The Construction Worker's view on Standardised Work Procedures:

An empirical study conducted within a large Swedish construction firm

Master of Science Thesis in the Master's Programme Design and Construction Project Management

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ABSTRACT

Implementation of standardisation in manufacturing has been considered straight-forward, contrasting the construction industry. Researchers associate this with the uniqueness of construction industry and consisting resistance to change. Many have researched the manager's perspective on standardized work procedures (SWPs), less is known about the perception of employees performing within boundaries of SWPs. This article presents an empirical study performed within a large Swedish housing development company which is a leading enterprises in standardisation within the Swedish construction market and one of the first construction companies in Sweden that attempts a large scale implementation of SWPs. Interviews were conducted with 23 construction workers and 5 middle managers, as well as the head of production development at the company. The results show that SWP can affect construction workers both positively and negatively. Moreover, that in order to obtain a positive reaction from construction workers, much emphasis must be devoted to the training of and communication with the on-site personal comprising workers, managers and subcontractors. Additionally, intra-organisational political barriers must be breeched, complications with constant modernisation of standards for, and contextualisation of, the craftsmanship role solved for a successful implementation process. This study gives a glimpse into the current situation of SWPs from the Swedish construction workers perspective and as our theoretical review conclusion suggests, this area requires more extensive research. Working with SWPs in the form of standardised installation manuals (SIMs), as in the case study presented in this article, requires much work and planning in terms of creation, visualisation and modernisation of the SIMs. Furthermore, in order for such a change to manifest within a company and become the norm, a unified understanding throughout all company levels and a cultural change towards a bottom-up oriented culture seems essential to the success rate of the change process.

Key words: Standardisation,   Construction   Industry,   Change   Management, Productivity, Contextualisation, Lean Construction.

Contents

Preface

This study is performed in the middle of a change process at a large construction firm in Stockholm, Sweden. With the intentions of portraying the individual construction worker's view on working with standardised work procedures within that environment. The research period started late October 2012, when we began writing a theoretical review article in order to gain knowledge on the subject, which was finished in early February 2013. In late February 2013, interviews were performed in Stockholm and with the data gathered there an empirical article was written and completed in early June 2013. Thereby the research period ranged from October 2012 to June 2013 and with the exception of 2 days of interviewing in Stockholm, was performed entirely at the Department of Civil and Environmental Engineering, Construction Management, Chalmers University of Technology, Sweden.

The study was performed by the authors and both the articles and the thesis were written in close collaboration during the entire research period. The decision not to divide the workload was made in order to share the amount of knowledge gained from the research as well as increasing the quality of the thesis. Professor Per-Erik Josephson from Chalmers University of Technology served as our supervisor for the extent of the research period and we like to thank him for his guidance. We would furthermore like to thank the department of Construction Management at Chalmers University of Technology for supplying us with office space during the study. Finally, it should be mentioned that the help of the head of production development and his colleges at the company, which took part in our interviews, was essential to this research. We are grateful for their help without them this study would not have been possible.

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Notations

Recurring abbreviations:

SWP (Standardised Work Procedure)
SIM (Standardised Installation Manual)
HPD (Head of Production Development)

1 Introduction

This master thesis comprises two articles, a theoretical review article, 'How standardised work procedures affect construction workers' and an empirical article, 'The Construction Worker's view on Standardised Work Procedures'. The introduction is therefore split into two parts, one for the introduction of each article. Following the introduction of both articles, a theoretical review which comprises the theory used in both articles, will be presented. Thereafter, is a method section which gives background to the route taken with this study as well as explanations of the approach used for each article. Following the method chapter, the references for both articles are presented. Finally, Appendix 1 contains the theoretical review article, Appendix 2 contains the empirical article and Appendix 3 contains relevant data used for the interviews in the case study.

1.1 Introducing – How standardised work procedures affect construction workers: A theoretical review

This paper explores the various concepts both in construction and change management in order to shed a light on employee perception on standardized work procedures. The introduction is divided into two parts, the former is a historical review and the latter prescribes the description and purpose of this article.

Why standardise – Historical review

Over the years, various principles have been introduced in order to create efficient processes, minimize waste and maximize profits. Key figures in management history, such as F.W. Taylor and H. Fayol, introduce a more scientific approach to organisational, management, structure and processes in the early 1900's. These included thinking of employees more like machines and structuring their work processes and procedures in efficient waste reducing ways, with high emphasis on measurable activities. Examples of this can be seen by exploring the early days of industries such as the automotive industry, where individuals, e.g. Henry Ford, build empires on the foundation of these principles (Liker, 2004). Following this introduction of systematic optimization of SWP, theoreticians, primarily C. Bernard and M. P. Folett, shifted the focus on to the employees' humanity and individual value. There work instigated unionism and a shift from coercive- to a more coactive empowerment, perceiving the employees more as human resources rather than simply a work force (Clegg et al., 2008).

Building upon the foundation of all of the management theorists mentioned above, principles, including lean, six sigma, total quality management, key performance indicators, etc., have been created in an attempt to develop cost-effective management systems that utilize human resources in order to produce value.

Description and purpose of article

The authors of this article pursued to research the topic extensively by using databases with relevant search entries. The theory presented is built upon articles by several theoreticians and scholars, ranging from employee's perception of standardized work procedures in Brazil to case study on standardisation of processes in Denmark. A fair

amount of research has been done on manager's perspective on standardized work procedures (SWP). Less is known about the perception of individual employees performing within the boundaries of standardised work roles using standards in their work. The role of the employee's in the construction industry has been a subject to change over the past decades. The introduction and successful implementation of standardisation and lean principles in manufacturing, especially automobile industry has spun a web of interest in projecting it on to the construction industry. This idea isn't irreproachable, though the construction industry is one of the most established project-based sectors and is subject to frequent change it doesn't mean that the change is always acceptable (Cheng et al., 2006). Cheng et al. (2006) insisted that the only way to get employee's to participate in the change is to gain their approval. The authors' understandings of implementing SWP within the framework of standardisation principles, is that they are not fully applicable in today's construction environment. In order to prevent misunderstanding, the purpose of this review article is not to diminish standardisation principles in present shape and form, but rather try to find appropriate ways to apply them in a construction industry context. This is done by exploring how SWPs affect the individual construction worker in order to find ways for improvement.

Research questions:

- How can the effects standardised work procedures have on individual construction workers be characterized?
- Can standardised work procedures fully contextualize the role of a construction worker?

1.2 Introducing – The Construction Worker's view on Standardised Work Procedures: An empirical study conducted within a large Swedish construction firm

This article supports Koskela and Vrijhoef (2000) argument that bottom-up innovation seems to be severely lacking within the construction industry. By comparing theory and practice the aim is to paint the "bottom-up view" picture that is presented to craftsmen in a change process involving SWP. Furthermore arguments are made for an increased utilization of on-ground personnel as this might facilitate the change process and provide a better outcome. This can only be achieved if the management levels of the firms create suitable environment to enable it to flourish. This is done by excluding the problems affecting the workforce, such as waste and excessive focus on value adding parts. (Koskela and Vrijhoef, 2000). However, the same thing applies to locally initiated changes, i.e. whether change needs to go up or down the hierarchy it is always subjected to political barriers, although, indeed, different ones depending on direction (Brunåker and Kurvinen, 2006, Cheng et al., 2006, Clegg et al., 2008, Gudmundsson et al., 2004, Fernie et al., 2006).

The structure of the article

The structure of this article goes as follows: first, relevant theory on SWP and change processes is reviewed, then the case study is introduced and the article described. Subsequently the methodology of both the article and the case study is presented. Next, the case study is explained, followed by the presentation of the results.

Thereafter findings are presented and discussed whereafter the article finishes with a short summary and concluding remarks.

The case study

The company participating in the research, here after called BuildCo, is a large construction and development contractor in Sweden. BuildCo was asked to participate in this research because of their pioneer status in the area of SWP, reached after a decision they took to standardise work procedures and methods of their own craftsmen. This decision is, according to the head of development (HPD), an unprecedented change towards SWP in terms of magnitude in a European construction firm. It follows a standardisation period which began in large with the introduction of Lean Construction within the company in 2009. As a result, BuildCo, which accordingly already had quite standardized systems in place, decided to take standardisation to the next level and systematically standardise their company's approach to building apartment buildings with much inspiration taken from Toyota's Lean principles. However, presently the company has shifted away from the term Lean construction or Lean production and towards calling it "Structured Production". HPD claimed the change of term was caused by the general decrease in popularity of the term Lean Construction within the construction industry and that the company felt that this might ease the transitioning process.

In 2009 BuildCo introduced a plan to implement standardised installation manuals (SIMs) which they began by assembling groups of elite craftsmen and middle managers who created a set of demo manuals that craftsmen could follow when working on various parts of the building process. These manuals were tried out in 2010 on a few building sites and following that a decision was made to use them throughout the entire company. As a result of this process a set of seminars were put in plays and the craftsmen were educated on the new system and the reason for it, with the objective to facilitate the change process.

According to Cheng et al. (2006) it can take up to 6 year for a change within an organisational milieu to be successfully embedded. As the interviews presented in the case study in this article were performed early 2013, this implies that BuildCo are still in the process of integrating this change. However the HPD could not entirely agree with this notion as he felt that by using the term integration or implementation it suggested that this new change had a beginning or an end. Accordingly this was something that did not suit BuildCo as he felt this process should be in the form of continuous change towards improving work procedures and hence the product outcome of the company. In terms of the financial success factor the complete bottom line result from this change process will not be seen until after the 10 year guarantee period that BuildCo has on their buildings has ended. Therefore it is still difficult to establish if the introduction of SWPs has been a success. However HPD stated that in terms of production costs, material costs had decreased with the increase in standardised material use which was facilitated by the SIMs. Hence it would seem as though this change process is a form of a long term investment that requires both financial and collective support from multiple areas of the organisation with unclear benefits.

2 Theoretical framework of references

The following chapters present the results of theory research performed in order to explain the effects SWPs have on construction workers. Furthermore, the literature gathered is supposed to provide fundamental knowledge about SWPs as well as various aspects to the change process which follows when applying them in modern construction settings.

2.1 Conceptualising standardisation

The concept of standardisation as we know it today, first emerged in the 1980's in the form of the stage-gate models (Gudmundsson et al., 2004). Since then, standardisation has been reformed over the years by various scholars and theoreticians and applied in numerous industries with incommensurable results. Standardisation is defined as the planning and development of pre-set procedures and referential material established by optimized practice in order to reduce waste and variation of the final product. Standards used in that sense are usually presented in writing, other formats such as sketches and pictures can also simplify understanding (Polesie, 2012, Santos et al., 2002, Santos, 1999). Ungan (2006) considered standardisation as a way to increase efficiency through consistency, reduce process variation and enable easier process control. In a case when a problem occurs in production like rejects or rework, root causes should be located and measures to amend the situation should be implemented where the standard is changed accordingly (Santos, 1999). Once the standard is in place the problem should not recur. For example did Edum-Fotwe et al. (2004) insist that with the introduction of standards a widespread deployment of innovation could be achieved.

Researchers have also expressed scepticism of standardisation, by suggesting that standardisation discourages innovation in the production process (Gudmundsson et al., 2004, Ungan, 2006).

Grasping the meaning

In order to grasp the meaning of standardisation in a production context, a brief overview of processes is needed. A process is a planned series of actions or operations that advance a material or procedure from one stage of completion to another (Ungan, 2006). Process information or process documentation is a graphical representation of a process. It is important for the production integrity to document the process in order to limit uncertainty and variability. Uncertainty and variability is usually attributed to differences in the way an employee performs a given task, thus, the employees capabilities determine the final results. In order to secure a homogenous result, the process must be documented. There are normally two causes of variability in production: the random factors which are often beyond the operative's control and the controllable cause which are within the power of the operative's control (Santos et al., 2002). Santos (2005) emphasized that information should be part of the process and that the access to information should be facilitated as much as possible. In relation to construction, visual controls are recommended to be incorporated in all the equipment, components and materials that move through the construction site.

Written standards

Standardisation requires that the same operation is repeated in exactly the same way and by multiple employees at dispersed geographical location. Therefore a way to document every procedure so that it can be easy to access and understand is needed. Ungan (2006) acknowledged that the best way to record knowledge is by creating written documents. The preferable way is to extract the knowledge of the employee who knows the best way of performing his task, a so called "process master" and thereby reducing the variant in the process output. Though it sounds simple, it can be challenging to obtain the tacit knowledge out of process participant's head and put it into written document. This can be done by using an established team to facilitate the extraction of tacit knowledge from the process master, as it can create a synergy which allows easier cooperation. Ungan (2006) further emphasized that once process is standardized it should be on hiatus until it is subject to revision, and thereby no new knowledge should be created during the implementation process. Santos (2002) doesn't share his colleague's opinion and encourages that standards should continuously be reviewed, improved and disseminated in order to reduce variability.

2.2 Why standardise work procedure in construction – Comparing industries

The construction industry has been widely reported as inefficient and old fashioned, which is why construction scholars have been increasingly trying to improve construction methods and practice by comparison and repetition of work methods and procedures from other industries. Fernie et al. (2006) and Koskela and Vrijhoef (2000) stated that the underlying factor behind the much emphasised comparison is the broad acceptance of consistently higher performances in other industries, e.g. automotive industry, which is usually assumed to be related to 'best practice'. Others have worded similar reasons adding to the ever growing criticism that construction processes are inefficient due to lack of standardisation, etc. (Polesie, 2012, Polesie et al., 2010). The construction industry, as oppose to other manufacturing industries, is more dependent upon individual and group performance than machinery, respectively (Maloney, 1993).

Companies within the construction industry most often work within a project based organisational form. The term construction project has been defined in multiple ways, e.g. a temporary organisation which aims to accomplish specific tasks (Polesie et al., 2010) or highly situational and context-dependent with fluctuating requirements (Styhre et al., 2006).

A project is defined by Maylor (2010) as a unique set of coordinated activities with definite starting and finishing points, undertaken by an individual or organisation to achieve a desired outcome. This presents a rather obvious difference between the construction industry on one side, with one design representing one or few products, and most other manufacturing industries on the other, e.g. automotive, computer, steel, etc., where most product designs are highly standardised and each design represents an enormous amount of products (Winch, 2010). Hence, the uniqueness related to the construction industry makes the comparison to other sectors rather difficult. This has made direct transportation of principles concerning standardisation rather problematic for many, which has resulted in a broad theoretical discussion and

development towards construction specific principles, e.g. Lean Construction. (Winch, 2010)

Uncertainty can be considered as relatively high in most construction projects, however, it is not always explicitly tied to the product, as elements such as processes and organisational structures can sometimes be the root cause. The high reliance most construction projects have on various suppliers and sub-contractors represents might cause construction firms difficulties in applying these standardisation principles directly, as the project organisation changes frequently over the project lifetime (Polesie et al., 2010). Having experienced staff and long term relationships with suppliers can be important for cost reduction and create stability which facilitates standardisation (Santos et al., 2002). However, managers, even within the same organisation, with diverse experiences, values, etc., run project differently. Running projects in different ways creates confusion and added waste, which can be related to variances in managerial staff backgrounds and underlines the input site managers, experienced or not, can have on value (Polesie et al., 2010). In other words, by choosing suppliers and procedures contradictory to company standards, an obstacle is created which hinders application of management principles.

Standardised Work Procedures (SWP)

The role of the craftsman has been a subject to change, beginning with the scientific management as applied in manufacturing during the beginning of the twentieth century. Skill-based training has been developing to take place of craft training, as workers are trained in particular subsets of skills rather than entire set of skills in a trade (Maloney and Federle, 1993). Standards in construction can be used as an intensive tool in challenging the workforce to develop better practices. When employees participate in such an activity, the standard becomes 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).

