

Ensuring health and safety of subcontractor workers in construction projects

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Subcontractors play a critical role in construction projects. Yet their workers are often exposed to high occupational health and safety (OHS) risks. Although subcontractors hold formal employer responsibility, OHS outcomes are strongly influenced by how main contractors and clients organize and manage project execution. This paper examines how subcontractors can be effectively involved in OHS management and how their safety can be ensured in construction projects. The study is based on case studies of three large construction projects in Norway, involving three clients, three principal contractors and nine subcontractors. The findings show that ensuring subcontractor worker safety requires a combination of formal structures, such as procurement and contractual requirements, and relational practices, including dialogue, leadership presence, and involvement in planning and risk management. Integrating OHS with production and quality management is identified as a key factor in managing risk for subcontractor workers under time pressure.

Keywords: Occupational health and safety (OHS), construction, subcontractors, OHS management, involvement.

1. Introduction

The construction industry is characterized by complex, project-based production, extensive subcontracting, and high levels of occupational risk. Workers employed by subcontractors, particularly those working in small and medium-sized enterprises (SMEs), are often exposed to high levels of mechanical, physical, and chemical hazards and experience an increased risk of work-related injuries and health problems (Kilskar & Winge, 2025). Subcontractors therefore represent a critical group when addressing occupational health and safety (OHS) challenges in construction projects.

In construction projects, subcontractors typically hold the formal employer responsibility for their workers' OHS in accordance with national legislation. At the same time, their actual working conditions and safety outcomes are strongly influenced by how principal contractors and clients organize, coordinate, and govern the projects. Previous research shows that OHS performance in construction supply chains is shaped by a combination of contractual arrangements, coordination mechanisms, and day-to-day interactions between clients, principal contractors, and subcontractors (Walters & James, 2011; Hasle et al., 2023).

Research on OHS governance in construction highlights two main approaches to influencing safety performance in supply chains: contractual management and relational governance. *Contractual governance* are formal requirements embedded in procurement processes, contracts, audits, and control systems to clarify roles, responsibilities, and minimum safety standards (EU-OSHA, 2012; James et al., 2015a). *Relational governance* emphasizes trust, dialogue, leadership, and collaboration between project actors as key mechanisms for translating formal requirements into safe work practices (Ke et al., 2015; Ruijter et al., 2021). Studies suggest that neither approach is sufficient on its own, and that effective OHS management in construction projects depends on a balanced combination of formal and relational mechanisms (Duryan et al., 2020; Hasle et al., 2023).

Despite this research, there is limited empirical knowledge on how subcontractors can be practically involved in OHS management in construction projects and how principal contractors and clients contribute to ensuring subcontractor worker safety in everyday project execution. In particular, there is a need for studies that examine concrete activities, practices, and interactions that shape subcontractor involvement across different phases of construction projects.

The aim of this paper is therefore to investigate how subcontractors can be effectively involved in OHS management and how their safety can be ensured in construction projects. Based on qualitative case studies of three large construction projects in Norway, the paper examines key *activities* and overarching *practices* through which principal contractors and clients influence subcontractor involvement across different phases of project execution. Based on this aim, the study addresses the following research questions:

- RQ1: Which key activities are essential for effectively involving subcontractors in OHS management and ensuring their safety in construction projects?
- RQ2: What overarching *themes and practices* characterize effective involvement of subcontractors with regard to OHS?

2. Material and methods

The study is based on qualitative case studies of three relatively large construction projects in Norway, in which three principal contractors acted as main contractors or design-build contractors. The cases were selected using purposeful sampling (Palinkas et al., 2015), as the aim of the study was to identify good practices related to subcontractor involvement in occupational health and safety (OHS), and therefore focused on projects led by principal contractors with well-developed OHS practices. In addition, the projects and contractors were selected based on accessibility through established industry networks.

The three projects were large or medium-sized construction projects involving a relatively high number of subcontractors. A total of nine subcontractors were included in the study. These subcontractors were selected based on their size (more than three employees) and their substantial scope of work in the projects, ensuring that they had relevant experience with project-level OHS management and coordination.

