

# REACTIONS FROM EMPLOYEES ON THE IMPLEMENTATION OF LEAN PRODUCTION

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*The aim of this paper was to empirically investigate what aspects that gave rise to positive and negative reactions among employees in Swedish companies that introduced Lean Production, and how they perceived their work. Two Swedish production plants that had introduced Lean Production 2-6 years before this study were chosen. Deep interviews with 19 blue-collar workers were performed. Continuous improvement and other tools gave a better structure to the work and improved the work situation. On the negative side was insufficient information, loss of freedom in paced assembly line jobs and a higher work pace.*

*Production philosophy, Working conditions, Mobility, TPS*

## **1 Introduction**

Toyota Production System has been developed for more than half a century. It is today considered to represent the “state-of-art” in how to design and organise manufacturing. The International Motor Vehicle Research Programme in the 1980’s presented results that showed how Japanese car manufacturers produced their cars with substantially better productivity and quality with less usage of resources. The manufacturing philosophy used by these companies was coined “Lean Production” by MIT researchers (Womack et al. 1990), which largely is their interpretation of Toyota Production System. The definitions of these concepts differ between authors in literature and between different companies (Balle 2005), and there are considerable differences between Lean theory and Lean applications. Lean Production was introduced in many companies in the beginning of the 1990’s. Proponents considered the philosophy as a solution to the problematic working conditions of Taylorism, but others strongly criticised it as “Mean Production” (see Berggren et al. 1991, Stewart and Garrahan 1995; Liker 2004). The main critique was that the working conditions were very demanding and that the risks of stress-related disorders including musculoskeletal disorders were high. Other critics claimed that Lean Production in principle did not differ from Taylorism. In Sweden, Lean Production seemed to become unfashionable towards the latter part of the 1990’s. These early cases to a large extent tried to copy the Japanese concepts, which created difficulties due to cultural differences (see Friel 2005; Seppälä and Klemola 2004). However, a new interest in Lean Production came back in the new millennium. Many Swedish industries are now working on implementing Lean Production and it is the totally dominating production concept, at least in the industrial rhetorics. Companies such as Scania and BT have introduced their own version of Lean Production, named Scania Production System and BT Production System respectively. These systems have to a large extent integrated concepts from the Scandinavian

tradition of work design with concepts from Japanese production systems. A similar development has taken place in Finland, where sociotechnical principles have been integrated with Lean Production (Seppälä and Klemola 2004).

In general, only few empirical studies on Lean Production or Toyota Production System can be found in the scientific literature. In most cases these point to positive effects following the introduction of Lean Production, and they have been published in engineering, logistics or economic journals. Only single empirical studies have been published from ergonomics or human science journals (Li 2007). The purpose of this paper was to empirically investigate what aspects of the production system that gave rise to positive and negative reactions from the employees in two Swedish companies that introduced Lean Production, and in particular to investigate how the employees perceived their work.

## **2 Methods**

Data was collected through semi-structured interviews with blue-collar employees in production tasks in two companies, one turbine manufacturer and one lift truck manufacturer. The interview guide was based on a literature survey of previous findings from studies with a similar purpose, and on meetings with company and union representatives from the two companies. In total, 19 persons were interviewed, 10 in the first and 9 in the second company. The participants were selected by the company representatives to include an equal number of persons with positive and persons with critical opinions, as there was no aim to survey the how common the different opinions were. On average, the interviews took a little less than one hour. For further details, see Berglund (2007).

## **3 Results**

The turbine manufacturer had worked with Lean Production some two years. They had mainly introduced tools, such as 5S, continuous improvement and “daily control”. There were many positive comments about these tools. The advantages perceived were better housekeeping and better order. Continuous improvement supported participation in problem solving, and opportunities to influence the own work situation. Problems were discussed and shared among the members of whole group, and when the problems became more visible, it was easier to handle them. In general, the work tasks were qualified, varied and gave a relatively high degree of freedom in relation to other manufacturing jobs, but this had not changed particularly much due to the introduction of Lean Production. The critical aspects concerned that some aspects in the new way of working was strange, e.g. not giving priority to optimizing machine utilization any more. The new way of working meant the use of more structured processes, which was perceived as decreased freedom by some persons. Other comments were that not all persons pay sufficient attention to the new routines, which caused unnecessary problems and disturbances. There was an uneven work pace, meaning too high work pace at times. Further, several persons pointed out that there had not been sufficient education on working with the new tools. There were different opinions on the reasons for and need of introducing Lean Production, indicating that too little information had been given. The collaboration between departments was perceived insufficient, especially between production and engineering design. Management was generally perceived in a positive way, but had problems with visibility since they spent

considerable time in meetings. The overall experience was that the technical aspects of the tools had been in focus, instead of cultural and motivational aspects.

