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Evaluation of the Implementation and Effectiveness of the Ontario Working at Heights Training Standard: Final Report



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List of abbreviations

FP, fall protection

FTE, full-time equivalent employee

IWH, Institute for Work & Health

MOL, Ministry of Labour

OHS, occupational health and safety

WAH, working at heights

WSIB, Workplace Safety & Insurance Board

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Executive Summary

The Institute for Work & Health's evaluation of the implementation and effectiveness of the Ontario working at heights (WAH) training standard is reported on.

Introduction

As of April 1, 2015, employers were required by regulations under the provincial Occupational Health and Safety Act to ensure that workers on construction projects had successfully completed a WAH training program, if they may use specified methods of fall protection. There was a transition period, until October 1, 2017, for workers who had previously completed fall protection training. The WAH training program standard specifies a basic theory module of at least 3.0 hours in length and a practical module of at least 3.5 hours in length. The program and any training provider delivering the program must be approved by the Chief Prevention Officer, Ministry of Labour.

The evaluation has two overarching questions:

1. To what extent has the WAH training reached the target population?
2. What impact has introduction of the WAH training requirements had on fall prevention on construction projects?

Methods in brief

The evaluation design consists of six elements of data collection and analysis:

- Analysis of Ministry of Labour (MOL) administrative records of WAH training
- Training provider survey -- 87 participants
- Construction employer survey -- 390 participants, from companies varied in size and economic sector
- Learner pre-post follow-up surveys -- 633 participants from the Infrastructure Health and Safety Association's WAH training (internal staff and training partners), varied in experience, sector and location
- Labour inspector interviews -- 10 inspectors from 5 regions
- Analysis of workers' compensation administrative records of lost-time claims

Evaluation results on program implementation

The evaluation findings indicate that the WAH training intervention was implemented as intended. The number of training provider organizations steadily increased over time so that about 220 are currently approved. The construction sector and other affected sectors became aware of and undertook the required training by the deadline of October 1, 2017. Among construction employers with six or more employees, 92% were found to be compliant with the requirement to ensure that affected workers were trained. By the transition deadline, about 420,000 Ontario-based learners had successfully completed the training (a number equivalent to 88% of the number of construction workers in Ontario in 2016). The survey of training providers substantiated that, for most, the new WAH training is more comprehensive and practical than the fall protection training their organizations previously delivered.

Evaluation results on intermediate outcomes

The evaluation study's surveys with IHSA WAH learners, showed that the training had a large impact on their knowledge about working at heights safety. Substantial improvements were found in ten of 12 self-reported WAH safety practices targeted by the training (including checking for fall hazards, maintaining 100% tie-off, and avoiding shortcuts that compromise safety). Changes at the work site were also evidenced in the survey of construction employers, particularly with regards to the purchase of new equipment, the development of fall rescue plans, and the inspection of equipment. On the other hand, labour inspectors in spring 2017 were not able to discern any changes in work practices attributable to the WAH training on construction sites.

Evaluation results on final outcome

Workers' compensation claim data were available until only the year 2017, when the intervention was not yet fully implemented. Nevertheless, a statistically significant impact was found of the WAH training intervention on the construction sector's lost-time claim rate of falls targeted by the intervention. This impact was mostly seen among the smallest employers (less than 5 full-time equivalent employees) and the sectors with the highest claim incidences. Impacts of the training were evidenced in other economic sectors too, including manufacturing and retail & wholesale trade. The full effect of the training program on the prevention of injury cannot yet be measured.

Discussion: effectiveness of the WAH initiative

The evidence from the evaluation suggests that on balance the mandatory WAH training standard has been effective. Large effects on knowledge and moderate effects on safety practices were seen in the survey of learners, and the analysis of lost-time compensation claims found a modest impact to date on the fall injuries targeted by the intervention. This pattern is consistent with that seen in research with other OHS training interventions. Nevertheless, many in the stakeholder community, including members of the project's advisory committee find the impact of the WAH initiative on fall injuries and fatalities to be a disappointment. While the full impact of the intervention has not yet been seen, results suggest that further new action by the system to prevent falls would be warranted to meet stakeholder expectations.

Conclusions

1. The evaluation found consistent evidence that the mandatory WAH training program reached the target audience.
2. The evaluation found consistent evidence that the training had an impact at the work site. A statistically significant but modest impact on lost-time claims for falls targeted by the intervention was found in 2017.

Considerations for the future

The report includes suggestions for improving the WAH curriculum, the WAH program, and working at heights safety more generally. These were gathered through the surveys of providers, learners and employers, and input from the project advisory committee.

1. Introduction

The Introduction gives an overview of the evaluation of the implementation and effectiveness of the introduction of the Ontario working at heights (WAH) training standard (“the intervention”), as well as a description of the Ontario construction sector.

1.1 Primary evaluation questions

The evaluation has two overarching questions:

- i) To what extent has the working at heights training reached the target population?
- ii) What impact has introduction of the WAH training requirements had on fall prevention on construction projects?

1.2 Background to the working at heights training standard

Among the recommendations of the Expert Advisory Panel on Occupational Safety & Health in December 2010 was a priority emphasis on the development of mandatory fall protection (FP) training for workers working at heights. In response, the Occupational Health and Safety Awareness and Training Regulation (O. Reg. 297/13) and the Construction Projects Regulation (O. Reg. 213/91), under the Occupational Health and Safety Act, were amended to require employers to ensure that workers on construction projects successfully complete a WAH training program, if they may use specified methods of fall protection. The program must meet a specified training program standard and be approved by the Chief Prevention Officer (CPO), and it must be delivered by a training provider approved by the CPO. The WAH program standard was announced in December 2013 and the first training programs were approved in March 2015.

The training requirement came into force on April 1, 2015. There was a transition period, until October 1, 2017, for workers previously trained to meet the requirement of Construction Projects Regulation. This older training requirement, which targeted the same type of workers, stipulated only the following: individuals must be trained “adequately” by a competent person; individuals must be given oral and written instructions; and employers must have records of the training. The transition deadline was initially said to be April 1, 2017, but in March 2017, its postponement to

October 1, 2017 was announced. Though the training first came into force in April 2015, the program standard had been announced in December 2013. The first training provider was approved to deliver training in March 2015.

The provincial training standard for working at heights prescribes a program with a Basic Theory module of at least 3.0 hours in length and a Practical module of at least 3.5 hours in length. While the Basic Theory module can be delivered using any of an e-learning, distance learning, or in-person mode of delivery, the Practical module may only be delivered in person and there is a specified maximum of 12 learners. As a result, the training is typically delivered in a one-day in-person session with 12 or fewer learners. The specified content of the training includes not only the use of the specified fall protection methods (such as a fall arrest system), but also legal rights and responsibilities, hazard identification, safe ladder use, warning methods and physical barriers, work access equipment and fall rescue plans.

1.3 Theory of change

A theory of change was developed at the outset of the project to guide the evaluation design, based on publicly available documentation and key informant interviews with stakeholders. The current version of it is shown in Figure 1. It depicts the regulation and standards bringing about improved provider training, leading to better WAH knowledge among trained front-line workers and trained supervisors. This knowledge is presumed to result in safer WAH practices by workers, and be supported by better supervision, better equipment and better management. The final outcome is fewer fall injuries.

1.4 Evaluation elements

To address the evaluation's primary questions, the evaluation design consists of six elements of data collection and analysis. By using these varied data sources and stakeholder perspectives, the elements complement one another and "triangulate" on the evaluation object to enhance the internal validity of the evaluation:

- Analysis of Ministry of Labour (MOL) administrative records of WAH training
- Training provider survey
- Construction employer survey
- Learner pre-post follow-up surveys
- Labour inspector interviews

- Analysis of workers' compensation administrative records of lost-time claims

There was at the outset of the study an additional planned element of a survey of trade workers registered with the Ontario College of Trades. However, this did not advance past the pilot stage; results are reported in Appendices A-B.

1.5 Ontario construction sector

The Ontario construction sector is dynamic and complex, employing trades people, training apprentices, labourers, project managers and engineers on construction projects ranging from small reroofing projects to multi-billion dollar infrastructure investments. Employment in the Ontario construction sector has increased by 16% between 2010 and 2017, from 440,000 to 510,000 (Statistics Canada, 2019). Over the same period, the share of the Ontario labour force employed in construction has increased from 6.7% to 7.1%.

The full-time equivalent construction workforce employed by construction contractors registered with the Ontario Workplace Safety and Insurance Board (WSIB) increased from 280,000 in 2010 to 423,00 in 2017 (50% increase). Self-employment is a common practice in the Ontario construction sector, with estimates indicating that self-employment accounts for as much as 30% of construction sector employment (Prism, 2010). An important portion of the increase in the WSIB FTE estimate arises from the WSIB's requirement in 2013 that independent operators (i.e., self-employed individuals who work for more than one person over an 18-month period) register for WSIB coverage (perhaps 50,000 FTEs).

In addition to the employment growth noted above, the Ontario construction workforce is aging. The proportion of construction workers aged 55+ have increased from 16% in 2010 to 21% in 2017. (Statistics Canada, 2019)

The North American Industry Classification System (NAICS) defines four primary sub-sectors in the Canadian construction sector: residential building construction, heavy and civil engineering construction, non-residential building construction and trade contracting. The WSIB classifies construction sector employers to 13 rate groups (see Table 1). Approximately 40% of the Ontario construction workforce is active in the residential construction sector, comprising new low-rise and high-rise construction as well as residential renovation and repair (Prism, 2010).

Work performed at heights is a very common activity in the Ontario construction sector and is a very significant occupational health and safety hazard. Over the past ten years, 22% of lost-time workers' compensation claims attributed to falls from heights occurred to the 8% of the WSIB-covered FTEs corresponding to workers employed in the construction sector.

Precise estimates of how frequently work in the construction sector involves tasks performed at heights are not routinely available in Ontario. We have made use of two sources of information to obtain estimates of the frequency of exposure to working at heights. In a survey of 3,200 Ontario workers, 30% of persons working in the construction sector reported exposure to working at heights greater than two metres above the ground or floor as frequently as every day and an additional 15% reported exposure to heights at least once a week (Smith et al., 2015). Projecting these estimates to the Ontario construction workforce would suggest that as many as 80 million work hours per year involve tasks performed at heights. A second source of information is available from the US Occupational Information Network (O*Net), which conducts regular surveys of workers to obtain estimates of occupational exposures. In the O*Net surveys, workers are asked the frequency of exposure to 'work in high places' and 'time on ladders, scaffolds and poles.' We obtained exposure time information from this data source for the 25 most common occupations in the Ontario construction sector. Projecting estimates from this source to the Ontario construction workforce suggests that total annual exposure hours to work in high places and time on ladders, scaffolds and poles is in the range of 65-70 million work hours per year (see Appendix C).

1.6 Structure of the report

Following a brief description of the methods employed in the study, the core evaluation findings are presented in three sections corresponding to the following:

- implementation of the mandatory WAH training requirements (i.e., the "intervention")
- intermediate outcomes of the intervention (i.e. WAH knowledge gain, WAH practice changes)
- final outcome of the intervention (i.e. changes in falls from heights injuries)

This is followed by a discussion and conclusions section to synthesize the results.

The report closes with a section entitled “Additional evaluation findings to support continuous improvement,” which, among other material, includes syntheses of suggestions from employers, learners and providers, gathered through the surveys. This is followed by Project Advisory Committee Suggestions, Tables, Figures, and Appendices.

2. Methods in brief

The methods of the evaluation are introduced briefly here. More detail is found in Appendix D.

2.1 Analysis of MOL administrative records of WAH training

Anonymized extracts of training records were provided by the Ministry of Labour (MOL) with information about dates of WAH training, names of WAH training providers and learner postal codes. This allowed the calculation of counts of learners by calendar quarter, training provider, and geographical region.

2.2 Survey of training providers

Approved WAH training provider organizations were contacted between July and September 2018 for an interview by telephone. Contact was limited to the 124 providers (out of 200) with the highest training activity over the previous year. Eighty-seven providers participated. The questionnaire is included in Appendix E. Its primary aim was to compare the current WAH training with any fall protection training they provided previously; its secondary aim was to collect feedback on the WAH curriculum and the program more generally.

2.3 Survey of construction employers

A listing of construction employers with six or more employees was obtained from InfoCanada, a commercial provider of marketing information. Contact with employers was attempted by telephone from July to December 2017. Ultimately 390 organizations participated, representing 23% of all eligible organizations in which contact with a person was made or a response rate of 15% using Statistics Canada methods (2001). Active declines numbered 218 (see Appendices D and Z for more details on recruitment). The questionnaire is included in Appendix F. The interview sought to assess primarily an employer's compliance with the WAH training requirement and their self-reported changes in management or worker practices, and secondarily an employer's difficulties in complying with the requirement and their general reaction to the program.

2.4 Learner pre-post follow-up surveys

A survey of successful participants in WAH training classes was undertaken in collaboration with the Infrastructure Health and Safety Association (IHSA), the largest provider of WAH training in Ontario. From September to November 2017, during usual WAH classes, 43 IHSA-affiliated instructors (both internal staff and external training partners) distributed a form on which interested potential survey participants could provide contact information for later follow up by researchers (see Appendix G). Researchers contacted participants at one week, four weeks and seven weeks post-training for participation in either an online or telephone survey (questionnaires in Appendices H-J). Participation was acknowledged by payment of \$40, \$30, and \$30 over the three survey waves. There was an eligibility requirement: that people needed to plan to work on a construction project in the following four weeks. From 1740 successful learners, 633 eligible volunteers completed the first questionnaire and 561 of them later completed at least one of the two follow up questionnaires.

The surveys together primarily sought to assess the knowledge gain of learners and any change in their self-reported WAH safety practices; they also sought suggestions for improving the WAH curriculum and WAH safety more generally.

2.5 Interviews with labour inspectors

Two labour inspectors from each of the five MOL regions were interviewed by researchers between March and May 2017. Transcripts from the one-hour semi-structured interviews were analyzed qualitatively for themes. The interviews focused on how WAH/fall protection training requirements were enforced and whether inspectors had noticed changes in WAH safety practices at the work site (see Appendix K for the interview guide).

2.6 Analysis of workers' compensation administrative records of lost-time claims

Extracts of lost-time compensation claim records were obtained from the WSIB for the period 2004-2017. Information in these records was used to create three categories of injuries:

- targeted falls (i.e., falls from heights due to events targeted by WAH training such as falls from ladders and roofs)

- untargeted falls (i.e. falls from heights due to events *not* targeted by WAH training such as falls down stairs and falls at the same level)
- “other acute injuries,” (i.e. all non-fall injuries caused by other events involving mechanical energy transfer such as struck by injuries)

See Appendices D and L for further information about how these categories were defined.

Pre-post WAH training intervention comparisons were made by comparing lost-time injury rates in 2017 to the three years pre-intervention, 2012-14. The years 2015 and 2016 were excluded from the analysis, since large portions of the target population remained unexposed to the WAH training during those years. Pre-post changes in the rates for targeted falls were compared with declines in the rates of untargeted falls and of other acute injuries. It was presumed that changes in these other injury rates would reflect ongoing changes (“secular trends”) in the workforce, construction safety and WSIB claims management; and that any additional decline seen in the rate of targeted falls could be attributed to the WAH training intervention.

3. Evaluation results on program implementation

3.1 Analysis of MOL administrative records of WAH training

3.1.1 Description of training activity by date of training and learner geographic location

MOL records show that about 500,000 instances of successful WAH training had taken place by the end of April 2018 (Figure 2). The distribution by calendar quarter (Table 2) shows a peak in the first quarter of 2017. This corresponds to the three months preceding April 1, 2017, which was initially announced as the deadline for completing training. The quarter with the second-highest volume was the second quarter of 2017. Most learners had a postal address within Ontario, but 4% had addresses from other provinces or the United States.

In order to address the evaluation's aim to understand the extent to which the WAH training was taken up by the target population, the number of training completions by Ontario-based learners as of the October 1, 2017 transition deadline was compared with the number of Ontario construction workers in 2016 (Table 3). A ratio of 0.88 training completions per construction worker was found, consistent with a high degree of uptake by the target population. It was high in all economic regions, varying from 0.80 in the Greater Toronto Area to 1.12 in the Northwest.

To provide a comparator for the above ratio of 0.88 training completions per construction worker, data from the survey of construction employers were used to estimate that the ratio of fall protection equipment users to employees in construction companies is 0.4. (This ratio must be used with caution since it is not derived from a representative sample of the employer population.)

In order to explore whether service delivery seemed to lag in any particular region, the increases in training completions over time were compared across regions. The increase is expressed in Figure 3 as the percentage of training completions relative to the total training completions at the time of the October 1, 2017 transition deadline. The assumption is that by the time of the deadline, any lags in service delivery would have been "caught up," especially considering the deadline had been postponed by six months. As the figure demonstrates, it appears that the delivery of training over time was very similar for all regions.

3.1.2 Training activity by training provider type and magnitude of activity

At the time of administrative record extraction, the WAH training had been provided by 199 approved WAH training providers (Table 2). Seventy-seven per cent (77%) of the providers (n = 154) delivered training to external clients, while the remainder (n = 45) delivered training in-house. However, 97% of the total training volume was delivered by the first group of providers.

Table 4 gives further insight into how the training volume was distributed across providers. It shows that only four organizations provided half of the training; and 30 organizations, including those four, provided 80% of the training. The remaining 20% of training was provided by 169 providers. With only one exception, all of the in-house providers were in this latter group.

3.2 Training provider survey: implementation

3.2.1 Characteristics of training provider organizations in survey

Table 5 provides a description of the training provider organizations participating in the survey. The key informants responding on behalf of their organizations had job titles of owner/CEO/president (48%), manager/director (28%), trainer/specialist/instructor (14%) or some other title (10%). More than 80% of the organizations had been providing OHS training for five or more years and 85% had five or fewer instructors. Most had provided fall protection training prior to the WAH training standard being introduced.

3.2.2 Coverage of economic sectors by training providers

Table 6 provides a distribution of WAH learners in relation to economic sector, based on pooled estimates from the provider survey. Each provider estimated the distribution of their trainees by economic sector (e.g., 80% construction, 10% utilities, 10% unspecified). The pooled percentages, accounting for the various provider training volumes, yield an overall estimate that 78% of learners were from the construction sector, 7% from utilities, 4% from manufacturing and 3% from transportation & warehousing, with smaller amounts in several other sectors.

3.2.3 Comparison of current WAH training to former fall protection training

Responses to a series of questions provide a description of how the current WAH training compares with the fall protection (FP) training the training providers were delivering prior to the regulatory changes (Table 7). Much of the WAH curriculum content was covered in the providers' pre-existing FP training, with work access equipment and platforms (excluding ladders) being the least often (67%) covered previously. Longer training times for the WAH training were reported on average for both the theoretical and practical components. The WAH training typically gives exposure to a larger variety of equipment than before. Like WAH training, about 80% of the former FP training involved the testing of learner knowledge and skill.

When asked about providers' perceptions of skill acquisition, 71% of providers said that learners acquired more "practical hands-on skills" in the WAH training. When asked a final holistic assessment of which training prepared a learner to work safely, seventy-six per cent thought the WAH training provided better preparation, five per cent thought the FP training did, and 19% thought they provided similarly.

3.2.4 Supplementary investigation of WAH training in manufacturing

As will be described later in this report, the analysis of workers' compensation claims suggested that the WAH training was adopted by non-construction sectors. In order to test the plausibility of that interpretation, the seven providers with the highest reported percentages of learners from the manufacturing sector were contacted. They were asked whether employers from non-construction sectors started to provide WAH training to their employees who worked at heights in non-construction activities. Six of seven providers said there was a "full" shift from FP to WAH training; the seventh said that was the case for 2/3 of employers. The five reasons given for employers undertaking this change were uncertainty about the distinction between industrial and construction regulations, the desire for flexibility in assigning work tasks, the belief that the WAH program would be coming to the industrial sector soon, a response to the promotion of the standard by the OHS system, and a desire to adopt best practice.

3.3 Construction employer survey: implementation

3.3.1 Characteristics of construction employers in the survey

The survey resulted in a final sample of 390 companies whose representatives provided a complete interview. All of the following types of employers were well-represented in the sample (see Table 8 for more detail):

- general and specialty trade contractors
- residential and non-residential construction sectors
- smaller and larger companies (<20 and 20+ permanent employees respectively)
- Greater Toronto Area (GTA) and non-GTA location of business
- Unionized and non-unionized

Forty-five per cent of the companies (n = 175) had temporary employees on the payroll and 83% (n = 323) used subcontractors at least some of the time.

3.3.2 Exposure to heights and use of fall protection equipment

A large majority of companies (83%) reported having permanent employees who were exposed to heights of three metres or more (Table 9). Accordingly, about 79% of companies reported having permanent employees who at least occasionally used fall protection equipment. These values were higher for larger companies than for smaller companies (Appendix M) but did not differ substantially according to GTA/non-GTA location (Appendix N).

Of the 175 companies that had any temporary employees, 59% of them (n = 104) reported that at least some of those employees were exposed to heights and a similar number (n = 99 or 57%) used fall protection equipment (Table 9).

When asked about typical use of fall protection equipment by the majority of their permanent employees, there was an even distribution of answers across the four categories provided to company interviewees: every day, 1-2 X per week, 1-2 X per month, and less than once a month (Table 9).

3.3.3 Awareness of WAH training requirement

The survey interview assessed whether the respondent was aware of the WAH training requirement by asking, “Have you heard about the new working at heights

training available to Ontario construction workers since 2015?” Only companies selecting “Yes, definitely” were considered aware. (The other possible answers were “Yes, I think so,” “No, I don’t think so”, or “No, definitely not.”) Using this relatively stringent definition, 93% of companies were found to be aware of the training requirement (Table 9). This high rate of awareness did not differ substantially by company size or geographical location (Appendices M-N).

3.3.4 Compliance with WAH training requirement

Compliance with the WAH training requirement was determined by comparing the reported number of employees who used fall protection equipment to the reported number of employees who had completed or were enrolled in a WAH training course. The overall rate of compliance by companies was high: 92% of companies having permanent employees using FP equipment had complied with the WAH training requirement (Table 9). For companies with temporary employees using FP equipment, the rate of compliance was 91%.

Compliance was similarly high for both smaller (< 20 employees) and larger (20+ employees) companies (Appendix M); and for firms inside and outside the Greater Toronto Area (Appendix N). High compliance rates ($\geq 90\%$) were also seen for both residential and non-residential sectors, and for unionized and non-unionized workplaces.

3.3.5 WAH training of overseeing supervisory/managerial staff

Research and practice have established that supervisors are a major influence on their subordinates’ work and safety practices. Among companies that had supervisors overseeing workers who use fall equipment, 93% trained all or most of those supervisors; the corresponding value for managers was 74% (Table 10).

3.4 Labour inspector interviews: implementation

3.4.1 Enforcement of fall protection requirement

The ten interviews with labour inspectors from across Ontario in spring 2017 showed that:

- Fall prevention was an ongoing priority for the inspectorate, even outside of “falls blitzes”
- Enforcement of FP/WAH training requirement had been taking place on an ongoing basis
- Non-compliance with requirements for FP use was perceived to occur more often in the residential sector than in the commercial sector; and in small companies more than large
- Small reroofing projects were of special concern to inspectors because of fall risks; some spent time searching for such projects to visit
- During field visits, inspectors examined documentation of FP/WAH training; inspectors assessed worker knowledge and sometimes wrote an order for retraining if knowledge seemed to be lacking

Further detail is found in Appendix O.

3.4.2 Workforce awareness of the WAH requirement

Inspectors said that the members of the workforce affected by the WAH regulations were aware of the WAH training requirement, even if they had not yet taken the training. This awareness was attributed to promotion in the media, as well as communication by inspectors during field visits.

You know, I've seen pretty much everyone knows now that they need this. It's been on the news, or on the radio, it's been in the advertisements, it's talked about throughout the industry. I think the majority of people know that it's here. [Interviewer: Do you ever end up on sites that are part of the underground economy...would they be in the know?] Yes, I would say they know. Probably they're less apt to act on the knowledge, to get compliant, but I believe they still, for the most part, they know. (Inspector 5)

Yeah, I'm pretty sure everybody would be, and a lot of guys, just because the media ads, I think worked real good, because I ... probably listen to some of the same radio stations that most of the construction industry listen to, and pretty much the radio ads were pretty heavy, and I think they have the message that it is changed, and this is the mandatory training, and if you don't

have it, you're going to be stopped from performing work. And even during that two year period that we're out there enforcing it, we are providing information. 'Are you aware of working at heights?' 'Yeah, yeah, we've heard it on the news, we know, we've got training coming up' or 'we've already been trained.' ...I haven't rolled across anybody that hasn't known about the working at heights. They either have it or they're waiting to get it before the April 1st, 2017 date. (Inspector 2)

4. Evaluation results on the impact on intermediate outcomes (WAH knowledge, WAH safety practices)

4.1 Characteristics of participants in the learner survey

The learners completing the first questionnaire (n = 633) were diverse with regards to their previous use of fall protection equipment, sector of work, union status, experience with Ontario construction projects and age (Table 11). About 65% were front-line workers, while the remainder held management, supervisor, technical or administrative positions. About 80% held permanent positions and just over half reported having received formal FP training previously. In terms of language ability, 94% reported being able to easily understand an English telephone message. Of the 633 learners undergoing the training, 384 (61%) were trained by an internal IHSA staff person and 249 (39%) were trained by an external training partner.

4.1.1 Comparison of geographical distributions of IHSA learners and the entire WAH learner population

The representativeness of the study's IHSA learner sample was explored. Postal codes were available for the subset of the follow-up study's participants who received a mailed gift card (n = 444). These postal codes were compared to those in the extract of MOL training records described above. The most frequently represented postal region for each is comprised of postal codes beginning with "L" (44% in the IHSA sample vs. 37% in the training records); and percentages for the next two largest groups in the IHSA sample are from the "M" and "N" regions (18% and 17%, respectively). This compares with the MOL training records for those regions (15% and 20%, respectively). Further details are in Appendix P.

4.2 Knowledge acquisition by WAH learners

Survey participants were asked how much information they learned in the WAH training. Only 1% reported "none at all" and 13% reported "a little bit," while 34% reported "some" and 52% "a lot" (Figure 4). Importantly, this knowledge was perceived by most to be useful (38%) or very useful (51%) (Figure 5).

The pre-post training knowledge test data collected by IHSA corroborated the subjective findings (Figure 6). For the 429 (of 633) participants who agreed to the

retrieval of their knowledge test data, large improvement from a pre-test average score of 6.8 to 9.5 (out of 10) was found.

4.3 Increase in learner confidence in using WAH safety practices

Survey participants were also asked how their confidence was affected by the training in relation to several WAH safety practices (e.g., picking the right lanyard, setting up a travel restraint, or raising safety concerns to a supervisor or manager). For each of these practices, the majority of respondents (from 60% to 87%, depending on the practice) reported their confidence improved as a result of the training (Figure 7).

4.4 Learners' post-training intention to change safety practices

Participants were asked, "How likely are you to change the way you take safety precautions as a result of the training?" Figure 8 shows that almost half said they were "very likely" to make such a change and another 36% said they were "likely" to make one.

4.5 Pre-post changes in learners' self-reported safety practices

4.5.1 Observed change in specific self-reported WAH safety practices

The T1 questionnaire, completed one week following training, asked about the frequency with which 14 different WAH practices were carried out in the two weeks prior to the training. Twelve of these practices were targeted by the WAH training; two other practices, though untargeted, were included to explore whether training increased the number of safety suggestions made to co-workers or supervisors. The T2 questionnaire, completed four weeks post-training, asked about the frequency of the same practices in the previous two weeks. Researchers presumed that any group-level changes in the practices of the participants, from pre-training to four weeks post-training, would likely be attributable to the training. The T3 questionnaire, completed seven weeks post-training, determined whether any changes seen at four weeks were maintained.

Figure 9 illustrates that meaningful (and statistically significant) changes, between pre-training and four weeks post-training, were found for 10 of the 12 self-reported work practices targeted by the WAH training. For example, there was a change on average from "sometimes" to "often" inspecting fall protection equipment; and the

frequency of maintaining 100% tie-off increased from “sometimes-often” to “often-always.” (i.e. 0.7 scale units). Importantly, all of the changes in self-reported practices were maintained in the third learner survey three weeks later. Two of the 12 self-reported work practices targeted by the training and the two nontargeted practices did not show change.

4.5.2 Learner self-reported holistic assessment of change in WAH safety practices

A second approach to measuring changes in WAH practices at four weeks post-training used a global assessment. It asked participants how much safer their work practices were at that point in time compared with before the WAH training. Table 12 shows that 37% thought they were “somewhat more safe” following the training and 52% thought they were “a lot more safe,” again giving a strong indication that a change in practices had taken place.

4.5.3 Learners’ most important change in WAH safety practices

Any learner who reported training made them more safe (see paragraph above) was asked “What is the one most important thing you are doing more safely now, compared with before the WAH training?” Of the 453 individuals who were posed this question, 418 responded and their answers were coded for content. The majority of these (83%) mentioned a change in practice, while others simply reported greater knowledge, greater awareness of hazards or more safety-consciousness.

Of those mentioning a practice change, the most commonly mentioned (38% of the 418 responses) was increased inspection of the site or equipment.

- *Inspection of equipment better than before. Previously I would skip this part or be careless.*
- *Training has helped me make sure that the site is safe before actually beginning the work. We absolutely make sure everything is safe now.*

Each of better/more use of fall protection equipment, more tying off, and better/less ladder use was mentioned in 10-12% of responses, for example:

- *I am wearing my harness more when working at 10 ft or higher and more conscious of my work environment.*

- *Checking out the area for safety and doing the math for bottoming out.*
- *Bringing multiple ropes so I can stay constantly tied off without exceeding the 30 degree angle rule. Do a lot of maintenance which requires us to be in travel restraint and moving across great distances to complete work.*
- *100% tie off*
- *Mainly with ladders. If we do have to use ladders, it's hammered into my head about how to safely set one up.*

Less frequently, people mentioned generally working more safely, using the right equipment (e.g., proper lanyard) or using a safer option. More details about the responses to this question can be found in Appendix Q.

4.6 Factors associated with greater change in WAH knowledge and in safety practices in IHSA learners

Exploratory analyses, described in detail in Appendix D, were undertaken to identify factors associated with greater improvement in knowledge and in safety practices following WAH training. A variety of demographic, work environment, and training variables were therefore tested simultaneously in multivariable regression models (Appendix CC). These included, for example, age, work role, residential/non-residential sector, unionization, frequency of FP equipment use, prior FP training experience, and whether the instructor had been an IHSA staff member or a training partner.

For WAH knowledge gain, measured with the IHSA knowledge test, the gain in knowledge was greater on average for those:

- Working in low-rise residential sector (vs. non-residential)
- Working less than 20 years in construction (vs. > 20 years)

These differences can be seen in simple group comparisons (Figures 10-11). As shown, the across-group differences in size of pre-post changes were driven by differences in the pre-training knowledge test scores.

For WAH safety practices, improvement was greater for those with:

- Less frequency of use of FP equipment
- A job as trade helper or labourer (vs. certified trade worker)

Again, the larger improvements were largely due to lower pre-training values (Figures 12-13).

4.7 Construction employers survey: reported impacts on construction projects

4.7.1 Impacts of WAH training on employers

Several interview questions assessed the impact WAH training had on construction projects. The questions were directed to only those companies whose employees had already undergone WAH training (n = 306). Questions were based on the training's learning objectives and were designed to probe both the front-line worker and management levels of the organization. Results are summarized in Table 13 for all firms and in Appendices R and S for firms disaggregated by size (<20 and 20+ employees) and by location inside/outside GTA.

The most frequently reported change arising from the training was the purchase of new equipment (40%). This was most often new harnesses (37%), but also included guardrails or protective covers (8%). These effects were seen, irrespective of company size or whether it was in the GTA.

A substantial percentage of companies either improved their fall rescue plans or created one for the first time (37%). On the other hand, 9% continued to not have a fall rescue plan. This was reported more frequently in smaller companies (14%) than in larger companies (5%).

Thirty-three per cent said inspections of equipment occurred more frequently and twenty-eight per cent thought that employees "tied off" their fall protection equipment more often. These findings were similar for employers of different sizes and from different geographical regions.

Supervisors were thought to be taking more action to prevent falls as result of the training, with 27% of companies overall reporting this. A similar frequency was seen in both smaller and larger companies. However, a difference was found regarding

location: only 19% for companies from outside the GTA and 36% for companies from inside the GTA.

4.7.2 Impacts of WAH training on subcontractor work practices

Employers who engaged subcontractors were asked about how the WAH training had changed subcontractor work practices. For the 239 employers to which this applied, 101 (42.3%) thought that the training had made the subcontractors work safer while 74 (31.0%) thought it had no effect. (The remaining 27% of employers did not know whether it made a difference).

4.8 Labour inspector perceptions of the impact of WAH training

There was a markedly dominant opinion (nine of ten), across interviews held in spring 2017 with labour inspectors, that the WAH training in and of itself had made no or little perceptible difference to worker fall protection practices on construction projects, particularly with regards to “tying off” when required. Explanations for this varied, with some pointing to worker knowledge not having been changed substantially, and others implying that even when knowledge has been improved, other individual factors overrode it, particularly in smaller companies. Large companies were seen to already perform well in this area [thereby limiting their ability to show change].

But, generally, I think that the guys know how to wear the equipment. Even if they had the training, if they're that type of a person they're just not going to wear it properly. So if you tell me, 'was there a drastic change between the working at heights training and the old fall protection training?', I didn't see a drastic difference. (Inspector 6)

No, like I said, to me it's just an adult choice for not tying off. We've been doing this underground roofing blitz for the past couple years, or even, I think, before the WAH came in, and, yeah, I haven't seen any changes. I haven't heard anybody come up and say, the WAH training has shown me the way that now I'm tied off because of that. (Inspector 2)

The workers don't seem any better off than they were before, because when we ask some of the questions, like for example, to explain the difference between travel restraints and fall arrests, they can't answer the question... I

don't see a difference. Large companies tied off quite frequently before it, and I think it's stayed the same. [Small companies] they didn't tie off that much before it, and they still don't." (Inspector 1)

Absolutely none [i.e., translation of WAH training into changes of practice on the work site] -- because the training isn't that different than the old working at heights training. It is better training, but at the same time going back to [what we talked about earlier] it's a choice people do. Like I said, I was ticketing people last year that had just taken the training. The belief was that this new working at heights training was going to show up as helping the industry...and it hasn't done anything other than make people pay \$130 every three years. The requirement for training was already in the regulation. (Inspector 7)

I don't think, as far as general work practice goes, I've seen really any change. The workers don't appear to be any more well-educated than they were before. (Inspector 4)

It's somewhat the same. It's a hit and miss. The employer gives them the equipment, if the employer leaves or the supervisor leaves for an hour and we show up and the guys are still doing the same thing that they're not tied off, and everything is up there. It's not like they don't have the equipment, everything is there, they just decide not ... They use always the same excuse that it bothers them, ... it's uncomfortable, it gets in the way. It's the same excuse I've been hearing for the last [number of] years. It's a hit and miss. ... Like I said, the bigger jobs it's hard to find. With the [larger contractor] jobs, they're pretty strict, you hardly ever catch anybody not tied off, but the smaller jobs, it hasn't changed much." (Inspector 8)

Inspectors were also asked about changes to supervisor behaviour and the presence of new fall protection equipment, but changes in these areas were also not detected by a large majority of inspectors.

Follow up with inspectors in January 2019 showed there had not been a shift in their opinion about the impact of training on practices.

5. Evaluation results on the impact on the final outcome (injuries)

As described in the “Methods in Brief” section, extracts of lost-time compensation claim records were obtained from the WSIB for the period 2004-2017. Information in these records was used to identify injuries attributed to fall events that were a specific focus of or targeted by the WAH training intervention (e.g., falls from ladders or roofs). The incidence rate of these lost time claims (termed “targeted falls”) were compared to the incidence rate of other fall events (“untargeted falls”) and to the incidence rate of traumatic injuries attributed to non-fall events (“other acute injuries”).

To guide the data analysis, three hypotheses about the pattern of lost-time injury claim rates were stated. Researchers expected to see the following if the WAH training intervention were effective:

1. a reduction in the incidence rate of lost-time claims attributed to targeted falls over time, in the construction sector, following the introduction of the WAH training requirements
2. a greater reduction in the incidence rate of lost-time claims attributed to targeted falls than observed for the incidence rates of each of untargeted falls and other acute injuries in the construction sector
3. a greater reduction in the incidence rate of lost-time claims attributed to targeted falls in the construction sector compared to other economic sectors

5.1 Trend in targeted fall injury claim rates over time in construction

Figure 14 shows the annual lost-time claim rates for targeted falls over 2004-2017 in construction. Contrary to the first hypothesis, the long-term trend of declining rates seen between 2004 and 2014 did not shift toward a greater reduction in rates following the introduction of the WAH training intervention; rather, a shift toward smaller annual declines was seen in the 2014-2017 time period. However, this general pattern over 2014-17 was not limited to targeted fall injuries; it was also seen with untargeted fall injuries and other acute injuries.

5.2 Comparing declines in claim rates of targeted falls with declines in rates of other injuries

To address the second hypothesis, the percent declines in injury claim rates from 2012-14 (pre-intervention) to 2017 were compared. The years 2015 and 2016 were excluded from the analysis, since large portions of the target population remained untrained during those years. As shown in Figure 15 and Table 14, a decline of 19.6% was seen in the rate of targeted falls, which was substantially greater than the declines of 2.1% and 7.2% seen in the rates of untargeted falls and other acute injuries. The differences between the declines in rates were statistically significant ($p = 0.004$ for the comparison of the targeted falls versus untargeted falls; $p = 0.02$ for targeted falls versus other acute injuries). The second hypothesis was supported and provides evidence that the WAH program was effective in reducing the risk of falls from heights.

The analysis was repeated using the same three injury categories, but restricting them to more serious injuries (i.e., fractures and concussions). Again, the decline in injury claim rates of targeted falls exceeded those of untargeted falls and other acute injuries (27%, 9% and 18% respectively).

5.2.1 Exploring the role of firm size

Additional analyses were undertaken to understand better in which type of firm the WAH program had an impact. Three different firm sizes were examined separately (Figure 16 and Tables 15a-c). For firms with < 5 FTEs, the decline in lost-time claim rate from 2012-14 to 2017 was 36.7% for targeted falls, 4.2% for untargeted falls (statistical significance of difference in declines, $p = 0.0005$) and 21.9% for other acute injuries ($p = 0.04$). For firms with 5-49 FTEs, a somewhat similar pattern was seen (declines of 6.8%, -2.9% and -1.2% respectively), but differences were less marked and not statistically significant. For firms with 50+ FTEs, declines in claim rates for the three injury types were even more similar (12.3%, 11.5%, and 9.5% respectively).

5.2.2 Exploring the role of sector

Many WSIB rate groups had too few annual targeted fall injuries to allow separate pre-post comparisons as in the above. We therefore created a high-incidence group and a low-incidence group of rate groups. The first group included Inside Roofing,

Masonry, Homebuilding, Form Work & Demolition, Siding & Outside Finishing, and Inside Finishing. The low incidence group included Electrical & Incidental; Mechanical & Sheet Metal; Millwrighting & Welding; Industrial, Commercial & Institutional (ICI); Road-building & Excavating; and Heavy Civil.

Within the high-incidence group, the decline in lost-time claim rate from 2012-14 to 2017 was 22.2% for targeted falls, in contrast to the changes in the rates of the other two injury categories: an increase of 5.2% for untargeted falls and a decline of 7.7% for other acute injuries (Figure 17 and Table 16a). Both the targeted/untargeted and targeted/other acute injuries comparisons of rate changes showed statistically significant differences ($p < 0.001$ and $p < 0.03$, respectively).

Within the low-incidence group, the declines were more similar (17.8%, 12.3% and 9.4%, respectively) and the declines did not differ significantly (Figure 17 and Table 16b).

5.3 Comparing declines in targeted fall injury claim rates in construction with those other sectors

Contrary to the third hypothesis stated at the beginning of this chapter, the large decline in lost-time claim injury rate for targeted falls seen in construction between 2012-14 and 2017 (19.6%) did not clearly exceed that seen in other sectors. For manufacturing, wholesale & retail trade, and all remaining Schedule 1 sectors, respectively, declines were 27.2%, 27.9%, and 17.4% (see Figure 18 and Tables 17-19), which did not differ with statistical significance from the 19.6% decline seen in construction.

Interestingly, in all three of the non-construction economic sector groups, like the pattern seen in construction, declines in rates of targeted fall injuries were greater than those for untargeted falls and other acute injuries. Also similar to findings in construction, the apparent training intervention effects were greater for the smaller firm sizes, when examined in manufacturing and trade (not examined in “other Schedule 1.”)

6. Discussion and Conclusions

6.1 Principal findings

6.1.1 Implementation

The evaluation findings from the analysis of MOL training records, in-depth interviews with labour inspectors, and the survey of employers, indicate that the WAH training intervention was implemented as intended. The number of training provider organizations steadily increased over time so that now about 220 are currently approved. The construction sector and other affected sectors became aware of and undertook the required training by the deadline of October 1, 2017. Among construction employers with six or more employees, 92% were found to be compliant with the requirement to ensure that affected workers were trained. By the transition deadline, about 420,000 Ontario-based learners had successfully completed the training (a number equivalent to 88% of the number of construction workers in Ontario). The survey of training providers substantiated that, for most, the new WAH training is more comprehensive and practical than the fall protection training their organizations previously delivered.

6.1.2 Intermediate outcomes

The evaluation study's surveys with IHSA WAH learners, showed that the training had a large impact on their knowledge about working at heights safety. Sizeable impacts on their self-confidence in using WAH safety skills and the intention to change work practices were also seen. Most importantly, and consistent with the other findings just mentioned, substantial improvements were found in ten of 12 self-reported WAH safety practices targeted by the training (including checking for fall hazards, maintaining 100% tie-off, and avoiding shortcuts that compromise safety). Changes at the work site were also evidenced in the survey of construction employers, particularly with regards to the purchase of new equipment, the development of fall rescue plans, and the inspection of equipment. On the other hand, labour inspectors in spring 2017 were not able to discern any changes in work practices attributable to the WAH training on construction sites.

6.1.3 Final outcome

Workers' compensation claim data were available until only the year 2017, when the intervention was not yet fully implemented. Nevertheless, a statistically significant impact of the WAH training intervention on the construction sector's lost-time claim rates of falls targeted by the intervention was found. This impact was mostly seen among the smallest employers (less than 5 full-time equivalent employees) and the sectors with the highest claim incidences. Impacts of the training were evidenced in other economic sectors too, including manufacturing and retail & wholesale trade.

There are challenges in estimating of the number of lost-time claims prevented by the WAH training intervention. One approach is to apply the incidence rate of lost-time claims attributed to targeted falls observed in the three-year period before the WAH intervention (2012-2014) to the full-time equivalent Ontario workforce in 2017. Applying this method, the "expected" number of lost-time claims attributed to targeted falls in 2017 would be 1,084. The actual number of lost-time claims attributed to targeted falls in 2017 was 861. It is plausible to conclude that the WAH training intervention prevented 220 lost-time claims attributed to targeted falls across all sectors in 2017. Continued monitoring of the incidence of compensation claims in subsequent years will clarify the accuracy of this estimate.

6.1.4 Effectiveness of the WAH initiative

The evidence from the evaluation suggests on balance that the mandatory WAH training standard has been effective. The study of a diverse group of WAH learners measured a large impact on their knowledge and an impact on their self-reported safety practices at the work site. Learners' self-reported work site practice changes were corroborated by the employer survey. That the labour inspectors could not discern a difference in work practices in spring 2017 is not inconsistent with the results of the surveys – inspectors do not track individual work sites closely enough to see their pre-post intervention changes.

Despite the large effects on knowledge and the moderate effects on safety practices seen in the survey of learners, the analysis of lost-time compensation claims found a modest impact to date on the fall injuries targeted by the intervention. This pattern is in fact consistent with that seen in research with other OHS training interventions (Burke et al., 2006; Robson et al., 2012). Nevertheless, many in the stakeholder community, including members of the project's advisory committee, understandably,

find the impact of the WAH initiative on fall injuries and fatalities lost-time injuries to be a disappointment. While we believe that the full impact of the intervention has not yet been seen, it also suggests that further new action by the system to prevent falls is warranted to meet stakeholder expectations.

