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Quarterly
SECOND QUARTER 2016
DATA REPORT

Safety Management and Safety Culture among Small Construction Firms

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In recent years, high performing construction industry contractors, who are striving for zero injuries and continuous improvement in their safety and health programs, have recognized that a positive safety culture is tied to all other aspects of their businesses, including productivity and competitiveness. To track changes in safety management and safety culture in the construction industry, CPWR has collaborated with Dodge Data & Analytics (formerly known as McGraw Hill Construction) to conduct an online Construction Safety Management Survey (CSMS) using Dodge's member contractor panel (>3,000). The first online survey was conducted in 2012; the second in 2015. Moving forward, the CSMS will be conducted biennially.

The Dodge SmartMarket Report "Building a Safety Culture: Improving Safety and Health in the Construction Industry" released in April 2016, details the findings from the CSMS (full report is available at http://www.cpwr.com). The results showed broad industry implementation of interventions to promote a strong safety culture. Jobsite worker involvement ranked first in the percentage of contractors who consider it an essential part of a world class safety program in 2015, up from ranking sixth in 2012. Moreover, a higher number of construction companies in the 2015 survey reported that they reduced work-related injuries and increased their business competitiveness by investing in safety.

Despite the encouraging results, the data indicates that small construction firms lag behind larger ones in most of the safety management and safety culture measures. To examine this issue in more detail, we analyzed the CSMS data comparing the differences in safety management and safety culture between small and large firms in this Quarterly Data Report.

KEY FINDINGS

- Small construction firms lag behind larger ones in most of the safety management and safety culture measures.
- Compared to larger firms, firms with fewer than 10 employees are less likely to practice and adopt safety protections, personal protective equipment (PPE), and Prevention through Design (PtD).
- Small firms are less likely to involve workers in, or have management commitment to, safety and health than firms with 500 or more employees.
- Small firms were less likely to require OSHA 10-hour and 30-hour training than larger ones.
- About one third of firms with fewer than 10 employees only provided training when employees were hired or when it was required.

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Image: Microsoft PowerPoint

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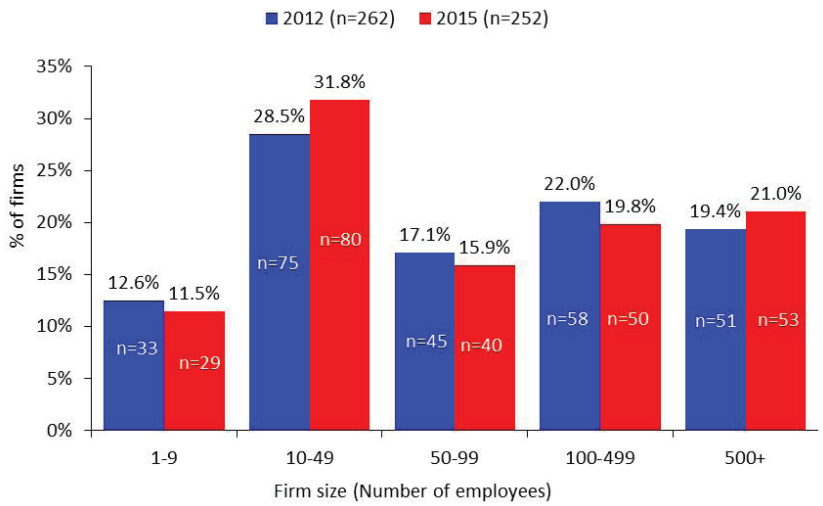
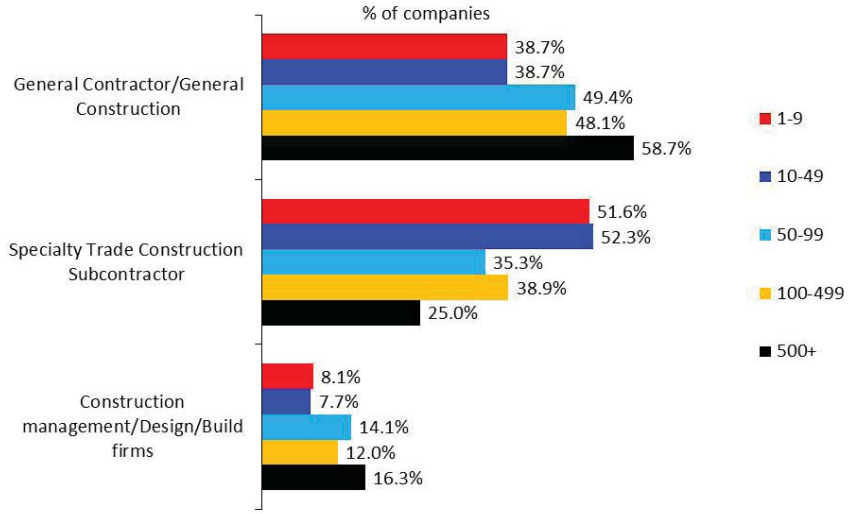
SECTION 1: Characteristics of Construction Firms

A total of 514 construction firms completed the online survey: 262 in the 2012 survey and 252 in 2015.[1] To obtain reliable estimates for small firms, data from the two surveys were combined if they shared common measures. In addition, some detailed indicators were aggregated into major categories to enhance data comparisons. The patterns of firm size in the two years were similar. Less than half of the respondent firms had fewer than 50 employees, while about one in five had 500 or more employees (Chart 1). The type of construction subsectors was associated with firm size. When combining the two years of data together, over half of the firms with 500 or more employees fell within the general contractor/general construction category (58.7%; Chart 2), while firms with fewer than 10 employees were more likely to be specialty trade construction subcontractors (51.6%).