SWP can be defined as processes divided into finite tasks, following that the optimal method of performing each task is identified. Workers are then trained in the requisite skills and the performance in process is closely monitored by the appropriate personal to ensure that the method is followed as described (Maloney and Federle, 1993).

The process of identifying what is the optimal method of performing each task is heavily reliant of what can be measured. Some things are easily measured, codified and adopted while other information flows by unnoticed and thereby cannot be measured (Fernie et al., 2006). When standardizing processes, which is viewed as forcing employees to standardize exact actions or routines, a room for interpretations of the individual employee is needed (Polesie et al., 2010). As such, variability shouldn't be entirely discarded from standardisation process as there are situations where variability is clearly beneficial to enhance process performance (Liker, 2004).

2.3 Implementing standardisation

Many have acknowledged that efficiency is missing from the construction industry, fixing this problem will inevitably bring on change. Fernie et al. (2006) described this change as being promoted by "identification, implementation, monitoring and measuring of best practice." Additionally they stated that the common view on these

principles emphasised intents such as integration, team work, trust, partnering, standardisation and value for money and as a result was bias by them. Gudmundsson et al. (2004) supports the notion that implementation of standardisation unavoidably carries change within an organisation but at the same time can rationalise product development work. Additionally he states that standardisation can have significant impact on organisations with value-adding changes in processes, product technologies and strategy. In his view these changes need to be accounted for prior to the launch of the implementation process in order to avoid problems and delays in latter stages (Gudmundsson et al., 2004). Santos and Powell (2001a) root for change, stating that progressing for the sake of improvement alone is guaranteed to provide a stronger organisation in the long term. However, an overemphasis on quantitative methods when applying standardisation principles can result in out-of-context appraisals of work procedures. When considering change towards SWP in construction, it is essential to contextualise with relations to past and present in order to rationalise future possibilities (Fernie et al., 2006).

Implementing SWPs

Implementing the standardized work procedures requires employee's incorporation into the process, as it can play a significant role on the workforce vision of effectiveness. For the standardisation to be successfully integrated, intention, motivation and voluntary adherence must be part of the process as it will only work when the employees are willing to participate in the integration (Santos, 2005). As Fernie et al. (2006) and Cheng et al. (2006) concurred, a successful application of practice in one sector is highly dependent on its compatibility with the actors within that sector or organisation.

Adequate training is imperative as it can help the employee to prepare and adapt to the new system. Castañeda et al. (2005) concluded in their case study, that construction workers are actually receptive when it comes to be trained. Although training employees can cause initial unsettlement, in the end it can result in an increase in efficiency for the implementing construction company (Salem et al., 2005). Another barrier associated with the implementation is a lack of senior management endorsement, as research has shown that they have little patience when it comes to waiting to reap the benefits of the new system (Cheng et al., 2006).

When the implementation is in place, the information on standard procedures should be available when and where the worker needs it in order to eliminate wasted time with unnecessary movement in attaining information (Santos, 1999). When information on site is not easily attainable the risk of mistrust and poor teamwork between managers and workforce increases. During such circumstances managerial decision will be questioned by the workforce (Santos, 2005).

Key factors for successful change in a construction context

Clegg et al. (2008) present change as:

> *"multilinear and multivariable, where many changes occur simultaneously as the effect of many different variables."*

Accordingly, organisational change is much like a contested campaign where prevailing traditions and codes need to be effectively positioned and maintained. Brunåker and Kurvinen (2006) state that "change is socially constructed and starts in the daily communications between actors." They discuss two types of organisational change; firstly, as a means for management to dominate over external as well as internal actors, and secondly, as a transparent democratic change often initiated by on-the-floor staff.

According to them, local initiatives in organisational change have a dissimilar rationality to that of managerial discourse known as the autocratic approach. The autocratic approach represents change protocols which are initiated, formed and understood by management, but often meet resistance on their way down the hierarchy (Brunåker and Kurvinen, 2006, Gudmundsson et al., 2004). This is underlined by Cheng et al. (2006) who presented resistance as a normality when the status quo is challenged with change. Clegg et al. (2008) explain this as an undesirable view on change due to the interruption of stable equilibrium which is considered the natural state of organisations.

Local initiatives to organisational change, which can come from individuals or groups, are dependent upon a person (or persons) within the organisation that possess comprehensive knowledge of local procedures. This knowledge empowers them to translate new procedures into something comprehensible and fitting to their settings. However, the same thing applies to locally initiated changes, i.e. whether change needs to go up or down the hierarchy it is always subjected to political barriers, although, indeed, different ones depending on direction (Brunåker and Kurvinen, 2006, Cheng et al., 2006). Describing this in more detail Cheng et al. (2006) state:

> "Any proposed implementation methodology must overcome resistance at various levels including the "super political" (executive), "organizational" (departmental/divisional) and the "implementation" (front-line/project) levels."

Additionally, they present arguments from multiple scholars that state the need for key persons on all levels of organisation to enlist political support to the change before the process has begun, in order to steer away from problematic resistance (Cheng et al., 2006). Picchi and Granja (2004) and Salem et al. (2005) concurred with that notion that Lean implementation is possible, but with the requisition that the leadership at a company proactively decides to apply and operate it with their own specific methods and manoeuvres.

The challenges of SWP

Fernie et al. (2006) stated that although using standardised procedures and measuring performance is certainly useful, it does not give a holistic explanation for the link between practice and performance. Their argument is that:

> "The stripping of best practice from what cannot be measured is unlikely to provide wholly reliable explanations for what makes practice 'best' or indeed 'poor'."

Furthermore, their view is that the practice of SWP in construction is too emphasised on measureable activities and as a result limits the context which the roles are perceived in, i.e. in a sense focusing on certain variables while excluding others.

Admittedly measuring quality of craftsmanship, for example, can be both difficult and time consuming (Fernie et al., 2006). As a result, it is necessary to comprehend the structural characteristics of context as well as the differences in characteristics between industries and organisations, i.e. recipes, logics and organisational routines that reflect a chronological recognition to context and practice.

> *"An understanding of the performance of a practice must simultaneously be rooted in an understanding of what it means to existing interest groups and partnerships."*

It is necessary to have a holistic comprehension of the industry from a managerial perspective before any enforcement of change in practise (Fernie et al., 2006).

Another thing missing from best practise theorists is how to apply it in a project organisation, with all their downsides on change management (Fernie et al., 2006). This can result in implementations of modern management principles that are enforced on middle managers without their approval and thereby have a definitive depreciation of the need for their individuality.

Additionally the term standardisation has a tendency to motivate negative feedback among many middle managers, who perceive it as a hindrance instead of a help, despite consistently using standardised activities which they like to refer to as simplified work procedures (Polesie et al., 2010).

The theory article by Fernie et al. (2006) presents a broad criticism towards methods such as benchmarking and implementation of 'best practice'. The argument is that these current methods used for SWP, do not provide any clarification of the affiliation between practice and performance. Accordingly these arguments are extremely valuable as they provide a trial that can test the principles in order to increase the adoption of SWP (Fernie et al., 2006).

Learning how to continuously improve and change

Styhre et al. (2006) described organisational learning as a place where individuals share knowledge and experience preferably through activities, in attempt to constitute and reproduce them in the same way. Learning and knowledge sharing can contribute significantly to the organization performance as well as understanding the linkage between practice and performance (Fernie et al., 2006) Effective implementation of organisational learning must be seen as an on-going and continual process, especially in construction, where there consists a resistance to change (Cheng et al., 2006). Although as Koskela and Vrijhoef (2000) insisted that it can be difficult to obtain knowledge and learning sharing experiences from sub-contractors as they are often acquired on tendering basis and seem to have low incentive to share their experiences.Santos and Powell (2001b), described the philosophies of "push and pull" learning in their article. Where push learning can be described as forcing learning upon learners and where the pull learning is where the learners are in charge of their own learning. An optimal resolution is a balanced approach between push and pull learning as it can facilitate changes within construction organisations. Where the environment is characterised by pull learning, However push learning is ideal for creating the initial reflection (Santos and Powell, 2001b).

Discouragement through rivalry and non-learning behaviours within organisational cultures needs to be avoided to facilitate incessant improvement. In a case study by Polesie et al (2010), interviewed personal acknowledged organisational strategies either as voluntary guidelines or as mandatory procedures and therefore a need exists for management to assert these strategies with the appropriate measures (Polesie et al., 2010). It can take up to 6 years for a change in an organisational environment to be successfully embedded (Cheng et al., 2006). Which can be contributed to the fact that these standardisation principles are considered to be too difficult or too time consuming to be useful (Polesie et al., 2010).

2.4 Standardising the individual employee

The strategy is more on reducing the variability by hiring a willing pair of hands, thereby discarding the knowledge, skills and abilities of the employee (Maloney and Federle, 1993). Individual freedom from a work perspective occurs when employee experiences pleasure instead of pain and responsibility instead of restrains. Clegg et al. (2008) acknowledged the importance of preserving the sense freedom in workmanship, by stating that

> *"creativity without structure tends to grow out of touch with reality, whereas structure without creativity results in a loss of innovation."*

In other words, workers need flexibility and freedom, which however cannot be too excessive as it will result in non-effective solutions.

The freedom of the individual construction worker

Before the industrial revolution, workers had to serve a lengthy apprenticeship to become members of a craft guild. Being a part of the craft guild enabled the workers to exercise a great deal of freedom when defining how a task should be executed. The introduction of scientific management approach has had a great impact on the utilisation of the employee's capabilities.

Authority asserted from employer to employee is seen as the centre of employer-employee relationship, as it creates order and certainty in their interactions (Coffey, 2010). Some firms in the construction industry have adopted the approach of creating self-managing teams. The workers manage the team, thereby utilizing the knowledge of the worker. In such an approach, the management only require a specific result and give the worker a freedom to decide means in order to achieve the objective. By doing so, the management trades some control for greater self-motivation and innovation (Maloney and Federle, 1993).

Strategically improving the employees' perspective

Companies have various obligations towards employees that often knowingly remain unfulfilled. In a construction context these obligations remain with site managers, as they are the ones employees engage in an employment relationship with and therefore expect fulfilment from (Coffey, 2010). Employees working within construction are generally considered to possess a low level of analytical skills, which enables them to have a good understanding of their own individual employee process but on the other hand there seems to be a lack of knowledge of the whole process (Santos and Powell,

2001a). Salem et al. (2005) stated that by promoting behavioural change, encouraging employee involvement and rewarding real improvement a large enhancement can be reached among the employees in learning and improving the Lean thinking and its implementation. The size of the firms can also contribute the role of the worker. Worker involvement in job management decreases as the number of staff positions increases (Maloney and Federle, 1993). This supports the arguments Coffey (2010) makes and further highlights the importance the site manager has towards the relationship organisations have with their employees. Taking an example of negative reactions that site managers can have, Santos (2005) presents the argument that people tend to be biased towards remaining silent when something goes wrong in organisational cultures that emphasise blame towards responsible employees.

Out on the construction sites, the term standardisation seems frequently used in a negative meaning, associated with limiting and controlling work procedures (Polesie, 2012). Despite this point, Polesie (2012) in his research, on site managers perception of freedom within standardisation, found it repeatedly mentioned that work procedures which can be considered as standardised were not perceived as freedom decreasing but rather as a way to minimize variation and uncertainty. Though, this was dependent upon the acceptance of these procedures among the employees and sub-contractors within the project-organisation. This is underlined by Cheng et al. (2006) who stated that employees have a big part to play in facilitating the implementation process of standardisation, as trust, confidence and teamwork need to be high in order for it to be a success.

Powering and activating the individual construction worker

In its essence the workers attitude towards their employer is positively practical and genuine. Therefore commitment and participation initiatives introduced to empower employees towards a productive way of working can increase innovation, quality and productivity (Coffey, 2010).

Organisations tend to concentrate only on what they can control through routines and standardized procedures. Management practices in the construction industry can create the perception among workers that they are just hired for their pair of hands as the management are often the ones who conceptualize the role of the construction worker. Construction sites are dynamic production environments, so it does not seem practical for managers to control every single process. Over-emphasising on controlling the routines minimizes the potential for innovation by excluding new information, reinforcing past routines and focusing on foreseeable matters (Clegg et al., 2008, Santos et al., 2002).

There are two types subordination connected with power and authority, coerced and voluntary. Participation by employees only occurs voluntarily, which means a positive attitude is essential for the employee. While requiring the authority to function, firms also require workers to possess initiatives to illustrate a creative and innovative thinking, thereby contributing positively to the activities in the firm (Coffey, 2010). Maloney and Federle (1993) present the view that greater employee involvement brings stronger motivation and improved performance due to a sense of reduced financial loss to the employees. This is built on the foundation that in industries such as construction, which have high emphasis on labour, performance is achieved through motivation, knowledge, skills and ability, as well as the individual perception

of the worker carrying out the activity. Concurring with this view, Coffey (2010) states that increased involvement and participation among workers is both possible and eligible, and therefore, should be sought after as a way to modernise construction companies. In his article, he found that most workers preserve an independent way of thinking which aims towards the benefit of their organisation and is not intended to challenge authority, and therefore stated:

> *"The importance of determining and understanding the attitudes of construction workers is because of their potential contribution to improving performance in the construction industry."*

Accordingly, workers who retain a critical state of mind towards their work procedures provide an important discipline for management as well as encouraging a broad acceptance towards innovative thinking (Coffey, 2010).

3 The master thesis journey and it's methodology

3.1 The origin of the topic

The original idea for this paper came to life after a course we took on Construction Processes and Management. After reviewing the course material and additional material we attained during the course duration, it became clear to us that waste reduction is a severely lacking in construction. The course itself contained material on Lean construction and Lean production, waste management, measurable activities, etc. As one of us had been working at BuildCo the previous summer we had inside knowledge that standardised installation manuals were in the making and were about to be introduced very soon. Going through all the material available to us we found that standardisation in general had been a very hot topic in the academic world over the recent years, especially around the year 2000. We found SWP to be a very interesting topic because of the possible gain that the construction sector could see when reducing waste and, perhaps more importantly, because of experience working on site we knew of the waste that often consists there. With the connections into BuildCo and a possibility to exploit that in a case study in later stages of a master thesis, the idea of researching standardised work procedures and this installation manual became all the more interesting. Therefore we decided that we would do a literature study on SWP that would be in the form of a theoretical review article. As one of us is a carpenter that has both worked as such and as a foreman, we had a certain insight into the gap that can sometimes exist between carpenters and foremen on site. With SWP in mind, this experience and the knowledge gained from the course, i.e. bottom up approach in Lean production, we decided that the perception of the individual construction worker would be our focus in our master thesis work.

3.2 The theoretical review article

In October, 2012 the work on the theory review article started in the form of a literature search which was run on relevant search engines with Chalmers access. The key words of the search were; standardisation, individual employee's perspective, craftsmen, construction workers, standardised work procedures, change management, freedom, lean construction, construction. This search turned up around 100 articles with a very broad reach over the material. We then skimmed over these articles in order to categorize them into 3 main categories:

- Category A for the most fitting, with 26 articles
- Category B for the ones that might fit or partly fit, with 20
- Category C for the ones that probably wouldn't be used but might contain useful background information, with about 22 articles (the rest of the 100 articles were not read and not categorized as they did not fit the subject).

In order to be able to overcome this amount of articles we then divided category A into 3 subcategories ranging from 1-3 depending on how fitting they were to our focus (the individual construction worker's perception on SWP). By doing this, we actually found out that out of the 100 articles we had found, almost none were written with a bottom up perspective with construction workers in mind. Quite a few articles did have the middle managers perspective, with relation to the difference in viewing SWP as a manager or senior manager at headquarters versus a manager or foreman on-site. In light of this situation, having already tried our best to find more articles with the

perspective of the construction workers, we decided to take a more top-down perspective on the literature study with the focus still on the construction workers. The article we wrote described the process of standardising work procedures with a top down perspective as we tried to shed light on how that might affect the individual construction worker. Furthermore we decided to question the limitation of the contextualization of the craftsman's role within standards.