6.2 Evaluation limitations

The evaluation study, like all research endeavours, has limitations, which researchers are obliged to discuss. First, as often happens with evaluations of regulatory changes in a jurisdiction, there has been no opportunity for using a “gold standard” randomized control trial design; indeed, this is a “single case” study. However, by using multiple perspectives (training provider, learner, employer, labour inspector, workers compensation system) and multiple means of data collection (administrative records, surveys, interviews), we have strengthened the internal validity of the study’s conclusions.

This study relied heavily on the results of surveys, to which there is always a threat of a “non-response bias” making the results seem more favourable than they really were (i.e., perhaps only the “pro-safety” respondents tend to participate). There were efforts to mitigate this in the learner survey by offering a financial incentive for participation. The resulting participation rate of 36% was quite high by research standards (and would have been higher if those not planning to work on a construction project in the following month were not purposely excluded), but the threat of selection bias still exists. The participation rate for the training provider survey was high (70%), so selection bias is less of a concern. In contrast, the construction employer survey achieved a response rate of about 20% and so the potential bias is of greatest concern here. We addressed this concern by comparing the WSIB lost-time claim rates of survey respondents and non-respondents; and no difference was found (Appendix Z).

Each of the surveys also has a limitation in terms of the representativeness of the samples. The employer survey excluded firms of five employees or less, since they can be especially difficult to recruit. While this meant we were not able to measure compliance and work practices in these smallest firms, this sub-group was included in the compensation claim analysis. With regards to the learner survey, we worked only with IHSA for reasons of feasibility. It is unknown how typical their training is, relative to other providers. On the other hand, they are widely recognized as the

largest provider. Further, we worked with both IHSA's internal trainers and external training partners. The latter group is diverse, including public providers, in-house employer providers, unions and training centres. Finally, we note that in implementing the training provider survey, for reasons of efficiency, we targeted only the 60% of providers providing the highest volume of training, since together they delivered over 95% of the WAH training. This served well the primary aim of the survey (to assess how fall protection training provided in the province had changed with the introduction of the regulations). Findings from the provider survey cannot be assumed to hold true for the smaller providers, nor for the internal providers, since there were few in the surveyed group

There are some limitations with the measurement of work practices in the surveys. We relied on self-report and it is possible that results are biased towards "social desirability" (i.e. giving the "pro-safety" answer rather than a true answer indicative of poorer safety). However, in both the employer and learner surveys, we did see substantial variation across the several practices measured, suggestive that more than just social desirability was influencing the answers. Another possibility to be considered is that by asking about the safety practices in the first survey of learners, the research activity might have reinforced good WAH safety practice and caused a greater effect at the time of the second and third surveys than would otherwise be seen (an interaction of the measurement activity with the intervention). Finally, the assessment of work practices is necessarily limited to what can be self-reported. In-field observations may allow assessments to consider practice quality and be more comprehensive.

The analysis of workers' lost-time claim analysis was limited by annual data being available until only 2017. That was still a year of partial implementation of the intervention: of the total number trained by the transition deadline of October 1, 2017, only 54% had been trained at the beginning of the year. Only in the latter half of 2019 will data will be available for 2018, the first year for which the intervention was fully implemented. Analyses of intervention effect will increase in accuracy after more post-intervention years of data become available.

The evaluation was not able to use fall fatalities to measure the impact of the WAH training intervention, even though Ontario stakeholders are especially concerned about fatalities and fall fatalities continue to occur in the construction sector. From a statistical point of view, the number of fall fatalities each year is too few to allow the

detection of “true” year-to-year change. The evaluation therefore used instead the more frequently occurring lost-time injury claims to measure the outcome of the training intervention.

6.3 Future research

As time goes on and more years of workers’ compensation data become available, the analyses could be enhanced further. Possibilities include analyzing compensation data with firm as the unit of analysis, making inter-provincial comparisons, and adjusting more precisely for “secular trends” in the data.

In-field observation of practices may provide richer data about where weaknesses in safety practices persist following training.

More information is needed about the person, task, company and sector factors that lead to injuries from falls, so that further preventive actions can be identified.

Consideration should be given to further culling the information available in MOL critical injury reports and WSIB lost-time injury claim records and determining the association between incidents and WAH training.

6.4 Conclusions

The evaluation found consistent evidence that the mandatory WAH training program reached the target audience. Construction sector employers were aware of the training requirement and compliance with the training requirement was high (> 90%) for both large and small employers. As the regulation came into full force on October 1, 2017, about 420,000 Ontario workers had been trained.

The evaluation found consistent evidence that the training had an impact at the work site. Both construction employers and WAH learners reported substantial changes, on average, toward safer workplace practices; and the changes were attributable to the mandatory WAH training program. A statistically significant but modest impact on lost-time claims for falls targeted by the intervention was found. Since claims data were available only until 2017, a year of only partial intervention implementation, the full effect of the training program on the prevention of injury can not yet be measured.

7. Additional evaluation findings to support continuous improvement

This section includes material secondary to the main evaluation findings, but helpful for a further understanding of the WAH training initiative and the reaction of stakeholders (employer, learner, training providers). Much of it can help inform future actions to further prevent falls from heights in Ontario.

7.1 Employer survey: negative impacts of WAH training on safety

Companies that had WAH-trained employees (n = 306) were explicitly asked whether there were “downsides or negative impacts on safety of the working at heights training.” If they answered “yes,” an explanation was sought. Fourteen respondents (4.5%) described a perceived negative impact. Most common (five of the 14) was the perception of those working on a roof or residential building that using the recommended WAH risk control methods created a tripping hazard. Here are quotes from four of the respondents:

In residential, you end up having a lot of different lanyards that criss-cross. There are more ropes on the job, creating a hazard. There are benefits and downfalls.

*Some of the sh*t" they say you need up there, no you don't need all of that. To carry all the equipment up 10 feet, it would be unsafe. You get 5 people up on a roof, and they are tripping over all their cords and they fall off.*

They've got so many ropes and stuff up on there, the men could easily trip over them and fall off because all of this stupidity. They have all this stuff on the roof, people could easily trip over it.

Some of it is a little overdone. You get ropes and hoses and all that stuff on roofs and stuff, and it gets very cluttered. That is part of the problem. People trip over hoses. That is my biggest concern, too many lines up on the roof, and you can fall.

Other respondents (n = 3) had a concern that people could develop a false confidence in their abilities to work at heights once they have passed the course, although respondent had no specific experiences to relate.

7.2 Employer survey: difficulties in complying with the WAH training requirement

With the intent on understanding the potential barriers to companies complying with the training requirement, several questions were asked about whether they “had difficulty” with a certain step involved in complying (Tables 20 and 21). Results show that the most common difficulties were as follows:

- arranging for employees to take time away from work (45%)
- covering the cost of the training (19%)
- finding a suitable course (17%)

Cost was more commonly an issue for smaller employers (25%) than for larger employers (15%), whereas identifying which employees needed to do the training was a more common difficulty for larger employers (11%) than for smaller employers (1%) (Table 20). Finding a suitable training course was more of a problem for employers outside of the GTA (22%) than inside the GTA (11%) (Table 21). Additional analyses showed in fact those in the “L” postal region had less difficulty finding a suitable course (7%) than all other postal regions including “M” (range 22% to 29%) and the difficulty occurred throughout the 2015-17 period, not just the initial period of implementation.

Following the series of questions about specific difficulties, summarized above, interviewees were asked whether there was “anything else” regarding difficulties. Ninety-one of 390 employers chose to answer. Thematic analysis of those answers showed a repetition of some of the above issues, but also revealed concerns with training quality, relevance and administrative issues:

- Training availability (27%)
- Training quality and relevance (25%)
- Cost (15%)
- Conflict with work (11%)
- Administrative issues; e.g. long wait to receive cards (11%)

Additional details with illustrative comments are included in Appendix T.

7.3 Employer survey: other reactions to the WAH training requirements

At the end of the survey interview with construction employer key informants, they were asked whether there was anything else researchers should know about the WAH training standard “good or bad.” About 40% (n = 158) chose to respond.

Analysis of those responses yielded the following most frequent themes:

- General comments (21%; mostly positive, e.g., “a good idea”)
- Training quality (16%; mixed opinion)
- Training relevance to work setting (15%; mostly negative)
- New knowledge from training (14%; mixed opinion)
- Cost (13%; all negative)

A ratio of negative to positive comments was determined to be 1.6 (see Appendix D for calculation method).

Additional details with illustrative comments are included in Appendix U.

7.4 Supplementary interview with an industrial sector association

Supplementary data collection among employer representatives from an industrial sector association was undertaken through a group interview. Representatives had contacted researchers with an interest in sharing their perspective. All representatives were from large organizations with sophisticated OHS management systems in place. Some key points of theirs included:

- At the time the WAH requirements were introduced, their organizations were already identifying fall hazards workers encountered in their jobs, and training as needed to mitigate the associated risks
- Large numbers of workers nevertheless needed to be trained for organizations to comply with the WAH training requirements because some of the workers’ activities fell under the Construction Projects regulation
- Meeting the WAH training requirement reduced the training resources available to address other workplace hazards and other organizational needs and yielded no improvement in fall prevention

More details are available in Appendix Y.

7.5 Provider and learner surveys: suggestions for improving WAH curriculum

Each of the training provider and learner surveys included a question which asked for suggestions of how to improve the WAH curriculum. Sixty-two providers and 251 learners provided their opinions. An integrated analysis of the two sets of responses was undertaken to identify the most frequently occurring topics for each group, and also topics of convergence for the groups (Table 22).

Training providers and learners converged in recommending most often (32% and 28%, respectively) that the training be even more practically oriented, with less “information overload,” and more hands-on activity or the use of realistic videos, pictures and scenarios.

The second most frequent theme for provider responses (19%) was more sector/trade specificity, particularly for the industrial sector. This was also a frequent theme among learners (9%) who recommended more content for sub-sectors other than building or roofing.

The third most frequent theme for training providers (18%) was related to recommendations for flexibility in the training, so that there could be adaptation according to group need, including a reduction in the mandatory minimum 6.5 hours of class time if the group being trained is small and experienced.

Providers also had a variety of suggestions related to fall protection equipment (16%), particularly with regards to anchors (6%). In contrast, the most frequent suggestion from learners concerning technical matters was with about ladders (5%), i.e., wanting more practical instruction in this area.

A more detailed report on the suggestions from providers and learners including illustrative comments is given in Appendix V.

7.6 Learner survey: barriers to applying WAH training to work site

Learners were asked a series of questions to assess potential barriers to them transferring the new knowledge gained in WAH training to the work site. As shown in Figure 19, the barrier items with the greatest agreement were:

- I do a special type of work (18%)
- Never told about the fall rescue plan (16%)

- Equipment at work is different (11%)
- FP equipment interferes with work (so sometimes don't wear it) (9%)
- Expensive for respondent to replace their fall arrest harness (8%)

7.7 Learner survey: suggestions for improving safety when working at heights

Learners were also asked, four weeks after WAH training, for their recommendations of how to improve safety when working at heights. While many of the 294 individuals choosing to respond to the open-ended question with a recommendation related to the WAH training or training more generally, the most frequent response (22%) concerned WAH equipment (i.e., having the right equipment, better equipment, more equipment, etc.):

- Equipment (22%)
- Training, generally (15%)
- WAH course modification (10%)
- Safety prioritization (7%)

A more detailed report on the suggestions including illustrative comments is given in Appendix AA.

7.8 Provider survey: suggestions for improving the training provider standard

Providers were asked by survey for suggestions of how to improve the training provider standard. Sixty-six providers (out of 87) provided a response. By far the most common was a concern about the quality of training, especially for training organizations who purchase the WAH curriculum from others. Providers reported multiple anecdotes of training being delivered in much shortened time frames and with less equipment, as well as concerns about instructor quality. Also frequent were brief positive comments such as “step in the right direction” and sharp comments about making the application process easier.

- Quality management (44%)
- Positive comments (26%)
- Ease application process (23%)

More results and illustrative comments are found in Appendix W.

7.9 Provider survey: suggestions for improving administrative processes

Training providers were also asked in the survey for suggestions in how to “further improve the administrative processes surrounding the WAH program.” Sixty-two of the 87 providers chose to respond. A large majority recommended reducing the administrative burden, particularly the requirement to copy records of each class on to a USB and to courier it to the MOL within a week following the class. Most of those who gave positive comments noted that there were plans to address this problem with the planned transition to an online system. Critical comments about the timeliness of responses by the MOL were also plentiful:

- Ease administrative burden, especially record submission (73%)
- Improve MOL timeliness, especially in sending learners’ cards (19%)
- Positive comments (14%)

More detailed results and illustrative quotes are in Appendix X.

7.10 Provider survey: other provider concerns

At the end of the survey interview with providers, they were asked whether there were any final comments about the WAH training initiative “good or bad.” About 87% (n = 76) chose to respond. Many comments repeated themes already identified and reported on in the above. Most frequent of the new themes was concerned with a perceived lack of strictness in MOL enforcement, followed by a perceived lack of promotion of the refresher course by the MOL.

- Enforce compliance on the work site (14%)
- Refresher course (9%)

More detailed results and illustrative quotes are in Appendix BB.

7.11 Events associated with falls from heights, as found in WSIB claim records

An analysis of the events associated with lost-time claim rates due to falls from heights, shows that falls from ladders are by far most common (39%), followed by falls from scaffolds/staging (13%) (Figure 20). A similar pattern is seen if one limits lost-time claims to only more serious fall injuries (i.e., fractures or concussions).

8. Project advisory committee suggestions

Over the course of the project, the research team had four meetings with the project advisory committee (members listed on page v) to discuss interim findings. There were three in-person meetings (January 2018, June 2018, December 2018) and one teleconference (January 2019), which followed circulation of a draft of the final report. As agreed during the last meeting, two committee members (one employer and one labour) subsequently led the collecting of committee suggestions for future action by authorities and others to prevent falls. The following then is that collection of member suggestions; it should not be construed as a consensus list, nor a set of recommendations.

TRAINING:

- Modify WAH training to require more 'hands-on' practice with setting up travel restraint.
- Encourage more trade/sector-specific WAH training.
- MOL to adjust implementation of the WAH Program based upon the study findings. Set measurable performance targets to reduce falls from heights.
- As there are many MOL approved training providers, review successes/ failures of different providers. Determine if there are more successful outcomes with some than others and why.

MEDIA:

- Review other countries' media campaigns (for example, the UK Health and Safety Executive (HSE) nationally coordinated publicity, education and inspection campaign about the risks of working at height). Objectives: increase awareness, influence attitudes of workers and supervisors, influence attitudes of clients/ those in procurement, partnership with Local Authorities and other stakeholders, evaluation for future analysis and change.
- Integrate workplace safety into media messages to affect culture.

CULTURE:

- Encourage widespread observance / remembrance by others of worker fatalities or severe incidents (to change attitudes/culture).
- Time to start working on culture change within organizations, starting at the top, and including all levels.
- As with seat belt use and smoking cessation, workplace safety initiatives should be directed to the general public, particularly youth.

INCENTIVES:

- Tax incentives to home owners who use legitimate contractors

ENFORCEMENT:

- Use of drones to monitor worker/company compliance. There is no reason drone technology cannot be used for surveillance and to ensure that workers are wearing appropriate fall arrest in high risk industries such as roofing. This can give 'real time' information to the inspectorate and target high risk areas. The very knowledge to employers and workers that there is an eye in the sky watching may also change behavior.
- MOL inspections to take place after hours and on weekends. During the weekday hours, there is a higher level of compliance than other times.
- Enact a legal responsibility for any person purchasing roofing material, using a MOL statement about responsibilities which must be completed before delivery. This could consist of 4 or 5 questions requiring the purchaser to read and must be submitted by the retailer. Add this to the media campaign.

OTHER:

- Industry (boots on the ground) should be consulted for solutions/ recommendations, especially the JHSC.
- Target the underground economy
- CFIB or other entities to become involved in compliance for their membership
- CFIB / Chambers of Commerce – Education pieces on the impact of poor safety performance on businesses. If a company is fined/ charged, that may mean that the company closes, thereby reducing Association's financial base.

- Better examination of WSIB accident data (critical and lost time incidents related to falls from heights) to understand root causes.
- Consider a research study to get to the root cause of non-compliant behaviour with workers. We need to understand why (after systems are in place, education is completed and enforcement is present) workers are still choosing to not tie off.

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10. Tables

Table 1: Ontario construction sector: WSIB rate group classification and full-time equivalent employment

Ontario construction sector		
Rate Group classification and full-time equivalent employment, 2017		
707 - Mechanical and Sheet Metal Work	73,789	17.4%
764 - Homebuilding	64,674	15.3%
704 - Electrical and Incidental Construction Services	55,686	13.2%
711 - Roadbuilding and Excavating	47,481	11.2%
723 - Industrial, Commercial and Institutional Construction	45,833	10.8%
719 - Inside Finishing	43,569	10.3%
751 - Siding and Outside Finishing	22,032	5.2%
732 - Heavy Civil Construction	15,102	3.6%
737 - Millwrighting and Welding	14,119	3.3%
728 - Roofing	12,942	3.1%
755 - Non-Exempt Partners and Executive Officers in Construction	12,644	3.0%
741 - Masonry	8,483	2.0%
748 - Form Work and Demolition	6,552	1.5%
Total	422,906	100%

Based on Schedule 1 – WSIB Covered Employment by Rate Group [Internet]: Toronto (ON): Workplace Safety & Insurance Board, 2010-2018 [cited 2019 02 20]. Available from <http://www.wsibstatistics.ca>.

Table 2: WAH training activity by type of training provider, date of training, and learner geographic location

	Number of successful training completions	%
Successful WAH training completions reported to the MOL	496,410	100.0
<i>Type of training provider</i>		
Provide training to external clients (n = 154)	480,440	96.8
Provide training in-house (n = 45)	15,970	3.2
<i>Date of training</i>		
2015 - Q1	70	0.0
2015 - Q2	25,355	5.1
2015 - Q3	24,985	5.0
2015 - Q4	25,154	5.1
2016 - Q1	43,058	8.7
2016 - Q2	53,727	10.8
2016 - Q3	32,248	6.5
2016 - Q4	37,362	7.5
2017 - Q1	107,593	21.7
2017 - Q2	66,992	13.5
2017 - Q3	33,934	6.8
2017 - Q4	26,398	5.3
2018 - Q1 (incomplete quarter)	19,237	3.9
2018 - Q2 (incomplete quarter)	297	0.1
<i>Learner geographic location</i>		
Ontario	472,107	95.1
Quebec	14,547	2.9
Canada - other	4,485	0.9
United States	846	0.2
Invalid postal code/zip code format	4,425	0.9

Data are based on anonymized MOL training records, extracted in July 2018.

Table 3: Numbers of WAH training completions (2015-2017) and construction workers (2016) by economic region

Economic Region	WAH training completions Mar 2015 – Sep 2017	Number of workers in the construction sector	Ratio of training completions to construction workers
Ontario	417,724	476,830	0.88
East	52,923	58,915	0.90
Ottawa	35,873	41,525	0.86
Kingston—Pembroke	17,050	17,390	0.98
Central	114,365	127,850	0.89
Muskoka—Kawarthas	15,600	19,345	0.81
Kitchener—Waterloo—Barrie	48,444	56,505	0.86
Hamilton—Niagara Peninsula	50,321	52,000	0.97
Greater Toronto Area	162,549	202,820	0.80
Southwest	54,481	57,360	0.95
London	18,577	23,725	0.78
Windsor—Sarnia	21,330	19,530	1.09
Stratford—Bruce Peninsula	14,574	14,105	1.03
Northwest	33,406	29,885	1.12
Northeast / Nord-est	25,320	21,080	1.20
Northwest / Nord-ouest	8,086	8,805	0.92

Data are based on anonymized MOL training records, extracted in July 2018. Number of workers in the construction sector is from Statistics Canada Census 2016.

Table 4: Distribution of providers by training volume delivered

Segment of the total training volume delivered	Number of providers delivering training in volume segment		Total number of providers in volume segment	Cumulative total number of providers across segments
	Provision to external clients	Provision in-house		
0-50%	4	0	4	4
50-60%	6	0	6	10
60-70%	9	0	9	19
70-80%	10	1	11	30
80-90%	21	1	22	52
90-100%	104	43	147	199

Training providers were ordered by the total number of successful training completions they had delivered March 2015 to April 2018, from highest to lowest. The cumulative percentage of total training was computed for the list. "Segment" refers to the portion of the list that delivered the indicated cumulative percentage. For example, "0-50%" corresponds to the four providers delivering the largest amount of training and together they account for 50% of all training completions. "50-60%" refers to the next highest volume group of providers in the list (n = 6) which together accounted for another 10% of training completions. Combining the two segments shows that 10 organizations provided 60% of the training and all of them delivered training to external clients.

Table 5: Characteristics of surveyed training provider organizations

	n	%
Time delivering H&S training		
0-5 years	16	18.4
>5 - 10 years	17	19.5
>10 - 20 years	30	34.5
>20 - 30 years	17	19.5
>30 years	7	8.0
Provider market for WAH		
Public	83	95.4
In-house	4	4.6
Year WAH training delivery started		
2015	45	51.7
2016	25	28.7
2017-18	17	19.5
Type of WAH curriculum used		
Developed own WAH curriculum	61	70.1
Purchased WAH curriculum	24	27.6
Purchased and customized WAH curriculum	2	2.3
Number of WAH instructors		
1-2	45	51.7
3-5	29	33.3
6+	13	14.9
Delivered fall protection training prior to 2015?		
Yes	76	87.4
No	11	12.6

Training providers with the highest training volumes (124 out of a total of 199 providers) were approached to participate in the survey; 87 participated.

Table 6: WAH learner distribution by economic sector, estimated with training provider survey

Sector (NAICS)	Number of providers delivering to that sector	Average estimated % of learners from sector (n=86)	Average estimated % of learners from sector, weighted (n=84)
Construction	83	75.19	77.60
Utilities	9	2.52	6.71
Manufacturing	32	7.32	3.68
Transportation & warehousing	3	0.22	3.30
Other services	7	1.23	1.19
Public Administration	3	2.13	0.74
Mining, quarrying & oil gas extraction	6	2.15	0.73
Educational Services	3	1.02	0.20
Professional, scientific & technical services	4	0.64	0.09
Arts, entertainment & recreation	2	0.29	0.08
Healthcare & social assistance	3	0.30	0.05
Real estate & rental leasing	1	0.35	0.03
Agriculture, forestry, fishing & hunting	1	0.06	0.01
Other (nec)	5	0.41	0.10
Unspecified	24	5.58	5.50

The unweighted average for a sector was computed using all provider estimates of the percentage of their learners being from the sector, including estimates of 0%. To compute the weighted average, a weight based on the number of learners trained by a provider was applied to each provider estimate.

Table 7: Comparison of WAH training and pre-existing fall protection training delivered by providers

Characteristic of training	%*
Length of theoretical component	
WAH longer than former training	70.7
WAH the same as former training	21.3
WAH shorter than former training	8.0
Length of practical component	
WAH longer than former training	81.3
WAH the same as former training	14.7
WAH shorter than former training	4.0
Variety of equipment in training	
Greater variety in WAH training	78.7
Greater variety in former training	5.3
No difference	16.0
Coverage of WAH topics by former training (% "yes")	
Personal fall protection equipment	98.7
Anchor points	96.0
Identification of hazards of working at heights	94.7
Rights and responsibilities	85.3
Eliminating or controlling the hazards of working at heights	81.3
Warning methods and physical barriers	78.7
Ladders and similar equipment	78.7
Rescue planning	76.0
Work access equipment and platforms	66.7
Application of requirements similar to the following WAH requirements (% "yes")	
Written test with a score of 75% or equivalent method	80.0
Demonstration of donning the fall arrest equipment	80.0
Demonstration of the inspection of fall arrest equipment	74.7
Knowledge and skills acquired in training	
Theoretical knowledge	
More in WAH compared to former training	65.3
Less in WAH compared to former training	2.7
About the same	32.0
Practical hands-on skills	
More in WAH compared to former training	70.7
Less in WAH compared to former training	8.0
About the same	21.3
Overall, preparing to work at heights safely	
WAH training much better than former training	52.0
WAH training somewhat better than former training	24.0
About the same	18.7
WAH training somewhat worse than former training	5.3

**Based on those respondents whose organizations delivered fall protection training prior to their delivery of WAH training (n = 76). Percentages for each item were calculated following the exclusion of one or two responses for which the respondents did not know the answer.*

Table 8: Characteristics of surveyed construction employers (n = 390)

	n	%
Type of Business		
General contractor	101	25.9
Specialty trade contractor	196	50.3
Both	81	20.8
Other	12	3.1
Sector (Any time spent in sector – not exclusive)		
Residential low-rise (1-3 stories)	198	50.8
Residential mid-to-high rise construction (≥ 4 stories)	110	28.2
Non-residential construction	310	79.5
Non-construction	50	12.8
Time in operation		
0-10 years	27	6.9
11-20 years	67	17.2
21-30 years	77	19.7
> 30 years	200	51.3
Unknown	19	4.9
Number of permanent employees^b		
0 employees	2	0.5
1 - 5 employees	50	12.8
6 - 19 employees	144	36.9
20 - 49 employees	76	19.5
50+ employees	118	30.3
Number of temporary employees^c		
0 employees	215	55.1
1 - 5 employees	59	15.1
6 - 19 employees	30	7.7
20 - 49 employees	36	9.2
50+ employees	50	12.8
Number of total employees (permanent and temporary)		
0 employees	0	0.0
1 - 5 employees	35	9.0
6 - 19 employees	132	33.9
20 - 49 employees	66	16.9
50+ employees	157	40.3
Company postal code – first letter		
K	54	13.9
L	172	44.1
M	45	11.5
N	78	20.0
P	41	10.5

	n	%
Location (GTA/outside GTA)^d		
GTA	177	45.4
Outside of GTA	213	54.6
Unionization of permanent employees		
Non-unionized	257	65.9
1-49% unionized	27	6.9
50-100% unionized	101	25.9
Unknown/Refusal/No permanent employees	5	1.3
Has subcontractors who work on construction projects		
Has subcontractors who use fall protection equipment	241	61.8

^a The survey was conducted through a telephone interview. Respondents had roles of OHS specialist only (18.5%) owner (21.3%), senior manager (18.5%), middle manager (18%), administrative support (21.3%), or other (2.6%). In addition, 22.1% of the latter five groups had a second/dual role in OHS.

^b Permanent employees were defined as employees on the payroll year after year with no pre-determined termination date and excluded subcontractors.

^c Temporary employees were defined as employees on the payroll with a predetermined end date, or whose work would end as soon as a specified project was completed, and excluded subcontractors

^d "Outside of GTA" was defined as postal codes beginning with any of the following: K, LOA – L0Z, L1A, L1B, L1C, L1E, L2A - L2W, L3B – L3M, L3V, L3Z, L4M, L4N, L4P, L4R, L7C, L7E, L7G, L7J, L7K, L9E, L9G, L9H, L9J, L9K, L9L, L9M, L9N, L9P, L9R, L9S, L9T, L9V, L9W, L9X, L9Y, L9Z, N, P. "GTA" defined as all postal codes beginning with L (excepting those already listed for outside GTA) or M.

Table 9: Employee exposure to heights and fall protection use, employer awareness of and compliance with WAH requirements

	All sizes (N=390)	
	N	%
Aware of working at heights training^a	362	92.8
Permanent employees		
With any permanent employees exposed to heights	324	83.1
With any permanent employees using FP equipment	308	79.0
Typical use by permanent employees using FP equipment:	N= 308	
Every day	64	20.8
Once or twice a week	87	28.3
Once or twice a month	77	25.0
Less than once month	77	25.0
Don't know	3	1.0
Compliance of permanent employees with WAH training requirement ^b	286	N= 308 92.2
Year when training of permanent employees began (N is companies with any trained permanent employees)	N= 296	
2017	138	46.6
2016	113	38.2
2015	45	15.2
Temporary employees		
With any temporary employees exposed to heights	104	26.7
With any temporary employees using FP equipment	99	25.4
Typical use by temporary employees using FP equipment:	N=99	
Every day	27	27.3
Once or twice a week	34	34.3
Once or twice a month	19	19.2
Less than once month	19	19.2
Compliance of temporary employees with WAH training requirement ^c	91	N=99 90.9

^a "Aware" corresponded to the respondent selecting a "Yes, definitely" answer to the question "Have you heard about the new working at heights training available to Ontario construction workers since 2015?"

^b Compliance was defined as having been met if all the permanent employees who ever use fall protection equipment were either trained or, if the interview was held prior to October 1, 2017, enrolled in training.

^c Compliance was defined as having been met if all the temporary employees who ever used fall protection equipment were either trained or, if the interview was held prior to October 1, 2017, enrolled in training.

Table 10: Prevalence of WAH training among supervisors and managers in construction companies

	Supervisors			Managers		
	N	N as % of all companies with employees using FP equipment (n = 317)	N as % of companies with overseeing supervisors (n = 307)	N	N as % of all companies with employees using FP equipment (n = 317)	N as % of companies with overseeing managers (n = 257)
<i>Not applicable</i>	10	3.2	--	60	18.9	--
All trained	260	82.0	84.7	160	50.5	62.3
Most trained	26	8.2	8.5	31	9.8	12.1
Some trained	12	3.8	3.9	34	10.7	13.2
None trained	7	2.2	2.3	31	9.8	12.1
Don't know	2	0.6	0.7	1	0.3	0.4
TOTAL	317	100.0	100.0	317	100.0	100.0

Questions about training supervisors/managers were posed to those companies that had any permanent or temporary employees using fall protection equipment (n = 317). The questions pertained to the supervisors/managers overseeing employees who used FP equipment. Not applicable responses were due to there being no overseeing supervisors/managers.

Table 11: Characteristics of participants in the learner pre-post follow up survey

Characteristic	n	%
All IHSA learners participating in the study	633	100.0
<i>Frequency of using FP equipment before WAH training</i>		
Never used	141	22.3
Less than once a year	101	16.0
Less than once a month	78	12.3
Once or twice a month	110	17.4
Once or twice a week	83	13.1
About every day	66	10.4
Three or four times a week	53	8.4
<i>Missing</i>	1	0.2
<i>Formal FP training previously taken</i>		
Yes	325	51.3
No	267	42.2
Don't know	40	6.3
<i>Missing</i>	1	0.2
<i>Usual sector</i>		
Residential construction – low-rise (≤ 3 stories or less)	179	28.3
Residential construction – med./high –rise (4+ stories)	114	18.0
Non-residential construction	243	38.4
Not in construction sector	94	14.9
<i>Missing</i>	3	0.5
<i>Union member</i>		
Yes	203	32.1
No	416	65.7
Not applicable- no work history	13	2.1
<i>Missing</i>	1	0.2
<i>Area of work</i>		
Greater Toronto Area (area bounded by Hamilton, Lake Simcoe, Oshawa and Lake Ontario)	326	51.5
Outside Greater Toronto Area	224	35.4
Both about equally	81	12.8
<i>Missing</i>	2	0.3
<i>Work role (continued on next page)</i>		
Owner	27	4.3
Manager	46	7.3
Professional/technical support (engineering, architecture, inspecting, estimating, etc.)	73	11.5
Front-line supervisor	63	10.0
Trade worker - certified	166	26.2
Trade worker - not certified	125	19.8

Characteristic	n	%
Trade helper or labourer	116	18.8
Other financial or administrative support	15	2.4
<i>Missing</i>	2	0.3
<i>Employment status</i>		
Permanent employee	503	79.5
Temporary/casual employee	57	9.0
Independent operator	42	6.6
Unemployed	8	1.3
Student	21	3.3
<i>Missing</i>	2	0.3
<i>Years of Ontario construction project experience</i>		
None	41	6.5
Less than three months	65	10.3
4 months to 1 year	83	13.1
2 to 5 years	132	20.9
6 to 10 years	123	19.4
11 to 20 years	94	14.9
> 20 years	93	14.7
<i>Missing</i>	2	0.3
<i>Age</i>		
24 years or less	111	17.5
25-34 years	216	34.1
35-44 years	136	21.5
45-54 years	101	16.0
55 years or more	67	10.6
<i>Missing</i>	2	0.3
<i>Gender</i>		
Male	595	94.0
Female	36	5.7
<i>Missing</i>	2	0.3
<i>English Language facility: ability to understand telephone message in English</i>		
Do easily	596	94.2
Do with some help	26	4.1
Do with a lot of help	4	0.6
Not able to do	5	0.8
<i>Missing</i>	2	0.3

Data for the table were collected in the T1 survey, distributed one week following training.

Table 12: Learner holistic assessment of change in WAH practices

	n	%
A lot LESS safe now...	7	1.4
Somewhat LESS safe now...	4	0.8
The SAME now as before the training	47	9.2
Somewhat MORE safe now...	189	37.0
A lot MORE safe now...	264	51.7

Data were collected at 4 weeks post-training (n = 511). The question asked was, "Compared with before the working at heights training, how much safer are your work practices now?"

Table 13: Impacts of WAH training on work site practice reported by construction employers (n = 306)

	n	%
Bought any new equipment	124	40.5
New FP equipment (e.g. harnesses)	114	37.3
New guardrails or protective covers	26	8.5
Anything else (ladders, hazard straps, life jacket etc)	21	6.9
Changes to fall rescue plan		
Created plan for the first time	12	3.9
Made changes to existing plan	102	33.3
No change to existing plan	155	50.7
Does not have fall rescue plan	27	8.8
Don't know	10	3.3
Inspections of fall protection equipment		
More often now	102	33.3
Just as often now as before	190	62.1
Don't know	14	4.6
Tying off by employees		
More often now	87	28.4
Just as often now as before	204	66.7
Don't know	15	4.9
Actions by supervisors to prevent falls		
More often now	82	26.8
Just as often now as before	214	69.9
Don't know	10	3.3

Questions were asked of companies with any permanent or temporary employees that had taken WAH training.

Table 14: Lost-time injury claims, FTEs, and claim rates, 2012-2017, and pre-post comparisons, construction

<i>CONSTRUCTION</i>		Number of lost-time injury claims			Full-time equivalents (FTEs)	Lost-time injury claim rates per 1000 FTEs		
Year(s)	Targeted falls	Untargeted falls	Other acute injuries		Targeted falls	Untargeted falls	Other acute injuries	
Intervention period								
Pre-intervention	2012	476	595	1,482	306,990	1.55	1.94	4.83
	2013	501	657	1,468	366,062	1.37	1.79	4.01
	2014	448	740	1,530	382,560	1.17	1.93	4.00
	2012-14	1,425	1,992	4,480	1,055,612	1.35	1.89	4.24
Transition	2015	460	673	1,545	392,277	1.17	1.72	3.94
	2016	472	682	1,572	399,040	1.18	1.71	3.94
Post-intervention	2017	459	781	1,666	422,906	1.09	1.85	3.94
Pre-post comparisons								
Claim rate ratio: 2017 vs. 2012-14						0.804	0.979	0.928
% rate decline: 2012-14 to 2017						19.6	2.1	7.2
95% confidence interval for % decline						(10.7, 27.6)	(-6.3, 9.9)	(1.8, 12.3)
Statistical significance (p-value) of difference in pre-post decline (targeted falls vs. other injury type)							0.004	0.02

Table 15a: Lost-time injury claims, FTEs, and claim rates, 2012-2017, and pre-post comparisons for three types of injuries, construction, <5 FTE

<i>CONSTRUCTION, < 5 FTE</i>	Year(s)	Number of lost-time injury claims			Full-time equivalents (FTEs)	Lost-time injury claim rates 1000 FTEs		per Other acute injuries
		Targeted falls	Untargeted falls	Other acute injuries		Targeted falls	Untargeted falls	
Intervention period								
Pre-intervention	2012	215	146	442	47,863	4.49	3.05	9.23
	2013	219	181	433	68,032	3.22	2.66	6.36
	2014	210	186	461	73,068	2.87	2.55	6.31
	2012-14	644	513	1,336	188,963	3.41	2.71	7.07
Transition	2015	211	182	477	75,283	2.80	2.42	6.34
	2016	222	188	444	77,202	2.88	2.44	5.75
Post-intervention	2017	175	211	448	81,161	2.16	2.60	5.52
Pre-post comparisons								
Claim rate ratio: 2017 vs. 2012-14						0.633	0.958	0.781
% rate decline: 2012-14 to 2017						36.7	4.2	21.9
95% confidence interval for % decline						(25.2, 46.5)	(-12.4, 18.4)	(13.1, 29.9)
Statistical significance (p-value) of difference in pre-post decline (targeted falls vs. other injury type)							0.00	0.038

Table 15b: Lost-time injury claims, FTEs, and claim rates, 2012-2017, and pre-post comparisons for three types of injuries, construction, 5-49 FTE

<i>CONSTRUCTION, 5-49 FTE</i>	Year(s)	Number of lost-time injury claims			Full-time equivalents (FTEs)	Lost-time injury claim rates per 1000 FTEs		
		Targeted falls	Untargeted falls	Other acute injuries		Targeted falls	Untargeted falls	Other acute injuries
Intervention period								
Pre-intervention	2012	181	230	590	118,389	1.53	1.94	4.98
	2013	177	251	599	138,945	1.27	1.81	4.31
	2014	161	306	658	141,312	1.14	2.17	4.66
	2012-14	519	787	1,847	398,645	1.30	1.97	4.63
Transition	2015	163	284	655	147,146	1.11	1.93	4.45
	2016	165	264	720	152,208	1.08	1.73	4.73
Post-intervention	2017	190	318	734	156,554	1.21	2.03	4.69
Pre-post comparisons								
Claim rate ratio: 2017 vs. 2012-14						0.932	1.029	1.012
% rate decline: 2012-14 to 2017						6.8	-2.9	-1.2
95% confidence interval for % decline						(-10.1, 21.1)	(-17.2, 9.7)	(-10.2, 7.1)
Statistical significance (p- value) of difference in pre-post decline (targeted falls vs. other injury type)							0.360	0.39

Table 15c: Lost-time injury claims, FTEs, and claim rates, 2012-2017, and pre-post comparisons for three types of injuries, construction, 50+ FTE

<i>CONSTRUCTION, 50+ FTE</i>	Year(s)	Number of lost-time injury claims			Full-time equivalents (FTEs)	Lost-time injury claim rates per 1000 FTEs		
		Targeted falls	Untargeted falls	Other acute injuries		Targeted falls	Untargeted falls	Other acute injuries
Intervention period								
Pre-intervention	2012	80	219	450	149,491	0.54	1.46	3.01
	2013	86	219	416	158,930	0.54	1.38	2.62
	2014	60	240	394	168,538	0.36	1.42	2.34
	2012-14	226	678	1,260	476,958	0.47	1.42	2.64
Transition	2015	63	193	386	176,857	0.36	1.09	2.18
	2016	67	209	377	175,167	0.38	1.19	2.15
Post-intervention	2017	80	242	460	192,444	0.42	1.26	2.39
Pre-post comparisons								
Claim rate ratio: 2017 vs. 2012-14						0.877	0.885	0.905
% rate decline: 2012-14 to 2017						12.3	11.5	9.5
95% confidence interval for % decline						(-13.2, 32.0)	(-2.4, 23.6)	(-0.7, 18.7)
Statistical significance (p-value) of difference in pre-post decline (targeted falls vs. other injury type)							0.956	0.83

Table 16a: Lost-time injury claims, FTEs, and claim rates, 2012-2017, and pre-post comparisons for high fall incidence construction sectors

<i>CONSTRUCTION, HIGH INCIDENCE GROUPS</i>	Year(s)	Number of lost-time injury claims			Full-time equivalents (FTEs)	Lost-time injury claim rates per 1000 FTEs		
		Targeted falls	Untargeted falls	Other acute injuries		Targeted falls	Untargeted falls	Other acute injuries
Intervention period								
Pre-intervention	2012	321	312	732	112,213	2.86	2.78	6.52
	2013	333	322	709	138,644	2.40	2.32	5.11
	2014	286	352	707	144,803	1.98	2.43	4.88
	2012-14	940	986	2,148	395,660	2.38	2.49	5.43
Transition	2015	308	349	741	148,952	2.07	2.34	4.97
	2016	326	352	728	152,294	2.14	2.31	4.78
Post-intervention	2017	296	420	803	160,230	1.85	2.62	5.01
Pre-post comparisons								
Claim rate ratio: 2017 vs. 2012-14						0.778	1.052	0.923
% rate decline: 2012-14 to 2017						22.2	-5.2	7.7
95% confidence interval for % decline						(11.4, 31.8)	(-17.9, 6.2)	(-0.1, 14.9)
Statistical significance (p- value) of difference in pre-post decline (targeted falls vs. other injury type)							0.001	0.03

Table 16b: Lost-time injury claims, FTEs, and claim rates, 2012-2017, and pre-post comparisons for low fall incidence construction sectors

<i>CONSTRUCTION, LOW INCIDENCE GROUPS</i>	Year(s)	Number of lost-time injury claims			Full-time equivalents (FTEs)	Lost-time injury claim rates per 1000 FTEs		
		Targeted falls	Untargeted falls	Other acute injuries		Targeted falls	Untargeted falls	Other acute injuries
Intervention period								
Pre-intervention	2012	155	283	750	203,530	0.76	1.39	3.68
	2013	149	329	739	227,262	0.66	1.45	3.25
	2014	145	380	806	238,114	0.61	1.60	3.38
	2012-14	449	992	2,295	668,906	0.67	1.48	3.43
Transition	2015	129	310	777	250,334	0.52	1.24	3.10
	2016	128	309	813	252,283	0.51	1.22	3.22
Post-intervention	2017	149	351	839	269,929	0.55	1.30	3.11
Pre-post comparisons								
Claim rate ratio: 2017 vs. 2012-14						0.822	0.877	0.906
% rate decline: 2012-14 to 2017						17.8	12.3	9.4
95% confidence interval for % decline						(1.0, 31.7)	(1.0, 22.4)	(2.0, 16.3)
Statistical significance (p- value) of difference in pre-post decline (targeted falls vs. other injury type)							0.571	0.35

Table 17: Lost-time injury claims, FTEs, and claim rates, 2012-2017, and pre-post comparisons for three types of injuries, manufacturing

<i>MANUFACTURING</i>		Number of lost-time injury claims			Full-time equivalents (FTEs)	Lost-time injury claim rates per 1000 FTEs		
Year(s)	Targeted falls	Untargeted falls	Other acute injuries		Targeted falls	Untargeted falls	Other acute injuries	
Intervention period								
Pre-intervention	2012	100	995	3,131	886,498	0.11	1.12	3.53
	2013	88	1,153	2,941	887,385	0.10	1.30	3.31
	2014	94	1,161	2,822	881,854	0.11	1.32	3.20
	2012-14	282	3,309	8,894	2,655,737	0.11	1.25	3.35
Transition	2015	88	997	2,771	909,604	0.10	1.10	3.05
	2016	98	1,072	3,096	907,562	0.11	1.18	3.41
Post-intervention	2017	71	1,084	3,167	918,334	0.08	1.18	3.45
Pre-post comparisons								
Claim rate ratio: 2017 vs. 2012-14						0.728	0.947	1.030
% rate decline: 2012-14 to 2017						27.2	5.3	-3.0
95% confidence interval for % decline						(5.5, 43.9)	(-1.5, 11.5)	(-7.2, 1.1)
Statistical significance (p-value) of difference in pre-post decline (targeted falls vs. other injury type)							0.055	0.01

Table 18: Lost-time injury claims, FTEs, and claim rates, 2012-2017, and pre-post comparisons for three types of injuries, retail and wholesale trades

<i>RETAIL AND WHOLESALE TRADES</i>	Year(s)	Number of lost-time injury claims			Full-time equivalents (FTEs)	Lost-time injury claim rates per 1000 FTEs		
		Targeted falls	Untargeted falls	Other acute injuries		Targeted falls	Untargeted falls	Other acute injuries
Intervention period								
Pre-intervention	2012	161	1,428	3,026	981,692	0.16	1.45	3.08
	2013	187	1,636	2,989	1,000,699	0.19	1.63	2.99
	2014	161	1,606	2,825	1,022,644	0.16	1.57	2.76
	2012-14	509	4,670	8,840	3,005,035	0.17	1.55	2.94
Transition	2015	176	1,473	2,998	1,048,072	0.17	1.41	2.86
	2016	174	1,588	3,168	1,075,549	0.16	1.48	2.95
Post-intervention	2017	132	1,601	3,366	1,080,260	0.12	1.48	3.12
Pre-post comparisons								
Claim rate ratio: 2017 vs. 2012-14						0.721	0.954	1.059
% rate decline: 2012-14 to 2017						27.9	4.6	-5.9
95% confidence interval for % decline						(12.6, 40.4)	(-0.9, 9.9)	(-10.2,-1.8)
Statistical significance (p-value) of difference in pre-post decline (targeted falls vs. other injury type)							0.006	0.00

Table 19: Lost-time injury claims, FTEs, and claim rates, 2012-2017, and pre-post comparisons for three types of injuries, all other Schedule 1 sectors

<i>OTHER SCHEDULE 1 SECTORS</i>	Year(s)	Number of lost-time injury claims			Full-time equivalents (FTEs)	Lost-time injury claim rates per 1000 FTEs		
		Targeted falls	Untargeted falls	Other acute injuries		Targeted falls	Untargeted falls	Other acute injuries
Intervention period								
Pre-intervention	2012	215	4,144	6,154	2,064,261	0.10	2.01	2.98
	2013	230	4,541	6,074	2,106,883	0.11	2.16	2.88
	2014	217	4,739	6,272	2,144,615	0.10	2.21	2.92
	2012-14	662	13,424	18,500	6,315,759	0.10	2.13	2.93
Transition	2015	186	4,194	6,258	2,206,936	0.08	1.90	2.84
	2016	190	4,583	6,928	2,239,778	0.08	2.05	3.09
Post-intervention	2017	199	4,677	7,261	2,299,496	0.09	2.03	3.16
Pre-post comparisons								
Claim rate ratio: 2017 vs. 2012-14						0.826	0.957	1.078
% rate decline: 2012-14 to 2017						17.4	4.3	-7.8
95% confidence interval for % decline						(3.3, 29.5)	(1.1, 7.4)	(-10.8,-4.9)
Statistical significance (p- value) of difference in pre-post decline (targeted falls vs. other injury type)							0.074	0.00

Table 20: Employer difficulties in complying with WAH training requirements, by company size

	All sizes (N=317)		<20 employees (N=142)		20+ employee (N=175)		p-value
	N	%	N	%	N	%	
Arranging for employees to take time away from work	144	45.4	56	39.4	88	50.3	0.05
Covering the cost of the training	61	19.2	35	24.7	26	14.9	0.03
Finding a suitable WAH training course	54	17.0	24	16.9	30	17.1	0.95
Understanding the deadlines for completing the WAH training	31	9.8	14	9.9	17	9.7	0.97
Applying to company's own work situation	29	9.2	15	10.6	14	8.0	0.43
Identifying which employees needed to do the WAH training	20	6.3	1	0.7	19	10.9	< 0.01

Statistically significant differences between groups are shown in boldface, based on the p-value being less than 0.05.

