

TEN YEARS OF LAST PLANNER IN FINLAND - WHERE ARE WE?

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ABSTRACT

The objective of this paper is to evaluate and summarize the diffusion of Last Planner in Finland in the past ten years. As Last Planner is a method to manage in a “lean manner”, its implementation in to use has required and requires a somewhat painful change to the fashion of “command and control” management. The efficient and successful use of Last Planner requires understanding of the lean concept.

The implementation is examined through analyzing pilot projects, education offerings and company policies from 2003 to 2011. The different mechanisms of spreading the idea and implementing the method are illustrated by mini cases. The research questions are: How has this “dance of change” of implementing Last Planner proceeded in Finland? What can be learnt? Where are we now? Are we at the tipping point?

Companies have explored the use of LPS mostly in pilot projects. Some have adopted parts of it, some everything and quite a few nothing. The use of LPS spreads in companies both vertically and horizontally. The basic idea from training and education creates new innovations of use at sites. People who have realized the gains take the method from an organization to another as they change company.

The findings from this evaluation of history show that Last Planner as a method can be adopted, but unless there is a understanding about the potential of Lean Construction as a production management model, the use of it seems to be a constant struggle. Our conclusions will contribute to the understanding of through which mechanisms spreading an innovation occur and how the practical implementation is realized in a lean construction context.

KEYWORDS

Last Planner System, site management, lean construction, production planning, implementation.

INTRODUCTION

For more than ten years, Last Planner System or parts of it has been implemented systematically in a number of projects and companies in different countries. The results have been most encouraging in regard to collaboration, productivity, cost, duration and safety. Even if its benefits are widely observed, it is also a common observation that the introduction of the Last Planner method to a site, into a company or into a country is not an easy and uncomplicated task.

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According to international practices, there are different learning pathways for those who want to implement Last Planner, for example self-study, a generic introductory workshop and a tutored and facilitated development programme applied on a live project (Mossman, 2009). Individuals have implemented LPS successfully after attending a one-day workshop, but according to Mossman (2009) it is fairly rare that someone successfully implements the whole System of Last Planner just from reading. In part this may be because ideas about and the theory underlying LPS are still emerging and there is as yet no definitive description of the current state of LPS. Change is continuous and best carried out by many (Senge et al. 1999).

The authors of this paper undertook to implement and disseminate the Last Planner System in Finland since 2003. Taking into account the positive start and the foreign encouraging examples, Last Planner should be widely used in Finland. Still its use has started to grow just in the last few years. The objective of this paper is to evaluate and summarize the diffusion of Last Planner in Finland in the past ten years. As Last Planner is an innovation and a method to manage in a “lean manner”, its implementation in to use has required and requires a somewhat painful change to the fashion of “command and control” management. The research questions are: How has this “dance of change” of implementing Last Planner proceeded in Finland? What can be learnt? Where are we now? Are we at the tipping point?

The implementation is examined through analyzing pilot projects, education offerings and company policies from 2002 to 2011. The different mechanisms of spreading the idea and implementing the method are illustrated by mini cases. The data for this paper has been collected partly through observations done in terms of consultancy assignments and coaching experiences, partly through systematic data collection in TuoVa-project³, and the thesis work done in construction companies implementing Last Planner ideas and tools.

The paper is structured as follows. First the ten years of Last Planner in Finland is described from the first four pilot projects implementing Last Planner in Finland to current situations. Then the implementation of Last Planner is presented by mini case examples of three types: (1) pilot projects, (2) the company way and (3) the word of mouth. The last set of mini cases refers to examples where people have started to make things happen after hearing and maybe reading about “the thing”. The findings of all of these implementations are discussed in order to evaluate what has this dance of change affected and are we at the tipping point. Finally, conclusions bring our thoughts together and set us on again on this continuous journey.

THE TEN YEARS OF LAST PLANNER IN FINLAND

FIRST TOUCH

The first Finnish pilot project in introducing Last Planner took place in the year 2003. Testing and training lasted for six months on four construction sites. A detailed

³ TuoVa-project (Managing factors influencing productivity of construction work, 10/2009...12/2011) was a research and development project financed by The Finnish Funding Agency for Technology and Innovation, nine major construction companies and The Confederation of Finnish Construction Industries RT (CFCI). R&D work was done in Tampere University of Technology in co-operation with Salford University, UK.

theoretical explanation as well as a simplified way of explaining and justifying the Last Planner System for construction professionals was developed. Site testing concentrated in

- Making weekly plans, where tasks don't have any constraints and the pre-requisites are taken care of.
- Getting participants to make commitments in the weekly plans.
- Checking the PPC (percent plan complete).
- Arising interest and starting systematic look-ahead planning, where the pre-requisites for the tasks to be done in the next couple of weeks are realised.
- Finding the reasons and explanations why the goals were not met and trying to learn from the past to prevent similar difficulties recurring in the future.

