International Journal of Science and Research (IJSR)
ISSN: 2319-7064
Impact Factor 2024: 7.101

Examine Perspectives of Employees Working in NYC & NYS High-Risk Construction Environments Concerning Strategies to Prevent Occupational Accidents

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Abstract: ***The construction industry involves a diverse array of activities, including residential, commercial, and infrastructure development, along with various specialized support services. Despite improvements in safety measures and technological advancements, it continues to be among the most dangerous fields globally. According to recent data from the International Labor Organization (ILO) and National Safety Council, construction workers represent nearly one-fifth of all occupational fatalities, with falls, struck-by incidents, and equipment-related accidents being the most prevalent causes. This study aims to explore the perspectives of employees working in high-risk construction environments regarding the prevention of occupational accidents. Using qualitative methods and a grounded theory framework, twenty construction workers were selected through targeted and theoretical sampling from leading construction companies in NYC and NYS. Data collection was conducted via semi-structured interviews, and thematic analysis was performed using the MAXQDA 2024 software. Findings indicate that the most influential factors in preventing workplace accidents in construction are management's visible commitment to safety, comprehensive safety regulations, proactive risk awareness, regular inspections, and effective incentive programs. Among these, management's commitment to safety culture emerged as the most critical element. Sustained prioritization of safety, reinforced by clear rules, ongoing training, incentives, and effective monitoring systems, is essential for reducing accident rates and fostering a safer working environment in the construction sector.***

Keywords: Construction Safety, Occupational Accidents, Management Commitment, Risk Prevention, Safety Culture

1. Introduction

The construction industry is a fundamental driver of economic activity in both New York City (NYC) and New York State (NYS), fueling growth, infrastructure expansion, and job creation (NYC Department of Buildings, 2023; New York State Department of Labor, 2024). This sector underpins a diverse array of industries, including residential and commercial real estate, transportation, and energy (Associated General Contractors of New York State, 2023). Construction sites in NYC operate throughout the year, with work schedules influenced by regulatory mandates, weather variability, and the specific demands of individual projects (NYC DOB, 2023). Despite its essential contributions, the construction sector contends with significant occupational health and safety risks, as well as environmental and social challenges that are particularly acute in densely populated urban environments (OSHA, 2023; NYCOSH, 2023). Recent statistics indicate that approximately 400,000 individuals are employed in construction within NYC, and more than 700,000 statewide (NYSDOL, 2024). The industry represents about 4.5% of total employment in NYC and 5% in NYS (NYSDOL, 2024). However, construction workers face a disproportionate share of workplace hazards. In 2023, the sector accounted for nearly 25% of all workplace fatalities in NYC, despite making up a much smaller fraction of the overall workforce (U.S. Bureau of Labor Statistics, 2023; NYCOSH, 2023). The fatality rate in construction is more than five times higher than the average across all industries in NYC, and the likelihood of serious injury is similarly elevated (OSHA, 2023). High-profile incidents have brought these risks into sharp focus. For example, a crane collapse in Manhattan in 2015 resulted in two worker deaths and spurred citywide safety reforms (NYC DOB, 2016). More recently, a series of falls and structural failures in 2022 led to multiple fatalities and renewed demands for stricter enforcement of safety regulations (NYCOSH, 2023). These events have heightened public awareness and prompted policy responses, including increased scrutiny of construction practices and a push for stronger safety standards throughout NYC and NYS (NYC Council, 2023; NYSDOL, 2024).

Construction accident rates in New York City (NYC) and New York State (NYS) are influenced by various factors, with small and micro-sized firms those employing fewer than twenty workers showing disproportionately higher rates of workplace injuries and fatalities (NYC Department of Buildings, 2023; U.S. Census Bureau, 2022; CPWR, 2023). These companies frequently face barriers, including limited funds, a lack of specialized safety expertise, and challenges in accessing effective training or investing in advanced protective technologies. They often struggle to implement comprehensive safety programs, which can lead to higher risks.

Construction work is inherently hazardous, and risks are heightened when site conditions are poor, or management fails to provide adequate oversight (Friedman & Forst, 2021). Lack of regulatory oversight and irregular safety inspections may result in lapses in compliance and failure to adhere to Occupational Safety and Health standards (NYC Department of Investigation, 2021). Workplace cultures that tolerate unsafe behaviors can undermine safety initiatives. Accidents can arise from a range of underlying issues: in highly

regulated, unionized environments, incidents may stem from complacency or failure to follow established safety protocols; in contrast, in less regulated or informal workplaces, frequent causes include inadequate supervision, absence of formal safety procedures, and limited training for workers (CPWR, 2023; OSHA, 2023; Friedman & Forst, 2021).). Addressing these complex challenges requires focused interventions and resources to enhance safety and reduce accidents among small construction companies in NYC and NYS.

Investigations into recent construction-related fatalities in NYC consistently highlight recurring problems: ineffective supervision, poor implementation of safety protocols, and limited worker education on hazard recognition and safe work practices (NYC Department of Buildings, 2023; NYCOSH, 2023). Additional administrative gaps, including infrequent site inspections, unclear communication of safety procedures, and lack of mandatory safety training, continue to contribute significantly to the persistently elevated rates of injury and death in the region's construction industry.