Table 21: Employer difficulties in complying with WAH training requirements, by GTA location

	All sizes (N=317)		<20 employees (N=142)		20+ employee (N=175)		p-value
	N	%	N	%	N	%	
Arranging for employees to take time away from work	144	45.4	61	43.3	83	47.2	0.49
Covering the cost of the training.	61	19.2	25	17.7	36	20.5	0.54
Finding a suitable WAH training course.	54	17.0	16	11.4	38	21.6	0.02
Understanding the deadlines for completing the WAH training.	31	9.8	11	7.8	20	11.4	0.29
Applying to company's own work situation.	29	9.2	15	10.6	14	8.0	0.41
Identifying which employees needed to do the WAH training.	20	6.3	8	5.7	12	6.8	0.68

Statistically significant differences between groups are shown in boldface, based on the p-value being less than 0.05.

Table 22: Major suggestions from training providers and IHSA learners for improving the WAH curriculum

Theme <i>Sub-theme</i>	Training provider survey		Learner survey	
	Number of responses	Percent of total responses (n=62)	Number of responses	Percent of total responses (n=251)
More practical/ less theoretical	20	32.3	69	27.5
<i>More hands-on</i>	*	*	51	20.3
Sector/trade specificity	12	19.4	*	*
Flexibility in training delivery	11	17.7	*	*
Fall prevention/protection methods (incl. anchors, lanyards, etc.)	10	16.1	*	*

A more detailed summary of results is included in Appendix V.

** indicates that < 15% of responses related to the theme.*

11. Figures

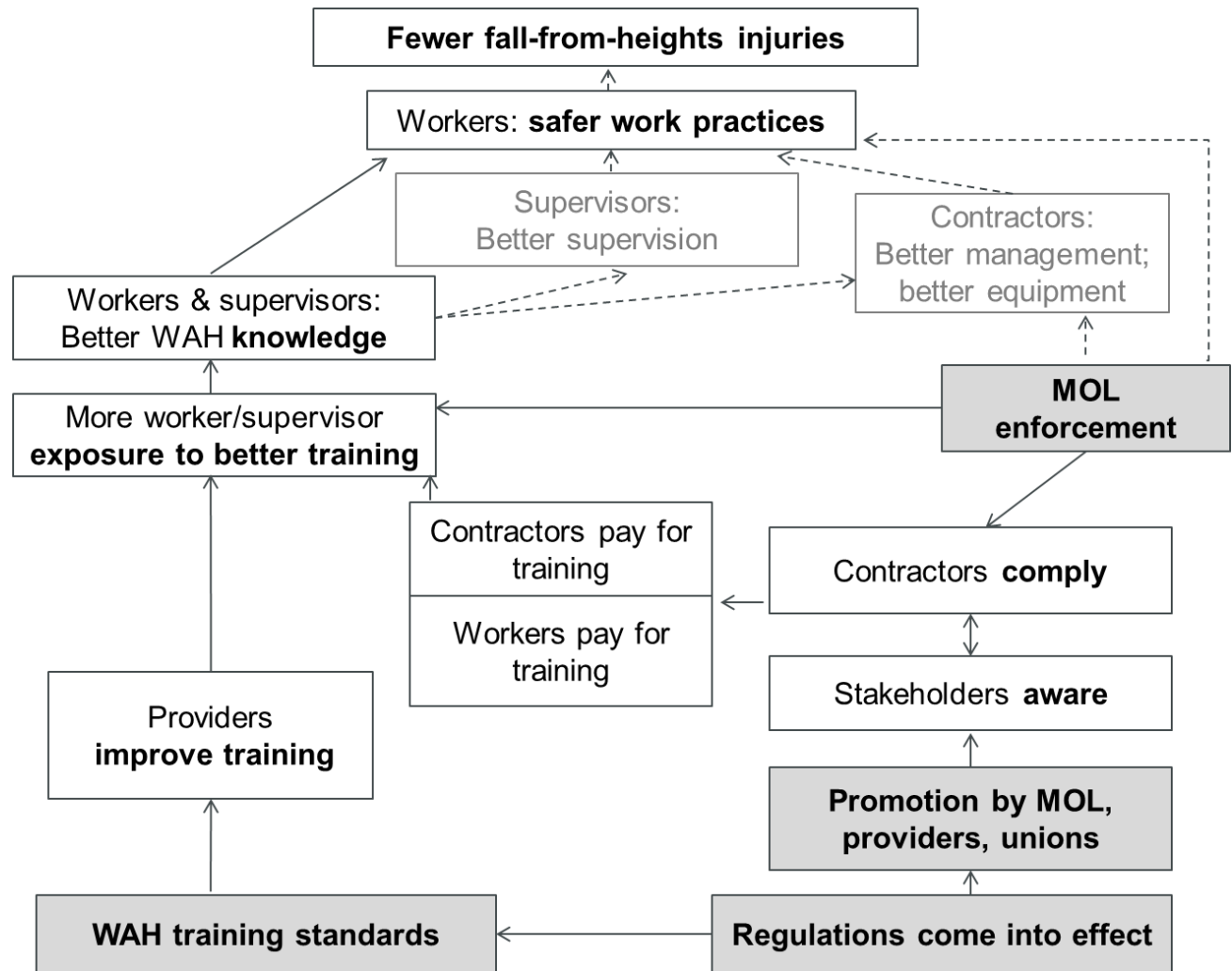


Figure 1: Theory of change for the introduction of mandatory WAH training to Ontario

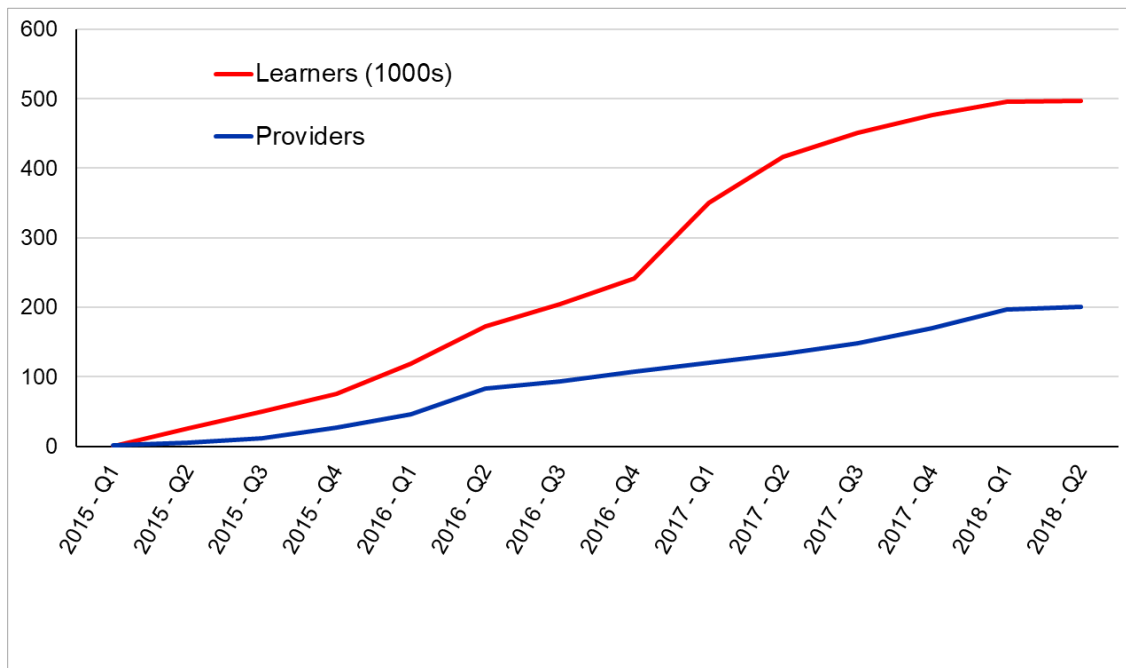


Figure 2: Number of successful WAH training completions and MOL-approved training providers (cumulative)

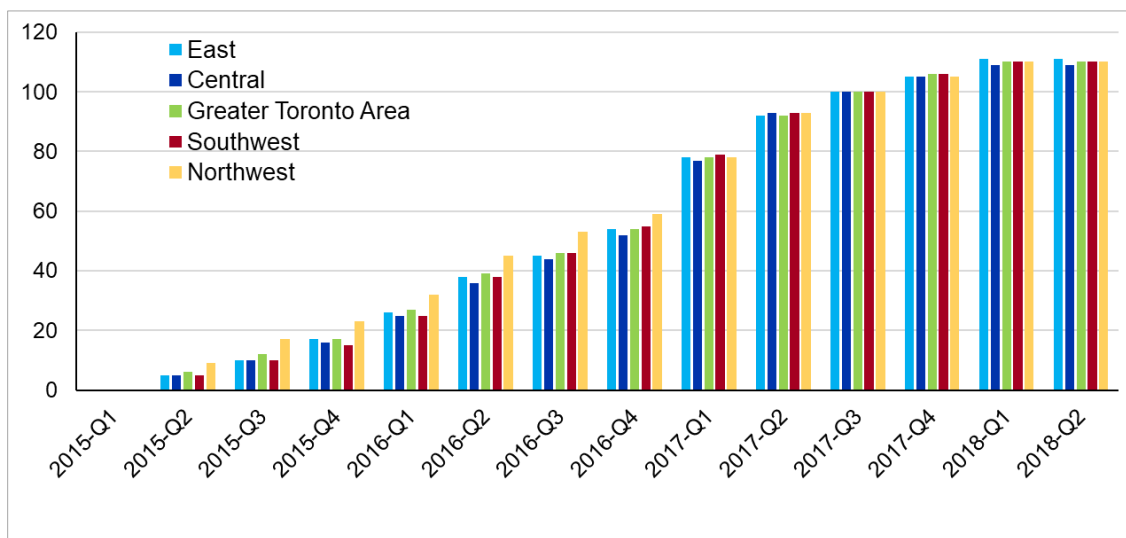


Figure 3: Training completions over time as percentage of total completions at transition deadline, by economic region

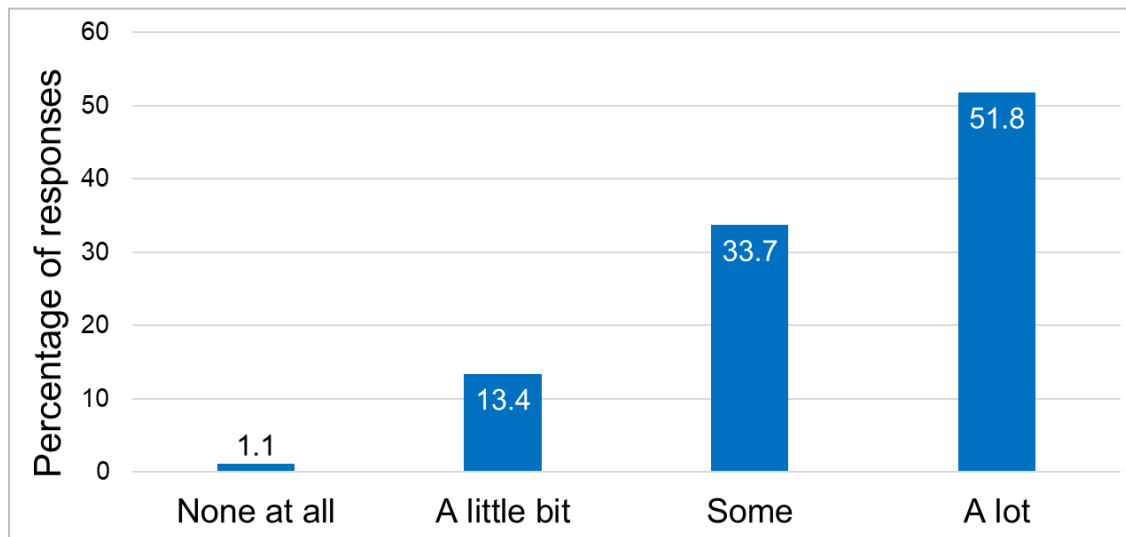


Figure 4: Perceived amount of new information learned in WAH training by IHSA learners

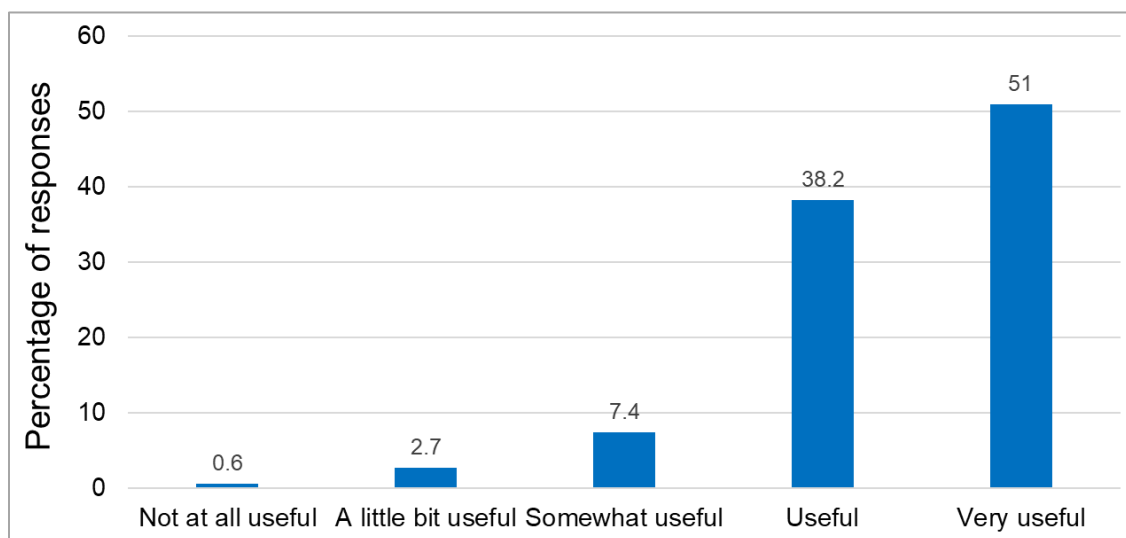


Figure 5: Perceived utility of new information learned in WAH training by IHSA learners

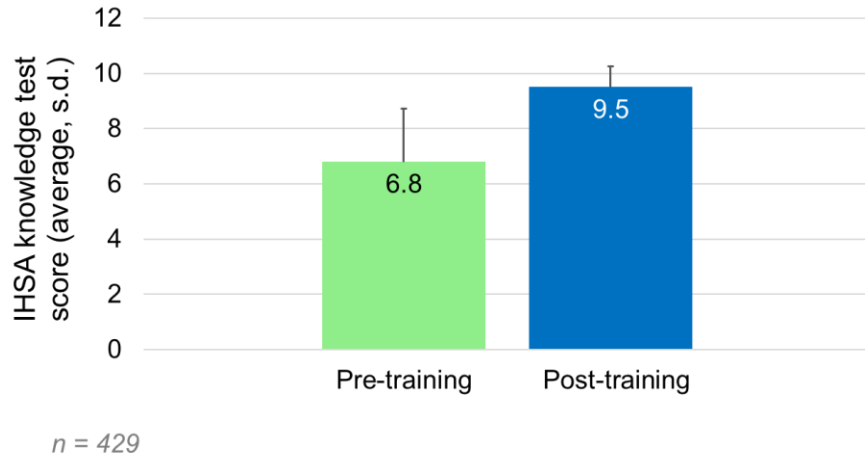


Figure 6: Pre-post IHSa knowledge test scores of WAH learners

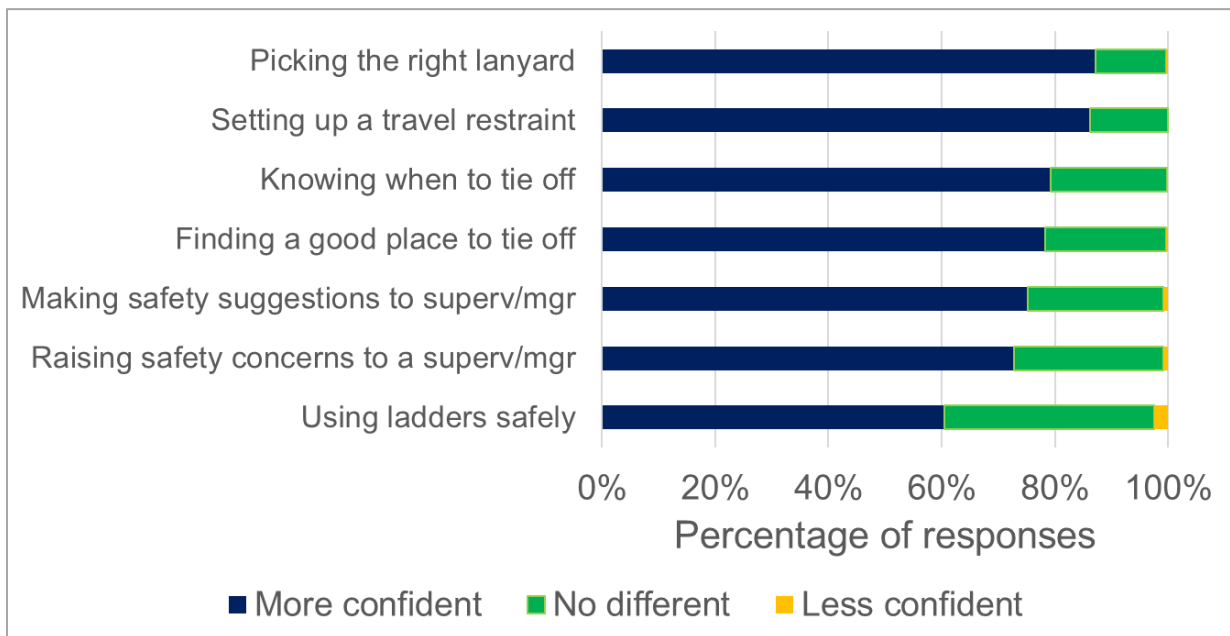


Figure 7: Effect of training on learner confidence in using WAH safety practices

Participants were asked how the training affected their confidence in carrying out safety-related tasks when working at heights. Number of respondents varied from 630 to 633, depending on the item.

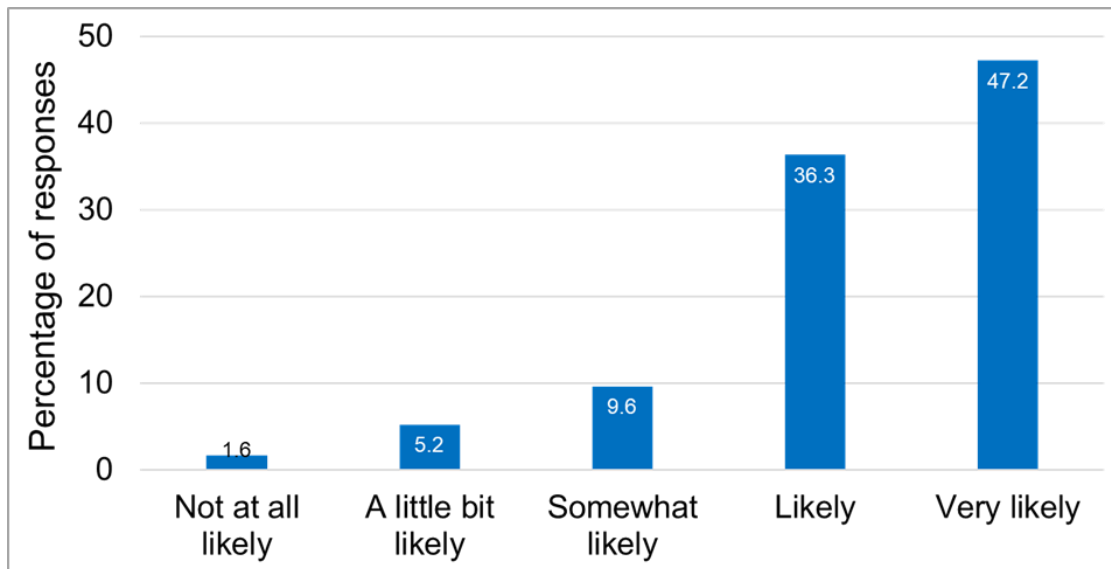


Figure 8: Learner intention to change safety precautions as a result of the training

Participants (n = 633) responded to the question “How likely are you to change the way you take safety precautions as a result of the training?”

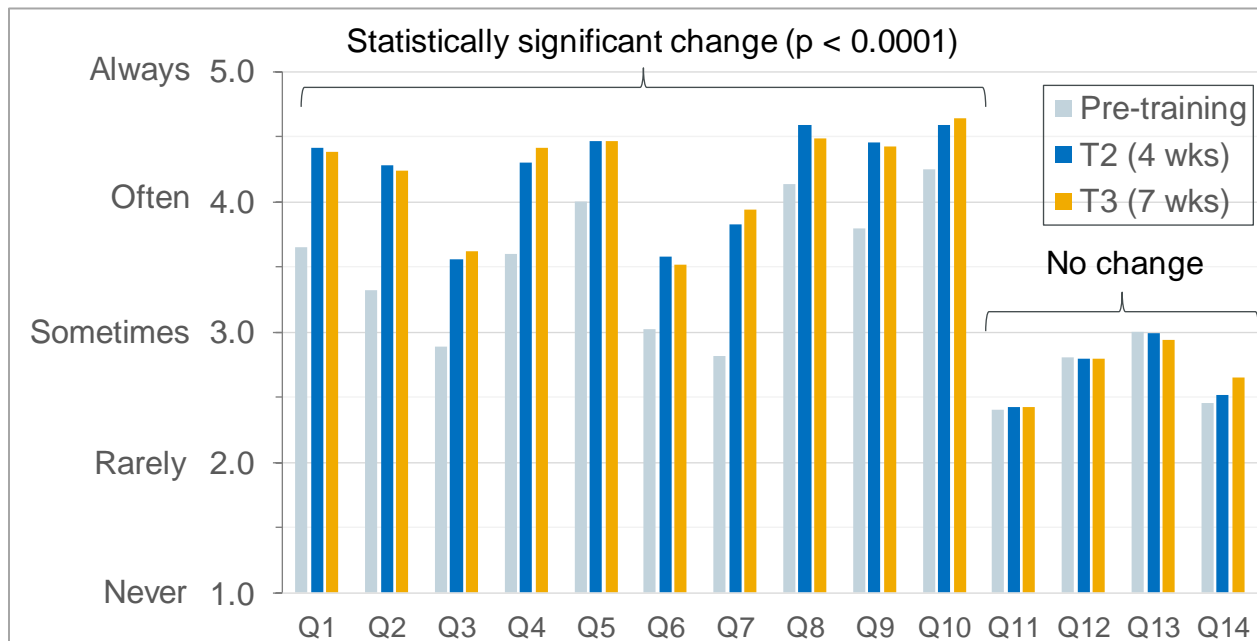


Figure 9: Frequency of WAH safety practices before and after training

Response options for WAH safety practice questions were never, rarely, sometimes, often, always, or not applicable. To compute the average, observations with not applicable or missing responses were excluded and the remaining responses were assigned a value from 1 to 5, for responses never through always, respectively.

- Q1. How often did you check the worksite for fall hazards at the beginning of the shift?
- Q2. How often did you inspect your fall protection equipment before using it?
- Q3. How often did you wear fall protection equipment when working on a ladder at a height greater than 10 feet?
- Q4. How often did you maintain 100% tie off when working at heights with fall arrest equipment?
- Q5. How often did you maintain three point contact when using a ladder?
- Q6. How often did you make sure you got job-specific orientation to fall protection at a new site?
- Q7. How often did you know the fall rescue plan?
- Q8. How often did you use fall protection equipment that was worn out? (reverse scored)*
- Q9. How often did you take a shortcut to save time, even though there was a chance of falling? (reverse scored)*
- Q10. How often did you use fall arrest equipment that might bottom out? (reverse scored)*
- Q11. How often did you make a suggestion to a supervisor/ manager to improve fall safety? **
- Q12. How often did you make a suggestion to a coworker to improve fall safety? **
- Q13. How often did you try to use guardrails instead of a fall arrest system?
- Q14. How often did you use travel restraint?

* Questions 8, 9, 10 are reverse scored so that higher values mean better practices.

** Questions 11 and 12 are the two practices are considered to be untargeted by the WAH intervention; the other 12 practices are considered to be targeted.

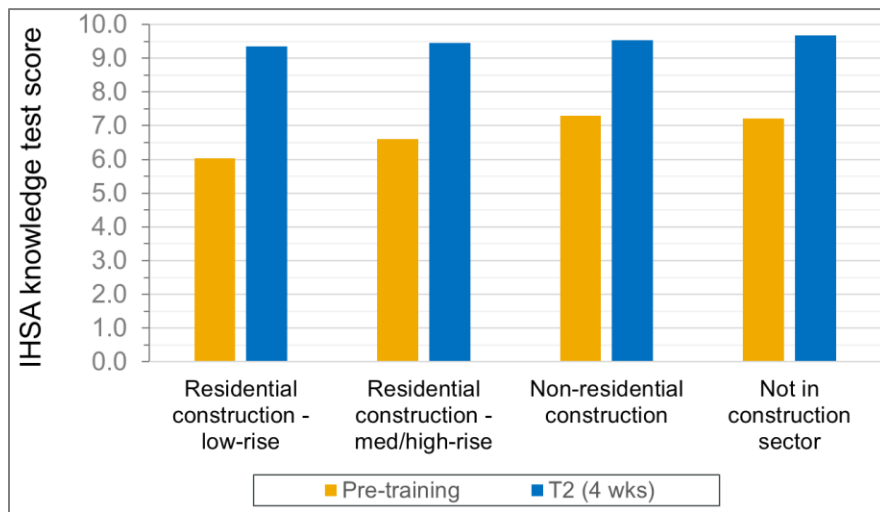


Figure 10: Effect of sector on WAH knowledge gain

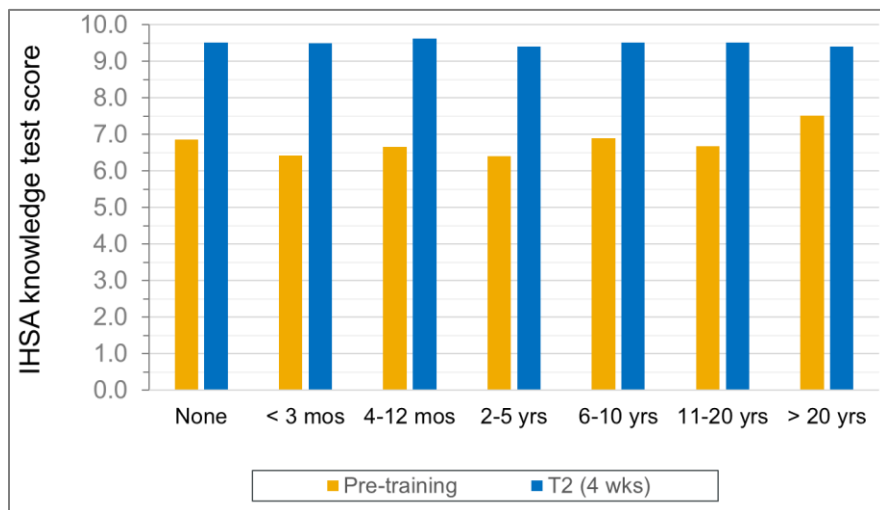


Figure 11: Effect of Ontario construction experience on WAH knowledge gain

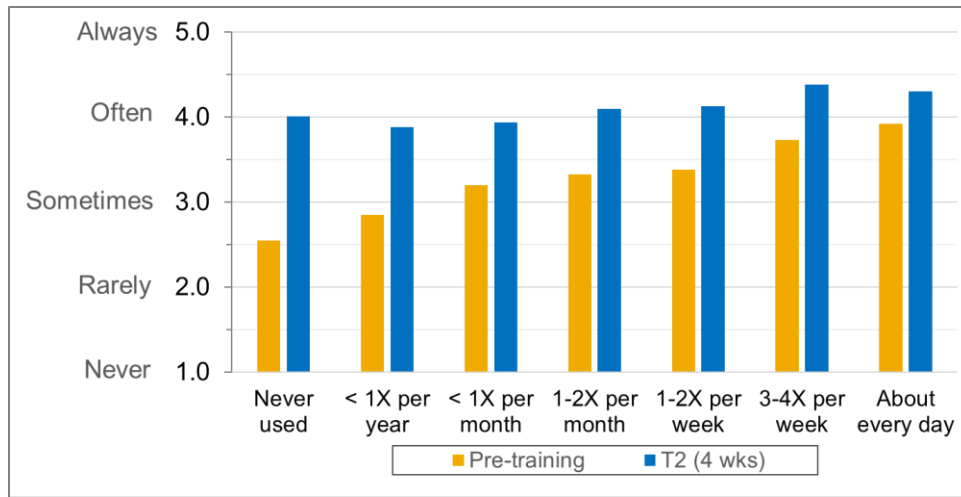


Figure 12: Effect of frequency of FP equipment use on improvement in WAH safety practices

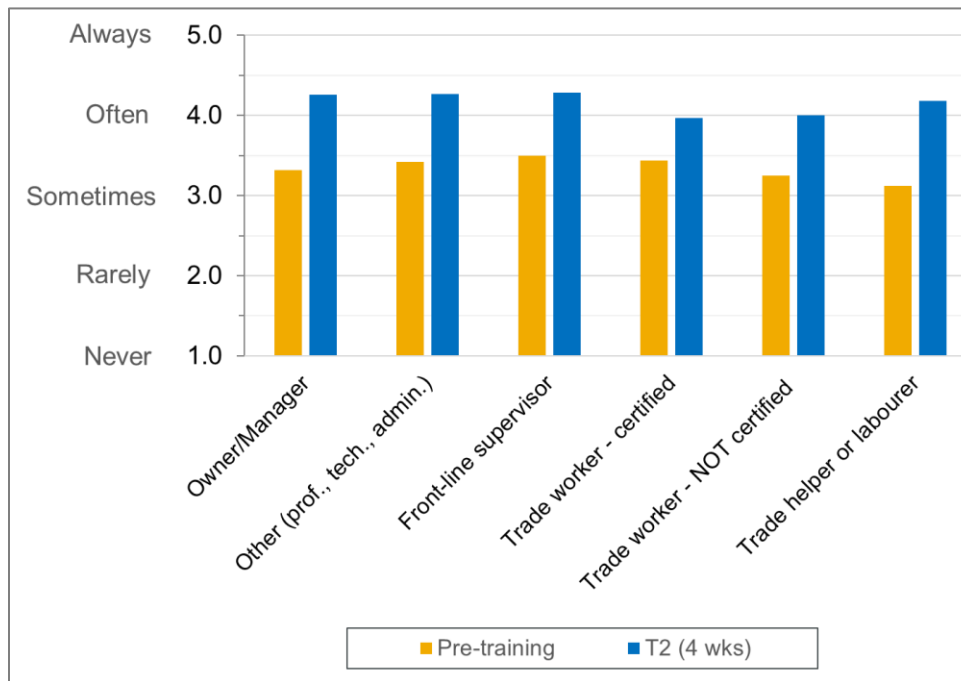


Figure 13: Effect of work role on improvement in WAH safety practices

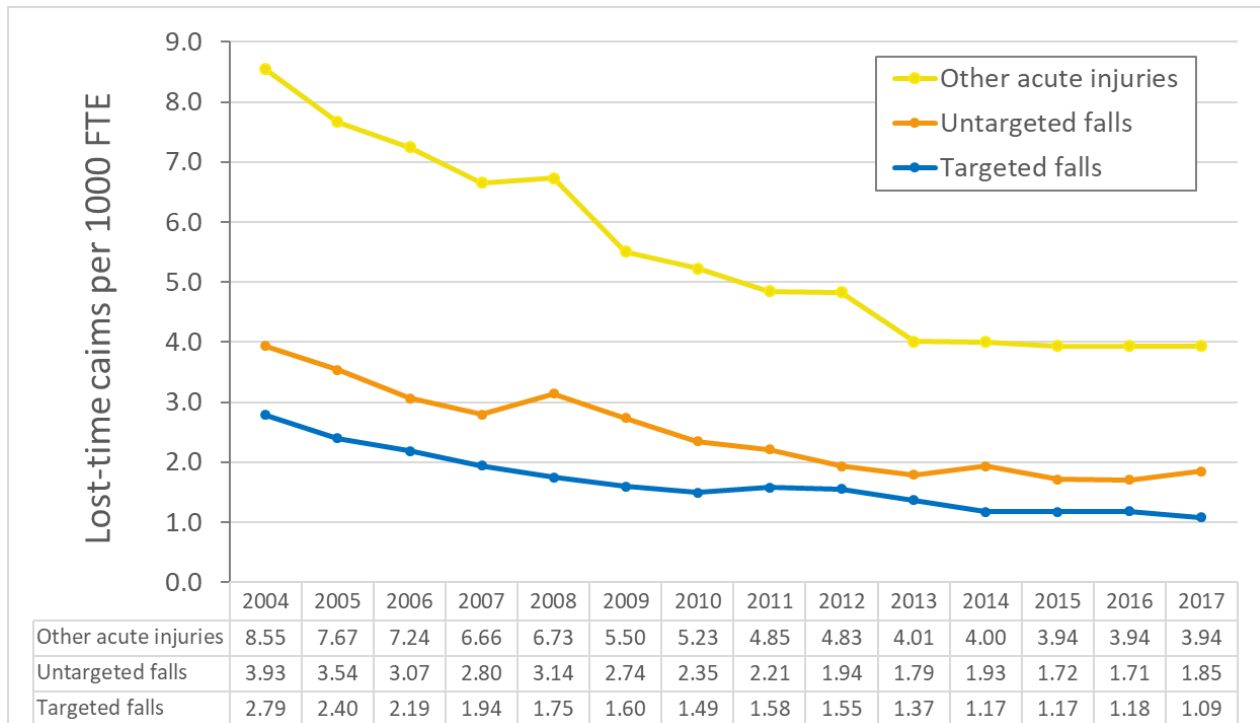


Figure 14: Lost-time claim rates for targeted falls, untargeted falls and other acute injuries, 2004-17, construction

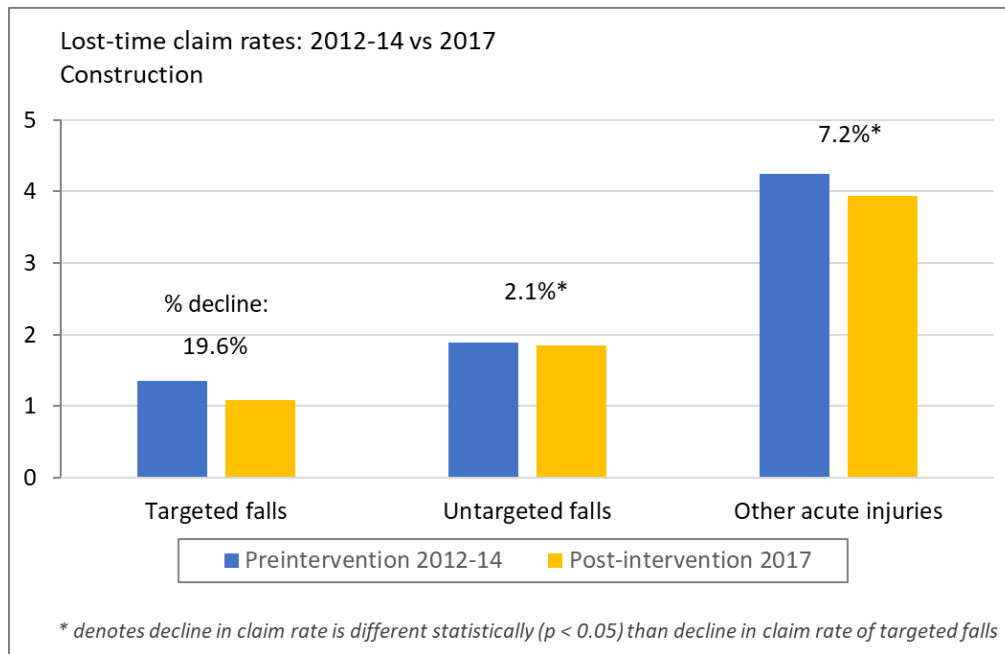


Figure 15: Lost-time injury claim rates in construction, 2012-14 vs 2017

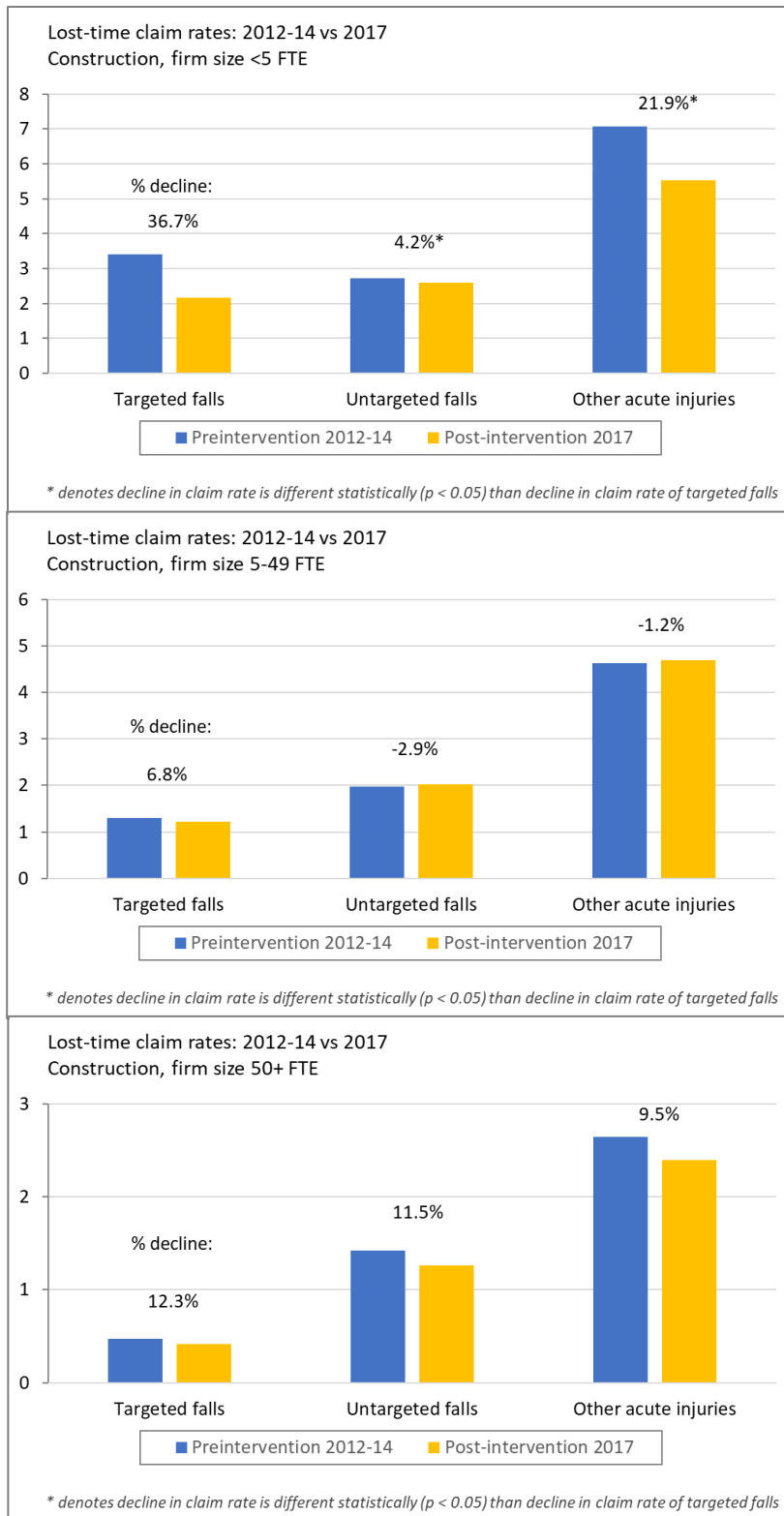


Figure 16: Lost-time injury claim rates in construction, 2012-14 vs 2017, by firm size

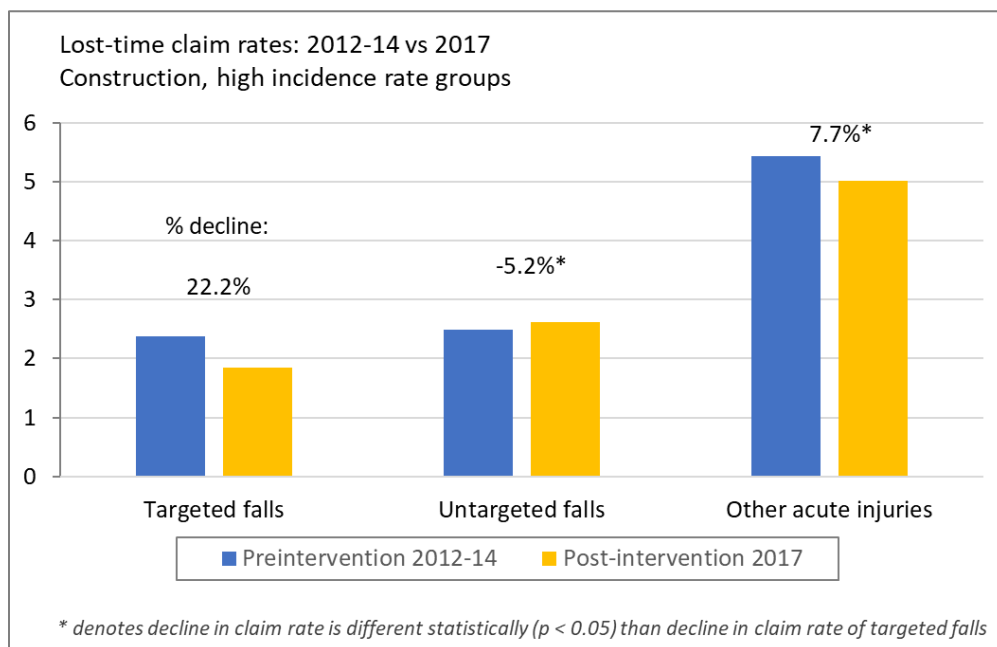
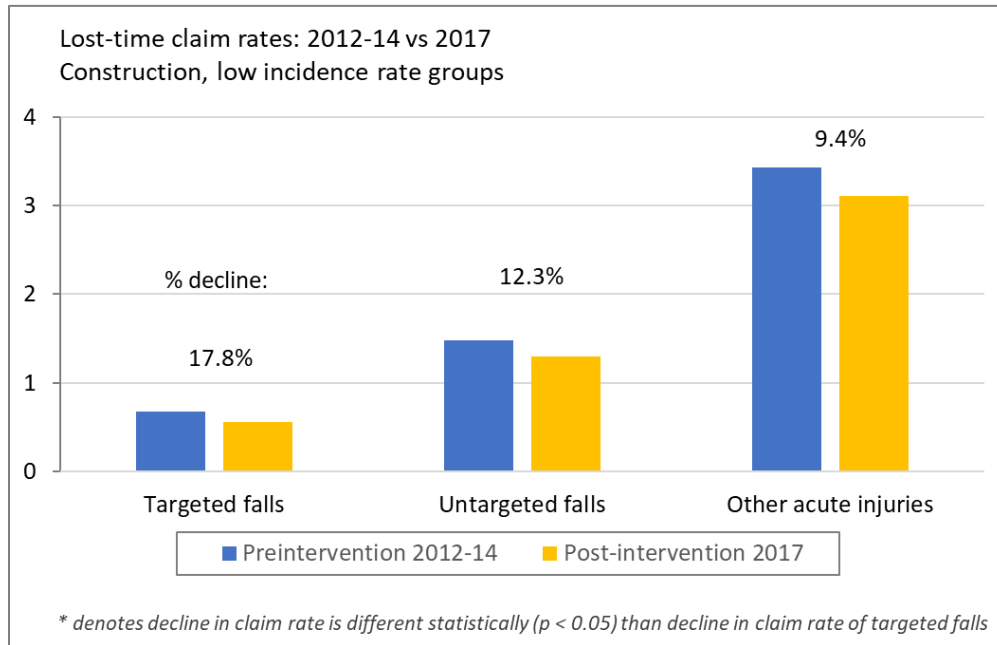


