

WHAT IS SEEN AS THE BEST PRACTICE OF SITE MANAGEMENT?

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ABSTRACT

The effect of management on site performance and productivity is presented by a number of researchers (Chormokos & McKee 1981, Arditi 1985, Banik 1999, Salminen 2005). Site managers play one of the key roles in the overall project success (Djebani 1996, Styhre & Josephson 2006). As superior managers are said to be almost twice as productive as their underperforming colleagues (Schmidt & Hunter 1998), the way we manage and lead our sites makes a big difference.

The objective of this paper is to evaluate what kind of site management is considered to be “good”, what do construction companies in Finland see as the best practice and how does this “best” differ from others. To achieve the objective both a literature review and a set of interviews were conducted.

Eleven top foremen were chosen by their employers mainly due to their ability to achieve the targets concerning time, schedule and quality. These top site managers shared their “best practice” views on managing factors affecting work site and construction productivity in a series of interviews in spring 2011.

Based on these interviews, the main factors affecting productivity on the sites are scheduling and the temporal management of the work site. The quality of design, the scheduling of the design process and the quality of resources were also viewed as strong factors affecting the opportunities of advance planning and site performance.

KEYWORDS

Site management, best practice, continuous improvement, respect for people, scheduling

INTRODUCTION

There is a consensus on the important influence site manager exercises in ensuring the success of a project (Wakefield 1989, Lovell 1993, Djebani 1996, Akintoye 1998, Salminen 2005, Simu 2009). Leadership qualities and interpersonal skills of site managers have been recognized as a prime key to achieving good performance (Bresnen et al. 1986, Mustapha & Langford 1990, Djebani & Lansley 1995, Farrell & Gale 2000, Savinainen et al. 2011). Important, critical, influential, stressful, tough and hard are some of the words used to describe the work of a site manager.

A question we want rise is “How is this job of managing a construction site done well?” As McKelvey (2006) argues, practitioners do not care about averages; they

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want to know how to identify good and bad leaders. The objective of this paper is to evaluate what kind of site management is considered to be “good”, what do construction companies in Finland see as the best practice and how does this “best” differ from others.

In order to understand what we know and should know a literature review was made on following topics: traditional management and leadership views, construction site manager as a leader and the ideas of Lean Construction on management and leadership. Conclusions of the literature review are presented.

To evaluate the “good practice”, eleven top foremen shared their views on managing factors affecting work site and construction productivity in a series of interviews in spring 2011. Excerpts from these interviews are used in this paper to express the ideas site managers have on managing a productive construction site.

The findings from this research will contribute to the understanding of state of the art in management of sites and the variety of ways to be “successful”.

LITERATURE REVIEW

“He is a good manager making good quality”, “His site is so mixed up, that nothing works”, “On her site things go smoothly and things happen on time”, “He is never on schedule”, “He knows what he is doing and respects the other stakeholders on the project”. These kinds of opinions and a considerable amount of other folklore is spread and talked about in the construction industry surrounding the factors and characteristics that influence the effectiveness of construction site managers.

ON MANAGEMENT AND LEADERSHIP

Management and leadership are two sides of a coin. The concept of management can be traced back to Sumerian traders and to the builders of the pyramids of ancient Egypt. Still, it was not until the 18th and 19th century when classical economists provided a theoretical background to management as resource-allocation, production, and pricing issues. The first comprehensive theories of management appeared around 1910-1920. Henri Fayol’s work was one of the first statements of a general theory of management (Narayanan & Nath 1993). Many of today’s management texts have reduced Fayol’s functions to four: planning, organizing, leading and controlling. The durability of this model is surprising (Woodall and Winstanley 2005).

The term “leadership” has been used in English commonly since the 18th century. According to Ralph Stodgill (1974), the Oxford English Dictionary in 1933 notes that the first signs of the word “leader” are from the year 1300. Earlier than that the words “chief”, “king”, “head of state”, “princess”, military commander” or “proconsul” were commonly used and had from the societal viewpoint, the same kind of meaning as the word “leader” (Stodgill 1974; Yukl 1989).

