Contractor Safety Context

A Companion Brief

Report 6 in Volume 1 of the *Multiskilling in the U.S. Construction Industry* Research Series

SIMPLAR FOUNDATION

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Contractor Safety Context: A Companion Brief

Report 6 of 6 in Volume 1

Multiskilling in the U.S. Construction Industry

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About the Series

This report is one of six reports in Volume 1 of *Multiskilling in the U.S. Construction Industry*. The series examines multiskilling through distinct research questions, evidence sources, and analytical methods. Volume 1 includes the largest field-collected dataset assembled to date on multiskilling as practiced in active U.S. construction projects and operations. It also includes controlled field trials, project records, evidence on employer workforce capability systems, a comprehensive review of peer-reviewed literature, and contractor safety context.

The research was conducted by the Simplar Foundation in collaboration with researchers affiliated with the University of Kansas, the University of North Carolina at Charlotte, and Arizona State University. Each report is designed to be read independently while contributing to the combined evidence base.

All published reports and related resources are available at the Simplar Foundation's Multiskilling Knowledge Hub (simplarfoundation.org/multiskilling).

Reports in Volume 1: Evidence on Project Performance

01	Work-Time Utilization and Staffing Level Impacts in Construction Crews	
02	Productivity in Multi-Trade Construction Workflows	
03	Schedule Duration and Labor-Curve Outcomes	
04	How Construction Employers Develop, Verify, and Sustain Workforce Capability	
05	A Comprehensive Review of Prior Evidence	
06	**Contractor Safety Context**	THIS REPORT

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Table of Contents

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COMPANION BRIEF

Contractor Safety Context

A supplemental brief to the research study *Multiskilling in the U.S. Construction Industry*

This companion brief examines safety-related context from the broader nationwide study of multiskilling in U.S. construction. The nationwide study was designed to investigate multiskilling's relationship to productivity, workforce utilization, and crew-level performance. It was not a formal safety audit or a causal comparison of injury outcomes between staffing approaches. The safety context in which the dataset was collected is nonetheless valuable to consider, and participating contractors emphasized that safety should never be treated as secondary when interpreting multiskilling. This brief draws on three sources of supplemental evidence: contractor-reported safety data, site-visit observations, and the potential safety relevance of reduced work-area density and crew handoffs.

1 CONTRACTOR-REPORTED SAFETY DATA

15 contractors · ≈33.2M employee-hours · ≈16,587 FTE workers

57%	66%	40%
below the NAICS-weighted TRIR benchmark	below the NAICS-weighted DART benchmark	below the 1.00 EMR baseline
sample 0.74 vs benchmark 1.72	sample 0.35 vs benchmark 1.03	hours-weighted average EMR of 0.60

123 total recordable cases · 58 DART cases · 0 reported fatalities · contractor-reported annual records, not independently audited

2 SAFETY MANAGEMENT PROGRAMS

Contractors reporting the highest available score, or use of the practice:

Safety pre-planning	**14/15**
Digital safety tracking	**14/15**
New-employee orientation	**13/15**
Incident investigation	**13/15**
Task-specific planning	**11/15**
Safety training	**11/15**

All 15 hold toolbox safety meetings: 6 daily, 9 weekly. Many firms also track leading and lagging indicators.

3 FIELD OBSERVATIONS ON SITE

- Access controls, orientations, PPE, task planning, and supervision were in routine use
- Sites appeared comparable to other well-managed construction environments
- No visible signs of uncontrolled or informal task switching
- Many projects served transportation, data center, industrial, power, institutional, and commercial owners known for stringent safety expectations

Qualitative researcher impressions, not formal safety audits

4 SITE DENSITY AND CREW HANDOFFS

Reports 1, 2, and 3 of this series each showed the potential to reduce site density through a multiskilled labor strategy.

Fewer workers and fewer crew-to-crew handoffs in a constrained work area may reduce congestion, trade stacking, and supervisory coordination burden.

Consistent with crowding and trade-stacking research (Hanna et al. 2007; ELECTRI 2007, 2018)

A potential safety mechanism, not a demonstrated outcome

KEY TAKEAWAY

The contractors in this study were generally high safety performers, based on available data and researcher observations.

FUTURE RESEARCH

Make safety an explicit primary endpoint of multiskilling research.

Worker hazard awareness across trades	Work-area density and hazard exposure	Task qualification and controls at trade boundaries	Direct worker input and leading indicators

Executive Summary

This companion brief examines safety-related context from a broader nationwide study of multiskilling in the U.S. construction. The primary purpose of the broader studies was to investigate the relationship between multiskilling and productivity, workforce utilization, crew performance, and practical implementation of a multiskilled labor strategy at the contractor level. These studies were not designed as formal safety audits or causal comparisons of injury outcomes between multiskilled and single-skilled staffing approaches. However, the safety context in which the nationwide dataset was collected is valuable to consider.

This brief draws on three sources of supplemental evidence: voluntarily reported contractor-level safety data, site-visit observations, and the potential safety relevance of reducing work-area density and crew-to-crew handoffs.

Fifteen participating contractors voluntarily provided 2024 safety data representing approximately 33.2 million employee-hours, or 16,587 full-time equivalent workers. Across these reported hours, the contractors recorded 123 total recordable cases, 58 DART cases, and no fatalities. The resulting aggregate TRIR (Total Recordable Incident Rate) was 0.74, the aggregate DART rate was 0.35, and the hours-weighted EMR (Experience Modification Rate) was approximately 0.60.

