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Health and safety training in a sample of open-shop construction companies

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Abstract

Problem: Compared to other industries, construction has the third-highest death rate. Many agree, and research has shown, that one way to change these statistics is through effective worker safety and health training. Little is known about the quality and nature of safety and health training available to open-shop (nonunion) construction workers. **Method:** It was the goal of this preliminary study to provide some initial background information about the nature and quality of safety and training in open-shop construction operations. **Results:** While the majority of contractors surveyed did provide safety and health training, most did not quantitatively evaluate their training programs in terms of reduction in hazardous behaviors or exposures, or increased job satisfaction or productivity. **Impact on industry:** Learning about the major parameters (e.g., methods, policies, barriers, company/worker perceptions, etc.) influencing nonunion construction safety training will help guide future construction safety-related research and intervention strategies on a national basis.

Keywords: Construction; Safety and health training; Open-shop contractors; Qualitative

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1. Introduction

It has been well documented that construction work is one of the most dangerous occupations (Bureau of Labor Statistics (BLS), 1996; Center to Protect Workers Rights (CPWR), 1997). With respect to all reported injuries (per 100 full-time workers) in 1994, construction ranked a close second, behind manufacturing. In terms of lost workday cases, construction had the highest rate of all industries (BLS, 1997). In addition, compared to other industries, construction has the third-highest death rate (CPWR, 1997). Many in the construction industry agree, and research has shown, that one way to change these statistics is through effective worker safety and health training. Juxtaposed to this belief is that, in 1993, construction ranked last in the percentage of employers providing formal job-skills training for workers (CPWR, 1997). Effective training should include teaching workers the necessary technical skills for performing their tasks and also to assure that skills are carried over to the job in a safe and healthful manner.

Ideally, job-skills, as well as safety and health, training should occur before the time of hiring and continue while working on the job site. This approach is the traditional training model for workers covered under collective bargaining agreements (CPWR, 1997). Union construction workers receive standardized skills training by attending a formal 3–4-year trade-specific apprenticeship program. Apprenticeship programs include classroom learning as well as hands-on activities so that workers gain mastery of the specific skills of their trade and learn how to perform those skills in a safe and healthful manner.

Open or merit (nonunion) shops now represent approximately 80% of the construction workforce (Hirsh & MacPherson, 1995). In the open-shop arena, there is a lack of a standardized or formal structure in place for providing the skills and safety training to new workers or upgrading the skills of more seasoned workers (The Business Roundtable, 1996). If training does occur, it is typically in the larger shops. The reasons given for not providing training include: (a) open-shop contractors tend to have a shorter-term focus on training and may choose to not spend money on long-term training; and (b) trained workers will leave for higher-paying jobs elsewhere, perhaps with contractors who can pay more because they spend less on training (Korman, 1997; The Business Roundtable, 1996). This is not to imply that open-shop contractors are not providing any worker safety and health training. For example, approximately 2 years ago, the National Center for Construction Education and Research (NCCER) was established by open-shop contractors and contractor associations to develop a standardized training curriculum for workers (The Business Roundtable, 1996). Today, the center has 23 trade associations on-board (including the Association of General Contractors and the Association of Builders and Contractors) and reaches out to the open-shop contractor to provide craft training, safety education, and management education to enhance the image of the construction industry. NCCER has been successful in providing skills and safety training to a large number of open-shop construction workers.

The fact remains, however, that little is known about the quality and nature of training available to nonunion workers and how the level and types of training might relate to safety outcomes. The present study represents an opportunistic collaboration between the St. Paul Fire and Marine Insurance (St. Paul, MN, USA) and the National Institute for Occupational Safety and Health (NIOSH) to begin exploring some of these issues. Some of the research questions that we attempted to address were: How many open-shop companies provide occupational safety and health training to their employees? How is such training developed, delivered, and evaluated? How do companies that provide such training differ from those that do not? Are safety outcomes (e.g., accident rates) related to training or to the lack of training? What are the barriers to training for those contractors who do not train their workers? What might motivate a nontraining contractor to begin a training program? It is hoped that findings from this preliminary study will provide some initial background information about the nature and quality of occupational safety and training in a sample of open-shop construction operations. Learning about the major parameters (e.g., methods, policies, barriers, company/worker perceptions, etc.) influencing nonunion construction safety training will help guide future research and intervention strategies on a national basis.