Data were collected through document analysis, site observations, and 21 semi-structured interviews with 28 informants representing clients, principal contractors, and subcontractors. The interviews focused on experiences with OHS management, subcontractor involvement, coordination practices, and project organization. A validation workshop was conducted with

representatives from the different actor groups to discuss and validate preliminary findings. The data collection covered topics such as procurement and contracting, start-up processes, risk assessment, onboarding, meetings and site safety walks, follow-up and control, leadership, and project culture.

The empirical material was analyzed using thematic analysis (Braun & Clarke, 2006). An inductive approach was applied, where themes and patterns were identified through systematic coding and comparison across cases. The analysis focused on identifying key activities and cross-cutting themes for subcontractor involvement in OHS management. Comparisons across projects and actor groups were used to strengthen the credibility of the findings.

The study has limitations. The empirical material is based on a limited number of projects and primarily involves large principal contractors that are assumed to have relatively mature OHS practices. The findings should therefore be understood as analytical insights rather than statistically generalizable results.

Table 1. Interview roles and number of interviews.

Interviewee roles	N.
Clients	3
Principal Contractors	9
Subcontractors	9
Tot.	21

3. Results

This chapter presents the empirical findings from the case studies and addresses the research questions by describing key activities and overarching themes related to subcontractor involvement in OHS management. We have sought to present the key assessments and viewpoints expressed by the informants from the interviews and the workshop, without making extensive evaluations of our own. Our assessments are mainly reflected in the choice of themes and descriptions included, and in what has been omitted.

3.1. Key *activities* for involving subcontractors in OHS management

The findings presented in this section relate primarily to the first research question by describing key *activities* that are central to involving subcontractors in OHS management across different project phases. These activities

span the project lifecycle and are closely interrelated. The key activities identified are:

- (i) Evaluation and procurement
- (ii) Contract
- (iii) Start-up meeting(s)
- (iv) Risk assessment and safe job analysis
- (v) Onboarding and personal safety instruction
- (vi) Meetings and site safety walks
- (vii) Follow-up and control on site

Evaluation and procurement are described as critical early-phase activities for setting expectations related to OHS. Subcontractors are primarily evaluated based on quality, progress capability, price, and OHS performance. While price remains important, contractors emphasize the need for balanced assessments, as subcontractors operating with very small margins may be more likely to compromise on OHS. Data from supplier registers, previous project evaluations, and formal qualification schemes are used as decision support, but are interpreted with professional judgement rather than applied mechanically. Clarification meetings following the procurement process are highlighted as important arenas for aligning expectations and ensuring that subcontractors understand their responsibilities related to OHS, quality, and coordination.

Contracts are emphasized as key instruments for clarifying interfaces, roles, and responsibilities. Clear contractual requirements related to OHS are viewed as essential for reducing ambiguity during production and limiting the need for ad hoc solutions. Informants underline that contracts should not only regulate formal obligations, but also support collaboration and good working relationships. The choice of contract form is considered relevant for OHS. Collaborative arrangements may facilitate early involvement, shared problem-solving, and better management of risk, although good collaboration is also possible within more traditional contract forms.

Start-up meetings play an important role in ensuring that subcontractors understand the contract, their responsibilities, and how OHS is to be managed in practice. These meetings are used to support early planning, coordination with the project schedule, and clarification of

communication routines. Informants describe good start-up meetings as an investment in later cooperation, contributing to trust-building and early ownership of OHS. At the same time, challenges are noted when participants in start-up meetings are not the same individuals who later work on site, making internal communication within subcontractor organizations particularly important.

Risk assessment and safe job analysis are described as core elements of OHS management between client, principal contractors and subcontractors. Contractors place strong emphasis on subcontractors conducting project-specific risk assessments of their own work prior to start-up. Risk assessments are expected to be living documents that are updated throughout the project. Safe job analysis is primarily used to address residual risk and unplanned situations during execution. Informants stress the importance of involving subcontractors and their workers in risk-related discussions, as they possess detailed knowledge of their own work processes and associated hazards. Differences in terminology and practice related to risk assessment and safe job analysis across projects are highlighted as a potential source of confusion.

Onboarding and personal safety instruction are identified as important activities for establishing common standards and building a shared understanding of OHS. Good onboarding practices include thorough introductions to the project, clear communication of OHS requirements, and opportunities to become familiar with other actors on site. Personal safety instruction is used to communicate practical information, site-specific risks, and expected behavior. Informants emphasize that onboarding provides an important opportunity to establish trust and identify potential challenges related to OHS at an early stage.

