Working in a loosely coupled system: exploring practices and implications of coupling work on construction sites

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ABSTRACT

The conceptualization of construction as a loosely coupled system has been widely used to explain behaviour within the industry. In this article, we revisit the concept by exploring what it means to work at the micro-level within this system. Adopting a practice lens, this study focuses on the daily work of site managers, a category of workers who often have been described to have a hub-like role in construction projects. The findings highlight how their work consists of activities that can be seen as mundane, yet simultaneously fill an important coupling function in the projects, which we conceptualize as *coupling work*. Coupling work denotes a managerial work practice through which site managers use slack from the parent organization to tighten site-activities. However, they do so in a particular way that tightens the projects closer to their own authority which, in turn, sustains organizational loose coupling. The study contributes to debates on change and development in construction by showing how coupling work is produced and reproduced to preserve the autonomy and control of site managers.

Introduction

One of the most widely used frameworks in explaining behaviour, relationships and processes in construction is the conceptualization of the construction industry as a loosely coupled system. To date, Dubois and Gadde's influential article from 2002 concerning loose coupling remains one of the most read and cited articles in the journal *Construction Management and Economics*. Loose coupling has been adopted as a theoretical backdrop to address and make sense of a wide set of research topics and areas, including innovation (Blayse and Manley 2004, Papadonikolaki 2018), standardization and routinization (Smyth 2018), logistics (Hedborg Bengtsson 2019), partnering (Bygballe et al. 2010, Crespin-Mazet et al. 2015), building information modelling (BIM) (Hartmann et al. 2012) and supply chain management (Bankvall et al. 2010), only to mention a few.

Drawing on Weick (1976) influential theory of organizations as loosely coupled systems, Dubois and Gadde (2002) suggest that the construction industry as a whole constitutes such a system. They propose that the system is stratified and builds on two interdependent layers: the loose layer is said to exist in the permanent network on industry-level, where there are loose couplings between participant organizations (actors). The tight layer is said to exist on site-level within individual construction projects, where there are strong interdependencies between activities undertaken in the building process.

Construction is often described as a site-specific, project-based activity. It is an industry characterized by "interdependence and uncertainty" (Crichton, 1966) where the complexities of the building operations call for decentralization of organizational authority to the site-level in construction projects. According to Dubois and Gadde (2002), the particular loose/tight coupling configuration in the construction industry can be seen as a means of coping with certain aspects of uncertainty and interdependence inherent in the building process on construction sites. An important reason why Dubois and Gadde's article remains influential nearly 20 years after it was published is that it still sheds light on the logic of operations in the construction industry. In particular, it explains why the

particular coupling patterns hamper innovation, learning and change.

Although the construction site-level is central in the conceptualization of construction as a loosely coupled system, few studies have examined the practical particularities of how the coupling patterns are manifested there. In particular, we still lack in-depth knowledge of how tight couplings are reproduced (made and re-made) in practice on site through everyday activities of the people working within this loosely coupled regime. The main body of the literature concerned with coupling in construction seems to have applied Dubois and Gadde's theory to address problems associated with loose coupling between actors on industry-level, such as its impeding effects on innovation, learning and change.

Studies that have examined coupling patterns on project and site-levels seem to have overlooked everyday work activities in their analyses. Indeed, in the traditional construction literature focussed on organization and project management studies, there has been a tendency to ignore the situated lived realities of people working in the industry, thus failing to make linkages between the macro-level and the micro-level (Dainty et al. 2007, Sage and Vitry 2018, Löwstedt and Sandberg 2020). In a similar vein, those studies that do engage with people and practices of everyday work seldom link findings to the coupling conditions of the industry (with a notable exception of Styhre 2012). Although loose coupling has become one of the most influential theoretical frameworks for portraying behaviour within the construction industry, this portrayal is largely conceptual, pertaining to the loose dimension of the coupling equation. The tight coupling phenomenon, however, remains under-researched, especially how and where such couplings are produced and reproduced in practice, i.e. how they unfold at the micro-level of an organization.

In this article, we contribute to the coupling debate by providing insight into what it means to work within the tightly coupled part of a loosely coupled system. Inspired by Tengblad (2012), we examine the project work (and life) worlds of site managers against the backdrop of the permanent organization, to which ultimately they are accountable. Thus, the aim of this article is to examine how the "tight" is reproduced (i.e. made and remade) in everyday practice, and who *does* the coupling on site. By taking the site perspective seriously, we pose two research questions: (1) how are the coupling patterns (loose and tight) that constitute the loosely coupled system manifested in the daily work on construction sites; and (2) how is tight coupling (re)produced in practice on construction sites? Hence, we add to the coupling debate by identifying and discussing real and potential challenges and pitfalls related to situated work on site, which warrant serious reflection when attempting to reconfigure coupling patterns, or, for that matter, when introducing "new" ways of working or organizing in the projects, to improve performance (e.g. Bankvall et al. 2010, Gadde and Dubois 2010, Crespin-Mazet et al. 2015, Papadonikolaki 2018). If these technical as well as social challenges are not taken into consideration, the efforts expended on a reconfiguration may well be wasted.

The specific activities and practices examined in this paper are the day-to-day work of construction site managers. Site managers have often been described as hubs of coordination, communication and orchestration on construction sites (Fryer 1979, Styhre and Josephson 2006, Styhre 2012). Indeed, one way of interpreting their role is that they are the managerial leaders in charge of the building processes operating at the intersection point where the loose and tight layers of the coupling system meet and materialize into concrete practices at the construction site. Their work can therefore be seen as particularly relevant in exploring how tight coupling is (re)produced in practice.

The study draws on a rich qualitative data, comprising field observations and interviews, collected in a large construction company in Sweden from 2014 to 2019. We adopt a management-practice lens, drawing on Alvesson and Sveningsson (2003) and Tengblad (2012), to examine how the practice of coupling is enabled through the mundane reproduction of work. From our analysis of the data material, we found that much of the site managers workdays consist of mundane activities, but we also observed how these activities seemed to have a more profound functions in the projects, which we argue are coupling functions.

