

PROSPECTS FOR IMPLEMENTING LAST PLANNER IN THE CONSTRUCTION INDUSTRY

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ABSTRACT

This paper presents, from a lean construction perspective, the results of a national study about production planning, involving building companies in Sweden. Collection of information includes field studies, an electronical survey and interviews with project managers and site managers. As a result of gathered information, common means regarding planning projects is being presented, as well as a compilation of the planners' requirements and desideratum. Lean construction is discussed in the relation to results showing that the respondents were unfamiliar with theories about planning e.g. the Last Planner system.

Many of the approached respondents in the study are of the opinion that their planning knowledge is insufficient and that they are in need of education in order to improve their planning ability, resulting in more profitable projects. Also, the study shows a desire to involve more people in the planning activities, such as physical workers and subcontractors. The will to improve the planning process in combination with a desire to involve more personnel are distinctive conditions to raise the industries knowledge about Last Planner.

KEY WORDS

Production planning, Last Planner, survey, interviews, Sweden, subcontractors, physical workers.

INTRODUCTION

The purpose of this paper is to illustrate the level of standard for the planning abilities in the Swedish construction industry. In order to show how well the construction industry actually performs, information has been gathered from construction sites around the country. The information is used to clarify the conditions for implementing the Last Planner system in the Swedish construction industry.

There are a numbers of different techniques that can be used when planning a project, e.g. the Last Planner system. This planning technique has been around for

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many years⁴, but still, it is for practitioners in Sweden⁵ only known as a theory, if even so.

According to Ballard and Howell (1997), it has been claimed that the Last Planner system potentially can increase productivity and reduce variability in construction projects. Also, the Last Planner system tends to increase the plan reliability creating a greater control of the production. (Ballard, 2000) By using the Last Planner system it is easier to avoid the uncertainty of the construction processes, the difficulties with variations of production and the commitment to deliver according to plan. (Ballard, 1994 and Howell, 1999) An evidence of the Last Planner system's effectiveness is the fact that it has been implemented with successful results in the construction industry in a large number of companies from several countries (Ballard and Howell, 2003). The way Last Planner manages commitments and the stability it creates in the production are main reasons why it is a successful planning method. (Vrijhoef, Koskela and Wiendahl, 2005)

The Last Planner system is a short term planning system that focus on what can and will be done. On weekly basis, the plan is divided into activities with a connection to a specific subcontractor or a specific installer. Weekly meetings are held with concerned personnel, establishing the short plans and summarizing the previous week's activities and measuring the Planned Percentage Completion (PPC). The PPC is a measurement that indicates how well the constructions site's production and planning is correlating. (Ballard, 1994)

The Last Planner system works at its best in a paradigm in which all personnel are driven by the will to improve. This means that the commitment from top managers, subcontractors and installers needs to be high for the Last Planner system to fully function. This also means that the knowledge of how the Last Planner system works and what it is suppose to generate needs to be substantial among both subcontractors and installers as well as the site managers. Especially the subcontractors need to be informed of what is expected from them in terms of plans and resource forecasts. (Johansen and Porter, 2003)

PLANNING – A CASE STUDY (Friblick and Olsson, 2009)

The study is based on information through a triangular method, meaning that information has been gathered in three ways, with different perspectives. Initially, an electronic survey was carried out. 270 employees⁶ from both large and minor construction companies in Sweden participated in the survey which had a percentage of answers at 59 %. The survey was followed by 20 in-depth interviews, with site managers and project managers. The questions were of more detailed character than the ones in the survey and the interviewees had the opportunity to elaborate their answers. In connection to the interviews, field studies on ten construction sites were carried out, in order to create a visual picture of the planning.

⁴ The first published mention of Last Planner was in a paper presented at the founding conference of the IGCL (Ballard, 1993). The first publication devoted explicitly to Last Planner was in 1994 (Ballard, 1994).

⁵ Based on 20 in-depth interviews with project managers and site manager in the Swedish building trade

⁶ project managers, site managers and project engineers

KNOWLEDGE AND WILL TO CHANGE

Based on interviews with site managers and project managers, there is a broad awareness of the importance of planning. One of the interviewees point out that it is important that the whole company is of this opinion: *"In our company, it primarily revolves around lifting planning higher up on the agenda, and planning should be spoken about as something of great importance"*

There is a will among the respondents to improve planning. On the question how planning should be prioritized in future improvement efforts, the result is speaking for itself. Average of data visualized in figure 1 is 6.8 on a scale from 1-8, where 8 correspond to: give planning a very high priority.