Meetings and site safety walks are described as key arenas for coordination, communication, and involvement. Short daily meetings are particularly important for sharing information about activities that may affect safety, such as simultaneous operations and deliveries. In addition, various formal meetings provide opportunities to integrate planning, production, and OHS considerations. Practices related to site safety walks vary across projects, but all emphasize documentation, follow-up, and dialogue. Informants highlight the value of

focusing not only on deviations, but also on positive observations, as this supports learning and engagement.

Follow-up and control on site are seen as necessary to ensure compliance and support continuous improvement. While subcontractors retain employer responsibility for their own workers, contractors vary in how actively they monitor subcontractor OHS performance. Early follow-up is considered particularly important, although informants note that the need for control differs between subcontractors depending on size, experience, and risk profile. Regular presence on site and informal dialogue are highlighted as important for both monitoring work practices and building trust.

3.2. Key themes and good practices

This section addresses the second research question by presenting overarching themes and practices that shape subcontractor involvement regarding OHS in construction projects. These themes cut across project phases and activities analyzed in section 3.1 and shape how OHS practices are understood and enacted in practice. The key themes identified are:

- (i) Long-term cooperation and alliances
- (ii) Clarifying and strengthening subcontractor responsibility
- (iii) Structure and organization
- (iv) Leadership and management style
- (v) Communication
- (vi) Integration of OHS, production, and quality
- (vii) Production pressure and time pressure
- (viii) Building teams and culture

Long-term cooperation and alliances between principal contractors and subcontractors are described as beneficial for OHS, as repeated collaboration enables mutual learning, predictability, and shared expectations regarding safety. While formal long-term agreements are not widely used, contractors often rely on subcontractors they have prior experience with, particularly where OHS performance is well known.

Clarifying and strengthening subcontractor responsibility is emphasized as a prerequisite for effective OHS management. Informants describe a clear expectation that subcontractors understand

and take responsibility for OHS for their own workers, supported through early clarification, dialogue, and differentiated follow-up rather than solely through control.

Structure and organization – including contracts, meeting structures, site organization, and co-location of key personnel – are highlighted as important enablers of coordination and involvement of subcontractors. Clear structures reduce ambiguity and support both formal and informal communication related to OHS.

Leadership and management style are described as central to balancing contractual control with relational governance. Informants emphasize the importance of visible, consistent leadership that combines clarity in expectations with dialogue and problem-solving, particularly under conditions of pressure.

Communication is viewed as essential for integrating subcontractors into planning and execution. Regular meetings and day-to-day dialogue provide arenas for sharing information, addressing risk, and ensuring that subcontractor knowledge and experience are taken into account.

Integration of OHS, production, and quality is identified as a key principle for preventing OHS from being treated as a separate concern. Informants emphasize that effective subcontractor involvement requires OHS to be embedded in planning, scheduling, and quality management processes shared between principal contractors and subcontractors, particularly where interfaces and simultaneous activities create elevated risks for subcontractor workers.

Production pressure and time pressure are described as recurring challenges that may undermine OHS if not actively managed. Informants emphasize the importance of realistic planning, openness about emerging delays, and joint problem-solving to prevent unsafe work practices among subcontractors under pressure.

Building teams and culture is highlighted as a cross-cutting theme that supports trust, openness, and shared responsibility for OHS. Visible leadership, inclusive practices, and arenas for interaction contribute to reducing “us and them” distinctions between contractors and subcontractors.

3.3. The client's role

According to the Norwegian Construction Client Regulations section 5, the client is responsible throughout the project for ensuring OHS on the

construction site, that statutory duties assigned to designers and employers are fulfilled, and that sufficient dialogue and coordination between actors are facilitated.

Overall, experiences with the client's role in the three projects studied were positive. Clients were described as relatively active through regular presence on site and participation in meetings, including site safety walks, operations meetings, and progress meetings. In practice, the client role was exercised through active use and continuous adjustment of the OHS plan, as well as through dialogue with contractors and other project actors. Client participation in these arenas was perceived as contributing positively to coordination and shared understanding of safety-related issues.