The concept of *coupling work* is introduced to capture the interlinkages between mundane site manager work activities and the coupling functions. We suggest that coupling work has a dual nature which provides an explanation to how both tight and loose coupling is reproduced in construction projects. This duality is manifested in how site managers use slack provided by the permanent organization to tightly couple activities in a particular way that strengthens their authority in the projects and sustains loose coupling to any other form of authority and governance emanating from outside the projects. A key to understand this particular enactment of coupling work, we suggest, is that it preserves the collective identities of the site

managers, and their "way of life". To conclude, we highlight an urgent need to consider the situated realities and perspective of the site managers in any attempt to transform the loosely coupled construction system.

Theoretical framing

Conceptual use of coupling theory in construction

When originally theorized by Weick (1976), loose coupling was elaborated as a metaphorical tool to understand how organizations deal with inherent complexities and contradictions. Central to the theory is the idea that it is the pattern of couplings (both loose *and* tight) that produces observed outcomes of a system, i.e. *how* contradictions are dealt with. According to Orton and Weick (1990), all organizations, and any location in an organization contains elements that are interdependent and vary in the number and strength of their interdependencies depending on the strength or weakness of coupling. For instance, each individual activity in an organization is somewhat linked to other activities, and thus it maintains a degree of responsiveness to other activities. This is captured in the word "coupling". Distinction is made between "loose" and "tight" couplings; the tighter the couplings are, the stronger are their interdependencies, the greater are the impacts of disturbances within an element on another, the greater is the need for coordination (Dorée and Holmen 2004).

As there are a range of elements which can be coupled in an organization, the loose coupling metaphor is used to describe a situation in which such elements are responsive, but simultaneously retain a degree of distinctiveness from each other. The attachment between the elements then become loosely coupled in the sense that they are "circumscribed, infrequent, weak in [their] mutual affects, unimportant, and/or slow to respond" (Weick 1976, p. 3). Orton and Weick (1990) also raised concerns of the application of coupling theory, stating that it has become the end of analysis rather than the beginning. In order to escape a black boxing of the concept, they encouraged scholars to increasingly engage with the particularities of the coupling patterns (loose *and* tight) in organizational settings, including their tensions and contradictions.

Dubois and Gadde (2002) applied Weick's theory to explain how the particular patterns of couplings in construction – loose couplings in the permanent industry network and tight couplings in individual projects – make it possible to cope with prevailing conditions of complexity and fragmentation in its operations. This interplay of the loose and the tight,

according to Dubois and Gadde, is beneficial for several reasons, foremost since it makes room for self-determination and enables a localized adaptation in the individual projects where they can adjust to and modify a unique contingency in the site environment without affecting the whole system (i.e. the industry). As conditions of uncertainty and interdependence in the industry call for a decentralization of authority to the projects, it is suggested that loose couplings in the permanent industry network provides the slack necessary to handle the tight couplings in the building process (ibid. p. 627).

Regarding how tight couplings are actually created in practice, they suggest that this is a result of collective adaptations. They argue that when actors coming from loosely coupled firms on industry-level work together in tightly knit groups on construction sites, they develop collective knowledge and a shared understanding of the building process. This collective knowledge then forms a common template that serves as a pattern for action and coordination and guides the actors. Based on a shared understanding, people are assumed to mutually adapt to each other since they follow the same established rules of how things ought to be done in the project. Similar views have also been put forth by other studies that have emphasized the importance of collective knowledge and learning and mutual adaptation in explaining coordinating patterns in construction projects (e.g. Kadefors 1995, Styhre et al. 2004, Bygballe et al. 2016, Eriksson and Kadefors 2017).

In the construction management literature, rather than engaging with the combination of coupling patterns, the coupling metaphor has often been used to describe the overall loose characteristics of the system at the industry network-level of construction. Here, the coupling metaphor seems to be used interchangeably with related concepts, such as relationships, connections, links and ties, to highlight a lack of coupling between interdependent elements of the construction system, such as companies, projects, people, ideas, activities, cultures (e.g. Bresnen et al. 2004, Segerstedt and Olofsson 2010). One example is how the loose coupling concept has been used to denote a lack of long-term relationship between actors in the industry network. Loose coupling seems to be a compelling metaphor to describe how each construction project brings together a temporary coalition of firms and individuals who work closely together for a duration of time, and then disband (e.g. Blayse and Manley 2004, Bygballe and Ingemansson 2014). Such studies have frequently underlined how these relational

arrangements foster a short-term mentality in the industry which hampers innovation, learning and change.

Another apt example is how temporary project organizations are portrayed as intra-organizationally decoupled from the permanent organization (e.g. Lindkvist 2004, Gluch 2009, Gluch and Räisänen 2009, Sandberg et al. 2018). This image has further been reinforced by studies that have described the role of construction project managers as being "uncoupled" (used interchangeably with "independent") from the firm (e.g. Polesie 2013), or more generally as being sovereign "CEOs", "kings" or "barons" in construction projects (e.g. Sauer et al. 2001, Styhre and Josephson 2006, Gann et al. 2012). Following this perspective, coupling is treated as a unidimensional concept; that is, portrayed as the endpoint of a coupling scale, ranging from tightly coupled to decoupled (as Orton and Weick 1990, p. 205 pointed out). Such conceptualizations have often been directed towards one extreme end-scale of coupling, where elements of the construction system are portrayed as if independent, i.e. having *no* couplings at all.

The coupling concept has remained influential in construction research (see, for example, Crespin-Mazet et al. 2015, Papadonikolaki 2018, Smyth 2018). Regarding the idea that the loosely coupled system hampers long-term change and development in construction, a number of studies have suggested that the industry would benefit from reconfiguring its coupling patterns in various ways to improve performance (e.g. Dorée and Holmen 2004, Bankvall et al. 2010, Bygballe et al. 2010, Crespin-Mazet et al. 2015). Often-proposed solutions have been that actors in the permanent network should collaborate and tighten their couplings to the projects, which implies that considerable authority and control over the projects would be transferred from the project-level to the level of the permanent organization and network.

