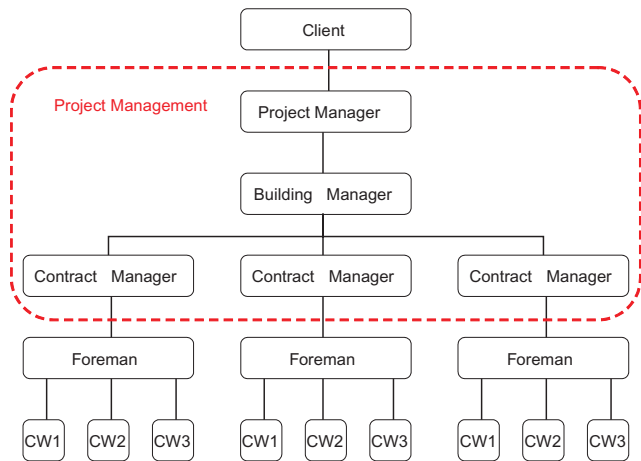
- The employer associations organise about 90% of all companies as measured by company turnover.
- The trade unions organise about 85% of all building and construction workers in Denmark.
- The employer associations and the trade unions have entered into nationwide collective agreements for individual segments of industry determining wage rates, working hours, etc.
- There is no minimum wage set by law. In fact, there is very little legislative regulation in the Danish labour market.
- There is a long tradition of collaboration between employers and workers in the field of vocational training of workers. Every construction worker has received four years of vocational training alternating between school instruction and on-the-job training as an apprentice in a company.
- The public vocational system for further training offers training courses for construction workers.
- Employers and trade unions work together to promote the industry and to make it better and more attractive both for potential customers and for people who want to work in the industry.

contractors’ interests (see figure 2). The communication of information from the project management to outside construction workers generally goes through the contract manager and the work foreman, typically in the form of instructions and guidelines. The management usually makes the decisions. This type of communication reduces the sense of ownership on the part of those at the receiving end of the communication and may therefore generate lack of or insufficient knowledge which again affects coordination between different trades and consequently the quality of the building. In addition, the process involves a risk of failure to meet the conditions for execution of the building project—known as the seven conditions (Koskela 2000). The end result may be suboptimisation and claims.

DEVELOPMENT OF A NEW TYPE OF ORGANISATION IN THE BUILDING SECTOR

TRADITIONAL ORGANISATION OF A BUILDING PROJECT

Building projects are generally organised as networks of independent companies – specialist contractors who are engaged to contribute to the overall project. In this conventional hierarchical way of organising building projects, coordination is effected at site meetings where the contract managers of the sub contractors look after the sub



CW = Construction Worker

Figure 2. Traditional organisation

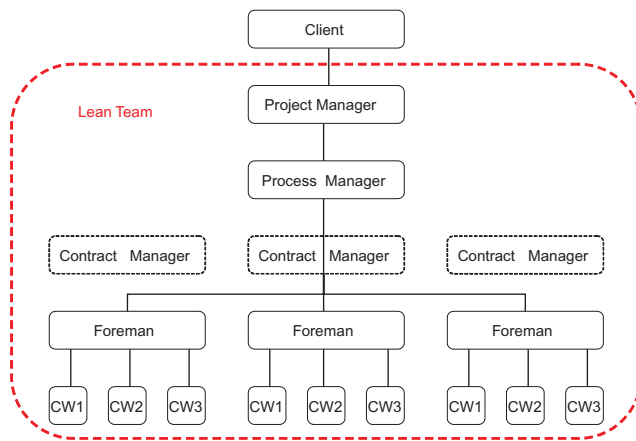
Each individual specialist contractor performs various activities in an overall process plan that requires coordination with the work of other contractors. The individual activities form part of individual specialist contracts divided into functions, which means that each individual player looks after his own interests.

Figure 3 illustrates the shift from a hierarchical organisation based on functions and characterised

by suboptimisation to a team-based organisation characterised by process orientation and collaboration. The focus moves away from financial aspects towards lead times.

TEAM-BASED ORGANISATION OF A BUILDING PROJECT

In the new team-based organisation, focus is on the whole picture. The project team comprises all contributors, from the project manager to the construction workers (see figure 4). Increased collaboration and process orientation with coordination across the various trades involved become the centre of attention.



CW = Construction Worker

Figure 4: Team-based organisation

The crews performing the work must be professionally competent when they perform individual activities in their specific field of expertise. This means that focus is on the crew’s knowledge, competencies, attitudes and motivation in relation to the construction process. If the right framework conditions can be created and objectives formulated for the entire crew, the crew will be able to take charge of preparing the activity and subsequently evaluating it.