These results compare favorably with national construction benchmarks. The participating contractors' aggregate TRIR was 66% below the 2024 Bureau of Labor Statistics construction benchmark of 2.20 and 57% below the NAICS-weighted benchmark of 1.72 calculated for the sample's industry mix. The aggregate DART rate was 73% below the broad BLS construction benchmark of 1.30 and 66% below the NAICS-weighted benchmark of 1.03. The absence of reported fatalities is favorable descriptive context, although not statistically conclusive evidence of lower fatality risk.

SAFETY DATA AT A GLANCE

15
participating contractors voluntarily provided 2024 safety data

33.2M
reported employee-hours in 2024

16,587
full-time equivalent workers

0
reported fatalities

The contractor data also indicate that many participating firms reported structured safety-management practices, including project pre-planning, task-specific planning, employee orientation and training, incident investigation, toolbox meetings, and tracking of leading and lagging indicators.

During site visits for data collection, researchers commonly encountered standard site-access controls, PPE requirements, safety orientations, task planning, and owner or client safety expectations. These visits were not formal safety audits, but the observations did not raise visible concerns that multiskilling was being implemented as uncontrolled or informal task switching. Observed safety procedures were inline with industry norms and the participating projects often operated under rigorous safety expectations which are commonly expected by clients in the transportation, data center, industrial, power, institutional, and commercial construction sectors.

The broader multiskilling study found that observed work sequences could potentially be completed with fewer workers than would be required under a single-skilled staffing counterfactual. This may have safety relevance because fewer workers and separate crews in a constrained work area could reduce congestion, trade stacking, crew-to-crew handoffs, and supervisory coordination demands. The study did not directly measure whether these conditions affected incident rates, so this relationship should be treated as a potential safety mechanism rather than a demonstrated outcome.

Overall, the available evidence shows that multiskilling was practiced within a sample of contractors reporting strong company-level safety performance and substantial safety-management infrastructure. The analysis does not establish that multiskilling caused those outcomes, because the safety records are annual company- or division-level data rather than task-level records for the crews observed. Direct evaluation of worker hazard awareness, task qualification, work-area density, crew interfaces, near misses, and activity-specific safety outcomes remains an important direction for future research.

AGGREGATE 2024 SAFETY PERFORMANCE OF THE PARTICIPATING CONTRACTOR SAMPLE

0.74

aggregate TRIR — 66% below the 2024 BLS construction benchmark of 2.20

0.35

aggregate DART rate — 73% below the broad BLS construction benchmark of 1.30

≈0.60

hours-weighted EMR — below the 1.00 experience-rated baseline

SECTION 1

Purpose and Scope

This supplemental brief accompanies a broader set of studies examining multiskilling in U.S. construction crews. The primary studies were designed to evaluate productivity, workforce utilization, crew-level performance, and the practical implementation of multiskilling in U.S. construction crews. Safety was not the primary outcome variable, and the research was not designed as a safety audit or as a causal comparison of incident rates between multiskilled and single-skilled staffing approaches. However, participating contractors repeatedly emphasized that safety should not be treated as secondary to productivity when interpreting multiskilling practices.

Safety is an essential lens through which any workforce strategy should be interpreted. The research team therefore reviewed safety-related context that was available alongside the larger productivity analysis which was the primary focus of the nationwide research effort. The safety context came from three sources:

1. **CONTRACTOR-REPORTED SAFETY DATA**
   voluntarily reported contractor-level safety performance data;
2. **SITE-VISIT OBSERVATIONS**
   qualitative researcher impressions from project site visits; and
3. **SITE DENSITY AND CREW-TO-CREW HANDOFFS**
   the potential safety relevance of reduced site density and fewer crew-to-crew handoffs suggested by the labor-resource finding.

This brief should be read as descriptive safety context. It does not establish that multiskilling necessarily causes improved safety performance. It supports a narrower conclusion: participating contractors using multiskilling reported strong overall safety performance, and the research team's qualitative site observations did not reveal visible evidence that multiskilling was being implemented as uncontrolled or informal task switching.

National Safety Context

Construction remains a high-risk industry, making safety a necessary consideration in any discussion of workforce strategy. In 2024, the U.S. construction industry experienced 1,034 fatal work injuries, with a fatal injury rate of 9.2 per 100,000 full-time equivalent workers. For nonfatal injuries and illnesses, the Bureau of Labor Statistics reported 2024 construction incidence rates of 2.2 total recordable cases and 1.3 DART cases per 100 full-time workers.

BLS incidence rates are calculated per 100 full-time workers using the formula (N / EH) × 200,000, where N is the number of cases, EH is total employee-hours worked, and 200,000 represents 100 full-time employees working 40 hours per week for 50 weeks. The same incidence-rate structure was used to calculate the aggregate TRIR and DART rates for the participating contractor sample.

2024 BLS NATIONAL CONSTRUCTION BENCHMARKS

2.2
total recordable cases per 100 full-time workers

1.3
DART cases per 100 full-time workers

9.2
fatal work injuries per 100,000 full-time equivalent workers

SECTION 2

Contractor-Level Safety Performance and Benchmark Context

This section summarizes the safety-related context available for the participating contractors, including contractor-reported annual safety performance, benchmark comparisons, reported safety-management practices, site-visit observations, and potential work-area staffing implications.

Contractor-Reported Safety Data

Fifteen participating contractors voluntarily provided 2024 safety performance data for review. These data consisted of contractor-reported annual safety indicators, including OSHA 300A-style trailing indicators and employee-hours. The research team treated these values as contractor-reported safety records and did not independently audit the underlying OSHA logs, case classifications, or company reporting systems.