Figure 17: Lost-time injury claim rates in construction, 2012-14 vs 2017, by high and low fall incidence sectors

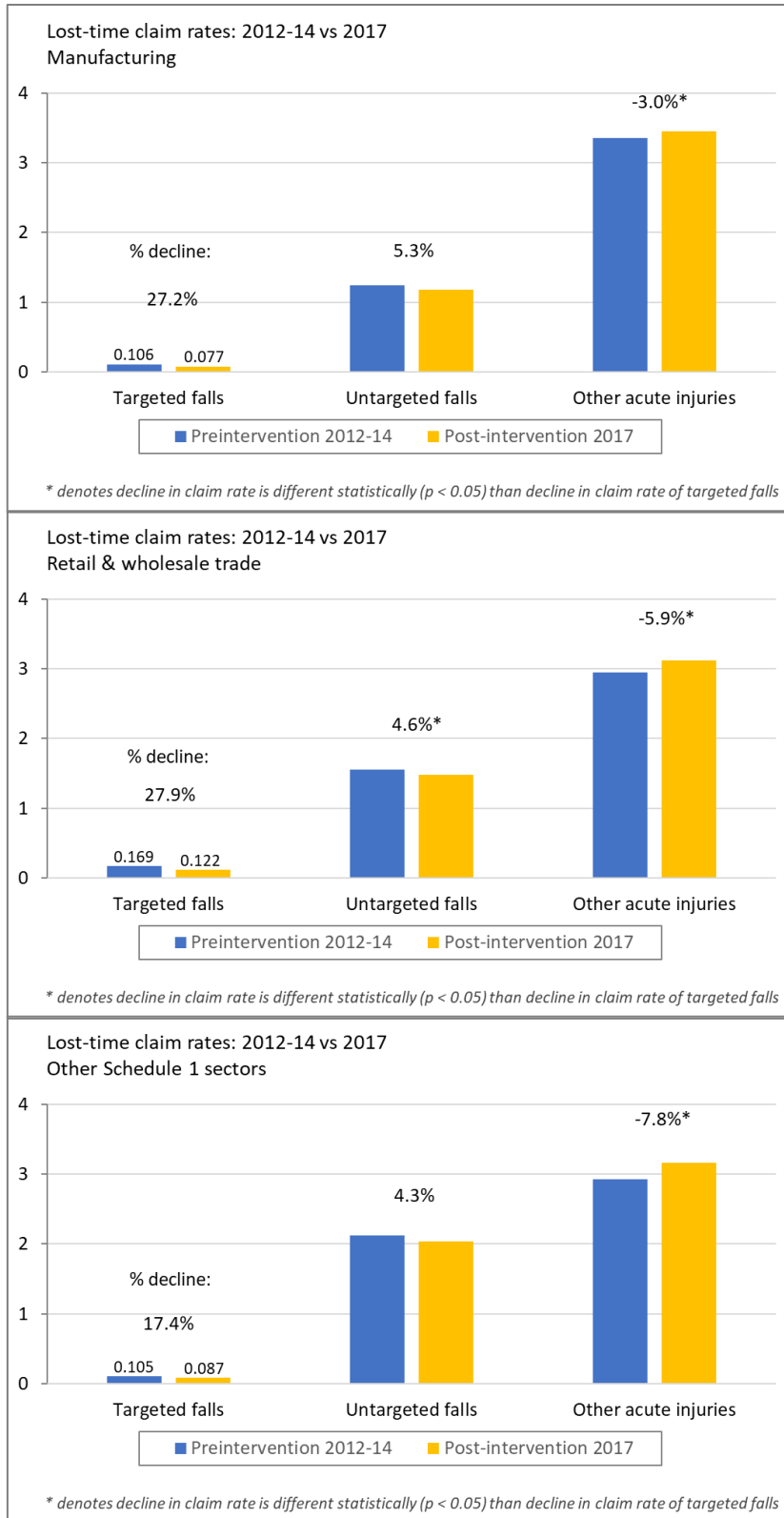


Figure 18: Lost-time claim rates in manufacturing, trade, and other Schedule 1 sectors, 2012-14 vs 2017

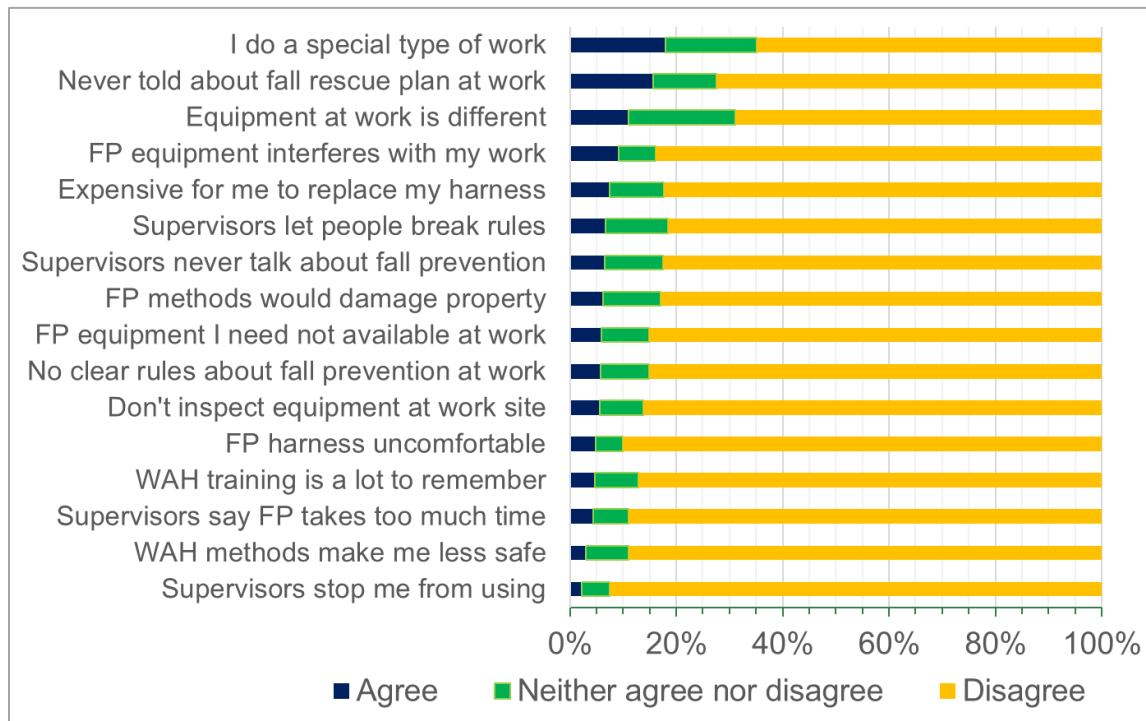


Figure 19: Barriers to learners applying WAH training to the work site

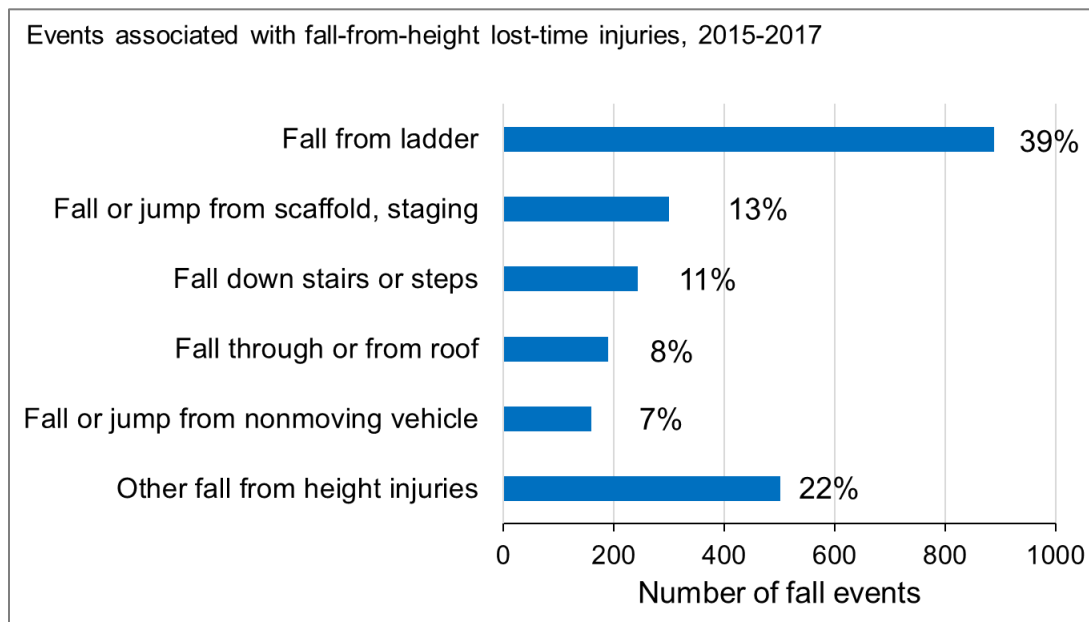


Figure 20: Events associated with fall-from-height lost-time injuries, 2015-2017

Appendices

Appendix A: Methods, results and discussion of pilot survey of trade workers

A pilot survey of trade workers was conducted in collaboration with the Ontario College of Trades (OCOT). The compulsory trades were of particular interest for potentially investigating the first evaluation question about reach of the intervention because OCOT maintains records, including contact information, of all individuals with a qualification in those trades. After completing the pilot survey, OCOT assessed that they were not able to support further survey activity.

Methods

Sample

Steamfitters were the target of the pilot because they were the Ontario compulsory construction trade with the highest exposure to heights, according to the O*NET database on occupations (www.onetonline.org/). A random sample of 110 individuals with e-mail addresses was selected from the membership of Steamfitters with an apprentice, journey person candidate or journey person status.

Recruitment and data collection

In mid-March 2018, an e-mail was sent by OCOT to the sample, inviting them to participate in the survey, with compensation of a \$30 Tim Hortons gift card. The recruitment e-mail included a link that when clicked led participants to an online survey. Two follow-up reminders followed over the subsequent 10 days. The recruitment outcomes of the survey yielded a 30% response rate: 32 completions, 72 non-respondents (17 e-mails were opened and 56 remained unopened), 5 invalid e-mail addresses (bounced back).

Survey questionnaire

The survey questionnaire was created for the project, pretested with members of the OCOT Steamfitters Trade Board, a small labour-management group, and then revised based on their feedback. The main aim of the questionnaire was to establish whether respondents were compliant with the requirement to do WAH training. It was also an opportunity to assess some of the same training outcomes measured in the learner survey. These included WAH knowledge gain, WAH training utility, and perceived change in WAH practices. A Microsoft Word version of the questionnaire is included in Appendix B. The survey was administered only in English.

Analysis

Counts and frequencies of the responses were determined.

Results

Characteristics of sample of trade workers

The characteristics of the respondents (n = 32) to the pilot survey of Steamfitters include:

- 91% with journeyperson certification
- 88% working in the ICI (industrial, commercial and institutional) sector
- 77% working for employers with ≥ 50 employees
- 90% unionized
- 91% with more ≥ 6 years experience working on construction projects in Ontario
- 81% are ≥ 35 years of age

Of note, prior to the WAH training, 90% had been using FP equipment at least once a month and 97% had taken formal FP training prior to taking WAH training. (The corresponding values for the IHSA learners were 49% and 55%. Overall, the sample of Steamfitters was a more homogenous group than the cohort of IHSA learners surveyed in the evaluation; and had more experience and prior training with FP equipment.)

Compliance with training requirement

Of the 31 individuals reporting that they use FP equipment, 30 had taken the WAH training, yielding a compliance rate of 97%.

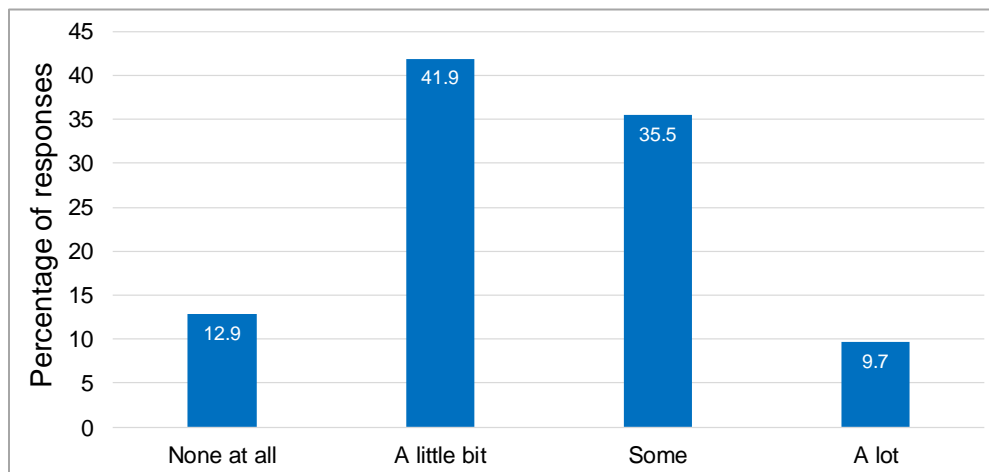
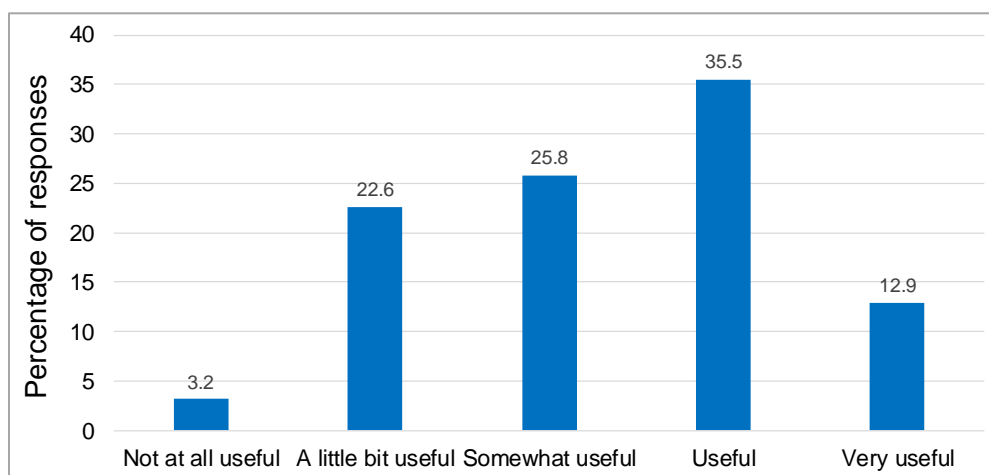
Training outcomes for trade workers

The same knowledge-related questions used in the learner follow-up study with IHSA learners were asked of Steamfitters. However, it should be kept in mind that while IHSA learners were asked the questions one week following training, the Steamfitters were asked months or even years after taking the WAH training. Knowledge acquisition and the perception of its utility was reportedly less for Steamfitters (Figure A1 and A2 below) than for IHSA learners (see Chapter 4). Accordingly, the Steamfitters appeared to perceive less of an impact of WAH training on the safety of their work practices (Table A1) than the WAH learners did. The two tables are not fully comparable because of the slightly different questions asked and the different post-training times. Positive effects of the training were nevertheless observed overall, with 39% of Steamfitters reporting they became “somewhat more safe as a result of the training.”

Table A1: Perceived change in WAH practices by Steamfitters

	n	%
They became a lot LESS safe as a result of the training	0	0.0
They became somewhat LESS safe as a result of the training	0	0.0
They stayed the SAME	19	61.3
They became somewhat MORE safe as a result of the training	12	38.7
They became a lot MORE safe as a result of the training	0	0.0

The question asked was, "How were your work practices affected by taking the working at heights training?"

**Figure A1:** Perceived amount of new information learned in WAH training by Steamfitters (n = 31)**Figure A2:** Perceived utility of new information from WAH training by Steamfitters (n = 31)

Appendix B: Questionnaire used in pilot survey of trade workers

Exposure to heights

1. **Do you work at heights of 10 feet or more?** (Yes, No)
2. [If yes to #2] **How often do you work at heights of 10 feet or more?** (Never, Less than once a year, Less than once a month, About once or twice a month, About once or twice a week, About every day)
3. [If yes to #2] **How often do you use fall protection equipment at work?** (Never, Less than once a year, Less than once a month, About once or twice a month, About once or twice a week, About every day)

Awareness

4. **Have you heard about the new Working at Heights training available to Ontario workers since 2015?** (Yes, definitely; Yes, I think so; No, I don't think so; No, definitely not)

Compliance with WAH training regulation

5. The new Working at Heights training focuses on fall protection equipment and on other ways of protecting against falls. It conforms to a government standard and has been on the market for three years now. **Have you taken the new Working at Heights training?** (Yes, No)
6. [If yes to #6] **In what year did you take the new Working at Heights training?** (2015, 2016, 2017, 2018)
7. [If yes to #6] **Who did you do the Working at Heights training with?**
 - a. Infrastructure Health and Safety Association, IHSA, or one of its training partners who uses IHSA materials
 - b. Workers Health and Safety Centre
 - c. Fall Protection Group
 - d. Construction Workplace Safety Training Ltd
 - e. Act First Safety
 - f. Another organization (if you know the name, please specify; if you don't know the name, please select the next option)
 - g. Another organization, but don't know its name
 - h. Don't know which of the above applies to me
8. [If answer is other than "never" to #4 and is "no" to #6] **Why have you not yet taken the new Working at Heights training?**

Impact of Working at Heights training [if yes to #6]

9. **How much new information did you learn in the Working at Heights training?** (None at all, A little bit, Some, A lot)

10. **How useful was the new information you learned in the Working at Heights training?**
(Not at all useful, A little bit useful, Somewhat useful, Useful, Very useful)
11. **How did the Working at Heights training affect your confidence in being able to work safely?** (A lot less confident, Somewhat less confident, No different, Somewhat more confident, A lot more confident)
12. **How were your work practices affected by taking the Working at Heights training?**
(They became a lot LESS safe as a result of the training; They became somewhat LESS safe as a result of the training; They stayed the SAME; They became somewhat MORE safe as a result of the training; They became a lot MORE safe as a result of the training)
13. **How were your co-workers' work practices affected by taking the Working at Heights training?** (They became a lot LESS safe as a result of the training; They became somewhat LESS safe as a result of the training; They stayed the SAME; They became somewhat MORE safe as a result of the training; They became a lot MORE safe as a result of the training; Don't know)

Demographics

14. [If yes to #6] **Before the Working at Heights training, how often did you usually use fall protection equipment?** (Never used it, Less than once a year, Less than once a month, About once or twice a month, About once or twice a week, About every day)
15. **Did you ever do formal fall protection training? (Formal fall protection training was required for construction workers using fall protection equipment, before Working at Heights training was introduced. Formal fall protection training resulted in a card.)**
[Yes, No, Don't know]
16. **What best describes your employment status now?** (Permanent employee, Temporary/casual employee, Independent operator, Unemployed, Student)
17. **In which sector do you most often work?**
- Home-building construction- small projects (e.g. a single- to six-family dwelling)
 - Home-building construction- large multi-unit projects (e.g. apartments, condominiums, new house developments of more than six homes, etc.)
 - Industrial, commercial and institutional construction *other than* apartments & condominiums
 - Other non-residential construction (e.g. heavy civil & roadbuilding)
 - Sector other than construction (please specify)
18. **In what size of organization do you typically work?** (0-4 employees; 5-19 employees, 20-49 employees; 50-199 employees; 200+ employees; Not applicable)
19. **Do you belong to a union?** (Yes; No; Not applicable – no work history)
20. **What are the first three letters/digits of your postal code?**

21. **How much experience do you have working on construction projects in Ontario?** (None; Less than three months; Four months to one year; Two to five years; Six to ten years; Eleven to twenty years; More than twenty years)
22. **In what age group are you?** (24 years or less; 25-34 years; 35-44 years; 45-54 years; 55 years or more)
23. **Which are you?** (An apprentice; A journeyperson candidate; A trade qualifier; A journeyperson)
24. **Did you complete an apprenticeship to attain a Certificate of Qualification?** (Yes; No; Not applicable- do not have Certificate of Qualification)

OCOT content

25. **In which arrangement would Steamfitters get the most safety benefit from the Working at Heights training?**
- a. **Current arrangement:** Working at Heights training is *separate from* the training pathway for obtaining the Certificate of Qualification
 - b. **Alternative arrangement:** Working at Heights training is *integrated into* the training pathway for obtaining the Certificate of Qualification
 - c. Makes no difference
 - d. No opinion
26. **Finally, what is your most important recommendation for making working at heights safer for Steamfitters? It could be about training or it might be about something else.**

Appendix C: Estimated annual exposure to working at heights, by construction occupation

NOC 2011	Occupation	Employ- ment (1)	Average exposure hours per worker per year (2)	
			Exposed to high places	Time on ladders, scaffolds, poles
7291	Roofers and Shinglers	8,000	760.0	368.8
7252	Steamfitters, pipefitters and sprinkler system installers	5,400	600.0	552.4
7281	Bricklayers	8,500	558.4	242.4
7245	Telecommunications line and cable workers	1,200	476.8	335.6
7241	Electricians (Except industrial and power system)	31,500	385.8	414.8
7313	Refrigeration and air conditioning mechanics	12,100	378.4	332.8
7284	Plasterers, Drywall installers and finishers and lathers	9,900	358.0	310.0
7294	Painters and Decorators	16,500	338.3	463.2
7611	Construction Trades Helpers and Labourers	72,500	287.7	250.0
7271	Carpenters	37,500	252.2	271.2
7251	Plumbers	16,400	237.4	185.2
7204	Contractors and Supervisors, Carpentry Trades	5,500	193.3	204.4
7205	Contractors and supervisors, other construction trades, installers, repairers	9,200	193.3	204.4
7302	Contractors and supervisors, heavy equipment operator crews	3,200	193.3	204.4
0712	Home building and renovation managers	20,000	161.6	92.8
0711	Construction Managers	13,400	161.6	92.8
7511	Transport truck drivers	2,500	122.1	72.4
6733	Janitors, caretakers and building superintendents	8,500	69.8	56.8
7521	Heavy Equipment Operators	10,500	67.9	41.6
2131	Civil Engineers	2,300	53.4	60.0
2234	Construction estimators	7,700	52.3	89.6
0016	Senior managers - construction, transportation, production and utilities	2,700	43.0	28.0
7441	Residential and commercial installers and servicers	19,500	34.8	21.6
1221	Administrative Officers	3,500	0.1	0.0
1411	General office support workers	4,500	0.1	0.0

Sources: (1) Statistics Canada - 2016 Census. Catalogue Number 98-400-X2016357 (2) O*Net, US Department of Labour

NOC, National Occupational Classification.

Appendix D: Methods in detail

The methods were approved by the University of Toronto Research Ethics Board for Health Sciences.

Analysis of MOL administrative records of MOL training

Data sources

Training activity. Anonymized extracts of training records were provided by the Ministry of Labour (MOL) with information about dates of WAH training, names of WAH training providers and learner postal codes. Any records lacking a date were not extracted. The extraction, conducted early July 2018, held records of training taking place between March 2015 to April 2018, but due to processing times, was incomplete in its coverage of 2018.

A determination of whether a training provider delivered training to external clients or in-house only was made by consulting the list of approved training providers on the MOL website (https://www.labour.gov.on.ca/english/hs/wah_providers.php).

Construction workers. Numbers of construction workers (total employed and unemployed) in 11 economic regions in 2016 were obtained from the Statistics Canada's 2016 Census data. The census uses the 2012 North American Industrial Classification System to define "construction" sector. The economic regions are geographic units created by Statistics Canada for use in analyses of regional economic activity.

Analyses

Records of WAH training completions were aggregated by calendar quarter, Statistics Canada economic region, and training provider to provide a description of training activity. Economic regions were assigned using the Statistics Canada Postal Code Conversion File (PCCF), which allowed the assignment of postal codes in existence up to June 2017. The Statistics Canada economic regions were further aggregated to the economic regions used in the Ontario Ministry of Finance reports.

Survey of training providers

Sample

The sample for the survey of approved WAH training providers was selected on the basis of provider training activity during the last full year of training records available, April 2017 – March

2018. Of the 199 providers appearing in the MOL extract of training, 126 met the first inclusion criterion of having successfully trained at least 100 individuals during Apr 2017-Mar 2018. However, one provider was excluded because it had lost MOL approval more than 6 months before the survey and three others were excluded because they participated in the pretesting of the survey questionnaire. Finally, representatives of two additional provider organizations were added to the sample after they contacted IWH to volunteer for the survey: one had not met the inclusion criterion for activity and the other was a new provider not yet appearing in the training records. These various inclusion and exclusion conditions resulted in a targeted group of 124 training providers.

Recruitment and data collection

The 124 training providers were contacted by telephone July to September 2018 to recruit them to the survey. The researcher first sought contact with the manager overseeing the WAH training. On occasion, this led to a referral to another person in the organization who held more of the relevant information. The telephone interview lasted 20-30 minutes, with data inputted by the interviewer using the online Qualtrics survey platform.

Organizations in the sample were re-contacted until the targeted key informant was reached and a decision about participation was made. If needed, two voicemails at the start of recruitment and one at the end of recruitment were left, and two to eight additional contact attempts were made with no message being left. During the recruitment period, the MOL communicated to all providers by e-mail that their participation in the survey was encouraged but was voluntary and that their participation status would remain unknown to the MOL.

Attempts to recontact all ten inspectors were made in January 2019 so that their perceptions of the impact of WAH training at the worksite could be updated. Two had moved on to different job roles and five provided a response to the follow up inquiry.

Survey questionnaire

The survey questionnaire was created for the project with two aims in mind: i) documenting the nature of changes, if any, that occurred in pre-existing providers' training curricula as a result of the regulations, and ii) identifying opportunities for improvement in the WAH curriculum or in the MOL administration of the WAH program. It was pretested with a small sample of training providers with lower training activity and then revised based on their feedback. A Microsoft Word version of the questionnaire is included in Appendix E. The survey was administered only in English.

Analysis

Frequencies and percentages of responses were calculated for the whole sample.

Survey of construction employers

Sample

A sample of Ontario construction employers was selected based on the records of InfoCanada, a commercial provider of marketing information. They provided records for construction employers (NAICS code 23) for different employer size strata: all employers with 50 or more employees (n = 1014); a random sample (n = 1550) of employers with 5-49 employees in the Greater Toronto Area (GTA), representing 47% of the stratum; and a random sample (n = 1550) of employers with 5-49 employees outside the GTA, representing 34% of the stratum.

“Outside of GTA” was defined as postal codes beginning with any of the following: K, LOA – L0Z, L1A, L1B, L1C, L1E, L2A - L2W, L3B – L3M, L3V, L3Z, L4M, L4N, L4P, L4R, L7C, L7E, L7G, L7J, L7K, L9E, L9G, L9H, L9J, L9K, L9L, L9M, L9N, L9P, L9R, L9S, L9T, L9V, L9W, L9X, L9Y, L9Z, N, P. “GTA” was defined as all postal codes beginning with L (excepting those already listed for outside of GTA) or M.

Each record included employer contact information, number of employees (5-9, 10-19, 20-49, 50+), a primary SIC code and up to four secondary SIC codes. Any of the primary or secondary SIC codes was the basis for selection into the sample. After receipt of the sample from InfoCanada, some records were excluded because they were unlikely to be a business with employees working on construction projects. Examples of exclusions included mining companies, management services from non-construction businesses, repair services associated with non-construction businesses and home improvement retailers. The last of these were presumed to have subcontractors but not employees working on construction projects.

Following these exclusions, the sample sizes of the above three groups, respectively, were 799, 1416, and 1517.

Data collection

Recruitment and data collection took place between June 29, 2017 to January 2, 2018. Experienced interviewers contacted companies by telephone, seeking the person most knowledgeable about occupational health and safety. A contact attempt was made with 3,043 companies (799, 1030 and 1214 from the above three groups respectively). Efforts were made to recruit approximately equal numbers of larger and smaller employers (20+ and <20 employees), and similarly achieve balance between employers situated in the GTA and outside of the GTA.

The outcome of all contact attempts was the following: not in service (73, 2.4%); no answer or voicemail message, and no message left by interviewer (994, 32.7%); voicemail message and interviewer message requesting return call (83, 2.7%); reached someone else in the organization (897, 29.5%); target person (repeatedly) deferred until a day past survey cutoff date (167, 5.5%), partial completion / withdrawal (4, 0.1%); ineligible organization (217, 7.1%);

active decline (218, 7.2%); and interview completed (390, 12.8%). Using the methods of Statistics Canada (2001), this yields a response rate of 15%.

Data collection was supported by Qualtrics, an online survey platform (www.qualtrics.com). Interviewers entered data directly into an online data collection form while interviewing the company contact.

Survey instrument

A survey instrument was created for the study. Domains of inquiry included employee exposure to heights, employee and subcontractor use of fall protection equipment, employee WAH training, impact of WAH training at the work site, and barriers to complying with the WAH training requirement. Most survey items sought close-ended responses, but a few sought open-ended. A Microsoft Word version of the online questionnaire is shown in Appendix F.

Analysis

All observations with completed questionnaires were included in the analysis ($n = 390$). Frequencies and percentages of responses were calculated for the whole sample and for sub-groups specified before analysis (i.e., in GTA, outside GTA, < 20 permanent employees, ≥ 20 permanent employees). Additional post-hoc comparisons between residential and non-residential and between unionized and non-unionized companies were also conducted. The statistical significance of between-group differences was determined with Chi-square frequency test, using $\alpha = 0.05$.

Responses to open-ended questions in the survey were analyzed using inductive thematic coding (Braun and Clarke, 2006) rather than a pre-determined coding scheme, informed by WAH concepts in the WAH training and in the evaluation study's conceptual model. Two to three codes were assigned to a given response. The prevalence of a theme in the responses was quantified and expressed as a percentage, by dividing the number of responses assigned the respective thematic code by the total number of valid responses.

For the final open-ended question at the end of the survey, which asked about anything else the researchers should know "good or bad," answers were again coded thematically based on the topic. In addition, they were coded as being positive, negative, neutral, or mixed (i.e., both positive and negative) towards the training. A ratio of negative to positive comments was calculated by dividing the number of negative comments (i.e. number of negative and number of mixed) by the number of positive (i.e. number of positive and number of mixed).

Learner pre-post follow-up surveys

The learner pre-post follow-up study, a longitudinal survey of successful participants in WAH training classes, was undertaken in collaboration with the Infrastructure Health and Safety Association (IHSA), the largest provider of WAH training in Ontario.

IHSA delivers WAH training throughout the province of Ontario through two different avenues. One employs in-house staff members and the other uses external training partners. The latter undergo training in the working at heights curriculum and in instructional methods. In addition, they meet IHSA requirements for previous experience in working at heights and willingness to participate in a quality assurance audit (more details found here: <https://www.ihsa.ca/pdfs/training-partner/becoming-ihsa-wah-tp-requirements.pdf>.) From hereon in this document, both types of instructors will be referred to collectively as “IHSA-affiliated instructors.”

Recruitment and survey data collection

From September to November 2017, during usual day-long WAH training sessions, IHSA instructors introduced the IWH evaluation and learner survey to their classes and distributed a one-page recruitment form for completion by those wishing to participate or wanting more information (Appendix G). The form mentioned the first survey of the learner pre-post study and a \$40 gift certificate (their choice of Tim Hortons or Canadian Tire) for participation, and sought participant contact information. It also applied the study eligibility criterion, by asking whether the participant planned to work on a construction project in the next four weeks.

Recruitment forms from each class were forwarded as a group to IWH, along with the list of successful class participants and the instructor’s name. This allowed researchers to identify and exclude from the study anyone who had not passed the course. It also allowed a determination of the proportion of the class completing the recruitment form.

Depending on the WAH class participant’s preference, indicated on the recruitment form, researchers followed up one week later by email (67%), text (20%) or phone (13%). At this point the potential participant was made aware that there would also be two follow-up surveys, with \$30 gift certificate compensation for participation in each.

Those contacted by e-mail or text were invited to complete an online version of the survey questionnaire, hosted on the Qualtrics survey platform (www.qualtrics.com). Those contacted by telephone were interviewed over the phone, with the interviewer using the same online platform for data entry. Before commencing the survey, potential participants were asked whether they planned to work on construction projects in the following four weeks. If the response was no, the potential participant did not proceed on to the survey. Two reminders were given to potential respondents over the following week if they did not respond to the initial invitation; their access to the questionnaire closed after one week.

Invitations to complete the two follow-up surveys were given at four weeks and at seven weeks, respectively, following the individual's training date. Again, two reminders were given in the week following if necessary.

Comparison of participants and dropouts

Of the 613 learners participating in the T1 survey, 561 went on to participate in at least one of the subsequent survey waves, while 72 dropped out of the study. The two latter groups were compared on demographic characteristics reported at T1 and found to differ with statistical significance on one: 67% of the people who dropped out after the first survey lived in the Greater Toronto Area, while only 50% of those providing follow-up data did.

Survey questionnaires

Three different survey questionnaires were created for the study and finalized following pretesting with several WAH content experts and with volunteer learners from three IHSA WAH classes. The questionnaires were comprised of both closed- and open-ended questions. They assessed the following WAH concepts (where T1, T2 and T3 refer to one, four and seven weeks post-training, respectively):

- Pre-training expectations of WAH training (T1)
- WAH knowledge gain (T1)
- WAH training utility (T1)
- Change in self-efficacy (confidence) in carrying out WAH practices (T1)
- Intention to change WAH practices (T1)
- Use of FP equipment, pre- and post-training (T1, T2, T3)
- WAH practices, pre-training (T1)
- WAH practices, post-training (T2, T3)
- Perceived change in WAH practices (T2, T3)
- Most important thing done more safely, following training (T2)
- Barriers to applying WAH training (T2)
- Recommendation for how to improve WAH training (T3)
- Recommendation for how to make working at heights safer (T2)
- Payer of training/harness (T1, T2)
- Demographics (T1)

Microsoft Word versions of the online questionnaires are shown in Appendices H-J. Surveys were administered only in English.

The survey items used to measure the impact of the WAH training were developed following a review of the methods used in evaluating training effectiveness (Alliger et al., 1997; Arthur Jr. et

al., 2003; Blume et al., 2010; Kirkpatrick, 1994; Phillips and Phillips, 2016; Sitzmann et al., 2008).

Measurement of WAH safety practices

Fourteen items were used to measure WAH safety practices. The structure for the questions and responses was based on another measure used successfully to measure a change in residential building construction practices (Kaskutas, 2016). Twelve of the items were developed with consideration of the objectives of the WAH course learning objectives in the provincial standard (i.e. items targeted by the training). Two additional items were created to explore whether there was communication of the course learning to co-workers, supervisors and managers. Responses were assessed using a 5-point scale plus a “not applicable” option, which was tailored to the particular question.

Development of a WAH safety practice scale

A multi-item scale measuring safety practices targeted by the WAH training was developed using factor analysis methods. The T1 observations (n = 633) were divided in half randomly, with one half used for exploratory factor analysis (EFA) and the other half used for confirmatory factor analysis (CFA). [This splitting of the sample was repeated twice more, so that analyses could be conducted three times in total.] Several criteria were employed to establish factor structure: sought to retain as many items as possible; factors needed to be “sensible”; items needed to load on factors with a weight of 0.3 or more; retained items needed to load on one factor with a weight 50% more than its weight on any other factor; and reproducibility across all three split samples. Two items did not load appreciably on any factors and were dropped from further consideration. EFA yielded an 8-item “compliance” factor, a two 2-item factors.

Alternate models were considered in CFA, at first using all 12 items. Ultimately, a 7-item single “compliance” factor was identified (RMSEA, 0.08-0.09; CFI, 0.91-0.93; TLI, 0.87-0.90; SRMR, 0.04-0.05), consisting of items 1-7 listed in Figure 9. This is referred to henceforth as the “safety practices” scale.

The scale score was computed as the average score on the ordinal response scale of the constituent items (5-point response scale never (= 1) to always (=5)); the response options also included a “not applicable” option, which was treated as missing data). When the response for an item at T2 (4 weeks) was missing/not applicable, the response at T3 (7 weeks) was substituted (since there was little change at the group-level between T2 and T3 – see Figure 9). If, for any individual, four or more of the items had missing or not applicable responses, even after the permitted T3-for-T2 substitution, then the score for the practice scale was treated as missing.

IHSA knowledge test data

IHSA administers to WAH learners a standalone set of ten safety knowledge questions before delivering the training. It re-administers the same ten questions as part of a 35-question post-training assessment. The pre-post change in responses to the ten questions provides a measure of knowledge acquisition attributable to the training and is used by IHSA for routine program quality assurance. IHSA provided IWH with the pre- and post-training test results for the 429 (of 514) survey participants who gave permission in the T2 survey for the data retrieval.

Analysis

Analysis of responses to multiple choice questions

Frequencies and percentages of close-ended survey responses were calculated for individual survey items. Chi-square tests, using SAS v9.4, were used to determine the statistical significance of any pre-post changes in the proportions of responses to WAH work practice items. They were also used to compare differences between sub-groups of survey respondents.

Analysis of IHSA knowledge test data

IHSA knowledge test scores (possible range 0 through 10) were treated as a continuous variable in analysis. Dependent t-tests were used to test the statistical significance of pre-post changes.

Exploration of factors associated with change in knowledge and in safety practices

Exploratory regression analyses were undertaken to identify factors associated with knowledge gain and safety practice improvement. The IHSA knowledge test score and the 7-item WAH practice scale score were used as outcome variables. For predictors, several demographic and work environment variables were available from the survey of learners. As well, an indicator of whether the training instructor was internal IHSA staff member or an external training partner was available from the administrative data. Finally, the survey contact method (e-mail, text, telephone) was included as a variable, since prior research has shown that survey modality can impact the outcome.

Two modelling approaches were undertaken for each of the two outcome variables. In the first, the T2 value of knowledge (practices) was the outcome variable, while the T1 value of knowledge (practices) was included as a predictor; in the second, the T1-T2 change in knowledge (practices) was the outcome variable. All predictors were included in the model simultaneously after confirming that multicollinearity was not excessive (majority of variance inflation factor values were less than 2 and none exceeded 4.)

Analysis of responses to open-ended questions

Responses to open-ended questions in the survey were analyzed using inductive thematic coding (Braun and Clarke, 2006) rather than a pre-determined coding scheme, though informed

by WAH concepts found in the WAH training and in the evaluation study's conceptual model. Two to three codes were assigned to a given response. The prevalence of a theme in the responses was quantified and expressed as a percentage, by dividing the number of responses assigned the respective thematic code by the total number of valid responses.

Interviews with labour inspectors

Sample

The Ontario public service has more than 400 inspectors to support the enforcement of occupational health and safety legislation and regulations. They are organized into five geographical areas. The manager of each area was requested to recruit five volunteers for an interview and provide their contact information to researchers, who then selected two inspectors at random from among each group of five.

Primary data collection

Researchers contacted inspectors by e-mail, provided them with more information, and obtained their consent. Semi-structured interviews were conducted by telephone, aided by an interview guide (Appendix K), between March and May 2017. Questions were concerned with how fall prevention regulations were enforced and the impact of WAH training on observed work site practices. One researcher led the interview, while a second researcher took notes. Each interview lasted one hour, was audio-recorded, and was later transcribed verbatim.

Analysis

A memo was produced soon after the interview based on notes taken during the interview and recollections, in order to synthesize the discussion and to identify any issues for follow up in subsequent interviews. After all interviews were conducted, thematic analysis was used (Braun and Clarke, 2006). A provisional code list was created, based on the research questions and a preliminary review of the interview transcripts. Transcripts were first coded by one researcher; the coding was reviewed by a second researcher who suggested modifications. After the coding of all interviews was finalized, the pool of interview data was segmented by the codes. Within each segment, themes were derived from conceptually related material, and substantiated with quotes.

Supplementary data collection

Since the initial data collection had taken place before the WAH regulation was fully in force, researchers attempted follow up with all ten inspectors in January 2019 to repeat the question,

“What, if any, impact has the WAH training standard had on the safety of work practices on construction sites, relative to before the training regulation started to come into force?” Eight inspectors were still in the inspectorate and five opted to respond to the follow up question.

Analysis of workers’ compensation administrative records of lost-time claims

Data source

Electronic administrative records maintained by the Workplace Safety & Insurance Board (WSIB) contain information on allowed lost-time claims (i.e., claims resulting in the payment of wage replacement benefits to workers), including the date of an injury, the employer’s major industrial sector, and characteristics of the injury/disease (the nature of the injury, the part of body involved, the source of the injury/disease, and the event or exposure). The characteristics are based on a national coding standard (CSA Z795).

The administrative records also include information about the employers registered with WSIB, including their major industrial sector and number of employee full-time equivalents (FTEs). The latter is imputed from reported payroll of the workforce covered by the insurance.

Employer industrial sector is defined by WSIB at three levels of granularity, from most broad to most fine, respectively: class, premium rate group and classification unit. This project employed the first two levels to create sub-groups of firms.

Extracts of lost-time compensation claim records were obtained from the WSIB for the period 2004-2017. (Data for 2018 will not be available until the latter part of 2019).

Lost-time claim injury categories

Information in these records was used to create three categories of injuries:

- targeted falls (i.e., falls from heights due to events targeted by WAH training such as falls from ladders and roofs)
- untargeted falls (i.e. falls from heights due to events not targeted by WAH training such as falls down stairs and falls at the same level)
- “other acute injuries,” (i.e. all non-fall injuries caused by other events involving mechanical energy transfer such as struck by injuries)

The CSA Z795 coding scheme classifies most fall events leading to injury as being either a fall from the same level or a fall from a height. Most analyses were based on a different categorization of falls, based on whether a fall event was targeted by the WAH training

intervention or not. The categorization of fall events as targeted/non-targeted was carried out by the lead author based on i) the learning outcomes in the WAH training program standard, ii) personal experience in two WAH training programs, and iii) structured input from two content specialists from IHSA. The resulting definitions of targeted and untargeted falls is shown in Appendix L.

An “other acute injuries” arising from mechanical energy transfer category was created as follows by excluding lost-time claims coded with any of i) a “nature of injury” category of “burns,” “effect of environmental conditions” or “diseases and disorders” or ii) an “event/exposure” of “bodily reaction and exertion,” “falls,” or “exposure to harmful substances or environments.” After these exclusions, remaining “nature of injury” categories included traumatic injuries, open wounds, surface wounds and intracranial injuries; and remaining categories of “events/exposure” included contact with objects and equipment (the major event contributing to the final “other acute injuries” category), transportation accidents, fires, assaults and violent acts, and other.