Establishment of autonomous crews calls for focus on the crew’s competence in relation to the entire construction process and on its professional knowledge. The crews’ understanding of the process and its members’ incentive to optimise the process are crucial in a team-based organisation. The autonomous crews make their own decisions on the basis of the collective expertise and professional competencies of the crew members. They collaborate across professional divides, using middle managers (the project and process managers) as coordinators and coaches. The various professions hold coordination meetings for the

purpose of exchanging information. Consequently, the various crews are well-informed, and this process also ensures that each individual activity is evaluated through comparisons. Likewise, quality assurance is performed and work areas are tidied up so as to make them ready for the next activity, which can therefore start without problems. The crew is responsible for ensuring that the handover meets the qualitative objectives applying to the project.

THE NEW ROLE OF MIDDLE MANAGERS

Middle managers—project, process and contract managers—assume new roles in the project team. A process manager replaces the former building manager, and middle managers are charged with creating framework conditions and formulating objectives in relation to the crew’s responsibilities and credibility. Their work assignments change since responsibility is delegated to the crew. The management form changes from a controlling style to a style based on information and resource allocation and on coaching, including support of team-based decisions. In addition, the middle managers act as sounding boards for the crews. The middle managers are responsible for preparing production in terms of ensuring timely information and adequate resources.

THE NEW ROLES OF CREWS

In a traditional organisation the only job of the crew is usually to perform the activity, which is illustrated in Figure 5. In relation to autonomous crews, the job is extended to include preparation of production, tidying, end control and process measurement. In other words: quality assurance, work safety, material and equipment logistics and quality control.

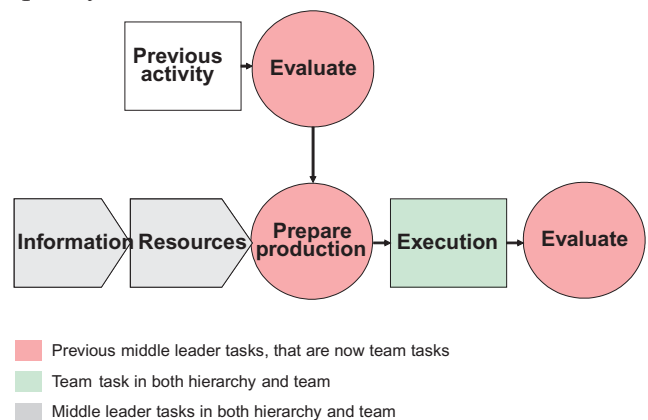


Figure 5: The new roles of middle managers and crews

One of the new roles of work crews is to document effects and lead times and to ensure seamless collaboration. The crews can do so by means

of process measurement (quality control and Percentage, Planned, Completed—PPC) where any idle time in relation to the activity is recorded and reasons for production problems clarified.

In this way, feedback and build-up of knowledge from building project to building project is ensured, which is a good basis for continuous development of professional skills and learning.

EXPERIENCE FROM PRACTICE

As basis for an analysis of the conditions that must be met to change an organisation from a conventional, hierarchical organisation to an organisation based on more team-based management, we have studied experience gained in three different workplaces focusing on autonomous crews, new roles in the organisation and coaching by process managers, respectively.

The three workplaces are

- A company in the food industry (anonymised)
- NKT Cables at Asnæs
- MT Højgaard's Tegholmshave building site

The two first workplaces represent industry, which sector has reaped more experience in the use of Lean principles than is the case in the construction industry. The industry and the construction sectors differ in a number of areas; consequently, not all experience gained in industry can be applied in the construction sector. However, a number of general issues in relation to the change process may be useful in relation to construction as well.

CASE 1: EXPERIENCE FROM AUTONOMOUS TEAMS

Background

A newly established company based on mass production of additives in the food industry decided to set up an organisation based on autonomous teams right from its formation in 1998. The company has 47 employees.

The factory manager⁶ is the key manager of a number of autonomous teams. There are no middle managers, but each team has a spokesperson. The spokesperson does not act as a proper manager; the teams are their own managers and assume a shared responsibility.

Work assignments in the past and now

Since the company opted for autonomous teams from the outset, employees have not had to adapt to new work assignments.

However, the factory manager himself previously worked as a manager in the conventional sense and needed to adapt to the position as manager of a company based on autonomous teams. Since he is the immediate superior of all employees in the company, we could correctly look at him as the unit having undergone a shift from a hierarchy to a team-based organisation. He used to be a project manager but is now a process manager.