The contractor-reported safety dataset represents:

15
participating contractors operating across 10 construction NAICS subsectors

33,173,541
contractor-reported employee-hours in 2024

≈16,587
full-time equivalent workers, based on the BLS 2,000-hour FTE convention

123
total recordable cases

58
DART cases

0
reported fatalities

≈0.60
hours-weighted average EMR

The 15 contractors were not a random sample of the U.S. construction industry. They were participating contractors in the broader multiskilling research effort who voluntarily provided safety data. The findings therefore characterize the safety performance of this participating contractor sample and should not be generalized to all construction contractors using multiskilling.

Aggregate Safety Performance and Benchmark Comparisons

Across approximately 33.2 million reported employee-hours, the participating contractor sample reported an aggregate TRIR of 0.74 and an aggregate DART rate of 0.35 (see Table 1). These rates compare favorably to both the broad BLS construction benchmark and a more tailored NAICS-weighted benchmark based on the specific industry mix represented in the sample.

Table 1: Summary of Participating Contractor Safety Performance

Metric	Participating contractor sample	BLS construction benchmark, 2024	Difference from broad BLS construction	NAICS-weighted BLS benchmark	Difference from NAICS-weighted benchmark
TRIR	**0.74**	2.20	**66% lower**	1.72	**57% lower**
DART	**0.35**	1.30	**73% lower**	1.03	**66% lower**
EMR	**0.60**	1.00 baseline	**40% below baseline**	n/a	n/a

The NAICS-weighted benchmark is the more tailored comparison because it accounts for the reported industry mix of the participating contractor sample rather than comparing all firms only to the broad construction sector. The sample included contractors classified in commercial and institutional building construction, oil and gas pipeline construction, highway/street/bridge construction, structural steel and precast concrete, framing, electrical, plumbing/HVAC, tile and terrazzo, site preparation, and other specialty trade construction. Where BLS published rates at a broader NAICS level than the contractor's six-digit code, the closest published BLS industry level was used.

The participating contractor sample reported zero fatalities across approximately 33.2 million employee-hours. This is favorable descriptive context. However, because fatalities are rare events, the absence of fatalities in a one-year sample of this size should not be interpreted as statistically conclusive evidence of lower fatality risk. At the 2024 BLS construction fatality rate of 9.2 fatalities per 100,000 full-time equivalent workers, a workforce exposure of approximately 16,587 FTE workers would correspond to an expected value of approximately 1.53 fatalities. Observing zero fatalities is favorable, but not statistically decisive.

The EMR value should also be interpreted carefully. The sample's hours-weighted average EMR of approximately 0.60 indicates favorable workers' compensation loss experience relative to the experience-rated baseline. However, EMR is not an injury incidence rate. It is affected by payroll classifications, state rating rules, company size, loss limits, claims management, and the applicable experience rating period. EMR is therefore useful supplemental context, but it should not be treated as a substitute for TRIR, DART, or task-level injury data.

The contractor-reported safety results support a narrow but important interpretation. They show that the participating contractors who voluntarily provided safety data performed well relative to standard U.S. construction benchmarks.

Contractors in the research sample were intentionally using multiskilling while also maintaining strong overall safety performance.

The safety data are company-level or division-level annual records. They are not specific to the exact workers, tasks, crews, or hours observed during the work-sampling periods. They also do not indicate whether any reported injury occurred during multiskilled work, single-skilled work, material handling, mobilization, equipment operation, supervision, fabrication, travel, or another activity. The most appropiate interpretation is that contractors in the research sample were intentionally using multiskilling while also maintaining strong overall safety performance.

Two additional industry sources provide useful benchmark context, but they should not replace BLS as the primary comparison point. The 2025 SMACNA Safety Profile provides a specialty-trade comparison. SMACNA reported 90 participating companies, approximately 53.0 million hours, 349 incidents, and an OSHA incident rate of 1.32 using 2024 data. The participating contractor sample in this study reported a lower aggregate TRIR of 0.74, but the comparison should be treated cautiously because the populations and trade mix are not identical.

The Construction Industry Institute safety summary provides a high-performing construction benchmark. CII reported that 48 organizations submitted 2023 safety statistics representing approximately 0.81 billion work hours. CII reported 2023 member TRIR and DART rates of 0.27 and 0.10, respectively. The participating contractor sample in this multiskilling study performed substantially better than broad BLS construction benchmarks, but not as low as the CII high-performing member benchmark. That comparison is useful because it avoids overstating the sample as "best in class" while still showing that the sample performed well relative to national industry averages.

Safety Management Context

The contractor-reported data also indicate that many firms in the sample reported structured safety-management practices (see Table 2). These data are not independent audit findings, but they are consistent with what the researchers observed on site and provide useful context for interpreting the lagging indicators.

Table 2: Safety Management Practices Employed by Participating Contractors

Reported safety-management indicator	Result in participating contractor sample
Daily toolbox safety meetings	6 of 15 contractors
Weekly toolbox safety meetings	9 of 15 contractors
Highest available score for project safety pre-planning	14 of 15 contractors
Highest available score for task-specific planning	11 of 15 contractors
Highest available score for new employee orientation	13 of 15 contractors
Highest available score for employee safety training	11 of 15 contractors
Highest available score for incident investigation	13 of 15 contractors
Digital tracking of both leading and trailing indicators	10 of 15 contractors
Digital tracking of at least one type of safety indicator	14 of 15 contractors

NOTE: "Strongest available response category" means that the contractor selected the highest-scoring response option available for that safety-management item in the reporting instrument.