The first results were positive and parallel to those abroad. The degree of realization of weekly plans clearly increased, site personnel considered the method useful and it was seen to contribute to the elimination of problems. Taking the positive results of the experimentation and the foreign cases into account, the implementation of the Last Planner method was recommended in short term production control on construction sites in Finland.

After the first pilot project Last Planner seemed to settle down in Finland, but just as a method. The potential of Lean Construction as a production management system was not yet understood. Still, several individual construction managers used Last Planner, pilot projects were underway in two major contracting companies a Last Planner trainer certified by the Lean Construction Institute offered training and facilitation and the Confederation of Finnish Construction Industries (CFCI) published a manual for Last Planner (Koskela, Koskenvesa & Sipi 2005).

FURTHER DIFFUSION OF LAST PLANNER

After the first experiment similar experiments were conducted in a many companies and on many sites. Word spread around, people got to be interested in Last Planner, articles were written in professional magazines and even some debate arose. All four of the companies, which took part in the pilot project, took part in other implementation projects of Last Planner.

Only one of the four companies took a good leap and started systematically working towards more reliable production by the means of Last Planner. They understood also that Last Planner is a technique that supports the Lean-approach as they understood the potential of Lean Construction as a production management system. This work is described in this paper under the topic "As a Company Way". Another company has started later by implementing through pilot projects. This work is presented in this paper in the part "Through Pilot Projects".

It would have been wrong at that time to assume that the production management paradigm had changed in our country. The years after proved that the implementation was actually even harder than thought at that time. In many cases first there was enthusiasm and planning was done well, but after a couple of weeks transparency of the production planning brought up such activities or non-activities that one started to avoid using the system. People went from a feeling of comfortable stability into a

feeling of panic. People seem to be happy staying in a comfort zone where people generally don't need to learn new things and therefore don't change.

CURRENT SITUATIONS

Last Planner is in use in some form in many companies. As Last Planner is a technique to protect production process from variability, it works better when the production process is designed to be achievable. This idea and understanding of flow and reliability is not yet the key priority, but somehow it feels we are on our way. People working for major companies have opened their eyes and the meaning of trust, reliability and stability in production have become an issue.

Productivity is the word that seems to count. Many researchers have stated that reducing plan variability helps increase productivity, such as Tommelein et al. (1999) demonstrating the effect of flow variability and Liu & Ballard (2009) suggesting a regression line between plan reliability and productivity. Also already Alarcon et al (1997) showed the difference in productivity before and after implementing the LPS. As Last Planner offers tools, which measure, the risk of concentrating on tools is evident. Flow and value of the production are easily forgotten when concentrating on the traditional productivity and only to the transformation embodiment of production. Also understanding the true meaning of continuous improvement stays in the shadow of measurement results.

Not only contractors, but also constructors have gotten interested in Last Planner and Lean Construction. Especially on the infrastructure sector, "Lean Thinking" and examples from abroad seem to have caught fire. Infra Contractors Association and key stakeholders of the whole branch (constructors, designers and contractors) have started several projects where lean tools are implemented, also Last Planner.

MINI CASES – THE DANCE OF CHANGE

In this chapter we present three forms of "learning" Last Planner or implementation strategies: First through pilot projects, secondly as a company way and thirdly more or less intuitively through the word of mouth.

THROUGH PILOT PROJECTS

In this company management had observed that weekly planning on construction sites does not meet the demands. A series of pilot projects and case studies were conducted. Two of them - an office-building project (A) and a large housing project (B) are presented. The main objective of these case studies was to create a culture of collaborative phase scheduling and to improve the quality and execution of weekly planning by the use of Last Planner method.

Pilot project A was documented as thesis by a graduate student. The first and second phase concentrated on weekly schedules. In the third phase production plans were made together with the subcontractors in phase scheduling sessions facilitated by the help of a consultant. The collaborative planning session was considered to be important as it forced the parties to plan future work. Still the plans made could not be kept very well. Changes were happening all the time and promises could not be kept. PPC was around fifty. Pilot project went on for just the time the graduate student and consultant kept their interest on the site.