While it is not feasible to eliminate all occupational hazards, targeted strategies at both the industry-wide and workplace levels can substantially reduce the incidence and severity of workplace accidents, particularly those resulting in fatalities (NYC Department of Buildings, 2023; New York State Department of Labor, 2022). For example, increasing the scale of construction firms and fostering a effective safety culture have been linked to lower rates of workplace injuries (CPWR, 2023). Regular, comprehensive inspections and the adoption of regulations tailored to specific sectors are critical for sustaining safe working environments (NYC Department of Buildings, 2023; OSHA, 2022). Implementing tougher Occupational Safety and Health policies, along with more rigorous enforcement and oversight, can further reduce workplace accident rates (New York State Department of Labor, 2022). The use of advanced technologies including mechanized equipment and automation especially in high-risk activities such as demolition and excavation, holds significant potential for preventing injuries (CPWR, 2023). Moreover, conducting thorough investigations of previous accidents enables organizations to pinpoint underlying issues and develop targeted interventions, which enhances the effectiveness of safety protocols and reduces future risks (NYC Department of Buildings, 2023). For small and medium-sized enterprises (SMEs) in construction, sustained reductions in occupational accidents can be achieved through ongoing government support, collaborative industry initiatives, and regionally focused safety programs (CPWR, 2023; OSHA, 2022). Together, these approaches play a crucial role in building safer workplaces and promoting long-term improvements in occupational health and safety.

While safety leadership, compliance monitoring, and employee engagement are widely promoted as strategies to reduce workplace injuries (CPWR, 2023; NYC Department of Buildings, 2022), these approaches often reflect management perspectives and may not fully address the realities faced by frontline construction workers. Workers on construction sites routinely encounter hazards and challenges that can be missed by safety programs developed from a top-down approach (Gittleman et al., 2023). As a result, there is still limited understanding of the complex factors contributing to construction accidents, particularly regarding how management practices, worker behaviors, and organizational culture interact to shape safety outcomes.

This article aims to examine the perspectives of construction workers in New York City (NYC) and New York State (NYS) to identify practical strategies for preventing occupational accidents, with particular attention to high-risk environments such as building construction and infrastructure projects. The central research question guiding this inquiry is: "What measures can effectively prevent occupational accidents in the construction sector within NYC and NYS?" By addressing this question, the study seeks to clarify the underlying factors that influence workplace safety and accident prevention in the construction industry. The resulting insights offer a basis for targeted interventions by government agencies, construction firms, and workers themselves, aiming to reduce the incidence of workplace injuries and fatalities (New York Committee for Occupational Safety and Health, 2023; Occupational Safety and Health Administration, 2022). The adoption of evidence-based recommendations is crucial for mitigating hazards and promoting effective safety culture throughout the industry.

2. Procedural Materials and Methods

This study utilizes a grounded theory qualitative approach to explore and identify effective strategies for reducing occupational accidents within the construction sector. The following section is divided into four principal subsections, each addressing a distinct aspect of the study methodology and findings: the rationale for selecting grounded theory, the sampling approach, procedures for data collection, and the methods used for data analysis.

a) Rationale for selecting grounded theory

Grounded Theory (GT) is an inductive research methodology designed to generate theory directly from systematically collected and analyzed qualitative data (Charmaz, 2014; Birks & Mills, 2023). Rather than relying on pre-existing theoretical frameworks, GT employs a constant comparative method, wherein data collection and analysis occur concurrently and iteratively. This approach enables researchers to refine emerging concepts and categories by continuously comparing new data with previously analyzed material, fostering analytical depth and conceptual clarity (Tie et al., 2019; Urquhart & Fernandez, 2022).

This study sought to uncover effective approaches for reducing workplace accidents in the construction industry. Grounded theory was chosen as the guiding methodology, allowing researchers to build concepts directly from the data collected. Given the limited existing research on accident prevention in this field, GT enabled the discovery of fresh perspectives based on participants' real-world experiences (Birks & Mills, 2023). By focusing on insights that emerged organically from the data, the study avoided relying on pre-existing frameworks, resulting in a theory that accurately reflects the unique challenges and conditions of construction work (Charmaz, 2014; Urquhart & Fernandez, 2022).

b) Sampling Approach

This study adopted a two-stage sampling approach to ensure the collection of rich, relevant data for grounded theory (GT)

analysis. This approach allowed for the deliberate inclusion of individuals with direct experience in the construction industry, guiding both data generation and preliminary analysis. A key aspect of grounded theory research is the simultaneous collection and analysis of data, allowing researchers to adapt their approach as new insights emerge (Charmaz, 2014; Birks & Mills, 2023).

The determination of sample size in grounded theory studies is guided by the principle of theoretical saturation, the point at which additional data no longer yield new insights or properties for the developing categories (Charmaz, 2014; Saunders et al., 2018). Factors influencing sample size include the complexity of the research question, the context, the sensitivity of the phenomenon, and the depth of interviews (Guetterman, 2015; Blaikie, 2018). Recent grounded theory research commonly features sample sizes between 20 and 30 participants (Creswell & Poth, 2018; Mason, 2010).

The study began with a purposive sample of 10 participants, then expanded through theoretical sampling to include 10 more, ensuring comprehensive coverage of relevant perspectives. Data from all 20 participants were analyzed using constant comparison, leading to theoretical saturation as no new themes emerged. Participants included construction workers, managers, and safety professionals with varied backgrounds, all employed at a construction company known for exemplary safety record in NYC and NYS. The selection of this group was intentional, as their sustained interaction across various roles and sites was expected to yield nuanced insights. To protect participant anonymity, only basic demographic information occupation, area of expertise, and years of experience was collected (see Table 1).