These reported practices matter because multiskilling should not be interpreted as informal task switching or as a relaxation of safety requirements. Responsible multiskilling requires workers to be trained, qualified, equipped, supervised, and authorized for the tasks they perform. It also requires task-specific hazard planning when work changes, especially when workers cross traditional trade boundaries.

OSHA's incident investigation guidance supports this systems-oriented view of safety. OSHA encourages employers to investigate worker injuries and close calls, identify hazards and program shortcomings, and focus on root causes rather than fault or blame. OSHA also emphasizes that incident investigations should look beyond immediate causes and consider procedures, training, equipment, supervision, production pressure, and other safety-management conditions.

Field Observations from Site Visits

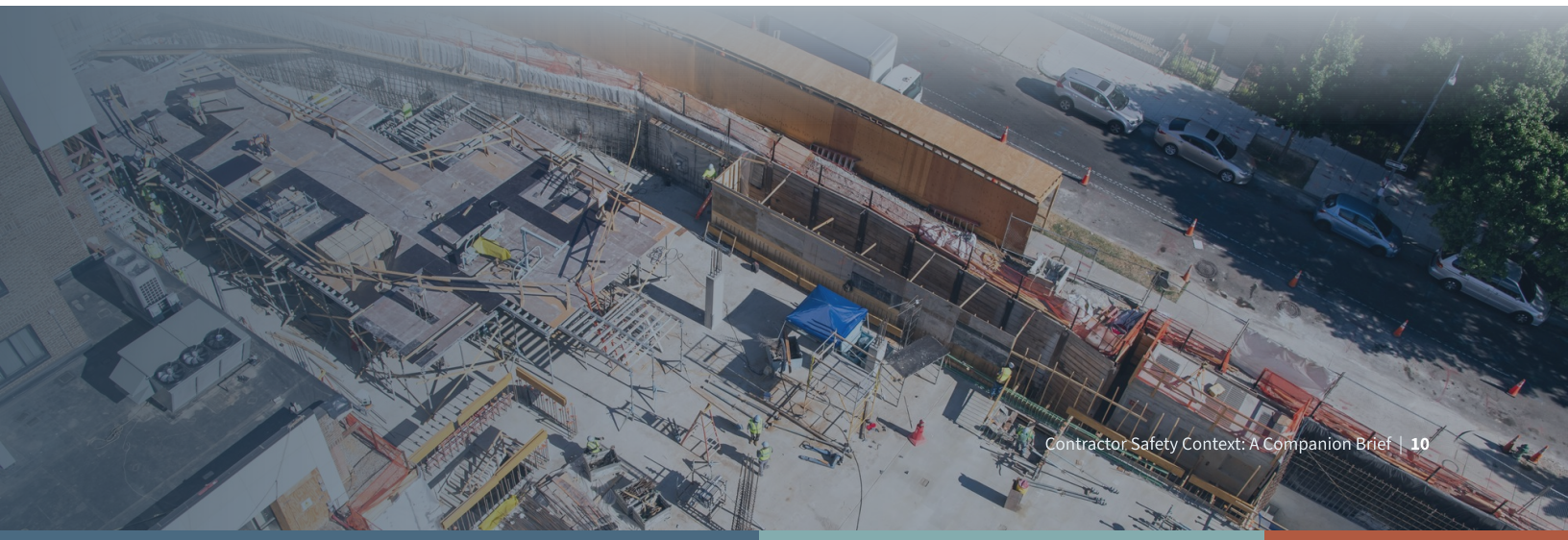
In addition to the contractor-reported safety data, the research team observed active work during project site visits conducted as part of the broader multiskilling research effort. These observations were conducted to document work activity, productivity, cross-tasking, staffing, and workflow. They were not formal safety audits and should not be interpreted as a statistical comparison of safety performance between multiskilled and single-skilled staffing approaches.

With that limitation, the research team's qualitative site-visit impressions provide useful supplemental context. Researchers commonly encountered standard site-access controls, safety orientations, PPE requirements, supervision, task-planning expectations, and project-level safety requirements. The contractor-reported safety management practices (in **Table 2**) were consistent with what the researchers observed during site visits. Several observed projects were industrial, infrastructure, or similarly safety-sensitive environments with stringent owner or client safety expectations.

The research team was not conducting OSHA inspections or formal safety audits. The team therefore does not claim to have evaluated technical compliance for every task, trade, or hazard condition observed. However, as construction researchers with experience observing active project sites, the team's professional impression was that the observed sites appeared comparable to other well-managed construction environments visited in both research and educational contexts.

The research team's site-visit impressions did not raise visible concerns that multiskilling was being implemented as uncontrolled or informal task switching. This does not prove that multiskilled work is safer or equally safe at the task level. It indicates only that, in the observed sample, multiskilling was occurring in project environments that appeared consistent with normal safety-management expectations for well-managed construction sites.

The research team's impression from their site-visits was that multiskilling was occurring in project environments that appeared consistent with normal safety-management expectations for well-managed construction sites.



Safety Relevance of Site Density and Crew-to-Crew Handoffs

One of the primary findings from the broader multiskilling study is that multiskilled crews can complete observed work sequences with fewer workers than would be required under a single-skilled staffing counterfactual. In the main study, for example, multiskilling was associated with a potential reduction in required workers at the crew level of 53% in the lower-bound analysis and 89% in the upper-bound analysis. These estimates reflect the additional single-skilled workers that would be needed to preserve the observed work sequence if workers were limited to tasks within a single trade classification at the crew level.