2. Methods

Independent of NIOSH, the St. Paul Fire and Marine Insurance was in the early stages of planning a small-scale survey of its open-shop construction client companies to identify training and safety management practices that might predict lower injury rates and correspondingly lower compensation claims. Learning of NIOSH's interest in the area, St. Paul sought technical consultation in developing and reviewing its interview instrument and assisting in the design of the overall research project. St. Paul staff identified and recruited participant contractors and worked with interviewers to collect the data. NIOSH staff consulted with St. Paul to ensure the scientific merit of the project, as well as to conduct the data analysis.

2.1. Sample and data collection

The St. Paul Fire and Marine Insurance Construction Division worked with company regional coordinators in the south, southeast, and southwest regions of the country to identify the client base of nonunion road and heavy highway construction companies. The focus on contractors in these regions was because of the strong open-shop presence, the likelihood of year-round employment, and the good relationships that already existed between St. Paul field staff and the contractors.

Contractors were selected with SIC number 1611 (highway and street construction, except elevated highways) or 1622 (bridge, tunnel, and elevated

highway construction). Road construction operations were targeted for investigation primarily because of their typically high compensable injury rates.

At the time of sampling, St. Paul had approximately 87 potential contractors in these regions that fit the criteria (SIC 1611 or 1622). Given this relatively small number of potential respondents, rather than randomly selecting companies from the list, all contractors were identified as potential participants in the study. St. Paul sent a letter to the chief executive officer of each candidate company introducing the study and asking for their willingness to participate. Included with the letter was an information sheet designed to address some likely questions such as: What is the purpose of this study? What types of contractors are going to be studied? How will the study be conducted? Will responses be confidential? Will the results be shared with other contractors who participate? What is the role of NIOSH in this study? If the company chose to not participate they were to call their St. Paul risk control consultant using the phone number provided and decline the invitation.

Four graduate students from the Risk Control Center at the University of Wisconsin–Stout campus were trained to administer, and paid to conduct, the phone interviews. Candidate companies that agreed to participate ($N=87$) were contacted using a brief recruiting telephone script reinforming them of the purpose of the study and requesting their participation. Forty-five of the 87 eligible contractors participated in the study (52% participation rate).

Once the contractors were contacted and agreed to participate, they were either interviewed at that time or were asked to arrange another convenient time for the 30 minute interview. The interviews were conducted anonymously such that neither the identity of the individual nor that of the company was permanently linked to the collected data. All data were entered into an Excel spreadsheet and converted to a SAS data set for analysis.

2.2. Survey development

The survey instrument for this study was designed to: (a) systematically gather information about the safety and health training practices of open-shop contractors; (b) characterize the nature of safety and health training in those companies where it occurs; and (c) identify barriers to safety and health training in companies where it does not. An additional aim of the study had been to examine the relationship between safety and health training practices and company injury rate/compensation costs, but this proved to not be feasible for a number of reasons. The company had recently merged with another company and claims collection procedures had not yet been standardized. In addition, although we were requesting internal St. Paul data, the cost for obtaining that data proved to be prohibitive. Consequently, the present report focuses on the results of the survey only.

The survey was developed for telephone administration to individuals responsible for worksite safety and health. In addition to collecting background information on the organization (e.g., number of employees, person-hours worked per year, SIC code), the survey asked about select company human

resource practices such as employee recruiting and selection methods, formal new-hire orientation, and alcohol awareness and drug-testing programs. The main body of the survey dealt with safety and health training practices. Items were developed to roughly correspond to the OSHA guidelines for a model training program (Occupational Ssafety and Health Administration, 1988). After ascertaining whether the company provided some degree of worker training, the survey covered such topics as trainer qualifications, content, timing and frequency, method of delivery, administration and recordkeeping, and methods for assessment/evaluation. Questions were asked in a fixed-response format with the interviewer probing for clarification or elaboration where appropriate. Earlier versions of the survey were reviewed for authenticity, relevance, comprehensiveness, and understandability by four focus groups comprised of open-shop contractors and construction health and safety managers. Two of the four focus groups were held in Cincinnati, OH, and were facilitated by a trained moderator. The other two were held in Chicago, IL, and were facilitated by the Vice President of Risk Control Services for St. Paul. Focus group attendees provided extensive comments and were generally excited about the project. All relevant comments were considered and incorporated into the final survey instrument. (Contact authors for copy of final survey instrument.)