Since the concept of leadership has been used to describe a person, in general a man who acts with other people and makes them follow him and his orders, it has been theorized, defined, conceptualized, described, typified and characterized innumerable times through centuries (Poutanen 2010). Stodgill (1974) points out the multitude of different definitions of leadership in the Handbook of Leadership. For example Rost (1991) examined 587 books, book chapters and journal articles written in the years 1900-1990 and he found 221 different definitions of leadership, which he

analysed. There are almost as many different definitions of leadership as there are persons who have attempted to define the concept” (Bass 1990).

SITE MANAGER AS A LEADER

Site managers carry out one of the toughest jobs in the construction process (Djebani 1996). Management of construction changes continuously (Wikforss and Löfgren 2007). Foremen’s actions impact directly on the productivity and final quality of the work they are responsible for. Thus, their performance is of particular importance for achieving the project’s objectives (Serpell & Ferrada 2006). Already in 1919 Henry L. Gantt wrote in his book *Organizing for Work* that “It is a foreman’s function to remove the obstacles confronting the workmen, and to teach them how to do their work. An average of the performance of the workmen is a very fair measure of the efficiency of the foreman”.

Site manager as the key person is susceptible to extreme pressure of work (Djebani 1996; Styhre & Josephson 2006) and often works alone, taking care of a variety of complex tasks on many different levels. Fraser (1999) crystallized some of the opinions concerning construction site managers in the form of ‘beliefs’ regarding the reasons that some managers are perceived as effective and some as ineffective. In 2000 Fraser came to the conclusion that only half of the identified personal characteristics appear to exhibit a relationship with the effectiveness of the construction site manager. Some facts seem to be taken falsely into consideration in the recruitment, retention and promotion of the site managers (Fraser 2000).

In their study Serpell and Ferrada (2006) identified three main critical activities of the site supervisor: 1) To plan the site and operational processes in accordance with tactical plan of construction project and company policies, 2) To lead internal and external work teams carrying out project construction in accordance with personnel management policies of organization and 3) To supervise the progress of construction activities and their execution, ensuring compliance with the organization’s quality system, safety and environmental standards.

The supervision of work seems still to be the most time consuming function for the general superintendent and the other superintendents; whereas work planning takes up only 15% of the site management’s time (Marjasalo et al. 2011). Savinainen et al. (2011) state that problems with material deliveries, constructability of the designs and mistakes and defects in the work itself cause most of the stress and workload to the site managers. In Finland managing the site operations is mostly seen as managing by contracts (Kankainen 2004). Managing is reactive, not proactive.

LEAN CONSTRUCTION VIEW

The history of Lean Construction can be traced to the seminal work of Lauri Koskela (1992). Another paradigm-breaking anomaly was the analysis that “normally only about 50% of the tasks on weekly work plans are completed by the end of the plan week” and that constructors could mitigate most of the problems through “active management of variability, starting with the structuring of the project (temporary production system) and continuing through its operation and improvement” (Ballard 1994, Ballard and Howell 1994, Ballard and Howell 2003).

In his dissertation Koskela (2000) established the Transformation-Flow-Value (TFV) model, which offers inspiration for the understanding of the nature of the

aspects of the construction project. According to the TFV-theory (Koskela 2000) the principles of production are: Realize value-adding activities efficiently (T); Reduce the share of non-value adding activities (F); Improve customer value (V). According to Koskela (2000) these three concepts of production need to be integrated and balanced. Although they all are necessary, the conversion model has dominated thinking, practice and management both in manufacturing and construction until recently (Ballard and Howell 1998, Koskela 2000). Still in 2004 Howell et al. stated that Henri Fayol's definition of management established the "common sense" of current project management practice.

Lean Construction presents a different way. Howell et al. (2004) argued that the historical "common sense" is challenged by a new definition of work and management put forward by Fernando Flores (1982). Flores proposed a different definition of management built on the idea that work in organizations is making and keeping commitments. When management of work is understood as "making and keeping commitments", the nature and focus of leadership and common sense changes. Producing reliability and trust is the essential role of leaders (Howell et al. 2004).