1. Size of construction firms, 2012 versus 2015



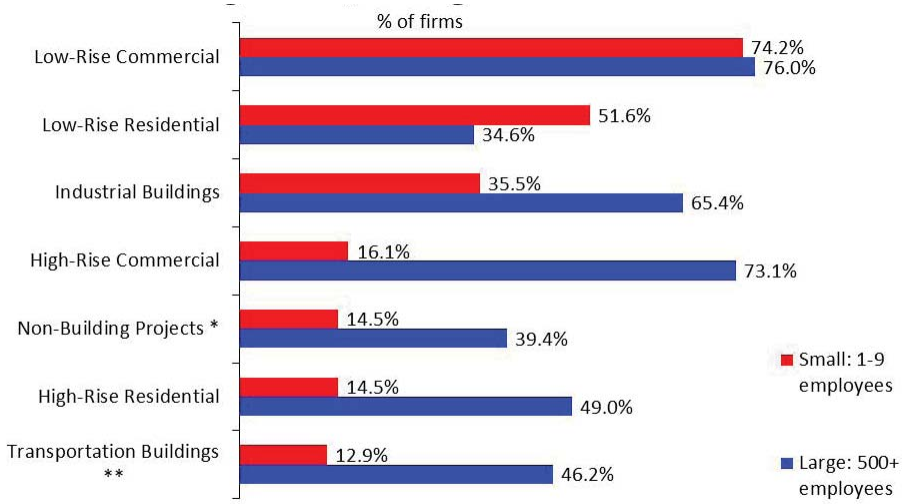
2. Type of companies by firm size, average of 2012 and 2015



[1]One firm in 2012 and two firms in 2015 were excluded due to lack of firm size information.
Source: Dodge Data & Analytics, 2012 and 2015 Construction Safety Management Survey. Calculations by the authors.

Types of building projects differed by firm size. Firms with 1-9 employees were often involved with low-rise commercial and low-rise residential projects (74.2% and 51.6%, respectively; Chart 3). Work on high-rise residential/commercial projects and industrial buildings were more commonly completed by firms with 500 or more employees.

3. Type of projects worked on in the last three years, small vs. large firms, average of 2012 and 2015

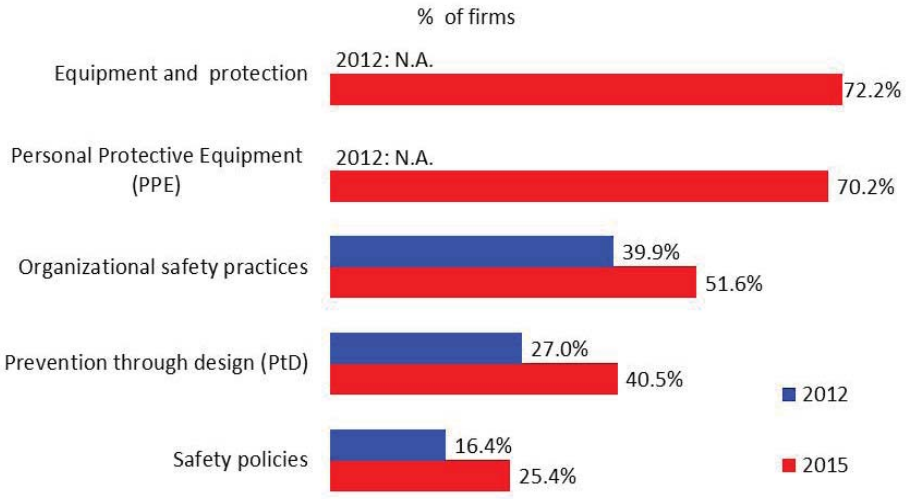


** Highway, street , and bridge; water and sewer; oil and gas pipeline; etc.*
***Airports, ports, train stations, etc.*
Source: Dodge Data & Analytics, 2012 and 2015 Construction Safety Management Survey. Calculations by the authors.

SECTION 2: Practices Used on Projects to Promote Safety

The survey had more categories of safety practices in 2015 than in 2012. Over 72% of the respondents reported that they adopted practices involving safety equipment and protection in 2015 (Chart 4), the highest among all safety practices, followed by personal protective equipment (PPE; 70.2%). Among all three major practices (organizational safety practices, prevention through design, and safety policies) that were surveyed in both years, the adoption rates substantially increased from 2012 to 2015.

4. Type of safety practices among construction firms, 2012 versus 2015

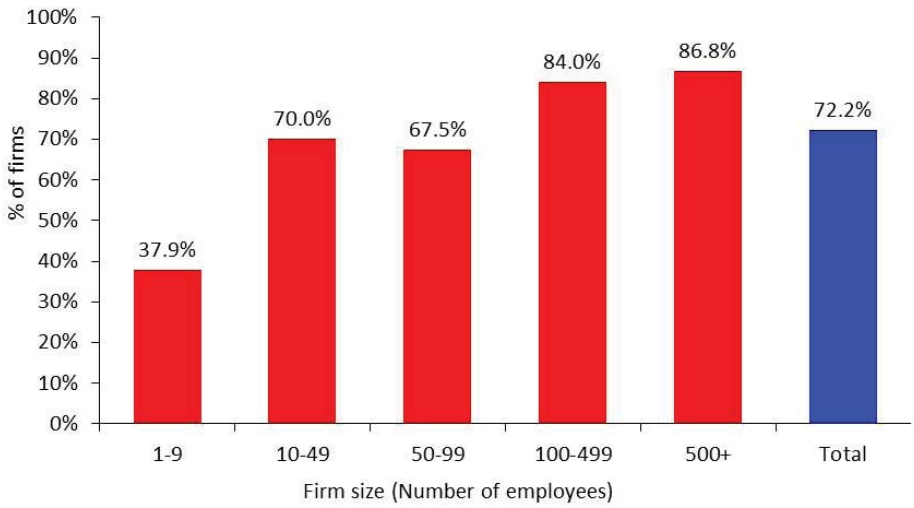


Source: Dodge Data & Analytics, 2012 and 2015 Construction Safety Management Survey. Calculations by the authors.

Section 2: Practices Used on Projects to Promote Safety Second Quarter 2016

Inspecting equipment for functionality prior to use and installing safety protections such as guardrails, safety nets, and alarms are important safety practices. The proportion of construction firms adopting these safety protections increased as firm size increased. Only 38% of firms with fewer than 10 employees adopted these safety protections in the workplace (Chart 5), while nearly 90% of firms with 500 or more employees had such safety protections.

