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Study and Recommendations by the Advisory Committee on
Occupational Safety and Health regarding

"Women in the Construction Workplace: Providing Equitable Safety and Health Protection"

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Women in the Construction Workplace:
Providing Equitable Safety and Health Protection

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Occupational Safety and Health Administration

Advisory Committee on Construction Safety and Health (ACCSH),
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ABSTRACT

As increasing numbers of women enter the construction trades, concerns about their health and safety are growing. In addition to the primary safety and health hazards faced by all construction workers, there are safety and health issues specific to female construction workers. The small percentage of females within the construction trades and the serious health and safety problems unique to female construction workers have a circular effect. Safety and health problems in construction create barriers to women entering and remaining in this field. In turn, the small numbers of women workers on construction worksites foster an environment in which these safety and health problems arise or continue.

Sources of information for this report include a survey of tradeswomen conducted by CWIT and two research studies by NIOSH. The key findings and recommendations are organized into seven categories: Workplace Culture; Sanitary Facilities; Personal Protective Equipment; Ergonomics; Reproductive Hazards; Health and Safety Training; and Injury and Illness Data and Research.

Similar concerns surfaced in all three studies. The prevalence of a hostile workplace, restricted access to sanitary toilets, protective clothing and equipment in the wrong sizes, and poor on-the-job training-these were significant issues that adversely impacted women's ability to perform their jobs safely.

Many of the identified problems are amenable to change through engineering, behavioral, or administrative intervention. The recommendations in this report are directed at employers, labor unions, manufacturers, training programs, supervisors, and workers. Improving the work conditions for women in the construction trades will not only ensure their health and safety, it will also serve to attract and retain women as workers during a critical time of labor shortages in this industry.

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INTRODUCTION

Some safety and health hazards have a greater impact on female construction workers

The primary safety and health hazards for the construction worker are: falls, being struck by/against (falling object, machinery), caught in/between (trench cave-ins, between vehicle and object), electrocution, musculoskeletal disorders (lifting, awkward postures, repetitive motion, hand-tool vibration, flying/falling objects), and exposure to a variety of chronic health hazards (noise, silica, asbestos, manmade fibers, lead and other metals, solvents, hazardous wastes, heat, and extreme cold).¹ While these health and safety issues affect both men and women, women working in construction have additional safety and health concerns, and some safety and health hazards have a greater impact on female construction workers. Inadequate physical protection, a possibly hostile work environment, and their status as a small fraction of the construction workforce are factors that add to women's concerns.

The construction industry as a whole is facing a nationwide crisis with respect to the availability of qualified labor. With the demand for labor outstripping supply, construction employers need to expand their recruitment efforts to previously untapped labor sources, including women. Thus, they need to ensure that the work environment is "woman friendly."

This report will not cover the health and safety concerns of all construction workers. Rather, it attempts to summarize the additional concerns of women working in construction, and the report will propose recommendations to help OSHA, NIOSH, employers, unions, and workers provide equal safety and health protection in the construction industry for all construction workers, regardless of gender.

BACKGROUND

60% of women age 16 and older participate in the workforce

Today, nearly 60% of women age 16 and over participate in the workforce. While women have made some gains in occupations traditionally occupied by men, construction trades remain overwhelmingly male dominated. In 1970, when OSHA was enacted, women made up less than one percent of workers in the construction trades.² By 1995 that percentage had only grown to 2.3 percent.

The small percentage of females working in the construction trades and the serious health and safety problems unique to female construction workers have a circular effect. Safety and health problems in construction create barriers to women entering and remaining in this field. In turn, the small numbers of women workers on construction worksites foster an environment in which these problems arise or continue.

Very little information has been collected on the safety and health concerns of women construction workers. This report will summarize findings from three studies that were designed to help identify and understand the health and safety hazards encountered by female construction workers. The first study, conducted by Chicago Women in Trades (CWIT), used mail surveys, phone interviews, and focus groups to ask 200 Chicago area tradeswomen about issues affecting their work.³ Although safety and health were not the primary foci of the study, concerns about these issues were uncovered in the responses to other questions asked in the study. The second and third studies were conducted by NIOSH.^{4 5}

Fifty-five tradeswomen participated in the first NIOSH study through focus groups, one-on-one interviews, or surveys. Using the findings from the first study, the second NIOSH study collected data from 213 tradeswomen during half-hour phone surveys. The two NIOSH studies focused specifically on health and safety issues affecting women construction workers.