2.3. Data analysis

Given the small sample size ($N = 45$), it was inappropriate to conduct inferential statistics. Since the primary intent of this pilot effort was to gain some insight into safety and health training practices among open-shop construction contractors, it was felt that follow-up research would be needed to examine causal relationships. Therefore, the findings reported in this paper are descriptive in nature. In addition to the quantitative data, the qualitative data provides the reader with a more in-depth understanding of some of the issues these open-shop contractors have with respect to training workers.

3. Results

3.1. Sample

Thirty-one percent of the 45 contractors who participated classified themselves as a general contractor, 11% as a subcontractor, while 58% considered themselves to be both a general and a subcontractor. The majority of those in the sample were open-merit shop contractors (96%), 4% ($n = 2$) described themselves as double-breasted (i.e., union and open shop). The average number of people employed by these contractors in any given year was 136 (minimum 22 to a maximum 800), with an average of 448,656 person-hours worked per year (minimum 2,300 to a maximum 5,800,782). The contractors reported approximate annual revenue ranging from US$2.5 million to US$200 million.

3.2. General health and safety activities

In addition to learning about training (which is discussed below), we were also interested in gaining a better understanding of the more general health and safety environment that exists within the interviewed companies. To do this, we asked all 45 of the contractors about their employee orientation programs, their policies with respect to drug and alcohol testing, hiring practices, and their perceived level of importance placed on safety and health (when compared to other issues).

3.2.1. Employee orientation

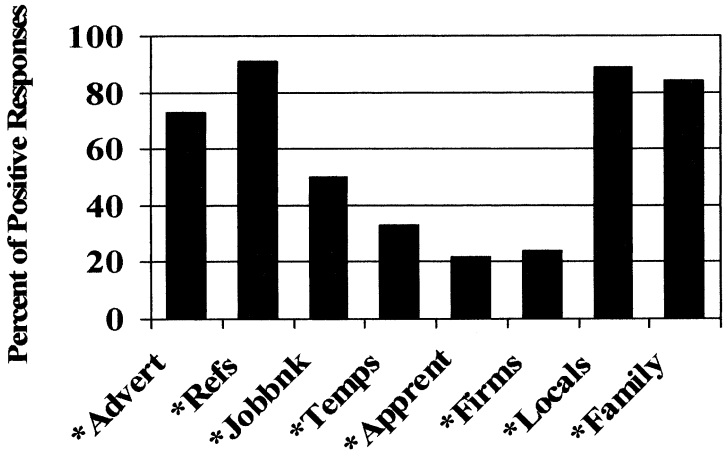
Sixty-two percent ($n = 28$) of the contractors said they had some type of orientation program for new employees, while 38% ($n = 17$) said they did not. The nature of the orientation varied considerably across companies and ranged from passive approaches such as providing new employees handbooks, packets of information, videos, and films, to more engaging approaches requiring each new employee to meet with his/her supervisor or foreman and discuss the safety manuals, safety procedures, and safety expectations while on the jobsite. Similarly, the content of the orientation programs ranged from furnishing a general overview of the basics of safety, first aid, hazard communication, fall protection, EEOC policy, and so forth to providing a job-specific orientation. One respondent called his orientation an "indoctrination program."

3.2.2. Drug and alcohol testing

The overwhelming majority (91%, $n = 41$) said they had drug or alcohol awareness programs. Of those, 40 (98%) said they had drug or alcohol testing policies. Most used all types of testing including: random (90%), for-cause (88%), for-reasonable-cause (75%), and preplacement testing (88%). A total of 41 out of 45 respondents (91%) said they performed postaccident testing, and 37 of those tested the person injured (90%) and 38 (98%) tested the person who caused the accident. When asked if there were others who might be tested, some respondents stated that anyone contributing to the accident or anyone that goes to the workers' compensation doctor would be tested. One respondent said, "if there was any question as to who was to blame for the accident, the whole crew gets tested."