During the literature study we created a database with numerous directly quoted fragmented parts, i.e. paragraphs and sentences, which aligned with our topic. After an outline of our article had been drafted, the quotes from this database, which was about 20 pages of quotes, were then categorized and sub-categorized to provide the red line through our theory and discussion chapters. The quotes were used as a way to puzzle our thoughts together on the best way to present and discuss the article's material and therefore it represents our understanding of the material used.

The theoretical review article was written in the form of a course that ranged from mid-October 2012 to late December, 2012. Although the article had been finished in that course, we decided to work more on it during the standard period for the master thesis work, despite the fact that the case study would be our main focus point for the thesis.

3.3   The case study and the empirical article

As has been stated, it was decided early on that the main focus of this master thesis would be the case study. An initial meeting took place in Gothenburg with BuildCo, where the original idea was presented. At that point our idea was to check the process of implementation of these standardised installation manuals up the whole ladder of the organisation from the site's in 3 regions of Sweden and all the way to headquarters in Stockholm. However this idea was not accepted by the company's representatives in Gothenburg, so we went back to the drawing boards. After another meeting with the representatives, where we had reformed our idea somewhat, we got the answer that a case study on SWP at BuildCo in Gothenburg was not possible for the time being. The reason for this was that the company had not reached the same stages with the SWP process in Gothenburg. This was early November and we got the information that BuildCo was much further along in Stockholm, so we decided that we would focus on our literature study and go back to the drawing boards with our case study. Late December we decided that we would make one last effort on BuildCo and try to produce a case study that might possibly be useful to BuildCo and ourselves. The study thesis would be written for Chalmers University but BuildCo would help by giving us support to travel to Stockholm and give access for interviews with their carpenters and foremen. The study had the focus topic: "The construction workers view on standardised work procedures".

The interviews

The request was sent to BuildCo's headquarters in Stockholm in the middle of January, 2013 and an answer came from the Head of Production Development (HPD) in the beginning of February. HPD arranged a trip for us from Gothenburg to Stockholm from the 25th to the 26th of February. We used the 3 weeks we had to prepare for the interviews to write questions that might be appropriate and create a framework for the information we wanted to gather.

We had already decided in the end of January, with our supervisor, that the case study would be a qualitative study and that we needed to create a framework which could grasp the topic that we had chosen. In accordance to this we tried to create about 20 questions that could fill this area within the framework, with as much information as possible without being leading or missing out on important information. These questions are shown in Appendix 3. The plan was that the interviews with the carpenters should take around 15 min. We also wrote a similar amount of questions for the foremen and some more general questions for the HPD, although those interviews were planned as a 30 min. to 1 hour discussion on the subject.

A framework for the interviews

Our framework was created with our aim:

- Get the craftsmen's opinion on standardised work procedures.
- Find out how well the craftsmen understand the concept of standardising work procedures.
- Find out if the craftsmen feel that they themselves can affect the standardisation of work procedures within the company.
- Find out if the craftsmen believe that a manual with standardised work procedures (SWPs) can grasp all aspects of the craftsman's role.
- Find out how much the craftsmen know about the standardised installation manuals (SIMs). Furthermore, get their opinion on how the concept of having a SIM can be portrayed from their point of view.
- Find out how the relations are between middle managers and craftsmen on site. Further try and find out if this can affect the craftsmen's vision of freedom and working conditions.
- Find out if the craftsmen want to have more effects on their work than they do in reality or if they are happy with the current situation.

In addition to the qualitative questions that we had created, we decided to have 6-8 quantitative questions in the form of a survey which could provide general answers on sense of freedom, trust and the gap that often exists between the foremen and craftsmen. To get feedback on our questions we used our supervisor first and then our opponents for the thesis. With our opponents we decided to train the interviews, asking them to play the part of craftsmen or foremen. We did this mainly to train in using correct Swedish (which is not our mother tongue), so as not to lead the interviewee or be misunderstood. This turned out to be quite helpful as the training did us good and we changed our wording on a few questions and also, and perhaps especially, with the spontaneous follow up questions that we would later use. Our opinion looking back on this training exercise after our interviews is that it was certainly helpful and gave us more confidence when doing the interviews themselves.

Stockholm

The trip to Stockholm was comprised of 2 whole days of interviews, as we arrived in Stockholm at 09.00 and were greeted by HPD, who would drive us to and from construction sites for the next two days. Day 1 started with a 1 hour interview sit down on the first job-site with HPD as we asked general questions on how the process

of standardising and implementing SWP began. We then went out on the construction site and interviewed the carpenters as they were working. After that HPD took us to lunch and after lunch he drove us to job-site 2, where we interviewed 2 foremen. Later he then drove us to the hotel. Day 2 started in similar fashion as HPD picked us up at the hotel and drove us to 2 job-sites. At both sides we interviewed both craftsmen and foremen in similar fashion as day 1.

Methodology of the interviews

Although doing the interviews with the craftsmen out on the construction site itself (not in the barracks) would prove as a challenge when transcribing the interviews, we found this to be the best approach as the carpenters would be in a familiar environment when answering the questions. The argument there was that they might discuss more freely their views when in a familiar environment rather than being summoned into a conference room close to the site manager's office.

The interviews with the foremen and HPD were set up more in a meeting form where we all sat around the coffee table and discussed the standardised installation manuals. HPD tried to be elsewhere when we conducted our other interviews so as to not affect what the foremen or craftsmen said. We interviewed 5 foremen and 23 craftsmen. The foremen were interviewed 2 at a time and then one of them individually, all of these interviews lasted for about 30 min - 50 min. Most of the interviews with the carpenters were conducted individually with one interviewer, although 3 of the interviews were conducted in a cafeteria with 2 or 3 craftsmen at a time. In total, 2 interviews with 2 interviewees and 2 interviewers, 1 interview with 3 interviewees and 2 interviewers and 16 individual interviews with one interviewer were conducted.

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 and previous (if changed) view of the craftsmen on SWPs and SIMs. Additionally, all the interviewees except the senior manager were asked to undertake a short quantitative questioner, with about 6-8 questions (found in Appendix 3), in order to establish the feelings that the different groups had towards their freedom in work as well as trust- and engagement levels between the two groups. All of the interviews were performed by the authors of this article, notes were taken during the interviews and they were all recorded as well. After each day of interviews all observations and reflection were discussed and noted as well as both authors kept a diary of each day's activities.

Analysing the results and writing the thesis

When all data had been collected the interviews were transcribed word for word in Swedish and then sentences used were later translated into English. We spent 4-5 weeks transcribing the interviews and writing down the data we had collected. When that was finished we discussed and divided the answers that we deemed useful or presentable into groups. This brought us about 20 pages of quotes which we had divided into 10 categories.

These categories were mainly drawn from the answers themselves and from the main points that we wanted to present, e.g. craftsmen views on; innovation and freedom, education, modernising, rotating roles, etc. in relation to SWPs and SIMs.

We used these categories to steer us as we wrote our synopsis. The synopsis described each paragraph, what topic it should include and how it should connect the previous one to the next one. The fundamental parts of our synopsis and layout were based on three sources, our supervisor's comments, Bem (1995) journal article on how to write an empirical article and lecture slides presented by The Effective Writing Program, UWO. The writing process started with the results and method section and continued with discussion, which included concluding remarks, and ended with the introduction with the theory part included. The 10 categories were divided further into 3 main chapters and then subchapters which can be seen in the discussion and results part of the article. The approach used for the interviews and the structure of the article was inspired by Polesie (2012), Polesie et al. (2009), Santos (2005) and Brunåker and Kurvinen (2006) as well as the authors mentor, a professor from Chalmers University. After both of the articles had been finished, this report was put together with the intent to portray a holistic view on the work performed over the research period.

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Appendix 1 – Theoretical Review Article

The Construction Worker's view on Standardised Work Procedures:
An empirical study conducted within a large Swedish construction firm

Master of Science Thesis in the Master's Programme
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ABSTRACT

Implementation of standardisation in manufacturing has been considered straight-forward, contrasting the construction industry. Researchers associate this with the uniqueness of construction industry and consisting resistance to change. Many have researched the manager's perspective on standardized work procedures (SWPs), less is known about the perception of employees performing within boundaries of SWP. This article presents a theoretical discussion aimed at explaining the role of individual construction workers in SWPs as well as portraying the effects standardisation can have within such a context. The results show that SWPs can affect construction workers both negatively and positively depending on implementation methods. Moreover, that in order to obtain a positive reaction from construction workers, much emphasis must be devoted to the training of and communication with the on-site personal. Additionally, intra-organisational political barriers must be breeched for a successful implementation. The contextualisation of the craftsmanship role faces several obstacles which require more extensive research.

Key words: Construction industry, Change management, Standardisation, Productivity.

1 Introduction

This paper will explore the various concepts both in construction and change management in order to shed a light on employee perception on standardized work procedures. This introduction chapter is divided into two parts, the former is a historical review and the latter prescribes the description and purpose of this article.

1.1 Why standardise – Historical review

Over the years, various principles have been introduced in order to create efficient processes, minimize waste and maximize profits. Key figures in management history, such as F.W. Taylor and H. Fayol, introduce a more scientific approach to organisational, management, structure and processes in the early 1900's. These included thinking of employees more like machines and structuring their work processes and procedures in efficient waste reducing ways, with high emphasis on measurable activities. Examples of this can be seen by exploring the early days of industries such as the automotive industry, where individuals, e.g. Henry Ford, build empires on the foundation of these principles (Liker, 2004). Following this introduction of systematic optimization of SWP, theoreticians, primarily C. Bernard and M. P. Folett, shifted the focus on to the employees' humanity and individual value. There work instigated unionism and a shift from coercive- to a more coactive empowerment, perceiving the employees more as human resources rather than simply a work force (Clegg et al., 2008).

Building upon the foundation of all of the management theorists mentioned above, principles, including lean, six sigma, total quality management, key performance indicators, etc., have been created in an attempt to develop cost-effective management systems that utilize human resources in order to produce value.

1.2 Description and purpose of article

The authors of this article pursued to research the topic extensively by using databases with relevant search entries. The theory presented is built upon articles by several theoreticians and scholars, ranging from employee's perception of standardized work procedures in Brazil to case study on standardisation of processes in Denmark. A fair amount of research has been done on manager's perspective on standardized work procedures (SWP). Less is known about the perception of individual employees performing within the boundaries of standardised work roles using standards in their work. The role of the employee's in the construction industry has been a subject to change over the past decades. The introduction and successful implementation of standardisation and lean principles in manufacturing, especially automobile industry has spun a web of interest in projecting it on to the construction industry. This idea isn't irreproachable, though the construction industry is one of the most established project-based sectors and is subject to frequent change it doesn't mean that the change is always acceptable (Cheng et al., 2006). Cheng et al. (2006) insisted that the only way to get employee's to participate in the change is to gain their approval. The authors' understandings of implementing SWP within the framework of standardisation principles, is that they are not fully applicable in today's construction environment. In order to prevent misunderstanding, the purpose of this review article

is not to diminish standardisation principles in present shape and form, but rather try to find appropriate ways to apply them in a construction industry context. This is done by exploring how SWPs affect the individual construction worker in order to find ways for improvement.

Research questions:

- o How can the effects standardised work procedures have on individual construction workers be characterized?
- o Can standardised work procedures fully contextualize the role of a construction worker?

2 Theoretical framework of references

This chapter presents the results of theory research performed in order to explain the effects SWPs have on the individual construction worker.

2.1 Conceptualising standardisation

The concept of standardisation as we know it today, first emerged in the 1980's in the form of the stage-gate models (Gudmundsson et al., 2004). Since then, standardisation has been reformed over the years by various scholars and theoreticians and applied in numerous industries with incommensurable results. Standardisation is defined as the planning and development of pre-set procedures and referential material established by optimized practice in order to reduce waste and variation of the final product. Standards used in that sense are usually presented in writing, other formats such as sketches and pictures can also simplify understanding (Polesie, 2012, Santos et al., 2002, Santos, 1999). Ungan (2006) considered standardisation as a way to increase efficiency through consistency, reduce process variation and enable easier process control. In a case when a problem occurs in production like rejects or rework, root causes should be located and measures to amend the situation should be implemented where the standard is changed accordingly (Santos, 1999). Once the standard is in place the problem should not recur.

Researchers have also expressed scepticism of standardisation, by suggesting that standardisation discourages innovation in the production process (Gudmundsson et al., 2004, Ungan, 2006).

Grasping the meaning

In order to grasp the meaning of standardisation in a production context, a brief overview of processes is needed. A process is a planned series of actions or operations that advance a material or procedure from one stage of completion to another (Ungan, 2006). Process information or process documentation is a graphical representation of a process. It is important for the production integrity to document the process in order to limit uncertainty and variability. Uncertainty and variability is usually attributed to differences in the way an employee performs a given task, thus, the employees capabilities determine the final results. In order to secure a homogenous result, the process must be documented. There are normally two causes of variability in production: the random factors which are often beyond the operative's control and the controllable cause which are within the power of the operative's control (Santos et al., 2002). Santos (2005) emphasized that information should be part of the process and that the access to information should be facilitated as much as possible. In relation to construction, visual controls are recommended to be incorporated in all the equipment, components and materials that move through the construction site.

Written standards

Standardisation requires that the same operation is repeated in exactly the same way and by multiple employees at dispersed geographical location. Therefore a way to document every procedure so that it can be easy to access and understand is needed.

Ungan (2006) acknowledged that the best way to record knowledge is by creating written documents. The preferable way is to extract the knowledge of the employee who knows the best way of performing his task, a so called "process master" and thereby reducing the variant in the process output. Though it sounds simple, it can be challenging to obtain the tacit knowledge out of process participant's head and put it into written document. This can be done by using an established team to facilitate the extraction of tacit knowledge from the process master, as it can create a synergy which allows easier cooperation. Ungan (2006) further emphasized that once process is standardized it should be on hiatus until it is subject to revision, and thereby no new knowledge should be created during the implementation process. Santos (2002) doesn't share his colleague's opinion and encourages that standards should continuously be reviewed, improved and disseminated in order to reduce variability.

2.2 Why standardise work procedure in construction – Comparing industries

The construction industry has been widely reported as inefficient and old fashioned, which is why construction scholars have been increasingly trying to improve construction methods and practice by comparison and repetition of work methods and procedures from other industries. Fernie et al. (2006) stated that the underlying factor behind the much emphasised comparison is the broad acceptance of consistently higher performances in other industries, e.g. automotive industry, which is usually assumed to be related to 'best practice'. Others have worded similar reasons adding to the ever growing criticism that construction processes are inefficient due to lack of standardisation, etc. (Polesie, 2012, Polesie et al., 2010). The construction industry, as oppose to other manufacturing industries, is more dependent upon individual and group performance than machinery, respectively (Maloney, 1993).

Companies within the construction industry most often work within a project based organisational form. The term construction project has been defined in multiple ways, e.g. a temporary organisation which aims to accomplish specific tasks (Polesie et al., 2010) or highly situational and context-dependent with fluctuating requirements (Styhre et al., 2006).

