Construction Workers' View on Standardised Work Procedures and its Influences on Freedom and Innovation

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Abstract

Implementation of standardisation in manufacturing has been considered straight forward, contrasting the construction industry. This is often explained by a uniqueness of the construction industry and a traditional resistance to change. This paper presents an empirical study performed within a large Swedish housing development company, which is leading in standardisation and one of the first construction companies in Sweden that attempts a large-scale implementation of standardised work procedures. Interviews were conducted with 23 construction workers and five site managers, as well as the head of production development. The results show that standardised work procedures affect construction workers freedom and innovative thinking negatively as well positively. In terms of contextualising the role of the workers, the workers seemed adamant about that it could never be fully contextualised. This study adds to the understanding of standardising operations on construction sites in Sweden.

Keywords

Standardisation, Construction industry, Change management, craftsmanship, Lean Construction.

1. Introduction

The introduction and successful implementation of standardisation and lean principles in manufacturing, especially automobile industry, has evoked an interest in transfer it to the construction industry with heterogeneous result (Koskela and Vriejhof, 2000; Fernie *et al.*, 2006). Nevertheless standards in construction can be used as intensive tool in challenging the workforce to develop better practices. When employees participate in an activity that implies using standards, the standards become the means to engage in the kind of learning process that can transform data into meaningful information which then, finally develops into further insight for improvement (Santos, 1999). Standardisation of work procedures (SWPs) can be defined as processes divided into finite tasks, following that the optimal method of performing each task is identified. Fernie *et al.*, 2006) stated, that it is certainly possible to use standardised procedures and measure performance. However, it does not necessarily entail that those particular procedures or performances are the optimal way of doing it,

as it can also be deemed as being a poor way. When standardizing processes, which should not be viewed as forcing workers to standardize exact actions or routines, a room for interpretations of the individual employee is needed (Polesie *et al*., 2009). Therefore, variability should not be discarded from a standardisation process as there are can come up situations where variability is unmistakeably beneficial to enhance process performance (Liker, 2004).

While requiring the authority to function, firms also require workers to possess initiatives to illustrate creative and innovative thinking, thereby contributing positively to the activities in the firm (Coffey, 2010). Edum-Fotwe *et al*. (2004) insisted that with the introduction of standards a widespread deployment of innovation could be achieved. Santos and Powell (2001) recognized that the creation of innovative solutions is hard to obtain if workers continue to use existing knowledge and practices. Although introduction of outside ideas may initially be perceived as burden by employees, it will however, pay off in the end. Picchi and Granja (2004) and Salem *et al*. (2005) acknowledged that Lean implementation is indeed possible, when the leadership at a company proactively decides apply and operate it with their own specific methods and manoeuvres. Nevertheless, out on the construction sites the term standardisation seems frequently used in a negative meaning, associated with limiting and controlling work procedures (Polesie, 2012). Clegg *et al*. (2008) acknowledge the importance of preserving the sense of freedom and flexibility in workmanship. It, however, cannot be too excessive as it will result in non-effective solutions.

The aim of this paper is to explore construction workers' view on implementation of standardised work procedures for specific operations and especially how these procedures influences workers perception of freedom and innovation. It is based on interviews with workers and some managers within one company that has taken standardisation beyond their competitors.

1.1 The case company

The case company is one of the Nordic region's leading developers of housing and residential areas. Their operations are focused on new production of homes in attractive locations, with the main focus on expanding metropolitan areas and university towns primarily in Scandinavia. They seek to promote long-term quality and environmental considerations in all its operations. It is a public limited company with a turnover of €1.3 billion and with 2,200 employees.

At the beginning of the 2000s, management decided to gather the strength of various improvement projects and conducted them under a concept named "Structured Project Development". The improvement projects' vision entailed freedom of choice in the project development process only existing for aspects that generate value, which means a quick and cost-efficient process and an ambition to create faultless products. This initiated efforts to improve cost control, which resulted in a successful project to standardize both the product and processes. In 2010 the sub-project Structured Production was launched, which is based on lean principles. One part within the sub-project is procedure descriptions and installation instructions. Specific operations are described in special installation instructions, here named standardised installation manuals (SIM). Examples of such installation include external wall panels and slab casting. A team of both foremen and workers developed the instructions. An internal test (unpublished) among 508 employees based on 31 recommendations for reducing waste developed by Josephson and Björkman (2011) showed that the employees perceive their company give highest priority to "Develop similar ways of working".

2. Method

As mentioned, the aim of this paper is to explore construction workers' view on the process of standardizing work procedures on site, how it affects their freedom and innovation along with their opinions about contextualising their role. Initially, a literature review on standardised work procedures in a construction context was done. The effect of standardisation on the individual construction worker and the contextualization of their role were especially studied. Based on the literature review, an interview guide was designed. The head of production development within the company supported

the study by organising the interviews. He chose four construction sites located in the Stockholm region. The main reason for choosing these projects was that the standardised work procedures were currently implementing in the projects and the majority of the workers and managers faced the procedures for the first time.