3.2.3. Hiring practices

With respect to hiring, the most often cited mechanisms for obtaining employees included referrals (91%), the local community (89%), family members (84%), advertising (73%), job banks (49%), and other avenues (36%; see Fig. 1). When asked what was meant by "other," responses included: (we) get (workers) from anywhere possible, from the internet, jail inmates, job fairs, TV ads in Mexico, walk-ins, word-of-mouth, NAACP women's groups, and minority groups were contacted to diversify the workforce. Forty-two percent ($n = 19$) said they hired from either a central location or both a central location and on



*Adver=Advertising, Refs=References, Jobbnk=Job Banks, Temp=Temp Agencies, Apprent=Apprenticeship Programs, Firms=Other Firms, Locals=Union Locals, Family=Family Members

Fig. 1. Hiring practices.

each jobsite. Seventy-six percent ($n = 34$) said they checked references to ensure new employees had the necessary abilities and skills and 47% ($n = 21$) said they evaluated potential new employees to determine if they knew how to do their job safely. These procedures included observing the employee working with machinery or running a piece of equipment, driving tests, or simply considering the years of experience of the worker.

3.2.4. Importance placed on safety

All contractors were asked a number of questions to help understand the perceived level of importance placed on safety in their company. Ninety-eight percent ($n = 44$) said their company placed special importance on safety. Of those, 56% ($n = 24$) said that compared to other important issues, safety was much more or more important and 43% ($n = 19$) said it was just as important as other company concerns. In an attempt to characterize how the emphasis on safety influenced workplace practices, respondents were asked to indicate whether the company implemented a variety of safety program elements. The majority of respondents had written safety and health policies (99%), formal safety and health recordkeeping (89%), held worker safety meetings (99%), provided personal protective equipment (99%), had a designated safety supervisor (93%), and had a formal safety program (93%; see Fig. 2). Twenty-four percent had some type of safety and health incentive programs. Additional safety and health activities mentioned included: paying employees to develop and conduct safety meetings, providing newsletters, holding an annual "supersafe" day, as well as conducting company-wide safety meetings. To more objectively assess the extent of company commitment to safety, respondents

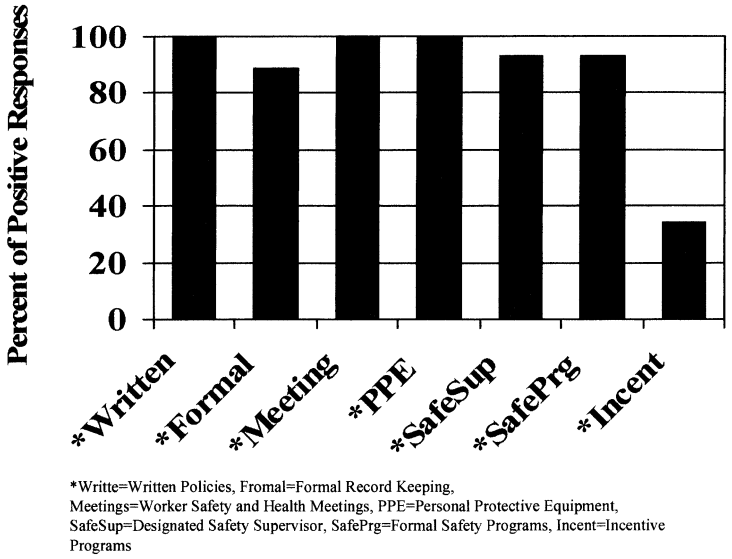


Fig. 2. Health and safety practices.

were asked to indicate whether safety-related expenses were accounted for in their operating budget. Seventy-six percent of all respondents ($n = 34$) said there were financial resources committed to support safety needs (averaging 4% of project costs). Seventy-eight percent ($n = 35$) reported that safety was a part of their formal bid process.

3.3. Training

A primary goal of the present study was to characterize occupational safety and health training practices among small to midsized open-shop construction companies, and to explore differences between companies that did and did not train. Companies reporting some form of training were asked a series of questions about the nature of their training program. Those not providing safety training were asked a series of questions exploring their reasons for not training and what factors might reverse that decision.

3.3.1. Companies that train

Eighty-nine percent ($n = 40$) of the respondents said they currently provided some type of training for their supervisors/foremen and/or workers and that they had been providing some training for at least 1 year (range 1–21 years, median 7.5 years). Two of the 40 respondents who trained their workforce noted they only provided formal/structured training programs and four said that they only used on-the-job training. The majority (85%, $n = 34$) said they provided a combination of formal and on-the-job instruction.

