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Managers' Perceptions of the Value and Impact of HAZWOPER Worker Health and Safety Training

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Abstract

Background—Worker training is a core component of the OSHA Hazardous Waste Operations and Emergency Response (HAZWOPER) standard, but few studies have considered what motivates managers to provide HAZWOPER training to employees or what they value in that training.

Methods—In 2012, four university-based programs conducted an exploratory survey of managers who sent employees to HAZWOPER courses. Results from 109 respondents were analyzed.

Results—Forty-two percent of respondents cited regulations as the most important reason to provide HAZWOPER training; many indicated they would provide less training if there were no standard in place. Three-quarters (74%) reported training had improved workplace conditions. Fewer than half said they were likely to involve trained employees in aspects of the organization's H&S program.

Discussion—Compliance with regulatory requirements is an important factor shaping managers' training delivery decisions. Managers recognize positive impacts of training. These impacts could be enhanced by further leveraging employee H&S knowledge and skills.

Keywords

worker training; health and safety; HAZWOPER; managers; regulations; workplace programs; employee involvement

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INTRODUCTION

The OSHA Hazardous Waste Operations and Emergency Response (HAZWOPER) standard (29 CFR 1910.120) was promulgated in 1989 to codify the safety and health requirements that companies must meet to clean up hazardous waste or to respond to hazmat emergencies [Slatin, 2009]. Worker training provisions are a core component of the standard. Several levels of training are specified based on the work employees perform and the potential hazards they face. At its core are courses for: (1) hazardous waste site cleanup (General Site Worker courses which include 40 hr of instruction, 3 days of supervised hands-on training, and 8 hr of refresher training annually), (2) hazardous waste management (24 hr of instruction and 8 hr of refresher training annually for those working at treatment, storage, and disposal operations and facilities), and (3) emergency response to hazardous materials incidents (various levels of training based on expected role in a response scenario). Workers handling hazardous materials/waste not covered by the federal OSHA HAZWOPER standard or by a state OSHA equivalent must receive comparable training under the EPA worker protection standard (40 CFR 311).

Research studies to evaluate HAZWOPER training have documented a number of positive outcomes—from workers' increased knowledge of hazards, changed attitudes, and feelings of efficacy to greater likelihood of taking action in the workplace [Brown & Nguyen-Scott, 1992; Cole et al., 1994; Coleman et al., 1994; McQuiston et al., 1994; Cole & Brown, 1996; Weidner et al., 1998; Lippin et al., 2000; Becker and Morawetz, 2004]. These studies have generated important lessons about effective training methods, including the value of hands-on approaches that provide opportunities for interaction and dialogue [Burke et al., 2006] and that engage workers in activities to identify, control, and prevent hazards in their work environment [Weinstock and Slatin, 2012]. Few studies to date, however, have considered this training from the management point of view—their reasons for providing training, or their perception of whether training contributes to preventing hazardous incidents and exposures.

Mid-level health and safety (H&S) managers play an important role in ensuring companies and agencies comply with the worker training mandates of the HAZWOPER standard. They are likely to understand the job-specific nature of hazards present at the worksite and to be familiar with the standard's requirements; it is their responsibility to identify which employees should receive training and to select training providers [Thompson, Hilton and Witt, 1998; Flin, 2003]. They may also be responsible for meeting operational demands and therefore may need to balance workers' training needs with budget and time constraints and/or upper management directives for production [Mollick, 2012; Frick and Johanson, 2014].

In this exploratory study, we investigate potentially competing factors that influence managers' decisions to provide HAZWOPER training for employees. In particular, we examine the role regulatory compliance plays in supporting managers' training delivery decisions. We also consider what managers expect employees to gain through HAZWOPER training and whether they regard training as a resource that can enable employees to engage in workplace decision-making to prevent and control hazards. Understanding how mid-level

managers make decisions regarding training delivery and balance potentially competing priorities can shed light on factors that may facilitate or hinder training effectiveness.