In total were 23 craftsmen and five site managers interviewed by the first two authors. All interviews were performed on-site and could be considered as exploratory, mainly in order to have a comfortable setting for the interviewee. Each interview took 15-30 minutes. The head of production development drove the first two authors to all projects, so they had several hours for informal conversation about the company, its strategy to take standardisation further and the approach used for developing and implementing the standardised work procedures.

The approach used for the interviews was inspired by Santos (2005), Brunåker and Kurvinen (2006), Polesie *et al*. (2009) and Polesie (2012) The interviews were explorative with a semi-structured approach where a set of qualitative questions were asked and then followed up by questions that depended on the answer from the interviewee. The goal with the interviews was to get an understanding of the on-going process and establish both the current as well as previous (if changed) view of the workers on standardised work procedures and standardised installation manuals. An analysis was performed with the focus on presenting the worker's perception of standardised work procedures, the implementation process and the context of their role as workers.

3 Results

3.1 Worker's identity

As SIMs outlines the work procedures thoroughly, it doesn't give much leeway in going of that track. That fact seems to worry the workers as they want to be able to contrive new things. "What I am also thinking about, is that we, workers have come up with the solutions for doing things on our own. Now, the solution is the same for everybody and therefore we stop to think. Now, we have to follow SIM and after a while we cannot come up with new things, we cannot improve anything. Then the next generation starts working by it and the next generations after that will not have a clue. By then they only have SIM to work after", explained one worker. Another worker provided a different insight to the situation proclaiming that he had developed a more critical mind-set after the introduction of SIMs, stating: "I would think that we were working more like robots the years before we started using SIM. Before that, you went to work and screwed on a drywall and did not even think of doing it any other way. So therefore I would say that we have started thinking more about how we are doing things now than ever before".

The workers have heterogeneous views on the possibility of creating a document, which incorporates the whole spectrum of craftsmanship. "If everyone is on board with this, then we could possibly describe around 90-95% of what we do, but only if we have the top management and the sub-contractors on the same train. However, I still believe that we will still battle with weather and wind and lost and wrong deliveries, therefore it will never be 100%", explained one worker. Workers seemed to understand that they worked under certain conditions: "You get a really, good strict line to work after. You are supposed to go from point a to point b, SIMs work like a map, which you are supposed to follow and on the way you can do a little side-track without going off path from the SIMs. However you work a little bit how you are used to work and I think that is great".

3.2 Consequences of SIMs

The case company decided that it was not sufficient to only equip the workers with SIM, but also required them to go through, first a two and a half day course and later a seven day course. "The purpose of the educational courses is to educate us on the principles of SIM for instance, why they are equipped with SIMs and why it is important to follow them. It's very good to go through the course. It makes everybody aware of how we are supposed to work at the company. That everyone should work

alike and that is very important in order to achieve a good result or at least a similar result", one worker explained. However the workers had disparate opinions about the quality of the course. One worker replied the following after having participated in the course and asked if it had affected him in any way: "I don't know, neither negatively or positively, the most important is a correct way of constructing". Furthermore, workers did not appear to perceive differences in their way of working after starting using the SIMs and attending the course. "SIMs are more or less how we have worked over the years. In my opinion, around 95% of the SIMs are something that we were already doing. It's just some little details that are missing". The head of production development admitted that not nearly everybody were satisfied with the implementation of SIM, stating: "First, they say that they will never be able to do it like that. It's usually 10-15% who are against big changes… Before, the responses were like, 'No, to hell with it, you can forget that!' But after we have educated and explained why it is so important to work alike, then only 2-4% of the workers are negative. You could say that is ample, that is if you tell someone that he has to work in a different way than he used to". He further acknowledges that 2-4% dissatisfaction among workers is acceptable.

Following the workers attending the course and started working according to SIMs, the workers began to notice the possibilities, which were entailed with using SIMs. One worker told "they are not complicated, it is like building with LEGO, and you can follow it step by step so it is difficult to misunderstand". The advantages in their minds was the ease of transfer of workers between construction sites and not spending as much time getting into the work procedure as they have a preconceived idea thanks to SIMs, of what it is supposed to look like. A common statement was: "You can see the advantage, I can go to another construction site and I don't have to start by getting into the speed of things I already know what I am supposed to do". It isn't only limited to workers shifting construction sites, even in the case of absence, an employee can step in and pick up where another one left off. A worker explained "you can rotate inside the team so if someone is sick you can step in and do his job".

SIMs is also intended to facilitate the execution of work procedures and material and tool handling. This has eventually caused a decrease in material expenses as the company are now buying larger quantities of the same material. Workers acknowledged a change after starting working by SIMs in relations to tools and material handling. One worker described: "You know exactly what you need for tools and stuff, so there it has become much simpler". Workers could also see the differences before and after the implementation of SIM "With the introduction of SIMs the managers can plan the work in advance, so that the material and tools are on site when the workers arrive. I have not worked in the industry for a long time but I know things have changed. Before the implementation of SIMs it was more difficult as it was hard to find the tools and material for the job. But now it has started to work better with structured way of working, now everything is on site when you arrive". Site managers also perceived their role as becoming easier after the implementation of SIMs. "My work has become easier. Now you don't have to resolve a large amount problems afterwards, now everybody work alike", a site manager explained.