3.3.2. How and when training is provided

Of those implementing formal training ($n = 2$) or a combination of formal and on-the-job training ($n = 34$), most (75%) used both in-house and external trainers to conduct their training. The majority of training was being provided during normal working hours (97%) with some during nonworking hours (44%) and some in the off-season (47%). Twenty respondents (56%) said that employees were paid when safety training was conducted after normal work hours.

Lectures, discussions and demonstrations (97%), printed materials (94%), and videos (94%), were, by far, the most common training modalities. CD-ROMs and slides were used to a lesser extent as were flyers, bulletin boards, outside seminars, and hands-on with equipment. Ninety-two percent of the respondents said there was a designated person in-charge of the safety training. The titles of this person ranged from the CEO, executive vice president, and company president, to the project manager, human resource manager, or general superintendent/foreman.

3.3.3. Mentoring

We were interested in learning from those who provided on-the-job training, if they had a formalized mentoring program. Of the respondents who provided on-the-job training ($n = 4$) or a combination of structured with on-the-job training ($n = 34$), 87% said they tried to pair-up experienced workers/mentors with inexperienced workers. They stated that various issues such as experience, ability to teach, personality factors, safety record, technical skills, safety attitude, and patience, all played into their decision as to which they believed would make a good mentor. Most (70%) said that mentors are not given a defined set of skills or procedures that they must use for mentoring, nor did they receive any additional incentives or benefits for being a mentor (88%). In addition, 82% said there was typically not a designated mentoring period before which an inexperienced worker was allowed to do a job. The group was evenly split as to whether there was any kind of evaluation conducted on the effectiveness of the mentoring relationship. For those saying there was some evaluation (47%, $n = 18$), most said it was done by informal observation of the mentor/supervisor.

3.3.4. Subcontractor training

Given that most respondents worked for companies that regularly used subcontractors on their jobsites, we were interested in learning whether or not they included subcontractors in their safety training. Seventy-eight percent ($n = 31$) of all respondents who provided structured and/or on-the-job training to their workforce ($n = 40$) said that they did not include subcontractors. Some of the reasons were: (a) each subcontractor supplies their own safety program; (b) lack of time; (c) lack of coordination; (d) it is the subcontractors responsibility to train but they must abide by the general contractor's safety policies; (e) subcontractors are required to have their own safety program and to maintain it themselves; (f) (we) have never done it; and (g) there are liability issues to consider. Reasons for providing safety training for subcontractors were: (a) the

contractor believes that they are ultimately responsible; (b) an accident recently occurred on a jobsite; (c) they want to keep the job safe; (d) training can be requested by subcontractor if they do not have the resources; (e) they are working in our domain so they need to operate safely so that our employees are safe; and (f) they need to understand policy and procedures of the company.

3.3.5. Tailored training

Sixty-five percent ($n = 26$) said they tailored the training for individual workers primarily making it job specific. One respondent reported that although their training was job specific (tailored), since all workers do many different jobs, ultimately everyone ends up with the same training. Another said that it depends on the person's ability to grasp the job and depends on the job itself. Eighty-eight percent ($n = 35$) said that they provided refresher or follow-up safety training for their workers.

3.3.6. Measuring training effectiveness

The training literature emphasizes the importance of obtaining feedback from those being trained for maintaining buy-in and for updating programs. Sixty-eight percent ($n = 27$) of the respondents said they had never evaluated their employees' attitudes toward the company safety training program. Some of the comments from the 13 companies who evaluated employee attitudes were: "we have round table discussions and ask employees what they think (of the training) and what can be done better"; "we ask for feedback and they often help develop the systems used."

Ninety-five percent ($n = 38$) of companies that provided training, documented it primarily by using sign-in sheets, kept attendance records, and provided certificates to workers who complete the training. Only 63% ($n = 25$) actually measured the effectiveness of the safety training. This was done by: observing on-the-job performance (88%), measuring employee satisfaction with the training (36%), looking at accident and near accident rates (32%), conducting formal testing (28%), evaluating workers comp rates (12%), and EMRs (experience modifier rate; 8%; see Fig. 3).