The results of these studies, other research findings, and the discussions of the HASWIC workgroup are highlighted below. The findings support the importance of creating policies and initiatives to address and improve the working conditions faced by tradeswomen. This report provides a starting place for those initiatives.

The paper is divided into seven subject areas where safety and health issues for women occur:

[Workplace Culture](#)

[Sanitary Facilities](#)

[Personal Protective Equipment and Clothing](#)

[Ergonomics](#)

[Reproductive Hazards](#)

[Health and Safety Training](#)

[Injury and Illness Data and Research](#)

The report concludes with recommendations intended to improve health and safety for women construction workers.

WORKPLACE CULTURE

**88%
percent
of the
respondents
reported
sexual
harassment**

The construction industry has been overwhelmingly male dominated for years, and on many jobsites women construction workers are not welcome. Sex discrimination and anti-women attitudes are still prevalent on worksites, despite the fact that sex discrimination is illegal.⁶ Several studies have shown that female construction workers suffer from gender and sexual harassment, a factor associated with low job satisfaction as well as psychological and physiological health symptoms and workplace injuries. NIOSH found that, in a one year period, 41% of female construction workers suffered from gender harassment. In the CWIT study, 88% of the respondents reported sexual harassment.

Isolation—working as the only female on a job site or being ostracized by co-workers—evokes both fear of assault and stress. Many tradeswomen report that they are reluctant to report workplace safety and health problems lest they be tagged as complainers or whiners, straining further their workplace relationships and jeopardizing their employment situation.

Hostile Workplace

**"You may get
this job
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government,
but
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alive.
...we'll take
care
of that."**

A hostile workplace presents safety and health concerns on several levels, ranging from a lack of training and safety information to physical assault. Distractions while working can lead to not taking proper safety precautions, resulting in on-the-job injuries. The effects of a hostile workplace can be reflected in acute as well as chronic stress reactions. Indeed, OSHA has begun to recognize workplace violence as an occupational safety and health issue.

One illustration of how a hostile workplace is an occupational safety and health issue can be found in a two-part newspaper article on sexual harassment of women miners at an Eveleth (Minnesota) mine.⁷ One of the women who experienced severe and unrelenting harassment at a mine testified that a male co-worker said he would throw "the little bitch" in the concentrator bins, huge receptacles for mixing iron ore powder. Such an action would likely cause the victim to suffocate or be crushed under the weight of the taconite. Some of the female miners testified that they carried knives to work or kept loaded guns within easy reach in their cars, because they believed their lives were in danger.

In the second NIOSH study, tradeswomen were asked if, in the past year, they had been mistreated by co-workers and/or supervisors because they were female. Forty-one percent responded that they had. The findings also showed that harassment by co-workers and/or supervisors was an important predictor for symptoms of increased psychological and physiological distress.

According to CWIT's study, tradeswomen find the sexist attitudes (and accompanying behavior) present on construction sites intolerable and stress producing. They reported negative behavior ranging from belittling remarks and constant checking of their work to threats of physical violence. Fifty-two percent of the survey respondents reported that men refused to work with them during their construction careers. One former carpenter explained,

The problem is that there's a mixture of skills you don't have as a woman, and, at the same time, you're dealing with hostile men. You could deal with the dangerous work if the men treated you right, or you could handle the men if the work wasn't so dangerous. It's the combination that's so hard.

A former welder reported,

I applied for an apprenticeship with the ironworkers. The men who were applying formed groups and sent someone from each group to talk to me. They threatened me. They said, 'You may get this job because of the government, but you won't leave it alive. We'll be on a site with you some day, and we'll take care of that.' At another job, every morning the men came in, punched the time clock, and then spat on the floor in front of me.

**"Sometimes
they drop
things
on you,
hammers and
wrenches...."**

A carpenter commented,

I've been around a lot of the older journeymen and a few others who really don't want to see women out there.

Tradeswomen tell of threats of physical harm, sabotaged work, and being placed in dangerous situations by male co-workers and supervisors. The NIOSH phone survey showed that, in the past year, 10% of the women reported having their work vandalized, and 10% had experienced threats of physical violence by co-workers and/or supervisors. The following quotations from the CWIT study provide examples:

I was going down a ladder one day that was, I don't know how many stories, and he [her foreman] came over there and took the ladder and started shaking it. If I had fallen I'd be dead, I was just that high. I said, 'Stop shaking the ladder,' but he kept shaking it and laughing, saying 'She's scared, she's scared.'