The implementation of SIM has met some resistance on the way among some workers. The interviews revealed apparent differences between age groups becoming more vivid as the interviewing progressed. "It works well if you have not performed the same kind of work before, however I can understand that there is some irritation, especially from the older ones who are not so keen on changing their way of working. Which is probably normal, it doesn't always work as it says in the manuals. Somehow there is always some kind of problem with it. Nothing is perfect anyway". An experienced worker expressed his conviction to why this apparent difference was. "The younger ones, for example, apprentices do as we do and are maybe coloured by it. It is normally easier to make the younger ones follow you".

As workers are obliged to go through a seven-day educational course regarding why and how to work by SIMs, site managers and other middle managers have to go through another course, which is intended to prepare them for holding work preparation meetings prior to every work procedure. As one worker stated: "Our site management and middle managers have also been educated and gotten a better vision on SIMs and are very involved with in them. So if you have questions for them they are

good at answering them". Despite of this comment, the workers perceive a gap between them and the managers in terms of inconsistencies in education. One worker described the situation "What I think is the worst part is that the managers are not on the same page. They haven't read it. They are not at all involved in it. We are however supposed to follow it, and it should not be like that."

The workers also mentioned the gap existing between themselves and sub-contractors' workers. The workers in the case company are supposed to work according to the SIMs. However, according to one of the workers the sub-contractors are under no obligation of working by it: "They are not involved in it, they are not even affected by it. They do not bother with it, they get their money elsewhere."

4. Discussion

The discussion of standards, here standardised work procedures, seems to go hand in hand with the subject of innovation. It seems that the term standardisation is viewed by many as directly connected to decrease in innovation or at least linked to the increase of risk of less innovation. Furthermore, judging by the reaction from the workers and suggestions made by Polesie et al. (2009), it seems as though the term standardisation creates negative reactions among on-site personal. It is apparent that workers interviewed in the case company didn't fully agree about the effect of SIM in relation to innovation. However, majority of the interviews did express concern that they felt a decrease in innovations and innovative thinking. This coheres with what Clegg et al. (2008) stated, that over-emphasising on controlling the routines minimizes the potential for innovation by excluding new information, reinforcing past routines and focusing on foreseeable matters. The case company seems to be aware of this risk. By continuously updating the SIMs the company tries to elicit the worker's need for innovation through the means of improvement proposals. Though, according to the interviews this has not fully gone as planned, as much controversy among the workers seems to surround the effects and length of the development process. Furthermore a difference in opinions among workers seems to exist on the matter of how much affect the SIMs will have on innovation within the profession at the company. One worker voiced his worries on future workers as he felt they were in danger of becoming robots. His argument was that when generations of workers had only been working by following the SIMs, these would not know any other ways of working and would therefore not be able to improve them. This line of argumentation is supported by Santos and Powell (2001), who state that the creation of innovative solution is harder to obtain without the added effect of outside ideas. The head of production development and one of the site managers did not share these worries as they felt there were arguments to suggest the exact opposite, i.e. that workers were robots before and the SIMs changed this. The site manager stated that he didn't really think through all of his procedures before the SIMs as he did it as he always had done before. However, after having worked with the SIMs he felt that he needed to think much more about each procedure and if the way in which the SIM described it, was really the best way. In light of these arguments, it seems as though perhaps both parties have a valid point, i.e. as Santos and Powell (2001) stated, there really is a need for outside ideas in order to improve the process continuously, however, working with standardised work procedures does not require workers to lose their critical way of thinking.

Measuring the whole spectrum of craftsmanship in terms of 'best practice' and documenting it, was viewed by the workers of being next to impossible to implement. They still seemed to put at least of some their own touch into the work procedures as there are always some aspects that cannot be put down on paper. Fernie *et al*. (2006) agrees with that and described how there are certain things that are easily measureable, while other information flows by unnoticed and therefore unmeasured. This raises the question if the case company sets out with a no-deviation rule, how they are able to control what is done during work procedures. Even though the work procedures contained in SIM are considered 'best practice', however as Fernie *et al*. (2006) mentioned above, the term 'best practice' seems to be debatable.

5. Concluding remarks

Despite the commonly voiced argument that innovation and freedom will suffer with increased standardisation, here implementation of standardised work procedures, it can be derived that in fact it can increase innovation and freedom to an extent. The risk of decrease in freedom and innovation among workers is not to be taken lightly, however, arguments have been made that by focusing on building a bottom-up culture the workers can increase their analytical thinking towards work procedures. Accordingly it is important in this aspect to seek a continuous improvement oriented culture that can consider outside input in the longer term. Furthermore, when creating these types of standards it is highly important to keep in mind the practical use of the standards. In the case company studied in this paper the purpose of the SIMs was to minimize variation in production output, however, it is important to acknowledge from the beginning that variation within a construction production line is highly important. The SIMs is a useful way to document production output, but at the same time they need to be usable in a variation of settings, and therefore cannot be excessively detailed.

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