CONCLUSIONS FROM LITERATURE

Henri Fayol's model of management still describes a foundation of the operating paradigm of project management and leadership and the nature of work itself. The durability of this model is surprising. Lean Construction presents a different way. Constructors could mitigate most of the problems through "active management of variability, starting with the structuring of the project (temporary production system) and continuing through its operation and improvement".

Leadership, however explained, is a powerful concept, capable of conveying much more than can be contained within a concise definition and capable of meaning many different things to different audiences in different contexts. Leadership is about creating an impact. The search for the characteristics or traits of leaders has been ongoing for centuries. Underlying this search was the early recognition of the importance of leadership and the assumption that leadership is rooted in the characteristics that certain individuals possess. Leadership qualities and interpersonal skills of site managers have been recognized as a prime key to achieving good performance.

According to the literature our site management rather supervises than plans and makes pre-requisites ready. It is like we would not believe that an average of the performance of the workmen is a very fair measure of the efficiency of the foreman.

DATA AND METHOD

This study was made and data gathered as a part of a research project called TuoVa (Managing factors influencing productivity of construction work 2009-2011). In order to compare the difference of so-called "best practice" sites and "normal" sites an interview of companies' "number one" site foremen (N=11) was conducted in nine Finnish construction companies.

We know what the literature and former studies tell us about site managers and their competences or about productivity and factors affecting it. The main interest for us was to examine from different perspectives "what are the main factors affecting

productivity on the work sites from the site manager point of view". This paper also tries to describe the key success factors of site management.

The same researcher conducted eleven open thematic interviews, each lasting from 1.5 to 2.5 hours. The interviews aimed to discover and explore factors that make some managers and their work sites "top of the class". Each interview dealt with the key areas of project management, such as procurement, work planning and sequencing, quality and quality assurance, cost estimation and forecasting, scheduling and task planning, risks, environment and work safety. The interview transcripts span nearly 160 pages and contain more than 70.000 words.

The data was processed several times in detail. First, each of the eleven interviews recorded was written out into a text format. Secondly, the data was organized and analyzed according to each theme. The third step was tagging the text to ensure that the most relevant themes were picked up.

Data from 17 sites and nine companies was collected already a year earlier as reference material for a comparative research. The site management of these cases was evaluated and compared to those considered as the best practice by the same researcher conducting the interviews.

INTERVIEW FINDINGS

CRITERIA

Nine Finnish construction companies were asked to name one of those site managers they considered to be the best. Companies were asked to present also the criteria why did they pick just that person. For regional reasons eleven site managers were named and interviewed.

Out of these eleven in all cases one of the named reasons was "keeps the project in budget and schedule". Other freely formulated reasons named were "works according to the company system and makes results", "is an example to everyone", "takes also exceptional care of quality", "the cooperation with the client works always" and "knows how to manage big projects".

Following findings presented are some details of the open interviews of these highly valued site managers. Findings are presented mostly as quotations. The thoughts, ideas and explanations rising from these findings are presented in between the data and concluded in the Conclusions chapter.

GOLDEN TRIANGLE OF COST, TIME AND QUALITY

The first question was: what factors affect most the productivity on a construction site? The homogenous results can be exemplified by the following quotations:

"They say that time is money. How you use time is the greatest factor. You're not always on schedule, but it's not always because of the work site either."

"Productivity must be clarified in one's mind, to see which things create productivity – you have quality, money and time. If money fails, you can still be all right with time and quality. If quality fails, it can still work with money and time. But if your schedule fails, it's very rare that you can save it with quality and time."

ROLE OF THE SCHEDULE

According to the interviews, schedule is the most important production plan at the work site and the basis of productive activity. Creating a functional schedule necessitates getting to know the work site intimately. The following views of feasible schedules and the importance of constant work reinforce the notion:

"I believe very strongly in management through scheduling. In controlling the process from start to finish. And in being able to create such a main schedule, that it is realistic and feasible."

"In this line of work it's schedule, procurement and controlling logistics – that's what is done week in and week out."

"Not all subcontractors care about the schedule, and they don't necessarily understand it. But when you show to them and explain to them the schedule chain, that here you advance one week per floor, for example, go forward like this, and a week from the time you started the next contractor will come to start his work and starts following you. And then again a week per round and another contractor comes along and that's the chain and if you fail to meet your goals then the whole system breaks down."