Lost-time claim rates and pre-post comparison of rates

Lost-time claim rates per 1000 FTEs were computed for a particular time period and industrial sector by summing all injuries occurring within the time period, dividing by the total number of full-time equivalents, and multiplying by 1000.

A series of analyses to assess the impact of the WAH program involved a comparison of the injury claim rate in 2017 (post-intervention) to that in 2012-14 (pre-intervention). The relative change (rather than absolute change) from pre- to post-intervention was determined by calculating the rate ratio (i.e., the claim rate in 2017 divided by that in 2012-14). The years 2015 and 2016 were excluded from these analyses, since large portions of the target population remained untrained during those years. (Note that even 2017 is not fully post-intervention since “grandfather” deadline for those with prior fall protection training was October 1, 2017.) Since there was no untrained control group of workers available to the evaluation, the “pre-post” relative change in the targeted fall injury rate in construction was variously compared to i) the pre-post relative change in the targeted fall injury rates in other industrial sectors and to ii) the pre-post relative changes in the rates of non-targeted falls and of other acute injuries.

Differences between groups were examined by comparing rate ratios as described in Robson et al. (2001, p. 108). A normal approximation of the distribution of the natural logarithm of the rate ratio was used to determine statistical significance. A two-sided statistical test and an alpha of 0.05 were used.

Appendix E: Questionnaire from training provider survey

I'll start with some general questions about you, your organization, and the learners who attend your working at heights courses.

Demographics

1. What is your job title?
2. How old is your organization (yrs)?
3. How long has your organization been delivering health and safety training (not just WAH-related training) (yrs)?
4. In what year did your organization start delivering the approved Working at Heights (WAH) training? (2015, 2016, 2017, DK (not offered))
5. Did you develop your own WAH curriculum or did you purchase one from another organization?
 - a. Developed own WAH curriculum
 - b. Purchased a WAH curriculum and adopted it in its entirety → **From which organization?**
 - c. Purchased a WAH curriculum and customized it to our organizational needs → **From which organization?**
 - d. Other
 - e. DK (not offered)
6. About how many WAH instructors does your organization currently have?
7. What is the length of your typical WAH training session in hours (not counting any breaks)?
8. Which sectors do your WAH learners mostly come from (e.g. construction, manufacturing, utilities, etc.)? [Category assigned by interviewer]
 - i. Agriculture, forestry fishing and hunting
 - ii. Mining, quarrying, and oil and gas extraction
 - iii. Utilities
 - iv. Construction
 - v. Manufacturing
 - vi. Wholesale trade
 - vii. Retail trade
 - viii. Transportation and warehousing
 - ix. Information and cultural industries
 - x. Finance and insurance
 - xi. Real estate and rental leasing
 - xii. Professional, scientific and technical services
 - xiii. Management of companies and enterprises

- xiv. Administrative and support, waste management and remediation services
- xv. Educational services
- xvi. Health care and social assistance
- xvii. Arts, entertainment and recreation
- xviii. Accommodation and food services
- xix. Other services (except public administration)
- xx. Public administration
- xxi. Other – nec (not elsewhere classified)
- xxii. Remainder – mixed sector
- xxiii. Explanation (i.e. comments regarding responses in i to xxii)

Former Fall Protection Training

Now I have some questions about training to prevent falls from heights

- 9. Your organization is one of the approved providers of the WAH training. Did you deliver any version of this training prior to 2015? (this may have been known as fall protection training or fall arrest training) (Yes (List name(s) of prior training), No, DK (not offered))**
- 10. [If “No” for #9, answer the following and then skip to #14]
Why did you start providing the WAH training?**

Comparison of WAH Training with Former FP Training - Training

- 11. [If “Yes” for #9] In the following questions, I’ll be asking you to compare the WAH training you deliver today to the <NAME OF TRAINING> training you provided before 2015.**
- a. As you know, there is both a theoretical and practical component to the current WAH training. I am going to ask you separately about both of these. How long is the theoretical component of the current WAH training (hrs)?**
 - b. How long was the theoretical component of the former <NAME OF TRAINING> (hrs)?**
 - c. So, the theoretical component of the WAH training is x (hrs) longer/shorter/same than the former <NAME OF TRAINING> then? (WAH longer by x hrs; WAH the same; WAH shorter by _____ hrs; DK (not offered))**
 - d. How long is the practical component of the current WAH training (hrs)?**
 - e. How long was the practical component of the former <NAME OF TRAINING> (hrs)?**
 - f. So, the practical component of the WAH training is x (hrs) longer/shorter/same than the former <NAME OF TRAINING>? (WAH longer by x hrs; WAH the same; WAH shorter by _____ hrs; DK (not offered))**

- g. **Another aspect that may or may not have changed is the variety of fall protection equipment incorporated into the practical training. Which training involves or involved a greater variety of equipment?** (the WAH training, the former <NAME OF TRAINING>, No difference, Other, DK (not offered))
- h. **I would now like to learn more about the different topics covered in the WAH training compared with the former <NAME OF TRAINING>. For each of the following nine topics in the WAH training, please tell me yes/no whether the former <NAME OF TRAINING> covered this topic?** (yes/no/don't know)
- i. Rights and responsibilities?
 - ii. Identification of hazards of working at heights?
 - iii. Eliminating or controlling the hazards of working at heights?
 - iv. Warning methods and physical barriers?
 - v. Ladders and similar equipment?
 - vi. Personal fall protection equipment?
 - vii. Anchor points?
 - viii. Work access equipment and platforms?
 - ix. Rescue planning?
- i. **One of the requirements of the WAH training program standard is the learner completing a written test with a score of 75%, or an equivalent evaluation method. Did the former <NAME OF TRAINING> have a similar requirement, yes or no?** (Yes, No, Other, DK (not offered))
- j. **Another of the requirements of the WAH training program standard is the successful demonstration by the learner of the inspection of fall arrest equipment. Did the former <NAME OF TRAINING> have a similar requirement?** (Yes, No, Other, DK (not offered))
- k. **There is also now a requirement in the WAH training program standard for the successful demonstration by the learner of donning the fall arrest equipment. Did the former <NAME OF TRAINING> have a similar requirement?** (Yes, No, Other, DK (not offered))
- l. **Were there any other important changes, good or bad, that took place as your organization changed from the former <NAME OF TRAINING> to the WAH training?** (Yes (*Please describe*), No, DK (not offered))

Comparison of WAH Training with Former FP Training – Perceived Impacts and Overall Assessment

12. We would like to understand your perception of the impact of the new WAH training upon typical learner acquisition of new knowledge and skills relative to that of the former <NAME OF TRAINING>.
- a. **Do you think that the theoretical knowledge acquired in the new WAH training is more, less, or about the same as the knowledge acquired in the**

former <NAME OF TRAINING>? (More in WAH, Less in WAH, About the same, DK (not offered))

- b. Do you think that the practical hands-on skills acquired from the new WAH training is more, less, or about the same as the skills acquired in the former <NAME OF TRAINING>? (More in WAH, Less in WAH, About the same, DK (not offered))**

- 13. Overall then, to what extent is the WAH training better or worse than the former <NAME OF TRAINING> in preparing people to work at heights safely? Would you say, the WAH training is: (Much better, Somewhat better, About the same, Somewhat worse, Much worse, DK (not offered))**

Unintended Consequences

- 14. Changing topics now, we know that delivering the WAH training requires telling learners their pass/fail results. We have heard of some instances where there was a negative reaction when learners learned that they had failed. Have your instructors ever reported experiencing a participant reacting with verbal or physical aggression? (Yes, No, Not applicable because no failures, Other, DK (not offered))**

- 15. [If "a" for #14] How many incidents of physical aggression, arising from such circumstances, have been reported to your organization, if any?**

- 16. [If "a" for #14] How many incidents of verbal aggression, arising from such circumstances have been reported to your organization, if any?**

Areas for Improvement

I'd like to turn now to areas of possible improvement in the WAH training program standard and administrative processes. First of all,

- 17. Does the current WAH curriculum meet the needs of your WAH learners? (Yes, No, DK (not offered))**

- 18. Are there any changes that could be made to the curriculum to better meet their needs?**

- 19. Beyond what was discussed already, are there any gaps in the curriculum that should be addressed?**

- 20. We've been talking so far about the WAH training *program* standard. There is also the WAH training *provider* standard to consider. It outlines the requirements for training providers seeking approval from the Chief Prevention Officer to deliver an approved working at heights training program. Would you have any suggestions on how the training provider standard might be improved?**

- 21. Beyond what we have already discussed, do you have any suggestions of how the MOL could further improve the administrative processes surrounding the WAH program?**

- 22. That brings us to our final question. Would you have any final comments about the WAH training initiative, good or bad, that you would like to add?**
- 23. May we send you a thank-you email with our contact information, in case you have anything you would like to add, or you would like to withdraw your survey data? (yes/no)**

Abbreviations: DK, Don't know

Appendix F: Questionnaire from construction employer survey

Please answer the questions honestly. Remember your answers will be seen only by researchers and will be kept confidential.

We are going to start with some questions about your company.

ELIGIBILITY (AND DEMOGRAPHIC)

1. Do any of your company's employees or subcontractors work on construction projects? (Yes, employees only; Yes, subcontractors only; Yes, both employees and subcontractors; No [*QUESTIONNAIRE ENDS HERE – RESPONDENT EXCLUDED*])

2. Are all of your employees and/or subcontractors working out of this location [*address from InfoCanada listing*]?

- Yes
- No (employees work out of multiple locations) [*1.) "Where are they?", 2.) "We would be interested in handling the locations separately if they differ in the way OHS is managed. Would it be easier for you if we talk about this location <address> or all of them?"*]
- No (address does not match InfoCanada listing)

EMPLOYER DEMOGRAPHICS

3. Based on your company's work over the past 2 years, would you consider your company to be a general contractor, specialty trade contractor, or both? (General contractor, Specialty trade contractor, Both, Other (not offered))

4. In which sectors have you worked in over the last two years? [*Please select all that apply.*] (Residential low-rise construction (1-3 stories); Residential mid-to-high rise construction (4 stories or more); Non-residential construction; Sectors other than construction)

5. What is the percentage of time spent in each sector? (Residential low-rise construction (1-3 stories); Residential mid-to-high rise construction (4 stories or more); Non-residential construction; Sectors other than construction)

6. In what year did your company start?

7. Does your company operate in other provinces besides Ontario? (Yes, No)

8. About how many permanent employees does your company have? This refers to employees on your payroll year after year with no pre-determined termination date and excludes subcontractors (in Ontario).

9. About how many temporary employees does your company currently have? By temporary we mean employees on your payroll with a predetermined end date, or whose work will end as soon as a specified project is completed. This excludes subcontractors. [*Includes employees doing seasonal jobs, temporary, casual, term or contract work.*]

Thank you for telling me about your company. Now I will move on to the main questions of the survey. They are all concerned with your operations in Ontario.

FALL HAZARDS / REQUIREMENT TO DO TRAINING

In the next set of questions, we are interested in how your employees work.

10. Thinking of your <number from Q8> permanent employees who work on construction projects only, about how many of them ever work at heights of 3 metres or more? This could be once in a while or all the time. [If they say “none” probe with whether anyone works on ladders, scissor lifts, above a ceiling, on scaffolding, or on a roof?” 3 metres = 10 feet] (If zero, skip to Q14)

11. And about how many of these <number from Q10> permanent employees ever need to use fall protection equipment? Again, this could be once in a while or all the time. (If zero, skip to Q13)

12. How often do most of these <number from Q11> permanent employees typically use fall protection equipment? (About every day, About once or twice a week, About once or twice a month, Less than once a month, Don’t know (not offered))

13. [If answer to Q11 is less than answer to Q10] How are the rest of those permanent employees who work at heights (of 3 metres or more) protected from falling?

14. Thinking of your <number from Q9> temporary employees who work on construction projects now, how many of them work at heights of 3 metres or more? [If they say “none” probe with whether anyone works on ladders, scissor lifts, above a ceiling, on scaffolding, or on a roof?” 3 metres = 10 feet] (If zero, skip to Q18)

15. And about how many of these <number from Q14> temporary employees ever need to use fall protection equipment?

16. And how often do most of these <number from Q15> temporary employees typically use fall protection equipment? (About every day, About once or twice a week, About once or twice a month, Less than once a month, Don’t know (not offered))

17. [If answer to Q15 is less than answer to Q14] How are the rest of those temporary employees who work at heights (of 3 metres or more) protected from falling?

AWARENESS

18. Have you heard about the new working at heights training available to Ontario construction workers since 2015? (Yes, definitely (*Go to next question*), Yes, I think so (*Go to next question*), No, I don’t think so (*Skip to Q21*), No, definitely not (*Skip to Q21*))

I’m now going to read you two statements about the Ontario working at heights training. For each statement, please tell me if it is true or false. If you don’t know the answer, please just say you don’t know instead of guessing.

The working at heights training.....	True	False	Don't Know
19. ...focuses on the use of fall protection equipment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
20. ...lasts a half day	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

COMPLIANCE/ TRAINING ATTENDANCE

21. *[If Q18 is NO or YES, I THINK SO]* The new working at heights training focuses on fall protection equipment, such as a fall arrest harness and lanyard, and on other ways of protecting against falls. It conforms to a government standard and has been on the market for two years now. **Have any of your company's <number from Q11> permanent employees who use fall protection equipment on construction projects taken the new working at heights training yet?** (Yes (Go to next question), No (Skip to question Q0), Don't know (not offered) (Skip to question 24))

22. How many?

23. **In what year did most of these <number from Q22> employees take the training?** (2017, 2016, 2015, 2014 or earlier, Don't know (not offered))

24. *[Only use if all permanent employees using FP equipment are not all trained yet]* **Are any of your permanent employees who use fall protection equipment on construction projects enrolled in an upcoming working at heights training course?** (Yes (Go to next question), No (Skip to Q27), Don't know (not offered))

25. How many?

26. **So to review, of the {number from Q11} permanent employees who use fall protection equipment, {number from Q22} have taken the working at heights training course already and another {number from Q25} are signed up to take it. Is that correct?** (Yes, No)

27. *[Skip if no temporary employees]* **Have any of your company's <number from Q15> temporary employees who use fall protection equipment on construction projects taken the new working at heights training yet?** (Yes → (Go to next question), No → (Skip to Q29), Don't know (not offered) (Skip to question 29))

28. How many?

29. *[Skip if no temporary employees. Only use if all temporary employees using FP equipment are not all trained yet]* **Are any of your <number from Q15> temporary employees who use fall protection equipment on construction projects enrolled in an upcoming working at heights training course?** (Yes → (Go to next question), No → (Skip to Q31), Don't know (not offered))

30. How many?

31. **So to review, of the {number from Q15} temporary employees who use fall protection equipment, {number from Q28} have taken the working at heights training course already and another {number from Q30} are signed up to take it. Is that correct?** (Yes, No)

32. Thinking now of the frontline supervisors of the employees who use fall protection equipment on construction projects, how many of those supervisors have taken the working at heights training course? (All supervisors, Most supervisors, Some supervisors, No supervisors, Don't know (not offered), Not applicable (no such supervisors))
33. And thinking of the managers who oversee the employees who use fall protection equipment on construction projects, how many of them have taken the working at heights training? (All managers, Most managers, Some managers, No managers, Don't know (not offered), Not applicable (no such managers))

IMPACT OF TRAINING STANDARD ON MANAGEMENT/RISK CONTROL PRACTICE

PREAMBLE: I am now going to ask some questions to better understand what impact the working at heights training may or may not be having on your company. If you really don't know the answer to any of the questions, just let me know, rather than guessing.

34. As a result of employees doing the working at heights training, did your company buy any new equipment, for example: harnesses, anchors, or guardrails? (Yes (Continue to next question), No (Skip to Q39), Don't know (Skip to Q39))

I'd like to find out specifically what type of equipment your company bought. **For each equipment item, please answer yes or no to indicate if your company purchased it as a result of the working at the heights training:**

	Yes	No	Don't know (not offered)
35. Harnesses, lanyards, lifelines, rope grabs or anchors	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
36. Guardrails or protective covers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
37. Anything else?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

38. What was the approximate cost of buying the new equipment we just discussed? Remember this should just be equipment purchased as a result of employees taking the working at heights training. (<\$1000; \$1000 - \$10,000; \$10,000 - \$50,000; >\$50,000; Don't know)

I'll continue now with more questions about how the new working at heights training may have affected work practices at your company.

39. As result of employees doing the working at heights training, what type of changes did your company make, if any, to your fall rescue plan? Would you say your company made.... (a fall rescue plan for the first time; some changes to the plan; no change to the plan; your company does not have a fall rescue plan; Don't know (not offered))
40. As a result of employees doing the working at heights training, have they changed how often they inspect their fall protection equipment? Would you say that they inspect their equipment... (more often now; just as often now as before; less often now; Don't know (not offered))

41. **As a result of employees doing the working at heights training, have employees changed how often they tie off? Would you say that, they tie off... (more often now; just as often now as before; less often now; Don't know (not offered))**
42. **As a result of employees doing the working at heights training, have your company's front-line supervisors changed how often they act to prevent falls? Would you say they act to prevent falls... (more often now; just as often now as before; less often now; Don't know (not offered))**
43. **Is there anything else that your company changed to improve safety as a result of employees taking the working at heights training?**
44. **We've spent some time talking about the possible safety benefits of the working at heights training. Are there, on the other hand, any downsides or negative impacts on safety of the working at heights training? *[If they respond yes]* Could you please tell us about them?**

FINANCIAL EXPENDITURE

I now have a few questions about the financial costs of training and equipment.

45. **Thinking of your permanent employees, who pays for the cost of their working at heights training? (Employees pay the full cost; Company (or union) pays the full cost; Employees and the company (or union) share the cost; Don't know (not offered))**
46. **[If company has temporary employees] And for your temporary employees, who pays for the cost of their working at heights training? (Employees pay the full cost; Company or union pays the full cost; Employees and the company (or union) share the cost; Don't know (not offered))**
47. **For your permanent employees, who pays for the cost of their fall arrest harnesses? (Employees pay the full cost; Company or union pays the full cost; Employees and the company (or union) share the cost; Don't know (not offered))**
48. **[If company has temporary employees] And for your temporary employees? Who pays the cost of their fall arrest harness? (Employees pay the full cost; Company or union pays the full cost; Employees and the company (or union) share the cost; Don't know (not offered))**

BARRIERS TO COMPLIANCE

In this next section, I am interested in any difficulties your company may have had with the working at heights training requirements. For each of the following activities that I'm going to read out, please answer yes or no, to indicate whether your company had difficulty with it or not.

Your company had difficulty....	Yes	No	Don't know (not offered)
49. Identifying which employees needed to do the working at heights training.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
50. Understanding the deadlines for completing the working at heights training.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
51. Finding a suitable working at heights training course.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
52. Arranging for employees to take time away from work to do the training.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
53. Covering the cost of the training.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
54. Applying what was learned in the course to your company's own work situation.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

55. Is there anything else about your company's experience that I missed in terms of what makes it difficult to comply with the working at heights training requirements?

SUBCONTRACTORS

Now I have a couple questions about subcontractors

56. Do any of your subcontractors who work on your construction projects in Ontario use fall protection equipment? (Yes (*Go to next question*); No (*Skip to Q59*); Don't know (not offered))

57. How has the working at heights training changed their work practices, if at all? (*How so? If "made them work safer" or "made them work less safe" is selected) (Made them work safer; Had no effect; Made them work less safe; Don't know – haven't been able to observe; Don't know whether subcontractors have taken WAH training; Other (not offered))

58. Do your contracts with them include requirements for WAH training? (Yes, No, Don't know (not offered), Declined to answer (not offered))

RESPONDENT DEMOGRAPHICS

59. Please tell me which of the following positions applies to you. [Owner; Senior manager (e.g. director, senior engineer); Middle manager or technical support (e.g. project manager, superintendent, site supervisor, engineer); Front-line supervisor; Tradesperson; Trades helper or worker; Administrative support; Health and safety specialist (e.g. OHS manager, OHS coordinator, OHS representative, JHS committee member)]

60. What percentage of your company's <number> permanent employees are unionized, if any?

61. What percentage of your <number> temporary employees are unionized, if any?

WRAPUP

- 62. Before I go, is there anything else about the working at heights training standard you think I should know, good or bad?**
- 63. Is it okay if I contacted you again with any further questions I may have related to what we just discussed? (Yes, No)**
- 64. Would you give us permission to look at your WSIB claims statistics and link them to your survey data? This would be for research purposes only and no one outside the research team would see it? (Yes, No)**
- 65. As you can see our study was focusing on the working at heights training requirement. Would you like to receive a one page document telling you more about the study? (Yes, No)**

Appendix G: Recruitment form used in learner recruitment to surveys



If you answered YES

- We invite you to participate in a **12 minute** survey about Working at Heights training
- Survey can be done online, or by phone
- You will receive a **\$40 gift card** to Tim Hortons or Canadian Tire for participating in the survey

Please fill in the information below if you want to participate or want more information

First Name	Last Name	Instructor Name	Date
			D D M M Y Y

Select one preferred method of contact and give your information

E-mail address (for online survey) (PLEASE PRINT USING CAPITAL LETTERS); or

Text message (for online survey); or

_____-_____-_____

Telephone call (for survey by phone interviewer)

_____-_____-_____

 Institute for Work & Health	Research Excellence Advancing Employee Health	For more information, contact
		Lynda Robson, Scientist lrobson@iwh.on.ca • 416-327-2027 ext. 2164

Appendix H: Questionnaire from learner pre-post surveys (T1)

Please answer all questions, so the survey data will be complete. Please select the best answer available. Please answer honestly so the research will be accurate. Remember, no one outside of the research team will see your individual answers. This is your opportunity to give your true views.

The first set of questions are concerned with your recent working at heights training.

KNOWLEDGE

1. How much new information did you learn about how to work safely at heights? (None at all, A little bit, Some, A lot)

UTILITY

2. How useful is the new information you learned? (Not at all useful, A little bit useful, Somewhat useful, Useful, Very useful)

BEHAVIOURAL INTENTION

3. How likely are you to change the way you take safety precautions as a result of the training? (Not at all likely, A little bit likely, Somewhat likely, Likely, Very likely)

SELF-EFFICACY

The next set of questions ask how, if at all, the Working at Heights training affected your confidence in some work tasks. (Less confident now, No different, More confident now)

4. How did the training affect your confidence in using ladders safely?
5. How did the training affect your confidence in knowing when you need to tie off?
6. How did the training affect your confidence in picking the right lanyard for a situation?
7. How did the training affect your confidence in finding a good place to tie off?
8. How did the training affect your confidence in setting up a travel restraint?
9. How did the training affect your confidence in making suggestions about fall safety to a supervisor or manager?
10. How did the training affect your confidence in raising safety concerns to a supervisor or manager?

The next set of questions ask about your work practices during the two weeks before your working at heights training. Remember, your answers are kept confidential.

EXPOSURE

- 11. How often did you use fall protection equipment in the 2 weeks before your training?**
(Never used it, Once or twice, Once or twice a week, Three or four times a week, Every day)

WORK PRACTICES (PRE-TRAINING)

- 12. Considering the 2 weeks before your training, how often did you...
...check the worksite for fall hazards at the beginning of the shift?** (Not applicable – did not work at heights in those 2 weeks, Always, Often, Sometimes, Rarely, Never)
- 13. Considering the 2 weeks before your training, how often did you...
...inspect your fall protection equipment before using it?** (Not applicable – did not work at heights in those 2 weeks, Always, Often, Sometimes, Rarely, Never)
- 14. Considering the 2 weeks before your training, how often did you...
...wear fall protection equipment when working on a ladder at a height greater than 10 feet?** (Not applicable – never worked on a ladder at a height greater than 10 feet in those 2 weeks, Always, Often, Sometimes, Rarely, Never)
- 15. Considering the 2 weeks before your training, how often did you...
...maintain 100% tie off when working at heights with fall arrest equipment?** (Not applicable – did not use fall arrest equipment in those 2 weeks, Always, Often, Sometimes, Rarely, Never)
- 16. Considering the 2 weeks before your training, how often did you...
...use fall protection equipment that was worn out?** (Not applicable – did not use fall protection equipment in those 2 weeks, Always, Often, Sometimes, Rarely, Never)
- 17. Considering the 2 weeks before your training, how often did you...
...maintain three point contact when using a ladder?** (Not applicable – did not use a ladder in those 2 weeks, Always, Often, Sometimes, Rarely, Never)
- 18. Considering the 2 weeks before your training, how often did you...
...take a shortcut to save time, even though there was a chance of falling?** (Not applicable – did not work at heights in those 2 weeks, Always, Often, Sometimes, Rarely, Never)
- 19. Considering the 2 weeks before your training, how often did you...
...use fall arrest equipment that might “bottom out”?** (Not applicable – did not use fall arrest equipment in those 2 weeks, Always, Often, Sometimes, Rarely, Never)
- 20. Considering the 2 weeks before your training, how often did you...
...make a suggestion to a supervisor/manager to improve fall safety?** (Not applicable – did not work at heights in those 2 weeks, Always, Often, Sometimes, Rarely, Never)
- 21. Considering the 2 weeks before your training, how often did you...
...make a suggestion to a coworker to improve fall safety?** (Not applicable – did not work at heights in those 2 weeks, Always, Often, Sometimes, Rarely, Never)

- 22. Considering the 2 weeks before your training, how often did you...
...make sure you got job-specific orientation to fall protection at a new site? (Not applicable – did not work on a new site in those 2 weeks, Always, Often, Sometimes, Rarely, Never)**
- 23. Considering the 2 weeks before your training, how often did you...
...know the fall rescue plan? (Not applicable – did not work with fall protection equipment in those 2 weeks, Always, Often, Sometimes, Rarely, Never)**
- 24. Considering the 2 weeks before your training, how often did you...
...try to use guardrails instead of a fall arrest system? (Not applicable – did not use a fall arrest system in those 2 weeks, Always, Often, Sometimes, Rarely, Never)**
- 25. Considering the 2 weeks before your training, how often did you...
...use travel restraint? (Not applicable – did not use fall protection equipment in those 2 weeks, Always, Often, Sometimes, Rarely, Never)**

PRE-TRAINING EXPECTATIONS

The next question is also about the time before your recent working at heights training.

- 26. Before you took the training, how useful were you expecting it to be? (Not at all useful, A little bit useful, Somewhat useful, Useful, Very useful)**

DEMOGRAPHICS AND PAYER FOR TRAINING

We'd now like to ask you some questions about yourself. They help us group your answers with others like you for the analysis.

- 27. Who paid for the working at heights training (accounting for reimbursements)? (I paid, My union paid; My employer paid; My employer and I shared the cost; My school paid; Other)**
- 28. Before the training, how often did you usually use fall protection equipment? (Never used it, Less than once a year; Less than once a month; About once or twice a month; About once or twice a week; About every day)**
- 29. Before the training, did you ever do formal fall protection training? (Formal fall protection training would result in a card) (Yes; No; Don't know)**
- 30. Do you belong to a union? (Yes; No; Not applicable – no work history)**
- 31. What best describes your employment status in the two weeks before your training? (Permanent employee, Temporary/casual employee, Independent operator, Unemployed, Student)**
- 32. What best describes your employment status now? (Permanent employee, Temporary/casual employee, Independent operator, Unemployed, Student)**

- 33. In which sector do you usually work?** (Residential construction – low-rise (3 stories or less); Residential construction – medium- to high-rise (4 or more stories); Non-residential construction; Not in construction sector)
- 34. In what geographical area do you usually work?** [Greater Toronto Area (area bounded by Hamilton, Lake Simcoe, Oshawa and Lake Ontario); Outside Greater Toronto Area; Both about equally]
- 35. How much experience do you have working on construction projects in Ontario?** (None, Less than three months, Four months to one year, Two to five years, Six to ten years, Eleven to twenty years, More than twenty years)
- 36. What best describes your work role?** [Owner; Manager; Professional/technical support (engineering, architecture, inspecting, estimating, etc.); Front-line supervisor; Trade worker – certified; Trade worker – NOT certified; Trade helper or labourer; Other financial or administrative support]

The following question helps us understand your ability in English.

- 37. How easy is it for you to understand a message in English over the telephone? Would you say ...** (...you can do this easily?; ...you can do this with some help?; ...you can do this with a lot of help?; ...you cannot do this?)
- 38. In what age group are you?** (24 years or less; 25-34 years; 35-44 years; 45-54 years; 55 years or more)
- 39. What is your gender?** (Male, Female)

Appendix I: Questionnaire from learner pre-post surveys (T2)

Please answer all questions, selecting the best answer available. Please answer honestly so the research will be accurate. Remember, no one outside of the research team will see your individual answers. This is your opportunity to give your true views.

EXPOSURE

1. **How often did you use fall protection equipment in the past 2 weeks?** (Never used it, Once or twice, Once or twice a week, Three or four times a week, Every day)

WORK PRACTICES (POST-TRAINING 1)

In the next set of questions we are interested in your work practices during the past 2 weeks. Remember, your answers are kept confidential.

2. **In the past 2 weeks, how often did you check the worksite for fall hazards at the beginning of the shift?** (Not applicable – did not work at heights during the last 2 weeks, Always, Often, Sometimes, Rarely, Never)
3. **In the past 2 weeks, how often did you inspect your fall protection equipment before using it?** (Not applicable – did not use fall protection equipment in those 2 weeks, Always, Often, Sometimes, Rarely, Never)
4. **In the past 2 weeks, how often did you wear fall protection equipment when working on a ladder at heights greater than 10 feet?** (Not applicable – never worked on a ladder at a height greater than 10 feet in the last 2 weeks, Always, Often, Sometimes, Rarely, Never)
5. **In the past 2 weeks, how often did you maintain 100% tie off when working at heights with fall arrest equipment?** (Not applicable – did not use fall arrest equipment in those 2 weeks, Always, Often, Sometimes, Rarely, Never)
6. **In the past 2 weeks, how often did you use fall protection equipment that was worn out?** (Not applicable – did not use fall protection equipment in those 2 weeks, Always, Often, Sometimes, Rarely, Never)
7. **In the past 2 weeks, how often did you maintain three point contact when using a ladder?** (Not applicable – did not use a ladder in those 2 weeks, Always, Often, Sometimes, Rarely, Never)
8. **In the past 2 weeks, how often did you take a shortcut to save time, even though there was a chance of falling?** (Not applicable – did not work at heights in those 2 weeks, Always, Often, Sometimes, Rarely, Never)
9. **In the past 2 weeks, how often did you use fall arrest equipment that might “bottom out”?** (Not applicable – did not use fall arrest equipment in those 2 weeks, Always, Often, Sometimes, Rarely, Never)

10. In the **past 2 weeks**, how often did you make a suggestion to a supervisor/manager to improve fall safety? (Not applicable – did not work at heights in those 2 weeks, Always, Often, Sometimes, Rarely, Never)
11. In the **past 2 weeks**, how often did you make a suggestion to a coworker to improve fall safety? (Not applicable – did not work at heights in those 2 weeks, Always, Often, Sometimes, Rarely, Never)
12. In the **past 2 weeks**, how often did you make sure you got **job-specific orientation to fall protection at a new site**? (Not applicable – did not work on a new site in those 2 weeks, Always, Often, Sometimes, Rarely, Never)
13. In the **past 2 weeks**, how often did you know the fall rescue plan? (Not applicable – did not work with fall protection equipment in those 2 weeks, Always, Often, Sometimes, Rarely, Never)
14. In the **past 2 weeks**, how often did you try to use guardrails instead of a fall arrest system? (Not applicable – did not use a fall arrest system in the last 2 weeks, Always, Often, Sometimes, Rarely, Never)
15. In the **past 2 weeks**, how often did you use travel restraint? (Not applicable – did not use fall protection equipment in those 2 weeks, Always, Often, Sometimes, Rarely, Never)

WORK PRACTICE CHANGE

The next set of questions are concerned with changes you may or may not have made as a result of the working at heights training.

16. Compared with before the working at heights training, how much safer are your work practices now? (A lot LESS safe now, compared to before the training; Somewhat LESS safe now, compared to before the training; The SAME now as before the training; Somewhat MORE safe now, compared to before the training; A lot MORE safe now, compared to before the training)

THE NEXT TWO QUESTIONS ARE ONLY FOR THOSE CHOOSING EITHER OF THE LAST TWO RESPONSES IN THE PREVIOUS QUESTION

17. To what extent is the recent improvement in your safety practices a result of the working at heights training? (Not at all a result of the training; Somewhat a result of the training; Mostly a result of the training; Completely a result of the training)
18. What is the one most important thing you are doing more safely now, compared with before the working at heights training?

BARRIERS

Sometimes people find it easy to apply new training to their job. Other times they can have difficulty. In the next set of questions, we want to learn more about the difficulties you may or may not have had.

Please indicate how much you agree or disagree with the statements.

19. **It's hard to apply what I learned in the working at heights training, because the equipment at work is different.** (Agree, Neither agree nor disagree, Disagree, Not applicable)
20. **It's hard to apply what I learned in the working at heights training, because I do a special type of work.** (Agree, Neither agree nor disagree, Disagree, Not applicable)
21. **It's hard to apply the methods I learned in the working at heights training, because they would damage the property I work on.** (Agree, Neither agree nor disagree, Disagree, Not applicable)
22. **It's hard to apply what I learned in the working at heights training, because there is a lot to remember.** (Agree, Neither agree nor disagree, Disagree, Not applicable)
23. **I sometimes don't wear the fall arrest harness when I should, because it's uncomfortable.** (Agree, Neither agree nor disagree, Disagree, Not applicable)
24. **I sometimes don't use fall protection equipment when I should, because it interferes with my work.** (Agree, Neither agree nor disagree, Disagree, Not applicable)
25. **I sometimes don't use what I learned in working at heights training, because I think it makes me less safe.** (Agree, Neither agree nor disagree, Disagree, Not applicable)
26. **I don't always replace my fall arrest harness when I should, because it's expensive for me.** (Agree, Neither agree nor disagree, Disagree, Not applicable)
27. **My supervisors send a message that fall prevention procedures take too much time away from doing the work.** (Agree, Neither agree nor disagree, Disagree, Not applicable)
28. **My supervisors sometimes stop me from using what I learned in the working at heights training.** (Agree, Neither agree nor disagree, Disagree, Not applicable)
29. **My supervisors let people break the rules around fall prevention safety.** (Agree, Neither agree nor disagree, Disagree, Not applicable)
30. **My supervisors never talk about fall prevention.** (Agree, Neither agree nor disagree, Disagree, Not applicable)
31. **It's hard to apply what I learned in the working at heights training, because I don't have the equipment I need at work.** (Agree, Neither agree nor disagree, Disagree, Not applicable)
32. **Where I work, there are no clear rules around fall prevention.** (Agree, Neither agree nor disagree, Disagree, Not applicable)

33. Where I work, we don't take the time to inspect our fall protection equipment before using it. (Agree, Neither agree nor disagree, Disagree, Not applicable)

34. Where I work, I have never been told about a fall rescue plan. (Agree, Neither agree nor disagree, Disagree, Not applicable)

FACILITATORS

The next set of questions asks you about things that may or may not have helped you apply the working at heights training to your job.

Please indicate how much you agree or disagree with the following statements.

35. The working at heights training gave me a good introduction to what I need to know to prevent falls from heights. (Agree, Neither agree nor disagree, Disagree, Not applicable)

36. I believe I should always follow safety rules around fall prevention -- even when it takes longer to do the job. (Agree, Neither agree nor disagree, Disagree, Not applicable)

37. My supervisors encourage the use of good fall prevention practices. (Agree, Neither agree nor disagree, Disagree, Not applicable)

38. The places I work promote the use of good fall prevention practices. (Agree, Neither agree nor disagree, Disagree, Not applicable)

RECOMMENDATION FOR IMPROVING WAH SAFETY

39. What is the one most important thing that you recommend changing so that working at heights is safer for you?

PAYER OF HARNESS

40. Who pays for your fall arrest harness? (I pay, My company pays, We share the cost, Other, Not applicable)

LINKAGE TO IHSA DATA

41. Do you give us permission to look up the multiple choice tests that you completed during the Working at Heights training and relate them to your answers here? (Yes, No)

Appendix J: Questionnaire from learner pre-post surveys (T3)

Please answer all questions, selecting the best answer available. Please answer honestly so the research will be accurate. Remember, no one outside of the research team will see your individual answers. This is your opportunity to give your true views.

EXPOSURE

1. **How often did you use fall protection equipment in the past 2 weeks?** (Never used it; Once or twice; Once or twice a week; Three or four times a week; Every day)

WORK PRACTICES

In the next set of questions we are interested in your work practices during the past 2 weeks. Remember, your answers are kept confidential.

2. **In the past 2 weeks, how often did you check the worksite for fall hazards at the beginning of the shift?** (Not applicable – did not work at heights during the last 2 weeks, Always, Often, Sometimes, Rarely, Never)
3. **In the past 2 weeks, how often did you inspect your fall protection equipment before using it?** (Not applicable – did not use fall protection equipment in those 2 weeks, Always, Often, Sometimes, Rarely, Never)
4. **In the past 2 weeks, how often did you wear fall protection equipment when working on a ladder at heights greater than 10 feet?** (Not applicable – never worked on a ladder at a height greater than 10 feet in the last 2 weeks, Always, Often, Sometimes, Rarely, Never)
5. **In the past 2 weeks, how often did you maintain 100% tie off when working at heights with fall arrest equipment?** (Not applicable – did not use fall arrest equipment in those 2 weeks, Always, Often, Sometimes, Rarely, Never)
6. **In the past 2 weeks, how often did you use fall protection equipment that was worn out?** (Not applicable – did not use fall protection equipment in those 2 weeks, Always, Often, Sometimes, Rarely, Never)
7. **In the past 2 weeks, how often did you maintain three-point contact when using a ladder?** (Not applicable – did not use a ladder in those 2 weeks, Always, Often, Sometimes, Rarely, Never)
8. **In the past 2 weeks, how often did you take a shortcut to save time, even though there was a chance of falling?** (Not applicable – did not work at heights in those 2 weeks, Always, Often, Sometimes, Rarely, Never)
9. **In the past 2 weeks, how often did you use fall arrest equipment that might “bottom out”?** (Not applicable – did not use fall arrest equipment in those 2 weeks, Always, Often, Sometimes, Rarely, Never)

10. In the past 2 weeks, how often did you make a suggestion to a supervisor/manager to improve fall safety? (Not applicable – did not work at heights in those 2 weeks, Always, Often, Sometimes, Rarely, Never)
11. In the past 2 weeks, how often did you make a suggestion to a coworker to improve fall safety? (Not applicable – did not work at heights in those 2 weeks, Always, Often, Sometimes, Rarely, Never)
12. In the past 2 weeks, how often did you make sure you got job-specific orientation to fall protection at a new site? (Not applicable – did not work on a new site in those 2 weeks, Always, Often, Sometimes, Rarely, Never)
13. In the past 2 weeks, how often did you know the fall rescue plan? (Not applicable – did not work with fall protection equipment in those 2 weeks, Always, Often, Sometimes, Rarely, Never)
14. In the past 2 weeks, how often did you try to use guardrails instead of a fall arrest system? (Not applicable – did not use a fall arrest system in the last 2 weeks, Always, Often, Sometimes, Rarely, Never)
15. In the past 2 weeks, how often did you use travel restraint? (Not applicable – did not use fall protection equipment in those 2 weeks, Always, Often, Sometimes, Rarely, Never)

WORK PRACTICE CHANGE

The next set of questions are concerned with changes you may or may not have made as a result of the working at heights training.

16. Compared with before the working at heights training, how much safer are your work practices now? (A lot LESS safe now, compared to before the training; Somewhat LESS safe now, compared to before the training; The SAME now as before the training; Somewhat MORE safe now, compared to before the training; A lot MORE safe now, compared to before the training)

THE NEXT QUESTION IS ONLY FOR THOSE CHOOSING EITHER OF THE LAST TWO RESPONSES IN THE PREVIOUS QUESTION

17. To what extent is the recent improvement in your safety practices a result of the working at heights training? (Not at all a result of the training, Somewhat a result of the training, Mostly a result of the training, Completely a result of the training)

RECOMMENDATION FOR IMPROVEMENT IN TRAINING

18. How could the working at heights training be changed to make people even safer when they get to the worksite? Please give your one most important recommendation.

ANYTHING ELSE

19. Is there anything else about working at heights safety you think we should know, but haven't asked about in any of the surveys?

FUTURE CONTACT

20. Do you give us permission to contact you again in the future about other research opportunities? (Yes, No)

Appendix K: Labour inspector interview guide

1. How long have you been an inspector in the construction sector with the Ministry of Labour?
2. And prior to that what was your experience with construction and OHS?
3. What region do you work in?
4. Do you cover all sectors of construction in your inspections? (residential, ICI, road building, heavy civil)
5. When it comes to preventing falls, can you tell me about how the decision is made about where to enforce? (reactive vs. proactive)
6. Would you have participated in the falls blitzes in 2014 and 2016? How do you go about a visit that's part of a blitz on falls? (Take me through the steps of such a visit; How often/what types of tickets or orders written? Common offences? Any differences between 2014 vs. 2016 blitzes? How do the fall blitzes differ with regards to the usual proactive enforcement of fall protection requirements, if they do?)
7. Have you to date been enforcing the requirement for the new WAH training standard? (Take me through the steps involved in doing that?)
8. This next question may be difficult to answer, but are you able to describe how the approach to preventing falls has changed over your time as inspector? (perhaps it hasn't) (e.g. different emphases or strategy? Enforcement approach? (Zero tolerance?) Organizational supports? Focus on guardrails, or FP equipment, training, etc.)
9. What, if any, impact has the WAH training standard had on what you observe on construction sites, relative to before the training regulation started to come into force?
 - a. How has it affected workers and their work practices, if at all? (more skilled? Using equipment more often?)
 - b. How has it affected supervisors, if at all? (more skilled? Enforce rules more often? Are they getting trained?)
 - c. How has it affected the availability of FP equipment, if at all? (why?)
 - d. How has it affected the way constructors manage fall protection, if at all? (i.e. more stringent about workers having proper training? Better tracking of training? Change in reliance on FP equipment? Using guardrails and other alternatives to FP equipment more often?)
 - e. How about workplace specific training—enforced differently? Awareness of?
10. [If time] Where do you find the most non-compliance with regards to preventing serious fall events? (size and sector) (What prevents compliance?)
11. Where do you think the system should focus its next efforts in order to prevent serious fall events in construction?

12. What else do you think I should know to understand how the WAH training standard has been implemented and its effect on workplaces?

13. Anything else?

14. *[If time allows]* Ask about different sector requirements for the training.