Thoughts collected from the stakeholders of the project illuminate what was happening on this site during the Last Planner implementation.

"It was a success, in the sense that we got everybody to come along and consider their work." –Site manager

"The phase planning was of no use on this site. It fell behind already on the first week. The only use was that everybody now knew their own shares." –Subcontractor

"Collaborative phase planning is needed when the main contractor doesn't know his own job. Last time they almost made a huge mistake, which I pointed out to them... I think it is pointless." –Subcontractor

"Once you do them for a while and you see that plans just do not work, you stop filling out paperwork and just start building." –Foreman, main contractor

The subcontractors' comments on collaborative phase planning were from people with prior experience with Last Planner planning from other work sites. They had used collaborative phase planning as a part of regular production planning and not just briefly tried it. They were frustrated. The main contractor's representatives' experiences are only from this concise experiment. They saw that it was useful. The degree of understanding and commitment has relevance. What is enough for someone is not enough for another. Still collaborative phase planning improved overall understanding of the project and how everyone's work ties in with the others'.

Pilot project B was managed strongly by the unit manager of the construction company. He came to the phase scheduling sessions with a consultant, expressed the importance of collaborative planning and demanded for answers and promises. All the contractors involved at the time to site operations attended the meetings.

Meetings were held efficiently and feasible schedules were made. Parties made promises and even kept them. Early winter, which came to Finland already in November in 2009, challenged the site and their production planning. Still they kept their target of starting the installation of the main frame of section A from floor one in the beginning of February.

"The phase planning can be useful in other stages as well, if it's really kept up to date. When a plan falls behind, you really have to intervene and make corrections on the way, instead of just standing by and saying you're doing what you can. When a plan is altered, you have to have everybody present. Nobody can move other people's tasks around without asking." –Subcontractor

Thoughts on the collaborative phase planning were positive. The schedules were made into the form of location-based line of balance after each meeting and distributed to all of the stakeholders. Production rate and milestones were easily detected. Planning and targets were transparent. Everything seemed to go well, but still something was missing. Site manager stayed a bit on the background in the phase planning sessions. Real passion and commitment did not show. Site engineer was much in charge with the visiting unit manager and the outsider consultant. Phase plans were great, but the good atmosphere of phase scheduling session and quality of plans did not embrace interest on weekly plans. Site manager did not require subcontractors to do them with the carefulness needed.

"The idea is good but you know the reality once you've become competent and know how things work." – Site manager

Things started to slip and the site engineer got tired of taking care of the weekly plans. Phase planning sessions were kept between longer intervals once the consultant

did not participate anymore. Seeds had been planted, seedlings rose, but somehow the watering of the plant did not work.

AS A COMPANY WAY

This company did not see making schedules as the problem on work sites. Problems lied in seeing the benefits gained from schedules, using schedules as an instrument in managing the site and implementing the schedule when delivering the project to its targets. The company realized that this anomaly could be grasped when new phase and weekly planning methods are taken into use. Company saw that developing production planning practices should have an influence to problems associated with productivity, safety, logistics, prices of subcontracting and to their whole company strategy of efficient supply chain and securing efficient subcontractor resources.

Company management went out with a clear message of reasoning. Productivity view was explained through examples of non value-adding and value-adding work (30% of work, 30 % moving, 40 % waiting). Examples of productivity, logistics and sub-contracting pricing were easy to understand, when these messages were talked about in meetings, presented in teaching and coaching situations, distributed both in company intranet and as brochures. The main issue was “reliability”.

Company defined the tasks for better reliability to everyone in the company production chain. The managing director defines the focus and monitors the development of reliability, the unit manager tells his subordinates why reliability is important, secures and supports the site managers so that reliability is measured, talks about reliability and makes it a issue in design meetings, subcontract meetings and supply meetings, and so on through the chain of project manager, site manager, foreman and work team. Everyone was involved.

Reversed phase schedule, weekly plans and 5-why were the key instruments. Company management had a Last Planner expert from abroad working with them. A support person worked with the sites so that new ways and ideas were implemented with the same style around the country. Developing and implementing was done also using thesis work and graduate students. The objective of these development projects was to create short and compact prescriptions. Based on user surveys and experiences, checklists were created to help the arrangements of successful meetings, making pre-requisites ready, creating feasible weekly plans and 5-why process.