It seems as if the real appeal for most of the studies that have applied the coupling metaphor in construction management research has been to describe the overall "looseness" of relationships on industry-level and how such looseness poses a barrier for change and development. However, few studies have looked at the coupling patterns through a situated work lens at the micro-level of the industry. Consequently, we still know little about what the loosely coupled system actually means in everyday situations for the people who work in it. Regarding Dubois and Gaddes (2002) claim that tight couplings produced on site-level in construction projects are derived from shared understanding and collective

adaptations, few studies have investigated how this actually occurs in practice, and from a worker-perspective.

A growing number of studies in the construction and project management literature have highlighted the need to further explore the micro-level work-life realities on construction sites (such as how people experience and cope with their daily work) in order to gain a more profound understanding of various macro-level characteristics of the construction industry (e.g. Dainty et al. 2007, Geraldi and Söderlund 2018, Sage and Vitry 2018, Löwstedt and Sandberg 2020). In line with these studies, we draw on rich empirical data from site managers' work lives in order to explore the micro foundations of the loose/tight duality as it is enacted in day-to-day "coupling work" on construction sites. We see it as essential to empirically engage with the particularities of the coupling patterns in practice on site, especially since the site-level is central in the conceptualization of the coupling system yet has remained under-explored.

Coupling work on site: a practice-based approach for exploring coupling

In this paper, a managerial practice lens to the study of site managers daily work on construction sites is adopted. Influenced by the "practice turn" in the social sciences (Schatzki et al. 2001), organization and management studies have been taking a practice-based approach to the study of leadership and managerial work (Tengblad 2012, Korica et al. 2017). Our rationale for adopting a practice perspective is to foreground human iterative action, performance and daily work in understanding how people partake in the production and reproduction of all aspects of social life, including organizations. Practices themselves have been defined broadly as "embodied, materially mediated arrays of human activity centrally organized around shared understandings" (Schatzki et al. 2001, p. 2).

Tengblad (2012) advocates a practice-based approach to the study of managerial work so as to include the complexity, heterogeneousness, uncertainty and unpredictability as it unfolds in a given workplace. Using this approach, Alvesson and Sveningsson (2003) have suggested a need to re-think the work of managers so as to take into account the "mundane", i.e. small acts that managers carry out every day, such as listening and chatting, and which are often trivialized, but have far-reaching implications. Such seemingly trivial and unimportant acts are argued to have important (and even *extraordinary*)

impact on social life in organizations. Sveningsson et al. (2012, p. 84) further elaborated the notion of mundane management work, describing the key activity of managers as "influencing expectations, meaning, and values about what is desirable and necessary to accomplish related to everyday work". The mundane perspective illustrates how inquiries into the micro-level of how managers make sense of and enact their day-to-day realities at work can be a powerful tool to understand how wider processes and structures unfold (and possibly can be transformed) in organizations (Sandberg and Targama 2007).

A central tenet in these work perspectives is to counter the common idea that managerial work merely is embedded in a rational and instrumental means-to-an-end logic (see for example (Jackall 1988, McCabe et al., 2020). Instead, scholars have increasingly come to emphasize how managerial work also to a large extent implicates more emotional dynamics through which managers constantly strive to shape a coherent sense of their professional identities (Sveningsson and Alvesson 2003). This view is often accentuated against the background of how many managers face difficulties in combining positive identities with the complex and fragmented realities of modern organizational workplaces. For example, Sveningsson and Alvesson (2003) have conceptualized "identity work" as an ongoing struggle where clashes between organizational discourses, role expectations and identity narratives constrain managers efforts to maintain a coherent and positive self-view. Managers are thus required to be more or less continuously engaged in shaping, repairing, maintaining and revising interpretations that facilitate the creation of a relatively coherent view of who they are (ibid., p. 1165). Identity work further implicates a power dimension since it often is a target for organizational control (Alvesson and Willmott 2002), as well as a potential source for resistance (Kondo 2009).

In this paper, we focus on the mundane work practices of construction site managers. Previous research has shown that site managers often have a central role in managing construction sites, and they have often been described as "hubs" around which everything revolves (Fryer 1979, Styhre and Josephson 2006, Styhre 2012). In a study by Styhre (2012), the daily work practice of site managers has been described as "muddling through". According to Styhre, muddling through denotes how site managers, in addition to managing planned activities, also haphazardly cope with unpredictable events on an ad hoc basis as these crop up (p. 134). Muddling through is described

as an incremental, skilful and improvisational problem-solving approach.

Styhre relates the everyday work practice of muddling through to the overall coupling conditions of the construction industry, arguing that site managers become substantially pressured by the decentralized loose coupling regime and their attempts to balance the loose/tight coupling structure on site (2012, p. 134). Against the background of construction as characterized by uncertainty and decentralization of authority, Styhre (2012, p. 139) argues that muddling through is a management work practice that is *required* in order to cope with all the unanticipated problems emerging in the site milieu. The conceptualization of muddling through aligns with previous descriptions of site management work as hectic, fragmented, reactive and demanding, often associated with long working hours, mental stress and work-life imbalances (Davidson and Sutherland 1992, Sandberg et al. 2018). Recent studies have also highlighted that this particular work practice is embedded in positive identifications with a certain site-worker ideal premiering freedom and independence (Styhre 2011, Polesie 2013, Raiden 2016, Löwstedt and Sandberg 2020). Although Styhre (2012) study links the coupling conditions of construction to the day-to-day work of site managers, it stops short of engaging with what the linkages look like or signify in practice. For example, how are coupling conditions manifested in their work, and how can a (re)production of tight couplings be understood in regard to site managers situated work practices? These are questions which we seek to answer in this paper.