In his previous job, his work assignments typically entailed checking that the various jobs planned were in fact performed. His current key assignment is to assume overall responsibility, to formulate goals and visions for the factory, and to follow up on them. In addition, he acts as a problem solver and human resource manager.

The autonomous teams are charged with planning their own work, performing jobs on time and effecting quality assurance. Jobs are automatically allocated to them via computers, removing the need for middle managers to distribute work. The teams do so themselves.

Where do major problems occur?

A typical conflict issue in the company is that nobody wants to clean the production machinery. On the other hand, nobody wants to take over dirty machinery. In an autonomous organisation, this is not a problem that can be solved by means of rules. It is a question of work ethics, and if an autonomous team is unable to solve the conflict on its own, the factory manager must help it by asking questions and guiding the team, thus enabling it to find solutions to the problems. To issue instructions is definitely not the right solution!

When one shift takes over from another is the time when there is a great risk of problems arising during a normal working day – when one shift leaves and another turns up for work. The teams are not always sufficiently good at communicating any problems that may have occurred to the next team. They typically pass the buck, which means that the issue will not be dealt with until the eleventh hour. The handover culture and communication skills of the employees are inadequate.

Another problem is that all organisations will include people who are not motivated or able to

⁶ The information in this section is based on an interview with the factory manager on 14 April 2005. All information has been anonymised to prevent misuse for competition purposes.

work in an autonomous team. Teams are generally characterised by a strong team spirit in relation to which the team needs to acknowledge that people are different. The team members acquire social positions in the team, and they have to be able to keep the pace. Otherwise group pressure may develop. Team members should have personal skills such as the ability to cooperate, responsibility, sound ethics and an ability to manage themselves.

Some conditions for success

The company has constant focus on training and learning. In the start-up phase, everybody was prepared for the job, and teambuilding activities were arranged for all employees without exception. All staff groups have subsequently undergone training. On average, all employees attend supplementary training activities for two or three weeks a year.

The company wants to introduce performance-related pay and bonus schemes. This type of pay is seen as a necessary incentive for building up a strong feeling of solidarity and common understanding of teamwork being for the common good: 'One for all and all for one'.

Experience gained

As compared with his experiences in previous jobs in other companies, the factory manager thinks people have a much greater sense of responsibility in this company and that everybody is really motivated. Close dialogue leads to a good team spirit, and most employees feel that the company is 'their' company.

A characteristic result achieved at the factory is that all human resources are used, i.e. the combined knowledge of all employees is brought to fruition, and ideas are generated at all levels of the organisation. Proposals for improvement presented by employees over the past three years are estimated to have resulted in an increase in productivity of more than 25%. Most proposals concern improved processes and technical solutions. Evidently, the teams are strong as regards product and process development.

Very concrete outcomes are a very low rate of absenteeism and a very low staff turnover at the factory.

Challenges

- Ethics in relation to agreements

- Communication between two shifts of workers
- Team culture in relation to individuals
- Focus on training and learning of management and workers
- Motivation through performance-related pay

Opportunities

- Greater responsibility
- Full use of human resources
- Low absenteeism and low staff turnover
- Suggestions for improvement from employees

CASE 2: NKT CABLES—NEW ROLES IN THE ORGANISATION

Background

Faced with a scenario of increased competition, the cable manufacturer NKT Cables⁷ initiated a comprehensive change process in 1986, which implied process integration and a team-based organisation.

The company had a very good starting point, because even then its attitude to human resources was conducive to dialogue and general involvement of employees. The proposal to introduce changes was therefore presented in the Works Council where shop stewards and management had an open discussion of the opportunities inherent in such a change process.

The process got on the track

External experts were taken on to assist in the process, and a person was employed to handle the comprehensive training activities that were scheduled from the very start of the change process. All hourly-paid workers received training for 11 weeks.

At a teamwork seminar, the management and the shop stewards formulated values that were to be used as process guidelines. These values focused on 'the good work' performed in an employee-oriented company in which not only customer care and efficiency but also the welfare of employees are key factors. The parties reached general agreement on how powers were to be distributed in the new organisation. Then everybody knew – and could use this knowledge as a guideline in relation to specific initiatives.

7 The information about NKT is taken from a project entitled "Flexible organisations – the new role of shop stewards" prepared by Irene Odgaard for CO Industry.

Where did major problems occur?