A project is defined by Maylor (2010) as a unique set of coordinated activities with definite starting and finishing points, undertaken by an individual or organisation to achieve a desired outcome. This presents a rather obvious difference between the construction industry on one side, with one design representing one or few products, and most other manufacturing industries on the other, e.g. automotive, computer, steel, etc., where most product designs are highly standardised and each design represents an enormous amount of products (Winch, 2010). Hence, the uniqueness related to the construction industry makes the comparison to other sectors rather difficult. This has made direct transportation of principles concerning standardisation rather problematic for many, which has resulted in a broad theoretical discussion and development towards construction specific principles, e.g. Lean Construction. (Winch, 2010)

Uncertainty can be considered as relatively high in most construction projects, however, it is not always explicitly tied to the product, as elements such as processes and organisational structures can sometimes be the root cause. The high reliance most

construction projects have on various suppliers and sub-contractors represents might cause construction firms difficulties in applying these standardisation principles directly, as the project organisation changes frequently over the project lifetime (Polesie et al., 2010). Having experienced staff and long term relationships with suppliers can be important for cost reduction and create stability which facilitates standardisation (Santos et al., 2002). However, managers, even within the same organisation, with diverse experiences, values, etc., run project differently. Running projects in different ways creates confusion and added waste, which can be related to variances in managerial staff backgrounds and underlines the input site managers, experienced or not, can have on value (Polesie et al., 2010). In other words, by choosing suppliers and procedures contradictory to company standards, an obstacle is created which hinders application of management principles.

Standardised Work Procedures (SWP)

The role of the craftsman has been a subject to change, beginning with the scientific management as applied in manufacturing during the beginning of the twentieth century. Skill-based training has been developing to take place of craft training, as workers are trained in particular subsets of skills rather than entire set of skills in a trade (Maloney and Federle, 1993). Standards in construction can be used as an intensive tool in challenging the workforce to develop better practices. When employees participate in such an activity, the standard becomes 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).

SWP can be defined as processes divided into finite tasks, following that the optimal method of performing each task is identified. Workers are then trained in the requisite skills and the performance in process is closely monitored by the appropriate personal to ensure that the method is followed as described (Maloney and Federle, 1993).

The process of identifying what is the optimal method of performing each task is heavily reliant of what can be measured. Some things are easily measured, codified and adopted while other information flows by unnoticed and thereby cannot be measured (Fernie et al., 2006). When standardizing processes, which is viewed as forcing employees to standardize exact actions or routines, a room for interpretations of the individual employee is needed (Polesie et al., 2010). As such, variability shouldn't be entirely discarded from standardisation process as there are situations where variability is clearly beneficial to enhance process performance (Liker, 2004).

2.3 Implementing standardisation

Many have acknowledged that efficiency is missing from the construction industry, fixing this problem will inevitably bring on change. Fernie et al. (2006) described this change as being promoted by "identification, implementation, monitoring and measuring of best practice." Additionally they stated that the common view on these principles emphasised intents such as integration, team work, trust, partnering, standardisation and value for money and as a result was bias by them. Gudmundsson et al. (2004) supports the notion that implementation of standardisation unavoidably carries change within an organisation but at the same time can rationalise product development work. Additionally he states that standardisation can have significant impact on organisations with value-adding changes in processes, product technologies

and strategy. In his view these changes need to be accounted for prior to the launch of the implementation process in order to avoid problems and delays in latter stages (Gudmundsson et al., 2004). Santos and Powell (2001a) root for change, stating that progressing for the sake of improvement alone is guaranteed to provide a stronger organisation in the long term. However, an overemphasis on quantitative methods when applying standardisation principles can result in out-of-context appraisals of work procedures. When considering change towards SWP in construction, it is essential to contextualise with relations to past and present in order to rationalise future possibilities (Fernie et al., 2006).

Implementing SWP

Implementing the standardized work procedures requires employee's incorporation into the process, as it can play a significant role on the workforce vision of effectiveness. For the standardisation to be successfully integrated, intention, motivation and voluntary adherence must be part of the process as it will only work when the employees are willing to participate in the integration (Santos, 2005). As Fernie et al. (2006) and Cheng et al. (2006) concurred, a successful application of practice in one sector is highly dependent on its compatibility with the actors within that sector or organisation.

Adequate training is imperative as it can help the employee to prepare and adapt to the new system. Another barrier associated with the implementation is a lack of senior management endorsement, as research has shown that they have little patience when it comes to waiting to reap the benefits of the new system (Cheng et al., 2006).

When the implementation is in place, the information on standard procedures should be available when and where the worker needs it in order to eliminate wasted time with unnecessary movement in attaining information (Santos, 1999). When information on site is not easily attainable the risk of mistrust and poor teamwork between managers and workforce increases. During such circumstances managerial decision will be questioned by the workforce (Santos, 2005).

Key factors for successful change in the construction context

Clegg et al. (2008) present change as:

> *"multilinear and multivariable, where many changes occur simultaneously as the effect of many different variables."*

Accordingly, organisational change is much like a contested campaign where prevailing traditions and codes need to be effectively positioned and maintained. Brunåker and Kurvinen (2006) state that "change is socially constructed and starts in the daily communications between actors." They discuss two types of organisational change; firstly, as a means for management to dominate over external as well as internal actors, and secondly, as a transparent democratic change often initiated by on-the-floor staff.

According to them, local initiatives in organisational change have a dissimilar rationality to that of managerial discourse known as the autocratic approach. The autocratic approach represents change protocols which are initiated, formed and

understood by management, but often meet resistance on their way down the hierarchy (Brunåker and Kurvinen, 2006, Gudmundsson et al., 2004). This is underlined by Cheng et al. (2006) who presented resistance as a normality when the status quo is challenged with change. Clegg et al. (2008) explain this as an undesirable view on change due to the interruption of stable equilibrium which is considered the natural state of organisations.

Local initiatives to organisational change, which can come from individuals or groups, are dependent upon a person (or persons) within the organisation that possess comprehensive knowledge of local procedures. This knowledge empowers them to translate new procedures into something comprehensible and fitting to their settings. However, the same thing applies to locally initiated changes, i.e. whether change needs to go up or down the hierarchy it is always subjected to political barriers, although, indeed, different ones depending on direction (Brunåker and Kurvinen, 2006, Cheng et al., 2006). Describing this in more detail Cheng et al. (2006) state:

> *"Any proposed implementation methodology must overcome resistance at various levels including the "super political" (executive), "organizational" (departmental/divisional) and the "implementation" (front-line/project) levels."*

Additionally, they present arguments from multiple scholars that state the need for key persons on all levels of organisation to enlist political support to the change before the process has begun, in order to steer away from problematic resistance (Cheng et al., 2006).

The challenges of SWP

Fernie et al. (2006) stated that although using standardised procedures and measuring performance is certainly useful, it does not give a holistic explanation for the link between practice and performance. Their argument is that:

> *"The stripping of best practice from what cannot be measured is unlikely to provide wholly reliable explanations for what makes practice 'best' or indeed 'poor'."*

Furthermore, their view is that the practice of SWP in construction is too emphasised on measureable activities and as a result limits the context which the roles are perceived in, i.e. in a sense focusing on certain variables while excluding others. Admittedly measuring quality of craftsmanship, for example, can be both difficult and time consuming (Fernie et al., 2006). As a result, it is necessary to comprehend the structural characteristics of context as well as the differences in characteristics between industries and organisations, i.e. recipes, logics and organisational routines that reflect a chronological recognition to context and practice.

> *"An understanding of the performance of a practice must simultaneously be rooted in an understanding of what it means to existing interest groups and partnerships."*

It is necessary to have a holistic comprehension of the industry from a managerial perspective before any enforcement of change in practise (Fernie et al., 2006).

Another thing missing from best practise theorists is how to apply it in a project organisation, with all their downsides on change management (Fernie et al., 2006). This can result in implementations of modern management principles that are

enforced on middle managers without their approval and thereby have a definitive depreciation of the need for their individuality.

Additionally the term standardisation has a tendency to motivate negative feedback among many middle managers, who perceive it as a hindrance instead of a help, despite consistently using standardised activities which they like to refer to as simplified work procedures (Polesie et al., 2010).

The theory article by Fernie et al. (2006) presents a broad criticism towards methods such as benchmarking and implementation of 'best practice'. The argument is that these current methods used for SWP, do not provide any clarification of the affiliation between practice and performance. Accordingly these arguments are extremely valuable as they provide a trial that can test the principles in order to increase the adoption of SWP (Fernie et al., 2006).

Learning how to continuously improve and change

Styhre et al. (2006) described organisational learning as a place where individuals share knowledge and experience preferably through activities, in attempt to constitute and reproduce them in the same way. Learning and knowledge sharing can contribute significantly to the organization performance as well as understanding the linkage between practice and performance (Fernie et al., 2006) . Effective implementation of organisational learning must be seen as an on-going and continual process, especially in construction, where there consists a resistance to change (Cheng et al., 2006). Discouragement through rivalry and non-learning behaviours within organisational cultures needs to be avoided to facilitate incessant improvement. In a case study by Polesie et al. (2010), interviewed personal acknowledged organisational strategies either as voluntary guidelines or as mandatory procedures and therefore a need exists for management to assert these strategies with the appropriate measures (Polesie et al., 2010). It can take up to 6 years for a change in an organisational environment to be successfully embedded (Cheng et al., 2006). Which can be contributed to the fact that these standardisation principles are considered to be too difficult or too time consuming to be useful (Polesie et al., 2010).

2.4 Standardising the individual employee

The strategy is more on reducing the variability by hiring a willing pair of hands, thereby discarding the knowledge, skills and abilities of the employee (Maloney and Federle, 1993). Individual freedom from a work perspective occurs when employee experiences pleasure instead of pain and responsibility instead of restrains. Clegg et al. (2008) acknowledged the importance of preserving the sense freedom in workmanship, by stating that

> *"creativity without structure tends to grow out of touch with reality, whereas structure without creativity results in a loss of innovation."*

In other words, workers need flexibility and freedom, which however cannot be too excessive as it will result in non-effective solutions.

The freedom of the individual construction worker

Before the industrial revolution, workers had to serve a lengthy apprenticeship to become members of a craft guild. Being a part of the craft guild enabled the workers to exercise a great deal of freedom when defining how a task should be executed. The introduction of scientific management approach has had a great impact on the utilisation of the employee's capabilities.

Authority asserted from employer to employee is seen as the centre of employer-employee relationship, as it creates order and certainty in their interactions (Coffey, 2010). Some firms in the construction industry have adopted the approach of creating self-managing teams. The workers manage the team, thereby utilizing the knowledge of the worker. In such an approach, the management only require a specific result and give the worker a freedom to decide means in order to achieve the objective. By doing so, the management trades some control for greater self-motivation and innovation (Maloney and Federle, 1993).

Strategically improving the employees' perspective

Companies have various obligations towards employees that often knowingly remain unfulfilled. In a construction context these obligations remain with site managers, as they are the ones employees engage in an employment relationship with and therefore expect fulfilment from (Coffey, 2010). Employees working within construction are generally considered to possess a low level of analytical skills, which enables them to have a good understanding of their own individual employee process but on the other hand there seems to be a lack of knowledge of the whole process (Santos and Powell, 2001a). The size of the firms can also contribute the role of the worker. Worker involvement in job management decreases as the number of staff positions increases (Maloney and Federle, 1993). This supports the arguments Coffey (2010) makes and further highlights the importance the site manager has towards the relationship organisations have with their employees. Taking an example of negative reactions that site managers can have, Santos (2005) presents the argument that people tend to be biased towards remaining silent when something goes wrong in organisational cultures that emphasise blame towards responsible employees.

Out on the construction sites, the term standardisation seems frequently used in a negative meaning, associated with limiting and controlling work procedures (Polesie, 2012). Despite this point, Polesie (2012) in his research, on site managers perception of freedom within standardisation, found it repeatedly mentioned that work procedures which can be considered as standardised were not perceived as freedom decreasing but rather as a way to minimize variation and uncertainty. Though, this was dependent upon the acceptance of these procedures among the employees and sub-contractors within the project-organisation. This is underlined by Cheng et al. (2006) who stated that employees have a big part to play in facilitating the implementation process of standardisation, as trust, confidence and teamwork need to be high in order for it to be a success.

Powering and activating the individual construction worker

In its essence the workers attitude towards their employer is positively practical and genuine. Therefore commitment and participation initiatives introduced to empower

employees towards a productive way of working can increase innovation, quality and productivity (Coffey, 2010).

Organisations tend to concentrate only on what they can control through routines and standardized procedures. Management practices in the construction industry can create the perception among workers that they are just hired for their pair of hands as the management are often the ones who conceptualize the role of the construction worker. Construction sites are dynamic production environments, so it does not seem practical for managers to control every single process. Over-emphasising on controlling the routines minimizes the potential for innovation by excluding new information, reinforcing past routines and focusing on foreseeable matters (Clegg et al., 2008, Santos et al., 2002).

There are two types subordination connected with power and authority, coerced and voluntary. Participation by employees only occurs voluntarily, which means a positive attitude is essential for the employee. While requiring the authority to function, firms also require workers to possess initiatives to illustrate a creative and innovative thinking, thereby contributing positively to the activities in the firm (Coffey, 2010). Maloney and Federle (1993) present the view that greater employee involvement brings stronger motivation and improved performance due to a sense of reduced financial loss to the employees. This is built on the foundation that in industries such as construction, which have high emphasis on labour, performance is achieved through motivation, knowledge, skills and ability, as well as the individual perception of the worker carrying out the activity. Concurring with this view, Coffey (2010) states that increased involvement and participation among workers is both possible and eligible, and therefore, should be sought after as a way to modernise construction companies. In his article, he found that most workers preserve an independent way of thinking which aims towards the benefit of their organisation and is not intended to challenge authority, and therefore stated:

> *"The importance of determining and understanding the attitudes of construction workers is because of their potential contribution to improving performance in the construction industry."*

Accordingly, workers who retain a critical state of mind towards their work procedures provide an important discipline for management as well as encouraging a broad acceptance towards innovative thinking (Coffey, 2010).

3 Discussion

This chapter presents the arguments from the authors of this article based on the theory presented, in an attempt to provide answers to the two research questions given in the introduction chapter. The chapter starts off with the characterization of the effects SWP have on the individual construction worker. This is followed by argumentation for adequate contextualisation of the role of the individual construction worker and, subsequently, a short summary in concluding remarks.

3.1 The effects SWP have on individual construction workers

The theory chapter shows a wide consensus among scholars, presenting the role of construction workers as pivotal in successfully implementing SWP (Santos, 2005, Fernie et al., 2006, Cheng et al., 2006, Polesie et al., 2010, Coffey, 2010, Maloney and Federle, 1993, Brunåker and Kurvinen, 2006). The effects SWP have on the individual employee are however not as clear, as this has not been a focal point for past research.

As many companies now focus on unity and adherence this directly effects the employees who can feel more joined with the organisations with increased motivation and harmonizing intentions at the same time as others feel left out and disjointed with a feeling of abandonment. It is therefore obvious that not only do the construction workers directly influence the implementation process of SWP but the implementation process also directly affects them and often brings on changes in their attitudes.

Challenging the status quo is something that will meet much resistance throughout an entire organisation and moulds, either positively or negatively, opinions in the mind of each individual employee affected (Cheng et al., 2006, Brunåker and Kurvinen, 2006, Gudmundsson et al., 2004). Therefore it is certain, impervious to the source of change, that political barriers need to be overcome in order for SWP to be realized within an organisation. As the change in practice is mostly formed in one of two ways, local initiatives or the autocratic approach, inevitably it will affect the individual construction worker. Consequentially, this means that construction workers need ample political understanding of the organisation to be able to affect the change process, e.g. gain support from key personal. Affectively, as many of the authors state, managerial involvement is not only sought after but required in successful implementation of SWP (Polesie et al., 2010, Coffey, 2010, Cheng et al., 2006).

If Santos's and Powell's (2001) statement is correct, this necessity to involve personal from all levels of organisation means that the individual construction worker's partial understanding of organisational processes needs to be broadened.