Research approach and methods

This article draws on qualitative data gathered in a Swedish construction company, here referred to as "ConstructEd", with approx. 20.000 employees and a yearly turnover of more than 50 Billion (SEK). The company consists of a line organization, including a number of core and group functions. It is structured as a matrix consisting of both functional and geographical units. The managerial levels consist of a CEO, vice CEOs, functional executives, business unit managers, regional managers, production managers, project managers and site managers. Furthermore, the company uses a large number of subcontractors from a variety of construction related trades. Construction projects in ConstructED are thus heterogeneous compositions, gathering a wide number of loosely coupled actors who need to work closely together to ensure

that production activities are tightly coupled according to the planned schedules, processes, and budget of a given project.

In line with Prasad and Prasad (2002), a qualitative, interpretative approach was chosen to investigate how people understand their life-worlds and how they act upon these understandings. We believe such an approach resonates well with the aim of the study. A case study design was deemed appropriate since it allowed us to combine research methods to examine issues and episodes from different angles and to capture a "thick" and detailed description of the site managers' everyday work (Geertz 1973).

In-depth interviews were conducted with 37 site managers, some on several occasions over the course of several years (i.e. 2014–2019). The site managers were selected from lists provided by contact persons in ConstructED and sampled to include individuals with different backgrounds, gender, age and work-life situations. The sample included site managers with different degrees of experience, ranging from individuals who were managing their first projects to individuals who had worked as site managers in the company over their entire careers. Most of the typical construction contexts and projects (large as well as small) were represented in the sample, including infrastructure, residential and commercial development projects.

The purpose with such a broad sample was to capture the rich variety of managerial work realities represented in the organization. Rather than focussing on a narrow and predefined category of managers, we wanted to keep a fairly broad scope since this would allow us to compare different experiences and approaches in site managers' daily work. We are aware that the interview responses and observations can be, and often are, sensitive to the specific project types and contexts in which the site managers operate. However, in line with the interpretative ethos of the study, we do not perceive the site managers' situated experiences as representing an unconditional truth about managerial work in the construction sector. Instead, we perceive these as representing "insightful examples" (Alvesson and Deetz 2000) of the variations, tensions and contradictions underpinning everyday organizational life (Orton and Weick 1990), and which allow us to challenge taken-for-granted assumptions about construction work.

All the interviews were rather informal, one to two-hour conversations, in which open-ended questions that encouraged "free" storytelling (Clandinin and Connelly 2000) were used to elicit personal narratives and story lines. Within this open frame, the interviewees were provided only with the minimum cues in order for them to start (and keep) describing their work: "describe your work", "tell us about a typical day", "what are your main challenges", "how did you deal with these challenges", "what does your work mean to you", "what do you enjoy/dislike the most about work". Within these general frames, they were encouraged to talk freely, and unexpected and interesting digressions were left uninterrupted. We then asked follow-up questions to elicit the broader context and meanings of their actions: "what was the purpose of the action", "why do you do it in this way", "what were the consequences", "was the action linked to any other activity in the project/organization". All the interviews were audio recorded and transcribed verbatim.

In addition to the interviews, the first author conducted participant observations on two construction sites over the course of nearly three weeks. One site comprised one of the largest building projects in Western Sweden at the time – a hospital – and the other comprised a middle-sized housing project. These observations included hanging around in the office, going for lunch with the site managers and their colleagues, participating in a variety of meetings (17 in total), participating in safety and quality inspections, engaging with problematic situations in production and informally talking to a variety of persons on site. Data were documented in field notes and reflections on the notes during and after the episodes and sessions, always after consent had been obtained. In additions, certain meetings were audio-recorded, and the recordings transcribed. Observations offered a valuable complement to the interviews since they enabled us to capture situated tensions and contradictions to compare with the open-ended personal narratives (Orton and Weick 1990). An overview of the research design and data collection is summarized in Table 1.

The analysis of the data was characterized by an explorative and interpretative approach focussing on the life-stories and work practices of the participants, and how these related to either one or the other, or even to both, of the contexts at hand (project and organization) (Prasad and Prasad 2002). The analysis was conducted by all the authors who jointly engaged to strengthen the relevance and inferences made. In practical terms, this meant to first read and re-read separately, followed by jointly discussing similarities and differences, using examples from the data. The analysis was open-ended, delimited only by our broad focus on the site managers' daily work and how they

Table 1. Overview of research design and data collection.

Focus	Managerial work practice, focusing in particular on construction site managers
Organization	ConstructED
Organizational level	Construction site level
Method used	Open-ended interviews and participant observations
Practitioners included	41 number of interviews in total with 37 site managers positioned on sites located primarily in Western Sweden
	First author spent nearly three weeks on two construction sites (a hospital and a middle-sized housing project), following the work of two site managers
Data overview	1–2 h/interview
	Audio recorded, transcribed verbatim (between 12-22 pages per interview and close to 500 pages in total)
	70 pages of written field notes/ approximately 300 pictures taken on site
Miscellaneous	Researcher observed the daily work activities of site managers. Participated in informal conversations with site managers and other site actors. Sat in on breakfasts, lunches, breaks. Participated in meetings (17 in total), workshops (2), daily inspection rounds, daily interactions/notes taken
Analysis and theoretical lens	Iterative analysis (Eisenhardt, 1989; van Maanen, 2007), moving back and forth between inquiry of theory and the empirical data material
More detailed accounts	Sandberg et al. 2018

experienced and coped with their work (Alvesson and Kärreman 2011). In an initial phase, the interview and fieldnote excerpts were given code words. After the transcripts had been read, each containing a number of excerpts and accompanying code words, these codes were then sorted under a number of prominent themes, including "coordinating", "improvising/solving problems", "making decisions", "running around", "seeking control", and "resisting top-level involvement".

It is important to note that our conceptualization of "coupling work" did not exist as an *a priori* construct for the observations and interviews but emerged as we proceeded to link these themes together into a coherent and recurrent pattern of site managers" work lives. More specifically, the concept of coupling work emerged as a micro-level interpretation of a certain complex duality that carried a strong resemblance with Dubois and Gadde (2002) famous conceptualization of tight and loose coupling.

