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WORK SKILLS REQUIRED FOR SUCCESS AS A FRONTLINE SUPERVISOR

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ABSTRACT

Frontline supervisors (FLS), commonly referred to as foremen or forepersons, play a critical role in the construction industry and lean project delivery as they direct the craft workforce and oversee production at the workface. FLS are responsible for ensuring that construction scopes are completed on time, safely, and to the required quality standards, as such, they are often the last planners for construction projects. For the purposes of this paper, an FLS is defined as "a person that is competent in their trade and leads a team of craft personnel and directs them in their day-to-day activities." The authors conducted focus groups to elucidate the key work skills required for success in the FLS role. The analysis identifies a total of fourteen (14) work skills required for success. The findings can help construction organizations assess whether they are equipping FLS appropriately to successfully deliver projects. Moreover, the lean construction community can consider how to embed lean principles into existing or developing training materials to empower FLS to support lean project delivery at the workface.

KEYWORDS

Work skills, frontline supervisor, foreperson, Last Planner.

INTRODUCTION

The Construction Industry Institute's Research Team 414 (2024) defines a frontline supervisor (FLS) as, "a person that is competent in their trade and leads a team of craft personnel and directs them in their day-to-day activities." FLS in the construction industry bridge the gap between management and the craft workforce, thus playing a critical role in ensuring that projects are executed efficiently, safely, and with high-quality standards (Rojas 2013; Kaur 2017). They translate project goals related to project performance (e.g., cost performance, schedule performance) into actionable tasks for the craft workforce and take responsibility for functions including planning, communication, and safety oversight (Dave et al. 2010; Marjasalo et al. 2011; Desai and Abdelhamid 2012; Ramadan et al. 2023). FLS drive safety and productivity at the workface, in turn driving project cost and schedule performance (Liberda et al. 2004; Hewage et al. 2011; Gerami Seresht and Fayek 2019; Lima et al. 2021).

Given the importance of the FLS in the industry, this paper focuses on elucidating the specific work skills required for success in the FLS role. A qualitative method was used to understand the required measurable FLS work skills needs. The authors hosted a series of focus groups with members of the construction industry that hired or managed FLS to elucidate the work skills required for success as an FLS in the future.

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Despite their importance, the role of the FLS has received limited attention in construction literature. Existing literature tends to emphasize broad competencies or personality traits, offering little guidance on the measurable work skills needed to perform the FLS role effectively.

To address this gap, this study explores the research question, what work skills are required for success in the frontline supervisor role?

When such skills are enumerated, they can be assessed more effectively. The list of work skills also enables more proactive integration of lean principles, as construction organizations can link work skills to lean teachings and outcomes, further building lean culture within organizations and on jobsites. Finally, this study is timely as the North American construction industry faces a workforce shortage of 350,000 - 500,000 workers over the next three years (ABC, 2026; AGC, 2026). FLS are critical actors in addressing the workforce shortage, as they are often responsible for training new workers and relationships between new members of the workforce and their FLS can impact the retention of workers (e.g., (Minooei et al., 2020).

LITERATURE REVIEW

Though limited, literature does highlight the critical role of the frontline supervisor in the construction workforce (e.g., (CII, 1992, 2015; Conchie et al., 2013; Dave et al., 2010; Gerami Seresht & Fayek, 2019; Hinze & Kuechenmeister, 1981; Maloney & McFillen, 1987; Minooei et al., 2020; B. Ramadan et al., 2022; B. A. Ramadan et al., 2022; Uwakweh, 2005; Wray, 1949). In particular, literature explores what defines an FLS to be successful (e.g, (Bigelow et al., 2019; CII, 1992, 2015, 2018, 2024; Conchie et al., 2013; Hinze & Kuechenmeister, 1981; Rojas, 2013).

Early reports (e.g., (Business Roundtable, 1983; CII, 1992; Lemna et al., 1986), highlighted the importance of training FLS in areas like planning, work organization, scheduling, safety, quality control, directing and coordinating, material control, human relations, motivation, leadership, communication, problem-solving, and methods improvement. The report noted that investment in supervisor training could yield a return of “up to three to one” (CII, 2007).