5. Safety practices involving equipment and protection by firm size, 2015

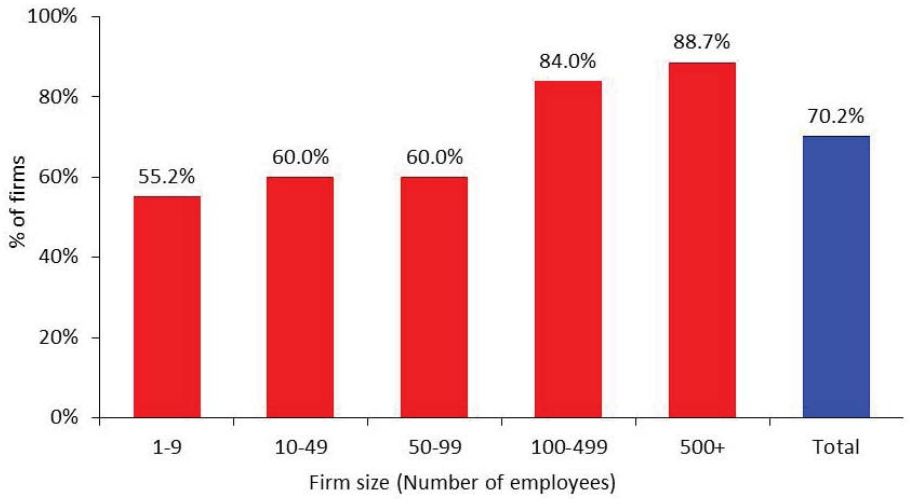


Source: Dodge Data & Analytics, 2015 Construction Safety Management Survey. Calculations by the authors.

Section 2: Practices Used on Projects to Promote Safety Second Quarter 2016

Personal protective equipment (PPE) use entails providing functional PPE, enforcing its use, and inspecting it for functionality prior to use. The use of PPE was reported in 55.2% of firms with fewer than 10 employees, and the percentage increased as the size of the firm became larger (Chart 6). About nine out of ten (88.7%) firms with 500 or more employees adopted safety practices involving PPE.

6. Personal Protective Equipment (PPE) use by firm size, 2015

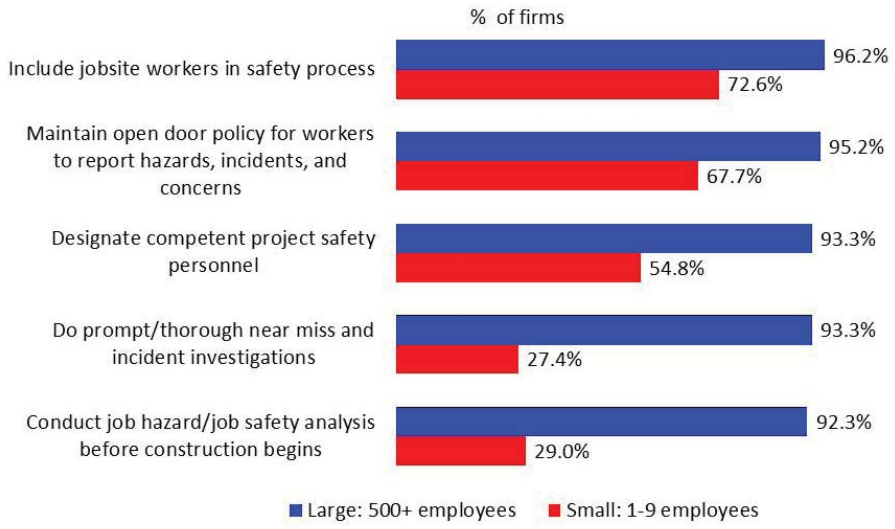


Source: Dodge Data & Analytics, 2015 Construction Safety Management Survey. Calculations by the authors.

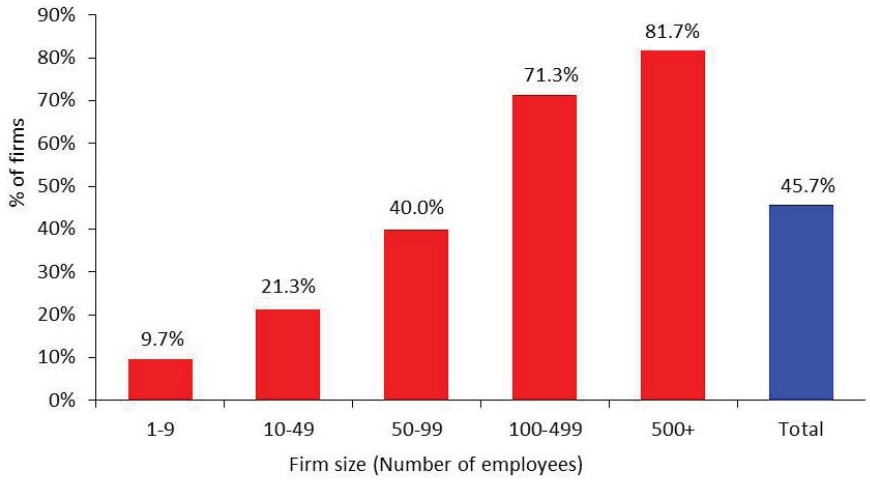
Section 2: Practices Used on Projects to Promote Safety Second Quarter 2016

Organizational practices to promote safety include the five measures shown in Chart 7. Significant differences were found between the smallest and largest firms with regard to the adoption of each of the five practices. Nearly all firms with 500 or more employees had adopted each of the organizational safety practices (Chart 7). More than half of the small firms included jobsite workers in safety practices and maintained an open door policy. However, only 27% said they conducted prompt incident investigation and job hazard/safety analysis. Using the average of the 2012 and 2015 data, about 82% of the largest firms applied all five organizational safety practices (Chart 8), more than eight times the rate among firms with fewer than 10 employees (9.7%).