Appendix L: Definitions of fall injuries targeted and untargeted by the WAH training

CSA Z795 code	Description of code	# claims 2004-17	F/FFH/M according to CSA Z795	Targeted by WAH training?	Final targeted/ untargeted classification
10000	Fall, unspecified	21	M	P	U
11000	Fall to lower level, unspecified	91	FFH	P	U
11100	Fall down stairs or steps	1103	FFH	N	U
	Fall from floor, dock, or ground level, unspecified	18	FFH	P	U
11200	Fall through existing floor opening	139	FFH	Y	T
11220	Fall through floor surface	98	FFH	N	U
11230	Fall from loading dock	20	FFH	N	U
	Fall from ground level to lower level (inc storm drains, sewers or excavation pits)	142	FFH	P	U
11240	Fall from floor, dock, or ground level, n.e.c.	54	FFH	P	U
11300	Fall from ladder	4387	FFH	Y	T
11400	Fall from piled or stacked material	7	FFH	P	U
11500	Fall from roof, unspecified	445	FFH	Y	T
11510	Fall through existing roof opening	38	FFH	Y	T
11520	Fall through roof surface	51	FFH	P	U
11530	Fall through skylight	9	FFH	Y	T
11540	Fall from roof edge	128	FFH	Y	T
11590	Fall from roof, n.e.c.	290	FFH	Y	T
11600	Fall from scaffold, staging	1467	FFH	Y	T
	Fall from building girders or other structural steel	39	FFH	Y	T
11700	Fall from nonmoving vehicle	790	FFH	P	U
	Fall to lower level, n.e.c. (inc side edge of stairs)	1479	FFH	P	U
11900	Jump to lower level, unspecified	8	FFH	P	U
12100	Jump from scaffold, platform, loading dock	94	FFH	P	U
12200	Jump from structure, structural element, n.e.c.	72	FFH	P	U
12300	Jump from nonmoving vehicle	149	FFH	P	U
12900	Jump to lower level, n.e.c.	193	FFH	P	U
13000	Fall on same level, unspecified	56	FSL	N	U
	Fall to floor, walkway, or other surface (Fall on same level)	4832	FSL	N	U
13100	Fall onto or against objects (Fall on same level)	1007	FSL	N	U
13200	Fall on same level, n.e.c.	67	FSL	N	U
13900	Fall, n.e.c.	28	M	P	U
	All fall events	17322			

Abbreviations: FFH, Fall from heights; FSL, Fall same level; M, Mixed; N, WAH training NOT intended to prevent that type of injury; P, partial (training intended to prevent only some of that type of injury); T, targeted, U, untargeted, Y, training intended to prevent all or most of that type of injury

Appendix M: Employee exposure to heights, fall protection use, employer awareness of and compliance with WAH requirements, by firm size

	< 20 employees (N =196)		20+ employees (N =194)		p-value ^a
	N	%	N	%	
Aware of working at heights training^b	177	90.3	185	95.3	0.05
Permanent employees					
With any permanent employees exposed to heights	149	76.0	175	90.2	< 0.01
With any permanent employees using FP equipment	137	69.9	171	88.1	< 0.01
Typical use by permanent employees using FP equipment:	N=137		N=171		
Every day	22	16.1	42	24.6	0.02
Once or twice a week	30	21.9	57	33.3	
Once or twice a month	41	29.9	36	21.1	
Less than once month	42	30.7	35	20.5	
Don't know	2	1.5	1	0.6	
Compliance of permanent employees with WAH training requirement ^c	N=137		N=171		0.73
	128	93.4	158	91.2	
Year when training of permanent employees began (N is companies with any trained permanent employees)	N=132		N=164		
2017	67	50.8	71	43.3	0.30
2016	49	37.1	64	39.0	
2015	16	12.1	29	17.7	
Temporary employees					
With any temporary employees exposed to heights	48	24.5	56	28.9	0.33
With any temporary employees using FP equipment	44	22.5	55	28.4	0.18
Typical use by temporary employees using FP equipment:	N=44		N=55		
Every day	9	20.5	18	32.7	0.31
Once or twice a week	17	38.6	17	30.9	
Once or twice a month	7	15.9	12	21.8	
Less than once month	11	25.0	8	14.6	
Compliance of temporary employees with WAH training requirement ^d	N=44		N=55		0.99
	40	90.9	51	90.9	

^a Statistically significant differences between groups are shown in boldface, based on the p-value being less than 0.05.

^b "Aware" corresponded to the respondent selecting a "Yes, definitely" answer to the question "Have you heard about the new working at heights training available to Ontario construction workers since 2015?"

^c Compliance was defined as having been met if all the permanent employees who ever use fall protection equipment were either trained or, if the survey interview was held prior to October 1, 2017, enrolled in training.

^d Compliance was defined as having been met if all the temporary employees who ever used fall protection equipment were either trained or, if the interview was held prior to October 1, 2017, enrolled in training.

Appendix N: Employee exposure to heights, fall protection use, employer awareness of and compliance with WAH requirements, by GTA/non-GTA locations

	Inside GTA (N =177)		Outside GTA (N =213)		p-value ^a
	N	%	N	%	
Aware of working at heights training^b	160	90.4	202	94.8	0.09
Permanent employees					
With any permanent employees exposed to heights	151	85.3	173	81.2	0.28
With any permanent employees using FP equipment	139	78.5	169	79.3	0.84
Typical use by permanent employees using FP equipment:	N=139		N=169		
Every day	37	26.6	27	16.0	0.22
Once or twice a week	38	27.3	49	29.0	
Once or twice a month	30	21.6	47	27.8	
Less than once month	33	23.7	44	26.0	
Don't know	1	0.7	2	1.2	
Compliance with WAH training requirement by permanent employees ^c	N=139		N=169		0.63
Year when training of permanent employees began (N is companies with any trained permanent employees)	N=134		N=162		
2017	58	43.3	80	49.4	0.10
2016	49	36.6	64	39.5	
2015	27	20.2	18	11.1	
Temporary employees					
With any temporary employees exposed to heights	39	22.0	65	30.5	0.06
With any temporary employees using FP equipment	37	20.9	62	29.1	0.06
Typical use by temporary employees using FP equipment:	N=37		N=62		
Every day	10	27.0	17	27.4	0.77
Once or twice a week	12	32.4	22	35.5	
Once or twice a month	9	24.3	10	16.1	
Less than once month	6	16.2	13	21.0	
Compliance with WAH training requirement by temporary employees ^d	N=37		N=62		0.71
	35	91.9	56	90.3	

a Statistically significant differences between groups are shown in boldface, based on the p-value being less than 0.05.

b "Aware" corresponded to the respondent selecting a "Yes, definitely" answer to the question "Have you heard about the new working at heights training available to Ontario construction workers since 2015?"

c Compliance was defined as having been met if all the permanent employees who ever use fall protection equipment were either trained or enrolled in training.

d Compliance was defined as having been met if all the temporary employees who ever used fall protection equipment were either trained or enrolled in training.

Appendix O: Summary of the enforcement theme from the labour inspector interviews

After coding the content of all transcripts from the interviews with ten labour inspectors, the data were segmented by the codes. All content coded with “enforcement” were extracted and the material synthesized into themes, with supporting quotes. A summary is provided below.

Methods used to enforce the FP/WAH requirements

Fall blitzes are no different than regular inspections since according to the inspectors, falls are always highly prioritized; however, a couple of inspectors said that blitzes tend to have a sharper focus on awareness and education.

All inspectors talked about their inspection process in a similar manner. They typically go on the site, assess who may be exposed to the risks, whether proper controls are in place, whether workers are FP/WAH-trained, whether trainers are approved, etc. The inspectors tend to quiz workers to see if they can answer basic questions related to fall protection and know how to inspect their equipment and/or check to see if they had tampered with the equipment in an attempt to “fix” them. Inspectors are cautious about risking their own safety and may conduct a field visit from the ground.

“Obviously, the first thing you do when you arrive is put the workers in a safe position, if they’re not already. Then, you introduce yourself and identify what the purpose of your visit is and then, typically, seek out the supervisor. Typically, you address them, if you can, and any worker health and safety reps, if they’re available, if their crews are big enough to need one. Then, usually, you start asking questions regarding the fall protection and their training and their company policies on working at heights and start looking at training documentation and things of that nature.... Then you compare what they’re doing with legislation and see whether they’re meeting the standard or not. If I continue on, I mean, you’re looking at everything at that point. Once the workers are safe and secure, then you’re looking at access, egress, via ladder or however they’re doing that, fire extinguishers. Documentation on the site, whether it be notice of project if needed, (inaudible) emergency procedures, how to rescue workers if they’ve been arrested by a fall. All that stuff that you’re looking for as part of a regular routine inspection...”

Yeah, we always ask for proof of training, as previously mentioned, but, you know, you’re going to ask them questions similar to what they might get on a test, if they took the working at heights training or the fall protection training. You know, requirements of equipment, when they’re supposed to use it, some of the methods of fall protection they could be using. You’re asking that to kind of test their knowledge, to see whether they’re competent and knowledgeable in what they’re doing. If they’re not, at that point we could order retraining, if we thought necessary.” (Inspector 4)

When it comes to roofers, many inspectors tend to do some time-consuming detective work, since re-roofing projects are too small to require a Notice of Project. Inspectors may scope out sites based on the residential areas that are due to have new roofs put on or follow roofers to their job sites. They might photograph the infraction or use binoculars to get a closer look.

Sometimes inspectors will seek out non-compliant employers actively, but sometimes they will be responding to anonymous complaints (including those logged by competing companies who did not get the contract).

The types of actions the inspectors can take were explained:

“There are different methods. Our basic entry-level is an order, which means they have a certain time to comply or that it’s been done immediately, which is a forthwith order. Under zero-tolerance, typically there are charges laid. You have a choice as an inspector whether you would issue a part one offence notice, which means ... It’s just like a ticket, like you’d get if you weren’t wearing your seat belt or were talking on your phone. You get a ticket right on the spot, with a fixed amount that is required to be paid. Being Ontario law, they could obviously go in and fight that if they’d like to, or challenge that ticket in a court of law. At which time, we would have to provide our proof for why we laid that charge. You can also issue a part one summons, which means someone is going to court to answer as to why fall protection wasn’t used. Whether it would be a worker or possibly a supervisor at that point. That’s a maximum fine of \$1,000. Or, if it’s a more serious offence or repeat offender, you can go with a part three prosecution, which for an individual, such as a supervisor, could be up to \$25,000 and/or a year in jail. Or for a corporation, it could be up to half a million dollars per count. That’s more of an investigation process and a very formal document. It’s what we call a brief. It takes time to develop that. You have to have a lot of particulars, a lot of information. A part three prosecution or a brief would be no different than if we were charging someone for a fatality on a job site....Again, if I go in and I see a worker the very first time I ever see them and they’re up on a roof, you know, 12, 13 feet in the air, I’m probably not going to issue a part three prosecution, it’s going to be a part one. If two weeks later, I see that same company again, then those types of considerations come into play.” (Inspector 4)

Non-compliance with FP requirements

Quite a few inspectors interviewed mentioned that roofing is a non-compliant sector, especially when it comes to single-family re-roofing. Sometimes they even tend to run away from the inspectors when caught red-handed. The residential sector is less compliant than the ICI sector. Larger projects (e.g. in the ICI sector) tend to have dedicated health and safety managers, unions and proper supervision, resulting in better compliance. Common scenarios of non-compliance were described:

“We saw guys not tied off at all. There was times where we showed up, the ropes are up there but they're not tied off to anything, so, they just put their harness on, or the safety belt, whatever, and they just disregard it. And supervisor is either he is not there sometimes or he's there and he's doing other work and not paying attention to them. That's what we've seen...The biggest story we have here is they hire somebody and they want to try him out to see if he fits the program, or the company. Meanwhile, they're thrown on top of the roof, or they're throwing him on a situation where they have to be tied off and we have to tell them, I'll say, well, let me see your training. And they'll turn around and say, well, no, we just hired him this week and we just want to see if he works out. For us, it doesn't make a difference, he still needs the training, but the employers don't get that part of it sometimes. We see a lot of that that goes on.” (Inspector 8)

More than half the inspectors said that training was not the issue and that workers don't comply despite knowing the rules and the consequences of not following them. Workers' explanations include ropes create a tripping hazard and equipment is too cumbersome/uncomfortable to wear. Even if the inspectors are trying to educate them or share cautionary tales of accidents/fatalities, workers don't seem to be too influenced by them. A lot of these workers are part of the underground roofing economy so they are dependent on piece-work which may discourage them from working at heights in a safe manner. They can also have a language barrier or a lack of education which may prevent them from understanding the legislation and training.

Appendix P: Comparison of postal codes in IHSA learner sample and MOL records of the successful learner population

Postal code first letter	IHSA learner sample		MOL records of the successful WAH learner population	
	Number	Percentage	Number	Percentage
K	35	7.9	72,452	14.6
L	195	44.0	183,007	36.9
M	80	18.1	75,108	15.1
N	74	16.7	100,734	20.3
P	43	9.5	40,806	8.2
Other	17	3.8	24,303	4.9
Total	444	100.0	496,410	100.0

The IHSA learner sample consists of those participating in the first survey and requesting their gift card to be mailed (n = 444). (We did not have postal code for those requesting gift card in electronic format.) The MOL extract included 496,410 records of successful training completions from March 2015 to April 2018. Chi-square test indicates the two distributions are different ($p < 0.0001$).

Appendix Q: Nature of work practice changes in IHSA learners due to WAH training

Learners were asked in the second survey (four weeks post-training) whether their work practices were safer than before the WAH training. If they reported affirmatively, they were then asked “*What is the ONE most important thing you are doing more safely now, compared with before the Working at Heights training?*”

Of the 453 individuals posed this question, 418 provided a response. Analysis of those responses identified several themes, which are summarized in the table below: The following table gives a summary of the “themes” found among those responses. This is followed by each theme’s description and illustrative quotes for themes found among 3% of respondents or more.

Theme	No. of references	% of total (n = 418)
Inspection	158	37.8
<i>Inspection- equipment</i>	88	21.1
<i>Inspection- site</i>	41	9.8
Hazard awareness	58	13.9
Ladder use	52	12.4
FP equipment use	50	12.0
<i>Bottom out</i>	13	3.1
Tie-off	41	9.8
Knowledge	33	7.9
General safety	27	6.5
Right equipment	20	4.8
Safer option	13	3.1

Theme: “Inspection” (38%)

Description: General comments about conducting inspections and/or risk assessments of fall hazards. Also includes phrases like “looking around for hazards” or “checking for hazards”. Also includes sub-themes “Inspection-equipment” and “Inspection-site.”

Quotes:

- *Assessing hazards before starting work.*

- *Knowing all the dangers before the day starts and being able to plan for a safe work day.*
- *Making sure everything is correct and inspected.*

Sub-theme: “Inspection- equipment” (21%)

Description: Specific comments about inspecting fall protection equipment and ladders to ensure that they are safe to use.

Quotes:

- *Inspection of equipment better than before. Previously I would skip this part or be careless.*
- *Checking the tags on the fall arrest equipment - mostly for manufacturer date.*
- *Always check my harness and lanyard before and after use.*

Sub-theme: “Inspection- site” (10%)

Description: Specific comments about inspecting the site to ensure a safe working environment.

Quotes:

- *Inspecting the site for fall and trip hazards. Ensuring trades do a better job of cleaning up their work areas.*
- *Training has helped me make sure that the site is safe before actually beginning the work. We absolutely make sure everything is safe now.*

Theme: “Hazard awareness” (14%)

Description: Awareness of or watching for/paying more attention to fall safety hazards or generally being more “safety conscious”. No mention of specific actions. In contrast, general comments about work practices being more safe go under GENERAL SAFETY theme.

Quotes:

- *Just In general being more aware of potential hazards on the jobsite and warning others.*
- *Realizing how detrimental a fall from 10-12 feet can be to my body (i.e. awareness of falling).*

Theme: “Ladder use” (12%)

Description: Referring to a decrease in use, using the right type of ladder, and/or using it the right way.

Quotes:

- *Mainly with ladders. If we do have to use ladders, it's hammered into my head about how to safely set one up.*
- *While using ladders to enter excavations I always make sure there is 3 point contact ...I inspect the ladder every time I use it ...It is kind of a non thinking action now!!*
- *I'm replacing the company's aluminum and wooden step ladders with commercial grade Fiberglas ones. As part of the in house HSE team.*

Theme: "FP equipment use" (12%)

Description: Mentions of harness, lanyard, travel restraint, gear or equipment being used more frequently or more appropriately.

Quotes:

- *When working on roofs or heights I always wear a harness and make sure I am secured to something that can bear my body weight.*
- *I am wearing my harness more when working at 10ft or higher and more conscious of my work environment.*
- *Knowing what I have learned [from] the training I'm more confident when using fall arrest and travel restraint. And safety and also put on correctly and used correctly.*

Sub-theme: "Bottom out" (3%)

Description: Mentions of improved practices to prevent bottoming out including mentions about length of lanyard and calculations.

Quotes:

- *Checking the bottoming out distance before selecting equipment.*
- *Checking out the area for safety and doing the math for bottoming out.*

Theme: "Tie off" (10%)

Description: Explicit mentions of tying off more often.

Quotes:

- *Whenever being 3 feet or higher off the ground I am making sure I am tied off and secure.*
- *Bringing multiple ropes so I can stay constantly tied off without exceeding the 30 degree angle rule. Do a lot of maintenance which requires us to be in travel restraint and moving across great distances to complete work.*
- *100% tie off.*

Theme: “Knowledge” (8%)

Description: Having more general or specific knowledge about working at heights safely, but no actual action mentioned. Covers content distinct from that in HAZARD AWARENESS.

Quotes:

- *I understand the procedures much more clearly since the training and am not afraid to ask questions now...*
- *One thing resonated in the course, is that your life is worth more than your job, just make sure you're safe. Make sure you don't cut corners, and inspect the area before you do the job and whatever is required, and go ahead and do it safely. I also cared more about getting my harness than what my supervisor said, and I remembered from the course that I could refuse a job when it is not safe.*

Theme: “General safety” (6.5%)

Description: General comments about work practice being more safe. Distinct from just being more aware or safety conscious. Uses words like “ensure” or “always”.

Quotes:

- *Considering all aspects of the potential fall hazards, whether it is a trip hazard, a tie off location, or a calculation to ensure you won't bottom out.*
- *When I go to scope a job that is on a roof, I avoid the edge at all costs and if I have to go near the edge, I ensure that I have proper equipment.*

Theme: “Right equipment” (5%)

Description: General comments about using the right kind of equipment/ladder and replacing worn equipment/ladder.

Quotes:

- *The most important thing that I am doing more safely now is using the 30" lanyard.*
- *To have proper fall protection equipment (more use of SRLs, not using equipment that has 'bottomed out').*
- *Using appropriate restraint for the type of work.*

Theme: "Safer option" (3%)

Description: Choosing or thinking of a safer option.

Quotes:

- *Using a travel restraint device rather than a fall arrest only device is a big difference. Also checking to see how far the device will allow me to travel in the event of a fall rather than just putting it on and using it.*
- *We are using the warning barricade as discussed in the training. Not a roof application but relevant to our work and much safer than caution tape.*
- *Thinking about working and being safe. For example I would use a ladder without much thought, but now I consider if there is a safer way to do the work needed.*

Appendix R: Perceived impacts of training on workplaces in employer survey, by company size

	<20 FTE (N=137)		+20 FTE (N=169)		p-value
	N	%	N	%	
Bought any new equipment	59	43.1	65	38.5	0.41
New FP equipment (e.g. harnesses)	54	39.4	60	35.5	0.48
New guardrails or protective covers	11	8.0	15	8.9	0.79
Anything else (ladders, hazard straps, life jacket etc)	10	7.3	11	6.5	0.79
Changes to fall rescue plan					
Created plan for the first time	7	5.1	5	3.0	0.05
Made changes to existing plan	41	29.9	61	36.1	
No change to existing plan	65	47.5	90	53.3	
Does not have fall rescue plan	19	13.9	8	4.7	
Don't know	5	3.7	5	3.0	
Inspections of fall protection equipment					
More often now	45	32.9	57	33.7	0.97
Just as often now as before	86	62.8	104	61.5	
Don't know	6	4.4	8	4.7	
Tying off by employees					
More often now	31	22.6	56	33.1	0.13
Just as often now as before	99	72.3	105	62.1	
Don't know	7	5.1	8	4.7	
Actions by supervisors to prevent falls					
More often now	34	24.8	48	28.4	0.75
Just as often now as before	98	71.5	116	68.6	
Don't know	5	3.7	5	3.0	

Questions were asked of companies with any permanent or temporary employees that had taken WAH training.

Appendix S: Perceived Impacts of training on workplaces in employer survey, by GTA/non-GTA location

	Inside GTA (N=137)		Outside GTA (N=169)		p-value
	N	%	N	%	
Bought any new equipment	50	36.5	74	43.8	0.20
New FP equipment (e.g. harnesses)	47	34.3	67	39.6	0.34
New guardrails or protective covers	12	8.8	14	8.3	0.88
Anything else (ladders, hazard straps, life jacket etc)	10	7.3	11	6.5	0.79
Changes to fall rescue plan					
Created plan for the first time	6	4.4	6	3.6	0.27
Made changes to existing plan	53	38.7	49	29.0	
No change to existing plan	60	43.8	95	56.2	
Does not have fall rescue plan	14	10.2	13	7.7	
Don't know	4	2.9	6	3.6	
Inspections of fall protection equipment					
More often now	53	38.7	49	29.0	0.12
Just as often now as before	80	58.4	110	65.1	
Don't know	4	2.9	10	5.9	
Tying off by employees					
More often now	42	30.7	45	26.6	0.53
Just as often now as before	90	65.7	114	67.5	
Don't know	5	3.7	10	5.9	
Actions by supervisors to prevent falls					
More often now	50	36.5	32	18.9	< 0.01
Just as often now as before	84	61.3	130	76.9	
Don't know	3	2.2	7	4.1	

Questions were asked of companies with any permanent or temporary employees that had taken WAH training.

Appendix T: Employer difficulties in complying with the WAH training requirement

Employers were asked in the survey “*Is there anything else about your company’s experience that I missed in terms of what makes it difficult to comply with the WAH training requirements?*” following a set of close-ended questions about possible difficulties complying with the training requirements. Of the 390 employers, 91 provided an answer. Analysis of these revealed several themes, which are summarized below in the table if more than 10% of respondents contributed toward the themes. This is followed by each theme’s description and illustrative comments, documented by the interviewer.

Theme Sub-theme	No. of responses	% theme
Training- Availability	25	27
<i>Training provider</i>	14	15
Training- Quality & Relevance	23	25
<i>Practicality</i>	10	11
<i>Sector relevance</i>	10	11
Training- Cost	14	15
Conflict with work	10	11
Training Administration	10	11

Theme 1: “Training Availability” (27%)

Description: Comments about training availability, e.g. classes being too full, hours of class operation and those covered in sub-themes of “training provider.”

Comments:

- *There was a backlog in having an instructor come out. It was difficult booking a time as they are backlogged for months and months. For us, we only deal with the {training provider}, so we couldn't get through to them. They don't return our calls, it's a disaster over there dealing with the {training provider}. What we don't like is that they are fast at implementing the course but not fast enough to get instructors out to supply the demand.*
- *Not enough variety in course offerings. More courses should be offered on weekends/evenings. The one company that provided a course outside working hours was much more expensive.*

- *I'd like to emphasize that finding a provider is the biggest challenge, due to location and scheduling. Especially if you have only one or two workers, there is very little for them to go to, and you have to have a full class for most service providers. Otherwise it is only offered on a weekend.*
- *Just the location. Some of our sites are northern, that was the most difficult area to provide training, but GTA and southwest were fairly easy.*

Sub-theme: “Training Provider” (15%)

Description: Comments regarding the lack of appropriate training providers and/or WAH-approved training providers; issues with becoming an internal trainer.

Comments:

- *The MOL criteria to become a trainer is unnecessarily strict and it involves too much time and resources, especially for a smaller company.*
- *It has created a large burden of paperwork for companies, and particularly on small companies. Would be very helpful for small businesses if the government set up an accreditation agency that informs companies of all legitimate training providers in the province. It would significantly cut costs/time for companies who have to jump through hoops to find reputable training providers. A single database should be created for this.*
- *Fraud and misinformation, took respondent unreasonable amount of time to figure out what needed and when, and finding decent provider, logo/stamp to indicate its official, had to make many phone calls to find proper course provider. Went with a 1st aid company but they were not registered. MOL needs to help facilitate this.*
- *Too much hassle to do training in-house or find space so they sent employees to <training provider> for WAH training; 2) There should be increased the number of classes for WAH courses in different languages.*

Theme 2: “Training Quality & Relevance” (25%)

Description: Comments about the quality of WAH training including clarity and issues raised under sub-themes “Practicality” and “Relevance.”

Comments:

- *Employees who took the training said it was a lot of information to take in within the time frame, lots of details/numbers*
- *The information on updated ManLift requirements were too vague, company had to do its own research after WAH course.*
- *A lack of clarity and uniformity in the information that WAH instructors provide employees creates confusion (ie: the example of rope grabs ...)*

Sub-theme: “Practicality” (11%)

Description: Whether or not the training is practical to apply at work.

Comments:

- *"It's not relevant. If you're on scaffold, you can't tie off, what are you supposed to do?"*
- *Not everything in the WAH training is practical on the actual jobsite, ie: new condos can have things to tie off to, but this is not necessarily the case in 60-year-old homes. It felt like the instructors were just reading off a script, not really tailoring it to our company needs. We had legitimate questions about incidents that may come up in our area of work, but they would not stop to focus on these. There should be room for this in the course.*
- *Grey areas of the law that make it complicated to follow. For example: 1) The first man up issue, when someone is climbing a ladder and is just about to put in an anchor, there is literally nothing to anchor to at that point. The company can get charged for failing to ensure that the worker is using fall protection gear; 2) No clear rules for WAH safety for arborists since there is no anchor to tie off to on a tree. They are not construction workers but can work on the same project, and respondent feels the MOL should provide clear answers for WAH regulations for arborists.*

Sub-theme: “Sector relevance” (11%)

Description: Whether or not training is relevant to the work they do or sector they are in.

Comments:

- *The course should expand on how to transfer the WAH guidelines between sectors in construction (ie: what are requirements with heavy machinery and hazardous surfaces); 2) Some employees are still confused after the course as to what constitutes as 'heights' on different projects*
- *Most of the course is working with booms and lifts, we don't use them, it's rare we could use a boom lift, so it is not applicable and difficult.*
- *The main problem is that the new WAH is all tailored towards working in other sectors. We work in sewer water main, it's assumed we have a building around us with tie off points. There is nothing in the training that outlines the best solution for tie off points. There is no training that takes into consideration our industry, we have been forgotten about. The only benefit of the training is that they are taking a little more action/inspection. We didn't change our emergency plan because nothing that was taught applies to us.*

Theme 3: “Cost” (15%)

Description: Comments about how expensive training is (includes contextual info e.g. high turnover in industry, small businesses being impacted more, etc.)

Comments:

- *It's just that there are about 20 different things that we have to comply with and they all cost a lot. When you have 10 different things you need to comply with, especially in the electrical construction sector, and nobody ever checks or cares, it's just a money grab from the government...*
- *Company has had to request price increases from clients (builders) to reflect the cost of additional time/money invested in training*
- *While they're doing the training, there is the cost of the training and then we pay them for that day they did they training, and it kind of adds up and takes away from them doing the work.*

Theme 4: “Conflict with Work” (11%)

Description: How training may act as a barrier to performance, productivity, profits; includes scheduling issues, other related inconveniences cited by employer, etc.

Comments:

- *Employees complain that the WAH training is "in the way," restricted in how they can do the work.*
- *Sometimes, employees find it impossible to carry around harnesses on the job site. You have to work one place, disconnect then hook up again at a different site - slows down productivity. The employees sometimes also just don't want to wear it themselves. You really have to push them, which puts the employer in a tough spot.*
- *Inconvenience of pulling people off job-sites for the training*

Theme 5: “Training Administration” (11%)

Description: System-related or administrative issues, e.g. issuing of certificates, rolling out of training, communication problems, problems with administering training, etc.

Comments:

- *They could speed up issuing of certificate. Employees in same training group will get it at different times.*
- *We had difficulty getting the notification of when we have to get it updated, it didn't occur to us until we got a visit from our CFIB rep (Canadian Federation of*

Independent Businesses--for small businesses), that we needed to be updated on the new training, I think they extended it to the Fall

- *There is a lack of clarity on the renewal/refresher -- would like MOL to provide more details.*
- *When it first came out in 2015, we had everybody trained, and then they changed the legislation again, with the accreditation part, so we had to get them trained again, and so I had to pay for it again.*

Appendix U: Other reactions of employers to the WAH training requirements

Employers (n = 390) were asked at the end of the survey interview whether there was anything else researchers should know about the WAH training standard “good or bad.” There were 158 responses, which were coded for the nature of their content, as well as whether they were positive, negative, neutral, or both positive and negative towards the training. The themes found in 10% or more of the responses are summarized below in the table. This is followed by each theme’s description and illustrative comments, documented by the interviewer.

Theme	Number of responses			Total	% respondents
	Positive	Negative	Neutral		
General comments	29	3	1	33	21
Training quality	14	11	0	25	16
Training relevance	2	21	1	24	15
New knowledge	10	12	0	22	14
Cost of training	0	21	0	21	13

Theme: General comments about training (21%)

Description: general comments about the training, that doesn't include details that would fit under any of the other TRAINING themes; e.g. "good idea" "step in the right direction."

Comments:

- *It was a pain to go through initially, but overall worth it.*
- *This is a good thing, it's definitely something they should have.*
- *I think it's a good thing that they're doing this.*

Theme: Training quality (16%)

Description: comments about training content and instructors.

Comments:

- *The training is helpful because it is thorough, company management may not be able to provide sufficient training on their own.*
- *The new WAH course is designed so that it is more uniform, informative and consistent with its material than the previous course*

- *Employees report being told conflicting information by instructors (ie: length of expiration of lanyards). Respondent also sat in on various classes and found conflicting information between instructors/course locations.*
- *Information about updates to equipment safety standards (ie: required length of harness line in different settings) has not been made not clear enough.*

Theme: Training relevance (15%)

Description: comments about how relevant/applicable the training is; comments about it being sector-specific, too vague, etc.

Comments:

- *... the training does not seem applicable to us because we very rarely work at heights (excavation).*
- *For specialty trades (ie: pole climbing), WAH training lacks content that is applicable to day-to-day work (ie: specific types of fall restriction devices)*
- *It's specialized and it is meant for the roofing sector. It doesn't completely apply to us, i.e. we don't use rope grabs, etc.*
- *...The generic information about WAH safety is not effective and will be forgotten by employees shortly. It should include more practicalities on jobsites that the employees will actually deal with. Lots of employees are just sitting there and not paying attention because the information is not relevant to them*

Theme: New knowledge (14%)

Description: references to whether or not training is the same as previous fall protection training or if it presents new information or a different aspect; comments about awareness; etc.

Comments:

- *We did fall arrest training years ago, and it's almost the same thing. It's almost like the government is doubling up the fee, which makes no sense at all, but it is what it is.*
- *Course material has not changed [from fall protection], but it is now longer and more expensive.*
- *It's a great course, actually. Just a lot of good information that most of the guys, even after years of working, they didn't realize. If you didn't take something out of the course, you were sleeping basically. It's an eye-opener for a lot of people, so it's beneficial.*
- *Enjoyed the training. All material was very relevant and employees have an increased respect and awareness for safety hazards.*

Theme: Cost of training (13%)

Description: references to the costliness of the program.

Comments:

- *The government got involved, and made it more expensive. I don't think the government should be so involved. Now it's double the price. We didn't have trouble covering the cost, but it was expensive, and it's mandatory, so you're forced into it.*
- *Our feeling from the contractors is that this should be a government program paid for by the government, because everyone needs it. It puts a big financial burden on legitimate contractors (i.e. the cost of the training and then paying for their time away from work).*
- *It's bad, I wish I could move to another province. It's just too much money, because if every single time I hire someone to do a job, I have to make sure they have it, although the cost is \$150, I have to pay them a whole day of wages as well, so it costs me over \$1000.*
- *I think the government rushed through the legislation too fast. They need to address that I need to invest \$500 in a guy before he steps on the site, because if he decides two days later "I don't like you or want to work for you", it's very unfair. The government should make it free for people initially. If they stick around for two months, then I'll pay.*
- *The training should be affordable for small companies, ie: cost should be pro-rated according to size of company.*

Appendix V: Suggestions for improving the WAH curriculum, from providers and learners

Training providers were asked an open-ended question about their recommendations for changes that could be made to the WAH training curriculum to better meet their needs, or the needs of their working at heights learners. Of the 87 individuals posed this question, 62 provided a response.

Learners were asked in the survey conducted seven weeks post-training for their one most important recommendation of how the WAH training could be changed to make people even safer when they got to the worksite. Of the 514 individuals posed this question, 251 provided a response.

The learner and training provider data were analyzed separately, using a common coding scheme. The table below includes all themes derived from 5% or more of respondents from either survey. The table is followed by each theme's description and illustrative quotes, in the order in which they appear in the table.

Category Theme Sub-theme	Training provider survey		Learner survey	
	Number of responses	% of total responses	Number of responses	% of total responses
Content - Specific	42	67.7	75	29.9
Fall prevention/protection methods (incl. lanyards, etc.)	10	16.1	*	*
<i>Anchors</i>	4	6.5	*	*
Regulatory gap	7	11.3	*	*
Ladder safety	6	9.7	13	5.2
Fall rescue	5	8.1	*	*
Emphasize importance	4	6.5	25	10.0
Delivery	38	61.3	122	48.6
More practical/ less theoretical	20	32.3	69	27.5
<i>More hands-on</i>	5	8.1	51	20.3
Decrease time	8	12.9	*	*
More engaging	4	6.5	22	8.8
Integrate practical & theoretical	4	6.5	*	*
Content - General	24	38.7	23	9.2
Sector/trade specificity	12	19.4	22	8.8
Simplify content	8	12.9	*	*
Content updates	4	6.5	*	*
Program-level issues	23	37.1	22	8.8
Flexibility	11	17.7	*	*
Managers/supervisors	7	11.3	*	*

Training providers, $n = 62$; learners, $n = 251$. * indicates that $< 5\%$ of responses related to the theme.

Category: “Content - Specific”

Theme: “Fall prevention/protection methods (incl. anchors, lanyards, horizontal lifelines)”

- Training provider (16.1%)

Description: General as well as specific mentions of fall prevention and/or protection methods or equipment, including lanyards and horizontal life-lines.

Quotes (training provider):

- *The inclusion of lanyard selection, so currently the standard does not address an E4 or an E6 lanyard...but so important the learners select the proper lanyard for the body weight... many people don't realise there are different shock absorbing lanyards, for different body weights, if you select the wrong one, you're going to cause damage/injury to your body.*
- *The standard (as set by <training provider>) is to connect the 'y-lanyard' to rope grabs on horizontal lifelines (held horizontally by other participants, or lying on the ground). This is not a realistic simulation of site conditions; neither the rope grabs or the '5/8' ropes are intended for use in a horizontal situation. Also, it is much more difficult to attach a rope grab horizontally, as the hinge-tabs which prevent the grab from being installed upside down, do not work properly in a horizontal plane. It is not that difficult to set up two vertical lifelines to do a more realistic site simulation, to truly test the learners' understanding and competency. I feel strongly that vertical lifeline set-up should be part of a revised standard.*
- *There needs to be a little more clarification on scissor lifts and elevated work platforms (regulations for them). I am thinking about what type of lanyard to use, the MOL has to come up with better understanding of what type of lanyards they want to use in training.*
- *Horizontal life-line, and compatible connectors should be included in the WAH training.*
- *A lot of the classes I have, there are more women involved in construction and taking the certification, and not a lot in terms of any differences in terms of equipment. I know they can use the equipment, and there is specific equipment available now for men and women, might be useful to have a few points to identify the differences because physically we are different. I've tried to do some research and find stuff out, but not a lot of information available*

Sub-theme: “Anchors”

- Training provider (6.5%)

Description: Comments about the need for greater clarity around best practices for anchor points in a variety of settings on the jobsite. Specific mentions of climbing up for the first/last time on a jobsite and anchor points for industrial settings.

Quotes (training provider):

- *It's nice that the MOL wants us to talk about anchors, and show anchors, but we also have to have solutions to the problem. Our biggest problem is the safety industry has not come up with the safety solutions with some of the things that the Ministry want us to do. Roofers are like how are we supposed to get the anchor up here if we have nowhere to tie off...when you put the anchor point up on the roof, we're not going penalize you until the anchor is up there, but they're not attached to anything...We show them 10 anchor points, they always asked us how do we get it up there, when we have to be tied off--no such thing as a 'sky hook' that we can be tied off to.*
- *There are grey areas in the WAH course that are not addressed. For example, when workers go up the ladder the first and last time, they have to go up without being tied to an anchor. The MOL does not address this in the WAH curriculum.*
- *They [MOL] said you have to tie-off but won't say how. Because it's liable on them. They just say do the best you can do, nothing to hook to when you're putting your truss up. Other one is, eavestrough, up on a ladder for less than 5 minutes, you can't tie off.*
- *More on different anchor points. There is not enough time spent on the details of different anchor points, or different solutions on making anchor points. It's very general. The most important things are anchor points, but they'd rather concentrate on warning signs. However, anchor points are more important.*

Theme: “Regulatory gap”

- *Training provider (11.3%)*

Description: Comments by training providers about the problematic parts of construction regulations (specific mentions of gaps, contradictions) and/or the lack of MOL enforcement on jobsites which can create problems when teaching the curriculum.

Quotes (training provider):

- *Because apparently there are industrial WAH regulations vs construction WAH regulations - so when I get into rest homes, they are considered an industrial site. So do we have to, for example, tie off on the roof? Nobody knows the answer, nobody can explain (my contacts at the MOL have all changed, hard to find new numbers).*
- *My understanding from speaking to other companies is that the MOL will say “It's not our job to tell you where to tie off, just to tell you that you have to tie off.” They do that because they would otherwise become liable if someone fell off. They have not provided enough guidance on this, I have tried to field those questions to the MOL but have not gotten any answers.*
- *There are inconsistencies in the legislation regarding guardrail use. The last line in the legislation states something to the effect that “if the guardrail is built well enough, it will*

resist all loads subjected on it by workers, and so the standard guidelines on guardrail use do not apply.” This line should be eliminated in my opinion, they should be strong on the issue no matter what. Right now, contractors don’t feel obligated to have strong guardrails.

- *There are lapses in logic with respect to MOL regulations and Greenbook guidelines, and we have to then explain to learners when things don’t make sense. For example, after 8 feet, we need to install guardrails but we need FP equipment after 10 feet. Does that mean I can stand on the roof’s edge outside the guardrail at 9 feet without FP equipment? I have to explain this to people, and sometimes logic and law don’t add up.*
- *There is also the MOL's lack of monitoring it on-site; in our area, they are very lenient.*

Theme: “Ladder safety”

- *Training provider (9.7%)*
- *Learner (5.2%)*

Description: Comments about having more content in general related to ladders and/or ladder safety, as well as some specific ladder-related suggestions.

Quotes (training provider):

- *WAH program should spend more time talking about safe ladder use.*
- *What comes up more often than not is the use of ladders, in the new program the ladder section is 1 hour in length. Companies that work in telecom are often up on a pole suspending wires and they use ladders quite a bit. I know companies like Bell and others would like to see a far more comprehensive section on ladders and ladder safety...More comprehensive information on safe ladder use.*
- *The ladder training (practical) needs to be improved. The whole risk assessment thing for ladders, there's nothing there.*
- *And in the refresher course, there is no point on ladders, when ladders is what they mostly use (both construction and industrial workers) and that’s where most people will fall off from.*
- *Yes, there are gaps. Specific example: MOL should be more clear about guidelines on ladder use for accessing the worksite, ie: if a client is going up a ladder trying to connect to an anchor. A worker was climbing up a ladder to get to the roof to connect to anchor, fell and injured himself. The company is being prosecuted. The reaction I am seeing in the industry is “What is the use in trying if I’m going to be charged anyway even when I’m trying to be safe?” The MOL should be able to address this more practically.*

Quotes (learner):

- *My job requires me to use ladders not fall arrest equipment so maybe proper inspection of a ladder.*

- *There could be a little more info on how to find the class rating of a ladder on the job site. I've looked and can't find tags with the right information.*
- *Real world examples and resulting consequences of falls, even from ladders. People seem to take cases where you need a harness pretty seriously and enforcement is good but are often slap happy when it comes to ladders.*
- *Work in the telecommunications field, specific training to our situations would be helpful. We basically only use ladders to climb poles or place our ladders on the strand. None of the instructors ever seem to know anything about it.*

Theme: “Fall rescue”

- *Training provider (8.1%)*

Description: Comments pertaining to fall rescue activity or planning, including suggestions to incorporate additional components.

Quotes (training provider):

- *Add in (a section on) self-rappelling.*
- *The one complaint that we get a lot is around rescue planning. It's hard because we have no direction from the MOL, and there is no literature anywhere about solutions for rescue planning. There should be more about this.*
- *Different things such as knots that may come in handy should they be involved in a fall, and need to climb back up, for example, the Prusik knot. I've included that in the program in case they are in certain situations if they are in alone (and a fall occurs).*
- *I would like to do more on rescue planning, we are making a fall and rescue course, but more on rescue planning/different ways they can learn rescuing a fallen worker, would be good to cover, no space in this program, that would be welcome by us, (out West they do it)*
- *Rescue planning needs to be more practical rather than theoretical. Some problem-solving...WAH program is somewhat worse than the former Fall Prevention training, because the WAH training program, the overall WAH program itself is done from an administrative view, for example, we talk about all the things the construction regulations require with regards to rescue plan, but it doesn't give us ideas of how to do a rescue plan; it says we need one, but doesn't help us to do one. In our previous training, we would make a rescue plan for the workers that the workers would do.*

Theme: “Emphasize importance”

- *Training provider (6.5%)*
- *Learner (10.0%)*

Description: Suggestions to have greater clarity about the course learning objectives and/or more content in order to make workers more aware of consequences of not working at heights safely, especially potential physical harms.

Quotes (training provider):

- *It does for some but I do get lots of complaints from participants who say/think they don't need training since they're not actually working at heights, they're just stepping on the site. They ask if they really need this, can they go to site without training. The curriculum can perhaps be shaped so learners realize this is for their own good, change perception of the importance of training.*
- *I think people don't understand why they need to attend the training. They might probably have to work at heights, or they don't understand what working at heights is exactly. They think they just need to recognize the hazards. They believe after one day of training they will be superman at heights, not good, not understood, the regulations not clear for everyone. Regulation could be more clarified in the description of the program.*
- *We feel that people after taking WAH, they think they are sufficiently trained for forklifts and elevated platforms, but not the case, but they don't have approved providers for forklifts and elevated platforms, but people come away from the training thinking they are good to go for elevated platforms, and swing stage, but the MOL needs to make it clear that it is a different training.*

Quotes (learner):

- *More emphasis on the dangers and penalties of unsafe work*
- *Go into depth about the severity of following precautions and procedure*
- *Workers take more risks below 10 feet because they think they can't get hurt. Workers take more risks. Explain that they can get hurt at any height*
- *Extra emphasis on equipment inspection and MOL consequences for worn out equipment.*
- *Examples. Show the group image and video. The fear of falling have to be in the brain of everyone to make them work safely.*

Category: “Delivery”

Theme: “More practical/less theoretical”

- *Training provider (32.3%)*
- *Learner (27.5%)*

Description: Recommendations to make the course more practical and/or less theoretical, including making it more relevant to learners' job conditions or increasing “hands-on” training.

Quotes (training provider):

- *Take a little more out of the theoretical and add it to the practical. Take it out of rights and responsibilities, and five first sections, i.e. identification of working at heights, eliminating hazards of working at heights, the first four sections, could be shortened up some. And then the practical end of it, supposed to be trained on every WAH equipment specific to the job, but I always get a lot of questions in the practical portion.*
- *There should be more content in the practical component. This is instructor feedback. ie: content should be more scenario-based, such as hooking up scissor lift, how you would do that differently if you were hooking up to another piece of equipment.*
- *Yes, as I stated before, the first part of the theory is redundant for us, because it is covered in other courses.*
- *Yes, basically from my point of view, too much to be covered in the theoretical portion. The WAH training is the most grueling course of all our courses, after the theoretical portion there is still a lot to come, fairly sophisticated, math to calculate fall distances, you can see the stress level in the learners rise. Maybe have 2 hours theoretical, 5 hours practical, it would make it a more relaxed learning experience and increase the retention level of learners. If you throw too much information at the learners, none of it sticks, you have to be selective of how you transfer knowledge of that type, in order to see the behavioural changes, and remove areas not relevant to working at heights.*
- *The more practical you can make the exercise, especially when it gets to the worker level, their retention level is much higher when it is practical, and they understand things. That's probably the one area of the program, I'm not trying to knock the Ministry by any means, I know what their intent was, but it almost went too far in one way. When dealing with workers, the course could be a little more practical... and maybe the workers are given a little less detail, and more practical*

Quotes (learner):

- *More complex case scenario studies*
- *More hands-on training vs theory.*
- *Additional practical training with specific use cases vs a large theoretical section. I feel the practical is retained easier than the theory especially in construction related equipment training and processes.*
- *Present more practical examples of working at heights situations that come up on worksite, and how to deal with them.*
- *There should be a "realistic common sense" portion of it. People will make mistakes, so realistically an employee should have some idea of what to do in an unsafe situation.*

Sub-theme: "More hands-on"

- *Training provider (8.1%)*

○ *Learner (20.3%)*

Description: Recommendations to make the training more "hands-on" or done in a realistic setting, including the learners' own worksite.