When the hourly-paid workers had finished their training, they came back in high spirits and so motivated that it was in fact a problem to cater to all their enthusiasm. At the time, the company was not ready to redefine work to such an extent that people felt they could use what they had learned. One reason for this is that the middle managers had not been taught how they were to change their management style.

The middle managers had not received any training and had not been informed of the changes in the same way as the hourly-paid workers – and were consequently not equally prepared to change their routines. Therefore, the group of middle managers in a way became a buffer between top management and the autonomous teams. This meant that top management's announcements about empowerment were changed by the middle managers who assumed responsibility in much the same way as they had always done. As a result, the new team-based system did not work in practice.

Work assignments in the past and now

In summary, it was necessary to change the management practice of the middle managers. Job enrichment required some freedom in planning work assignments, a certain variation in work tasks and feedback about the results achieved. The management style had to promote values relating to decisions made by the employees—and should certainly not obstruct such decision-making.

The top management and the shop stewards agreed to continue the process of development and realised that the middle managers needed help to change their roles in practice. They were therefore offered supplementary training.

The company could not dispense with the middle managers. As a matter of fact, managers were needed more than ever, but they had to apply new management skills: instead of planning and controlling the performance of work assignments, the managers were to make sure that things developed in the right direction and that things progressed as planned. They were to help the autonomous teams in solving problems the teams were unable to solve on their own, and they were to provide all necessary information and guidance. The prime task of the middle managers was to stimulate team development. Such a shift required middle managers to change their self-perception—which was easier said than done.

The workers also needed to change their attitudes. The autonomous teams needed to learn how to solve problems and how to assume broader

responsibility in the new organisation. Before the change, they would typically sit at a machine all day long, but the system of autonomous teams required planning of their own work and participation in team meetings.

Making a team-based organisation function smoothly calls for both managers and co-workers to change their attitudes to each other. NKT succeeded in achieving this change – but not without losing some people who decided to quit their job.

Some conditions for success

It is necessary to bear in mind at all times that there is a guiding line to follow, i.e. that it is necessary to follow the set of rules that everybody agreed upon at the outset. Otherwise pressure in everyday activities may make people revert to the old values.

This also applies inside individual teams, where the strongest personality may easily become the one who sets the agenda. In NKT, the shop steward is charged with embedding the norms of tolerance and mutual help in the teams. Seminars are held regularly to discuss disruptions of everyday work: how can people pass on information to each other, given that they work in shifts; how do we handle the situation when people become sick or are going away to attend a training programme? The norms are determined by the majority and not only by the strongest personalities.

Experience gained

One of NKT's current strengths is that the employees show greater commitment and greater desire to be in the company. Dialogue and the use of employee's knowledge and expertise have made the company flexible, able to respond fast and willing to adopt changes to an unprecedented extent. Ideas are generated from the bottom and up, and the greater freedom bestowed on workers motivates them to develop areas relating to their daily work.

The experience gained in NKT is that people behave as they are treated themselves. The more companies are willing to treat people as responsible adults, the more adult and responsible will people become. But it does not happen overnight. Just as a workplace has a special attitude to people, so does each individual have an attitude to work shaped through many years' experience. Such attitudes cannot be changed at a snap of the fingers; new attitudes have to develop gradually.

Challenges

- Preparation of middle managers through training
- Determination of responsibilities
- Changed management practice
- Change in management and worker attitudes

Opportunities

- Collaboration on values
- Maintenance of values
- Flexibility and willingness to change in the organisation
- Improved competitive strength

CASE 3: COACHING EXPERIMENT⁸

The Tegholmshave building project includes the construction of 135 housing units: 12,800 square metres at a price of DKK 131 million, roughly corresponding to USD 18 million. The project framework differs slightly from that of standard building projects in that great efforts were made in advance to ensure seamless collaboration. A joint venture company was set up, composed of the company in charge of construction management and the construction, concrete and timber and hardware contractors. The parties have endeavoured to build up greater trust between the construction management and the contractors by sharing office facilities and organising a common catering scheme, just as pastry is served at most meetings. This shows that efforts have been made to create a good team spirit, in the long term likely to result in improved collaboration between the construction management and the subcontractors.

The formation of a joint venture company makes the process manager responsible for making sure that quality assurance is performed in relation to the concrete contracts, as would be the case in many conventional building projects. Consequently, the process manager needs not act as the big bad wolf, a role generally perceived as very annoying by both parties. The process manager is no longer responsible alone but shares the responsibility with the concrete contract administrator, which acts as an incentive to improve collaboration.