Another important aspect of effective training is to provide feedback to the workers on how well they have incorporated training into their work. Sixty-eight percent ($n = 27$) of the respondents said they provided feedback to their workers. This was done in a number of ways, including: (a) if an unsafe act was observed, provide the worker with verbal feedback about what was done incorrectly and ways to correct it; (b) review and discuss incidents at safety meetings; and (c) provide retraining to employees who did not demonstrate the necessary skills.

3.3.7. Changes to training

Respondents were asked whether or not the training had changed since it was first offered. Eighty percent ($n = 32$) said that it had changed. Specific ways in which training had changed included: (a) revamping it to keep up with the industry and with government regulations; (b) evolving it into a more structured

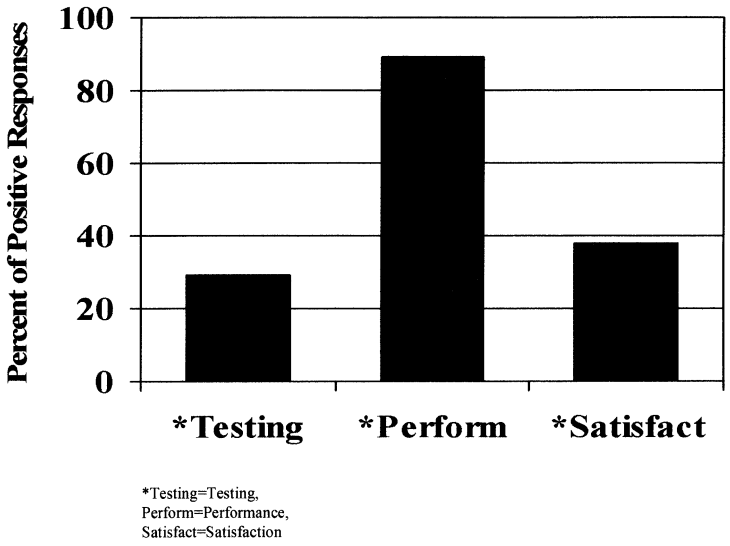


Fig. 3. Measuring effectiveness.

(and formal) program; (c) increasing the amount of documentation and certification and have more employee involvement; and (d) providing more verbal (vs. written) information because of the high illiteracy rate. Basically, these changes mean spending more time.

3.3.8. Contractors perceived effect of training on a variety of issues

3.3.8.1. Productivity. While 79% believed that their safety training increased or greatly increased employee productivity, 13% believed that productivity decreased due to safety training, and 8% felt it had no impact. Examples of responses to the question "In what ways has safety training increased (or decreased) productivity?" include: "(workers) are able to perform tasks without interruptions"; "there are better attitudes and there is less turnover"; "the workers feel safer so that they aren't apprehensive about the work — they can concentrate on the job"; "the guys are more conscientious and take pride (in their work)"; "there is less down time due to employee injury"; "the work stays more fluid which means it takes less time to complete the job"; "if you care about worker — they will work harder." Two comments reflected the perceived downside: "(worker) has to work slower" and "it may impede productivity in terms of time."

3.3.8.2. Employee morale. Eighty-three percent believed that employee morale was increased or greatly increased as a result of safety training. Six percent believed that employee morale was either decreased or greatly decreased as a result of the safety training and 8% felt that it had no impact on morale. Again, better attitudes were mentioned as a positive outcome of providing safety

training. Also mentioned were: "morale is better and (employees) feel safer with other employees," "they feel like the company is paying more attention to them, that they are part of the family," and "that the interactions between workers and supervisors were better."

3.3.8.3. Safety and health of the work environment. One hundred percent of the respondents agreed that the safety and health of the work environment had increased or greatly increased due to their safety training. Respondents believed that with respect to the work environment: (a) trained supervisors provide models for workers; (b) employees are more aware of safety issues making the environment safer; and (c) there is an increased use of personal protective equipment (PPE) and a decrease in lost/dropped tools.

3.3.8.4. Quality of work and company profits. Seventy-three percent of the companies believed that their safety training either increased or greatly increased the quality of the work produced, as well as increasing or greatly increasing company profits. Comments about the quality of work and on company profits included: "quality and safety are related," "take more time — be more careful — do it better," "there is better quality when employees have a good attitude," "fewer accidents — lower insurance premiums — reduced lost time due to injuries," "no lost time means more work gets done."