METHODS

In 2012, four training providers who receive funding from the National Institute of Environmental Health Sciences (NIEHS) Worker Education and Training Program (WETP) conducted a survey of mid-level managers who sent employees to their HAZWOPER training courses. Participating programs included the Midwest Consortium for Hazardous Waste Workers Training, the New England Consortium/Civil Service Employees Association (NY) (TNEC/CSEA), the New Jersey/New York Hazardous Materials Worker Training Center, and the Western Region Universities Consortium (WRUC). All four programs are university based and offer open-enrollment and contract H&S training courses to employers and the general public.

The survey questions and methods were developed through key informant interviews conducted in 2010 with 28 health and safety managers from a range of industries who rely on our programs for their HAZWOPER training needs. The study team also considered findings of a 2008 pilot study of mid-level managers conducted by the New England Consortium [Roelofs, Slatin & Volicer, 2008]. The resulting survey tool consisted of 18 questions examining what motivates respondents to ensure employees received hazmat-related H&S training; what they look for in a training provider; their expectations of training, including intentions for involving trained employees in H&S planning and decision making; and the impact they believe HAZWOPER training has had in the workplace. Survey items included a mix of closed- and open-ended questions, and the questionnaire was designed to be completed in approximately 15 min. The survey questions were pilot tested with individuals who had participated in the initial key informant interviews. SurveyMonkey served as the online platform for the final survey tool.

The study targeted managers from both the private and public sectors who sent employees to any 40- or 24-hour Hazardous Waste Operations or 8-hour Refresher course; 24-hour Treatment, Storage, or Disposal (TSD) Facility Worker course or 8-hour Refresher; or Emergency Response courses offered by any one of the programs. Potential survey respondents were identified in one of two ways. Managers who arranged contract courses for their employees were contacted directly and asked to participate. In open-enrollment courses, trainees were asked for the name and contact information for the H&S decision maker in their workplace as well as the name and contact information for the person who arranged for them to take the course. Through these avenues, we identified 325 potential management respondents to whom invitations were sent by email. The invitation explained project goals and objectives. Potential respondents were provided a link to the online survey tool and offered an incentive for their participation: the chance to be entered into a raffle drawing to win one of four iPod Nanos.

The study was approved by Institutional Review Boards of the four universities that sponsored the study. No signed written consent was required for this study; consent was

implicit when respondents accessed and completed the survey tool. Data collection took place from August 1, 2011, through July 31, 2012.

Survey questions regarding managers' motivations and expectations of training were asked in two ways. First, respondents were presented a list of factors and asked to rate each factor on a three-point Likert scale from "highly important" to "unimportant." Then respondents were asked to identify the single *most important* factor on the list. This dual question structure allowed us to examine the relative influence of various factors on managers' motivations and expectations and to assess managers' responses when pressed to choose between potentially competing priorities. Survey questions regarding the perceived impacts of training were designed using three- and five-point Likert scales. For all survey items, respondents were allowed to provide open-ended comments on their responses. Quantitative results were analyzed using Excel. Qualitative responses were combined into a single document and analyzed for key themes, which in turn were used to help interpret the quantitative findings.

RESULTS

Sample Characteristics

Of the 325 individuals who received an invitation to participate in the survey, a total of 124 responded. One hundred and nine surveys had enough information to be included in the subsequent analysis, for an effective response rate of 34%.

Respondents held a wide variety of job titles. Nearly half (45%) had explicit H&S titles such as environmental or H&S managers, safety officers or inspectors, environmental engineers, industrial hygienists, or environmental H&S specialists. Other common titles included project or operations managers and supervisors (21%). A small number of respondents (5%) had director or assistant director titles or other miscellaneous titles (7%).

Characteristics of the respondent companies and agencies are summarized in Table I and represent the diversity of workplaces covered by HAZWOPER. Companies and agencies ranged in size from fewer than 20 employees to into the thousands; the median company/agency size was 300 employees. The majority of respondents were from the private sector. Thirty-six percent of respondents reported their companies/agencies had negotiated H&S roles for union employees. The majority of respondents indicated their worksites had one or more hazard identification and control programs in place.