According to Coffey (2010) authority is seen as the centre of the employer-employee relationship as it can create order and certainty. This paper additionally portrays two sets of subordinations, coerced and voluntary, constraining employees' participation to the latter. However, organisations sometimes tend to concentrate on the prior with controllable routines and procedures, which can lead to excessive dominance. This is yet another factor where managers as well as the organisations as a whole often

negatively affect the individual construction worker, for example by forcing them to comply without including them in the decision process. More often the reason is not to intentionally force the construction workers to comply but rather to obtain reduced variability and unified solutions towards more efficient and value producing practice. Yet, this involves negligence of the potential impact that construction workers can have towards better practice. As history has shown, this often results in destructive moral and negative reactions among workers who experience a sense of reduced freedom and uncertainty. (Santos, 2005, Coffey, 2010, Clegg et al., 2008, Maloney and Federle, 1993).

Freedom is extremely important to all individuals and can be experienced in different manners. According to some of the authors the experience of freedom, which can be perceived as the employee's encounter with pleasure and responsibility in work settings, is an important but tight balance of flexibility with empowerment versus structure with restraints (Polesie, 2012, Clegg et al., 2008, Maloney and Federle, 1993). Many companies strive to find this middle road in order to grab the golden goose, i.e. retain maximised value. This is often done with human resource initiatives, e.g. teamwork, workshops, providing common goals and values, etc. In turn, management then trades reduction of control for greater self-motivation and innovation amongst individual employees. Additionally, as many of the scholars mentioned, learning programs (e.g. workshops) can facilitate the implementation process by educating the construction workers on the changed practice as well as the need for change (Fernie et al., 2006, Cheng et al., 2006, Styhre et al., 2006, Coffey, 2010, Maloney and Federle, 1993). This might both provide an easier adaptation of SWP and give the construction workers a more holistic understanding of the organisation, which is often lacking (Santos and Powell, 2001).

As is mentioned in the theory, it is absolutely pivotal for the construction industry to tap into the knowledge and expertise that construction workers have (Coffey, 2010, Maloney and Federle, 1993). The individual employee's attitude towards an organisation and their perceived image of their employer starts of as positive, trustworthy and genuine. Therefore by involving the construction workers and educating them they become more motivated, obtain a more critical way of thinking and improve their work methods and attitudes towards work. This increased knowledge and empowerment provides an opportunity to increase innovation, quality and productivity in an organisation and should therefore be desired.

These arguments along with arguments presented in the theory chapter have been amalgamated into an answer to the first research question:

How can the effects standardised work procedures have on individual construction workers be characterized?

The characteristics of the effects can be grouped into two categories, negative impact and positive impact. The negative impact that SWP can have on the individual construction worker includes, but might not be limited to, negative change in attitude, sense of reduced freedom, sense of abandonment, decreased -cooperation with co-workers, -productiveness, -innovativeness, uncertainty as well as indifference towards the organisation. Likewise, the positive impact that SWP can have on the individual construction worker is, but might not be limited to, increased; -awareness, -enthusiasm, -sense of freedom, -knowledge, -innovativeness, -efficiency, -unity

among workers and across intra-organisational boundaries, as well as an attitude towards continuous improvement and value creation.

3.2 Addressing difficulties with contextualisation of activities with regards to written standards

Tracing back to the industrial revolution, the role of the craftsmen has been a subject of change which has led to major reforms in his role. Today the role of the craftsmen is more specified where his profession has been built upon a more skilled-based training. This transition should have enabled the contextualising of the craftsman role. For instance, a "carpenter" today may only possess the skills to construct concrete forms along with other specific procedures in carpentry rather than having the full range of skills in the carpentry craft (Maloney and Federle, 1993). That said, it should be noted that no employee works in exactly the same way, which contributes to the variability and uncertainty in the final result. As Santos et al. (2002) acknowledged, in order to exclude these unwanted factors a documentation of the process need to take place. One way of doing this is using 'best practice' as a standard to document. This can be done by using so called "process masters" which are usually the most experienced workers available at the organisation and are considered performing 'best practice' procedures (Santos et al., 2002, Ungan, 2006). Though it might sound simple enough, it is far from it as Fernie et al. (2006) discovered. As the process of identifying what is optimal method of performing a task is reliant on what can be measured, whereas certain things are easily measureable, while other information flows by unnoticed and therefore unmeasured. Even though it can be measured, it's difficult to say if a practice is performed in a best way or simply in a poor way. Thus measuring and documenting the quality of craftsmanship, can be considered difficult and also time consuming. It should be noted that excluding all variability isn't necessarily a good thing. As workers need flexibility and creativity, however it cannot be too excessive as that would lead to a non-effective result (Clegg et al., 2008).

Can standardised work procedures fully contextualize the role of a construction worker?

Understanding the entire context to which the role of a craftsman is defined within seems to be essential when creating standards. At first glance, given the presented theory, the answer seems to be that modern principles that measure work procedures are not fully able to contextualise the role of the construction worker to an extent that can fully recognize the value he or she brings. However, answering the research questions with full certainty turns out to be challenging after only having done a preliminary research into the theory behind it. It requires a more extensive research with a practical inquiry on the subject.

4 Concluding remarks

It can be concluded from the literature that standardising work procedures is economically important to most modern construction firms. The employee perception of SWPs should be considered as equally important. As this article has supported, employees should be utilized as resources that can support the implementation and continuous improvement of SWPs. However, the contextualisation of the employees' craftsmanship needs to be further explored in order to discover the magnitude of their effects on standardisation. Additionally and for that reason, the perception of the individual construction worker needs to be explored with the intention of encouraging higher performance and engagement, as well as finding a way to measure the roles with more precision.

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Appendix 2 – Empirical Article

The Construction Worker's view on Standardised Work Procedures:
An empirical study conducted within a large Swedish construction firm

Master of Science Thesis in the Master's Programme
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ABSTRACT

Implementation of standardisation in manufacturing has been considered straight-forward, contrasting the construction industry. Researchers associate this with the uniqueness of construction industry and consisting resistance to change. Many have researched the manager's perspective on standardized work procedures (SWPs), less is known about the perception of employees performing within boundaries of SWPs. This article presents an empirical study performed within a large Swedish housing development company which is a leading figure in standardisation within the Swedish construction market and one of the first construction companies in Sweden that attempts a large scale implementation of SWPs. Interviews were conducted with 23 construction workers and 5 middle managers, as well as the head of production development at the company. The results show that SWP can affect construction workers both negatively and positively depending on implementation methods and level of participation. Moreover, that in order to obtain a positive reaction from construction workers, much emphasis must be devoted to the training of and communication with the on-site personal comprising both workers and managers. Additionally, intra-organisational political barriers must be breeched, complications with constant modernisation of standards for, and contextualisation of, the craftsmanship role solved for a successful implementation process. This study gives a glimpse into the current situation of SWPs from the Swedish construction workers perspective and as our theory research conclusion suggests, this area requires more extensive research. Working with SWPs from standardised installation manuals (SIMs), as in the case study presented in this article, requires much work and planning in terms of creation, visualisation and modernisation of the SIMs. Furthermore, in order for such a change to manifest within a company and become the norm, a unified understanding throughout all company levels and a cultural change towards a bottom-up oriented culture seems essential to the success rate of the change process.

Key words: Standardisation, Construction industry, Change management, Productivity, Contextualising craftsmanship, Lean Construction.

The following abbreviations are used frequently in this paper: SWP (Standardised Work Procedure), SIM (Standardised Installation Manual), HPD (Head of Production Development).

1 Introduction

This article supports Koskela and Vrijhoef (2000) argument that bottom-up innovation seems to be severely lacking within the construction industry. By comparing theory and practice the aim is to paint the "bottom-up view" picture that is presented to craftsmen in a change process involving SWP. Furthermore arguments are made for an increased utilization of on-ground personnel as this might facilitate the change process and provide a better outcome. This can only be achieved if the management levels of the firms create suitable environment to enable it to flourish. This is done by excluding the problems affecting the workforce, such as waste and excessive focus on value adding parts. (Koskela and Vrijhoef, 2000). However, the same thing applies to locally initiated changes, i.e. whether change needs to go up or down the hierarchy it is always subjected to political barriers, although, indeed, different ones depending on direction (Brunåker and Kurvinen, 2006, Cheng et al., 2006, Clegg et al., 2008, Gudmundsson et al., 2004, Fernie et al., 2006).

1.1 SWP

The introduction and successful implementation of standardisation and lean principles in manufacturing, especially automobile industry has evoked an interest in projecting it on to the construction industry with heterogeneous result (Koskela and Vrijhoef, 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. Craftsmen are then trained in the requisite skills and the performance in process is closely monitored by the appropriate personal to ensure that the method is followed as described (Maloney and Federle, 1993).

1.2 Implementing standardisation

Santos (2005) emphasized that information should be part of the process and that the access to information should be facilitated as much as possible. In relation to construction, visual controls are recommended to be incorporated in all the equipment, components and materials that move through the construction site (Santos, 2005). Ungan (2006) insisted that the best way to record knowledge is by creating written documents. The preferable way is to extract the knowledge of the craftsman who knows the best way of performing his task, a so called "process master" and thereby reducing the variant in the process output. Though it might sound simple, it can be challenging to obtain the tacit knowledge out of a process participant's head and put it into written document. This can be done by using an established team to facilitate the extraction of tacit knowledge from the process master, as it can create a synergy which allows easier cooperation. Though keeping in mind what 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. For the standardisation to be successfully integrated, intention, motivation

and voluntary adherence must be part of the process as it will only work when the craftsmen are willing to participate in the integration (Santos, 2005). Ungan (2006) further emphasized that once process is standardized it should be on hiatus until it is subject to revision, and thereby no new knowledge should be created during the implementation process. Santos (2002) does not agree with that notion and encourages instead that standards should continuously be reviewed, improved and disseminated in order to reduce variability. When the implementation is in place, the information on standard procedures should be available when and where the worker needs it in order to eliminate wasted time with unnecessary movement in attaining information (Santos, 1999). When information on site is not easily attainable the risk of mistrust and poor teamwork between managers and workforce increases. During such circumstances managerial decision will be questioned by the workforce (Santos, 2005). Another barrier associated with the implementation is a lack of top management endorsement, as research has shown that they have little patience when it comes to waiting to reap the benefits of the new system (Cheng et al., 2006).

1.3 Employee involvement

When standardizing processes, which should not be viewed as forcing craftsmen to standardize exact actions or routines, a room for interpretations of the individual employee is needed (Polesie et al., 2009). As such, variability should not be entirely discarded from a standardisation process as there are situations where variability is clearly beneficial to enhance process performance (Liker, 2004).

Cheng et al. (2006) recognised that craftsmen, have a big part to play in facilitating the implementation process of standardisation, as trust, confidence and teamwork need to be high in order for it to be a success. Bearing in mind what (Polesie et al., 2009) cautioned, that the high reliance that most construction companies have with their supplier and sub-contractors can cause difficulties when applying standardisation. On that note, Salem et al. (2005) presented an example from the US construction industry, where a construction contractor integrated Lean concepts into their production. Promoting behavioural change, encouraging employee involvement and rewarding real improvement can lead to a large enhancement among the employees in learning and improving the Lean thinking and its implementation. Concurring with this view, Coffey (2010) stated that increased involvement and participation among workers is both possible and eligible, and therefore, should be sought after as a way to modernise construction companies. In his article, he found that most workers preserve an independent way of thinking which aims towards the benefit of their organisation and is not intended to challenge authority.

Santos and Powell (2001b), drew a conclusion on the optimal way for a change to happen in construction surroundings. The article describes the philosophies of "push and pull" learning. Where push learning is forced upon learners and where pull learning proclaims that the learners are in charge of their learning. In his research, he concludes that a balanced approach between push and pull learning is the best way to introduce changes within construction organisations. Where the environment is characterised by pull learning, However push learning is ideal for creating the initial reflection (Santos and Powell, 2001b). Although keeping in mind what Cheng et al. (2006) stated, that effective implementation of organisational learning must be seen as

an on-going and continual process, especially in construction, where there consists a resistance to change

Adequate training is imperative as it can help the employee to prepare and adapt to the new system. Many scholars have portrayed training of the employees as a vital part in successful implementation of lean principles (Fernie et al., 2006, Cheng et al., 2006, Styhre et al., 2006, Coffey, 2010, Maloney and Federle, 1993). The consequences of training the craftsmen may cause unsettlement in the early stages of implementation but over the long run will result in increase in efficiency for the construction company implementing it (Salem et al., 2005). This corresponds with the conclusion of Castañeda et al. (2005) in their case study, which stated that construction workers are actually receptive to training

On the subject of involvement of personal on site (Koskela and Vrijhoef, 2000) stated that sub-contractors are usually obtained on a tendering basis. Therefore there seems to be a low incentive in sharing the learning experience involved in the problem solving that exists on site.

1.4 Powering and activating the craftsmen

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 (2001b) 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.

1.5 The case study

The company participating in the research, here after called BuildCo, is a large construction and development contractor in Sweden. BuildCo was asked to participate in this research because of their pioneer status in the area of SWP, reached after a decision they took to standardise work procedures and methods of their own craftsmen. This decision is, according to the head of development (HPD), an unprecedented change towards SWP in terms of magnitude in a European construction firm. It follows a standardisation period which began in large with the introduction of Lean Construction within the company in 2009. As a result, BuildCo, which accordingly already had quite standardized systems in place, decided to take standardisation to the next level and systematically standardise their company's approach to building apartment buildings with much inspiration taken from Toyota's

Lean principles. However, presently the company has shifted away from the term Lean construction or Lean production and towards calling it "Structured Production". HPD claimed the change of term was caused by the general decrease in popularity of the term Lean Construction within the construction industry and that the company felt that this might ease the transitioning process.

In 2009 BuildCo introduced a plan to implement standardised installation manuals (SIMs) which they began by assembling groups of elite craftsmen and middle managers who created a set of demo manuals that craftsmen could follow when working on various parts of the building process. These manuals were tried out in 2010 on a few building sites and following that a decision was made to use them throughout the entire company. As a result of this process a set of seminars were put in plays and the craftsmen were educated on the new system and the reason for it, with the objective to facilitate the change process.

According to Cheng et al. (2006) it can take up to 6 year for a change within an organisational milieu to be successfully embedded. As the interviews presented in the case study in this article were performed early 2013, this implies that BuildCo are still in the process of integrating this change. However the HPD could not entirely agree with this notion as he felt that by using the term integration or implementation it suggested that this new change had a beginning or an end. Accordingly this was something that did not suit BuildCo as he felt this process should be in the form of continuous change towards improving work procedures and hence the product outcome of the company. In terms of the financial success factor the complete bottom line result from this change process will not be seen until after the 10 year guarantee period that BuildCo has on their buildings has ended. Therefore it is still difficult to establish if the introduction of SWPs has been a success. However HPD stated that in terms of production costs, material costs had decreased with the increase in standardised material use which was facilitated by the SIMs. Hence it would seem as though this change process is a form of a long term investment that requires both financial and collective support from multiple areas of the organisation with unclear benefits.

The structure of this article goes as follows: first, relevant theory on SWP and change processes is reviewed, then the case study is introduced and the article described. Subsequently the methodology of both the article and the case study is presented. Next, the case study is explained, followed by the presentation of the results. Thereafter findings are presented and discussed where after the article finishes with a short summary and concluding remarks.

2 Method

This section provides the methodology used in this study.