7. Organizational safety practices, small versus large firms, average of 2012 and 2015



8. Percentage of firms with five organizational safety practices by firm size, average of 2012 and 2015

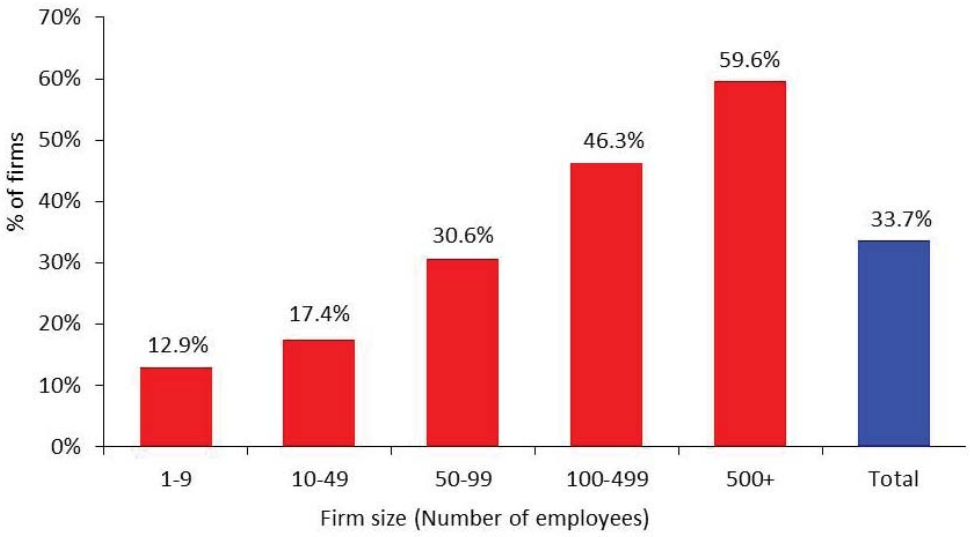


Source: Dodge Data & Analytics, 2012 and 2015 Construction Safety Management Survey. Calculations by the authors.

Section 2: Practices Used on Projects to Promote Safety Second Quarter 2016

Prevention through Design (PtD) integrates hazard mitigation into the engineering and design process, which in turn, leads to making projects safer during the building process. Only 13% of firms with less than 10 employees applied PtD to improve worker safety. Among firms with 500 or more employees, PtD was used to a much greater degree (59.6%; Chart 9).

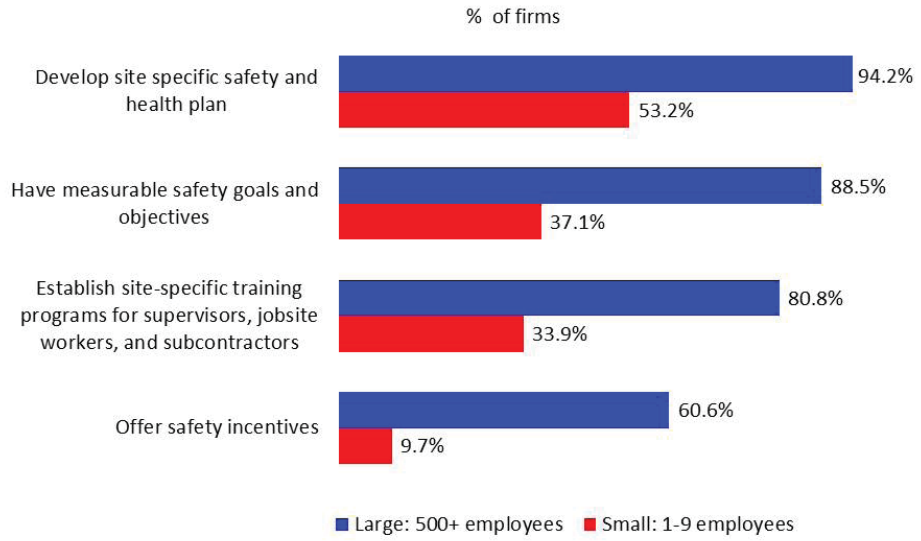
9. Prevention through Design (PtD) to promote safety by firm size, average of 2012 and 2015



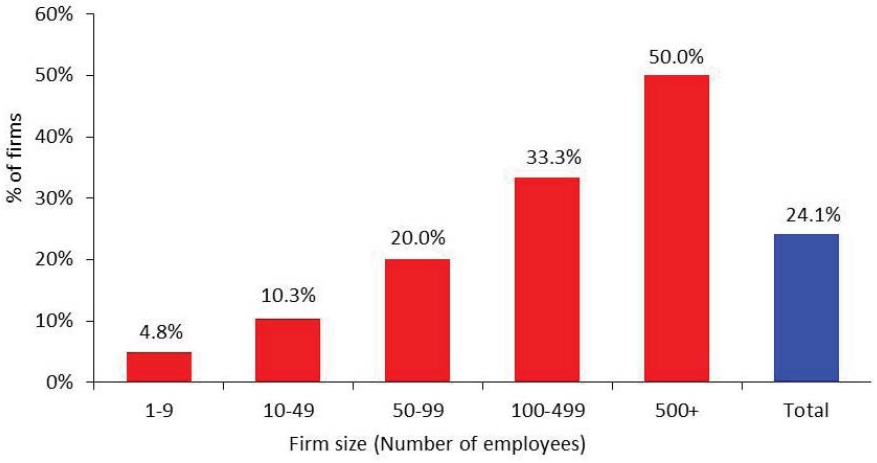
Source: Dodge Data & Analytics, 2012 and 2015 Construction Safety Management Survey. Calculations by the authors.

The majority of respondents from firms with 500 or more employees said they engaged in each of the four comprehensive safety policies listed in Chart 10. In contrast, small firms were much less likely to have these safety policies in place. While 61% of firms with 500 or more employees offered safety incentives, less than 10% of small firms did so (Chart 10). When 2012 and 2015 data were combined, about half of firms with 500 or more employees had four safety policies in the workplace (Chart 11), more than 10 times the rate among the smallest firms (4.8%).

10. Safety policies, small versus large firms, average of 2012 and 2015



11. Percentage of firms with four safety policies by firm size, average of 2012 and 2015



Source: Dodge Data & Analytics, 2012 and 2015 Construction Safety Management Survey. Calculations by the authors.

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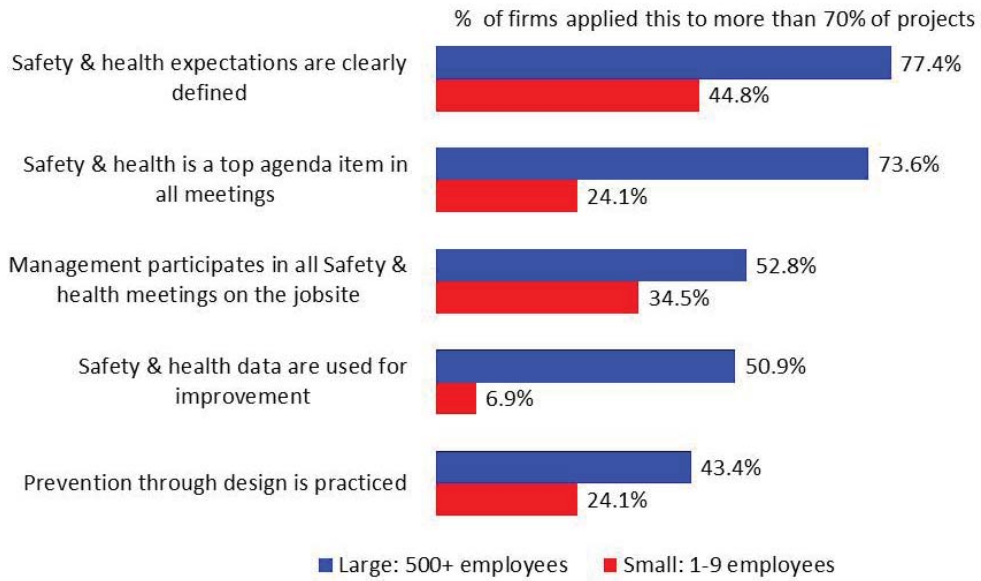
SECTION 3: Safety Culture Indicators