The initial list of skills required for success in the FLS evolved over time. CII (1992) conducted a study on supervisory education and found leadership, communication, planning and control, ethics, and motivation ranked most important for the FLS level. Hardison (2012) conducted a Delphi study with construction safety experts to identify the most important knowledge-based competencies that FLS should possess to improve safety performance; Lima et al. (2021) reiterate that the FLS play an active role in creating a culture of safety on construction sites. Rojas (2013) developed the “12 Pillars of Successful Supervision” through qualitative research in the unionized electrical construction sector: humility, consistency, leadership, communication, character, effectiveness, knowledge, willingness, commitment, people skills, experience, and curiosity. More recently, CII (2018) developed a list of ten competencies for industrial frontline supervisors through interview and survey methods: (1) general construction knowledge, (2) trade-specific knowledge, (3) verbal and written communication, (4) pre-planning, (5) problem solving, (6) ethical value system, (7) people management, (8) leadership, and being (9) proactive and (10) goal-driven.

Taken together, these studies show that most prior research has focused on high-level traits, general competencies, or organizational behaviors. Few studies define or assess specific, trainable skills required for success in the FLS role, and even fewer examine how those skills may need to adapt in response to changes in the construction industry, e.g., implementation of lean construction, the advent of new technology and automation. The present study addresses these gaps by identifying the measurable skills required for success in the FLS role.

METHODOLOGY

This study leverages data from focus groups to identify and refine the work skills needed for success in the FLS role. Focus groups are a common qualitative research method used to explore participant perspectives through moderated group discussions (Dawson et al., 2024). The format allows for the efficient generation of substantial content within a relatively short period while also reducing moderator bias by situating data collection in a more natural and interactive setting (Cooper & Schindler, 2013). Focus groups captured what industry professionals identify as the skills required for FLS.

FOCUS GROUP PARTICIPANTS

Participants in the focus group discussions were purposefully selected from the Construction Industry Institute's Research Team 414 (CII, 2024). A total of 19 individuals representing contractors, owners, service providers, and academic institutions served as team members and participated in this study. These participants held senior roles such as Operations Manager, Program Manager, and Training Manager (

Table 1). These individuals were chosen to participate in RT-414 based on their professional experience and interest in FLS development and training. Their experience ranged from 9 to 30 years (

Table 1), with an average of over 20 years. All participants had direct insight into the responsibilities and skills required for success as a FLS. This diverse group ensured a well-rounded perspective aligned with the study's aim to identify and validate essential work skills for success in FLS roles.

Table 1: Focus group participants

ID	Organization Type	Title	Experience (Yrs)
A1	Academic	Associate Professor	13
A2	Academic	Scholar	23
C1	Contractor	Operations Manager	30
C2	Contractor	Field Operations Manager	17
C3	Contractor	VP	30
C4	Contractor	Area Manager	18
C5	Contractor	Sr. Project Manager	27
C6	Contractor	Training Manager	26
C7	Contractor	Sr. Construction Manager	9
C8	Contractor	Operations Manager	25
C9	Contractor	PM	25
O1	Owner	Tech Manager	23
O2	Owner	Program Manager	24
O3	Owner	Manager	16

Table 2: Focus group participants (continued)

ID	Organization Type	Title	Experience (Yrs)
O4	Owner	Project Execution Manager	20
O5	Owner	Manager	25
O6	Owner	Manager	27
SP1	Service Provider	Manager	9
SP2	Service Provider	HR	23

FOCUS GROUP SESSIONS

The authors conducted in-person and virtual focus group meetings, based on previous research indicating that combining virtual and in-person formats can improve participant engagement and convenience without sacrificing data quality (Dwyer et al., 2022; Gibson et al., 2022; Gottlieb et al., 2022). Specifically, the authors hosted:

- In-person sessions that were 8 hours long were conducted on July 29, November 19, November 20 (2024), January 16, and April 8 (2025).
- Virtual sessions on Microsoft Teams that were one hour long were held on August 27, October 23, November 1 (2024), and January 22, February 12, February 17, and March 10 (2025).

Table 3 lists the focus group meeting dates and participants. Attendance varied by session, with participants attending different meetings throughout the project timeline. All participants were provided with the same materials and discussion prompts to support consistent preparation for focus group sessions. During in-person focus groups, participants created and revised a list of work skills required for success in the FLS position. Virtual sessions focused on reviewing the work skills list developed or revised during in-person focus group sessions. Feedback from virtual focus group participants was then incorporated into the work skills lists for the next in-person focus group. For example, feedback from the virtual focus group sessions in August, October, and November 2024 contributed to refining the preliminary work skills developed at the July 2024 in-person focus group.