The purpose of this article is to portray the view of the craftsmen on the process of standardizing work procedures on site and in an organizational environment. It is therefore argued that the angle portrayed should be a so called "bottom up" way of looking at this process as this view seems to be non-existing within the scope of SWP-research performed in the construction industry (Koskela and Vrijhoef, 2000). Furthermore the aim here is to try and grasp whether or not contextualizing the craftsmen role is truly possible and eligible, i.e. if the general objective truly should be to describe the entire role of a craftsmen or if it should be to align craftsmen in their way of working. After a literature review on SWPs in a construction context had been performed, where the effects on the individual construction worker and the contextualization of their role were studied, 23 craftsmen, 5 middle managers and 1 senior manager in a large Swedish construction firm were interviewed. Out of the 23 craftsmen, 3 were team leaders, which meant that in addition to working as craftsmen they had responsibilities to attend to the other craftsmen's needs and act as a connection between middle managers and headquarters if needed. The term "middle manager" will be used in this paper over both foremen and site managers because of the similarities in the part of their job handling craftsmen, as well as due to the fact that on small construction sites these two parts are often agglomerated into a single position.   BuildCo has been considered as one of the leading forces in standardization within the Swedish construction market and supported this research because of an expressed interest of the HPD in the research area and the company's pioneer position in SWPs on the Swedish housing development market. The HPD chose 4 locations to conduct the interviews and all of them were located in Stockholm as the same level in the process of standardizing work procedures had not been reached out site of the capital in February 2013. All of the interviews were performed on-site and could be considered exploratory, mainly in order to have a comfortable setting for the interviewee, save time for both interviewee and to be able to conduct the study in 2 days. The approach used for the interviews and the structure of the article was inspired by Polesie (2012), Polesie et al. (2009), Santos (2005) and Brunåker and Kurvinen (2006) as well as the authors mentor, a professor from Chalmers University. The interviews performed with craftsmen varied from 10-25 minutes, were mostly one-on-one (interviewer-interviewee) interviews with the exception of three interviews at the fourth (out of four) location which were held in a cafeteria with a two-on-two or two-on-three set-up, in order to save time. 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 and previous (if changed) view of the craftsmen on SWPs and SIMs. Additionally, all the interviewees except the senior manager were asked to undertake a quick quantitative questioner in order to establish the feelings that the different groups had towards their freedom in work as well as trust- and engagement levels between the two groups. All of the interviews were performed by the authors of this article, notes were taken during the interviews and they were all recorded as well. After each day of interviews all observations and reflection were discussed and noted as well as both authors kept a diary of each day's activities. When all data had been collected the interviews were transcribed word for word in

Swedish and then sentences used were later translated into English. An analysis was performed with the focus on presenting the craftsmen's perception of SWP, the implementation process and the context of their role as craftsmen. This approach was taken in order to expose in as much details as possible, the bottom-up view that craftsmen have on a change process of this magnitude.

3 Results

The following section presents key findings on interviewed craftsmen's perception of working within the compounds of SWP as well as the affect it has on the craftsman's role.

3.1 SIM – Investing in the future

An interview with the head of production development (HPD) revealed that the introduction of lean principles within the company began around, 12-15 years ago. In 2010, following the economic crises they began the process of creating the Standardised Installation Manual (SIM). This had subsequently been the 6th time BuildCo had tried to implement standardisation in production. Were the previous 5 attempts had failed because of either lack of support from top management or because of transition of top management focus onto other priorities. Additionally he added that the most recent implementation is on a much larger scale and that the plan was to implement it for the future by making it independent of any single top management individual. When this is written the implementation of SIMs is still in process as BuildCo has not yet been able to fully implement it to all of the company's forefronts, currently they have gotten farthest in implementing it in Stockholm, where their largest market area is. SIMs was intended among other things to be a way to prevent dabbling among craftsmen, but first and foremost to ensure a coherent craftsmanship. This was due to the fact that when BuildCo sell off their final product a 2 years guarantee appraisal starts, which is included in their 10 years guarantee liability, and encompasses all craftsmanship that was performed during the construction of the product. This indicates that a full comparison between a project that was constructed before the use of SIMs and after it will not be available until around the year 2020. However, the possibility of the comparison of construction cost between similar projects is attainable presently for many aspects of the production. Although according to the HPD, this will not give the complete picture or even the bigger part of it as the reason for having SWP was to lower the cost of the aftermarket affect, in case of reworks, which' final figures come in after the guarantee period is finished. Currently there are 31 fully prepared manuals, with intention of adding additional 33 manuals.

3.2 Creation of Standardised Installation Manual

In order for BuildCo to create the SIMs, groups of craftsmen and middle managers were formed. The craftsmen that were going to serve as a process masters for the creation of the SIMs for particular work phases were hand-picked by middle managers and team leaders from sites that had shown good results or groups that had a good reputation within the company. "We took in four carpenters, and two middle managers, as they are the ones who work together and know it best. Our belief was that these are the experts at their craft. Otherwise we would not want them to be associated. Then they got the opportunity to sit down and try to find a reasonably good solution to implement different procedures" (Head of production development 1, (HPD 1)). Then in the fall of 2010, the first batches of craftsmen were educated by attending educational courses, first for two and half day period where they learned about why every craftsman should work alike, understanding in Lean principles and

learning to use SIMs on site. Few of the craftsmen and a middle manager expressed their opinions about the lean principles taught at the course, "This will never be a Toyota factory line, which is not affected by weather and wind or a missed delivery. Nor are they affected if the sub-contractors are behind schedule."(Cr 7.1). Then a seven day education course followed where craftsmen got more familiar with using SIMs as they addressed the use of features, such as machine and tools handling, planning production processes, safety and environment and ensuring coherent craftsmanship in relation to the aftermarket. In the end of the course the craftsmen were presented with an image which illustrated a two way street sign that had "BuildCo" as one way pointer and "Goodbye and welcome back" on the other. Hence, the craftsmen were given the option to either accept this new way of working or simply leave the company. Information collected from the interviews with HPD, the craftsmen and middle managers suggested that many craftsmen did indeed at that time, decide to leave the company. However, the courses are intended to give the craftsmen the relevant competences and required understanding to be able to grasp the SIMs concept, which was well received as one craftsman phrased. "In the beginning like I said, you wrinkle your forehead a little bit and think to yourself, damn, here it is in black and white how you should do it. However in the beginning I did not want to follow it. But as soon as you start to involve yourself and understand that this here is a very large company, there are a lot of construction sites that are affected and it makes it easier for everyone if everybody works in the same way. Then you start to think, I can change a little how I do things because the procedures listed in the manual works just as they are written." craftsman number 1 – comment number 1, (Cr 1.1). This initial reaction seems to be coherent with the majority of interviewees, as they had their scepticisms in the beginning. One respondent concurred with that notion, but added an interesting opinion: "In the beginning, when it was new, you thought what the hell. Each craftsman thought to himself, this is against me and those kinds of things. They felt sad that the company was taking their building ideas and putting them down on paper. They were perhaps afraid of being replaced" (Cr 17.1).

To ensure that the quality in the output of production is in accordance with the SIMs, a group of aftermarket personal perform frequent inspections on how the craftsmen execute specific procedures at the time of production. Before each working procedure is started a work preparation meeting takes place, where the middle managers go through, with the help of the SIMs, which materials, tools and procedures should be used in that particular work phase. During the seven day course the craftsmen were educated in how they could affect the SIM by sending improvement proposal if they identified flaws during the procedure that did not work as intended or knew of an easier way of performing it. "You can send in improvement proposals. You can send in if you think something is done incorrectly for example if there is something with the material that you think is wrong. You never do anything more than what says in the manual but you can send suggestions further and change it there" (Cr. 17.2). The SIMs are usually printed on site, by middle managers, who have access to the manuals through an intra-net used by BuildCo. A single manual is typically printed out for each work procedure and stored either at a site office or at a storage container on site. Craftsmen also have the possibility to ask for a copy of SIM, which according to a team leader they had done on some occasions.

The accessibility and visualisation of SIM

In terms of accessibility for SIM, the craftsmen appeared to be aware of where they were located when asked about it. A team leader was very contented about the accessibility of the manuals and verbalized it as being: "In my opinion they cannot be more accessible then they are, they are perfect!" (Cr 11.1). However, some of the other craftsmen seemed to struggle to acknowledge them as being as accessible. "Both Yes and no, it obvious that the manuals work like clockwork. However if you are doing a job and you are working with someone who has some experience, it is much easier to just ask him. You cannot go up to the barracks to look it up every time you are not sure" (Cr 5.1). Yet another craftsman brought up the idea of craftsmen getting their own access to SIMs, which opens the possibility of browsing through the manuals on their mobile phones. "It would be great to have the manuals as a file in the mobile phone and then you could open it up and browse through it. Everybody seems to have a smartphone today anyway" (Cr 9.1).

Use of improvement proposals

As touched upon in subchapter 3.1, the craftsmen have the opportunity to send in improvement proposal if they have any suggestion about improving SIMs. Although this might sound simply enough, craftsmen expressed their concerns about the duration it takes for a proposal to be processed and finally changed in SIMs "It's good to have the improvement proposals, but it takes too much time before anything happens. You stand there and work and notice that the way I am used to doing is much better than what says in the SIMs. But you are not allowed to do it your way, without sending it first, then it goes through the main office where it is examined and revised and then finally it comes back" (Cr 6.1). The craftsmen were not unanimous about the time it took for a proposal to be taken under consideration and changed, and varied between interviewees. A prevalent statement among the craftsmen was on the note of: "It may take a little time for them to change it, it varies a bit. It can take one moth or it can take a 1 year. It depends on the matter, if it is something connected with safety it usually takes a shorter time" (Cr 17.3). Craftsmen also had some concerns about the uncertainty of knowing if their proposals were taken under consideration or not. One craftsman expressed his frustration about how BuildCo reacts when sending in improvement proposal. "You notice that something is happening when you send it in, even if it yes or no, it does not matter, just as long as they take it under consideration. If you notice that nothing happens when you send it in, you will be disappointed in people for doing that, it is as simple as that" (Cr 19.1). Then when BuildCo has received and approved the improvement proposals and subsequently updated the SIMs on the intra-net, there is little way of knowing for middle managers and craftsmen when BuildCo has uploaded the newest version on the intra net. "They just presented us with a new version of SIMs, and they say something like, yes it was so bad for that specific procedure, so here is another version. But we do not know if we have the newest version of SIMs" (Cr 19.2). On that point, a team leader revealed a first-hand experience of the problem: "In the beginning I tried to make a binder with all the SIMs and that was good for that construction site. But when I started working at the next construction site, then the SIMs I had in the binder were considered old and obsolete. As soon as it is updated in the computer then that version becomes valid" (Cr 7.2). On the other hand, the craftsmen seemed to acknowledge that this was the unfortunate events of implementing something new. "We are at a different stage right now, it so early in the

process. Nobody has seen the result and I think I have observed that feeling out on the construction sites" (Cr 18.1).

3.3 Craftsman's identity

The following chapters will describe the craftsmen need for freedom and the option of innovative thinking. Ending with a chapter on craftsmen's view on how or if it is really possible to fully contextualise the craftsmen role.

Craftsman's need for innovative thinking

As SIMs outlines the work procedures very thoroughly, it doesn't give much leeway in going of that track. That fact seems to worry the craftsmen as they want to be able to contrive new things. "What i am also thinking about, is that we, craftsmen 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" (Cr 18.2). Another craftsman 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" (Cr 7.3).

SIMs affecting craftsmen freedom

On a similar note to that above, by following the SIM, the craftsmen perceive that their freedom of craftsmanship is partly infringed. A craftsman asked about the effects of SIM on his work, replied: "You feel a little bit inhibited, as it feels a little like you are working more or less as a robot when you only follow what is stated in the SIMs. Therefore you could say that thinking on your own is slowly disappearing" (Cr 6.2).

Fellow craftsman told another story "Yes of course, it's important to have a personal touch on your work. But the SIMs are not designed so that everyone should works as a robot or a machine. There are some who are concerned with the SIMs, that they by using them they are discarding their freedom. However, I think the complete opposite as in my opinion; there is a great deal a freedom by working under SIMs" (Cr 1.2)

Contextualisation

The Craftsmen 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%" (Cr 7.4) Craftsmen 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" (Cr 1.3).

3.4 Consequences of SIMs

With the introduction of SIMs, craftsmen have noticed changes to their previous way of working. The upcoming subchapters describe the benefits but also the drawbacks following the introduction of SIMs.

Educating the craftsmen

As mentioned in sub chapter 3.1, BuildCo, decided that it was not sufficient to only equip the craftsmen with SIM, but also required the craftsmen to go through, first a 2 and a half day course following a seven day course. "The purpose of the educational courses is to educate the craftsmen on the principles of SIM for instance, why they are equipped with SIMs and why it is important to follow them. It's was very good to go through the course. It made everybody aware 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" (Cr 8.1). However the Craftsmen had disparate opinions about the quality of the course. One craftsman replied the following after having participated in the course and asked if it had affected him in any way: "No I do not, neither negatively or positively, the most important is a correct way of constructing" (Cr 6.3). Furthermore, craftsmen 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" (Cr 7.5). HPD of BuildCo 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 it's only 2-4%. 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" (HPD 2) He further acknowledges that 2-4% dissatisfaction among craftsmen is acceptable.

The perceived benefits of using SIM

Following the craftsmen attending the course and started working according to SIMs, the craftsmen began to notice the possibilities which were entailed with using SIMs. "They are not complicated, it is like building with LEGO, and you can follow it step by step so it is difficult to misunderstand" (Cr 5.2). The advantages in their minds was the ease of transfer of craftsmen 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 do not have to start by getting into the speed of things I already know what I am supposed to do" (Cr 7.6). It is not only limited to craftsmen shifting construction sites, even in the case of absence, an employee can step in and pick up where another one left off "You can rotate inside the team so if someone is sick you can step in and do his job" (Cr 7.7).

Facilitation of material and tool handling

As touched upon earlier the SIMs also is intended to facilitate the execution of work procedures and material and tool handling. This has eventually caused a decrease in material expenses for BuildCo as they are now buying larger quantities of the same material. Craftsmen acknowledged a change after starting working by SIMs in relations to tools and material handling. "You know exactly what you need for tools and stuff, so there it has become much simpler" (Cr 4.1). 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" (Cr 1.4) Team leaders 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" (Cr 11.2).

The effect of age on implementation

The implementation of SIM has met some resistant on the way among some of the craftsmen. The data covered by questionnaires 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" (Cr 5.3). An experienced craftsman 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" (Cr 17.2). An interesting example of the tug of war that appears to exist between the generations was when a younger craftsman described assailing an older craftsman for his remarks about SIM. "What is sad is when they go inside their box, and they say for example "No, i have done this my way for over twenty years now" Well you do not have a 20 year old mobile phone in your pocket now do you?" (Cr 19.2).

Existing gap between craftsmen and managers

As craftsmen are obliged to go through a seven day educational course regarding why and how to work by SIMs, 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 craftsman 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" (Cr 1.5). Despite of this comment, the craftsmen perceive a gap between them and the middle managers in terms of inconsistencies in education. "What I think is the worst part is that, the middle 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." (Cr 19.3).