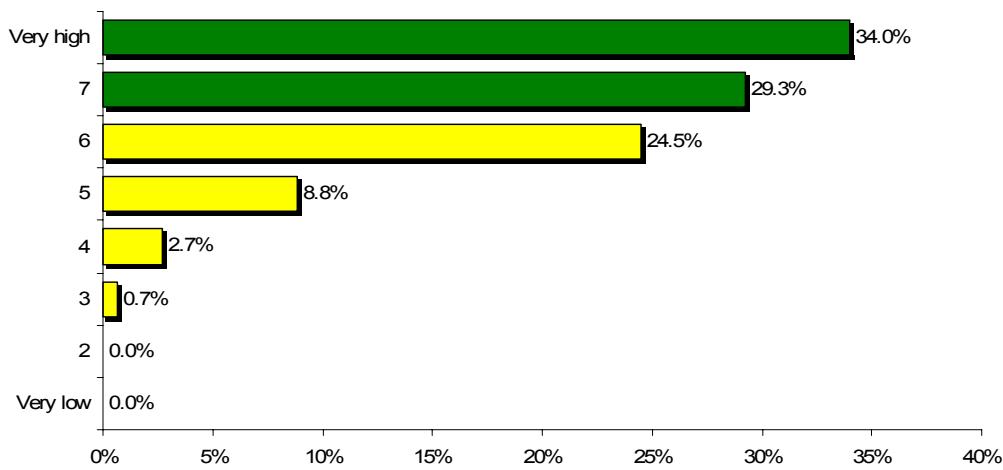


Figure 1: How Planning Should be Prioritized in Future Improvement Efforts

Many of the interviewees consider prioritizing planning quite a challenge. For example project managers and site managers are generally hesitant to spend a lot of time in front of the computer, drawing detailed plans. At the same time they are aware that doing so will lead to a more continuous flow in the production.

Some people argue that even though there is an understanding about the importance of planning the road of least resistance is chosen, leading to the prioritization of more practical activities. This is despite the fact that several interviewees explain that in their experience serious consequences arise as a result of planning, not having been given the necessary prioritization.

The survey also asked if the respondents were of the opinion that there is a palpable connection between well planned projects and profitable projects (data visualized in figure 2). More than 70 % of the respondents definitely considered there to be a significant connection. The average value in the figure is high, 7.55, which indicates that the Swedish construction industry is well aware of the importance of planning when it comes to increasing project profitability.

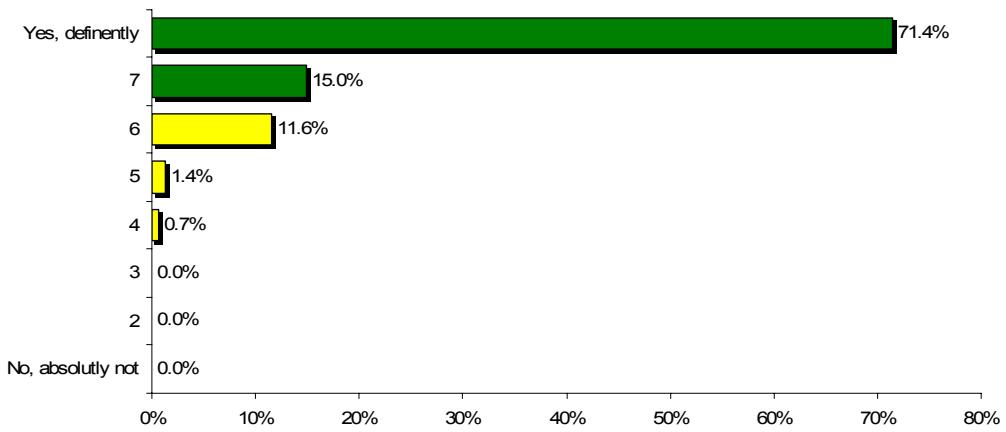


Figure 2: Whether Improved Planning Generates More Profitable Projects

INVOLVEMENT OF RESOURCES

When asked to what extent the respondents would like to participate in the planning process, almost every project manager, site manager and site engineer replied that they would like to become more involved than they are today.

There is also the opinion that all active personnel involved in a project should participate in the planning process, see figure 3. The average value of data is 6.23, which indicates a strong standpoint for the involvement of all relevant personnel.