Motivations for Providing HAZWOPER Training

Factors shaping the H&S training decisions of respondents are shown in Table II. Managers most frequently ranked employee safety considerations as highly important in their decision to provide HAZW-OPER training; regulatory concerns were ranked slightly less often as highly important. When asked to identify the *most important* factor in this list, one-half (51%) of respondents indicated that protecting workers from hazards or preparing them for emergencies was the most important reason to provide training; an additional forty-two percent (42%) indicated they were motivated most by the fact that training was required by OSHA or EPA.

Constraints to providing HAZWOPER training included the financial cost of training and costs associated with employee release time; both were ranked by about one-third of respondents as highly important limiting factors (Table II). Respondents indicated the costs of release time were the *most important* factor limiting HAZWOPER training. Lack of management commitment to training and unclear regulatory requirements were each cited as *most important* by about 12% of respondents.

Respondents most often ranked “background or experience of trainers” as highly important (91%) when selecting a training provider (data not shown). Other highly ranked factors included “provider reputation” (78%) and “willingness to provide training at a convenient location” (70%). Also important were interactive training methods, use of group exercises and industry-specific case studies, and trainers’ ability to keep courses “fresh and lively.”

Finally, respondents were asked how the training they provide to employees might differ from what they currently provide if there were no OSHA HAZWOPER standard in place (Table III). While 44% indicated they would provide the same level of training, many indicated they would provide less by arranging for shorter and/or less frequent courses and relying more on computer-based approaches. A number of comments indicated that, in the absence of a specific regulation, full 40-hour HAZWOPER training would be provided to a smaller group of employees with particular titles or specific job tasks (e.g., emergency responders).

Expectations of Employees Following Training

Respondents most frequently indicated that maintaining knowledge and skills relevant to the job was the *most important* outcome they expected of trained employees (Table IV). About one-fifth (21%) cited the need to earn or maintain a certificate documenting successful completion of HAZWOPER training as the most important factor, while an additional one-fifth (20%) cited the importance of employees learning to perform their jobs more efficiently or safely.

About three-quarters of respondents indicated employees who completed the training were much more likely than other employees to engage in safer work practices or comply with facility safety rules (Table V). Respondents had overall lower expectations of management to involve trained workers in specified activities to improve the workplace, such as reporting H&S issues, developing H&S plans and procedures, participating on H&S committees, identifying gaps in H&S programs, or evaluating H&S program effectiveness.

Perceived Impacts of HAZWOPER Training

More than three-quarters of respondents strongly or somewhat agreed that HAZWOPER training had “made our company or agency more prepared for emergencies” (87%) or “helped improve health and safety policies and procedures” (77%) (Table VI). Other commonly perceived impacts at the organizational level included improvements to H&S programs (73%), improvements to work quality (68%), stimulation of more H&S training (62%), and increased resources dedicated to H&S issues (57%).

Respondents also reported that training had lead to fewer hazard exposures. Nearly three-quarters agreed that HAZW-OPER training had reduced unsafe or unhealthy conditions (74%), and more than half agreed it reduced the number of accidents (58%).

DISCUSSION

Hazardous waste operations and emergency response activities pose unique H&S challenges for workers who are at risk of exposure during site cleanup, hazardous waste handling or hazmat emergency response activities. Work processes require a specially trained workforce with the knowledge and skills needed to identify hazards and take necessary precautions to protect themselves and the public [Slatin, 2009]. Training is a vital component of the HAZWOPER standard, designed to facilitate the participation of workers in creating the safest possible working conditions [Elisburg & Moran, 2001; NIEHS, 2006; Delp, Podolsky & Aguilar, 2009; NIEHS, 2012]. In addition, regulatory requirements for supervised onsite training and annual refresher training provide a unique opportunity for trained workers to maintain up-to-date knowledge and hone their skills and expertise as they apply to specific worksite conditions.