Processing the data gathered by questionnaires put to craftsmen on three different construction sites revealed interesting results towards the attitude of craftsmen towards their supervisors, showed in Figure 1 and 2. When examining the figures, correlation between both figures can be detected depending on which construction site is in question. Construction site nr 1 and 3 show a fairly positive response towards their supervisors. However construction site nr. 4 exposed a relatively negative outlook on their supervisors.
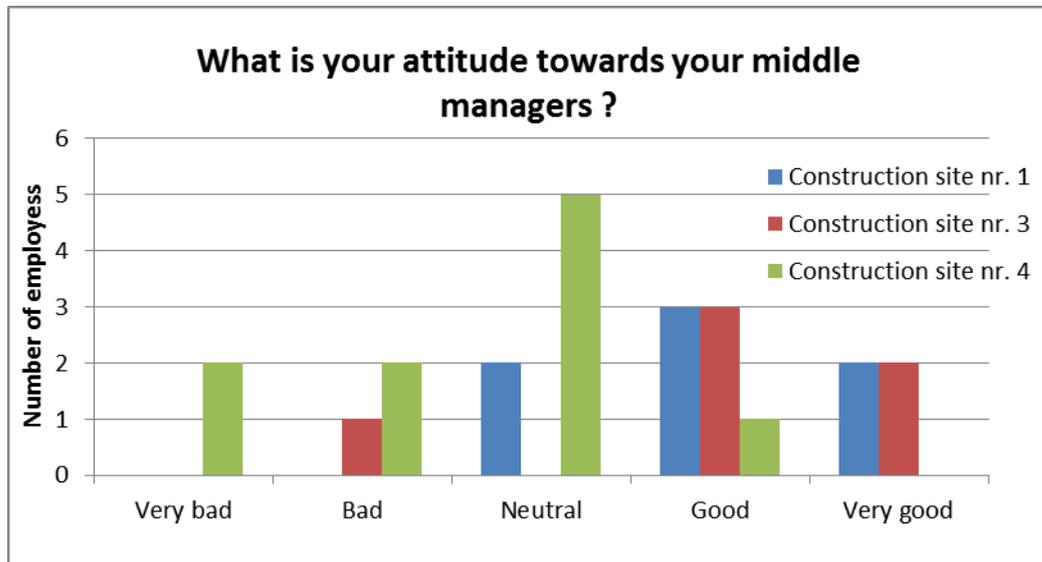

Figure 1: Comparison between construction sites on the attitudes of craftsmen towards their supervisor
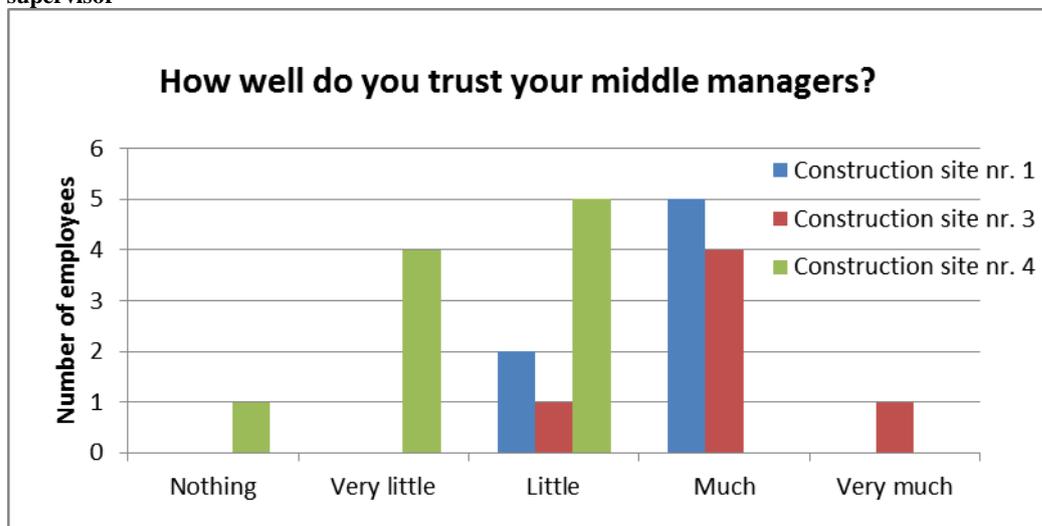

Figure 2: Comparison between construction sites on trust relations between craftsmen and their supervisors

Friction in sub-contractor relationship

Craftsmen also mentioned the gap existing between themselves and craftsmen working for sub-contractors. Craftsmen working for BuildCo are supposed to work according to the SIMs. However, according to one of the craftsmen the sub-contractors (non-builders) 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." (Cr 19.4). Craftsmen at BuildCo, work according to a piece

work contract (S. Ackord), which means that they are not paid per time worked, instead they are paid fixed rate by each unit produced (Findlaw.co.uk, 2013) unlike majority of the employees of sub-contractors. This has caused some frustrations by BuildCo's craftsmen towards the craftsmen of other professions working as sub-contractors. "The same thing if someone works after a piece work contract and another by time worked, it just doesn't work. When they are working after us, we need leave out a lot of things, such as ventilations and pipes everything you need in a house. It happens, when you are working on different floors and when you are moving down to continue on, the sub-contractor is not finished with his part" (Cr 19.5) meaning that they sometimes have to go back in order to finish phases that they no-longer are working on.

4 Discussion

This chapter presents the arguments from the authors of this article based on a comparison of the theory presented and their analysis of the results gathered. The chapter starts with an analysis of the way in which SWP was implemented in BuildCo and continues with a discussion about the various viewpoints mentioned by the craftsmen. The chapter ends with a short discussion and conclusion on the craftsman's viewpoints to standardization and how that affects the process.

4.1 SIM – a long-term investment

BuildCo had, as HDP mentioned, tried to implement a change towards a more standardised way of working 5 times before this attempt. However, due to lack of long-term top management support all of these attempts faded away. This time around the purpose is to engage this process on a much larger scale as it should not be dependent upon any single top management employee (see, chapter 3.1). Lack of top management support as a reason for failure in implementing change within an organization, has echoed throughout the academic world. However, many scholars take this even further giving voice to a broader need for support within an organization for change to be implemented. Accordingly, regardless of a bottom-up or a top-down approach, political barriers need to be breached at all levels of an organization and support gathered from various types of employees (Clegg et al., 2008, Brunåker and Kurvinen, 2006, Cheng et al., 2006, Gudmundsson et al., 2004, Fernie et al., 2006). In terms of what Maloney and Federle (1993) averred, that in order for the performance to be as described, appropriate personal must monitor and thereby ensuring coherent craftsmanship. This is line with what BuildCo is doing with the aftermarket personal as there responsibility is to inspect if the craftsmen are following the SIMs or not. BuildCo seems to have knowingly taken such advice under consideration as HPD mentioned that out of the 2200 employees currently employed at BuildCo, between 300 and 400 of them took part in the process of making the SIMs "we took in somewhere around 180 and 200 craftsmen, 100 technicians, 100 middle managers and a few others" (HPD 3). BuildCo's approach here is therefore a move from previous 5 attempts with a top-up approach towards a bottom up-approach which is supposed to involve employees on all stages of production as well as headquarters. Despite the fact that this could be considered as a bottom up approach, the continued support of top management is and has been according to HPD, however, crucial to the change process in the last few years. Notwithstanding the fact that construction costs between projects before and after the introduction of SWP can be compared, the true comparison of the overall profitability of this change process will not be actual until around 2020. "The thought behind is to see how it is made, before the customers move into our housing. We are affected if we have to go back if the customers say that something is wrong. It's terrible for us if we have to tear down a wall just to see how it's done." (HPD 4). The goal is therefore obviously a longer term one, with less emphasis on any shorter term goals. However, BuildCo has been provided a carrot in terms of the shorter term outcome off the SIMs, as the first projects have already started to show less material cost because of the precise material listings in the SIMs. "We can now lower our material costs up to 20% by ordering larger quantities at a time" (HPD 5)

4.2 Creation, visualisation and modernisation of SIMs

The process in which SIMs are created, visualised and modernised is extremely important, especially with concern to addressing the resistance to status quo, i.e. getting people to embrace the change (Clegg et al., 2008).

Creation

By forming the teams working on creating the SIMs with 4 craftsmen and 2 middle managers, BuildCo seem to have followed a similar approach as Ungan (2006) presents. Accordingly, the preferable way of creating a standard is to extract the knowledge of the employees that know the best way of performing a task, so called "process masters", which thereby reduces variants in the process output. Furthermore, states that as it might become a difficult process to transfer tacit knowledge into explicit form, a preferable way to extract the knowledge could be to create an established team as collaboration might provide better results. This is in many ways supported through the literature review presented in the introduction as increased influence from workers is eligible as a way to modernise construction companies (Coffey, 2010). However, Fernie et al. (2006) provide a different aspect to this as they argue that deriving at a way of best practise is something that is disputable at best and could just as well be a poor way of working in contradiction to what others might think. In their statement they claim that measuring performance can be useful but does not always grasp the whole concept of the relation between practice and performance. In other words, it is debatable that the best output, or any output for that matter, is brought by 'best practice' and furthermore 'best practice' at one company can be considered poor practice at another. This is perhaps mostly true in terms of non-measurable procedures and outputs that are difficult to measure, whereas easily measured procedures and output should give a reliable 'best practice' within an organisation.

Conversely, when it comes to revision of standards BuildCo seem to disagree with Ungan (2006) statement that the standards should not be revised during implementation, and instead agreed with Santos et al. (2002) in urging their employees to hand in improvement proposals continuously from day one. If BuildCo would have decided to suspend the updating process during the manifestation period of the change process, according to Cheng et al. (2006) they would not have started updating the SIMs until around 2015 or 2016. That could be considered as quite a long time bearing in mind that the craftsmen were getting very aggrieved by the fact that the standards were not up to date. The process out on the construction site after the SIM implementation process began requires the middle managers to have a work preparation meeting with the on-site staff. Some off the craftsmen stressed that these meetings were important to discuss the different procedures within the SIM, both for understanding as well as getting the chance to make suggestions for change (see, chapter 3.2). Keeping in mind both the workers views on constantly having updated SIMs as well as HPD's determination to avoid the term implementation and consist on a constant change process, the decision to modernise the standards regularly is understandable and does seem to reduce the resistance to change.

Visualisation

When asked about how well the craftsmen thought the standards were available the answers varied between sites. In general the craftsmen seemed quite happy with the accessibility to the SIMs, however, some of them did complain that they were not always up to date and that they needed to go through their team leader or middle manager in order to get them printed. It was quite clear that the craftsmen do not seem to be given direct access to the standards on the intranet. Santos (2005) emphasizes that information should be a part of the process and that the access to information should be facilitated as much as possible. This corresponds with Lean production where pictures and guidelines should be located in visible areas near workstations (Liker, 2004, 165-166). However, in the settings of a construction site where the location of a craftsman workstation can vary quite much, this is different from the factory settings. As few of the craftsmen and a middle manager mentioned, (see quote Cr 7.1, chapter 3.2). Despite the fact that the majority of the craftsmen interviewed were happy with the amount of visually available SIMs and their supply from team leaders and middle managers, it still bears a question if this could be improved upon. One of the craftsmen said that it was much easier to ask the older craftsmen instead of having to go back to the barracks to get the manuals. Another mentioned that he thought they should get access to the intranet via smartphones, as he stated that most craftsmen had those anyway. If they were to get this access, arguments can be made that this would indirectly increase visualisation of the SIMs as they would be available in all locations. However, this would require that the craftsmen were provided incentives to insure that they checked the newest edition of the standard before starting a procedure. The risk here is that either the craftsmen would not embrace this new technology or it might be inefficient as it would take too much time from their work procedures. Nevertheless, if such a change would be implemented, the SIMs would arguably be more visual than they are today.

Modernisation

Santos (1999) noted that when individuals start using standards in their line of work, they become more involved in the process and develop more understanding for what can be improved Many of the craftsmen were adamant that the process to change these manuals took far too long and therefore undermined the will to improve them (see quote Cr 6.1, chapter 3.2.2). Despite this time issue, they did seem to understand the process that their suggestions needed to undertake in order to be accepted and published in a newly updated SIM. Although the answers in time periods varied between craftsmen and type of suggestion (i.e. concerning health and safety or improvement upon a procedure), the most common intake from all of the sites seem to be that the process felt too long. Furthermore some of the craftsmen stated that the fact that they did not get answers to their suggestions was also undermining this process and made them feel like perhaps no-one actually considered their motion for change(see quote Cr 19.1, chapter 3.2.2). Many of the craftsmen stated that their suggestions always went through the middle managers and that this happened most often in the work preparation meetings before each new production phase. This could be the reason why some of the craftsmen do not seem to get feedback on their suggestions from above, i.e. the feedback is both dependent upon the middle manager on site and the answers he or she gets from headquarters. Therefore in light of the lack of interest shown by the craftsmen in updating these standards a different approach might be in order. Creating stronger incentives in order to motivate the employees and

considering a more direct approach might be an answer here (Salem et al., 2005). One of the craftsmen stated a completely opposed view to craftsmen from the other construction sites, as he praised the middle managers on his site because they had put up a board on the wall where they showed all of the approved changes in SIMs that came from that site. Hence, by creating transparency in the modernisation process the middle managers on site created incentives for the craftsmen to improve the SIMs, which is both eligible and should be pursued further (Coffey, 2010, Maloney and Federle, 1993, Salem et al., 2005). In fact, providing craftsmen with constant access to the intranet would not only provide more visualisation but further give BuildCo the opportunity to solve one aspect of the modernisation problem, as craftsmen would be able to check the SIMs online themselves giving them the most update version, when they need it on whichever location they are located. Furthermore, BuildCo would not have to suffer major expenses to give their craftsmen access to the intranet, which would give them an opportunity to provide direct feedback on each improvement proposal, how long it took for it to be considered and valued. Displaying these proposals on a virtual database with arguments for or against it could even give others within the company a chance to review proposals earlier in the acceptance period and possibly present new and interesting arguments that hadn't been considered. Moreover, it might prevent having to process similar proposals over and over again and therefore possibly shorten the valuation process. Creating a common ground for all within the company to review the standardisation process could provide a shorter processing period and also a possibility to breach the political borders that often seem to exist between different levels of organisations, e.g. on-site vs. headquarters or middle managers vs. craftsmen. Hence a direct virtual approach to this update problem might ease the change period and facilitate the use of incentives like rewards and competitions. Such a step might sequentially be seen as a step towards a cultural change within the organisation towards a more bottom-up improvement oriented culture.

4.3 Contextualisation of the craftsman role

Unison seemed to exist among the craftsmen that a standard could not completely grasp the whole spectrum of their role as craftsmen. Furthermore decrease in freedom and innovation seems to be a worry among some craftsmen as many feel that they cannot affect the standards they are meant to follow. A sense of freedom and room for variation seem to be important aspects to craftsmen when following SWPs.

Innovation and freedom

The discussion of standards or SWPs seems to go hand in hand with the subject of innovation. It seems to the authors of this article 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 craftsmen 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 craftsmen in this research 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 innovation (see quote Cr 18.2, chapter 3.3.1). 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. As suggested in the modernisation chapter, BuildCo seem to be aware of this risk. By continuously updating the SIMs the company tries to elicit the craftsmen'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 craftsmen seems to surround the effects and length of the modernisation process (see quote Cr 6.1, chapter 3.2.2). Furthermore a difference in opinions among craftsmen seems to exist on the matter of how much affect the SIMs will have on innovation within the profession at the company. One of the craftsmen voiced his worries on future craftsmen as he felt they were in danger of becoming robots. His argument was that when generations of craftsmen had only been working by following the SIMs, these craftsmen would not know any other ways of working and would therefore not be able to improve them (see quote Cr 6.2, chapter 3.3.2). This line of argumentation is supported by Santos and Powell (2001b), who state that the creation of innovative solution is harder to obtain without the added effect of outside ideas. HPD and one of the team leaders did not share theses worries as they felt there were arguments to suggest the exact opposite, i.e. that craftsmen were robots before and the SIMs changed this. The team leader 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 (2001b) stated there really is a need for outside ideas in order to improve the process continuously, however, working with SWPs does not require craftsmen to lose their critical way of thinking (see quote Cr 7.3, chapter 3.3.1).

Contextualising the role

Measuring the whole spectrum of craftsmanship in terms of 'best practice' for craftsmen and documenting it, was viewed by the craftsmen 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 BuildCo 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.

4.4 Consequences of SIM

The chapter describes the consequences which have affected craftsmen working for BuildCo, following the implementation of SIMs.

Forcing Change

In his argument, HPD suggests that forcing change was the only real possibility for success if working with SWP was to be a possibility for BuildCo. In his example the two managers supposedly showcase the fact that if given the choice most people will decide to remain faithful to their normal routines and avoid adopting new ones. This is underlined by Cheng et al. (2006) who presented resistance as a normality when the

status quo is challenged with change. This can be understood as an undesirable view on change due to the interruption of stable equilibrium which is considered the natural state of organisations (Clegg et al., 2008).