WORD OF MOUTH

Word of mouth is a strong instrument in creating change. Also being involved in the change, taking own responsibility and engaging yourself can be the glue that makes the will of change to stick.

I have heard. A unit manager wanted to have real concentration on production planning and collaboration of all the stakeholders in a special high-rise building project. A coaching session was held for the site management of the main contractor. Last Planner as a method became familiar to them. In a couple of weeks time the first phase scheduling session was held with all the main subcontractors attending. After the session a joint phase schedule was the basis of look-ahead planning and taking care of pre-requisites. After two months the project manager called and asked could he use our material in their fairly difficult renovation project. This was because the

constructor (an industrial company) insisted on using Last Planner after they had heard so much good about it from the contractor. The word of mouth works.

Tray of tools. In TuoVa-project (10/2009-12/2011) researchers and company representatives realized that the only real way to gain results was to invest in the staff. Consultants and company experts could keep things going, but what happens when they leave. In the last phase of TuoVa-project we chose the way of “small steps” instead of trying to take a leap. The idea of going slow in the beginning will allow to go fast later on. Site managers got to choose from a “tray of tools” what tools they would like to use. Look-ahead planning, collaborative reversed phase scheduling, A3-task planning (making ready) and weekly planning were chosen according to site-specific needs. Enthusiasm on the sites and among the site managers was easily detectable. You engage when you realise the need and you participate in making the commitment yourself.

Own innovation. A group of experienced site managers took part in a long-term training. One part of the training was production planning (task planning and Last Planner). After the two-day session participants had an idea of Last Planner as a system. Two of the professionals were working on the same site and they went from reflection to action right away. They made the air-raid shelter of their housing project to a “big room” where the work groups, foremen and site manager planned the future weeks on a chalkboard. This board was made by painting one wall in the shelter with magnetic paint and then on it with chalkboard paint. For planning they used small magnets, chalk and Post-It-stickers. Innovations create new innovations.

DISCUSSION ON FINDINGS

HOW HAS “DANCE OF CHANGE” PROCEEDED IN FINLAND

The key principles of Last Planner System have been characterized: (1) plan in greater detail as you get closer to doing the work; (2) produce plans collaboratively with those who will do the work; (3) reveal and remove constraints on planned tasks as a team; (4) make and secure reliable promises; (5) learn from breakdowns.

The main functions of Last Planner are collaborative planning and making ready – process. Both the principles and main functions are important in implementing Last Planner. For some site managers and other project stakeholders these principles and functions seem to differ from the prior way of working so much that there are major difficulties in the implementation. Planning in detail as late as possible, working in a team collaboratively, looking-ahead in revealing and removing constraints, making promises and keeping them, revealing mistakes and problems and even more learning from breakdowns are unfamiliar, slightly scary, revealing and involving ways to work. This does not seem to fit all of our project people.

Development is changing. The findings from the projects in Finland from the last ten years show how the practical implementation of Last Planner is realised. There are challenges of initiating change, sustaining momentum after some progress has been achieved and rethinking when change initiatives gain broader credibility and confront the established internal infrastructure and practices of the organisation just as Senge et al. (1999) state. It is easy to say: “This does not work – we will stop trying and go back to the old way”. We should be saying: “This did not work this way – what should we do otherwise to make it work”. The idea of continuous

improvement, plan – do – check – act, should be the way to work also in developing our operations and performance. That is the real dance of change.

Have we reached the “tipping point”? According to Gladwell (2009) three things characterize “The Tipping Point”: (1) contagiousness, (2) the fact that little causes have big effects and (3) that change happens not gradually but at one dramatic moment. Last Planner as an innovation has been implemented in pilot projects and try-outs, tested and shaped. Some parties have made it a company issue or even a issue of the whole sector of the construction industry (Infra), graduate students have made studies and tried implementing the LPS or parts of it, the principles and main stages of the LPS have been taught to graduate students and to professionals as a part of their education, companies have hired consultants and used their own personnel to implement the system.

The use of LPS spreads in companies both vertically and horizontally. The basic idea creates new innovations of use at sites. For some, new ideas and tools seem to work well. People, who have realized the gains, take the method from an organization to another as they change employers. Pilot projects and implementations where the site manager has been committed to work for the change have been successful.