In addition to the efforts expended to create closer collaboration, a great deal was done to support the process manager in a number of 'difficult situations'. In such situations, the process manager may contact a personal coach, who will try to help him focus and come up with a possible solu-

tion to the problem. In such difficult situations, communication may easily reach a deadlock, which may impact negatively on the building process. Together, the process manager and the coach must work to ensure that communication between the process manager and the subcontractors becomes more seamless.

To ensure better communication, we examined whether in this case the process manager provides any kind of coaching himself to subcontractors and construction workers on the site. A key condition for generating good communication is that the coach—in this case the process manager—has his focus on the person he talks to. At the same time, he should pave the way for letting subcontractors/construction workers provide the answers themselves by asking appropriate questions instead of issuing orders as to how things should be done. By following the process manager in his daily activities, we could see that he managed to be very pleasant and to build up a relationship of trust with subcontractors and construction workers. In several situations where jobs were to be performed, the process manager asked questions to the subcontractors and construction workers as to how they would suggest doing it. Consequently, they were given an opportunity to come up with answers. Then, it did not seem hierarchical at all that the process manager made the people in question perform the jobs at hand. It is important to note that a different type of coaching is required on a building site as compared with a situation in which a coach is coaching a client during a session. On a building site, time is not available to pinpoint the problem; it is better if the coach/process manager is familiar with the problem and asks the client/builder how the problem should be solved in the given situation.

Generally, it would be good if process managers and contract managers could use coaching in their management, since it would normally make communication easier. It also gives the other party a feeling of sharing responsibility, since he had devised the solution himself. This site visit proved that coaching is already being used, albeit inadvertently.

Experience gained so far

Coaching performed by the process manager at Tegholmshave is a good way of communicating. Collaboration with the crews work better than usual. The construction workers or contractor enters into a dialogue about his own work assignments and problems, making him realise that his

⁸ The background for this study is a visit to the MT Højgaard building site. The description has been written by Morten Alsdorf, student of civil engineering at the Technical University of Denmark.

opinion is valuable. Good communication is a key factor between construction workers and managers; in the long term it may have a positive effect: better health and safety and a better building process. There can be no doubt that coaching is useful, since it calls for respect for and focus on the person coached – in this case the builder and the contractor.

Challenges

- Ensuring timely communication
- Improving the ability to address various problems
- Making the process manager visible
- Maintaining a positive spirit
- Countering non-reconciled requirements and expectations
- Making sure that the process progress as planned

Opportunities

- Follow-up on time schedules
- Open, constructive collaboration in everyday work
- Build-up of a good team respecting each other's competencies
- Shared finances and openness in the joint venture

CONDITIONS FOR SUCCESSFUL IMPLEMENTATION

The experience gained in the three workplaces confirms that team-based organisations present great opportunities. Based on this experience as well as experiences from MT Højgaard's TrimBuild concept and some general experience from industry⁹, a number of conditions for a successful transition from a hierarchical organisation to a team-based organisation can be identified.

THE PURPOSE OF CHANGE

There may be many reasons why a company decides to initiate a change process. Typically, the overall goal is to develop the organisation to make it more resilient and more competitive, while at the same time exploiting current knowledge and competencies of the company better, making the organisation more flexible and ensuring more satisfied employees. One element of this process may be to improve the corporate culture in the

organisation and to increase employees' job satisfaction and desire to work together to improve the company's performance.

VALUES

To ensure that everybody supports the idea, goals and values must be clear both to the management and the employees from the very start, so as to ensure that nobody is lost in the process. It is crucial to keep the goals in mind at all times, to make sure that there is a connecting thread in the entire process and that it is followed. Otherwise, everyday workloads may make people return to their old habits.

It is also important that representatives of management and workers are involved in decision-making processes related to the changes, the reason being that lean production will change the daily working life of everybody dramatically.

THE NEW ROLES OF THOSE INVOLVED

A great deal is required on the part of people involved in a change process. First of all, the management must be willing to set aside all resources required, just as it must fully support the change process. Experience from NKT shows that middle managers must be trained to apply a new form of management. Middle managers hold key positions as the links between top management and workers and are consequently able to make or break a successful outcome.

An important lesson learned from the experience gained is that team organisation does not make middle managers superfluous, but new management skills are required. Rather than controlling and planning, middle managers must act as sounding boards and coaches to the teams. In return, workers must assume responsibility for the planning and execution of work assignments, just as they must present and implement new ideas. This is a mutual process that calls for changed behaviour by both parties.