Quotes (training provider):

- *Put in more hands-on time. A lot more people learn hands-on. It's just so heavily theory-based...more hands-on, and the addition of requirement for more hands-on, with equipment.*
- *I would develop a program that was far more hands-on, or one that is case-study based. Learners can be presented with situations that have occurred, ie: 'what do you think about this?' They can draw on knowledge they have, can see how certain things can be employed/deployed.*
- *As far as hands-on training, it should be on-the-job training, because you're dealing with people that are working at 100 feet in the air, it's a lot different than practicing on a floor on a fake edge. They come into so many circumstances of different anchor points, the practical component of it is unrealistic.*

Quotes (learner):

- *Demonstrate using fall arrest safety in an actual work environment. Practicing the exercises in the classroom was very different from using them on an actual site.*
- *More real life practical use with harnesses and safety lines to ensure everyone is completely comfortable using equipment.*
- *Actually working at heights when doing hands training to actually see hazards first hand with teacher and being able to ask questions. It's hard to know what questions to ask from a classroom*
- *Elevated platforms to simulate working at heights more accurately may increase understanding*

Theme: "Decrease time"

○ Training provider (12.9%)

Description: Suggestions to cut down on course length.

Quotes (training provider):

- *The course could really be shortened down, it's the same stuff as in WHMIS (i.e. basics of health and safety)...These guys are more hands-on, they don't want to sit in a class. They are labourers. They are antsy, you need to get their attention quickly. A full day class is counter-productive to the audience.*
- *I can't think of anything but there are a handful of learners who have walked out during a class because it was too long for them (were later reprimanded by their supervisors).*

- *The course could be...a little shorter in duration...Let's face it, a lot of these guys are not made to sit in a room for 8 hours.*
- *It's far too long for people to retain even half the information. I feel like it covers too much, especially for one day.*

Theme: “More engaging”

- Training provider (6.5%)
- Learner (8.8%)

Description: Comments about retaining learners' attention by improving content flow and incorporating greater use of videos, illustrations and classroom interactions, etc.

Quotes (training provider):

- *Making it more accessible to the learners (ie: use cartoons to illustrate points), cutting back to what really matters will help make the course more interesting to the learners.*
- *Should include more videos - this would be more impactful for learners. They don't want to listen to same person for 8 hours.*
- *We talk about so much more, from experience and stories to make it more realistic, it's a safety culture thing.*
- *[Provider] could benefit from more videos in their program content.*

Quotes (learner):

- *I believe that to show more testimonials of those who lost a loved one due to work accidents would help to make people understand the necessity of the use of PPE.*
- *Show the results of not wearing/inspecting your safety gear through visual aids like photos of injuries and even fatalities that have resulted from the lack of training or neglect. Shock is a valuable instrument in the education process to show what could happen to the individuals*
- *Start right away with some stories of workplace accidents. It may make people pay more attention and hopefully they will retain more of the info and apply it better.*
- *Power point should have more videos and more interaction with students, instead of lecturer*
- *Learners giving their own site-specific input to the class.*

Theme: “Integrate practical and theoretical”

- Training provider (6.5%)

Description: Comments by training providers remarking on the similarity of topics in the practical and theoretical modules; and their preference to deliver them together rather than separately.

Quotes (training provider):

- *I sometimes think that the manner in which the course is designed (theoretical + practical) works well if you're looking at it from the perspective of wanting to do a blended style of training. But this does not flow well if you're trying to do an instructor-led program. We want to blend more practical into the theory to keep the course flow more engaging from an adult learning perspective.*
- *We introduce anchors, fall arrest, travel restraint and fall protection in theory component but don't really describe what it is. You then have to wait 2.5 hours until practical part to demonstrate to learners what each of these is. They should be explained what each of these items is in the theory.*
- *A lot of duplication in the program, for example theory and practical, warning methods and physical barriers are essentially duplicated...So we don't have to talk about it in two components, not too many people take the course just to go through theory portion.*

Catagory: "Content - General"

Theme: "Sector/trade specificity"

- Training provider (19.4%)
- Learner (8.8%)

Description: Comments about training for a larger variety of or different type of setting than building construction (e.g. shafts, trenches, maintenance using stepladders). Suggestions to add or adapt modules for industrial sectors (e.g. arborists, utility workers).

Quotes (training provider):

- *It needs to be trade-specific, because if you have 8 roofers and 4 electricians in your classroom, it's very, very different. The program is very standard, and it doesn't focus on reality, really. Needs to be more specific to actual trade. Hazards are very, very different (falling but to the degree of trade, it changes), the program is way too generic for what these workers actually do need.*
- *For some of them, it's not specific to their working situation...We would like to see the MOL going into other sectors, ie: industrial sector (manufacturing, warehousing, where they are using scissor lifts, order pickers, etc.). It's great that they are focusing on construction, but there are still lots of accidents taking place in other sectors. They definitely need more training, and training should be mandatory for them like it is construction. It should be everywhere where they are working at heights and need to better understand how to keep safe and what their responsibilities are.*
- *It's too general, especially for roofers, arborists and utility workers because their hazards and risks are greater, they already do more safety training anyway. For example, arborists do not have an engineered anchor point, so there is not enough material in the*

course that discusses that - other than the fact that they must be tied off. So there should be more industry-specific information.

- *I think that in Ontario, the gap between construction and industrial sector needs to be closed (for training). We have students that operate in both sectors but because current WAH Standard does not apply to industrial sector workers - it puts their taking the course into an interesting paradox. The course content is not clear about how that individual can transfer from one sector to another. It helps construction industry but not those in other sectors. It would be a strong benefit to push WAH into industrial sector.*
- *Our workers fall under construction regulations for a few rare jobs (ie: installing AC units, replacing light fixtures in room) and will never actually be doing any of the things that we're required to teach them in the course.*
- *The major gap is that this is ONLY for construction projects. However, the exact same principles and conditions apply in industrial and mining. There is no need to adapt this to the other industries, MOL just needs to enforce this in other industries. The same workers / trade union folks work in construction, industrial, and the mines. But requirements are different. Very confusing for those who work across various industries, which as a contractor, many if not most do cross over the three industries. No good reason whatsoever that WAH standard doesn't apply across the board. Everyone deserves to have the knowledge and skills to work safe regardless of the type of establishment they work in.*

Quotes (learner):

- *I visit many sites in a day of work so I do a hazard awareness assessment at each location that i go too. Most of the training seems to address work sites where workers are actually performing tasks for long periods of time.at one location. There could be more examples of assessing hazards at different types of construction sites. Working in pits, shafts and places where a worker could fall down shafts or off ladder ways into underground electrical chambers.*
- *More specific courses to those who don't use lanyards and harness etc.*
- *If there was job-specific training. I am an electrician and most of what I learn does not affect me. Would have been nice to learn more about ladders then we did.*
- *It would be nice if it was modified for other types of construction, not just from buildings. I am often working at heights due to large excavations/trenches/shafts/etc. and it is sometimes difficult to apply the training as the majority of demonstrations/videos/discussions/examples/etc. is all geared to buildings.*
- *Add training specific to engineers & architects who go to site less frequently for field reviews & inspections.*

Theme: "Simplify content"

- Training provider (12.9%)

Description: Comments by training providers about content being too complex and/or repetitive. Suggestions to get rid of technical jargon and/or eliminate redundant information.

Quotes (training provider):

- *Too much information...They talk too much in detail for the program... but some areas are a little repetitive, some of it too much, that's the feedback from people. It's a bit overwhelming...People can only focus for so long, and then then they don't remember it...too much detail for the group is what we deal with.*
- *1) They should reduce the technical jargon in the course; 2) Units used in examples are kilonewtons (kN) which nobody uses in the construction sector, can confuse the learners (they are used to pound-force); 3) Some learning objectives require that learners remember the exact angle of an anchorage point. This is testing for memory - more useful to emphasize the importance of anchor points when testing them. Concepts should be approachable and relevant to them.*
- *They need to keep it simple. Many of the learners do not want to read/write, that's why they got into construction in first place.*
- *Sometimes it includes too many things for them. It is good to know about the hazards, but there may be too much information about the hierarchy of controls. There should still be a hazard assessment, but they could take out some of the hierarchy information.*
- *English is poor, so they don't have a clue about when you say, 'hierarchy of controls. That is frustrating. Who uses that kind of terminology on the job? Only a safety trainer and HR.*

Theme: “Content updates”

- Training provider (6.5%)

Description: Comments about the need for the curriculum to reflect new technology and/or updates for CSA standards or OHS legislation.

Quotes (training provider):

- *My only disappointment and frustration with the WAH is the lack of communication between the MOL and delivery agents. There is a huge gap between what the MOL is asking for, the CSA standards, and what a trainer can do. There have been inconsistencies and confusion with the equipment that the MOL is asking for in the practical component in the training and what is available in the market. For example, the CSA guidelines say that you cannot tie a knot in a lifeline, but the course we followed through the <training provider> required tying a knot. This was fine with the MOL that year, but we are not allowed to do so this year. This is a clear example of bureaucracy, no direction or options for us. We are left out to hang.*
- *They don't seem to understand that there's a lot of new technology out there, and there should be more examples of this in course. Even after taking the course, learners are*

just stuck in basic tool steps. It helps to have greater differentiation between basics and what else there is to learn.

Category: “Program-level issues”

Theme: “Flexibility”

- Training provider (17.7%)

Description: Comments suggesting for greater flexibility for trainers to adapt course based on class demographics (e.g. adjust modules based on skill-sets/sectors of learners, shorter practical component for small-sized classes).

Quotes (training provider):

- *I am bound by time. You have to keep learners for 6.5 hours no matter what. But if you only have a class of 3-4, it's very hard to stretch that class out for so long. Writing the test does not take an hour, marking it does not take an hour. If you have smaller classes, you should be able to do it on a needs basis because these are journeymen. It would be different if you had all apprentices, then it would make sense. We ask them to do equipment (practical) several times to fill time. That's when they get upset, not because of pass/fail.*
- *They should allow trainers to evaluate the skill-set of the learners and tailor the course to that. (ie: a guy who uses harness everyday needs different kind of training from someone who will only use it 3x per year).*
- *What happens is there are different types of learners out there in the industry now, that the course, as much as they wanted to make it an adult learning format, it doesn't fit these people being trained. The course is not flexible, e.g. roofers do not use guardrails on residential houses, yet they have to go and understand how to use guardrails. The training cannot be flexible, it is sort of cut and dry that you have use the standard and that's it.*
- *Ministry requires rope grabs, however 99% of our customers don't use it, but we still have to cover it. Formerly we would do a needs assessment, and deliver based on what the customer required, now we have to cover it based on what the MOL says, which is silly.*
- *They are just looking at if we are following the program content, but if you're dealing with different ethnicities, language barriers, and learning disabilities, you have got to put it in a fashion they will understand. I may not read exactly what's on the screen, but I am going to cover the topic, there needs to be more flexibility there.*

Theme: “Managers/supervisors”

- Training provider (11.3%)

Description: Comments about supervisors/managers taking or being required to take the training course. Suggestions to add modules geared towards owners and management/supervisors.

Quotes (training provider):

- *I think there should be a course that supervisors have to take so they understand more when they are on the jobsite. There is nothing for them right now. They take courses as learners, as employees. There should be more in depth courses for supervisors so they understand legislation more, and they can be on the ball at the jobsite to tell workers if their harness is correct, etc.*
- *The MOL should make mandatory training for company owners, CEOs and general managers, i.e. for rescue plans, workers are coming in not know there is a requirement for written rescue plan--we have to educate our top people at the organizations, they are the one setting budgets, they have to have budget for health and safety, the worker having to tell the employer usually doesn't work very well. We have got to educate the management, most of the management don't take the courses, they send their front-line workers, they should take the course.*
- *The supervisors and owners of the companies are not being trained. The supervisors don't understand their responsibilities. The purchasers are not trained and purchasing wrong equipment. Everyone involved in working at heights should be trained whether from administrative viewpoint or supervisor, that's the gap.*
- *Many times, we are not speaking to the right audience. The workers that leave the courses leave with high level of understanding on how to keep themselves safe, they know about the different types of lanyards they need to keep themselves safe. However, the employers don't always comply. They say they don't have the equipment, and won't buy it. So the worker knows the equipment he needs to be safe, but cannot do anything about it when it's not available. Sometimes, a rescue plan for workers is not set in place by employer either. The problem is implementation, which won't happen until we get the right people on board [taking the course]. There needs to be a shorter (half or one-day) focusing on equipment and situation-specific guidelines for employers. The employers sometimes do not know what their responsibilities are, or the impacts of their responsibilities, and the workers have nowhere to turn*

Appendix W: Suggestions for improving the training provider standard

During administration of the training provider survey, participants were read a preamble: “We’ve been talking so far about the WAH training program standard. There is also the WAH training provider standard to consider. It outlines the requirements for training providers seeking approval from the Chief Prevention Officer to deliver an approved working at heights training program.” They were then asked, “Would you have any suggestions on how the training provider standard might be improved?”

Of the 87 individuals posed this question, 66 provided a response. Analysis of those responses identified several themes, which are summarized in the table below for themes found in 10% or more of responses. This is followed by each theme’s description and illustrative quotes.

Theme Sub-theme	No. of references	% of total (n = 66)
Improve Quality Management	29	43.9
<i>Purchased program quality</i>	11	16.7
<i>Enhance/ensure instructor quality</i>	8	12.1
Positive Comment(s)	17	25.8
Ease Application Process	15	22.7
Improve Assessment Process of Training Providers	8	12.1

Theme: “Improve Quality Management” (44%)

Description: Suggestions to the MOL that the quality management (QM) of training providers by the MOL should be improved to ensure other training providers are up to the standard (i.e. duration of training, carrying/wearing all the gear, quality of trainers). Also includes sub-themes “Purchased Program Quality” and “Enhance/ensure Instructor Quality”.

Quotes:

- *Too many people teaching the course. Right now, the way they [MOL] have set it up -- they have "whored" it out. It ranges from a guy in a truck selling it for 75 bucks to \$300 -- there is no continuity. There are some people teaching it that don't even wear the gear.*
- *They could expand on the code of ethics. We've been in business a long time and aware of our competitors cutting corners, out and out ignoring the standard by playing with the time frame and things like that. If they could firm up the code of ethics and find a way of enforcement of such.*

- *I hear horror stories about people not delivering the course properly, e.g. someone came in and trained for 15 minutes and issued certificates to the learners -- this was from an MOL-approved provider, and after the MOL had done an inspection. There needs to be more enforcement.*
- *Just that it should be enforced, huge amounts of companies are doing the program in 3-4 hours, and multiple instructors are carrying hardly any gear. We get reports on this routinely.*

Sub-theme: “Purchased Program Quality” (17%)

Description: Further suggestions that the MOL should improve their quality management of the programs purchased by licensees.

Quotes:

- *There are MANY providers in Ontario who license existing certified programs from other organizations. Those licensees are NOT audited as they are supposed to be. There are countless stories from our own clients who describe WAH sessions carried out with approved material in hotel rooms without even close to the minimum amount of equipment present. Or providers who obviously do not have experience and are only going off of the licensed material but can not answer real world questions. Licensing the WAH material is creating the exact opposite effect that the standard was trying to achieve when the licensees are not audited and held to the same level of performance as the original developer of the WAH program. I've had multiple clients tell me they refuse to use any licensed provider as they have witnessed extremely poor delivery as such and don't want their workers to be injured due to the lack of quality training.*
- *Third party trainers rent out their programs from other companies but are not necessarily scrutinized enough by those who sell the programs (why would they if they're being paid for it?). I personally know of employers and unions doing 4-hour classes, using approved programs. So even though someone has an approved program, they are not necessarily good quality. Everyone who delivers training should be approved, regardless of who they bought the program from.*
- *There seems to be a lot of licensing of materials in the industry, and I'm not always sure that quality assurance of training programs is as thorough as it should be. We are seeing \$89 5-hour WAH courses online for our neighbourhood. How can you possibly do course in 5 hours when it's mandated to be 6.5 hours? I don't know if MOL is aware that the number of training providers has grown exponentially, and I don't know if audits are being done. Do organizations who sell their program monitor the companies they sell their programs to? They should have to do that. If they license the program, they should have to audit. This is a huge gap and nobody anticipated that when*

people lease their curriculum (do not hire their own trainers), there would be great need for quality assurance audits. The overall MOL audit quality is fine.

- *For the ones that are piggybacking off others (e.g. purchased from <training provider>), some of them are delivering the course in 2-3 hours. But because they are with the <training provider> [purchased from them], they get away with it because there's no enforcement.*
- *The only thing I would maybe recommend, is that anyone purchasing it from an approved provider, there should be more restrictions on that, through the application. During the approval process, there is not a lot that has to be mentioned, there was not a lot asked about it, how are they tracking it--our program is just a [name] program, you have to be a [name] instructor to provide it--but what is the quality assurance process for those/third party who purchase the program? It should be written in the application, are you going to be doing this, and if so, have them/it written out and stated, and have policies and procedures in place, and what are your policies and procedures.*

Sub-theme: “Enhance/ensure Instructor Quality” (12%)

Description: Suggestions to the MOL to ensure instructors/trainers of the WAH training program are qualified trainers who are experienced in the field.

Quotes:

- *1) ...verifying instructors do have necessary work-related experience to be qualified to train; 2) If I add new trainers, the MOL is not checking up to make sure those trainers are competent.*
- *They should set a criteria for the years of experience and certification qualification for a trainer to teach the course. There are some providers that do the course in a couple of hours and the trainers have zero background or qualifications in training.*
- *People that are training should have proper liability and errors omission insurance. There should be some level of qualifications, e.g. 5 years of training experience. The problem is that lots of companies that rent out forklifts, etc. -- their guys are fixing forklifts one day and then teaching WAH the next day, they are not WAH specialists. On the MOL website, there are A/C guys, roof sellers, anybody can go and buy the course from <training provider>, pay the fee and then they are trainers. It's a dog's breakfast. Just because someone is doing WAH training does not mean they are experienced. Our learners sometimes complain that our training is so different. And just because an organization has an approved course, it does not mean everybody should be allowed to train it.*
- *I personally will check to see if my instructors have good listening and people skills (we do not sell our program). <Training provider> simply sells their goods*

and does not take responsibility for it after. I don't think <training provider> or MOL is judging these third party providers.

Theme: “Positive Comment(s)” (26%)

Description: Positive comment(s) from the training provider agreeing with the WAH training provider standard requirements.

Quotes:

- *I thought the person [from the MOL] who did my evaluation was excellent. She pointed out some things about material or delivery that I never thought of. I would like to teach a future class again with MOL evaluator present without being officially evaluated... I would like someone to just observe and provide feedback.*
- *The MOL provided an individual support worker, so if I have problems, I can go to them, this is an improvement they made recently. I like the idea of having the same person to talk about our problems and issues each time, good to have that consistency.*
- *I've gone through the process a couple times (I've assisted others doing it), pretty thorough, organized way to do it.*
- *We went through the application as necessary, turn around time was pretty quick, no complaints there.*
- *I think it's good the MOL is enforcing the standard, and it's consistent across the province. It has moved some of the fly-by-night providers, the ones who try to do the training as short as possible to keep the cost down, which hasn't been good in getting the learners to come out with behavioural changes. It has standardized the training. The policing of providers is stricter for the WAH program.*

Theme: “Ease Application Process” (23%)

Description: Suggestions to the MOL to ease the application process, for example, reduce the duration of the application process, make guidelines clearer, and make more user-friendly. Also includes sub-themes “Clearer Guidelines” and “More User Friendly”.

Quotes:

- *...what they asked us to go through to be an approved provider was over the top, and ridiculous. It took well over a year to get approved, that's ridiculous.*
- *Horrible system. We basically have to recreate the entire program in the application. I've never seen anything as bad as that. It needs to be more user friendly for the training providers.*
- *Once it is submitted, you receive a review and action plan - this tells you what the issues/problems are in your submission form. All we had were a few minor errors but because of those, the timeline was pushed back months. We had to fix the errors, and*

we had to get another application form and do the process all over again, and then had to wait for months to hear back.

- *It definitely needs more definitive language. For example, "Other information as required". What is all other information?*
- *The wording of training provider standard is very technical - the language should be more simple and easier to understand.*
- *Initial process - it wasn't without headaches - too much technology for me.*

Theme: "Improve Assessment Process of Training Providers" (12%)

Description: Suggestions to the MOL to improve the quality of the assessment of training providers, particularly with regard to consistency.

Quotes:

- *The other thing is consistency. When we had our program approved, our assessor was much stricter and detailed than assessors for some of these other companies. The exact same program was not approved by the assessors when we submitted our application. Every assessor has different ideas, there is no consistency in the assessment. This is a big concern.*
- *Some of the feedback I had, when I did the practical assessment, if it's in the program or on the slide, you have to cover it, it has to be mentioned, and quite frankly that is just death by PowerPoint. The assessors, what is their background? I'm pretty sure a couple of the ones I was involved with hadn't trained anyone before, and don't understand principles of adult training.*

Appendix X: Suggestions for improving administrative processes

Training providers were asked in the survey, “Beyond what we have already discussed, do you have any suggestions of how the MOL could further improve the administrative processes surrounding the WAH program?”

Of the 87 individuals posed this question, 85 provided a response. Analysis of those responses identified several themes, which are summarized in the table below: This is followed by each theme’s description and illustrative quotes (for themes found in 5% of respondents or more).

Theme	No.	% of total
<i>Sub-theme</i>	<i>of references</i>	<i>(n = 85)</i>
Ease Administrative Burden	62	72.9
<i>Ease Learner Record Submission</i>	54	63.5
<i>Minimize Lost Records</i>	8	9.4
<i>More Time for Submission</i>	7	8.2
Improve MOL Timeliness	16	18.8
<i>Reduce Wait for Learner Cards</i>	12	14.1
Positive Comment(s)	12	14.1
Improve MOL Communication	9	10.6
Information Tracking System/Access to Learners IDs	8	9.4
Easier Course Changes	5	5.9

Theme: “Ease Administrative Burden” (73%)

Description: Recommendations to ease the administrative burden on training providers by simplifying the processes of submitting information to the MOL, (e.g. reduce data entry). Also includes sub-themes “Ease Learner Record Submission”, “Minimize Lost Records”, “More Time for Submission”, and “Ease Annual Reporting”.

Quotes:

- *Reduce the paper burden. The amount of paper we have to produce is disproportionate to the rest of our business, we have had times we've discussed not doing it anymore because of it. The amount of money we make from it, it's not friendly to revenue, if it costs us more to do the paper work than the training.*
- *The entire administrative process (all aspects, not just record submission) is overwhelming. MOL can use a product called SKILLSPASS ONLINE, it is an easy software to use for record keeping, and it would be easy to submit records through this portal - and it would take away burden of filling everything out 2-3 times...MOL is*

disconnected from modern technology. MOL expects training providers to send everything by mail, it's very costly to do this...

- *Stop screwing around with year end reports, tell me what you want and don't keep changing it. The information from year one didn't apply when you go out to fill out the report. They changed what they want the next year. This new computer program for the year-end reports, sounds like they're going to change it again. I just want to know what they want at the beginning of the year, not at the end.*

Sub-theme: “Ease Learner Record Submission” (64%)

Description: Suggestions to ease the learner record submission process by continuing to implement an online submission system for learners' records; to reduce the use of USB keys, thus reducing the cost of the USB keys and of couriering them; and to reduce the paperwork burden.

Quotes:

- *They are moving to a cloud-based storage system which is great. Having to send one USB stick per class is ridiculous because we're not allowed to stick several classes in one stick.*
- *The big one right now which I think is very onerous is having to submit original consent forms and having to fill out locked PDF documents. This is an archaic process. It's very time-consuming, it does not allow us to be efficient or leverage technology which our company has had in place for a long time. This is not a very user-friendly experience from the provider's standpoint.*
- *If I could upload the info and cut down on Purolator costs and jump-drive costs for the management of the information, that seems to be very cumbersome issue, those reports within 5 business days.*

Sub-theme: “Minimize Lost Records” (9%)

Description: Comments about submissions to the MOL being lost.

Quotes:

- *The information for one class was lost/forgotten about. This was devastating for these learners because they spent 8 hours in training and did not have a training certificate for the job site. The MOL then asked us to re-send the information.*
- *Even some of the ones I have sent, have been lost, have not been even processed. I think it would help if we emailed it, that way we have proof it was emailed, especially if there were multiple courses in one package.*

- *I don't understand why we can't email or upload. And then they tell us its our fault they lost the class from <year>, and then we are spending hours looking for it when they lost it.*
- *... we know we put the memory stick in there, but they lost it. We don't mind sending the stuff to them, but it has to flow nicer.*

Sub-theme: “More Time for Submission” (8%)

Description: Comments about allowing more time for learners' records to be submitted.

Quotes:

- *The timing of submissions for documents is awful. We have to submit documents immediately but then the MOL takes a very long time to return cards. We don't even know when to expect it back. They don't reciprocate timeliness.*
- *I currently have 5 business days to submit information to the Ministry. ... that seems to be a very cumbersome issue...*

Theme: “Improve MOL Timeliness” (19%)

Description: Recommendations to the MOL to improve timeliness, including approval for the program and program changes. Also includes sub-theme “Reduce Wait for Learner Cards”.

Quotes:

- *... they are just now processing classes from four months before.*
- *The [course] review process should be expediated, its not fair to providers or to learners. I could not train anybody for months and had to turn business away, this included repeat customers. My business suffered.*

Sub-theme: “Reduce Wait for Learner Cards” (14%)

Description: Comments that it takes too long for learners to get their cards from the MOL.

Quotes:

- *It takes 6-8 months after we have submitted information to get the certificates from the MOL.*
- *Some of our students did not receive their cards until 3-4 months after the course.*

- *...they're supposed to have their cards by 3-6 weeks, some of them haven't received their cards in a year, but I have to get their information in within 7 days. I get so many calls about their cards...*
- *They could be a little better on the paper work side of it. The turn around right now, we have to have our paper work done in 7 days, but it's taking them 8-11 months to get the cards out.*
- *The only complaint we tend to get is about the time frame between doing courses and receiving learners' cards. Some are taking 6-9 months to get.*

Theme: “Positive Comment(s)” (14%)

Description: Positive comments about the MOL, including areas where there has been improvement.

Quotes:

- *I think they're already moving in that direction, making reporting info about learners easier, and having someone [at MOL] to support to you.*
- *MOL is doing a great job. They are approachable and prompt and send a contact person to me when we have questions. This is very helpful.*
- *They've already done several things. 1.) Bringing in Blue drop, I have my suspicions if it will be better, but it's better than now, mailing everything now is just tedious. They're not getting everything in on time, but they're working in it. 2.) They have actually given each of us providers a direct contact to call or email to, which is really nice. I have someone for whom I actually know their name. Now I have an answer in 5 minutes, before it took a few days. They're getting there, they're really making some serious efforts to solve this.*
- *I know they're working on stuff and I can see positive changes already. They're better at communication than other organizations (i.e. WSIB), and even when this program started, there was very little communication. The manager now, Richard, is very good at keeping us up to date and what is going on, even if we don't like what is going on.*
- *They are working on a new system of submitting worker records -- so that is a good step. We'll see how that works, though it's been a slow process. They have been talking to us about things, so that's good. They're good at answering questions and getting back to us. They're doing an ok job, 7/10.*

Theme: “Improve MOL Communication” (11%)

Description: Recommendations to the MOL to improve their communication with training providers (e.g. a contact person at the MOL), employers and learners (e.g. regarding the clarity of credentials, learners' cards, whether learners need the full course or the refresher); including more specific feedback/suggestions to providers during the application process.

Quotes:

- *I get so many calls about their cards, and these workers cannot call the MOL during the day because they are working and don't have their cell phones...*
- *I just find that people don't know about the WAH training; they don't know that they need it [WAH] or need the refresher. We had students in our class sitting there for 6 hours who only needed refresher course. Learners don't seem to know much about it, other than they need it. Government did not do a good job of marketing. Those learners had called the MOL and apparently were told they had to take the program again, this may have been miscommunication.*
- *When they are checking the submissions, they are looking for specific words but are not allowed to give any advice, e.g. if you don't understand what they are asking for, they are not allowed to guide us. They will only tell us after submission. They should clarify and help us during the submission process.*
- *MOL should improve their communication [with training companies]. I have never had someone from the MOL contact me to ask me how things are going. There will be an email once in a while or an invite to a conference call, but no direct communication. There should be a direct line to contact someone at the MOL for training providers, emails take too long (usually 3 days) when I need answers immediately. I have to call the regular 1-877 number and then be transferred and hope that someone speaks to me. Improved access [to MOL] would improve everything down the line as well.*

Theme: “Information Tracking System/Access to Learners IDs” (9%)

Description: Recommendations including to improve or create a tracking system for information submitted to the MOL, particularly learner records, and to provide access to learners' ID numbers to training providers, in case learners lose them, and to improve follow up on refresher courses.

Quotes:

- *Yes, we are starting a refresh process already, and our employees are getting letters they don't have the initial training. It is a mess up in how they are linking the initial course to the refresh course, it is extra work for us and the MOL.*
- *We as training providers can't receive learner ID numbers directly from the Ministry for privacy concerns, so administratively it would be much easier to receive that from the Ministry directly for refresher courses. Also, the cards, recertification is an issue, student's will call in for recertification, if they lost their Ministry of Labour card, they have to get that from the MOL, even though we train them. It's the recertification process that's going to be a huge burden for the provider, because the learner would not care about the card until they need to recertify. We can't get learner ID numbers from the MOL. This causes issues with recertification. Employers used to be able to get it, but they're not*

allowed anymore on behalf of the employee, and the MOL said no. Admin-wise, trying to get the learners' IDs, is a pain.

- *I don't think the MOL thought about what we should do when learners lose their cards. Many lose their cards instantly. With the older program, we would have to mail out cards to them but with the WAH course, I don't have any control over the cards. With the refresher course coming up now, I need their ID numbers to contact them, but if they don't have their cards, they don't have their IDs. About 3% of the workers can put their hands on the card the moment you ask for them. The employers for these workers don't have the IDs because the cards are mailed directly to the house, and they didn't have the foresight to think to create a tracking system. I cannot get their information as a third party, even though I know they signed up for a refresher course. I can't sign them up without their IDs, it's been a disaster. Suggestion: Once the MOL sends out the cards to the workers, they could do a follow-up with the training provider and provide them just the IDs so we can track them. This way, when I contact them for the refresher course, I already have the IDs, and the worker doesn't have to worry about it.*
- *There should also be a method for approved training providers' administration to check for refresher course material. Often, people lose their cards or are not familiar that they need their MOL learners' ID for refresher course. So if there was a way we could check for that and have access to IDs and their expiration dates before an upcoming course, it would be beneficial.*

Theme: "Easier Course Changes" (6%)

Description: Comments about how the process of changing course content could be easier, including the communication about changes from MOL, more timely review times by MOL, and more flexibility after approval.

Quotes:

- *With new standards coming out, it would be nice to get an email ahead of time requesting changes to be made to program instead of waiting for end of year and then having to catch up on a list of changes. Doing it as we go takes less time.*
- *One of my main issues is the amount of permission we need to change anything in our program. They went over the program with us, we presented it to them. At this point, if we want to change something, as long as it maintains the training standard-we should be trusted at this point. We've been teaching the course for a long time, the original course included videos and we want to change those videos. But should we leave it as it is because the process to change it is too tedious/daunting.*

Appendix Y: Supplementary interview with an industrial sector association

As described in Appendix D, researchers were contacted by an industrial sector association near the end of the evaluation's data collection. A telephone interview with several of the association's representatives was arranged. Below is a summary of the content of the interview.

- Representatives were from large companies in the industrial (non-construction) sector
- Their organizations have sophisticated systems in place to manage OHS. OHS risks to workers are systematically identified and addressed, including falls from heights risks. Accordingly, prior to the introduction of the WAH regulations, workers were already receiving training to prevent falls from heights. The training was high quality and tailored to the workers' individual needs.
- Large numbers of workers from these companies underwent the WAH training, because some of their activities fall under the Construction Projects regulation.
- The WAH training was regarded as wasteful because:
 - People were trained already to prevent them from falling from heights
 - People were trained in the WAH training to use equipment they would never use
 - Some WAH training duplicated other training the employees did (e.g. rights and responsibilities, ladder training)
- The perceived impact was that:
 - Costs to the organization were increased with the uptake of WAH training, with no additional benefit to preventing falls
 - Limited training resources were diverted away from addressing more important workplace hazards; some hazards were therefore addressed using only on the job training rather than formal training
 - Limited training resources were diverted away from other priorities, such training for quality systems, making the organizations less competitive
- Representatives thought that the "broad brush" and prescriptive approach taken with WAH might be appropriate for the construction sector or for smaller businesses, but not for large companies in the industrial sector with mature OHS systems. They believe that instead the MOL should allow for equivalencies or review existing programs and identify where enhancements should be made

Appendix Z: Non-response bias analysis

Introduction

Nonresponse bias threatens the validity of conclusions drawn from survey results. For this reason, those conducting surveys strive for high response rates. However, research has found that a low response rate does not *necessarily* result in a biased survey estimate (Groves, 2006; Sturgis et al., 2017). Rather, this arises only when the respective survey variable is correlated with the likelihood of responding to the survey. Any particular survey may yield some estimates that are biased and others that are not.

The WAH employer survey achieved a response rate of 15%, as determined with the method of Statistics Canada (2001) and summarized in Appendix Z.a. The low rate prompted an investigation of the potential for nonresponse bias using the method of “archival analysis.” In this method, non-survey variables, available for both respondents and nonrespondents and possibly related to the survey variable(s) of interest, are used to compare the two groups. This approach to nonresponse bias testing is one of three suggested by Lohr et al. (2016) and of nine suggested by Rogelberg and Stanton (2007).

From our data sources, described in more detail below, claim rate is the non-survey variable of primary interest. The assumption is that claim rate is an indicator of an organization’s OHS performance, which would in turn affect both its likelihood of responding to an OHS survey and its OHS practices, such as compliance with WAH regulations and WAH safety practices, measured in the survey. Claim rate data are available following a record-matching step.

Some other non-survey variables for comparing respondents and nonrespondents, including firm size, geographical location and industrial sector, are readily available from our data sources. However, these are of secondary interest to the nonresponse bias testing. Prior analyses of the survey data (reported in Interim report I) have shown these factors have little effect on either a firm’s compliance with the requirement for WAH training or on its report of the impact of training on WAH practices at the firm.

The nonresponse bias testing compares respondents (n = 390) with *active* nonrespondents (n = 218). The latter are those who decided not to participate in the survey at the point they were solicited. *Passive* nonrespondents¹ (n = 1,986) are therefore not included. This decision to exclude passive nonrespondents is based in part on resource considerations, since the record matching step associated with using the claim rate data is labour-intensive. It also stands to reason that active nonrespondents, relative to passive nonrespondents, would be more likely to

¹ Passive nonrespondents (n = 1,986) included phone not answered, n = 56*; reached voicemail, n = 862*; reached someone else in organization, but not targeted HS person, n = 897; respondent deferred past survey deadline, n = 167; and postponements during survey administration, n = 4. (The asterisked values have been adjusted already for those estimated to be out of scope, when following the methods in Statistics Canada (2001)).

differ from respondents with regards to OHS performance. Research by Rogelberg et al. (2003) on passive and active nonrespondents in employer attitude surveys supports such distinctions among nonrespondents.

Methods

Sample

The sample was comprised of the respondents (n = 390) and active nonrespondents (n = 218) in the WAH survey of employers. The relation of these survey sub-groups to the initial recruitment list of 3,043 firms is summarized in Appendix Z.a. Further details about the sample are provided in Appendix D.

Power calculation

An *a priori* power calculation, based on 390 respondents and 218 nonrespondents, showed that statistical power would be 66% and 100%, to detect effect sizes of 0.2 and 0.5, respectively, in a t-test of independent means.

Data sources, variables, and record matching

InfoCanada

InfoCanada records included name, physical address, phone number, firm size (5-19, 20-49, 50+ employees) and sector, among others. Sector was reported using 6-digit Standard Industry Classification system codes. Each company was assigned a single primary SIC codes and zero to six secondary SIC codes.

Compass

As part of the Province of Ontario's Open Data Directive, the Workplace and Safety Insurance Board (WSIB) created Compass to allow the public access to health and safety data. Each record in Compass contains yearly allowed claim rates by whether they involved lost time or not for the period 2012-2016, firm name (legal and business), firm size as categories of number of full-time equivalent employees, address (physical/account/ mailing), sector (industry, rate group(s), and classification unit(s)), Rate groups are groups of businesses defined by type of business activity based on the Standard Industry Classification system and/or activity risk; and at a finer level, there are classification units. In Construction there are 13 rate groups and 71 classification units.

Average claim rate variables were constructed from the Compass data using data for the most recent three years (2014, 2015 and 2016) for No Lost Time Allowed (NLTA) Claims, Lost Time Allowed (LTA) Claims and for a total of both types (NLTA+LTA).

Record matching

Respondent and active nonrespondent companies in the InfoCanada list were matched to firms in the Compass database to obtain claim rate information using the following variables:

1. Firm name

2. Firm address - for Compass, this can refer to the physical, mailing or account address; for infoCanada it is the physical address
3. Sector - for Compass, sector is reported as rate groups and classification units; for Info Canada, SIC codes

Respondents and active nonrespondents fared similarly through the matching process (Figure Z.1): 60.2% of respondents and 63.4% of active nonrespondents were fully matched; and 83.6% and 84.8 %, respectively, were either partially or fully matched.

Analysis

Outlier exclusion

Three outliers were removed from most analyses. All were large firms. One was a respondent with an average LTA claim rate falling at the 60.5 x IQR mark (798.6 per 1000 FTEs), while the other two were nonrespondents with average NLTA claim rate values falling slightly beyond the 9.8 IQR mark (608 and 672 per 1000 FTEs). The results of the matching process and outlier exclusion are depicted in Figure Z.2.

Logistic regression: modeling the probability of responding with claim rate as a predictor

Logistic regression was used to investigate whether claim rates impacted on a firm's decision to participate in the survey. Two regression models were fitted, one with 3-year average NLTA claim rate as a predictor (Model 1) and the other with 3-year average LTA claim rate as a predictor (Model 2). The following additional variables were controlled for in each of the two models:

- **Firm size** (number of employees): Small (5-19), Medium (20-49), Large (50+)
- **Geographical region**: First letter of postal code (Eastern Ontario (K), Central Ontario (L), Metropolitan Toronto (M), Southwestern Ontario (N), Northern Ontario (P))
- **Type of work** (2-digit SIC codes): Building Construction (General Contractors and Operative Builders), Heavy Construction except Building Construction, Specialty Trade Contractors, Others (not in construction).

For each of these models, the exponent of the estimated regression coefficient, or odds ratio, for claim rate tells us the impact of an increase of one additional claim per 1000 FTE on the probability of a firm to respond to the survey while holding firm size, region and type of work fixed.

Comparison of respondent and nonrespondent claim rates with size stratification

Ninety-five per cent confidence intervals (CIs) of the LTA, NLTA and total claim rate means, as well as of the corresponding mean differences in claim rates between respondents and nonrespondents were calculated by firm size (small, medium, and large). The non-parametric bootstrap method (using 1000 samples) was used for computing robust CIs. If the 95% confidence interval of the difference of means was found to contain zero, the null hypothesis of no difference in mean claim rates was accepted.

Results

Descriptive statistics of respondents and active nonrespondents

Compared to nonrespondents, respondents tended to be larger companies (i.e., 50+ employees; $p=0.0004$), more concentrated in Central and Northern Ontario ($p = 0.08$) and perform more work in Building Construction (as General Contractors) and in Heavy Construction ($p=0.03$) (Table Z.1).

Regarding claim rates, respondents showed somewhat higher mean values and higher variation than nonrespondents (Table Z.1), though their respective confidence intervals showed considerable overlap (Appendix Z.b).

Logistic regression: modeling the probability of responding with claim rate as a predictor

Model 1 (using 3-year average NLTA claim rate as a predictor)

Average NLTA claim rate did not have a significant effect on the probability of response ($p = 0.1689$). Firm size was the only explanatory variable that was found to have a significant effect, with large firms being 1.9 times more likely to respond to the survey compared to small firms ($p = 0.0024$). No significant effect of medium firms as compared to small firms was found.

Model 2 (using 3-year average LTA claim rate as a predictor)

Model 2 yielded similar findings with no significant effect of the average LTA claim rate on response probability (p -value = 0.2219). Firm size was again found to be important, with large firms being 2.0 times more likely to respond than small firms (p -value = 0.0014) and no difference found between medium and small firms.

Comparison of respondent and nonrespondent claim rates with size stratification

Given the importance of size to response status found through logistic regression, claim rate differences between respondents and nonrespondents were computed separately for the three sizes of firms. The mean differences and their corresponding 95% CIs are portrayed as bars in Figure Z.6. The CIs for all three sizes contain zero, and therefore, there is no evidence in the data to support the hypothesis that respondents and nonrespondents differ with respect to 3-year average claim rate.

Discussion and conclusion

We investigated the potential for nonresponse bias in the WAH employer survey. Two analytical approaches were used to assess whether the non-survey variable WSIB claim rate differed between responding and actively nonresponding companies. In one approach, claim rate was included as a predictor of response status in logistic regression. In the other, the mean values of LTA, NLTA and total claim rates in respondents and active nonrespondents were compared, after stratifying by three size groups. In both cases, statistical tests did not reveal differences. We conclude that there is no evidence of nonresponse bias in the survey estimates of compliance with WAH regulations and with changes in WAH practices.

However, there are several limitations to this analysis that should be noted. First, the “archival analysis” approach is considered to be only of quality level 2 in a ranking of nine methods of nonresponse bias testing where 1 = lower quality and 4 = higher quality (Rogelberg and Stanton, 2007). Second, claim rate is a relatively weak proxy for organizational OHS performance because of potential differences between responders and nonresponders in their reporting and management of worker injuries and thus claim rates. Third, statistical power was low for the comparison of means among medium-sized organizations. On the other hand, the logistic regression was well-powered. Finally, the analysis was limited to only active nonrespondents and did not include passive nonrespondents. However, active nonrespondents are of most concern, based on limited evidence from employee surveys (Rogelberg et al., 2003).

