*Annals of Work Exposures and Health*, 2020, 64, No. 8, 897–902
doi: 10.1093/annweh/wxaa060
Advance Access publication 1 July 2020
Short Communication



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# Does Experiencing an Injury Claim Impact Small Construction Company Leaders' Participation in a Fall Protection Survey?

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Submitted 7 February 2020; revised 29 April 2020; editorial decision 27 May 2020; revised version accepted 29 May 2020.

## Abstract

**Objectives:** Workers in small and medium residential construction companies (≤50 employees) have a high risk of fall-related fatality or disability. However, little is known about effective ways to engage with this subsector for research and training. We tested whether insurance-documented fall-related claims during the past 12 months and lower familiarity with equipment motivated companies' representatives to engage with a fall protection survey.

**Methods:** Oregon's largest workers compensation insurer drew a random anonymous sample of small and medium residential construction that did ($n = 197$) and did not ($n = 195$) have a recent fall-related claim. Samples were stratified by size, trade, and region. Company representatives were emailed a 34-item questionnaire about equipment familiarity to enter a raffle to win fall-prevention equipment. We coded survey engagement binarily, indicating whether a participant completed at least half of the survey. Familiarity with 10 pieces of equipment was measured with a scale from 0 (never seen it) to 3 (use it frequently) points.

**Results:** The survey was initiated by 88 out of 392 representatives (22.4% response rate). Of those, 63 representatives provided the company identifier which was needed to establish claim status. Survey engagement was higher among representatives from companies with claims compared with those without (57.6 versus 42.4%, $P = 0.16$). Equipment familiarity was lower among company representatives with lower survey engagement (1.15 versus 1.56, $P < 0.05$).

**Conclusions:** The survey had a relatively encouraging response rate for a hard-to-reach sector. The large but not statistically significant difference in survey engagement rates suggests that adverse events motivate companies to engage with fall protection research. Low equipment familiarity in the sample substantiates the need to identify effective engagement methods for fall protection practices.

**Keywords:** accidental falls; construction industry; occupational injuries

## Introduction

Small and medium construction companies (≤50 employees) accounted for 74% of fatal falls from elevation between 2011 and 2015 (Dong *et al.*, 2018). The burden of such falls is substantial, as small (<20 employees) companies make up 90% of construction companies with payroll in the USA (Marín and Roelofs, 2018; The Center for Construction Research and Training, 2018). The average indemnity and medical expenses cost of non-fatal falls is $46 592 per claim (National Safety Council, 2020). Reducing fall-related injuries and deaths is arduous because employers and workers of small residential construction companies are difficult to engage, and thus are underrepresented, in prevention research (Legg *et al.*, 2017; Marín and Roelofs, 2018). This challenge is evidenced by the low-to-moderate survey response rates that range from 10.0 to 35.7% (Baruch and Holtom, 2008; Choi and Carlson, 2014). Factors such as less structured managerial practices, lack of financial or personnel resources, low access to information or equipment, and geographic dispersion may contribute to this disengagement (Legg *et al.*, 2017).

A study from the Center for Construction Research and Training (CPWR) indicated that representatives (e.g. owners and safety officers) from small residential companies may be more likely to engage with prevention research if their company had experienced a fall that resulted in a workers' compensation claim (Scruggs *et al.*, 2014). This statement is supported by the Motivating Operations (MO) theory, which predicts that an antecedent environmental condition may alter the value or effectiveness of a consequence and the behaviors associated with it (Laraway *et al.*, 2014). Per this theory, a recent fall may function as an MO by increasing the value of protective practices (e.g. workers using fall protection equipment), and increasing leaders' safety-related behaviors (e.g. engaging with materials or information about fall protection equipment, enforcing safety practices).

This short communication tested the hypothesis that leaders from small and medium residential construction companies that had a recent fall-related workers compensation claim would have higher engagement with a fall protection survey than representatives of comparable companies without such claims. We also examined whether familiarity with fall protection equipment, which may independently be associated with fall risk, differs by survey engagement. Additionally, our study advances the field by exploring respondent and company characteristics that may impact engagement by leaders in this hard-to-reach construction subsector (Kaskutas *et al.*, 2016). The goal of our research is to find effective ways to improve working conditions in this hard-to-reach construction subsector and ultimately reduce the inordinate burden of falls.