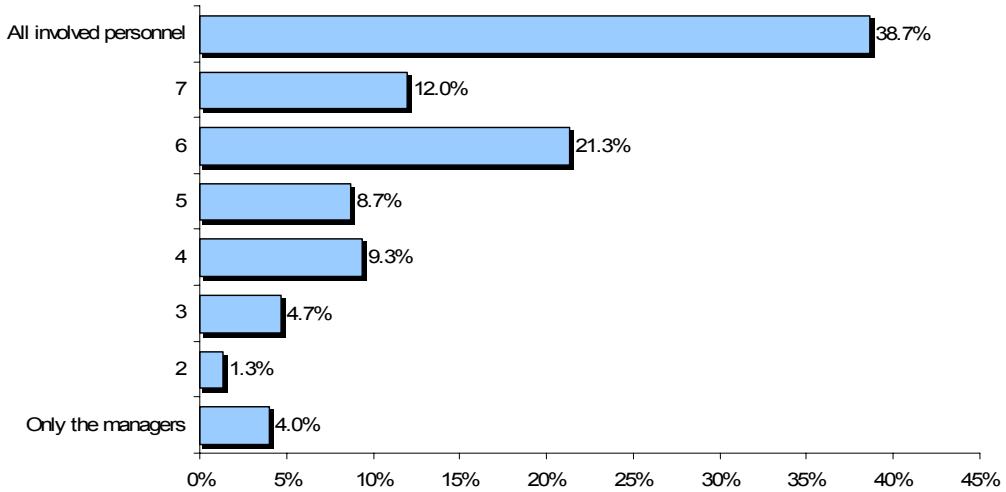


Figure 3: People who Preferably Should Plan A Construction Project

The viewpoint that relevant personnel should be involved as early as possible has been expressed within interviews. By doing so, everyone gets a clear picture of the project and can thereby work towards a common goal as well as solving problems in an early stage that otherwise would have to be solved in the construction phase, which can be very expensive. In Figure 4 is a visualization of how the ability to influence cost decreases as project time passes.

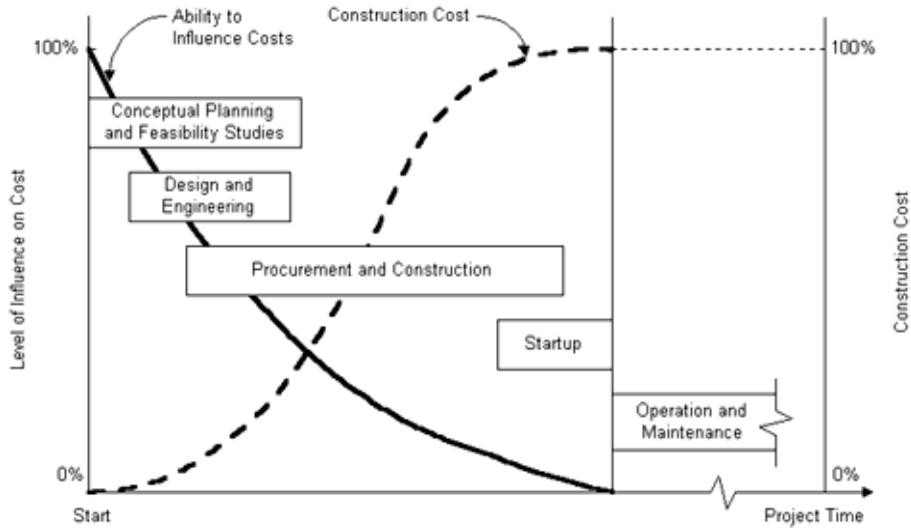


Figure 4: Ability to Influence Construction Cost Over Time (Hendrickson, 1998)

INVOLVEMENT OF PHYSICAL WORKERS

Despite the prevalent opinion that everyone involved should participate in the planning process, the physical workers are only marginally involved according to the answers given in the survey, see figure 5.

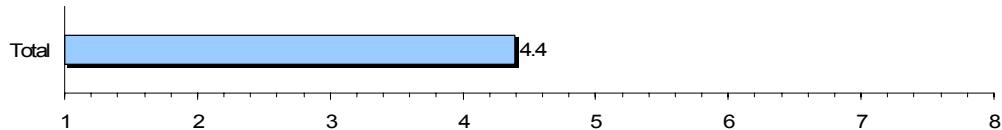


Figure 5: In which Degree the Physical Workers are Involved in the Short Term Planning. (1=Low Involvement, 8=High Involvement)

The interviewees are not of the same opinion as the respondents of the survey. The majority of the interviewees claim that the physical workers often are involved in the planning process. It is, however, stated that the plans usually are created by the management and first thereafter given to the physical workers for confirmation that activities and durations listed within are reasonable. This procedure is considered to involve the physical workers in the planning process.