The findings from this exploratory study shed light on the motivations and expectations of mid-level managers operating in hazmat work contexts where regulatory requirements for worker training are explicit. Such work settings offer a valuable opportunity to examine in more detail the relative role regulations and other factors play in shaping managers' decisions about employee training.

Motivators for Providing Training

Survey responses regarding managers' motivations to provide training for employees suggest that while many mid-level managers are driven by concerns about employee safety, compliance with regulatory requirements serves as an important motivator and helps support training in the face of competing operational and resource demands. Respondents' split in motivations to provide HAZWOPER training—i.e., whether out of concern for employee safety or to achieve regulatory compliance—suggests that they see both aspects as important (Table II). These are not mutually exclusive goals, but with forty-two percent indicating they provide training principally because it is required by OSHA or EPA, the importance of regulations as a driver to protect training resources is clear. Many respondents indicated their preference for HAZWOPER training featuring experienced instructors, interactive training methods, and industry-specific case studies—factors that align with the NIEHS minimum criteria for quality training [NIEHS, 2006]—but at least one-third reported that, without a standard in place, they would likely provide less frequent training or would shift to more online options to save time and money (Table III). As one manager from a public utility in New England indicated:

I would focus the training on a tighter (smaller) group to be called on to respond in an emergency rather than train a broad base of employees. Full level cleanup activities would be left to a vendor specializing in those activities.

Other managers reported that they would seek to increase efficiencies by eliminating annual refresher training for all HAZWOPER employees and instead provide training only to those who do not seem to understand the rules.

Even for respondents who indicated they were motivated mostly by the desire to protect workers from hazards or prepare them for emergencies, the costs associated with training delivery or production time lost for training remained important factors potentially limiting the amount of training employees receive (Table II). In these cases, OSHA and EPA standards appeared to serve as important safeguards against pressures to cut costs. As one public sector manager from the Midwest explained:

My choice would be to provide the same level of training. [However] our operating divisions most likely would either eliminate it or cut way down on the number of their people who would attend or get trained.

A third comment from a public sector manager in California further underscores the role of regulations in supporting H&S training for workers—in this case, the California requirement for an Injury and Illness Prevention Program:

As an emergency response agency, our employees respond to hazmat spills. The employee would need the same level of training even if HAZWOPER was not in place because providing training concerning known hazards is part of our Injury and Illness Prevention Program.

Perceived Impact of Training

Survey respondents perceived positive impacts of HAZWOPER training on H&S programs and on reduction of hazardous exposures in the workplace. A large proportion of respondents reported that training had helped improve their H&S policies and procedures, made their companies or agencies more prepared for emergencies, and reduced unsafe or unhealthy conditions in the workplace (Table VI). These perceptions of positive impacts raise important questions about the mechanisms through which training is most likely to bring about changes. Many respondents reported a strong likelihood that trained employees would engage in safer work practices and comply with safety rules (Table V), suggesting a perception of training as leading principally to behavior-based changes in the workplace. This understanding aligns with respondents' reported expectations for training—that employees maintain knowledge and skills and learn to perform their jobs more effectively and/or safely (Table IV). These outcomes are clearly important. A focus on employee safety behavior, however, may limit the potential effectiveness of worker training as a resource for improving H&S programs through active employee engagement.

Trained Workers as a Resource

Comparison of results within Table V suggests that managers in this survey may not fully recognize the potential for trained employees to participate in shaping the organization's H&S program and improving workplace conditions to reduce and prevent injuries, illnesses, and fatalities. In contrast to employee behavior-based safety activities, fewer respondents indicated that management decisions would likely extend to involving trained employees in hazard reporting, program development and participation, or assessment of workplace H&S

systems, despite the fact that most respondents reported having such systems in place. Almost no respondents prioritized active involvement in H&S programs or emergency response activities as most important in their expectations of training. An appreciation of training as a means to encourage employee engagement in workplace H&S programs could further enhance the value of training by giving trained employees opportunities to provide input into site-specific H&S program components [Cohen & Colligan, 1998; Becker & Morawetz, 2004; Weinstock & Slatin, 2012]. Future H&S training research should further investigate factors supporting or discouraging managers' decisions to involve trained workers in aspects of their H&S programs.