CLAIMS AND COMPLAINTS

Conflicting views and practices were discovered on opinions concerning processing claims. Some see that complaints must be made immediately when they are required, and they must always be done in writing as others see that claims as well as fines for delays are the road to doom.

"It's not a tool I like to use, ... complaints are resolved by real cooperation, genuine partnership."

All the interviewees thought that mistakes should be reported in some way. Typically they wanted to sort out things by talking. The interviewees who found claims as a positive thing saw them only as reports of mistakes made by either party.

"A complaint is a positive thing. It tells you that someone cares about you. It should always be interpreted as a positive message."

DESIGNS ARE PRE-REQUISITES

Project schedules are tight. This has led to the maximal overlap of design and execution. Designers create design into project banks. Procurement and work site get schematics from the project bank, but the level of detail and feasibility are not always up to the standards nor set quality levels. The problems seem to be ubiquitous in the construction industry.

"I'd start from the designs, they must be in order. The work crew must be in order as well. I think that with those you can get a good result."

A product can be made according to design only when the designs exist and are feasible to execute. Both the quality of the design and following the procedures described in the schedule are crucial. Promises must be kept.

"If the designs are carelessly made from obsolete starting data and then moved ahead, like here's a schematic boys, build. Look it up from that and when things don't match up the hours start to pile up with the basement and the first floor and the

second floor and even with the roof. It's the kind of stuff that hasn't improved at all during the past ten years."

THOSE WHO PLAY TOGETHER

Resources make a big difference. Bids are made and accepted, contracts are negotiated and signed purely according to "price counts" –principle. Companionship, partnering, getting to know the resources or even knowing the way resources work has been forgotten. Contracts are made with subcontractors that do not have competence or sufficient skilled workmen.

"The amount of workmen does not help. We should use skilled contractors and workmen. Quantity does not make up for quality. A poor man should not buy cheap".

People who want to work together in cooperation need not share the same attitude to things (Werner & Parmelee 1979). Key issue is that they behave as supposed.

"The game must be played also with procurement. Otherwise you can get surprises during work – we haven't understood what we've ordered or some task's material hasn't been ordered at all, because it has become a no man's land."

LOOK-AHEAD AND MAKE READY

Procurement process and schedule has to be tied to the design schedule. There needs to be decisions made at the right time, enough time for designing and the designs need to be in time and in order at site for the construction project to work.

"For a good schedule you need designs that are in order. I can create a schedule, like I have a bunch of in this folder. It's just tough when you make a general schedule and then a month later it is obsolete."

The start-up meeting was found crucially important for going through the tasks and confirming things, as well as a tool for creating engagement and consensus.

"After the start-up meeting even the worker knows what he's setting out to do and what are the ground rules ... it's a basic requirement for working."

Meetings, bulletin boards, phone conversations, emails and chats at the work site were all mentioned as communication methods. Most found that communication must be open and mostly everyday interactions. Contractor meetings were held every 1-2 weeks or when necessary.

"I find that there's no better form of communication than a good meeting. I mean really, when you have the right people and the agenda has been well prepared."

COMPARISON

There is a difference in the way "best practice" (BP) site managers work as to the way the sites of the comparative group were managed. The BP site managers communicate better and require better performance from subcontractors both in actual work and in cooperation. Schedule means more as it is considered to be a real instrument for managing the site and not just a contractual claimer as the case was on several sites with the comparative group.

Site managers work in the same operating environment with the same problems of design management and resource procurement. The difference is in the attitude. BP site managers take the role of a leader. They do not complain. They make things work

in the best possible way. It is not always the most cooperative or communal way, but it seems to work for them, the project and the company they represent.

As an example here are a couple of facts of one BP site manager. His attitude, behaviour and intensity of leadership differ from the majority of site managers. Respect for people and continuous improvement, the key principles of Toyota Production System TPS, seem to be the ways to success. Other embodiments of success are pre-requisites for subcontractors and work gangs are made ready, deadlines are being kept, respect for schedule is the guideline, practical “heijunka” in even production speed, promises given are being kept, learning from mistakes and developing the performance.