This labor-resource finding has a potential safety implication because reducing the number of workers required in a constrained work area may reduce work-area density, congestion, crew-to-crew handoffs, and supervisory coordination burden. The logic is not that lower headcount automatically makes work safer. Rather, the potential mechanism is that fewer workers and fewer short-duration crew changes may reduce the physical and coordination pressures that can arise when too many workers or crews occupy the same active work area.

53%

potential reduction in required workers at the crew level — lower-bound analysis

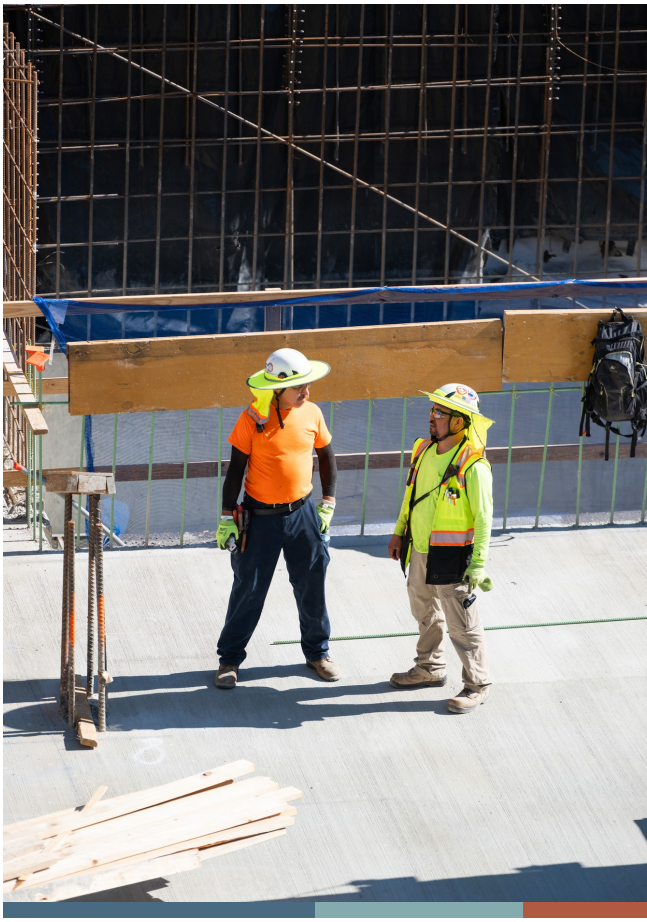
89%

potential reduction in required workers at the crew level — upper-bound analysis

Prior construction productivity research supports the relevance of this mechanism. Hanna *et al.* (2007) define “overmanning” as an increase in the peak number of workers of the same trade above the actual average number of workers used throughout the project, and their study of mechanical and sheet metal projects found productivity losses ranging from 0% to 41% depending on the level of overmanning and peak project labor requirements. The relevance to this brief is not the productivity loss itself, but the underlying conditions associated with excess labor loading: high labor density, congestion, physical conflict, supervision dilution, and more difficult coordination and control. Therefore, the extent to which a multiskilled strategy can reduce the labor requirement and smooth the labor curve on a project may therefore improve the labor conditions noted by Hanna *et al.*

ELECTRI International's labor productivity research for electrical contractors similarly identifies "overmanning" and stacking of trades as productivity factors. The 2007 ELECTRI report states that overmanning can introduce site congestion, stacking of trades, dilution of supervision, higher accident rates, and supply chain inefficiencies. The 2018 ELECTRI report defines stacking of trades as the total number of craftspeople from all trades working in a given area and explains that having too many workers in one area creates congestion and crew interference as workers navigate around one another and compete for space to store tools and materials.

This literature does not prove that multiskilling reduces injuries. However, it supports the plausibility of a safety-relevant mechanism: if multiskilling allows a contractor to complete the same work sequence with fewer workers, fewer separate crews, or fewer crew-to-crew handoffs in a constrained work area, then it may also reduce exposure to congestion-related hazards and coordination burden. The present study did not directly measure whether reduced work-area density caused lower incident rates. This relationship should therefore be treated as a future research hypothesis, not as a demonstrated safety outcome.



Related research also reinforces the importance of planning, coordination, and skill systems. Toole (2005) emphasizes that construction safety is shaped by project planning, constructability, procurement, submittal review, site observation, and the knowledge that project participants bring to safety-related decisions. Mahamid (2020) identifies lack of manpower skills, inadequate job planning, and inadequate coordination and integration among major causes of rework in building projects. These findings are not direct evidence about multiskilling and safety, but they reinforce the broader point that worker capability, planning systems, and coordination quality are relevant to how safety, quality, and productivity interact on construction projects.

SECTION 3

Scope and Limitations

Overall, this nationwide study on multiskilling was not focused on safety as a primary endpoint; rather, the emphasis was on productivity, schedule, and labor requirements. Future research should more intentionally investigate the relationship between a multiskilled labor approach and various safety indicators.

Several limitations are important.