The diffusion has been more bottom-up than in other countries (Koskenvesa & Koskela 2005). Although we have good examples, successful implementation, company wide initiatives, there has not yet been a real locomotive company implementing Last Planner systematically and widely in its activities. One explanation to the inertia observed was that many key professionals (Junnonen 2010) seem to subscribe to the conventional production control methodology. We have not reached the third trait – the idea that epidemics can rise or fall in one dramatic moment.

WHAT CAN BE LEARNT FROM THE TEN YEARS OF IMPLEMENTATION?

In our opinion the ideas behind Last Planner are accepted widely also in Finland. Almost everyone says reliability, flow and value generation are important things in production. Almost as many agree on principles such as continuous improvement and respect for people. Still, when we should change the way we have been used to work, the attitude towards these “good” things changes too. According to our findings mainly four things hinder us from making the leap. These findings are (1) the incredible power of the master schedule, (2) difficulties in revealing problems, (3) contracts that prevent collaboration, and (4) the misunderstanding of development.

Making do (Koskela, 2004) – the “eight waste” – is a severe problem on Finnish construction sites causing an enormous amount of waste (muda) in the form of uneven production rate (mura) and unreasonable circumstances (muri). Work is done to keep the schedule. We are buying “keeping the schedule” at the expense of productivity, flow and value. There is no sense in doing a task just to keep a contract or a main schedule milestone if this requires opening the structure later (for example suspended ceiling is closed before the electricity and water pipes are installed), but still we do this and the customer pays the bill. What is the flow and what is the value? Not much. Still, we can buy time on a construction project. This is done through planning and the price is effort and conviction (Ryan, 2009). In return we get a project delivered on time and in budget. Somehow this equation of reliability is just so hard to believe in among the project professionals. Management tools, ways and

means to set targets and objectives have been used for decades and this culture is hard to learn away from.

Our big challenge is in announcing problems. People are not used to talking about problems and mistakes out aloud. Last Planner System is built on the idea of not allowing problems to be hidden - “problems are the jewels”. On construction sites most problems are never reported. Maybe we think we will “get into trouble”. The “blame game” holds more peril than one might think for companies intent on improving processes and products (Keller, 2010). Leaders and methods they use must promote problem discovery, problem announcement and problem learning. Variances to our expectations are the opportunity to learn and to start the cycle of improvement (P-D-C-A). Toyota claims that over 80% of all their improvements start and finish with Good 5-Why™. Still it seems one of the reasons LPS is not considered to be a convenient method in managing a Finnish construction site is the fact of transparency. Problems, concerning every stakeholder, come to the daylight. We are not used to that, but we are on our way.

Trust is the foundation of relationships. Scholars and practitioners widely acknowledge trust's importance. Fernando Flores proposed that, “the work of business is making and keeping commitments” (Flores, 1982). This definition puts people at the center as they organize themselves to deliver on the promise(s) of the project to the client (Macomber & Howell, 2003). In many cases contractual difficulties are faced when people come together to plan a phase in a reversed phase schedule session. Contracts and schedules that have been made without the needed and relevant information tie our hands. Contracts and clauses become sand in the wheels of collaboration. Trust production in construction is characterized by a strong emphasis on institutional trust (thin trust), while relational trust (thick trust) is neglected. In this weak trust context contracts influence trust negatively, since changes tend to produce tensions (Kadefors & Laan, 2010).

CONCLUSIONS

The findings from this research contribute to the understanding of through which mechanisms spreading an innovation occur and how the practical implementation is realized. It is obvious that one cannot buy solutions for better performance, productivity or efficiency. Development is needed and it is happening through channels of teaching, coaching, testing and implementing. Ideas and practices spread vertically and horizontally in organizations through people.

Last Planner has been contagious in Finland the past ten years. Looking at the change at the moment the speed of contagion is on the rise. Changes in our production planning ways and methods are not big, but they are important. Toyota Production System has two pillars – “respect for people” and “continuous improvement” that are imperative to any change. It is the actual way we do things, how trustworthy we are and how we treat one another, which make the difference. Little things count.

Last Planner as well as Lean Construction as a whole, give a perfect opportunity to work towards better performance and project delivery creating real value in a way that gets its legitimacy from protecting production process from variability and power from respect for people and continuous improvement. To become a real predominant practice, people have to have the knowledge of what and why, skills of how to act

and most importantly the will and desire to do. A big motivator for the use of Last Planner would be the understanding of the potential of Lean Construction as a production management system. The work on implementing Last Planner and spreading the ideas of Lean construction continues. When the will spreads like epidemics, we are at the tipping point.

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