“Schedule leads the way, respect for one another creates the mood and keeping promises is the key. Be proactive, not reactive – claims are the road to doom.”

CONCLUSIONS

As in production, also in managing production, variation causes problems. The effect of management on site performance and productivity is presented by a number of researchers. Best or even good practices should be the course of action. Best practices need to be realized, talked about, documented and used. To be used needs to be required by the top management always remembering that “best practice” keeps improving continuously. Construction companies seem to appreciate site managers who keep the projects in budget and on schedule.

Often the central figure of a construction project, site manager works alone while taking care of a varied range of tasks. It seems that companies obey the thought of Theodore Roosevelt, “The best executive is the one who has sense enough to pick good men to do what he wants done, and self-restraint enough to keep from meddling with them while they do it.”

Some of the site managers say that “time is money”, but still they or their company concentrate on minimizing the cost through “efficient” procurement and get things done (transformation) cheap instead of concentrating on the production process (flow) and quality gained (value). Securing or shielding the production is not the key issue. At the moment the site management rather supervises than plans and makes pre-requisites ready. We do not understand that average of the performance of the workmen is a very fair measure of the efficiency of the foreman.

Construction projects have a strong tendency for short schedules and quick performance. Based on the interviews of this study, the main factor affecting the productivity on site is scheduling and the temporal management of the work site. The quality of design, the scheduling of the design process and the quality of resources were also viewed as strong factors affecting the opportunities of advance planning.

In general, people want to do a good job. In worksite temporal management this means being proactive, making pre-requisites ready and taking care of the flow of the production. When one’s role in the whole is understood, it is easier to take care of that role. Good site management provides an opportunity for each stakeholder to create value to the customer by taking care of the prerequisites, taking charge, making promises and keeping them. If we want to get the best out of everyone, we need to change our vision of managing by command-control and contracts to managing the production in an integrated project.

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REFERENCES

- Akintoye, A. S. (1998). "Delivery of postgraduate programmes in construction management in the UK: An industrial perspective." In J. Yang and W. P. Chang (Eds.) *Building Education and Research*, E & F Spon, London, 90-99.
- Arditi, D. (1985). "Construction productivity improvement." *Journal of Construction Engineering and Management*, ASCE, 111 (3). 1-14.
- Ballard, G. (1994). "The Last Planner". *Spring Conference of the Northern California Construction Institute*, Monterey, CA, April 1994.
- Ballard, G., and Howell, G. (1994). "Stabilizing Work Flow." *Proceedings of the 2nd Annual Conference of the IGLC*, October, Santiago, Chile.
- Ballard, G., and Howell, G.A. (1998). "What kind of production is construction?" In: *Proceedings of the 6th Annual Lean Construction Conference*. Guarujá, Brazil.
- Ballard, G., and Howell, G.A. (2003). "Lean project management", *Building Research and Information*, Vol. 31 No. 2, pp. 119-33.
- Banik, G.C. (1999). "Construction productivity improvement." Proc. of the 26 Ann. Associated School of Construction (ASC) Conference, San Obispo, CA, USA.
- Bass, B.M. (1990). *Bass & Stogdill's Handbook of Leadership: Theory, Research and Managerial Applications* (3rd edition). New York: The Free Press.
- Bresnen, M. J., Bryman A. E., Ford J. R., Beardsworth A. D., and Keil E. T. (1986). "The leader orientation of construction site managers." *ASCE Journal of Construction Engineering and Management*, 1123, 370-86.
- Chromokos, J., and McKee, K.E. (1981). "Construction productivity improvement. Journal of Construction Division." ASCE, 107 (CO1), 35-47.
- Djebarni, R. (1996). "The impact of stress in site management effectiveness." *Construction Management and Economics*, 14(4), 281-293.
- Djebarni, R., and Lansley, P. (1995). "Impact of site managers' leadership on project effectiveness." *Proceedings of the First International Conference on Construction Project Management*. Singapore.
- Farrell, P., and Gale, A. (2000). "The site manager. Role, education and training in the UK." *Journal of Construction Research*, 1 (1), 43-52.
- Flores, F. (1982). *Management and Communication in the Office of the Future*, PhD Dissertation, University of California at Berkeley, USA.
- Fraser, C. (1999). "A non-results-based effectiveness measurement index for construction site managers." *Const.Mgmt. and Econ.*, 17 (6), 789-798.
- Fraser, C. (2000). "The influence of personal characteristics on effectiveness of construction site managers." *Const.Mgmt. and Econ.*, 18, 29-36.
- Gantt, H. (1919). *Organizing for work*. Harcourt, Brace and Howe. 113 p.
- Howell, G., Macomber, H., Koskela, L., and Draper, J. (2004). "Leadership and Project Management: Time for a Shift from Fayol to Flores." *Proceedings of 12th IGLC conference*, Elsinor, Denmark.