References to this Appendix

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Table Z.1: Description of respondents (n = 325) and active nonrespondents (n = 184), following matching and exclusion of outliers

Variables	Respondents		Non-respondents		Chi-Square
	n	%	n	%	
Region (first letter of postal code)					
Eastern Ontario	45	13.9	35	19.0	P=0.08
Central Ontario	141	43.4	66	35.9	
Metropolitan Toronto	39	12.0	24	13.0	
Southwestern Ontario	68	20.9	49	26.6	
Northern Ontario	32	9.9	10	5.4	
Size (no. of employees)	n	%	n	%	
5-19	169	52.0	113	61.4	
20-49	31	9.5	30	16.3	
50+	125	38.5	41	22.3	
Sector (2-digit SIC)	n	%	n	%	P=0.03
Building Construction – General Contractors and Operative Builders (15)	102	31.4	46	25.0	
Heavy Construction except Building (16)	39	12.0	11	6.0	
Specialty trade contractors (17)	179	55.1	123	66.9	
Other (Not Construction)	5	1.5	4	2.1	
WSIB claims per 1,000 FTE (2014-16)	median	IQR	median	IQR	
Lost-time Allowed	0	12.8	0	13.2	
No-lost-time Allowed	30.7	64.2	24.2	52.8	
Total (Lost- and No-lost-time)	41.8	75.2	36.4	69.9	
WSIB claims per 1,000 FTE (2014-16)	mean	s.d.	mean	s.d.	
Lost-time Allowed	14.0	34.4	11.2	20.5	
No-lost-time Allowed	42.5	50.0	35.9	45.3	
Total (Lost- and no-lost-time)	56.5	66.9	47.1	48.7	

Table Z.2: Results of logistic regression with response/nonresponse as dependent variable

Variable	Model 1 (NLTA ₂₀₁₄₋₂₀₁₆ predictor)				Model 2 (LTA ₂₀₁₄₋₂₀₁₆ predictor)			
	Estimate	SE	Pr > ChiSq	Exp(est)	Estimate	SE	Pr > ChiSq	Exp(est)
Claim Rate	0.3607	0.2622	0.1689	1.434	0.00443	0.00363	0.2219	1.004
Size								
Large	0.6567	0.2290	0.0041	1.928	0.7273	0.2270	0.0014	2.069
Medium	-0.3289	0.2948	0.2647	0.720	-0.2793	0.2924	0.3395	0.756
Small	0	-	-	-	0	-	-	-
Region								
Central Ontario	0.4233	0.2509	0.0916	1.527	0.3844	0.2477	0.1207	1.469
Eastern Ontario	-0.1612	0.3047	0.5968	0.851	-0.2005	0.3042	0.5097	0.818
Metropolitan Toronto	0.0683	0.3374	0.8395	1.071	0.00318	0.3326	0.9924	1.003
Northern Ontario	0.6217	0.4209	0.1397	1.862	0.6330	0.4203	0.1321	1.883
Southwestern Ontario	0	-	-	-	0	-	-	-
Sector								
Construction - Special Trade Contractors	-0.4188	0.2208	0.0579	0.658	-0.4068	0.2210	0.0657	0.666
Heavy Construction, Except Building	0.2943	0.3968	0.4583	1.342	0.2740	0.3970	0.4902	1.315
Other-Not in Construction	-0.8246	0.7162	0.2496	0.438	-0.8285	0.7164	0.2475	0.437
Building Construction General Contractors	0	-	-	-	0	-	-	-

Figures

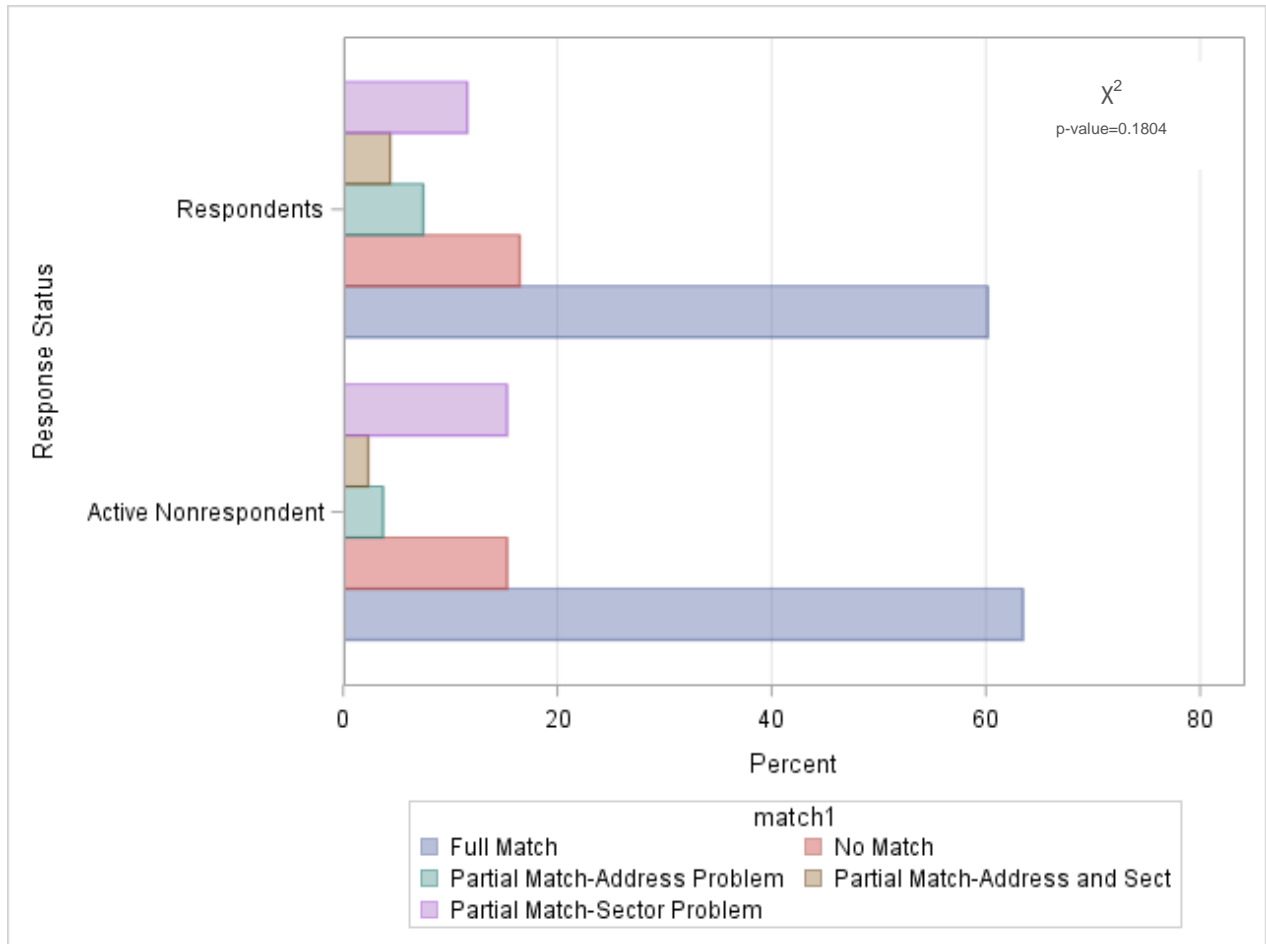


Figure Z.1: Results of the matching process for respondents (n = 390) and active nonrespondents (n = 218)

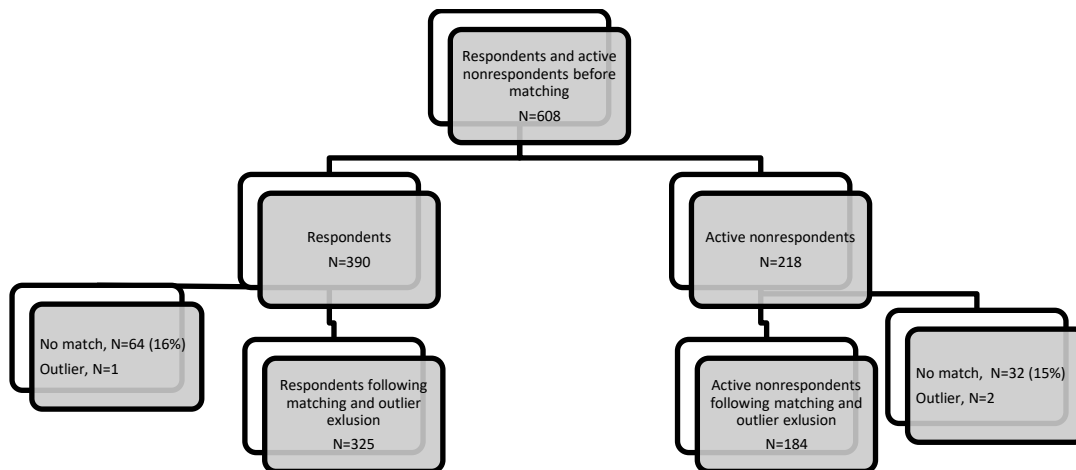


Figure Z.2: Analytic sample: results of the matching process and exclusion of outliers

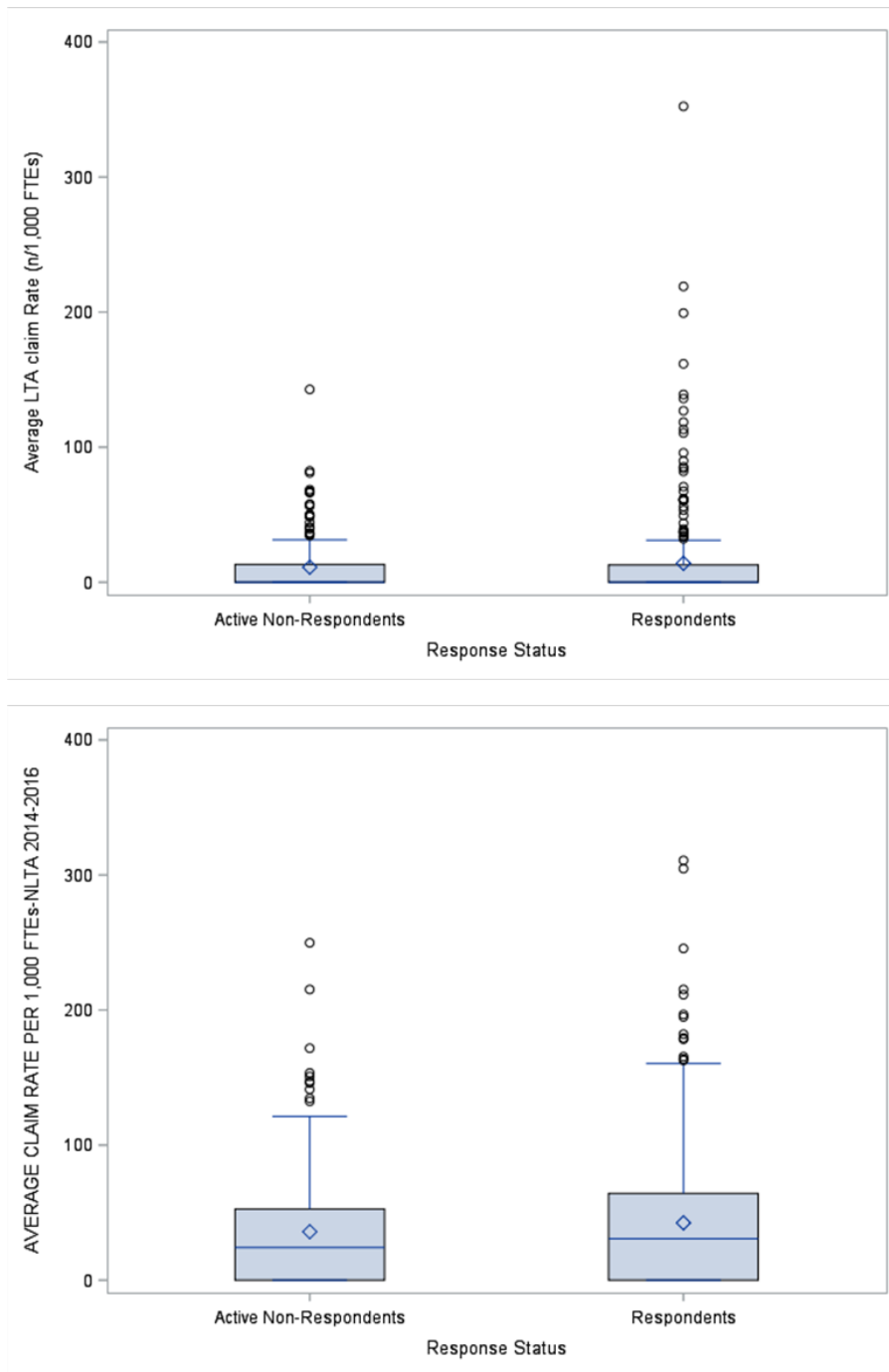


Figure Z.3: Boxplots of average LTA and NLTA claim rates for active nonrespondents and respondents (excluding outliers)

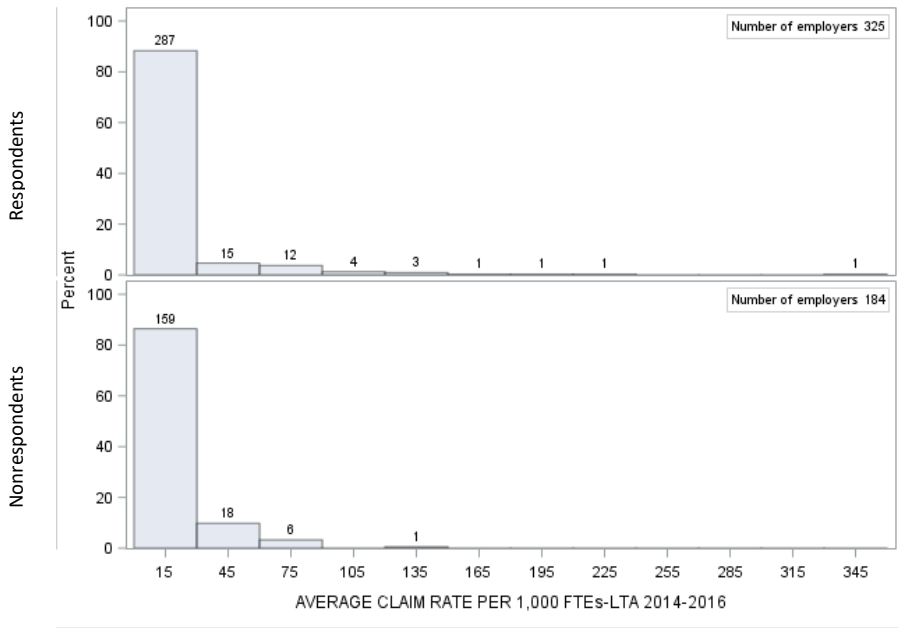


Figure Z.4: Histogram of average LTA claim rates for respondents and nonrespondents (excluding outliers)

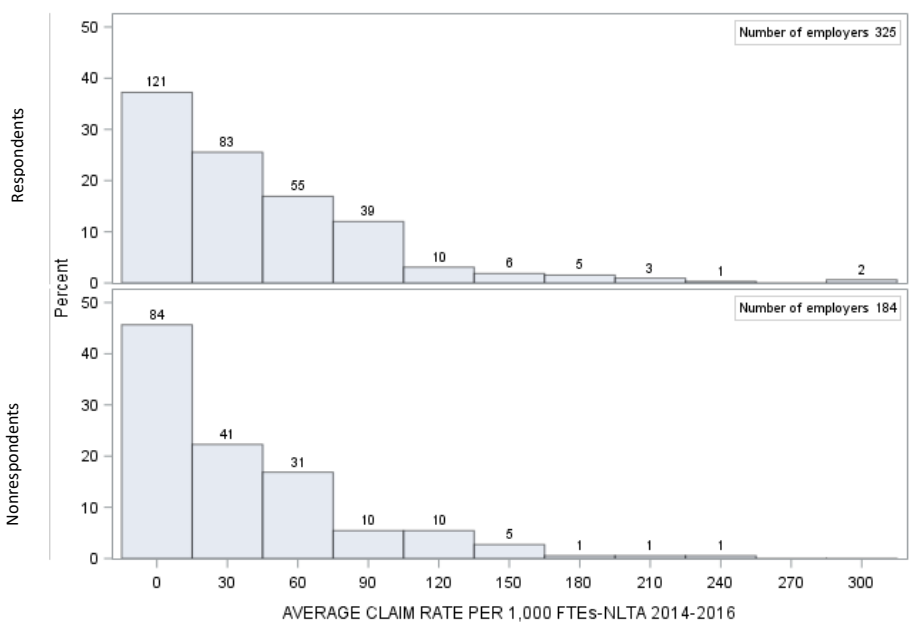
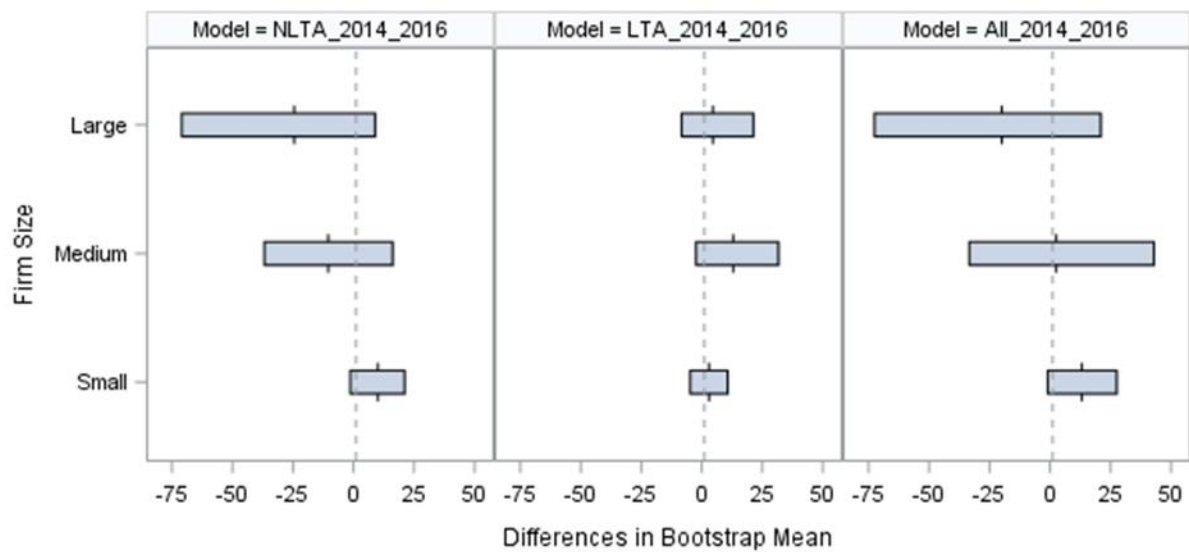


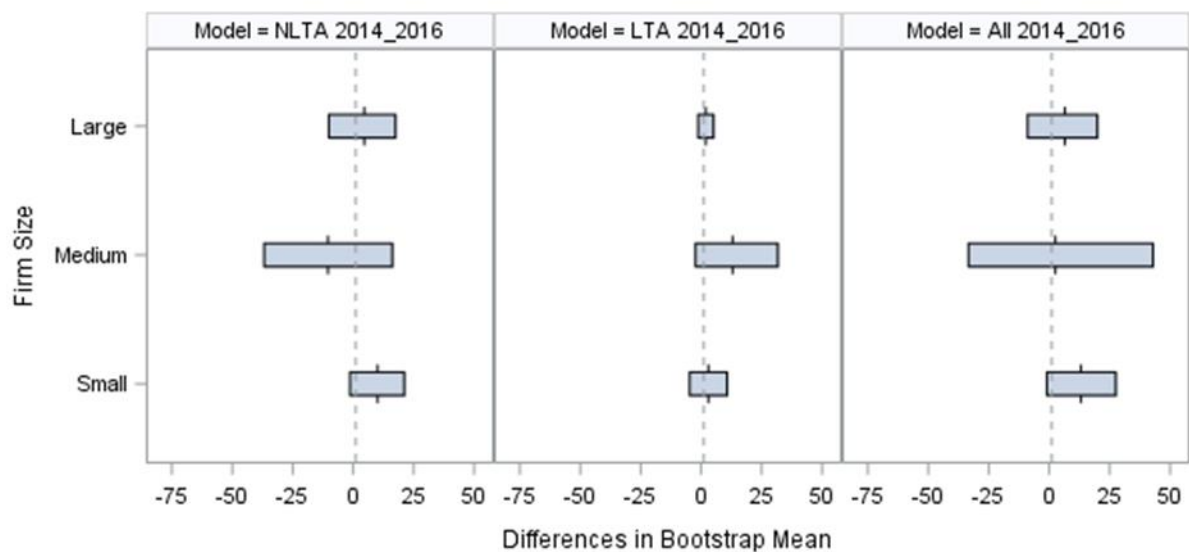
Figure Z.5: Histogram of average NLTA claim rates for respondents and nonrespondents (excluding outliers)

Figure Z.6: Respondent-nonrespondent differences in bootstrap mean claim rates, by size and claim type

a) Including outliers



b) Excluding outliers



Appendix Z.a

Calculation of Response Rate at the Estimation Phase

Method of Statistics Canada (2001) has been employed. Main font reflects source document terminology; italicized font gives explanation, using terminology from the employer survey

Total Number of Units (Box 1) – on recruitment list and attempted contact at least once	3043
Resolved Units	
In-Scope Units	
Responding Units	
Number of Unusable Responding Units – <i>Withdrawals</i> (Box 5A)	4
Number of Refusal Conversions (Box 6)	0
Number of Other Responding Units – <i>Completed interviews</i> (Box 7)	390
Total Number of Responding Units (Box 5 = Box 5A + 6 + 7)	394
Nonresponding Units	
Number of Refusals (Box 9)	218
Number of No Contacts – <i>Reached org'z'n, but not person with HS knowledge</i> (Box 10)	897
Number of Residual Nonresponding Units – <i>Target deferred past deadline</i> (Box 11)	167
Total Number of Nonresponding Units (Box 8 = Box 9 + 10 + 11)	1282
Number of In-Scope Units (Box 4 = Box 5 + 8)	1676
Out-of-Scope Units	
Number of Non-existent Units – <i>Number not in service</i> (Box 13)	73
Number of Temporary Out-of-Scope Units (Box 14)	0
Number of Permanently Out-of-Scope Units – <i>do not work on constr'n projects</i> (Box 15)	217
Number of Out-of-Scope Units (Box 12 = Box 13 + 14 + 15)	290
Number of Resolved Units (Box 2 = Box 4 + 12)	1966
Unresolved Units – no answer or voicemail message	1077
Estimated* Number of In-Scope Unresolved Units (Box 3A)	918
Estimated* Number of Out-of-Scope Unresolved Units (Box 3B)	159
Number of Unresolved Units (Box 3 = Box 3A + 3B)	1077
Total Number of Units (Verify that Box 1 = Box 2 + 3)	3043
<u>Calculation of Response Rate at the Estimation Phase</u>	
Total Number of Responding Units (Box 5 from above)	394
Number of Unusable Responding Units (Box 5A from above)	4
Responding Units at the Estimation Phase (Box 5 minus Box 5A)	390
Number of In-Scope Units (Box 4 from above)	1676
Estimated No. of In-Scope Unresolved Units (Box 3A from above)	918
In-Scope Units at the Estimation Phase (Box 4 plus Box 3A)	2594
Response Rate at the Estimation Phase ((Box 5 - 5A)/(Box 4 + 3A) = 390/2594)	15.0%

* Estimated based on proportion of in-scope/out-of-scope among resolved units

Appendix Z.b

Bootstrap mean and confidence intervals for respondents and active nonrespondents, by claim type, year(s), and type of record matching

		All Matches-Full and Partial											
Survey Response	N	NLTA/1,000 FTE'S				LTA/1,000 FTE'S				NLTA + LTA /1,000 FTE'S			
		2014	2015	2016	2014-2016	2014	2015	2016	2014-2016	2014	2015	2016	2014-2016
Respondents	325	44.9 38.0- 52.3	42.4 34.9- 50.8	40.0 33.0- 47.8	42.3 36.8- 47.8	10.6 7.5- 14.5	17.3 10.2-26.2	13.9 9.3- 18.9	13.9 10.5- 18.1	55.5 47.5- 64.3	59.4 48.5- 72.9	53.7 44.9- 63.8	56.2 49.3- 63.9
Active Non-respondents	184	34.9 25.9- 44.7	38.8 29.2-49.5	32.1 24.6- 39.6	35.4 29.0- 42.0	10.2 6.3- 14.6	13.2 8.5- 18.5	11.0 5.7- 17.7	11.5 8.7- 14.5	45.1 35.5- 55.9	52.0 41.5- 64.1	43.0 33.8- 53.0	46.7 39.8- 53.8
		Full Matches Only											
Respondents	291	46.3 38.1-54.5	45.0 35.6- 56.1	38.6 31.3- 47.3	43.3 36.8- 50.1	11.5 7.5- 16.9	14.1 9.4- 19.7	15.6 9.6- 22.5	13.7 10.1- 17.9	57.8 47.5-68.6	59.0 46.9- 72.9	54.2 43.6- 66.9	57.0 48.5- 66.6
Active Non-respondents	164	38.2 27.1- 50.3	43.0 30.7- 56.2	34.6 25.7- 44.1	38.6 30.7- 46.7	10.9 6.3- 16.2	13.1 8.1- 18.8	11.0 5.1- 19.3	11.7 8.4-15.3	49.1 36.9- 62.2	56.1 43.2- 70.6	45.6 34.8- 58.6	50.3 41.8- 58.4

Bootstrap means and confidence intervals based on 1000 bootstrap samples.

Appendix AA: Learner suggestions for improving safety when working at heights

Learners were asked in the 4-week post-training survey, “*What is the ONE most important thing that you recommend changing so that working at heights is safer for you?*” Of the 514 individuals posed this question, 294 provided an answer. Analysis identified several themes, which are summarized in the table below, for those with 3.0% or more of learners contributing to the theme: This is followed by each theme’s description and illustrative quotes.

Theme	No. of	
Sub-theme	references	% of total
Equipment	65	22.1
<i>Right</i>	21	7.1
<i>Better</i>	15	5.1
<i>More</i>	12	4.1
<i>Supplied by employer</i>	10	3.4
Training, generally	44	15.0
WAH course modification	30	10.2
Safety prioritization	22	7.5
Communication about WAH safety	18	6.1
Adherence	17	5.8
Ladder	14	4.8
Tie-off points	14	4.8
Supervision/leadership	13	4.4
Planning fall safety	13	4.4
Enforcement	11	3.7
Inspection	11	3.7
Guardrail	9	3.1
Buddy	9	3.1

Theme: “Equipment” (22.1%)

Description: Suggestions relating to equipment

Sub-theme: Better equipment (5.1%)

Description: Suggestions for better/newer equipment.

Comments:

- *More comfortable harness.*
- *New ropes.*
- *Parachute harness.*

Sub-theme: “More equipment” (4.1%)

Description: Having more equipment available.

Comments:

- *Personal harnesses instead of sharing.*
- *Proper equipment to be available at all times.*

Sub-theme: “Equipment supplied by employer” (3.4%)

Description: Suggestions about the need for employers to supply equipment to prevent falls.

Comments:

- *All companies provide safe PPE for employees.*
- *Companies to provide updated and fitted harnesses.*
- *When work on residences, we sometimes we have to find our own wooden planks on the site (to stand on). The company should provide metal planks to us instead.*

Theme: “Training, generally” (15.0%)

Description: Suggestions about more training; follow-up/reinforcement training; and knowledge gaps that could be fixed by training, though not specifically by modifying the WAH course.

Comments:

- *I would love to see online refreshers for those like me who don't use fall protection regularly.*
- *Not so much for me but for employees that work under me - increased education/awareness about job safety in general. You can't just hire people and throw them out on the job without experience/training and have expectations.*
- *Making sure that everyone has a good understanding of what they learned in the classroom.*

Theme: “WAH course modification” (10.2%)

Description: Comments about how the WAH course could be improved.

Comments from this theme are not included here because an in-depth treatment of this topic was undertaken elsewhere (see Appendix V).

Theme: “Safety prioritization” (7.5%)

Description: Comments or suggestions of how safety should have greater prioritization within the organization.

Comments:

- *The workplace culture - to accept this training and equipment as a part of the job.*
- *Buildings and property managers need to be ridiculed for not maintaining their anchors and safety. They want us tied off but have limited to no anchor points and don't want to pay for the extra time it takes to set up safety but can spend any extravagance on landscaping and superficial work.*
- *That the other people realize that it is an issue, like some places you go to, it's not that big of a deal, where I work they are pushing safety, but some places haven't got a clue. More knowledge for other smaller places I guess.*

Theme: “Communication about safety” (6.1%)

Description: Informal (questioning, reporting, communicating on the job, etc.) or formal (safety talks, signage, etc.) communication at work sites.

Comments:

- *Possibly more signs sort of on the line of "hard hats and safety glasses required in this area" but for in construction sites where working at heights is all around. E.g. fall arrest equipment required when working 3m or higher, etc.*
- *Our morning meetings could be a little bit more in depth, as far as job details are concerned ("toolbox talks").*
- *Make information available online and have a poster at jobsite to promote this kind of safety. Having both a poster and a binder with this info at the jobsite will allow workers not to have an excuse not to be safer at work.*

Theme: “Adherence” (5.8%)

Description: Comments about following recommended safe WAH practice, e.g. about using FP equipment, 100% tie-off, not taking shortcuts, etc.

Comments:

- *Follow the rules, follow what they teach you, 90% of the people don't apply because it takes longer, but in the end it's our safety.*
- *Overall, just being safer and more aware of obstacles that could be harmful to myself and others.*
- *Always think to be 100% tied off.*

Theme: “Ladder” (4.8%)

Description: Less ladder use, proper use of ladders, using the right kind of ladder, etc.

Comments:

- *Ladder use be minimized.*
- *Climbing ladders with 3-point contact shouldn't require positive tie off. moving the rope grab up could cause less then 3 points of contact.*
- *Replacing older step ladders with new fibreglass ones.*

Theme: “Tie-off points” (4.8%)

Description: Availability of tie-off points.

Comments:

- *Legislate all rooftops have tie off rings installed.*
- *I would like for ALL builders to provide permanent anchor points and lifelines and safety straps. It is annoying when I have to place my own temporary anchor point.*
- *To make sure there is always something to be tied off to.*

Theme: “Supervision/leadership” (4.4%)

Description: Suggestions about supervisors or senior leaders setting example, communicating, monitoring, enforcing rules, etc.

Comments:

- *For supervisors to be more vigilant in requiring staff to follow safety rules.*
- *Supervisors should always be present, it helps motivate employees to follow safety rules.*
- *More supervisors need to be trained on the heights training as well as workers, so they know what we're looking at and the precautions that need to be made to make the job safer for us!!*

Theme: “Work plan” (4.4%)

Description: Mentions of a formal plan regarding fall protection and/or rescue.

Comments:

- *For everyone on the work site to know what to do in a fall safety plan.*
- *Always have rescue plan reviewed before starting work.*

Theme: “Enforcement” (3.7%)

Description: Suggestions of enforcement by MOL or other external parties; or non-specific mentions of enforcement.

Comments:

- *Government should randomly audit companies to see if they are adequately protecting their workers.*

- *Put more responsibility on owners of companies to enforce fall protection. I've never heard of owners going to WAH trainings because they are not on site. MOL makes me tell my employer what has to be done, putting job at risk. They should go after companies first, and then if the company can prove they've done everything possible to ensure a safe site, then fine the worker who was not working safely.*

Theme: "Inspection" (3.7%)

Description: Inspection of equipment and/or site.

Comments:

- *A procedure to verify your equipment is still good.*
- *More inspection by safety representative.*

Theme: "Guardrail" (3.1%)

Description: Recommendations around proper guardrails or more guardrails.

Comments:

- *Have guardrails installed when working at heights.*
- *Properly built guardrails.*

Theme: "Buddy" (3.1%)

Description: Comments related to co-workers, e.g. the need to work in pairs, holding each other accountable, providing mentorship, etc.

Comments:

- *Having someone assist so that I'm more comfortable, because I just started.*
- *Working in pairs.*
- *They (anybody that you work with) should stop and remind employees of consequences of not wearing fall protection.*

Appendix BB: Other training provider concerns

Training providers were asked in the survey, “That brings us to our final question. Would you have any final comments about the WAH training initiative, good or bad, that you would like to add?” Of the 87 individuals posed this question, 76 provided a response. Analysis of those responses identified several themes that repeated those already identified in other questions (and reported on in Appendices W and X). Below are included only new themes with a prevalence of 3% or more.

Theme Sub-theme	No. of references	% of total (n = 76)
Enforce Compliance on Work Site	11	14.5
Refresher Course	7	9.2
Improve Employer Safety Culture	4	5.3
Standardize Other Courses	4	5.3
Legal Requirement to Install Anchor Point(s) on Buildings	2	2.6
MOL Favouring Health & Safety Associations	2	2.6

Theme: “Enforce Compliance on Work Site” (14.5%)

Description: Comments pertaining to a greater enforcement of compliance on the work-site by MOL inspectors.

Quotes:

- *There are a lot of fraudulent cards out there with no penalty to those issuing them. I'm not saying it's happening all the time but there are some employers who simply created their own card and copying another training provider's card and replaced the names. The MOL did not punish them, they just told them to provide training for these workers. The MOL instructors have to shut them down.*
- *I think the MOL inspectors when they're out in the field and finding people without their WAH cards, they had a soft approach, but I think they need to have more of a hard approach, because I'm finding people are saying, "They caught me without a card, that's why I'm here", and they didn't receive a ticket. Most people are here not for refreshers but are here for the full course and have never been required to take it for some time, and still haven't received Ministry enforcement as of yet.*

Theme: “Refresher Course” (9.2%)

Description: Comments pertaining to the WAH refresher training course.

Quotes:

- *There has been very little refresher training requested from clients. There were so many calls for the initial course, but nothing for the refresher and this is worrisome.*
- *We've gone through all this effort to do this and the MOL completely dropped the ball on the refresher course. Our phones are basically dead, we have a refresher course coming up soon but nobody has registered. It was the most dumb execution for the certificates. There is no expiry date on them for the original course/ How will workers be motivated to take a refresher course if the message coming from the MOL is that you don't really need it. There is no admin follow-up or good support for a program that got off to good start. This is an enormous problem*
- *For recertifications, MOL should be all over the radio for people to get recertified. Learners are all expecting that they will get a number from the MOL for their initial training (their learner ID). It MOL doesn't follow up with participants, they're in the dark. If you created this program, it has to be backed up now.*
- *When we asked about the refresher course, the way they positioned it was that they did not make it seem mandatory to do within 3 years of initial course. I don't think that's a good move. I.e: FAQs on MOL website on their refresher course are “goosey.” This is a mistake because when you tell people things are changing and they need updated training, they'll be reluctant to do it. People don't do things until forced to. They will procrastinate.*
- *The only thing I would add would be it would be nice to see a little support from the MOL, in regards to the renewal training, so all the learners from 2015 that need to recertify do so. We are experiencing an underwhelming response, I don't know if the learners are dragging their feet, we haven't even heard a lot of radio ads like you gotta renew.*

Theme: “Improve Employer Safety Culture” (5.3%)

Description: Comments pertaining to improving employer safety culture.

Quotes:

- *Training is only part of the learner experience. We also have to make sure that there is appropriate follow-up in the workplace either by the employer or an HS officer. There is a missing link right now to ensure that there is accountability on the worksite on the learner has gone through the training. You can have all the training in the world, but it won't necessarily change the culture of a company.*
- *It's not about the program or how good it is, it is the mentality of the workers, and employers' attitude and the safety culture aspect of it.*

- ... training is small piece of it, more information needs to be provided to the supervisors to see more competency. If supervisors are not engaged, and don't stop the work activity, not much is going to change.
- ...the program has been around for over 3 years, but not seeing significant drop in injuries and fatalities they were hoping. But at the same time, I'm still surprised everyday how many workers still don't have the training, even after 3 years. It's not necessarily an enforcement issue. It goes down to culture at the company. Maybe there has to be more emphasis, even more than they're currently doing, on employer responsibility, supervisors' responsibilities. Put more onus back towards them, because there are still so many people flying under the radar without WAH training. I tell my clients all the time when I go to do an assessment or audit, you have got to change the way you're doing things and takes things seriously. When someone gets hurt, you could wind up in jail. So just getting it done is not going to fly. There's a reluctance to change the culture. I'm not sure how we're going do it, not where to start, but I guess enforcement and combination of enforcement through education.

Theme: “Standardize Other Courses” (5.3%)

Description: Comments to create standardized programs for other courses in Ontario.

Quotes:

- I think it's great, we would definitely like to see more of these government approved/regulated programs. The amount of people that show up for WAH far exceeds amount of ppl for non-regulated programs (*i.e. forklift, etc.), so we know people are out there doing things that are not best. A lot of them think they know, and they later realize they were putting themselves in quite a bit of danger. Also great for employers to have peace of mind, that they sent someone to a regulated training course, they come back with their certificates and feel quite confident that their employees will be safe. If it was a random class, I might be far more worried they might actually get hurt.
- There should be more standards as such for lock and tag, confined space and other common training programs to help ensure the quality and integrity of training being performed in Ontario.
- I would like to thank the MOL, for making the effort. The program is so much more educational, it is beneficial to people. They should set standards across the board for all programs, to prevent people from getting cards just by waving their hands. Absolute 100% improvement. I'm totally satisfied.
- I've been in construction for 30 years, and this course works if it is delivered properly and saves lots of live. All courses should be standardized like this.

Theme: “Legal Requirement to Install Anchor Point(s) on Buildings” (2.6%)

Description: Comments pertaining to a legislative requirement to install anchor points on buildings.

Quotes:

- *I'm not sure what government body is responsible for this, but why can't they make it so that every building is required legally to install an anchor point or a 35-inch temporary wall. This should be in the building code. This way, we don't even need to tie-off and we don't need fall protection because anchor points/safeguarding wall already exists. Does the MOL have jurisdiction over this? This would significantly reduce injuries/deaths.*
- *But I would like to see a legislative change for anchor points. For some occupations (e.g. construction jobs in residential houses), it's very difficult to find an anchor point to tie-off to. They should make it mandatory for housing companies, especially for framers/builders to have permanent anchors installed. This way, other trades come in and have an anchor to tie-off to already. Some housing building companies do this already. But this should be in the building code, or a legislative act.*

Theme: “MOL Favouring Health & Safety Associations” (2.6%)

Description: Comments pertaining to biases and subsidies by the MOL towards health and safety associations, rendering greater competition for smaller, private organizations.

Quotes:

- *Subsidies (from the government) are fine for research purposes but don't make it harder for other companies to stay in business--don't cut my throat. If they used a regular business model, they could not do this--just does not make sense.*
- *From my standpoint, our biggest challenge/competition, is the MOL inspectors for MOL issuing order to the clients to the 3 biggest associations. The associations are also lying to actual audience saying they are the only suppliers of the course, and they say they are not-for-profit. We are competing with the government.*

Appendix CC: Results of exploratory analyses to identify factors associated with greater change in WAH knowledge and in safety practices in IHSA learners

The below tables give the results of the regression analyses described in Appendix D and reported on in section 4.6.

Results of regression analyses using T2-T1 change scores as outcome variables

Predictor variables	Knowledge gain			Safety practices change		
	Coeff.	SE	p	Coeff.	SE	p
Formal FP training previously taken						
Yes	ref			ref		
No	0.02	0.21	0.93	0.15	0.13	0.24
Don't know	0.92	0.40	0.02	-0.18	0.22	0.41
Frequency of FP equipment use						
Never used	Ref			ref		
Less than once a year	0.03	0.34	0.93	-0.03	0.28	0.89
Less than once a month	0.04	0.34	0.90	-0.61	0.25	0.02
Once or twice a month	0.02	0.32	0.96	-0.52	0.23	0.02
Once or twice a week	0.13	0.35	0.71	-0.58	0.23	0.01
Three or four times a week	-0.02	0.42	0.96	-0.60	0.25	0.02
About every day	-0.08	0.37	0.22	-0.88	0.23	0.0002
Usual sector						
Residential construction – low-rise (≤ 3 stories or less)	0.86	0.25	0.0006	0.18	0.15	0.24
Residential construction – med./high –rise (4+ stories)	0.31	0.27	0.25	0.15	0.15	0.34
Non-residential construction	ref			ref		
Not in construction sector	0.21	0.30	0.48	0.34	0.19	0.08
Union						
Yes	0.12	0.23	0.61	0.04	0.14	0.76
No	ref			ref		
Geographical location of work						
GTA	ref			ref		
Outside GTA	-0.24	0.22	0.27	0.18	0.14	0.18
Both equally	0.04	0.29	0.88	0.29	0.19	0.13
Work role						
Owner/manager	0.06	0.36	0.87	0.05	0.22	0.82
Professional/technical/financial/administrative support	0.35	0.36	0.33	0.03	0.21	0.89
Front-line supervisor	-0.05	0.35	0.89	0.35	0.22	0.11
Trade worker - certified	ref			ref		
Trade worker - not certified	0.27	0.28	0.34	0.09	0.16	0.60
Trade helper or labourer	0.34	0.32	0.28	0.46	0.19	0.01

(cont.)

Predictor variables	Knowledge gain			Safety practices change		
	Coeff.	SE	p	Coeff.	SE	p
Years of Ontario construction experience						
None	0.69	0.50	0.17	-0.48	0.36	0.18
Less than three months	0.96	0.47	0.04	0.19	0.28	0.50
4 months to 1 year	0.95	0.44	0.03	0.003	0.28	0.99
2 to 5 years	0.95	0.39	0.01	0.16	0.24	0.50
6 to 10 years	0.54	0.37	0.15	0.16	0.23	0.50
11 to 20 years	0.82	0.36	0.02	0.26	0.24	0.28
> 20 years	ref			ref		
Employment status						
Permanent	ref			ref		
Temporary/casual	-0.09	0.33	0.78	-0.14	0.21	0.51
Independent operator	0.53	0.39	0.18	0.17	0.24	0.49
Unemployed/student	0.69	0.47	0.14	-0.34	0.48	0.48
Age						
24 years or less	-0.45	0.31	0.14	-0.08	0.18	0.67
25-34 years	ref			Ref		
35-44 years	-0.14	0.25	0.58	0.05	0.15	0.71
45-54 years	-0.05	0.31	0.87	0.42	0.21	0.04
55 years or more	-0.29	0.40	0.47	0.17	0.25	0.50
Gender						
Female	-0.07	0.39	0.86	-0.21	0.29	0.46
Male	ref			ref		
Instructor type						
Internal IHSA staff	ref			ref		
External training partner	0.47	0.21	0.03	-0.07	0.13	0.62
Survey contact method (& administration method)						
E-mail (self-administered online)	ref			ref		
Mobile text (self-administered online)	0.50	0.23	0.04	0.13	0.13	0.34
Telephone (interviewer-administered)	0.51	0.28	0.07	-0.34	0.22	0.13
Model statistics						
Observations used		428			293	
Parameters estimated		37			37	
df		391			256	
F-value(p)		1.99			1.72	
		(0.0008)			(0.0092)	
R-square, adj.		0.08			0.08	

Results of regression analyses using T2 score as outcome variable

Predictor variables	Knowledge (T2)			Practices (T2)		
	Coeff.	SE	p	Coeff.	SE	p
Outcome pre-training						
Knowledge (T1)	0.07	0.02	0.0008	--		
Safety practices (T1)	--			0.44	0.05	<0.0001
Formal FP training previously taken						
Yes	ref			ref		
No	0.03	0.08	0.72	0.14	0.11	0.21
Don't know	0.06	0.16	0.68	-0.09	0.18	0.61
Frequency of FP equipment use						
Never used	ref			ref		
Less than once a year	0.31	0.13	0.02	-0.03	0.24	0.91
Less than once a month	0.06	0.14	0.66	-0.26	0.21	0.22
Once or twice a month	0.10	0.12	0.43	-0.12	0.19	0.52
Once or twice a week	0.19	0.14	0.17	-0.14	0.20	0.50
Three or four times a week	-0.10	0.16	0.53	0.06	0.22	0.79
About every day	0.11	0.15	0.44	-0.15	0.21	0.48
Usual sector						
Residential construction – low-rise (≤ 3 stories or less)	-0.12	0.10	0.24	-0.03	0.13	0.82
Residential construction – med./high –rise (4+ stories)	-0.18	0.11	0.10	0.02	0.13	0.90
Non-residential construction	ref			ref		
Not in construction sector	0.11	0.12	0.34	0.35	0.16	0.03
Union						
Yes	-0.003	0.09	0.98	0.01	0.11	0.91
No	ref			ref		
Geographical location of work						
GTA	ref			ref		
Outside GTA	-0.18	0.09	0.04	0.12	0.11	0.30
Both equally	0.01	0.11	0.92	0.05	0.16	0.77
Work role						
Owner/manager	-0.12	0.14	0.38	0.16	0.18	0.38
Professional/technical/financial/administrative support	-0.03	0.14	0.85	0.26	0.18	0.15
Front-line supervisor	-0.17	0.14	0.22	0.47	0.18	0.01
Trade worker - certified	ref			ref		
Trade worker - not certified	-0.10	0.11	0.37	0.08	0.14	0.57
Trade helper or labourer	-0.25	0.13	0.05	0.46	0.15	0.003

(cont.)

Predictor variables	Knowledge (T2)			Practices (T2)		
	Coeff.	SE	p	Coeff.	SE	p
Years of Ontario construction experience						
None	-0.12	0.20	0.54	-0.66	0.30	0.03
Less than three months	0.11	0.19	0.55	-0.04	0.24	0.86
4 months to 1 year	0.14	0.17	0.42	-0.01	0.23	0.96
2 to 5 years	-0.10	0.15	0.50	0.15	0.20	0.47
6 to 10 years	0.03	0.15	0.82	0.18	0.19	0.37
11 to 20 years	0.03	0.14	0.86	0.04	0.20	0.85
> 20 years	ref			ref		
Employment status						
Permanent	ref			ref		
Temporary/casual	-0.19	0.13	0.14	-0.01	0.17	0.95
Independent operator	-0.15	0.16	0.34	0.21	0.20	0.28
Unemployed/student	0.03	0.19	0.88	-0.25	0.40	0.53
Age						
24 years or less	-0.07	0.12	0.59	-0.12	0.15	0.42
25-34 years	ref			ref		
35-44 years	-0.02	0.10	0.84	-0.01	0.12	0.92
45-54 years	-0.18	0.12	0.14	0.21	0.17	0.22
55 years or more	-0.32	0.16	0.05	-0.05	0.21	0.82
Gender						
Female	0.04	0.15	0.80	-0.38	0.24	0.11
Male	ref			ref		
Instructor type						
Internal IHSA staff	ref			ref		
External training partner	0.21	0.08	0.01	-0.07	0.11	0.52
Survey contact method (& administration method)						
E-mail (self-administered online)	ref			ref		
Mobile text (self-administered online)	0.001	0.09	0.99	0.09	0.11	0.41
Telephone (interviewer-administered)	-0.34	0.11	0.003	-0.18	0.19	0.35
Model statistics						
Observations used		428			293	
Parameters estimated		37			37	
df		390			255	
F-value (p)		2.39			3.86	
		(<0.0001)			(<0.0001)	
R-square, adj.		0.11			0.27	