There are also projects where physical workers are involved in the planning process to a higher degree, where great value is drawn from their experience by having them assign likely durations for their corresponding activities. This is considered to work well, creating a higher value to the planning process. One of the interviewed project managers points out that by giving the physical workers more attention they tend to take his viewpoint into account to a higher degree.

INVOLVEMENT OF SUBCONTRACTORS

According to the survey, subcontractors, like physical workers, are not particularly involved in the planning process. See the average opinion in figure 6.

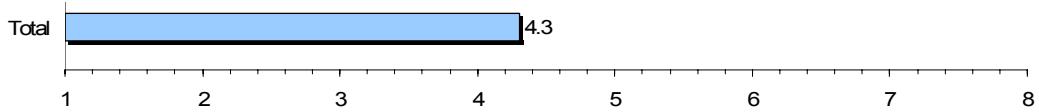


Figure 6: In which Degree the SubContractors are Involved in the Short Term Planning. (1=Low Involvement, 8=High Involvement)

The interviews confirm the survey's result. The majority of the interviewees do however say that meetings are occasionally held with subcontractors where they are encouraged to give feedback on the plans. Even though often enquired after by the project manager, the subcontractors are often reluctant to share their plans. The suspected reason for this is that the subcontractors do not want the contractor interfering with their plans. There is also reluctance from the management to give the subcontractors too much influence over plans. The suspected reason for this is a tendency among the subcontractors to blame their own delays on the general plan.

IMPLEMENTATION OF LAST PLANNER IN SWEDEN

In addition to the information gathered regarding the planning ability in Sweden experiences and data are used from a number of pilot projects in which the Last Planner system has been used.

Last Planner has been tested on several construction projects in Sweden with positive results. Since the actual results are complicated to measure though there are many factors involved, all personnel on the involved projects have participated in surveys before and after implementation of the Last Planner system. The results of this survey indicate that the estimated total time of working with non-value adding activities decreases because of elimination of waste, such as rework and waiting, see figure 7. A non-value adding activity is according to Womack and Jones (1996) defined as "*an activity that uses resources without creating any value for the customer and added design of goods and services that fail to meet customer needs*".

Figure 7 show that by spending more time on planning, the production ends up with gained production efficiency, generating a higher profit. One pilot project did, according to estimated time assumptions, increase its efficiency of labor with 8.7 %.

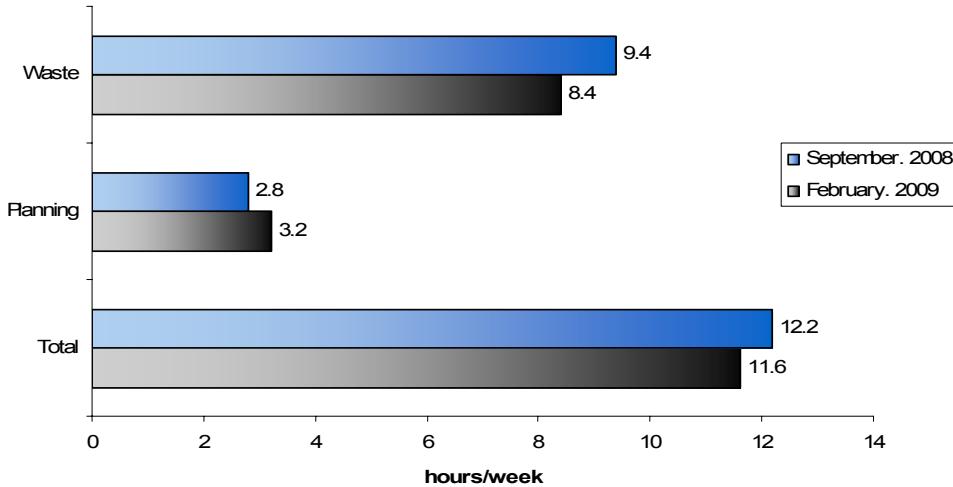


Figure 7: Estimation of Hours Working with Non-Value Adding Activities (Waste⁷ and Planning) Before and After Using Last Planner

DISCUSSION

The case study clearly indicates that planning is an important factor for successful production. As a result of this, construction managers have shown a great interest in strengthening their knowledge regarding planning and scheduling. This interest should be of great importance for top managers at the construction companies, since it gives them the opportunity to implement better planning methods. There are numerous of methods to choose from when planning, but notable is that interviewees never mention any of these and when asked they say that they are not familiar with any.