Only 5% believed that training decreased the quality of the work produced, and 8% believed it decreased company profits. One respondent cited the cost of providing personal protective equipment and training as affecting company profits. Twenty-three percent and 13% believed that safety training had no impact on quality of the work or company profits, respectively.

3.4. Companies that do not train

3.4.1. Barriers

One of the first questions asked of those who said they did not train either their workers or supervisors ($n = 5$) was, "What were some of the reasons for not providing training?" Responses included: "there's no time" ($n = 4$); "employees leave too soon" ($n = 4$); "we don't know where to begin" ($n = 3$); "there's no one to do it" ($n = 2$); "it's too expensive" ($n = 1$); "we're too spread out"; and "there's no central place to do it" ($n = 1$). Two respondents said their company had tried to provide safety training but had discontinued it because there was no time and by the time the group was trained, the employees had turned over.

3.4.2. Motivators

Two related questions asked of those companies that had provided training and then stopped was what factors played a major role in their decision to offer it initially, and what factors might influence them to resume training. Proof that it was cost effective, availability of easy-to-use training materials, and free consultation and resources were all mentioned as being important. In addition,

stricter inspections and enforcement of training regulations and improved employee morale were mentioned as potential motivators, as were reduced insurance costs, safer performance, and fewer injuries.

3.4.3. Contractor perceptions on employee behavior and the future of training in construction

Respondents were asked about their beliefs as to why some employees behave safely and others do not. There was a high degree of overlap of answers, some of the more prevalent ones were: human nature, experience/maturity/level of employee, personality/character, some just do not care/low self-esteem, bad habits, carelessness and stupidity, attitude (of the supervisor), intelligence. One respondent commented that 99.9% of the time the employees who behave unsafely are involved with drugs.

Finally, respondents were asked for their predictions about construction-related safety training in the next several years. Everyone responded to this question, and again, there was a high degree of overlap of responses. A universal comment was that there will be more training and that continuing regulations will require it. Training will increase because of the rising cost of negligence/litigation, because owners will see that safety and health can affect the bottom-line, and because of the increased complexity of jobs.

4. Discussion

The primary purpose of this study was to gain an understanding of the quality and nature of safety and health training in open-shop (merit) construction companies. We also planned to compare the training practices of high and low injury rate companies. The good news is that the majority of survey participants (81%) stated they provided safety and health training to their employees. The bad news is that because of this, and because we could not obtain claims data (as mentioned earlier), a comparison of those who train ($n = 40$) and those who do not ($n = 5$) was not statistically possible.

Open-shop contractors were asked about their safety and health practices and employment hiring strategies. Nearly all contractors said their company placed special importance on safety and most said that safety was just as important as other issues of concern to the company. Obviously, the best way to test this perception is by examining the types and quality of safety activities sponsored. The majority of contractors did have a formal safety program with written safety and health policies, recordkeeping, worker safety meetings, personal protection equipment provision, and a designated safety supervisor. The majority of contractors also had a drug and alcohol awareness program and conducted drug and alcohol testing for a variety of scenarios (i.e., random, for-cause, for-reasonable-cause, preemployment, and postaccident).

The construction industry labor shortage, and ways to resolve it, is a frequent topic of discussion among contractors. Results from this survey revealed that

contractors hired employees use many avenues (e.g., referrals, advertising, local community, and family members). Most said that they checked references, and provided new employee orientation; however, the nature and quality of this orientation varied greatly. The primary concern is not necessarily where workers are hired from, but ensuring that the contractor adequately trains them to carry out the job properly and in a safe and healthful manner.

Specific questions about training revealed that most of the contractors interviewed provided safety and health training to their employees using a combination of formal/structured and on-the-job training, using both in-house and external trainers during working hours. Information on adult education and training tells us that to be most effective, training must be interactive and experiential. Results indicated that these contractors use a variety of methods to train their workforce (e.g., lectures, discussions, demonstrations, printed material, and videos). Most contractors stated that they documented training occurrence, and two-thirds said they actually measured training effectiveness, mostly by observing on-the-job performance. Observation of on-the-job performance is probably the most objective method for evaluating training effectiveness. However, for smaller companies who have no safety personnel, it can also be time consuming. In addition to observing performance while working, it may be beneficial to have workers demonstrate their abilities before going out on the jobsite. It was not evident from the interviews that job-site observations were either scheduled or systematic. Thus, while most companies report providing some type of training, and many report systems for documenting training deliver, there is little time spent in assessing the quality or effectiveness of the training in terms of actual knowledge gain or skills enhancement.