The site managers typically described their workdays as very stressful and consisting of a series of hectic actions and activities, such as running around, solving problems, dealing with nitty-gritty details in production, and participating in a stream of meetings, which was corroborated through our own observations. In particular, the site managers described that the purpose of these actions were often directed towards creating "tightness" between work sequences. They did not use the term "coupling" explicitly in these accounts; but similar terms such as "coordinating", "connecting", "tightening" or "aligning" were used instead.

However, their stories also revealed a deeper purpose of their actions that was geared instead towards upholding a certain distance to all kinds of interventions coming from outside the projects, most notably the parent organization. Altogether, the analysis elucidated that the site managers strove to remain control on site by means of a dual manoeuvre that combined producing tightness (to site-activities) and looseness (to activities outside the site). In order to further refine this micro-level representation of Dubois and Gadde (2002) tight/loose duality, we iteratively moved back and forth between inquiry of theory and empirical data (Eisenhardt 1989, van Maanen et al. 2007), drawing foremost on theoretical streams linking work/identity (Sveningsson and Alvesson 2003) and mundane/extraordinary work (Alvesson and Sveningsson 2003). In the next section, these findings are presented as three interrelated themes that altogether represent the prevalent characteristics of "coupling work" (Table 1).

Findings: the coupling work of construction site managers

Three themes emerged as central in the manager's stories and observations of their day-to-day work activities: (i) Coupling work on site: Tightening activities to each other, (ii) The role of site managers for coupling work: Tightening work to oneself, and (iii) Reinforcing identification with the site: Maintaining the loose coupling to the organization. The first theme illustrates how site managers (re)produce tight couplings between activities on site through mundane everyday work activities. The second theme illustrates how site managers have come to have a nearly indispensable role for (re)producing tight couplings on site through their work. The third theme illustrates some actual and possible consequences of their "tight coupling" manoeuvres.

Coupling work on site: Tightening activities to each other

An important aspect of site managers' daily work is how they tighten work sequences by making

impromptu decisions and reacting to unforeseen disruptions. Planning in construction projects is often curtailed by conditions of uncertainty and complexity. This poses a major challenge for the various professional project workers to coordinate and align their activities in a tightly coupled chain of work sequences. As a response to this problem, we found that site managers create tight couplings on-the-hoof by moving around on site, solving various large and small problems, making decisions and revising plans such that it directly impacted on other site actors' abilities to coordinate their work. We found that this often was an outcome of how they enacted a series of fairly mundane, even trivial, acts and activities, such as making phone calls, engaging in informal conversations, or as the following example illustrates, drawing a line on the ground on the building site.

> I have to draw this line on the ground today in order for the guys to know where to put the formwork tomorrow. The thing is, if that line is not there tomorrow when they start, it will take some time before they can get the formwork in place to cast the next time. The result will be that if we do not cast the wall tomorrow, there will be no wall the following day. But there has to be a wall there in order to connect the other walls the following days … It has to be done this week. There is a lead time to this, so I am not sure that I can get the formwork for the next foundation in time. [extract from field observations, site manager 1]

This mundane and informal act of drawing a line might seem trivial, but it is an apt illustration of how this site manager "connects the dots" for the "guys" ensuring that his revision of the plan tightly couples the sequences of activities as he deems fit. Seemingly trivial tasks like this hardly pertain to the formal role description of site managers. However, we found that all the respondents purposefully took on these kinds of tasks rather than delegate to others.

Unforeseen disturbances can arise almost anywhere in production. However, one type of disturbance that stood out in the data was in the management of site deliveries. In the following example, we see how a site manager for a multi-residential housing project has to deal with a delivery arriving a couple of days before the scheduled agreement and plan. In this case, it is a delivery of gigantic pole elements 20 m long and weighing 4.5 tones each. The workspace is already confined due to surrounding barriers, so it is far from obvious how the elements will be unloaded. To make things worse, a large concrete delivery is scheduled to arrive soon, meaning that there will be insufficient space for unloading the material.

> Site manager says to researcher: "It is good that you are here today, because there is going to be complete chaos [laughing]. […] First, I have to book a crane with capacity to unload the poles. But you know, it is not certain that they can arrive in five minutes [said with ironic undertone]. I would have needed a day or two to rearrange the space at the roundabout zone. But if I go in there now and move things around, or if I cancel the other deliveries, I will disrupt the [already] planned activities" [extract from field notes, site manager 14]

In this example, the site manager realizes that it will be too difficult to unload the poles through the main gate. Yet, if he cancels the concrete delivery, it will cause an inordinate problem in terms of delayed work sequences. However, if the poles are not delivered, production cannot continue. A solution is called for that allows *both* deliveries in order to stave off disruptions. His solution is to remove parts of the fence and bring in the delivery from another direction. Then, both deliveries can be unloaded at different locations. In order to do this, a pedestrian walkway has to be sealed off, which by law requires a permission from the Swedish Transport Administration. So, the manager goes to his office space to make a series of phone calls. Moments later, he comes back, having been granted an exemption to occupy the walkway by a local municipalities officer, for the time it takes to solve the problem.

Unexpected occurrences like these reflect daily reality for many site managers and calls for skilful and improvizational problem-solving. The example has been chosen since it illustrates how the problem-solving approaches preferred by site managers often have a coupling intention and function. We have seen that site managers tend to solve problems in a particular way that both prioritizes as well as ensures that the overall system of tight couplings on site remains intact. Their actions struck us as having a double intention, though: one explicit intention of ensuring that activities on site are tightly-knit and efficiently performed, yet, at the same time, the constant presence and solutions chosen, as reflected in the typical examples, seemed to signal and enforce an implicit message of indispensability. This message was "loudly" signalled in the undertones of the respondents, but also documented in the fieldnotes as the following sub-section describes.