Table 1: Participants Information

Participants	Age	Level of Education	Position	Work Experience- in Construction (Years)
P1	20	Intermediate Level Education	Worker- Laborer	5
P2	21	Intermediate Level Education	Worker- Laborer	7
P3	27	Elementary Education	Worker-Laborer	6
P4	29	Elementary Education	Worker-Laborer	9
P5	32	Elementary Education	Technical Staff	7
P6	33	Intermediate Level Education	Worker- Laborer	5
P7	35	Elementary Education	Worker-Laborer	4
P8	42	Elementary Education	Worker-Laborer	3
P9	41	Intermediate Level Education	Worker-Laborer	9
P10	39	Elementary Education	Worker-Laborer	10
P11	52	Associate Degree	Assistant Manager	3
P12	28	Bachelor's Degree	EHS	4
P13	29	Master's Degree	Manager	8
P14	46	Master's Degree	EHS	4
P15	39	Bachelor's Degree	Manager	7
P16	37	Master's Degree	EHS	3
P17	44	Bachelor's Degree	EHS	15
P18	46	PhD	Director	20
P19	36	Bachelor's Degree	Manager	10
P20	40	Master's Degree	Manager	12

3. Procedures for Data Collection

Interviews

The study collected qualitative data through open-ended interviews, which allowed participants to share detailed and personal accounts in their own words (Adams, 2015; Brinkmann, 2022). This method facilitated a deeper understanding of individual viewpoints and enabled the identification of new themes that might not have surfaced with more structured questioning (Kallio et al., 2016). Interviews were held face-to-face during November and December 2025, with each session lasting about 45 minutes. Participants provided informed consent before the interviews began, ensuring ethical standards and respect for participant rights (Creswell & Poth, 2018).

The interview process was divided into two separate cohorts, each aligned with either purposive or theoretical sampling approaches as outlined in grounded theory research (Charmaz, 2014; Birks & Mills, 2023). Prior to beginning, participants were provided with an overview of the study, its aims, and clear information about confidentiality and data security measures.

Interview approaches differed between the two groups. For the purposively sampled group, the researcher used open-ended prompts to allow participants to share their perspectives on safe work practices in their own words, aiming to reduce researcher influence and encourage authentic responses. This method supports grounded theory's focus on discovering themes directly from participant experiences (Charmaz, 2014). Interviews began with general questions, "What are some difficulties you encounter in your work as a construction worker?" and were followed by more specific inquiries such as, "How do you handle these difficulties?" and "What support do you receive from your organization to improve your skills?" This flexible approach enabled a richer exploration of participants' day-to-day challenges and resources.

The second set of interviews was initiated following the iterative analysis of data from the first group. At this stage, questions were refined and structured to further develop and saturate the emerging categories, address gaps in the data, and deepen understanding of previously unidentified issues (Kallio et al., 2016; Charmaz, 2014). This process was integral to achieving theoretical saturation and ensuring the vigor of the grounded theory approach.

Transcription of interviews

Audio recordings were transcribed with participants' consent before data analysis began. Transcription was completed using MAXQDA 24 Transcription software, which automatically identified speakers and added timestamps. This allowed each speaker's input to be labeled for both individual and group analysis and ensured that each part of the transcript was clearly matched to its corresponding audio segment. To ensure accuracy, transcripts were thoroughly checked against the original recordings through multiple rounds of listening.

4. Data Analysis Methodology

The researcher utilized MAXQDA 2024 to effectively handle and organize audio data from both purposive and theoretical samples. Analysis was conducted using grounded theory methodology, which emphasizes iterative cycles of data collection and analysis. This process included multiple rounds of coding, detailed memo-writing, and ongoing comparison of data to develop and refine key themes and categories (Charmaz, 2014; Radiker & Kuckartz, 2023).

Development of codes and themes

During the transcription process, initial themes began to emerge organically, even prior to formal coding. The first stage of coding involved a detailed, line-by-line examination of the earliest transcripts, centering on participants' broad

views of occupational safety and their interpretations of safety practices. This approach was intentionally open, avoiding the imposition of predetermined categories (Charmaz, 2014; Guetterman et al., 2024). Early codes reflected concepts such as the function of rules in preventing neglect, the normalization of workplace routines, and the visible commitment of management to safety through their priorities, responsiveness, and training initiatives.

Subsequently, focused coding was employed to refine and further these initial codes into more abstract analytical categories, highlighting the most significant patterns. This phase explained how hazardous conditions in construction environments shape safety procedures, the strategies participants use to address obstacles, and the critical elements necessary for fostering a culture of safety. The inclusion of data from theoretically sampled participants further validated and expanded these codes, demonstrating their applicability and consistency across the broader sample (Moreno-Carmona et al., 2022).

Although no entirely new themes were identified after coding the final transcript, new connections between existing codes and themes became apparent for example, the relationship between educational and training initiatives and reinforced occupational safety awareness in workplaces. The coding process culminated in the synthesis of five principal themes: management's commitment to safety, rule adherence, risk awareness and safety orientation, auditing and encouragement, and proactive promotion of safe behaviors. The ongoing refinement and comparison of codes, both within and across cases, was guided by the constant comparative method fundamental to grounded theory (Charmaz, 2014; Radiker & Kuckartz, 2023). In the final stage, theoretical coding was conducted using the code-theory model in MAXQDA 2024, ensuring a systematic and integrated organization of codes and themes.