In the 2015 survey, safety culture was measured by 33 indicators. Seven indicators simply identified whether the company used the safety practice or not (0=No; 1=Yes), while the other 26 indicators were measured by the degree of adoption (from 0=Not practiced to 3=High: practiced to more than 70% of the projects). To increase the comparability, the 26 indicators were grouped into seven major categories: 1) management commitment to safety and health, 2) safety and health fundamental to company values, 3) safety and health accountability, 4) supervisory leadership, 5) jobsite worker involvement, 6) safety and health communication, and 7) owner/client involvement in safety and health (See Charts 12-18).

Management commitment to safety was measured by the five indicators listed in Chart 12. The largest firms were more likely than the smallest ones to report a high level of adoption of all five practices. More than half (51%) of firms with at least 500 employees used safety and health data for improvement on over 70% of their projects (Chart 12), more than seven times the adoption rate among firms with fewer than 10 employees (6.9%). The scope of management commitment to safety and health is consistent with the number of safety practices shown in the previous section, indicating that employers play an important role in overall safety culture.

12. Management commitment to safety and health, small versus large firms, 2015

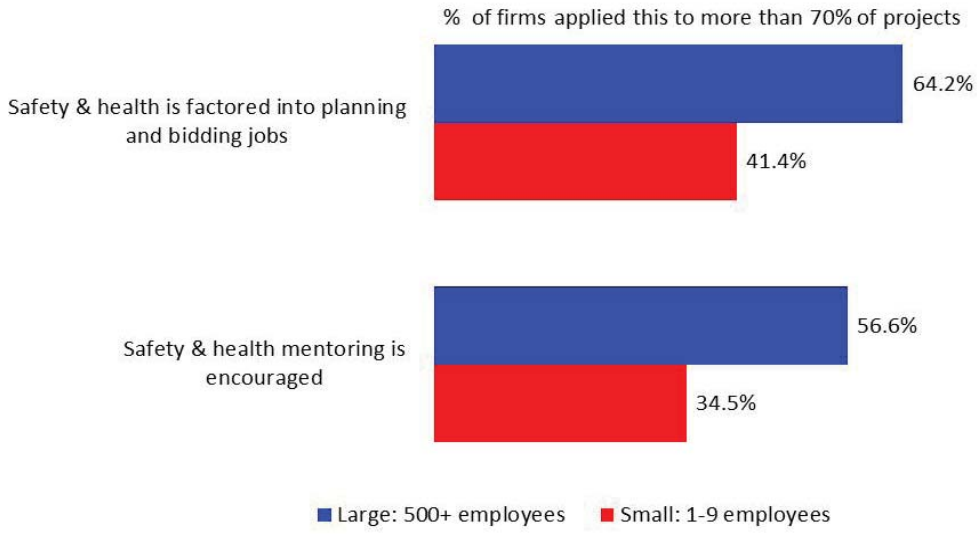


Source: Dodge Data & Analytics, 2015 Construction Safety Management Survey. Calculations by the authors.

Section 3: Safety Culture Indicators Second Quarter 2016

Safety and health as a fundamental company value was defined as considering safety and health while planning and bidding jobs and encouraging safety and health mentoring. Nearly two out of three (64%) firms with at least 500 employees considered safety and health into planning and bidding jobs on more than 70% of their projects (Chart 13), while only 41% of firms with fewer than 10 employees did so.

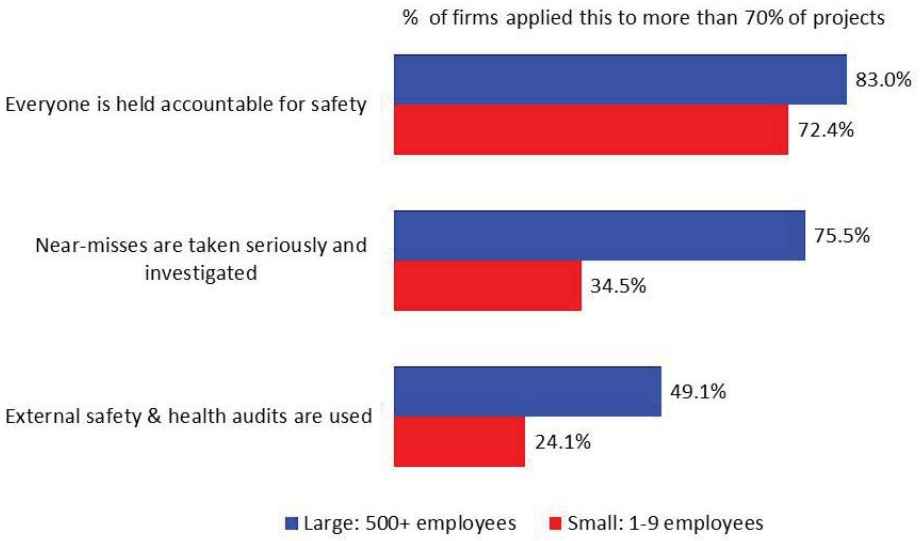
13. Safety and health are fundamental company values, small versus large firms, 2015



Source: Dodge Data & Analytics, 2015 Construction Safety Management Survey. Calculations by the authors.

Three items were used to measure safety and health accountability as depicted in Chart 14. Although there was not much difference by firm size for "holding everyone accountable for safety," there were notable differences for "investigating near-misses" and "using external safety and health audits." Three out of four (75.5%) firms with at least 500 employees reported that near-misses were taken seriously and investigated for more than 70% of their projects (Chart 14), which was more than double the adoption rate among firms with fewer than 10 employees (34.5%).