The concept of Last Planner is a great example of how theoretic planning methods can help project managers including more people in the planning process and at the same time raises the level of knowledge. One great problem regarding the implementation of the Last Planner is that the knowledge of the method among the construction managers is almost non-existing. This results in managers not knowing why Last Planner should be used and what the benefits are. This is the main obstacle to overcome in order to implement Last Planner, fulfilling the building trade's requirements.

Main fields have been identified in order to raise the planning ability in Sweden. The importance of involving all the members of the project in the plan instead of only the managers is the distinguished one. Physical workers as well as subcontractors need to be involved in the short term project plan to make it reliable and effective. Although it is expressed that physical workers and subcontractors should be involved in the planning process, they are not. The reason for this can only be speculated. But according to Johansen and Porter (2003), trying to implement Last Planner in a

⁷ Rework, waiting, looking for and getting material, inefficient use of time and receiving deliveries.

project in UK, there seems to be a cultural issue in getting the subcontractors to adopt the methodology. Also, there might be a lack in understanding the benefits by involving more personnel in the planning. The managers levels of consciousness about this need to be raised with the purpose to facilitate the implementation of Last Planner.

Last Planner has been implemented in projects all over the world. Kim and Jang (2005) showed that Last planner improved the work flow reliability when implementing it to a Korean project. They learnt by experience that managers need more experience and knowledge about planning, which according to our study seems to be the case in Sweden too.

In Brazil there are several examples showing that the Last Planner implementation in construction projects has been successful. According to Auada (1998) the time was reduced as well as waste such as re-work and waiting.

Evidently, Last Planner has been implemented successfully in several countries and it tends to improve the projects profitability. Considering this the Swedish building trade should also adapt this way of working, in order to develop in the same direction as the rest of the world. The construction industry in Sweden has good conditions for implementing Last Planner, although there is a gap of knowledge regarding Last Planner to fill to improve the planning. Figure 8 shows conditions in the Swedish building trade and points out the obstacle for implementing Last planner.

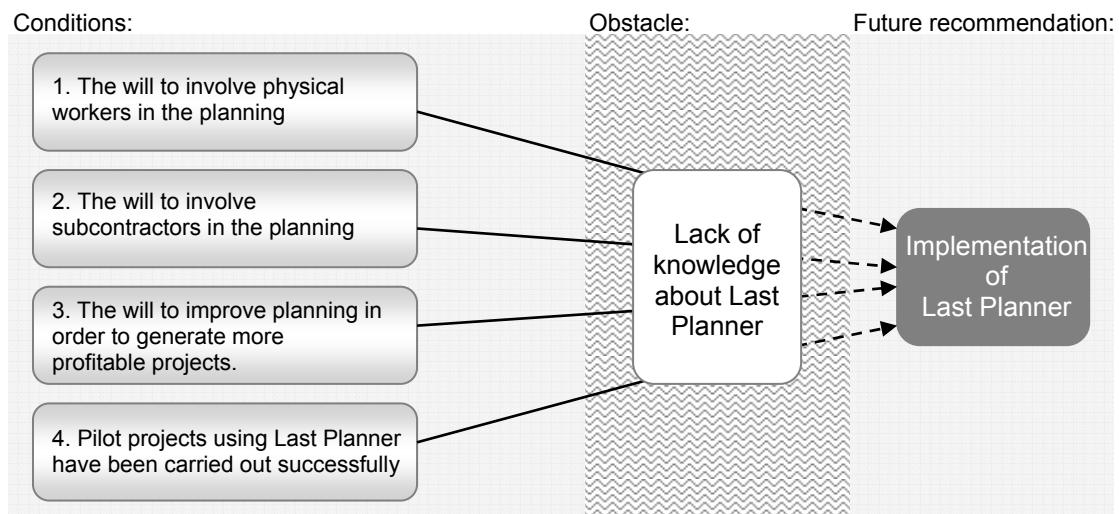


Figure 8: Mapping of Conditions, Obstacle and Future Recommendation

CONCLUSION

The common view is that better planning leads to more successful projects. Planning is seen as one of the most important conditions for managing a prosperous project. This is in combination with the will to change is a perfect start for making continuous improvements and eliminating waste in the construction industry.

Preferably, Last Planner should be implemented in more projects in the Swedish construction industry in order to raise the planning level. In order to manage a successful implementation the purpose of Last Planner should be clarified to practitioners who are the ones in need of knowledge in order to improve their daily work.

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