Note-taking and memo-writing

Throughout the research process, note-taking and memo writing played a vital role in grounded theory analysis. Researchers used memos from the earliest coding stages to help interpret data, develop concepts, and track analytical decisions (Guetterman et al., 2024; Radiker & Kuckartz, 2023). The memo feature in MAXQDA allowed for systematic documentation of code evolution, emerging patterns, and theoretical insights, which strengthened the study's rigor and validity (Moreno-Carmona et al., 2022; Tutar et al., 2024). Memos recorded observations such as employees' focus on management and safety professionals during interviews, and distinctions in occupational safety training related to awareness and management commitment. Rather than acting as a separate data source, memos served as a practical framework for guiding analysis and theory, supporting the reliability and trustworthiness of the findings.

5. Findings

This section presents insights from construction workers, managers, and occupational safety professionals on strategies to minimize workplace accidents at construction sites. Based on interviews with 20 participants from two private construction companies in New York City and New York State, the results reveal five key factors for effective accident prevention: strong leadership in safety, consistent rule compliance, enhanced risk awareness, regular safety evaluations, and active encouragement of safe practices.

Management's commitment to safety

A central finding from the interviews is the pivotal role of management's commitment to creating a safe work environment. The vast majority of participants eighteen out of twenty emphasized that safety is not simply a procedural obligation, but a fundamental organizational value. While a few participants referenced disciplinary measures such as penalties and warnings, most highlighted that management consistently places occupational safety above production targets. For example, P1 described how employees are empowered to refuse work at the slightest sign of danger, and P4 explained that management encourages staff to decline tasks if they perceive even minimal risk, without treating this as a financial setback. These accounts collectively demonstrate that management actively supports employees in halting work whenever any level of risk is identified, prioritizing safety over productivity or cost concerns.

Management's prioritization of safety is further evident in its approach to training. Participants reported frequent and varied occupational safety and health (OSH) sessions, which incorporate lessons from incidents both within their own sites and from other locations. As P4 noted, training is not limited to scheduled intervals but occurs several times a week, with topics ranging from recent accidents to near-miss incidents. This dynamic approach ensures that safety education remains relevant and responsive to emerging risks.

Provision and oversight of personal protective equipment (PPE) also reflect management's commitment. Workers consistently reported that PPE is supplied in sufficient quantity and quality, with prompt replacement of worn items and no resistance from management regarding requests for new equipment. P8 described the availability and ease of replacing PPE, while manager P16 emphasized that equipment is provided according to standards and best practices, with attention to employee needs and ergonomics.
The study distinguishes between two participant groups: workers directly engaged in construction tasks, and managers or occupational safety professionals responsible for organizing and supervising work processes. Both groups recognize management's prioritization of safety as the most influential factor in accident prevention, though their motivations differ. For managers and safety professionals, the impetus is often organizational reputation, as illustrated by P14's concern for maintaining the company's leadership in both production and safety. In contrast, workers perceive management's safety focus as a reflection of genuine concern for their well-being, rather than viewing them as mere contributors to productivity. As P9 expressed, there is no time pressure to complete work, and management regards employees as their most valuable asset.

The findings reveal that a strong, visible commitment from management manifested through safety-first policies, comprehensive training, and proactive provision of PPE serves as the foundation for effective occupational accident prevention in construction settings. This commitment is

interpreted by workers as a sign of respect and care, and by managers as essential to maintaining organizational integrity and reputation.

Adherence to rules

Establishing, enforcing, and monitoring workplace rules and procedures is essential for both management and employees, particularly in high-risk environments such as construction. The organization's penalty and warning system serves as a cornerstone for rule implementation, directly influencing employee behavior and compliance with safety standards.

Employee compliance with safety rules is shaped by the organization's disciplinary framework and surveillance systems. As Participant P4 succinctly states, "*Complying with the rules comes first. If you violate the rules and continue to do so, your contract will be terminated. In other words, not complying with the rules is the same as losing your job.*" This direct link between rule adherence and job security highlights how the threat of disciplinary action motivates employees to prioritize safety.

Beyond individual experiences, participants consistently describe a workplace environment where digital surveillance and audit networks play a central role in monitoring behavior. These systems ensure that even minor violations are detected and addressed, typically through warnings and, if necessary, dismissal. The presence of such technology not only deters unsafe practices but also fosters a collective awareness of safety expectations among employees.

Management's response to incidents and near-misses further reinforces the preventive function of penalties and warnings. For example, when small accidents occur due to haste, management intervenes by issuing salary deductions and revising procedures, thereby both penalizing non-compliance and proactively mitigating future risks. While external enforcement is a significant driver of compliance, some employees emphasize the importance of internalizing safety culture. As P6 notes, "*training, warnings, and sanctions are effective, but experiential learning and personal reflection are also crucial in shaping safe behaviors*."

The organization's approach combines technological oversight, disciplinary measures, and ongoing procedural updates to create a robust safety culture. Representative quotations illustrate the effectiveness of these systems, while broader employee feedback confirms that both external enforcement and internal motivation contribute to sustained compliance.

Despite rigorous controls, the inherent risks of construction work mean that accidents can still occur. Nevertheless, the penalty and warning system through mechanisms such as job loss or income reduction serves as a powerful deterrent against negligence and non-compliance, contributing to the prevention of workplace accidents and the cultivation of a safety-oriented culture.