Several informants highlighted the importance of close integration between economy, production, quality, and OHS. This integration was described as facilitating change management and cost control, while also supporting safer work practices. Co-location of key actors and short lines of communication were identified as important enablers of openness, trust, and effective collaboration. In this context, collaborative approaches were seen as contributing to a project culture in which the client was perceived not only as a controlling actor, but also as a partner and part of the project team.

At the same time, informants noted that client involvement varies considerably across the construction industry. While some clients are active and engaged, others have limited presence and primarily rely on the principal contractor for follow-up of subcontractors. Economic and time pressure were highlighted as recurring challenges in construction projects more generally. Informants pointed out that time pressure often originates at the client level and may cascade through contractors and subcontractors, potentially increasing OHS risk if not adequately addressed. Although this was less pronounced in the projects studied, it underlines the importance of allocating sufficient time for planning and execution.

In sum, the findings indicate that an active and engaged client, combined with collaborative approaches, openness, and integration of OHS with production and quality, supports effective involvement of subcontractors and their workers. Client practices related to time allocation,

coordination, and interaction with other project actors are therefore critical for OHS outcomes in construction projects.

4. Discussion

This study investigates how subcontractors can be effectively involved in OHS management in construction projects and how their safety can be ensured through concrete activities and overarching practices. The discussion addresses the two research questions on key *activities* identified in the results (RQ1) and the cross-cutting *themes and practices* that shape how these activities function in practice (RQ2).

With regard to RQ1, the findings show that subcontractor involvement in OHS is shaped through a set of recurring activities spanning different phases of construction projects, including procurement, start-up processes, risk assessment, onboarding, meetings, site safety walks, and follow-up on site. These activities largely correspond to what previous research describes as contractual governance mechanisms, where roles, responsibilities, and minimum safety requirements are defined through formal procedures, contracts, and control systems (EU-OSHA, 2012; James et al., 2015a; Walters & James, 2011). However, the findings demonstrate that these activities are not merely administrative or compliance-oriented. Rather, they function as important *arenas* for communication, clarification of expectations, and coordination between principal contractors and subcontractors, thereby influencing how formal OHS requirements are understood and enacted in daily work.

Addressing RQ2, the study highlights a set of overarching themes and practices that cut across individual activities and shape the effectiveness of subcontractor involvement. Central among these are accountability, integration of OHS with production and quality management, leadership style, communication, and project culture. The findings illustrate a hybrid form of governance in which contractual and relational mechanisms interact and reinforce each other. Consistent with research on relational governance in construction, dialogue, trust, leadership presence, and early involvement of subcontractors emerge as critical for translating formal requirements into safe work practices (Ke et al., 2015; Ruijter et al., 2021; Hasle et al., 2023).

A particularly important finding related to RQ2 concerns the integration of OHS with production planning and quality management. Informants emphasized that treating OHS as a separate or secondary concern increases the risk that safety is deprioritized under conditions of time pressure and high production intensity. Integrating OHS considerations into scheduling, coordination of simultaneous activities, and production planning was seen as essential for managing interfaces between subcontractors and preventing risk escalation. This supports earlier research showing that safety risks tend to increase when production pressures dominate decision-making, and that effective leadership is required to balance productivity and safety demands (Manu et al., 2011; Wright, 2016; Shepherd et al., 2021).

While the findings demonstrate how subcontractor involvement can be strengthened through a combination of structured activities and overarching practices, the capacity to implement such approaches varies across actors in the construction industry. Large clients and principal contractors often possess the competence and organizational capacity required to operationalize these practices, whereas smaller actors may lack sufficient resources, systems, or expertise. This limitation is particularly relevant in relation to RQ2, as the identified themes and practices may be more challenging to implement in less-resourced organizations. This points to a need for future research and practical development aimed at translating these findings into accessible support tools, guidelines, or frameworks that can assist smaller clients and contractors in strengthening subcontractor involvement and OHS management.

Overall, the study contributes to the literature on OHS management in construction by providing empirical insight into how subcontractor involvement is shaped through everyday project activities and interactions. By explicitly linking concrete *activities* (RQ1) to broader *themes and practices* (RQ2), the findings underscore the importance of combining contractual arrangements with relational practices to achieve sustainable improvements in OHS performance in construction projects.

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