Sometimes they drop things on you, hammers and wrenches—dangerous things like that, supposedly by accident, from ladders or scaffolding. I just throw it back and say, 'You dropped this and I don't want you to have to come back down for it.'

Many tradeswomen report that their physical strength is often "tested" by their male co-workers. They recount being asked to lift or carry materials that men would not handle alone. Some women said they

**Female
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harassment
complaints**

often felt they had to overcompensate in their work to "prove" themselves to their co-workers and bosses. Many new male apprentices experience a period of hazing at first, but for women the poor treatment persists. It is intended not to "test," but to drive the women away.

A number of women in the first NIOSH study reported they often felt that they could not ask for help because that would start the scenario of "See, I told ya she couldn't do it." Most were extremely concerned with how asking for help would be perceived by their co-workers and particularly their foremen.

The women said:

A lot of times I feel like I've got to do this because I'm a girl, because if I don't they're going to say, 'See, what'd I tell ya, she's a girl. She can't lift it.'

I didn't [ask for help], I ended [up] getting myself injured. It took once and one time only. I won't do it again, I won't be too proud to ask for help.

Women injure themselves more than the men because they refuse help, and they are not allowed to ask for help, and it's a much bigger deal if a woman asks for help.

I ended up almost hurting myself just to try to prove that I can do the job as well as he. Then it ended up that I got angry, and really told him. I had had enough ...he was shocked, because I was in his face, and that was it.

Sexual Harassment

**43% had
experienced
uninvited
sexually
suggestive
looks,
comments,
joking,
or gestures
from their
supervisors**

Sexual harassment is a serious problem for female construction workers. According to a 1996 *USA Today* analysis of U.S. Equal Employment Opportunity Commission and Bureau of Labor Statistics data, female construction workers had the second highest rate of sexual harassment complaints per 100,000 employed women.⁸ Female miners had the highest rate. Sexual harassment in the workplace is not only an equal employment opportunity issue but is also increasingly recognized as a safety and health issue.

Sexual harassment violates laws prohibiting sex discrimination in employment. Under Title VII of the Civil Rights Act of 1964, as amended, unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature constitutes sexual harassment when:

1. submission to such conduct is made either explicitly or implicitly a term or condition of an individual's employment;
2. submission to, or rejection of, such conduct by an individual is used as the basis for employment decisions affecting such individual; or
3. such conduct has the purpose or effect of unreasonably interfering with an individual's work performance or creating an intimidating, hostile, or offensive working environment.

Furthermore, under Affirmative Action Requirements announced by the Office of Federal Contract Compliance Programs, federal construction contractors have a responsibility to ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites and in all facilities at which the contractors' employees are assigned to work.⁹

While the problem of sexual harassment is gaining increased attention in all workplaces and civil rights remedies are more aggressively pursued, many are beginning to see it not only as an issue of employment discrimination but as a real workplace safety and health issue as well. The International Labour Organization, the Trades Union Council, and the Canadian Labour Congress have publicly recognized sexual harassment as an important health and safety issue. There is growing evidence that sexual harassment, at a minimum, is a stress producer and, in its more extreme forms, can pose a danger as a result of distraction, fear, and assault. ¹⁰

According to the NIOSH and CWIT studies, sexual harassment in various forms is a fact of working life for most tradeswomen. Complaints range from subtle forms of sexual harassment such as being stared at, "pinups" of naked and nearly naked women, and unwanted sexual remarks (including comments on appearance) to being touched in sexual ways and sexual assault. Women tell of co-workers spreading vile rumors about them and playing "pranks," such as putting condoms on their car antennas. Women also report threats of physical harm, and many prefer to work in areas with several workers. Unpublished findings from a survey conducted in 1989 in cooperation with the Massachusetts-based Women in the Building Trades, showed that 43% of tradeswomen surveyed had, at some point in their career, experienced uninvited sexually suggestive looks, comments, joking, or gestures from their supervisors.¹¹ Seventy-two percent reported the same from co-workers.

In the second NIOSH study, 34% of the tradeswomen answered "true" to the question: "In the last year, have co-workers and/or supervisors made unwanted sexual suggestions about, or references to, sexual

activity?" Also, 16% said that they had experienced unwanted physical contact, including that of a sexual nature, from co-workers and/or supervisors during the last year.

In the CWIT study, tradeswomen reported the following forms of sexual harassment: 88% had been confronted with pictures of naked or partially dressed women; 83% experienced unwelcome sexual remarks; and 57% reported being touched or asked for sex. The study included the following quotes:

Some of the pictures they had on their lockers made me sick. I don't mean *Playboystuff*, although I don't like that either. It was the *Penthouse* and the *Hustler* stuff that made me feel so angry.