The role of site managers for coupling work: Tightening work to oneself

There seems to be more to tight coupling than merely ensuring that sequences of site activities flow as smoothly as possible, are coordinated with resources

(human and non-human) in place, and that problems are rapidly solved to keep to the overall plan and time schedule, if not the budget. We can ask, why do the site managers take these mundane tasks upon themselves? After all, they have project personnel on site, e.g. site supervisors and team leaders, whose formal tasks among others are to coordinate work sequences and ensure that work plans and schedules are followed. However, the respondents were resistant to delegating to their staff, providing a number of explicit as well implicit reasons which we will show in this section.

While there are many different categories of workers involved in construction projects, we found that site managers nevertheless were the ones who created the tight coupling between work sequences in the projects. They provided the expertise, experience and practical know-how that was essential for dealing with disturbances that militated against coordination and production of tight couplings. An indirect, yet salient, manifestation of their seeming indispensability was observed during instances when a site manager was absent from the site office or the site altogether. In these cases, as evidenced in the fieldnotes, there would be a constant stream of workers coming into the office seeking the site managers' decisions on how to proceed with their work. Seeing that the manager was absent, they asked other people where he was so they could find him (e.g. "second floor first building", "he went with the carpenters", "he went with John and his crew"). Rather than trying to solve the various issue on their own, the workers frequently halted work sequences until they found the site manager. A supervisor also brought this up during an informal talk.

> It is not necessarily his [the site manager's] technical skills that are required. Most of us are quite capable of solving technical issues in production ourselves. It is just that we don't know all the decisions that have been made, and why. It then becomes bloody difficult to know what consequences a particular solution will have down the line. [extract from conversation with site supervisor]

This quote is interesting coming from a supervisor since their role is formally to support the site manager in coordinating activities. In order to do so, they too are expected to keep track of important planning and decisions. A starker opinion was expressed by a superior multi-project manager who considered the site managers' person-bound knowledge of site operations as highly problematic since production becomes oversensitive to their absence from the site.

> No one on site has a clue about the site managers' planning and decisions. What material is coming in, what cranes have been ordered. So, if the site manager is absent everything will come to a halt. This is a huge problem for production [...] this is very tough for the site manager who is absent. We know that if you are at home things will become difficult as hell for the others. [extract from conversation with project manager]

The site managers absence recurrently led to disturbances in the coordination of work sequences. An illustrative example of this was how workers then unloaded deliveries and put tools and materials in workspaces that were planned for other purposes. When other workers needed to use the space, they spent considerable time moving the material (often to another location that was planned to soon be used by another person). Episodes like this caused chains of delays in production. Gradually, it became clear to us that the site managers presence on site was needed since they were the sole actors who kept track of the interdependent network of actors, activities and resources on site. Site managers themselves referred to this as having the "big picture" of operations.

> In this system everything is dependent upon everything. You have to have a spider in the web who can see how it all connects. The role of the site manager is to have the overall responsibility and to keep track of what is happening on site ... No one else has the big picture so it is my job to make means meet ends in the project. [site manager 8]

The site managers' person-bound knowledge of the interdependencies in the project was thus a condition for coordination. The site managers only shared this knowledge by being present and involved in virtually all activities on site. This included participating in meetings, conducting inspections, directing activities, solving problems – large and small – providing support, and communicating with all types of project stakeholders, among many things. Combined, these activities served to attain a pattern of tight coupling between activities in the project. In practice, the pressure to be present was often translated into long working hours, a hectic work pattern, and expectancies to be available for work at all times (even while sick). It was not uncommon that they worked up to 80 hours per week.

Being present was rarely enough, however. We found that the managers were also constantly moving around on the site. As one manager put it: "[t]he only way to capture what I do is to put a Go Pro cam on me" [site manager 17]. When revisiting the field notes, it was noteworthy how often the verb "running" was

used when describing their activities ("he runs to open the gate", "he runs between the houses", "she rushed here to meet us"). Although there were instances when site managers were literally running, the verb also figuratively conveys a sense of pressure of trying to be everywhere at the same time to oversee that work sequences are flowing as they should. During occasions when the managers were *not* running, but were sitting still in their office, they were constantly interrupted by workers asking them to "check out" various situations or to help them with unexpected problems.

These snapshots lend weight to the conception that there seems to be no other actor, document, protocol or system that easily could substitute the presence of the site manager in producing tight coupling between activities in the building process. Their presence and moves seem to be indispensable requirements since so many of the other actors rely on the site manager's approval and "sign off" even when activities flow as they should. From this perspective, there seems to be an interconnection between tightening activities on site, as we saw in theme one, and tightening the activities and people closely to oneself, as we have seen in this theme.

Reinforcing identification with the site: Maintaining the loose coupling to the organization

Initially, it was difficult to understand why site managers seemed to have such an indispensable role in producing and maintaining tight coupling on construction sites. Gradually, however, we came to realize that the site managers purposefully, maybe even strategically, strove towards indispensability in the projects. For the site managers, it was important that they could exert full control and authority over their sites. In part, there appeared to be rational and instrumental reasons for such control. An important reason was that the site-manager role comes with the formal responsibility for the overall performance and budget of the construction projects, accountability up stream and the main filter down stream. This kind of exposure puts considerable pressure on them, as a site manager described rather bluntly: "If things go wrong in the project, all shit rains down on the site manager" [site manager 7].

To moderate the pressures of their job, the site managers typically saw it as a prerequisite to maintain as loose links as possible to external organizational control and governance. From their point of view, a loose coupling to the parent organization allows them space to deal with the unpredictable realities in the site milieu without needing to account for their actions and decisions. It further allows them flexibility and freedom to act quickly whenever unforeseen disturbances arise on site, as illustrated in themes one and two. Thus, the data illustrate instances in which the site managers actively decoupled themselves from external interference in what they considered as *their* territory of mandate.

> If someone tries to interfere, then they can take over ... I'll withdraw. The most important element of site management is that you have full responsibility [site manager 10]

> There can be only one rooster in the hen house! [site manager 14]

The site managers exerted efforts to keep a tight reign over their sites, believing it to be an essential project success factor and enabler of rapid problem-solving and decision-making in uncertain and disruptive situations. However, there also appeared to be an emotional dimension related to the site managers' strong desire for independence and control. In their accounts, we discerned a sense of pride in the responsibility they felt for their projects: a territorial responsibility that encompassed not only the formal or technical management of the project, but also the space and people management. This feeling of responsibility struck us as a central part of their understanding of their professional selves and identification with their peers. Over time, and through reproduction, site managers have come to enjoy the feeling of being free, independent and in charge of construction operations. This was illustrated in how some site managers portrayed their work as a certain "way of life" rather than as merely a role or an occupation.