- First, the contractor safety data are self-reported annual company-level or division-level records. The research team did not independently audit OSHA logs, verify case classifications, or validate the completeness of each contractor's reporting system.
- Second, the data are not task-level safety data. They do not identify whether an injury occurred during multiskilled work, single-skilled work, supervision, material handling, mobilization, equipment operation, fabrication, travel, or another activity. They also do not isolate the incident rate of workers while performing cross-tasked work.
- Third, the data are not project-specific to every site visit. Contractor-level annual safety records include the broader 2024 operations of each participating firm, including projects and crews that may not have been observed in this study.
- Fourth, the sample is voluntary and non-random. Contractors willing to participate in a research effort and provide safety data may differ from contractors that did not participate or did not provide data.
- Fifth, OSHA 300A-style injury and illness data are known to have underreporting limitations. This affects employer-reported injury data generally, including both the contractor-reported data reviewed here and the BLS SOII benchmarks used for comparison.
- Sixth, the site-visit observations were qualitative and non-audit-based. The research team observed active construction work for the purpose of documenting productivity, workflow, and cross-tasking. The observations were not designed to rate safety compliance, quantify exposure to high-energy hazards, or compare safety conditions statistically across multiskilled and non-multiskilled sites.

For these reasons, the findings should not be interpreted as evidence that multiskilling causes lower injury rates. They support a narrower conclusion: participating contractors using multiskilling in this study reported strong overall safety performance relative to standard benchmarks, and qualitative site-visit impressions did not identify visible evidence that multiskilling was being implemented as uncontrolled or informal task switching.

Future Research

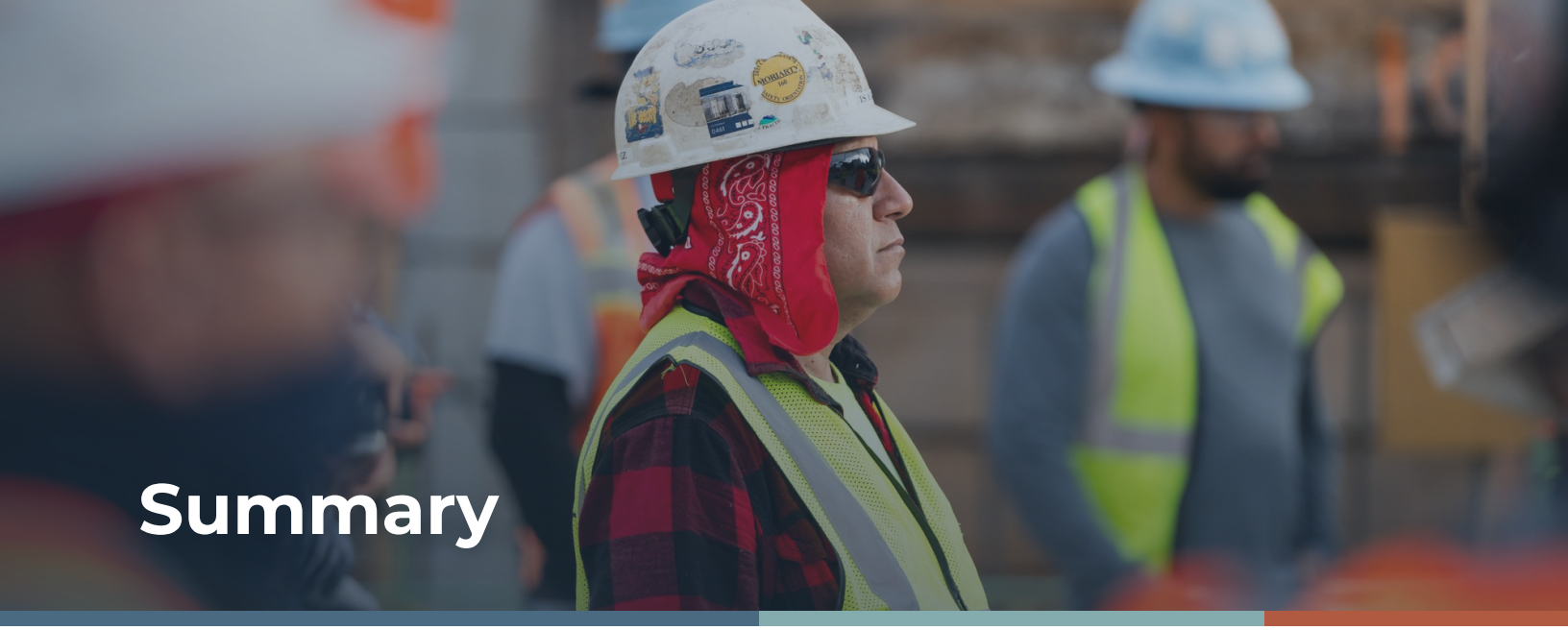
The findings in this supplemental brief support the need for a dedicated safety-focused phase of multiskilling research. The current evidence shows that multiskilling was observed among contractors with strong company-level safety performance, but it does not directly measure whether multiskilling changes safety exposure or safety outcomes at the worker, task, crew, or project level.

The findings in this supplemental brief support the need for a dedicated safety-focused phase of multiskilling research.

Future research should examine at least four safety mechanisms.

- Future work should investigate whether multiskilling increases worker hazard awareness. A plausible hypothesis is that workers who understand adjacent trades, task interfaces, sequencing constraints, and downstream work conditions may be better able to anticipate hazards created by their own work or by nearby crews. This is an important but untested safety question.
- Future work should examine whether reduced work-area density changes exposure to congestion-related hazards. The current productivity study found that multiskilled crews could complete observed work sequences with fewer workers than would be required under a single-skilled staffing counterfactual. A safety-focused study should directly evaluate whether those labor-resource differences affect exposure to struck-by, caught-between, fall, electrical, ergonomic, material-handling, or high-energy hazards.
- Future work should examine how contractors verify task qualifications and safety controls when workers perform tasks across traditional trade boundaries. Key variables should include training, licensing compliance, task qualification, supervision, pre-task planning, stop-work authority, hazard analysis, near misses, good catches, and leading indicators.
- Future work should include direct worker input. Team-level interviews, one-on-one interviews, and craft-worker focus groups could help identify how workers understand the safety implications of adjacent trades, how they decide whether they are qualified to perform a task, and how they use stop-work authority when work crosses traditional trade boundaries. Because many construction crews include Spanish-speaking workers, future data collection should be designed to include Spanish-language interviews or bilingual facilitation where appropriate.