## Methods

### Participants and data sources

We partnered with the leading workers' compensation insurer in Oregon (SAIF Annual Report, 2018) to establish a stratified random sample of small and medium residential construction companies (≤50 employees) in high-risk trades (e.g. painting, framing, and roofing). First, the insurer identified all active and current residential construction policyholders with a current standard premium of ≤$20 000, which is the cutoff point utilized by the insurer to designate small organizations ($N$ = 6935). Our sample was double-blinded, so policyholder identifiers were withheld from researchers and their responses withheld from the insurer. The insurer drew a stratified random sample of policyholders with an injury claim due to a fall from an elevation (e.g. major and minor falls including fatalities) between 1 January 2016 and 3 March 2018, that incurred any reimbursement cost ($n$ = 197). This sample was matched with policyholders without a fall-related claim since January 2016 (2 years without claims; $n$ = 195).

In July 2018, the insurer mailed policyholders (e.g. owner and safety representative; $n$ = 392) a link to a 10-min online survey with 34 items. Policyholders were notified that their responses were shared only with researchers and were kept fully confidential from the insurer. A reminder was sent via postal mail 2 weeks after. Participants did not receive survey incentives but were informed that their company would be entered into a raffle to win fall protection equipment and training. The methods and procedures were approved by the Oregon Health & Science University Institutional Review Board.

### Outcomes

The response rate was computed based on the number of surveys with at least one question completed. We defined survey engagement with a binary variable indicating whether a participant completed at least half of the survey, which is a conventional benchmark (Courser, 2008). We measured the familiarity with fall protection equipment with 10 questions about frequently available tools (i.e. safety boots, wall walker, safety bar, pump jack, power pole, anchor, choker strap, truss anchor, yo-yo, and rope grab (Kaskutas *et al.*, 2010). Participants reported if they never seen it (0), seen it but never used it (1), used several times at work (2), and often used at

work (3). We created a mean score as a variable for the overall equipment familiarity and use.

### Covariates

The survey also asked the job title of the respondent (e.g. owner, president, manager, safety officer, and crew member), their age, as well as the number of years they have worked in the industry. Likewise, company characteristics were recorded such as the total number of homes built or serviced during the last year and the average number of employees per year.

### Statistical analysis

We first described the variables per survey engagement. We tested our hypothesis with a $\chi^2$ test of proportions and conducted several one-way analyses of variance to examine the average differences in survey engagement for each variable, one at a time. All inferential tests were two-tailed with a 0.05 level of significance.

## Results

The survey had a 22% response rate, with 88 participants starting the survey out of 392 invited policyholders. Only 63 out of the 88 participants who initiated the survey provided their insurer-assigned confidential company ID number, which was needed to link it back with fall claims per insurers' records. Of those, 33 had a fall claim during the last 12 months, and 30 did not. Survey engagement (i.e. completing half or more of the survey items) was higher among representatives from companies with fall-related claims when compared with representatives from companies without claims (19/33 or 57.6% versus 12/30 or 40%). This difference of 17.6% was not statistically significant [$\chi^2(1, n = 63) = 1.94$, $P = 0.16$].

The familiarity with fall protection equipment was low across all representatives, with an average of 1.42 points in a 0 (never seen it before) to 3-point (used often) scale. However, equipment familiarity was higher among representatives who completed half or more of the survey [$F(1, 54) = 6.81$, $P < 0.05$]. Specifically, familiarity with anchors [$F(1, 53) = 8.24$, $P < 0.05$], choker strap [$F(1, 49) = 11.07$, $P < 0.05$], and rope grab [$F(1, 49) = 10.98$, $P < 0.05$] was much higher among those who completed half or more of the survey.