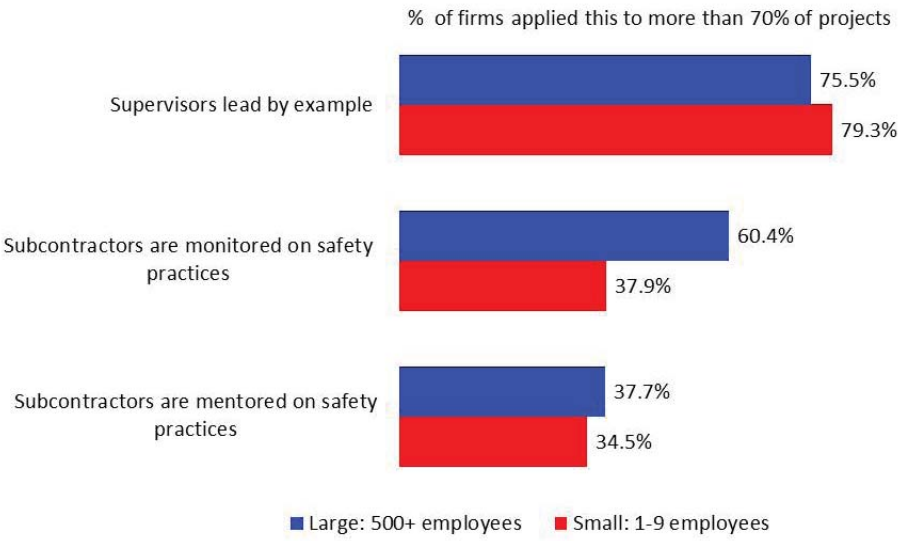
14. Safety and health accountability, small versus large firms, 2015



Source: Dodge Data & Analytics, 2015 Construction Safety Management Survey. Calculations by the authors.

Safety leadership was measured with three items (Chart 15). About six out of ten (60.4%) firms with 500 or more employees monitored subcontractors on safety practices at a high level (more than 70% of their projects), while only 38% of firms with fewer than 10 employees did so. No significant differences were found for the other two measures by firm size.

15. Supervisory leadership, small versus large firms, 2015

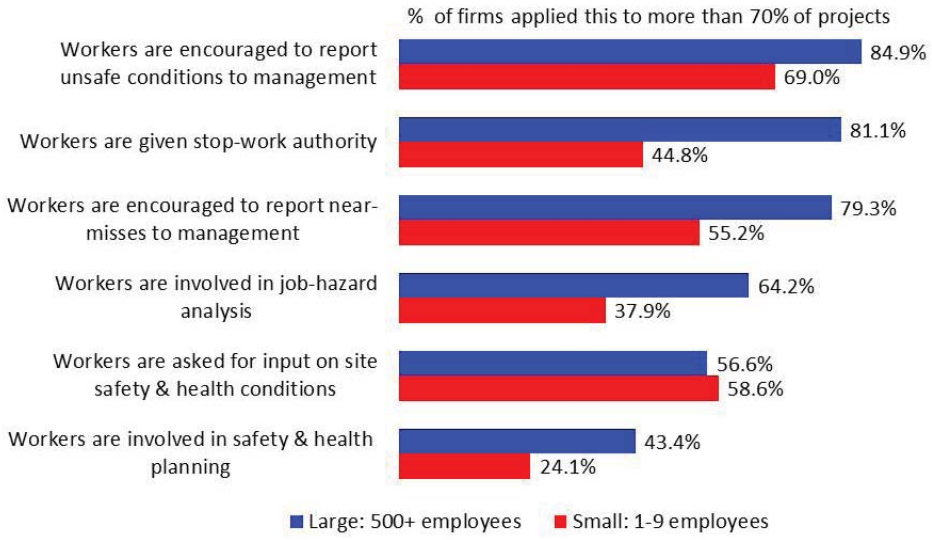


Source: Dodge Data & Analytics, 2015 Construction Safety Management Survey. Calculations by the authors.

Section 3: Safety Culture Indicators Second Quarter 2016

Worker involvement with workplace safety and health was determined by the six items shown in Chart 16. The data show that the largest firms incorporate all the practices to a greater degree than small firms except for "workers are asked for input on site safety and health conditions." The most common practice for both large and small firms was that workers were encouraged to report unsafe conditions to management. In addition, about 81% of the largest firms said that workers were given stop-work authority for more than 70% of their projects (Chart 16), nearly double the proportion among firms with less than 10 employees (44.8%).

16. Jobsite worker involvement, small versus large firms, 2015

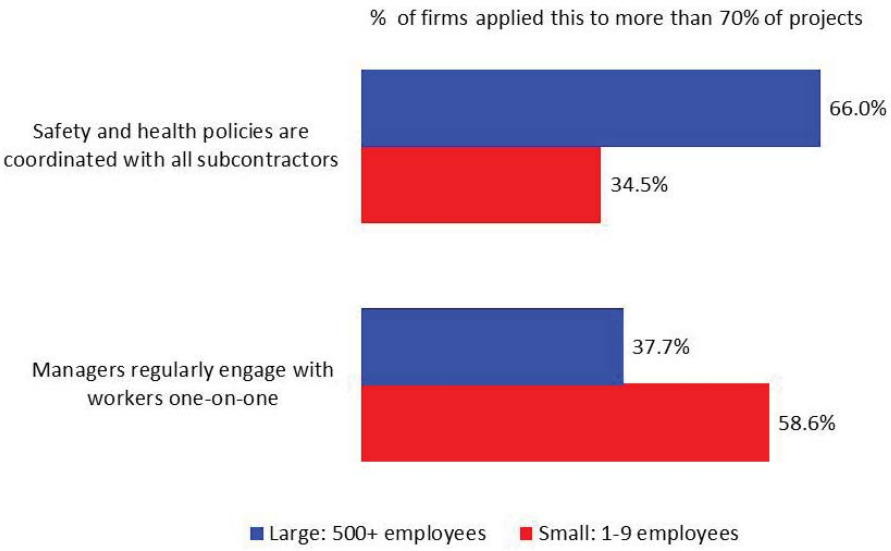


Source: Dodge Data & Analytics, 2015 Construction Safety Management Survey. Calculations by the authors.