Experience also shows that organisational change is very much a question of changed attitudes on the part both of team members and managers. Values and norms deeply rooted in people must be changed, which cannot be done overnight. It is an ongoing process that may take quite a while.

⁹ The experience referred to is that described by Per Brøndsholm Nielsen, former consultant of the Confederation of Danish Industry, in relation to the implementation of Lean Production in a number of industrial enterprises in Denmark.

TEAM CULTURE AND INTERNAL COLLABORATION

It is important continuously to pay attention to the team culture and the way in which the teams collaborate. People are different from one another, and a number of personal competencies such as interpersonal skills and responsibility are needed in relation to teamwork. Tolerance and mutual help should be key in the teamwork.

Friction in the teamwork will typically appear in connection with disruptions of or changes to the work. Examples are when a team is to hand over a job to another team, or situations as the one described in relation to the food industry where conflicts typically occurred in relation to a change between two shifts. Companies must set up some clear rules as to how such conflicts should be handled.

TRAINING

Both the food industry case and the NKT case reveal that training and development of social skills are crucial for ensuring a successful shift to a team-based organisation. All members of staff – managers as well as workers – must be prepared and motivated to take on new assignments in a way that makes the goals and objectives clear to everybody.

Subsequently, continuous training is significant. Continuous development, ability to change and flexibility in the organisation call for deployment and use of all resources. Consequently, ongoing focus on training, knowledge and competencies is necessary—lifelong learning becomes a fact.

NEW WAYS OF THINKING NEEDED IN THE BUILDING AND CONSTRUCTION SECTOR

Based on the experience gained from practice, we can conclude that new framework conditions and areas of responsibility for middle managers and for building and construction workers need to be developed.

BARRIERS AND REQUIREMENTS IN RELATION TO A NEW ORGANISATION OF THE BUILDING AND CONSTRUCTION SECTOR

To reap the maximum benefit from Lean Construction, the organisational structure must be changed from a conventional hierarchical structure to a team-based organisation. The question is what requirements such a development pose to

companies and workers, for example specific training requirements.

The initiation of a change process makes great demands on the people involved. The management must delegate responsibility and powers to building and construction workers, who again must generate and implement ideas. This is a mutually committing process that calls for changed attitudes and behaviour by all parties involved.

To ensure a successful change process, all those involved must work towards the same goal and must be able to identify with the purpose of the change. Everybody involved must have the competencies required to perform the new assignments required by the new organisational structure. Consequently, training becomes a key element in the change process. Both middle managers and crew members require training enabling them to perform the new assignments. New methods and new assignments will appear on an ongoing basis, and Lean Construction therefore makes lifelong learning essential. More specifically, training programmes need to be developed with focus on social skills, interpersonal skills, communication, coordination and process measurement of time and quality.

To adjust the processes successfully, expertise must be identified in crews and direct access ensured to the resolution of problems. One condition for success is that each individual crew is empowered to do so and to solve problems on the basis of the training that crew members have undergone.

The crews will take over responsibility for planning the actual building and construction work. In this way, the conventional hierarchical organisational structure with fixed lines of command will change into a flat structure, bringing the crews closer to the management.

The crews will share responsibility for quality and safety, and they will also be in charge of planning and coordinating their own work. In return, the crews' role in the change process will be to improve their ability to collaborate with each other and with other trades. This includes becoming more aware of the need to prepare for work to be carried out by others. In theory, collaboration will be enhanced automatically when the crews begin to plan their work and coordinate the assignments of the various crews.

For middle managers the changed organisation means that their management roles shift from being roles of control and planning to roles of coaching and resource allocation. The middle manager's role as a sounding board for the crews will increase, the purpose being to ensure a seamless building process.

This means that the role of middle managers will be to act as agents of change in relation to future changes of building site organisations, their responsibility being to communicate values and provide good framework conditions for the crews.

Consequently, companies and workers should define a new set of rules to govern future agreements at building sites.

Such rules should focus on the behaviour and attitudes of everybody working at the building site so as to promote the best possible working climate. At the same time, focus must rest on production conditions on site so as to create a sense of ownership for the building project and a sense of the site being 'my workplace'.

In addition, agreements between the parties should be backed by agreements on measurement and evaluation.

To succeed, companies need to think along new lines in terms of training at all levels, centring on lifelong learning for all parties involved. Institutions of education and training must be prepared to change the objectives of their programmes, aiming at greater crew responsibility and an understanding of the middle manager's role as a coach.

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