Table 3: Focus group meetings (italic font is for virtual meetings)

	Meetings											
ID	**2024**						**2025**					
	29 Jul	*27 Aug*	*23 Oct*	*01 Nov*	19 Nov	20 Nov	16 Jan	*22 Jan*	*12 Feb*	*17 Feb*	*10 Mar*	08 Apr
A1	x	*x*	*x*		x	x	x	*x*				x
A2	x	*x*	*x*	*x*	x	x		*x*	*x*	*x*	*x*	x
C1	x	*x*	*x*			x	x	*x*				x
C2						x		*x*		*x*		
C3								*x*			*x*	
C4	x	*x*	*x*	*x*	x	x		*x*				x
C5			*x*			x	x		*x*		*x*	x
C6	x	*x*	*x*		x	x	x			*x*	*x*	x
C7	x								*x*	*x*	*x*	x
C8	x	*x*	*x*					*x*				x
C9	x	*x*	*x*	*x*	x	x	x	*x*	*x*	*x*		x
O1		*x*				x						
O2	x	*x*	*x*		x	x	x	*x*				x
O3												
O4	x		*x*				x					x
O5	x	*x*	*x*		x	x	x	*x*				x
O6	x	*x*			x	x	x					x
SP1	x	*x*						*x*				
SP2		*x*	*x*		x	x			*x*		*x*	x

During the first in-person focus group, all attendees collaboratively developed a list of work skills required for success in the FLS position. The focus group facilitator projected a Microsoft Excel sheet (Figure 1) and participants suggested work skills.

Sample Work Skills (adapted from Al Sultan et al. (2025)
Read and interpret blueprints and drawings.
Ability to manually move objects weighing up to 70 to 100 pounds.
Oversee, direct and retain a crew of laborers
We will now develop a list of observable work skills required for success in the FLS role:
1.
2.
3.
…

Figure 1: Data collection work sheet to capture work skills suggestions from focus group participants

Virtual meetings held in 2024 focused on gathering feedback on the preliminary FLS work skills list developed in July 2024, allowing for successive iteration and refinement, culminating in a "final" list of work skills during the November 2024 in person focus group. In the January 2025 in-person focus group, participants reviewed the updated skills lists and worked to ensure each work skill was specific, unique, and measurable. During this focus group, participants culled the work skills list down by highlighting key skills for success as an FLS rather than listing every skill that may be required. Virtual sessions held in February and March 2025 included smaller groups of participants whose day-to-day responsibilities involved working with or supervising FLS. These meetings concentrated on refining the language of each work skill, removing redundancy, and confirming that the skills were clear and relevant to construction site supervision and supervisory tasks. Although the March 2025 meeting had fewer participants, those involved had direct experience with FLS-related responsibilities and contributed practical insights to the final adjustments. The final in-person focus group (April 2025) ensured that all participants reached consensus on the final work skills list. The authors note that the focus group participants' familiarity with the FLS role likely allowed them to achieve consensus on work skills required for success earlier than a focus group with less familiarity with the FLS role would have. Because the team coalesced on a set of work skills relatively quickly, the authors were able to focus on refining the skills and ensuring that the skills were actionable and specific enough to be useful to employers and FLS alike.

RESULTS AND DISCUSSION

Focus groups yielded a final set of fourteen (14) work skills required for success in the FLS role, presented in Table 4.

Table 4: Work skills required for success as an FLS

No.	Work Skill Descriptions
1	Direct work crews' production and performance
2	Direct crews in multiple work locations
3	Ability to motivate a team of multi-generational craft laborers to complete a specific set of tasks in a fixed timeframe
4	Demonstrate procedures for construction tasks
5	Clearly communicate crew-level progress and challenges to management
6	Report and track construction progress on daily basis
7	Utilize data to manage production, safety and quality
8	Ensure work meets quality requirements and project specifications
9	Identify hazards and risks in assigned construction activities
10	Set up/arrange physical conditions for safe and productive work
11	Implement task efficiency improvements without being prompted
12	Work self-directed in daily work activities to complete assigned tasks per construction schedule
13	Ability to address multiple needs and requests simultaneously
14	Appropriately allocate resources based on site conditions or status of work

Skills 1-5 (Table 4) all speak to the need for the FLS to directly engage with the craft workforce as a manager and a teacher. Indeed, each of these skills suggests that the construction industry is driven by human relationships, a theme reinforced throughout the focus group sessions. Focus group participants further indicated that successful FLS excel at developing work plans and directing crews to execute these plans. These skills directly align to the skills required for success as a last planner, indicating that FLS can, and arguably should, play a role in lean project delivery. The authors thus postulate that teaching FLS lean techniques, including the 5 Whys, plan-do-check-act, and the language-action cycle can enhance FLS' lean understanding and make FLS lean champions on their projects.