A future safety study should not rely only on TRIR and DART. It should combine lagging indicators with leading indicators, near-miss and good-catch data, worker interviews, direct field observations, task-specific planning records, safety climate measures, documentation of task qualification, and scenario-based hazard recognition exercises. Photo- or video-based hazard recognition exercises may be especially useful for comparing how multiskilled and single-skilled workers identify hazards across multiple trades and work interfaces. This would allow a more direct test of whether multiskilling changes safety awareness, safety exposure, and safety outcomes.



Summary

The safety data reviewed in this supplemental brief do not establish that multiskilling causes lower injury rates, nor do they directly compare incident rates for multiskilled and single-skilled staffing approaches. The available data are contractor-level annual safety records voluntarily provided by 15 participating contractors.

The contractor-reported data nevertheless provide useful context. Across approximately 33.2 million reported employee-hours, the participating contractor sample reported aggregate TRIR and DART rates substantially below both broad construction and NAICS-weighted BLS benchmarks, along with favorable EMR performance and zero reported fatalities.

Across approximately 33.2 million reported employee-hours, the participating contractor sample reported aggregate TRIR and DART rates substantially below both broad construction and NAICS-weighted BLS benchmarks, along with favorable EMR performance and zero reported fatalities.

The research team's site-visit impressions provide a second, more qualitative form of context. The site visits were not formal safety audits, and they should not be interpreted as a statistical safety comparison. However, the research team did not identify visible evidence that multiskilling was being implemented as uncontrolled or informal task switching. Observed projects generally appeared consistent with standard safety-management expectations for well-managed construction environments.

The third safety-relevant implication concerns work-area density and crew-to-crew handoffs. The broader multiskilling study found that multiskilled crews could complete observed work sequences with fewer workers than would be required under a single-skilled staffing counterfactual. This may reduce congestion, work-area density, and crew-to-crew handoffs, but the present study did not directly measure whether those changes reduced incident rates.

In closing, multiskilling was observed among contractors with strong overall safety performance as part of the broader research effort. The findings should be interpreted as safety context for the participating contractor sample, not as evidence that multiskilling caused better or worse safety outcomes. Responsible implementation remains essential. Multiskilling should be bounded by documented task qualification, training, licensing compliance, supervision, task-specific hazard analysis, pre-task planning, stop-work authority, and continuous learning from incidents and near misses.

Terms, Abbreviations and Definitions

Safety and Statistical Terms

BLS — Bureau of Labor Statistics — The statistical agency within the U.S. Department of Labor that produces national data on employment and working conditions. Its Injuries, Illnesses, and Fatalities program reports nonfatal occupational injury and illness data through SOII and fatal occupational injury data through CFOI.

CFOI — Census of Fatal Occupational Injuries — The BLS program that produces the annual national count and rate of fatal occupational injuries. Fatal injury rates are generally expressed as fatalities per 100,000 full-time equivalent workers.

DART — Days Away, Restricted, or Transferred — A category of OSHA-recordable cases involving one or more days away from work, one or more days of job restriction, or transfer to another job. A case involving more than one of these outcomes is counted as one DART case rather than as multiple cases.

DART Rate — The number of DART cases per 100 full-time equivalent workers. It is calculated as: **DART cases × 200,000 ÷ total employee-hours worked**.

Days-Away-from-Work Case — A work-related injury or illness that results in the employee being unable to work for at least one calendar day after the day on which the injury occurred or illness began.

Employee-Hours — The total hours worked by all employees during the reporting period. Employee-hours are used as the exposure denominator when calculating TRIR, DART, and similar incidence rates.

EMR — Experience Modification Rate — A workers' compensation insurance factor that compares an employer's historical loss experience with the loss experience expected for employers of generally comparable type and size. An EMR of **1.00** represents the experience-rated baseline; a value below 1.00 generally indicates more favorable loss experience, while a value above 1.00 generally indicates less favorable loss experience. EMR is not an OSHA injury incidence rate and should not be directly equated with TRIR or DART. Exact calculation rules vary by rating jurisdiction and workers' compensation rating bureau.

Fatal Injury Rate — A BLS measure of fatal occupational injury risk, generally expressed as the number of fatal work injuries per 100,000 full-time equivalent workers. This differs from TRIR and DART, which are expressed per 100 full-time equivalent workers.

First Aid, for OSHA Recordkeeping Purposes — The specific set of minor treatments that OSHA classifies as first aid. A work-related case requiring only treatment on OSHA's first-aid list does not become recordable solely because that treatment was provided. OSHA's list is exhaustive for recordkeeping purposes.

FTE — Full-Time Equivalent Worker — A standardized exposure unit used in injury-rate calculations. For the nonfatal incidence-rate convention used in this report, 100 FTE workers represent 200,000 employee-hours; therefore, one FTE corresponds to 2,000 employee-hours. An FTE is an analytical unit and does not necessarily equal one individually identified employee.