The lift truck manufacturer had worked for almost 6 years according to their interpretation of Lean Production. Several new tools had been introduced, including 5S, continuous improvement, Kanban, process orientation and visual management. Paced line production had also been introduced, and there were activities on improving collaboration with suppliers. In general, the positive comments on the new production system were in majority, even though there were also negative comments. Some persons pointed to the loss of the feeling of joint cooperation in the company. Advantages included that investments and expanding volumes contributed to job security. All respondents considered it necessary to introduce the new production system in order to be more competitive in the international markets, a necessity for future survival. One of the societal and cultural differences identified was the view on leisure time. Many of the Swedish workers found it difficult to work overtime on short notice. Other advantages frequently mentioned were participation in the improvement groups, better housekeeping and better order. However, working on assembly lines was controversial. Work had become more monotonous and stressful, and it was difficult to keep track of the Kanban routines, even though materials handling has improved in general. On the positive side was the opportunity to improve workplace design in order to create less strainful work postures and that work could be performed more smoothly and with less effort for each truck. The newly employed persons accepted the assembly lines better compared to those who had experienced the old way of working in longer cycle times. Working conditions were considered good in terms of job security, opportunities to test other tasks and make a career and a good physical working environment, but the contacts with other with co-workers had diminished due to a higher work pace and stress, and there had also been loss of freedom. There were, however, also persons considering that the work pace was acceptable. Several persons perceived that they had got too little information and education on the production system. Management was often perceived invisible since they also in this company spent considerable time in meetings.

#### **4 Discussion**

In spite that the two companies had worked with Lean Production for different lengths of time, they displayed many similarities. The employees in production were more positive than negative to the new way of working, although they identified both positive and negative aspects of the production concepts. There was also agreement that the demands for quality, productivity and performance had increased as well as management control. These aspects may of course be both positive and negative from the employees' point of view. Working conditions had improved regarding a clearer structure of work and opportunities to participate in continuous improvements. On the negative side was loss of freedom in assembly line jobs and a higher work pace. The results are in agreement with Karasek's model that higher demands and higher decision latitude is positive and diminishing stress levels and that lower decision latitude is negative and increase stress levels.

In both companies the employees experienced that information and education had been insufficient. Also, the employees regarded Lean Production as consisting of the tools

that had been introduced. There was limited awareness about the philosophy behind the concept. Further, it was found in both companies that management was not visible on the production floor. Another result of interest is that employees who had no previous experience of working in production before the introduction of Lean Production, easier accepted the concept than those who had earlier experiences.

Lean Production is a fragile production concept which is dependent on motivation and self-discipline among the personnel (see Liker 2004). Therefore, there are substantial improvement opportunities in these fields.

A final issue is to what extent the implementations can be regarded as pure Lean Production, or whether they are a mixture of concepts inspired by Toyota Production System and Sociotechnical systems. Many examples were identified where consideration had been taken to the previous national and organizational cultures, e.g. the handling of overtime, the role of the supervisors, and the practice of standardisation. The philosophies of the companies were that it is necessary to consider the context in which production takes place and to combine the best concepts from Lean Production and the previous traditions. At the same time, it was considered that some aspects of the Swedish and Sociotechnical traditions needed to be changed. This concept of adapting Lean Production to national and organisational contexts is now widely referred to (Seppälä and Klemola 2004; Friel 2005; Bhasin and Burcher 2006).

## **5 Conclusions**

The applications of Lean Production at the two manufacturing companies were not copied from existing theoretical concepts. Instead, they were consciously adapted to the local organisational and national cultures with the purpose of becoming more acceptable and more effective. After the introduction of Lean Production in two manufacturing companies, the employees in production were more positive than negative to the new way of working, although they identified both positive and negative aspects of the production concept. There was agreement that the demands for quality, productivity and performance had increased as well as management control. Working conditions had improved regarding a clearer structure of work and opportunities to participate in continuous improvements. Lean Production offered usable participative tools that showed positive results relatively quickly. On the negative side was loss of freedom in paced assembly line jobs and a higher work pace. However, newly employed persons without experiences of the previous work system accepted the assembly lines and the shorter cycle times better. The employees in both companies considered that they had not been given sufficient information and education about the new concepts.

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