Of the 88 initial participants, 59 participants provided information about their job title. The survey was completed by owners or presidents ($n = 30$, 34.1%), managers or leaders ($n = 18$, 20.5%), or other representatives (e.g. safety officer, secretary or treasurer, and crew member; $n = 11$, 12.5%). The average age of respondents was 51.18 years (SD = 12, $n = 55$) with an average of 24.36 years in the construction industry (SD = 12.27, $n = 58$). The average company size was 11.66 employees (SD = 10.89, $n = 58$) and on average, companies serviced or built 42.5 (SD = 51, $n = 53$) homes during the last year.

The survey had similar response rates by job titles [$\chi^2(2, n = 59) = 1.01$, $P = 0.602$]. Table 1 shows respondent and company characteristics by survey engagement. There were no significant mean differences in company size according to the participants who completed at least half of the survey versus those who did not [$F(1, 57) = 0.389$, $P = 0.535$]. Respondents who completed half or more of the survey reported almost twice the number of homes built or serviced in the past year than their counterparts who completed less than half of the survey. This difference was borderline statistically significant [$F(1, 53) = 2.976$, $P = 0.091$]. Likewise, there was no difference in terms of respondent age [$F(1, 55) = 0.83$, $P = 0.364$] or years of experience in construction [$F(1, 58) = 1.064$, $P = 0.307$].

## Discussion

We show that representatives whose small residential construction companies had a fall-related claim in the past 12 months had higher engagement with a fall protection survey than representatives from companies without such claims. Although the results were not statistically significant, the absolute rate difference of 17.6% suggests that a triggering event, such as a fall-related claim, may be a useful strategy to engage with these companies. Per the MO theory, the likely explanation is that representatives are more likely to engage with research and outreach because they already experienced the costly and detrimental consequences of a fall from elevation to both their workforce and bottom-line. As such, our findings reflect a concern as companies' representatives may only respond to fall protection research and outreach mostly after experiencing adverse events.

Familiarity with fall protection equipment was low across the sample, although the survey was sent to representatives such as owners, presidents, and managers who do not necessarily work directly with these pieces of equipment. Still, representatives from companies who reported less familiarity with fall protection equipment were also less likely to engage with the survey. The low levels of equipment familiarity contrasts with a prior study with residential construction workers that showed an 80% self-reported prevalence of any fall protection equipment usage (Kaskutas *et al.*, 2016).

**Table 1.** Differences by survey engagement in workers' compensation claims, company characteristics, and familiarity with fall-prevention and control equipment among representatives from small and medium residential construction companies ($n = 88$).

| | $n$ | Did not complete at least half of the survey ($n = 52$) | | $n$ | Completed half or more of the survey ($n = 36$) | | $P$ |
|---|---|---|---|---|---|---|---|
| | | *M* | SD | | *M* | SD | |
| Workers' compensation claim (No/Yes)[a] | 14 | 42.4% | | 19 | 57.6% | | |
| Number of employees per year | 23 | 9.91 | 7.98 | 34 | 11.41 | 8.85 | |
| Serviced homes last year | 23 | 28.31 | 12.517 | 35 | 52.58 | 284.8 | * |
| Respondent age | 22 | 53 | 11.15 | 33 | 49.97 | 12.55 | |
| Years in construction | 24 | 26.5 | 14.97 | 34 | 22.85 | 11.92 | |
| Equipment familiarity[b] | 18 | 1.15 | 0.61 | 36 | 1.56 | 0.54 | ** |
| Safety boots familiarity[b] | 18 | 1.11 | 1.02 | 36 | 1.41 | 0.93 | |
| Wall walker familiarity[b] | 18 | 1.0 | 0.68 | 36 | 1.11 | 0.74 | |
| Safety bar familiarity[b] | 18 | 0.94 | 0.72 | 36 | 1.30 | 0.92 | |
| Pump jack familiarity[b] | 17 | 1.23 | 0.66 | 36 | 1.66 | 0.98 | |
| Power pole familiarity[b] | 17 | 0.88 | 0.69 | 36 | 1.02 | 0.81 | |
| Anchors familiarity[b] | 17 | 1.41 | 0.71 | 36 | 2.19 | 1.00 | ** |
| Choker strap familiarity[b] | 13 | 1.07 | 0.75 | 36 | 2.06 | 0.95 | ** |
| Truss anchor[b] | 13 | 1.00 | 0.91 | 36 | 1.16 | 0.87 | |
| Yo-yo familiarity[b] | 13 | 0.92 | 0.64 | 36 | 1.50 | 1.00 | |
| Rope grab[b] | 13 | 1.23 | 0.72 | 36 | 2.19 | 0.99 | ** |

[a]Companies that had a fall-related claim during the last 12 months determined with insurer records.
[b]Self-reported and measured with a scale from 0 (never seen it) to 3 (use it frequently) points.
*$P < 0.1$.
**$P < 0.05$.