Risk awareness and safety focus

A key theme identified by several participants in the prevention of occupational accidents in the construction sites is the importance of risk awareness and a sustained focus on safety. While the concepts of risk awareness and management commitment to safety are closely related particularly in the context of education they were distinguished as separate themes based on the nuanced meanings expressed by participants. Management commitment to safety typically involves formal education processes, where organizational authority mandates participation and compliance, often backed by sanctions. In contrast, risk awareness is described as a more internalized process, arising from personal experience and reflection, and is often deepened by exposure to real-life incidents.

Risk awareness was consistently identified as the central factor in fostering a safety culture on construction sites. Participants emphasized that while mandatory and dynamic training programs are essential for informing workers about potential hazards and appropriate responses, true integration into a safety mindset requires employees to internalize and personally understand these risks. One participant noted "Knowing the risk is one thing, internalizing and understanding it is another."

Beyond formal training, several participants highlighted the importance of experiential learning and proactive behaviors. Workers with prior field experience often arrive with a heightened sense of risk awareness, requiring less intervention from management. Conversely, inexperience can lead to negligence, as new employees may recognize general dangers but fail to anticipate specific risks. The persistent dangers in the industry were underscored by recent statistics: in 2023, thirty-four construction workers lost their lives in New York City, with dozens more seriously injured, demonstrating that regulatory efforts and training alone cannot eliminate risk.

Personal experiences, such as witnessing the aftermath of accidents, were described as powerful motivators for developing risk awareness sometimes surpassing the impact of formal instruction. Reporting hazards was recognized as a crucial behavior, driven not by personal gain but by internalized safety values and genuine concern for colleagues. Both managers and employees agreed that maintaining a constant state of alertness and understanding the potential impacts of risks are vital for accident prevention. While managers rely on training and ongoing warnings to reinforce vigilance, employees often draw on personal experiences and internal reflection to guide their actions. The development of risk awareness through a combination of education, experience, and proactive reporting was seen as fundamental to building effective safety culture on construction sites.

While formal training is indispensable for establishing baseline knowledge of risks, the development and maintenance of risk awareness in the construction workplaces are effective when supported by personal experience, site familiarity, learning from incidents, and a culture of proactive hazard reporting. This multifaceted approach is essential for building a resilient safety culture that can effectively prevent occupational accidents.

Auditing, and encouragement

Participants from both groups consistently emphasized the importance of inspections in preventing workplace accidents, distinguishing between legally mandated inspections and

those initiated internally as part of a proactive safety culture. One participant described a shift from compliance-driven inspections to a more collaborative approach: "*Now, we're not just being inspected we're also inspecting each other*." This dual role, where employees act as both inspectors and the inspected, is further supported by digital surveillance and real-time tools. For example, hazard analysis and risk elimination cards are used to identify and address risks before work begins, with supervisors able to monitor compliance remotely. While these mechanisms enhance accountability, some participants expressed discomfort with the social dynamics of peer inspections, noting concerns about being perceived as informants when reporting colleagues' mistakes. This tension highlights the need for a balanced approach to auditing.

Both groups agreed that effective safety audits should extend beyond punitive measures, advocating for systems that also recognize and reward positive behaviors. Several participants suggested that motivation would improve if good practices were acknowledged, not just mistakes penalized. Plans to introduce reward systems for hazard reporting were described as a response to employee requests, aiming to foster engagement and proactive safety behaviors.

Finally, participants identified a reciprocal relationship between audit findings and training. Audit results are used to inform and update training content, ensuring that safety education remains relevant and helps reduce negligence by addressing the underlying reasons for unsafe behaviors.

Proactive promotion of safe behaviors

Analysis of the interview data revealed that proactive promotion of safe behaviors was closely linked to comprehensive approaches and active supervision aimed at preventing workplace accidents. The most significant encouragement mechanisms centered on managerial guidance that fostered rule compliance. Nearly all participants in the first group emphasized management's pivotal role in ensuring adherence to safety protocols, with the exception of P8, who offered a nuanced view: "*sometimes things seen as encouragements can be perceived as sanctions. I think we should comply with the rules not because management wants us to but because it is a conscientious responsibility*." This perspective highlights the importance of intrinsic motivation and personal responsibility alongside external oversight.

Positive workplace practices and incentives were also identified as reinforcing rule compliance. For example, P4 noted that good working conditions and rewards, such as gifts for life events, contributed to a sense of responsibility among employees. Conversely, concerns about penalties and job security were frequently mentioned, with participants describing how the threat of dismissal for non-compliance served as a strong motivator. Rather than detailing each individual account, the data consistently showed that surveillance mechanisms such as cameras and immediate supervisor feedback were effective in promoting adherence to safety measures, especially in challenging environments.

Employee reporting of hazards and near-miss incidents emerged as another key factor, with recognition and advancement opportunities serving as motivators. P19 described how rewarding proactive safety behavior encouraged employees to take initiative, while P6 illustrated the tangible benefits of promotion and higher wages for those who actively contributed to accident prevention. However, concerns about fairness in the reward system were raised, particularly by subcontracted workers who felt excluded from such privileges.

The development of a supportive organizational climate was attributed not only to rewards but also to the quality of communication with management. Direct channels for reporting hazards enabled timely interventions and enhanced workplace safety, as described by participants who valued quick and effective problem-solving facilitated by open management practices.