Limitations and Strengths of the Study

Our study sample does not represent all H&S managers in HAZWOPER-related industries or those from other industries who must comply with other H&S regulations. The sample size is small, and since respondents were drawn from a population of managers who arrange routine training for employees from established providers, respondents may represent a subset of employers and businesses that are especially concerned about employer H&S and compliance with regulations. Furthermore, the HAZWOPER regulation includes some of the most stringent requirements for H&S training, including the provision that employees conducting HAZWOPER activities be trained before engaging in the work. These regulatory expectations coupled with the inherently hazardous nature of the work may provide extra incentive for these managers to secure training for their workforce.

The study has a number of notable strengths. Our research methods gathered information on a topic on which little peer-reviewed literature exists. Key informant interviews served as an important mechanism to inform the development of a survey tool that captured a range of mid-level manager expectations and perspectives regarding H&S training. By recruiting respondents through four university-based training consortia in the Northeast, Midwest, and West coast, we obtained responses from a diverse sample of managers from different geographic regions of the United States and across various industries and sectors. Results of this exploratory survey provide sufficient data to develop a preliminary view of worker safety and health training that has not been presented to date and from which future research questions can be generated. Occupational H&S researchers interested in the impacts of worker training should prioritize strategies for reaching managers and employers. In light of their control of production processes and protocols, understanding managers' perspectives on workplace H&S is an essential step in achieving the OSHA's mandate for healthy and safe workplaces.

CONCLUSION

Mid-level managers influence the potential impacts of worker H&S training in various ways, yet few studies to date have examined managers' beliefs and attitudes about what motivates them to provide training for their employees, what they look for in training providers, their perceptions of the value and impact of training at their worksite, or how they balance the H&S needs of frontline workers with both regulatory requirements and financial or time pressures within the company or agency. This study offers a window into these issues. The

positive impacts managers ascribe to training—from improved H&S policies and procedures and emergency preparedness to reduction in unsafe or unhealthy conditions—are consistent with existing evaluation research that shows the effectiveness of worker training in reducing workplace illnesses, injuries and fatalities [Fernandez, Daltuva & Robins, 2000; Mukherjee et al., 2000; Burke et al., 2006; Robson et al., 2012]. Further research that examines just *how* training brings about these changes—and the specific role that mid-level managers play—can increase our understanding of mechanisms through which worker knowledge and skills result in improved workplace conditions. The study also demonstrates the role of regulations in contributing to manager decisions and behaviors. The findings suggest that OSHA regulations help support workplace investments in H&S resources, particularly in the face of competing demands [see Brown, Lippin & Eckman, 2000]. The explicit training requirements under the HAZWOPER standard and their influence on managers' training delivery decisions may offer lessons for workplaces where no regulatory training mandates exist.

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TABLE I**Characteristics of Respondents Companies/Agencies**

Industry	Percent
Manufacturing	27.8%
Government	23.1%
Environmental Services	8.3%
Public Safety or Emergency Response/Preparedness	8.3%
Utility	6.5%
Healthcare	5.6%
Construction	3.7%
University/Academic	3.7%
Waste Treatment, Storage, or Disposal	2.8%
Mining	1.9%
Transportation or Distribution	1.9%
Other	6.5%
Company Size	Percent
<20	16.7%
20–100	13.9%
101–500	34.3%
501–1500	17.6%
>1500	16.7%
No answer	0.9%
Sector	Percent
Private	61.1%
Public	38.9%
Negotiated H&S Roles for Union Employees	Percent
Yes	36.4%
No	42.1%
Dont know	21.5%
Hazard Identification and Control Programs in Place	Percent
Emergency response/evacuation plan	94.3%
Site-specific health and safety plan	88.7%
Joint management-employee health and safety committee	85.7%
Medical surveillance program	77.9%
Near miss or other hazard reporting system	75.2%
Management-only health and safety committee	40.2%