Hours-Weighted Aggregate Rate — A combined rate calculated by summing cases across all participating contractors, multiplying by 200,000, and dividing by the contractors' combined employee-hours. This approach gives each reported work-hour equal weight and is not the same as taking a simple average of contractor-level rates.

Incidence Rate — A standardized measure expressing the frequency of occupational injuries or illnesses relative to employee-hours worked. For nonfatal OSHA-recordable cases, BLS calculates the rate as **cases × 200,000 ÷ total employee-hours worked**, producing a rate per 100 full-time equivalent workers.

Job Restriction — An outcome of a work-related injury or illness in which the employee is prevented from performing one or more routine job functions or from working the full workday that the employee otherwise would have worked.

Job Transfer — An outcome of a work-related injury or illness in which the employee is assigned to a job other than the employee's regular job for at least part of a workday after the day of the injury or onset of illness. OSHA records job-transfer and restricted-work cases in the same case category.

Lagging Indicator / Trailing Indicator — A measure of safety outcomes that have already occurred, such as the number or rate of injuries, illnesses, DART cases, or fatalities. OSHA generally uses the term *lagging indicator*; *trailing indicator* is also commonly used in industry reporting.

Leading Indicator — A proactive or preventive measure used to assess safety activities, identify potential weaknesses, and evaluate whether safety-management processes are functioning as intended. Examples may include completion of pre-task plans, inspections, worker participation, hazard corrections, training, and near-miss reporting.

Medical Treatment Beyond First Aid — Medical management or care that exceeds the treatments specifically classified by OSHA as first aid. A work-related injury or illness involving medical treatment beyond first aid generally meets OSHA's recordability criteria.

NAICS — North American Industry Classification System — The federal standard used to classify business establishments according to their primary economic activity. Federal statistical agencies use NAICS classifications when collecting, analyzing, and publishing U.S. industry data.

NAICS-Weighted BLS Benchmark — A comparison rate calculated for this report by weighting applicable published BLS injury rates according to the employee-hours represented by the different NAICS classifications in the contractor sample. It is a study-calculated benchmark—not a separate rate published by BLS—and is intended to account for the sample's industry and trade mix.

Near Miss / Close Call — An unplanned worksite event in which no worker was injured but a worker could have been injured if circumstances had been slightly different. OSHA encourages employers to investigate close calls as well as incidents that produce injuries.

OSHA — Occupational Safety and Health Administration — The agency within the U.S. Department of Labor responsible for administering and enforcing federal occupational safety and health requirements, including injury and illness recordkeeping requirements.

OSHA Form 300 — Log of Work-Related Injuries and Illnesses — The OSHA recordkeeping form used to list and classify individual recordable work-related injury and illness cases occurring at an establishment.

OSHA Form 300A — Summary of Work-Related Injuries and Illnesses — The annual summary of the establishment's OSHA-recordable injury and illness information. The form summarizes case totals, days away or restricted, employment information, and employee-hours, and is subject to OSHA certification and posting requirements.

Other Recordable Case — An OSHA-recordable case that does not involve death, days away from work, job restriction, or job transfer. This category commonly includes work-related cases involving medical treatment beyond first aid, loss of consciousness, or another qualifying recordability criterion while the employee remains at work without restriction or transfer.

Recordable Case / OSHA-Recordable Case — A work-related injury or illness that meets one or more OSHA recording criteria. These criteria include death, days away from work, restricted work or job transfer, medical treatment beyond first aid, loss of consciousness, or certain significant injuries or illnesses diagnosed by a physician or other licensed health care professional.

SOII — Survey of Occupational Injuries and Illnesses — The BLS program that produces national and industry-level estimates of nonfatal occupational injuries and illnesses based on employer-reported information. SOII is the source of the BLS nonfatal incidence-rate benchmarks used in this report.

TRIR — Total Recordable Incident Rate — The number of OSHA-recordable cases per 100 full-time equivalent workers, calculated as **total recordable cases × 200,000 ÷ total employee-hours worked**. BLS formally labels the equivalent measure the *total recordable cases incidence rate*. TRIR includes DART cases and other recordable cases.

Study-Specific Multiskilling Terms

Crew-to-Crew Handoff — A transition in which a separate crew must enter the work area or assume responsibility for the next activity in a work sequence. This is distinct from a worker within the same crew shifting between tasks.

Multiskilling — An intentional workforce strategy in which an individual worker or crew performs tasks spanning more than one traditional trade, craft, or job-role classification. Use of the term does not imply the removal or waiver of applicable training, qualification, licensing, supervision, or safety requirements.

Single-skilled staffing counterfactual — A hypothetical analytical scenario in which workers are limited to tasks falling within a single trade classification. It is used to estimate the additional workers or crews that could be required to reproduce the observed work sequence without cross-tasking. It is not an observed control group or a separate set of actual projects.

Task Qualification — Evidence that a worker has the knowledge, training, demonstrated competence, employer authorization, and—where applicable—license or certification needed to perform a particular task safely. The applicable requirements depend on the task, equipment, jurisdiction, and governing safety standard.

Work Area — The physical area in which a worker or crew performs a planned construction activity.

Work-Area Density — The concentration of workers or crews occupying a defined work area during a defined period. In this report, reduced work-area density is discussed as a potential safety-relevant mechanism associated with reduced congestion and coordination burden; it was not measured as a direct safety outcome.

Site Density — The broader concentration of workers, crews, or manpower across a project site or project zone. Site density is related to work-area density, but the terms should not be used interchangeably unless the geographic scale being discussed is clear.

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