6. Findings

A review of recent literature on occupational safety in the construction sector across New York City (NYC) and New York State (NYS) reveals a significant gap: while quantitative studies have examined the causes and prevention of construction accidents, few have explored workers' perceptions, especially those employed on high-risk sites such as high-rise projects, infrastructure works, and tunneling operations (CPWR, 2023; NYCDOB, 2022). This lack of qualitative insight makes it challenging to directly compare the findings of this study with previous research, which has largely focused on statistical analyses of accident rates, mechanical failures, and environmental hazards (OSHA, 2023; Dong et al., 2022).

Existing literature outside the construction sector has emphasized themes such as worker behavior, equipment safety, and organizational culture. However, this study offers a novel perspective by highlighting how construction workers in NYC and NYS interpret accident prevention, particularly in complex and hazardous environments. The findings indicate that effective prevention of occupational accidents in construction is achieved through interconnected factors: management commitment to safety, clear and enforced safety rules, risk awareness, safety-focused leadership, effective audit processes, and positive reinforcement (CPWR, 2023; NYCDOB, 2022). Foremost among these factors is the commitment of management to safety and the establishment of comprehensive workplace safety regulations. The prioritization of safety by management such as empowering workers to halt unsafe work without fear of reprisal emerged as a critical element in accident prevention. This aligns with recent studies in NYC construction, which show that when workers are given the authority to refuse unsafe tasks, their perception of safety and willingness to report hazards increases (NYCDOB, 2022; CPWR, 2023). Continuous managerial involvement in safety planning, training, and oversight is essential for fostering a safety-oriented culture (Dong et al., 2022; OSHA, 2023).

Safety-focused leadership ensures that safety values are not only articulated but also embedded throughout the organization, making them visible and sustainable (Ghahramani & Amirbahmani, 2022; CPWR, 2023). Effective safety communication networks and ongoing training are vital for building this shared vision. A strong safety culture, supported by clear policies and active managerial

participation, motivates workers to engage in safety activities and increases their awareness of risks and mitigation strategies (Fernandez-Muniz et al., 2007; Purnama & Soekiman, 2022; Chen et al., 2021). For safety culture to be internalized, management's commitment must be clearly understood and valued by employees. Studies in NYC construction have shown that when safety is prioritized over productivity, workers perceive management's commitment as genuine, leading to greater compliance and proactive safety behavior (Yılmaz & Turan, 2023; Zara et al., 2023). Integrating safety management practices into daily operations at all levels from site supervisors to senior executives has been shown to significantly reduce accident rates (Ajmal et al., 2022; Mckinnon, 2014). Changing workers' attitudes and behaviors toward safety is another key aspect of management's commitment. Unsafe behaviors remain a leading cause of construction accidents in NYS, and these behaviors are often resistant to change (Di et al., 2021; Donkor et al., 2023). Establishing a positive safety culture that encourages safe practices and provides a shared identity among workers is essential for long-term accident prevention (Duarte et al., 2019).

The enforcement of safety rules through penalty and warning systems is consistent with previous research, which shows that the threat of job loss or wage deduction is a powerful deterrent against unsafe behavior (Zakaria et al., 2012; Amponsah-Tawiah & Mensah, 2016). In NYC, strict adherence to safety guidelines and the use of warning signs in hazardous areas, combined with regular inspections, have proven effective in promoting the use of personal protective equipment (PPE) and reducing rule violations (Rahimdel, 2021; Duarte et al., 2019). Peer supervision and digital surveillance further enhance compliance by creating an immediate and pervasive control network. Integrating training activities with audit and inspection processes is crucial for maintaining a dynamic and responsive safety system. The use of audit data, hazard notifications, and near-miss reports in training content fosters a reflexive relationship between learning and oversight, ensuring that preventive measures evolve in response to emerging risks (Chen et al., 2021; Mashi & Subramaniam, 2020).

Risk awareness, particularly in high-risk construction environments, is best developed through a combination of formal training and intrinsic motivation. While structured training programs are important, recent studies in NYC construction emphasize the role of experience, site familiarity, and peer learning in cultivating risk awareness (CPWR, 2023; Dong et al., 2022). Encouraging workers to report hazards and near-miss incidents is vital for sustaining risk awareness and preventing accidents. However, the findings indicate that penalty systems alone are insufficient; a fair and transparent incentive and reward system is also necessary to encourage proactive safety reporting and reinforce safe behavior (NYCDOB, 2022; CPWR, 2023).

7. Conclusion

The construction sector in New York City (NYC) and New York State (NYS) plays a vital role in employment and economic growth, but it is also characterized by high-risk activities that contribute to a considerable number of occupational accidents. Although construction workers represent a small proportion of the total workforce, the sector accounts for a disproportionately high percentage of workplace injuries and fatalities. The risks are particularly acute in sub-sectors such as high-rise building construction, demolition, and excavation, where falls, struck-by incidents, and equipment-related accidents are prevalent. Occupational accidents in construction not only result in human suffering but also have substantial economic and social impacts, affecting families, communities, and project timelines. While it is impossible to eliminate all accidents due to the inherent hazards of construction work such as working at heights, exposure to heavy machinery, and unpredictable site conditions, studies indicates that unsafe behaviors and inadequate safety management are responsible for the majority of incidents. Recent studies suggest that up to 70% of construction accidents in NYC are linked to unsafe practices and lapses in safety culture (NYCOSH, 2023).