> It is a special way of life. It is shitty and rainy sometimes ... but it is also very stimulating. The culture of free and independent work is the reason why we are here. Otherwise we would have chosen another profession, perhaps with less commuting, and with a fancier title and better salary. But we are here for a reason, and that is because we enjoy it. [site manager 7]

Hence, freedom and independence at work seem to represent an ideological focal point around which the site managers craft their identities. The site managers described their "way of life" as exceptionally challenging and demanding, which largely stems from the fact that building operations are so complex unpredictable. It is interesting to note, however, that what seems to make this job so attractive to them is

precisely its unpredictability and variation and its features of creative craftsmanship, entrepreneurship and constant need to improvise. The relative loose coupling between construction projects and their external environment has historically left a considerable space for creative and idiosyncratic solutions in the production process. This space has allowed site managers to put their "professional touch" on both the building process and the built product, which seems to be a source of enormous pride and satisfaction in their work life.

> I enjoy the possibilities to put my professional touch on production. In the end, it is we [the site managers] who make the buildings beautiful. [site manager 18]

> The absolute most joyful part of this job is to take part in the creation of something new … a new building. It is perhaps a little bit cheesy of me to say, but in the end, it feels like I am a bloody artist (laughing) [site manager 8]

For the site managers, it was thus not only important to have the mandate to manage the projects independently, but also to do so in personal and unique ways, i.e. crafting their environment to suit their workview. Few of them took this mandate for granted, however. Many expressed that their freedom increasingly had become curtailed. They experienced that the parent organization increasingly attempted to tighten its control over the projects, predominantly by imposing various standardization initiatives for the production process. While these initiatives were described in a variety of ways ("procedures", "routines", "rules", or simply "bureaucracy"), they were also articulated as impinging on their freedom and control, thus, and more interesting, reducing their territorial responsibility. In the interviews, the site managers often openly expressed frustration with what they saw as "interference" that would negatively reflect in the project performance measures. A telling example was a short diatribe from one site manager who deplored the fact that he had to obtain a permission from the parent organization to put up a ladder on site: "How do they expect us to work in this way?" [site manager 24].

The site managers were not passive to the perceived threat to their freedom and authority. We found that they took measures to retain their independence by strengthening the authority and keeping their sites tightly coupled. An especially efficient approach that the site managers used to strengthen their authority was by coupling activities tightly and informally to themselves. We found that the site managers frequently circumvented standardized and formal organizational procedures in preference of their own informal and "person-bound" way of coupling activities. A good example of this was that they frequently relied on their own personal network of contacts and acquaintances in the industry to solve problems in the project. Whenever disturbances arose, they called upon their personal contacts to acquire necessary resources (manpower, tools, materials, expertise etc.). This was further associated with a tendency of bypassing actors and firms formally procured through the organization. Although the site managers recognized that this approach potentially could lead to legal disputes, they justified it by saying that the prescribed organizational procedures were too "slow" and "bureaucratic".

Taken together, the site managers informal and person-bound way of coupling allowed them to increase their indispensability in the project at the expense of other stakeholders. It allowed them to keep a tight reign over site operations and thus to preserve their free and independent way of life.

Discussion

The findings in the previous section outline three interrelated aspects of coupling work. They show how the site managers activities aimed at coupling building sequences tightly to each other implicate a certain tight/loose duality enmeshed in the particularities of their work. On the one hand, they are coupling *themselves* tightly to the daily work *within* the projects and, on the other hand, draw on these tight couplings as a strategy to remain loosely coupled to the operations *outside* the projects, as a means to stave off any attempts by the permanent organization to redistribute authority and control of their work.

The various work sequences on site are generally performed by a wide range of actors representing different organizations and professions – carpenters, painters, bricklayers, tilers, electricians, scaffolders, excavator operators, tower crane drivers, material suppliers, and so forth. When working together on site, all these actors have to coordinate and align their individual efforts into a tightly coupled chain of sequences, often under conditions of great uncertainty and unpredictability. Dubois and Gadde ([2002](#)) argue that the loose couplings that exist between the different actors in the broader industry network provide the necessary slack and flexibility for the actors working on the construction sites to create such tight couplings by means of "collective adaptations" and shared understanding. Similar views have been proposed by

other studies that have stressed the importance of collective learning, trust, synchronization and mutual adaptation in explaining coordination and alignment processes in construction projects (e.g. Kadefors 1995, Styhre et al. 2004, Bygballe et al. 2016, Eriksson and Kadefors 2017).

The findings in this study highlight that such distributed forms of coordination do not always work in practice, and that the actors on site have a much more fragmented understanding of the couplings between their various work sequences. Under theme two, for example, it was illustrated how not even production supervisors, who have formal coordinating responsibilities, were able to keep track of the progression on site. Instead of collective adaptations and shared understandings, our findings show how the vital knowledge needed to couple sequences together and thus drive progression was asymmetrically funnelled towards the construction site manager as the "omniscient coupler". This position needed, however, to be constantly reaffirmed. In an ongoing fashion, the site managers thus upheld an individualized overview of operations – the "big picture" – by moving around (often running) as a physical repository of knowledge, constantly tightening the couplings, not only sequence-to-sequence but also to themselves. They purposefully resisted delegating to supervisors, whose formal responsibility actually is to oversee the detailed running of production tasks on site.

We suggest that "coupling work" is a useful construct to theorize a number of interrelated dualities of site-manager work, which distinguishes it from the traditional construct of coordination work. Furthermore, the coupling metaphor sheds new light on the tensions and contradictions underlying the loose/tight coupling duality (Orton and Weick 1990) that hitherto has not been captured in the macro conceptualization of the production system in construction and contributes to expanding Dubois and Gadde (2002) coupling theory.