Section 3: Safety Culture Indicators Second Quarter 2016

Communication regarding safety and health is essential for promoting workplace safety. Firms with fewer than 10 employees were less likely to coordinate safety and health policies with all subcontractors than firms with 500 or more employees (34.5% versus 66.0%, respectively). However, managers from small firms were more likely to engage with workers one-on-one than large firms (58.6% versus 37.7%, respectively).

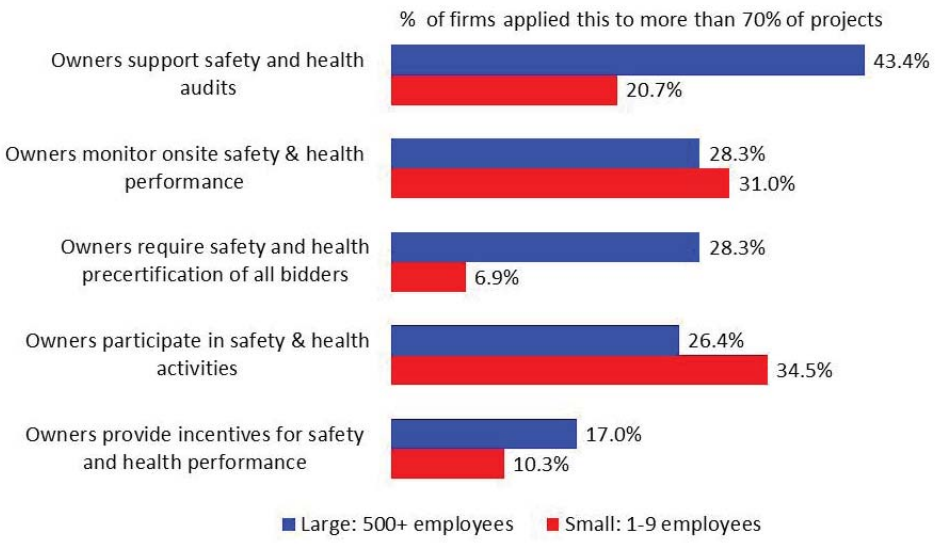
17. Safety and health communication, small versus large firms, 2015



Source: Dodge Data & Analytics, 2015 Construction Safety Management Survey. Calculations by the authors.

Owners and clients have the ability to influence workplace safety and health in a number of areas (Chart 18). Nearly 30% of owners from firms with 500 or more employees required safety and health precertification of bidders for over 70% of their projects, more than four times the adoption rate among firms with less than 10 employees (6.9%). About 43% of the largest firms supported safety and health audits for more than 70% of their projects, while only 20.7% of firms with fewer than 10 employees did so.

18. Owner/client involvement in safety and health, small versus large firms, 2015



Source: Dodge Data & Analytics, 2015 Construction Safety Management Survey. Calculations by the authors.

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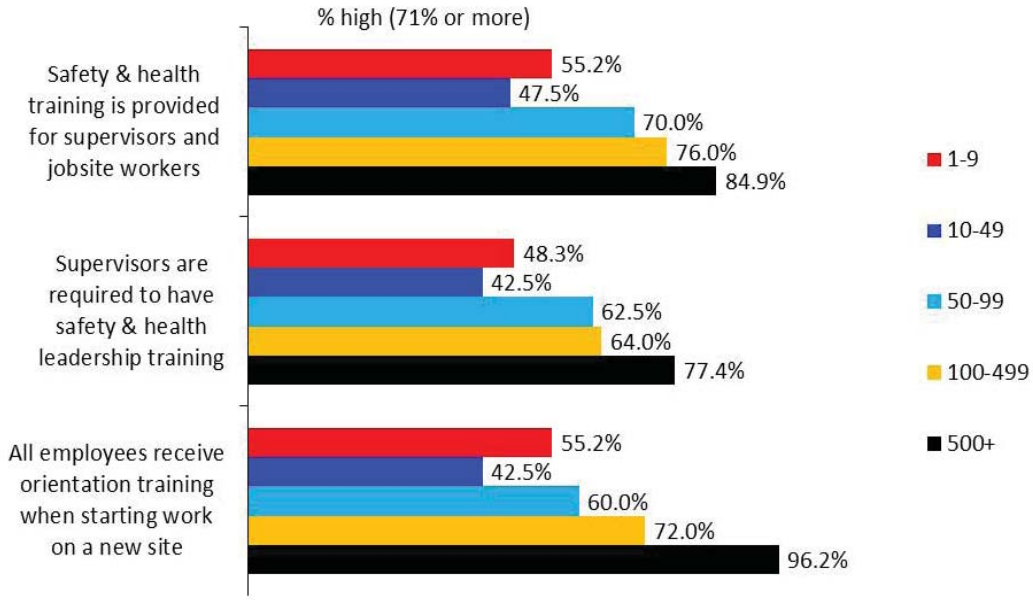
SECTION 4: Safety and Health Training

In general, safety and health training increased with firm size. Firms with 1-49 employees were less likely to provide each of the three types of training than firms with 50 or more employees (Chart 19). In terms of whether "all employees receive orientation training when starting work on a new site," almost all (96.2%) firms with at least 500 employees required such training on more than 70% of their projects, nearly double the percentage among firms with fewer than 10 employees (55.2%).

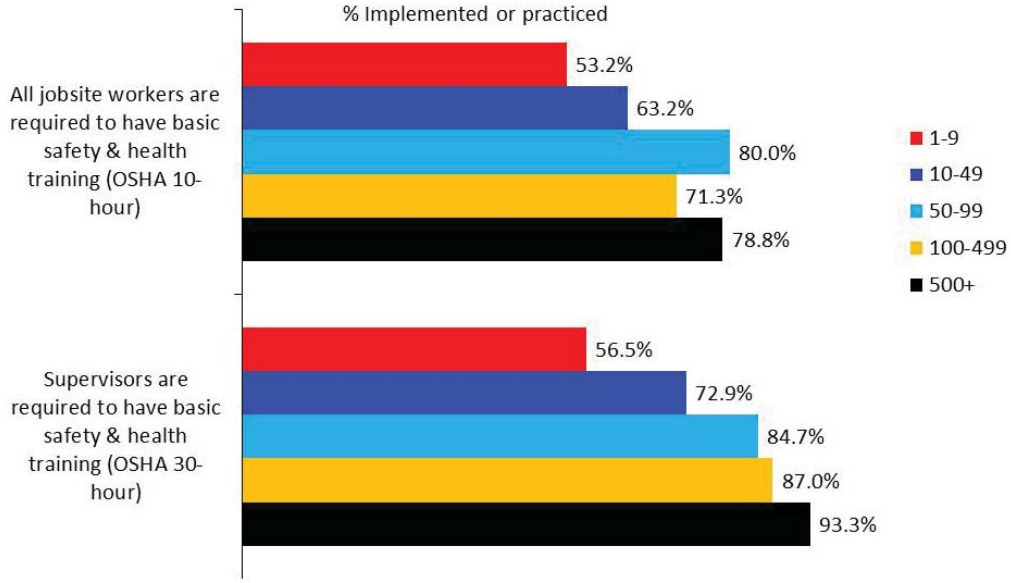
19. General safety and health training by firm size, 2015