TABLE II

Factors Encouraging and Limiting Training

How important is each of the following factors in your decision to provide employees with HAZWOPER training?	Percent Highly Important	Percent Most Important
Protects employees from hazards	86.9%	33.3%
Prepares employees for emergencies	85.2%	17.6%
Required by OSHA	81.6%	31.5%
Required by EPA or other federal agency	73.8%	10.2%
Required by company or agency policy	71.0%	1.9%
Part of company or agency health and safety program	63.6%	2.8%
Improves employees job performance	57.4%	2.8%
Training requested by employees	34.0%	0.0%
Provides workers compensation or insurance discounts	14.3%	0.0%
Total	—	100%
How important is each of the following factors in limiting the amount of HAZWOPER training your employees receive?	Percent Highly Important	Percent Most Important
Time costs for employees being off-the-job for training	33.0%	43.3%
Financial cost of training courses	35.8%	24.0%
Lack of upper management commitment to training	16.8%	11.5%
Unclear regulatory requirements	13.1%	12.5%
Total	—	100%

TABLE III

Training Decisions in the Absence of Regulation Guidelines

If there were no OSHA HAZWOPER standard in place, how might the training you provide to employees be different than what you currently provide? (Check all that apply)	Percent
I would provide employees with the same level of training	44.0%
I would provide more online training	32.1%
I would provide refreshers only for those who do this work regularly	25.7%
I would provide employees with less than 40 hr for initial training	22.0%
I would provider refreshers less than annually	17.4%
I would customize the 40-hour or refresher course	9.2%
I would provide refreshers only for those who have shown they do not understand the health and safety rules well	8.3%

TABLE IV

Expectations of Trained Employees

Thinking about what you expect employees to get from HAZWOPER training courses, how important are each of the following?	Percent Highly Important	Percent Most Important
Maintain knowledge and skills relevant to the job	94.3%	44.3%
Learn to perform their jobs more effectively and/or safely	89.6%	19.8%
Keep up with changes to regulations that apply to our worksite	83.0%	7.5%
Earn or maintain certificate	76.4%	20.8%
Gain knowledge for active involvement in the organizations emergency response activities	67.6%	0.0%
Gain knowledge for active involvement in the organizations health and safety program	58.5%	7.5%
Total	—	100%

TABLE V

Changes to Employee and Management Behavior

How likely are employees of your company or agency to do the following as a result of completion of HAZWOPER training?	Percent Much More Likely
Engage in safer work practices	75.7%
Comply with safety rules	74.5%
Maintain safety gear or ER equipment	69.8%
Report near misses or unsafe conditions	57.9%
How likely is management at your company or agency to do the following with employees who have completed HAZWOPER training?	Percent Much More Likely
Encourage them to report health and safety issues	46.7%
Involve them in enforcing health and safety policy	40.0%
Ask them to develop health and safety plans and procedures	37.1%
Invite them to participate on health and safety committee	34.9%
Ask them to identify gaps in health and safety program	32.7%
Involve them in evaluating health and safety program effectiveness	32.1%
Assign them to train other workers on health and safety or environmental issues	29.5%
Involve them in reviewing workplace injuries, illnesses, or fatalities	29.2%

TABLE VI**Impacts of Hazwoper Training in the Workplace**

Indicate your agreement or disagreement with the following statements about the impact HAZWOPER training has had on your company or agency	Percent Strongly Agree or Somewhat Agree
Health and safety programs	
Made our company or agency more prepared for emergencies	86.9%
Helped our company or agency improve its health and safety policies and procedures	76.6%
Improved our health and safety program	72.9%
Helped improve the quality of our work	67.9%
Stimulated more health and safety training	61.7%
Encouraged us to devote more resources to health and safety	57.0%
Helped improve productivity	40.6%
Allowed us to meet bid requirements for new projects	25.7%
Hazardous conditions and exposures	
Reduced unsafe or unhealthy conditions	73.8%
Reduced number of accidents	57.9%
Increased reports of near misses	42.1%
Reduced workers compensation claims	24.3%