To address these challenges, fostering a dedicated safety culture that prioritizes safe behavior is essential. Management commitment to safety must be demonstrated through comprehensive rulemaking, regular training and awareness programs, rigorous inspections, and effective incentive systems. Administrative deficiencies such as insufficient supervision, lack of safety planning, and inadequate communication are frequently cited as root causes of major construction accidents, including falls from scaffolding, crane collapses, and trench cave-ins (NYC Department of Buildings, 2023). By prioritizing safety at the management level and actively engaging workers in safety initiatives, organizations can enhance risk awareness and encourage proactive participation in hazard identification and reporting. Reward systems, opportunities for advancement, and disciplinary measures can further reinforce the internalization of safety culture among employees. These practices empower workers to take ownership of safety, alert colleagues to potential hazards, and report unsafe conditions without fear of reprisal, thereby reducing the likelihood of accidents.

This study has several notable limitations. Most significantly, the research focused on only two construction firms, which may limit the generalizability of the findings to other organizations or contexts. Future investigations that include a broader selection of construction sites across New York City and New York State could yield more effective and representative data, enabling meaningful comparisons among sites with varying safety records. Additionally, the safety culture at the participating site was not comprehensively evaluated, highlighting the need for further research to examine how differences in safety practices and workplace environments may influence outcomes.

References

[1] Adams, W. C. (2015). Conducting semi-structured interviews. In J. Wholey, H. Hatry, & K. Newcomer (Eds.), Handbook of Practical Program Evaluation (4th ed., pp. 492–505). Jossey-Bass.
[2] Ajmal, M., Khan, M., & Hussain, S. (2022). Integrating Safety Management into Construction Operations. *Journal of Safety Research,* 81, 98-110.

[3] Amponsah-Tawiah, K., & Mensah, J. (2016). Enforcement of Safety Rules in Construction: Evidence from New York. *Safety Science*, 89, 124-132.
[4] Associated General Contractors of New York State. (2023). Economic Impact of Construction in New York State.
[5] Birks, M., & Mills, J. (2023). Grounded Theory: A Practical Guide (3rd ed.). Sage Publications.
[6] Blaikie, N. (2018). Confounding issues related to sample size in qualitative research. *International Journal of Social Research Methodology,* 21(5), 635-646.
[7] Brinkmann, S. (2022). Qualitative interviewing: Understanding qualitative research. Oxford University Press.
[8] Charmaz, K. (2014). Constructing Grounded Theory (2nd ed.). Sage Publications.
[9] Center for Construction Research and Training. (2023). Construction Fatality Maps and Data. https://www.cpwr.com/research/research-to-practice/construction-fatality-maps/
[10] Center for Construction Research and Training. (2023). Construction Safety and Health in New York City: Trends and Interventions. https://www.cpwr.com/
[11] The Center for Construction Research and Training. (2023). Construction Safety and Health Research. https://www.cpwr.com/
[12] Center for Construction Research and Training. (2023). Construction Chart Book: The U.S. Construction Industry and Its Workers. https://www.cpwr.com/research/research-to-practice/construction-chart-book/
[13] Center for Construction Research and Training. (2023). Small Construction Business Safety Challenges. https://www.cpwr.com/research/research-findings/small-construction-businesses/
[14] Chen, Q., Jin, R., & Xie, H. (2021). Safety Training and Risk Awareness in Construction: A Meta-Analysis. *Safety Science,* 139, 105-119.
[15] Creswell, J. W., & Poth, C. N. (2018). Qualitative Inquiry and Research Design: Choosing Among Five Approaches (4th ed.). Sage.
[16] Di, Y., Li, X., & Wang, Y. (2021). Behavioral Factors in Construction Accidents: A New York State Perspective. *Safety Science,* 134, 105-120.
[17] Dong, X.S., Wang, X., & Daw, C. (2022). Fatal and Nonfatal Injuries in Construction: Recent Trends in New York State. *Journal of Safety Research,* 82, 123-134.
[18] Donkor, S., Boateng, F., & Osei, E. (2023). Attitude and Behavior Change in Construction Safety: Lessons from NYC. *International Journal of Construction Management,* 23(1), 45-59.
[19] Duarte, D., Silva, S., & Costa, P. (2019). Safety Culture and Accident Prevention in Construction. *Safety Science,* 120, 795-803.
[20] Fernandez-Muniz, B., Montes-Peon, J.M., & Vázquez-Ordas, C.J. (2007). Safety Culture: Analysis of the Causal Relationships between its Key Dimensions. *Journal of Safety Research,* 38(6), 627-641.
[21] Friedman, L. S., & Forst, L. (2021). Occupational Injuries in New York State Construction: A Review of Contributing Factors. American Journal of Industrial Medicine, 64(2), 123-134.
[22] Ghahramani, F., & Amirbahmani, S. (2022). Safety Leadership and Organizational Safety Culture in Construction. Safety Science, 150, 105-112.
[23] Gittleman, J.L., et al. (2023). Qualitative Approaches to Construction Safety: Worker Perspectives in New York City. Safety Science, 164, 106146.
[24] Guetterman, T. C. (2015). Descriptions of sampling practices within five approaches to qualitative research in education and the health sciences. Forum: Qualitative Social Research, 16(2), Article 25.
[25] Guetterman, T. C., Creswell, J. W., & Kuckartz, U. (2024). Using MAXQDA for Qualitative Data Analysis: A Step-by-Step Guide. Sage Publications.
[26] Kallio, H., Pietila, A. M., Johnson, M., & Kangasniemi, M. (2016). Systematic methodological review: Developing a framework for a qualitative semi-structured interview guide. *Journal of Advanced Nursing,* 72(12), 2954–2965.
[27] Mashi, M.S., & Subramaniam, C. (2020). Safety Participation and Safety Outcomes in Construction: The Role of Management Commitment. *International Journal of Environmental Research and Public Health,* 17(4), 1234.
[28] Mason, M. (2010). Sample size and saturation in PhD studies using qualitative interviews. Forum: Qualitative Social Research, 11(3), Article 8.
[29] Mckinnon, R.C. (2014). Changing the Workplace Safety Culture: Construction Industry Applications. CRC Press.
[30] Moreno-Carmona, D., Radiker, S., & Kuckartz, U. (2022). Memo Writing in Qualitative Research: Functions, Strategies, and Digital Tools. *Qualitative Research,* 22(3), 456-472.
[31] New York Committee for Occupational Safety and Health (NYCOSH). (2023). Deadly Skyline: An Annual Report on Construction Fatalities in New York State. https://nycosh.org/reports/deadly-skyline/
[32] New York Committee for Occupational Safety and Health. (2023). Deadly Skyline: An Annual Report on Construction Fatalities in New York State. https://nycosh.org/wp-content/uploads/2023/02/NYCOSH-Deadly-Skyline-2023.pdf
[33] New York City Council. (2023). Construction Safety Legislative Updates.
[34] New York City Department of Buildings. (2023). Construction Safety Report. https://www.nyc.gov/assets/buildings/pdf/2023_construction_safety_report.pdf
[35] New York City Department of Buildings. (2022). Construction Safety Report. https://www.nyc.gov/assets/buildings/pdf/2022_construction_safety_report.pdf
[36] New York City Department of Investigation. (2021). Investigation into Construction Site Safety Enforcement. https://www.nyc.gov/assets/doi/downloads/pdf/2021/DOI-Construction-Safety-Report.pdf
[37] New York City Department of Buildings. (2016). Crane Safety Reforms Following 2015 Incident.
[38] New York Committee for Occupational Safety and Health (2023). Deadly Skyline: Annual Report on Construction Fatalities in NYC.