In light of HPD's argumentation based on their initial trial and error approach, i.e. the prior 5 times of failed implementation. BuildCo now, decided their stance towards the present implementation was to make it mandatory. As was clearly underlined with the example from HPD concerning the seminar, in subchapter 3.2, where the craftsmen were left with no choice other than to accept the change or leave. However this did not imply that employees would not have any way of affecting the results of the SWPs used, as they could affect it through improvement proposals. Hence, to an extent this is still a top-down decision, i.e. the bottom-up perspective is perhaps more of a long term goal that might be reached with a top-down change proposal. In other words they are going top-down in order to be able to go bottom-up. This is in line with what Santos and Powell (2001b)argued, that in order for a change to happen, a supportive setting characterised by pull learning is the most feasible. However, push learning is ideal in the beginning to trigger continuous pull learning. Therefor an optimal balance between a push and pull learning should be sought after. After this transition time, it seems as the craftsmen had accepted that this decision had been made and that this was the future of BuildCo. However, there was still turmoil within the group and some of the craftsmen were not happy that they needed to start working, as one put it "like robots" (see quote Cr 6.2, chapter 3.2.3). These responses can be contributed to being in the middle of a change process and that the construction industry seems to be highly resistant to change (Fernie et al., 2006). To the authors of this article, it seems as though the initial barriers of resistance need to be breeched by force. Whereas, in order for the change to manifest within the company, much support and effort needs to be put in place towards a cultural change that supports the new way of working. That is, by simply pushing one creates movement, but if one pushes to hard the resistance becomes bigger and thereby the possibility of success is smaller.

Accepting Change

Coffey (2010) reached a conclusion that involvement and participation is both possible and feasible among craftsmen. The acceptance between age groups at BuildCo was evident as younger craftsmen seemed much more inclined to accept the change followed by the introduction of SIMs. Parenthetically this can be contributed to the fact that older craftsman have developed and are more used to their own set of working skills, which they have performed for a long time, and also the fact that they are less prone to diverge their usual way of working and trying out new things. Compared to the younger group of craftsmen, they are less affected as they are less experienced of working by their own methods. This should obviously be a concern for BuildCo, as this resistance can easily discourage the change. The company therefore needs to take measures in order to counteract against this. Santos (2005) suggested that intention, motivation and voluntary adherence are crucial parts of the process for employees to accept change. This resistance among older craftsmen could also infect the younger craftsmen, as younger craftsmen seem to look up to the older ones, and if they are opposing the younger craftsmen their relationship could also be coloured by that (see quote Cr 17.2, subchapter 3.4.4).

A gap between the professions

A gap appeared to exist between the craftsmen and middle managers. The reason for the gap insisted by craftsmen is partly to be contributed by indifference in the different educational courses between employees. Craftsmen felt that they are out of sync with the middle managers because they did not attend the same course (see quote 19.3, chapter 3.4.5). Another factor is the obscureness between the responsibilities between the two professions on site can often lead to arguments. This concerns mostly tools and equipment as well as work procedures, which can often differ between sites due to effects from either craftsmen or middle managers on that site. When the implementation is in place, the information on standard procedures should be available when and where the worker needs it in order to eliminate wasted time with unnecessary movement in attaining information (Santos, 1999). When information on site is not easily attainable the risk of mistrust and poor teamwork between managers and workforce increases. During such circumstances managerial decision will be questioned by the workforce (Santos, 2005). However from the understanding gathered from craftsmen, SIM seemed to be rather acceptable. On the other hand this varied between construction sites and managers (see figure 1 and 2, subchapter 3.4.5). All aspects to why this indifference between construction sites exists as well as the existence of this gap between the two professions, is not available. Speculating on the reason for it, it might be contributed to an existing mistrust on particular sites between a middle manager and craftsman. This gives the conception that the gap isn't solely tied to the indifference in the educational courses, but moreover linked too many other underlying aspects which consist in their relationship, e.g. issues between individual personal or a lack of mutual understanding of production methods and production output. Furthermore, the added tension with contractual arrangements such as piece work contracts, at the same time as subcontractors are working without SIMs and getting paid by the hour, seems to only add friction. Possibly increasing, or at least maintaining the gap between on-site and headquarters, if not middle managers and craftsmen. However, this is a topic that requires deeper research in order to derive a conclusion as to why these gaps exist. In the opinion of the authors of this paper, concerning the case of BuildCo, it seems as though creating a mutual understanding throughout the company and the right incentives, e.g. team building between the various professions, can reduce this gap. Moreover, enlarging the scope of the SIMs so that they can be provided to all professions of craftsmen working in production as well as unifying contractual arrangements, might serve to diminish any friction.

Education and training

The course that the craftsmen went through gave the impression of being an imperative part of the implementation of SIMs. As many scholars have mentioned, learning programs (e.g. workshops) can facilitate the implementation process by educating the construction workers on the changed practice as well as the need for change (Fernie et al., 2006, Cheng et al., 2006, Styhre et al., 2006, Coffey, 2010, Maloney and Federle, 1993) It's unclear how much impact the education had on the workings of craftsmen, as the interviewed group seemed split in their opinions, where some craftsmen seemed to have gained a lot from the experience while others seemed rather to have ignored the basics of it by the notion that they have seen and done most of these things before (see quote 7.4, subchapter 3.4.1). However, the craftsmen used for this research suggests that the group which seemed to gain a lot from the education and training experiences is much the larger one. Salem et al. (2005) stated, that

construction companies may experience some difficulties when starting education for the employees. In relation to quote HPD 2, subchapter 3.4.1, HPD seemed very certain with his figures when he stated that only 2-4% were discontent with the change after having gone through the course. Though it is difficult to verify that exact number the data gathered suggests that the figure is not so farfetched. Therefore, judging by these numbers and the theory it is imperative for the success rate of this type of change process that the craftsmen undergo educational courses that can increase their knowledge and create a mutual understanding between them and the management of the company.

The chain of responsibility

In general both craftsmen and middle managers seemed to be happy with the existence and use of the SIMs. According to everyone involved, 2 frequent problems have been addressed with the arrival of the SIMs.

The first problem addressed was the one concerning who took responsibility for material and equipment that the craftsmen needed. According to most of the craftsmen interviewed, this used to be a frequent problem prior to the SIMs as tools and material were either not correct or had not been brought on-site because the middle manager needed (or wanted) advice from the craftsmen before making a decision (see quote 1.4, subchapter 3.4.3). However, this is no longer a problem after the introduction of the SIMs as the lines are already clear even before the project starts. As HPD put it, "In theory they can now order material and tools years in advance, because everything is listed in the standard" (HPD 6). The second problem was in the variation of work procedures used between different groups of craftsmen and different sites. As the craftsmen interviewed explained, changing groups used to bring uncertainty since this meant learning or adapting to new procedures and often not knowing how to or not being able to pick up where others left of. With younger craftsmen this was often the case of needing to learn and adapt new ways, whereas with the older ones this could create tension as they often seem to be more set in their ways (see Cr 5.3, subchapter 3.4.4). This has, likewise, disappeared with the introduction of SIMs as they state exactly how all the groups should work. In other words, blame and transference of procedures is no longer an issue as all are informed on who is supposed to do what. Arguably this has eased the relationship between both craftsmen and middle managers as well as between various groups of craftsmen, as the lines between responsibility areas have become much clearer and more effective. By drawing clear lines in this matter BuildCo seem to have eased the tension on-site which might provide a much needed help in bridging the gap in trust between the two professions.

Involvement of others

An evident problem seems to consist between craftsmen working for BuildCo and the sub-contractors working on same projects. These sorts of problems can be anticipated as Polesie et al. (2009) stated that the high reliance most construction projects have on various suppliers and sub-contractors might cause construction firms difficulties in applying standardisation principles directly. Furthermore, Cheng et al. (2006) stated that coherent guideline should be elaborated, as it facilitates, trust and confidence, and that teamwork needs to be emphasized in order for it to be a success. These kinds of guidelines do not exist at BuildCo, according to some of the craftsmen and thereby, disunion consists. However, HDP, when talking about builders, proclaimed that sub-

contractors should also work according to SIM, referring to the situation in Gothenburg he said: "They, (the sub-contractors) are bound to follow SIMs, and that has worked fine. It is almost easier to let them follow them as you can get money if they do not follow it. At least, we cannot lower our own workers' wages" (HPD 7). This does not, however, address the problem mentioned by one of the craftsmen as he felt that craftsmen from other professions were not really taking any interest in the SIMs and went on with their work regardless of the consequences for BuildCo's craftsmen (See quote Cr 19.5, chapter 3.4.6) his problem provides a concern for construction companies that want to implement SWPs among their own builders but do not possess the skills to create these standards for other professions, e.g. plumbers and electricians, as they are all subcontracted. Therefore, it bears consideration that contractual terms between craftsmen and their companies can affect this type of change as well as the company's relations with subcontractors. In relations to topics such as partnering, where need for sub-contractors participation has been voiced, this seems to be an area that needs deeper research.

4.5 Concluding remarks

Looking back on the change process undertaken by BuildCo, it can be concluded that putting this much effort into a long term investment should provide payoff in the end. However, there are obvious steppingstones along the way which need to be addressed appropriately. It seems as though process of standardising work procedures within the construction environment is highly dependent upon the reaction of the craftsmen working on-site. Creation, Visualisation and Modernisation of SIMs are all of vital importance and seem to benefit from increased involvement of the craftsmen, as they are the experts in their craft. Despite the commonly voiced argument that innovation and freedom will suffer with the implementation of SWPs, 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 craftsmen is not to be taken lightly, however, arguments have been made that by focusing on building a bottom-up culture the craftsmen 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 this research the purpose of the SIMs was to minimize variation in production output, however, it is very important to acknowledge from the beginning that variation within a construction production line is highly important. The SIMs are 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.

Undertaking a change process of this magnitude requires difficult decisions to be made as well as a clear-cut unity among top management. Due to the magnitude of change, the change process has a long life period and is always going to be subjected to resistance among the employees. This research implies that in such a big change the optional route of implementation is not suitable. Mainly due to the fact that when such a mass of people is involved it would mean that a resistance to change might render the process obsolete from the beginning, i.e. people would rather stay in status quo. Therefore a clear line has to be established where everyone involved comprehends that this will be the company's future and as such will not be aborted.

It is moreover vital that the common understanding among employees is that given the direction and location to aim for, they can affect the process of getting there. Establishing this understanding and eliciting the employees in this change process requires multiple engagement procedures and incentives to be created for all involved. The gap between different professions within the company needs to be bridged and mutual understanding has to be reached throughout the organisation. It seems to be very effective to use education seminars in order to reach this understanding. However, it is very important that during these seminars the different professions have a chance to interact in order to create this unified awareness. Furthermore, if the SWPs are clear-cut they can create transparent and defined borders between the different professions and thereby extinguish the disputes that can arise as a result of unclear roles or responsibilities. The need for involvement is not only subjected to the effected bodies within the organisation, rather, the involvement of subcontractors should also be considered. Their effects on the resistance to change can be quite severe, especially when craftsmen work on piece work contracts and can therefore be personally affected by the actions of the subcontractors, working in other professions. Keeping this in mind, a SIM should therefore be considered for all professions within the construction setting appropriate.

In conclusion, the importance of the craftsmen's effects and participation in a change process of this magnitude is severe and should be in the forefront. BuildCo's process is currently not finished and therefore the results drawn from this research do not portray the full picture of this change. However, the authors of this paper feel that the importance of a bottom-up perspective is apparent in this type of change. Moreover, to maintain the SWPs existence and insure the continuous value in the outcome of this change process, there is a need to create a bottom-up functioning culture within the company. A deeper research of an entire process of this magnitude would be feasible in order to progress the industry's understanding of this matter. Furthermore, research into power relation between the different stakeholders subjected to this change, as well as into the sub-contractor and contractual complications, could provide an interesting aspect to this case.

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Appendix 3 – Interview Template and Survey

BuildCo

Information:

Ålder: ##

Yrke: ######

Hantverkare
nr: # – Arbetsplats #

Tid: ##.##, 25-26 februari 2013

Frågor:

Hur länge har du jobbat för JM? - Hur länge har du arbetat inom bygg?

Svar:

Kan du berätta lite vad du tycker om monteringsanvisningarna?

Svar:

Använder du monteringsanvisningarna? På vilket sätt?/ När började det? /Varför inte?

Svar:

Påverkar monteringsanvisningarna ditt arbete på något sätt? Hur? (Har det blivit bättre eller sämre?)

Svar:

Tycker du att du kan påverka monteringsanvisningarna på något sätt? Hur? / Varför inte?

Svar:

Är monteringsanvisningarna tillgängliga när som helst, var som helst? Tycker du att det kan vara bättre?

Svar:

Har du fått någon träning av att följa och förstå monteringsanvisningarna? Kan du berätta lite om det?

Svar:

Vilka är dina åsikter om monteringsanvisningarna?

Svar:

Vilka är dina kollegers åsikter om monteringsanvisningarna?

Svar:

Känner du någon, eller känner till någon som har påverkat och eller hjälpt till att skapa monteringsanvisningarna? Vem? / När gjorde han/hon det? / Hur påverkades dom?

Svar:

Vilka är dina åsikter om begränsningar och förenklingar av arbetssätt?

Svar:

Tycker du att alla hantverkare inom JM borde jobba på likformigt sätt? (varför, varför inte?)

Svar:

Har du någonsin varit otillfredsställda med ditt arbetssätt eller hur du har behövt arbeta? Om ja, berättade du det för någon?/till vem (inte namn, utan position)

Svar:

Tror du, hypotetiskt sett att om vi skapar en beskrivning av hantverkarnas roll, att det skulle kunna på något sätt omfatta eller inbegripa alla aspekter av din roll som hantverkare?

Svar:

Hur är din relation med din arbetsledare och platschef?

	Inget	Väldig lite	Lite	Mycket	Väldig mycket
Tror du att de vet hur du utför ditt arbete? Hur mycket vet dem?	☐	☐	☐	☐	☐
Hur engagerade tycker du att de är om hantverkarnas roll inom företaget	☐	☐	☐	☐	☐
Hur mycket tycker du att arbetsledare och platschefer borde vara involverade i hantverkarnas arbete?	☐	☐	☐	☐	☐
Litar du på dina arbetsledare och platschefer	☐	☐	☐	☐	☐
Hur mycket frihet tycker du att du har i ditt hantverk?	☐	☐	☐	☐	☐

	Väldig dålig	Dålig	Neutral	Bra	Väldig bra
Vad är din inställning om dina arbetsledare och platschefer	☐	☐	☐	☐	☐

Hur är din relation med hantverkarna?

	Inget	Väldig lite	Lite	Mycket	Väldig mycket
Litar du på dina hantverkare?	☐	☐	☐	☐	☐
Hur engagerad är du hantverkarnas roll inom företaget?	☐	☐	☐	☐	☐
Hur medveten är du om vilket sätt hantverkarna sköter sitt jobb?	☐	☐	☐	☐	☐
Hur mycket tycker du att arbetsledare och platschefer borde vara involverade i hantverkarnas arbete?	☐	☐	☐	☐	☐
Hur mycket tror du att hantverkarna litar på dig?	☐	☐	☐	☐	☐
Hur mycket frihet tror du att hantverkarna har i sitt hantverk	☐	☐	☐	☐	☐

	Väldig dålig	Dålig	Neutral	Bra	Väldig bra
Vilken är din inställning till dina hantverkare?	☐	☐	☐	☐	☐
Vilken inställning tror du att hantverkarna har till dig?	☐	☐	☐	☐	☐