The majority of contractors who trained said that the training they provided had changed since its inception. Some said that it is always evolving, becoming more structured and intense, and in order to address illiteracy, more oral and verbal written instructions are used. This again is evidence suggesting that these open-shop contractors not only provide training to their workforce, they follow safety and health trends in the industry and workforce and make the necessary changes for providing adequate training. Most contractors reported that they tried to pair-up experienced workers (mentors) with inexperienced or new workers, but that these mentoring programs were unstructured with no fixed apprenticeship period, no formal competency criteria, and no defined goals for the mentors. Mentors were not paid and did not receive incentives for their efforts.

The role of mentors in enhancing the safety and health of a workforce should not be underestimated. Formalizing the process by selecting mentors on skill-based competencies and interpersonal relations skills, coaching mentors on how to mentor effectively, setting specific goals, defining the apprenticeship time period, and compensating mentors for their work, would all greatly enhance the changes for success.

Thirty-four of the 45 contractors interviewed (76%) said that financial resources were committed to support safety needs, and 35 (78%) said that they

included safety and health expenditures as part of their bid process. Ideally, 100% of all contractors would answer these two questions in the affirmative. This would even out the playing field when it came to bidding jobs as well as making every jobsite safe for all workers.

Although we did not ask specifically, it is unlikely that these contractors objectively or quantitatively evaluated their health and safety training programs in terms of whether it increased productivity and improved work quality, morale, and job satisfaction. That is, they had no hard data to show that their bottomline was impacted as a result of implementing a safety and health program. Nonetheless, the majority of these contractors answered in the affirmative when asked if their safety-training program affected all of these issues. The overall theme across all of the categories was that employees got the message that the company they worked for cared about them and their well being. Because of that, contractors believed that workers were more careful, had fewer lost workdays, and produced a better product, all of which effect a company's bottomline.

A limitation of this study was that this was not a randomly selected group of open-shop contractors. Rather, the respondents were all St. Paul Insurance company clients. Before St. Paul writes a policy, they evaluate that company's loss history and will write policies only for those companies who meet certain standards. In addition, St. Paul provides ongoing safety and health consulting services to their clients. Thus, it is possible (perhaps likely) that these respondents are different with respect to safety and health practices than other (non-St. Paul client) open-shop contractors. That being said, we still found variability in safety and health policies and procedures even among some of the most safety and health-conscientious companies in the industry.

In addition, because of the small number of contractors stating that they did not train, we were unable to attain our primary goal for the study that was to compare companies who provide safety and health training with those who do not in terms of numbers of injuries and incidents, profitability, and so forth. These types of analyses would have provided a much more in-depth picture of the potential effect safety and health training can have on a company's bottomline.

5. Conclusion

Given the transient nature of the construction industry both in terms of the jobsite and the workforce, it is understandable that a contractor might not immediately see the value of providing safety and health training to their workers. However, it is hoped that the findings presented here, plus the open-shop contractors predictions of the need for increased training in the future, will provide a stimulus for future research aimed at making safety training more attractive, accessible, and efficient among small open-shop contractors. Providing tools to the open-shop contractor to assess training effectiveness will be beneficial for programs as well as research. While the majority seem to provide training, there was little time spent assessing the quality or effectiveness of the

training in terms of actual knowledge gain or skills enhancement. In addition, guidelines or recommendations on adult learning principles to be used to enhance existing training might be provided as well. Guidelines for effective mentoring programs could be developed, disseminated, and evaluated for their effectiveness. While most contractors try to pair up experienced workers (mentors) with inexperienced or new employees, the mentoring programs were unstructured with no fixed apprenticeship period or formal competency criteria/goals. Finally, cost/benefit evaluation recommendations for training programs could be developed and provided to the contractors. Most contractors did not quantitatively evaluate their safety and health training programs in terms of increased productivity, reduced risk exposures, or job satisfaction.

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