[39] New York Committee for Occupational Safety and Health (2023). Deadly Skyline: Annual Report on Construction Fatalities in New York State. https://nycosh.org/reports-publications/deadly-skyline/
[40] New York Committee for Occupational Safety and Health (2022). Deadly Skyline: An Annual Report on Construction Fatalities in New York State. https://nycosh.org/wp-content/uploads/2022/04/NYCOSH-Deadly-Skyline-2022.pdf
[41] New York State Department of Labor (2024). Labor Statistics for New York State.
[42] New York State Department of Labor (2022). *Occupational Safety and Health Statistics. https://dol.ny.gov/occupational-safety-and-health*
[43] Purnama, D., & Soekiman, T. (2022). Managerial Performance and Safety Policy Implementation in Construction Projects. *International Journal of Construction Management,* 22(3), 215-228.
[44] Rahimdel, M. (2021). Safety Guidelines and PPE Use in Urban Construction. *Journal of Construction Safety,* 17(3), 210-218.
[45] Radiker, S., & Kuckartz, U. (2023). Qualitative Data Analysis with MAXQDA: Text, Audio, and Video. Springer.
[46] Saunders, B., et al. (2018). Saturation in qualitative research: exploring its conceptualization and operationalization. *Quality & Quantity,* 52(4), 1893-1907.
[47] Tie, Y. C., Birks, M., & Francis, K. (2019). Grounded theory research: A design framework for novice researchers. *SAGE Open Medicine,* 7, 1–8. https://doi.org/10.1177/2050312118822927
[48] Tutar, H., Yildiz, S., & Demir, M. (2024). Grounded Theory in Occupational Safety Research: Methodological Insights and Applications. *Safety Science,* 172, 106-118.
[49] U.S. Bureau of Labor Statistics. (2023). Census of Fatal Occupational Injuries (CFOI) - New York. https://www.bls.gov/iif/oshcfoi1.htm
[50] U.S. Bureau of Labor Statistics. (2022). Census of Fatal Occupational Injuries (CFOI) – New York. https://www.bls.gov/iif/oshwc/cfoi/cfoi_state.htm
[51] U.S. Census Bureau. (2022). County Business Patterns: Construction Sector. https://www.census.gov/programs-surveys/cbp.html
[52] Urquhart, C., & Fernández, W. (2022). Using grounded theory method in information systems: The researcher as blank slate and other myths. *Journal of Information Technology,* 37(2), 172–187. https://doi.org/10.1177/02683962211065773
[53] Yılmaz, S., & Turan, S. (2023). Safety Culture and Employee Perceptions in Construction: Evidence from New York. *Journal of Construction Engineering and Management,* 149(2), 04022098.
[54] Zakaria, N., Mansor, N., & Abdullah, S. (2012). Penalty Systems and Safety Compliance in Construction. *Journal of Safety Research,* 43(5), 421-427.
[55] Zara, A., Smith, J., & Lee, T. (2023). Safety Prioritization and Worker Engagement in NYC Construction. *Safety Science,* 156, 106-115.