- Kankainen, J. (2004). "Managing Construction" in *Facts and visions on management*. Recallmed, Klaukkala, Finland.
- Koskela, L. (1992). *Application of the New Production Philosophy to Construction* (No. 72): Center for Integrated Facility Engineering. Stanford University. USA.
- Koskela, L. (2000). *An exploration towards a production theory and its application to construction*. Espoo, VTT Building Technology. 296 p. VTT Publications; 408
- Lovell, A. (1993). "Unsung heroes" in *Building*, July 1993, 49 p.
- Marjasalo, A., Koskenvesa, A., Tolonen, T., and Koskela, L. (2011). "Time Allocation of Site Management." Proceedings of the 19th Annual Meeting of the International Group for Lean Construction. Lima, Peru.
- McKelvey, B. (2006). Van de Ven and Johnson's "Engaged Scholarship: Nice Try, but . . ." *Academy of Management Review* 31, 4: 822-9.
- Mustapha, F.H., and Langford, D. (1990). "What skills do effective site managers bring to their work?" Proceedings of the CIB W-90 Conference. University of Technology Sydney, Australia.
- Narayanan, V.K., and Nath, R. (1993). *Organization theory: a strategic approach*, Irwin, 29 p.
- Poutanen, H. (2010). *Developing the role of human resource information systems for the activities of good leadership*. Faculty of Science, Department of Information Processing Science, University of Oulu
- Rost, J.C. (1991). *Leadership for the Twenty-First Century*. Westport, CT: Praeger.
- Salminen, J. (2005). "Measuring Performance and Determining Success Factors of Construction Sites". Helsinki University of Technology, Structural Engineering and Building Technology. Espoo, 175 p.
- Savinainen, M., Uusitalo, M., Merivirta, M-L., Nyberg, M., and Toivio, P. (2011). *The work and working capability of construction site management*. Finnish Institute of Occupational Health (TTL).
- Schmidt, F.L., and Hunter, J.E. (1998). "The validity and utility of selection methods in personnel psychology: Practical and theoretical implications of 85 years of research findings." *Psychological Bulletin*, 124, 262-274.
- Simu, K. 2009. *Risk Management in small Construction Projects*. Luleå University of Technology. Luleå, Sweden. 143 p.
- Serpell, A., and Ferrada, X. (2006). "A Competency Framework for Construction Supervisors in Developing Countries." CIB W107 Construction in Developing Countries International Symposium. 18 – 20 January 2006, Santiago, Chile.
- Stogdill, R.M. (1974) *Handbook of Leadership: A Survey of Literature*. Free Press, New York.
- Styhre, A. & Josephson, P-E. (2006). "Revisiting Site Manager Work: Stuck in the Middle?" *Construction Management and Economics*, 24(5), 521-528 pp.
- Wakefield, N. E. (1989). "Site management – its role today and tomorrow." *The Practice of Site Management*, Vol. 3, Harlow, P.A., Ascot.
- Wikforss, Ö., and Löfgren, A. (2007). "Rethinking Communication in Construction." *ITcon* Vol 12 337-345.
- Woodall, J., and Winstanley, D. (2005). *Management development – strategy and practice*. (First Published 1998). Backwell Publishers Inc. Oxford, UK.
- Yukl, G.A. (1989). *Leadership in Organisations*. Prentice-Hall International, Englewood Cliffs, N.J