Our findings show how much of the site managers' workdays consist of improvising and skilfully solving problems aimed at maintaining a tight coupling in and of production, in line with Styhre (2012) notion of "muddling through". From this perspective, coupling work can be seen to have an important coordinating intention in the site milieu. Yet, the findings also show that coupling work does not only consist of a stream of mundane coordination activities, but likewise show that site managers actively position themselves to sustain the need for "extraordinary" acts and authority performed by them (Alvesson and Sveningsson 2003). That is, rather than only being preconditioned by the

slack allowed by the permanent organization and the industry network (Dubois and Gadde 2002), the site managers actively use and reproduce this slack to couple activities tightly to their own authority and to segregate themselves further from outside governance and control. From this perspective, coupling work also has a territorial intention aimed at keeping a tight reign over the project and create "buffers" against external organizational control (cf. Orton and Weick 1990).

The findings show how site managers tactically circumvent formal, rule-bound organizational procedures and implement their own informal, person-bound coupling procedures in the projects. By coupling activities tightly to themselves, they safeguard their singular authority and reinforce their role as indispensable "hubs" in the projects (cf. Fryer 1979, Styhre and Josephson 2006, Styhre 2012). Our findings highlight, however, that this was not merely an instrumental measure to cope with the complexities that follow from the fact that projects are loosely coupled to organizational control and governance (cf. Sauer et al. 2001, Gann et al. 2012), but also had another, emotional dimension that spanned beyond the mundane means-to-an-end significance of construction projects into a strong positive identification with a certain work ideal – or even "way of life" – premiering freedom and independence (Alvesson and Sveningsson 2003, see also Kondo 2009).

The site managers seemed to derive a major part of their work motivation and positive professional identification from the constant stream of ad-hoc problem solving that characterized coupling decisions, which aggregated allowed them to constantly improvise and put their "personal touch" on production. In essence, being able to work independently and to craft their environment to suit their work-world and work-view is something that the site managers highly appreciate, and can also be seen as defining their understanding of their professional selves and identification with their peers (see also Styhre 2011, Polesie 2013, Raiden 2016, Sandberg et al. 2018, Löwstedt and Sandberg 2020, for similar observations).

The duality of coupling work may therefore be depicted as site managers dual and recursive engagement in, not only the particularities of an ongoing construction project, but also in an ongoing "identity project", in which they strive to preserve their identities as free and independent craftsmen (Sveningsson and Alvesson 2003) by sustaining tight coupling between themselves and the activities within the projects, and loose coupling to any other forms of

governance and authority emanating from outside the projects, including the permanent organization.

Orton and Weick (1990) have suggested that loosely coupled systems are less conducive to system-wide change than tightly coupled system; one explanation being dynamics that tend to preserve the uniqueness, identity and separateness of its various elements (Weick 1976, p. 7). This study suggests that the work of site managers provides a sustaining mechanism for the loosely coupled construction system that altogether seems to preserve the *uniqueness* of site managers' work, their *identities* as free and independent craftsmen, and *separateness* to other organizational elements that are kept at a distance by reproducing loose couplings. In other words, the site managers situated coupling work practices pose a barrier for transforming and reconfiguring the loosely coupled construction system that seriously needs to be taken into account in any such attempt.

Conclusion and implications

In this paper, we have explored what it means to perform "coupling work" within a loosely coupled system. Using a practice-lens, and focussing in particular on the situated work realities of construction site managers, we have examined how the "tight" part of the system is (re)produced in everyday situations. In doing so, we found, however, that the site managers' ongoing work to produce tight couplings between the construction work sequences also was enmeshed with an ongoing strive to safeguard their own authority and control by sustaining loose couplings to external actors in the industry network, most notably the permanent organization.

An important implication of this tight/loose duality is that it makes up a prevalent sustaining mechanism for the coupling system, which have remained unaccounted for in previous macro-level conceptualizations. A key for understanding this mechanism, we suggest, lies in how conditions of loose coupling have come to shape the work and identities of site managers. Due to this loose coupling, site managers have been conditioned to work in an exceptionally free and flexible role where they have been afforded the responsibility to manage the projects almost as if these were their own enterprises. This study shows how they have come to internalize these conditions as a taken-for-granted "privilege" of their work – something that has become ingrained in their professional identity and is transferred to following generations of site managers. As the data has shown,

they are not anywhere near relinquishing this freedom yet.

Up until recently loose coupling seems to have created a win-win situation; it has allowed the site managers to tighten their reign on the sites which has been beneficial for construction firms to come to grips with conditions of complexity inherent in the building process. The site managers tight reign has in turn validated the looseness from the organization. However, as construction companies are striving to improve the performance of the construction process, they are now attempting to rebalance the site managers' authority and control by means of tightening the control over the individual projects and standardizing their work (see also Polesie 2013, Löwstedt and Sandberg 2020).

This study provides situated empirical evidence of how site managers' coupling work manoeuvres in the projects can risk undermining such change initiatives and thus stave off attempts to modify the established balance of the tight/loose coupling layers. Altogether, this underlines the importance for both researchers and practitioners to seriously take into account the situated lived realities and perspectives of the site managers in regard to all kind of change initiatives that ultimately threaten the site managers free and independent work lives. It is important to stress here that this position is neither to uniformly favour the site managers' perspectives and preferences in regard to balancing the loose and tight couplings; nor does it disregard the value of the collected stock of studies that have applied the coupling metaphor as to frame discussions of change and development in the construction industry. Rather, we believe that a combination of micro and macro-lenses could be a fruitful approach to better align change visions and intentions in construction firms with the situated lived realities of people who work in production, especially those with considerable power to undermine intended change implementations. Clearly, our understanding of how the loosely coupled construction system is reproduced in practice can only benefit from further research that explores the worldviews, motivations and identities of an important category of people of purposefully work to preserve it.

Disclosure statement

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