Source: Dodge Data & Analytics, 2015 Construction Safety Management Survey. Calculations by the authors.

Compared to large firms, firms with fewer than 10 employees were less likely to require OSHA 10-hour and 30-hour training. Only 53% of these small firms required OSHA 10-hour training for all jobsite workers, the lowest among the respondent firms (Chart 20). About 57% of these small firms required the OSHA 30-hour training for supervisors, while almost all supervisors (93.3%) were required to do so in firms with 500 or more employees.

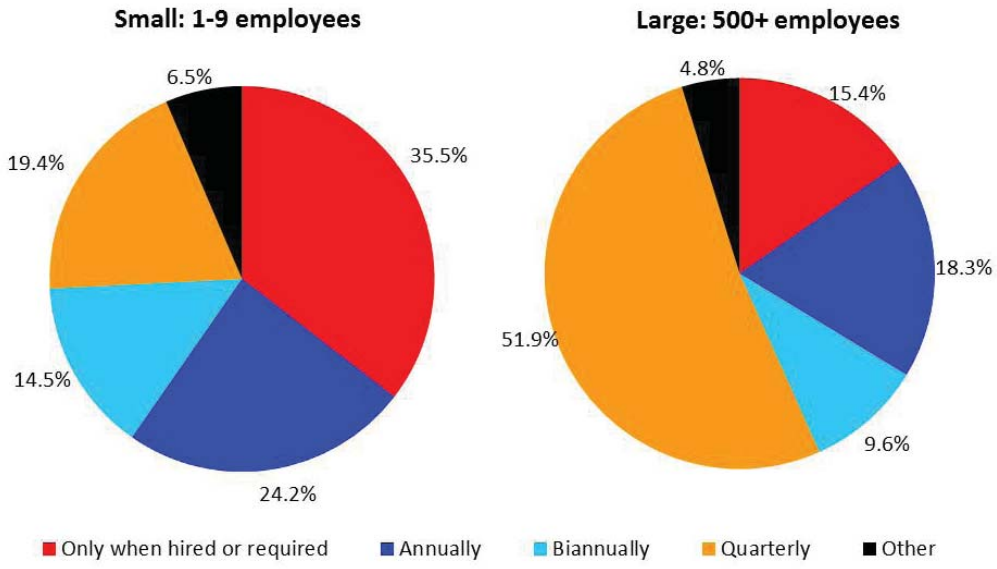
20. OSHA training by firm size, average of 2012 and 2015



Source: Dodge Data & Analytics, 2012 and 2015 Construction Safety Management Survey. Calculations by the authors.

Small firms also provided training to their employees less frequently. For the 2012 and 2015 average, more than one third (35.5%) of firms with fewer than 10 employees provided training when employees were hired or when it was required (Chart 21). In contrast, more than half (52%) of the largest firms provided training quarterly, nearly three times higher than the proportion among the smallest firms (19%).

21. Frequency of general safety and health training, small versus large firms, average of 2012 and 2015



Source: Dodge Data & Analytics, 2012 and 2015 Construction Safety Management Survey. Calculations by the authors.

Conclusion

The findings suggest that overall, firm size is significantly correlated with the degree to which safety management programs are implemented and the strength of the safety culture in the construction industry. Compared to large firms, firms with fewer than 10 employees are less likely to adopt safety protections, personal protective equipment (PPE), and Prevention through Design (PtD) to promote safety and health; and less frequently to provide safety and health training to their employees. Small firms are also less likely to involve workers in, or demonstrate true management commitment to, safety and health than large firms. Thus, it is critical to continue reaching out to small firms and providing them with the information and resources they need to improve worker safety and health as well as safety culture.

References

- Dodge & Data Analytics. 2013. Safety Management in the Construction Industry. http://www.cpwr.com/sites/default/files/publications/SafetyManagementinConstructionSMR-2013_0.pdf
- Dodge & Data Analytics. 2016. Building a Safety Culture: Improving Safety and Health in the Construction Industry. http://www.cpwr.com/sites/default/files/research/Building%20a%20Safety%20Culture%20SmartMarket%20Report%202016%20ff.pdf

Data Sources

- Dodge & Data Analytics, 2012 and 2015 Construction Safety Management Survey (CSMS).

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About the CPWR Data Center

The CPWR Data Center is part of CPWR – The Center for Construction Research and Training. CPWR is a 501(c)(3) nonprofit research and training institution created by North America's Building Trades Unions, and serves as its research arm. CPWR has focused on construction safety and health research since 1990. The Quarterly Data Reports – a series of publications analyzing construction-related data, is part of our ongoing surveillance project funded by the National Institute for Occupational Safety and Health (NIOSH).

Please visit CPWR's other resources to help reduce construction safety and health hazards:

Construction Solutions http://www.cpwrconstructionsolutions.org/
Construction Solutions ROI Calculator http://www.safecalc.org/
The Electronic Library of Construction OSH http://www.elcosh.org/index.php
Falls Campaign http://stopconstructionfalls.com/
Hand Safety http://choosehandsafety.org/
Work Safely with Silica http://www.silica-safe.org/

CPWR is the research arm of North America's Building Trades Unions, and it is uniquely qualified to serve workers, contractors, and the scientific community through its program of applied research. This Quarterly Data Report was produced using funds provided by Cooperative Agreement U60-OH009762 from The National Institute for Occupational Safety and Health (NIOSH). The contents are solely the responsibility of the authors and do not necessarily represent the official views of NIOSH.

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