Our results also showed that survey engagement was similar across respondent characteristics such as job title, experience in the subsector, or age, as well as company characteristics in terms of size. Nonetheless, there was a borderline statistical difference in survey engagement by service volume. Future outreach and research efforts may be more successful by first targeting more established companies and employers. Altogether, our findings raise the need to find effective outreach methods to engage companies with reduced motivation or other barriers to engage in education or research because such companies may have prominent fall protection knowledge and practice gaps. Our findings suggest that many small residential construction companies across Oregon, regardless of active claim status, could benefit from training on and increased access to fall protection equipment.

## Practice and research implications

The fact that the insurer sent the survey invitation may have lowered the response rate if participants feared that their premiums could be increased (Kvorning *et al.*, 2015). Community-based tactics (e.g. forming collaborative partnerships with community-based organizations for recruitment and survey administration) may increase the engagement of construction companies with prevention research and practices (Marín *et al.*, 2015; Marín and Roelofs, 2018). Community-based organizations have higher trust than regulatory agencies, insurance companies, and even universities (Kvorning *et al.*, 2015). Further research is encouraged to study the impacts of community-based outreach methods. Additionally, it is possible that greater response and engagement rates may occur if outreach is conducted within a few weeks following an incident (Cunningham and Sinclair, 2015). Research in this subsector should investigate tailored timing of invitations that also need to be considerate of time needed for coping after a fall-related death or disabling event.

## Study strengths and limitations

Strengths of the study include a partnership with a leading workers' compensation insurer and a stratified, random, and double-blinded sampling method.

Limitations include a small sample size, which is typical in this subsector but was still powered to detect our estimated response rate. Per the literature, our sample was powered expecting relatively low-to-modest 10–30% response rates (Baruch and Holtom, 2008). The response rate of 22.4% is within this range (Choi and Carlson, 2014). Another limitation was missing data, which affects the statistical and internal validity. Furthermore, our survey did not capture the fall histories of companies, although the insurer sampled companies with recent claims as well as companies without claims in the last 2 years. Selection bias is a related issue as concerns that survey responses could be revealed to the insurer may have prevented some policyholders, potentially those with worse adherence to safety practices, from participating. Providing a financial incentive to respondents, in addition to the raffle, may have improved participation but would have also weakened our ability to test our hypothesis that representatives would be motivated to engage with fall protection survey. Finally, though the MO theory is empirically supported through laboratory-based and highly controlled applied studies (Laraway *et al.*, 2014), its generalization to occupational scenarios is less supported.

## Conclusions

We report a non-statistically significant difference showing that representatives from companies with recent fall-related claims were more likely to complete at least half of a fall protection survey, presumably because they already had experienced the consequences of a fall. Equipment familiarity was lower among those with lower survey engagement, which highlights a need for continued outreach and training with this subsector. We recommend that studies examine the effectiveness of more precise timing of recruitment methods or studies with more profound methods of engagement involving trusted partners and other types of community-based intermediary organizations.

## Funding

This study was funded by the National Institute of Occupational Health Sciences through the Oregon Fatality Assessment and Control Evaluation (OR-FACE) program (grant number U60 OH008472). This work was also partially supported by the Oregon Institute of Occupational Health Sciences at Oregon Health & Science University via funds from the Division of Consumer and Business Services of the State of Oregon (ORS 656.630).

## Acknowledgments

The authors would like to acknowledge the contributions of Mike Lazarev, Ila-Gilbert Jones and Nikolas Smart.

## Conflict of interest

The authors declare no conflict of interest relating to the material presented in this article. Its contents, including any opinions and/or conclusions expressed, are solely those of the authors.

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