Skills 6-8 focus on tracking progress and quality. Focus group participants indicated that these skills would likely be applicable regardless of the level of technological integration in the construction industry in the future. Indeed, focus group participants stated that while the tools for reporting and tracking progress may change, the responsibility for progress will continue to lie with the FLS, making these tracking skills critical. For example, what is now manually tracked in a daily log may in the future be automatically tracked in a construction management software program; either way, the FLS will be required to ensure the accuracy of the reporting (i.e., Skills 6 and 7) as well as the work itself (i.e., Skill 8). The authors highlight that these skills relate to the lean production system. The authors would suggest that teaching FLS how to track percent plan complete (PPC) on a daily basis for a given crew may empower the FLS to develop creative solutions that improve quality and production. Focus group participants emphasized that most FLS take pride in delivering high-quality work and hitting production

targets; the authors thus suggest that empowering FLS with lean tools would not only further lean implementation onsite, it may also improve FLS job satisfaction.

Skills 9-10 emphasize jobsite safety. Identifying hazards and risks in assigned construction activities and setting up or arranging physical conditions for safe and productive work are seen as fundamental responsibilities that will not be displaced by automation or digital oversight. While focus group participants acknowledged that the nature of safety concerns may shift in the future—for example, the increased presence of autonomous equipment or co-located robotic systems may create additional hazards related to human-machine interaction—the expectation remains that the FLS will need to recognize these risks and ensure that appropriate controls and safety measures are in place. Similarly, the act of preparing a jobsite for work requires an FLS who understands how to set up a site for safe and efficient production. The authors note that safe operations onsite are fundamental to lean construction's respect for people principle; however, the authors did not identify specific lean tools that would enhance FLS' ability to set up safe sites.

Skills 11-14 focus on management. Skills 11 and 12 reflect the expectation that FLS manage themselves by operating independently and taking initiative. Skills 13 and 14 describe the FLS' role in managing crews, and in coordinating complex, fast-paced field operations. Focus group participants emphasized that managing people, equipment, and priorities on the ground determines how successful an FLS is able to be in their role. Taken together, these four skills reinforce the importance of the FLS managing themselves and others to support successful project delivery. This aligns to prior work related to the qualities of a successful FLS (Dai et al., 2007; Hinze & Kuechenmeister, 1981; Lemna et al., 1986; Maloney & McFillen, 1987; Rojas, 2013; Wray, 1949), which highlights leadership and management as key qualities for successful FLS. Based on focus group results, it appears that FLS' success has continued to depend on their ability to manage themselves and others. Focus group participants expect this will continue to be true in the future, even if new technologies and digital environments change the construction site itself in the future.

Skills 9-14 seem, in the authors' view, to evoke the lean principle of respect for people. To be effective, FLS must be able to set up sites and allocate resources to safely complete their tasks. The authors surmise that FLS may find that in learning more about lean principles, they naturally improve their capabilities with respect to Skills 11 and 12 as they seek to take accountability for project outcomes as last planners. Further, FLS trained in lean may begin to act as change agents where they empower the members of their crews to become last planners for their individual efforts. The authors argue that in listing the skills required for success as an FLS, the lean construction community can begin to take purposeful steps to engage FLS in building lean culture within their own organizations and across their construction projects.

LIMITATIONS

This study has several limitations, as below.

- Industrial and Infrastructure Context: Most focus group participants work on industrial and infrastructure construction projects. As such, the results may not be fully generalizable to the residential or commercial construction sectors.
- North American Context and Applicability: The authors highlight that focus group participants, and the Construction Industry Institute more broadly, comprise North American professionals. As such, findings presented herein are likely most applicable in the North American context, though the authors highlight that the skills enumerated in this paper align to those discussed by authors studying FLS worldwide. The authors thus expect that while the skills were developed in the North American context, they

will likely be applicable in other countries as well if FLS have similar responsibilities (even if they have different titles in other countries).

CONCLUSION

The authors facilitated twelve structured focus group sessions to develop and refine a list of 14 work skills required for success in the FLS role. These work skills reflect traditional supervisory responsibilities—engaging crews, monitoring safety, tracking production, and managing crews. Focus group participants expect these skills will be critical for success in the FLS role regardless of how technology changes the construction industry. These findings contribute to ongoing efforts to understand how the role of the FLS is changing and provide a basis for future research on workforce needs. Moreover, by providing a set of clear and measurable work skills required for success as an FLS, the lean construction community can explore how to embed lean principles into these skills to further lean implementation on construction sites.

The authors suggest future work may focus on validating the work skills presented herein via a survey or another method that would allow the authors to consider contextual factors, e.g., country where FLS works, degree to which FLS' employer emphasizes lean. Future work may also focus on exploring which lean tools can be integrated into existing FLS training. Finally, future work could explore how FLS training in lean impacts cost, schedule, and quality performance on projects.

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