There was a lot of harassment. One time one man said to me in front of twelve other men, 'I'd like to eat the lining out of your stuff.' I ran out of that trailer crying. One man came out of the trailer and said, 'He's just high, don't let it bother you.' But it did bother me. The other men started making lots of remarks after they found I was going to file a suit. I fell in a mud hole and almost drowned after that; I wasn't focusing on my work. I got hurt on my next job because of that—I wasn't focusing.

**57% reported
being
touched or
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Sexual harassment of female traffic controllers at a road construction site was the subject of a 1988 Appeals Court decision ¹² in which the court ruled in favor of the female plaintiffs. Darla Hall, Patty Baxter, and Jeannette Ticknor were hired as "flag persons." Immediately after the women started work, male members of the construction crew began to inflict verbal sexual abuse on the women, referring to the women with obscene adjectives. They nicknamed Ms. Ticknor "Herpes" after she developed a skin reaction due to a sun allergy. On one occasion, Ms. Baxter returned to her car and found vulgar anatomical names written in the dust on the sides of her car. Male crew members repeatedly used crude obscene requests to ask Ms. Hall if she wanted to have sex, and they requested that Ms. Hall and Ms. Baxter engage in oral sex with them.

In addition to the verbal abuse, male co-workers subjected Ms. Hall and Ms. Baxter to offensive, unwelcome physical touching. All three women also experienced other types of abuse at work. The women were "moonied;" a crew member exposed himself; obscene pictures were flashed at the women; and co-workers urinated in one woman's water bottle and another's gas tank.

Another example of abuse was also a safety and health hazard. The women complained when carbon monoxide fumes leaked from the pilot truck, causing the driver to become drowsy. The mechanic ignored the women's complaints and, instead, forced the women to rotate their positions so that no one was in the truck for more than a short period of time. Eventually the women quit their jobs.

Impact of Isolation on Safety and Health

**"When you
have more
than one
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You don't want
to be alone."**

Often a tradeswoman will find that she is the only woman on a jobsite. Twenty-two percent of respondents to the CWIT survey had never worked with another woman. Isolation, when experienced within a hostile workplace culture, can add to a woman's fear of harassment and assault. To quote several tradeswomen:

They [coworkers] were starting to talk really dirty. ...it was filthy stuff. Plus they were starting to touch me. I was the only woman on the job. I was the steward, but I was the only woman on the job, and we were in a shanty that I never felt comfortable in with them anyway.

When you have more than one woman working with you, you have a better chance. You don't want to be alone. The stress is incredible. I had too many illnesses because of that. The more women there are, the more the climate begins to change. I don't have close friendships with the other women, but the fact that there are more women helps.

When you go to a job and you see another woman, it's a big relief.

Hazard Reporting and the Link to Job Security

"When I complained that there was no toilet they transferred me to another jobsite. They took me away from a really good partner and good overtime."

The work culture described above—combined with tradeswomen's more tenuous hold on their jobs than that of the more senior or more favored male workers—deters women from reporting unsafe or unhealthy working conditions. Women in the first NIOSH study reported that they could not bring up the issue of proper restrooms or worksite safety, because it might threaten their jobs. But such safety and health issues, nonetheless, are of major concern to tradeswomen.

In a hostile environment, where women already feel vulnerable, calling attention to these problems is not always possible or productive. One woman explained that, if a new employee complained about the lack of adequate restroom facilities for women, "You'd see yourself bye-bye." An electrician in the CWIT study found:

When I complained that there was no toilet they transferred me to another jobsite. They took me away from a really good partner and good overtime.

As evidenced in the following quotations, the women feel that complaining about safety issues does not win points with other workers.

Women in the construction trade...can't go out there whining ...or we can't go out there and complain. We just have to bite our lip and deal with it if we want to keep our job and if we want to get along with fellow workers.

Tradeswomen are targeted for early layoffs anyway, so you can't be putting them in positions to get themselves in trouble.

Sixty-two percent of the women interviewed in the second NIOSH study felt insecure about job promotions and/or advancement in the industry.

SANITARY FACILITIES

80% of tradeswomen have encountered worksites with dirty toilets or no toilets

Access to sanitary facilities is frequently a problem on a new construction site. Temporary facilities are usually unisex, often without privacy, and generally not very well maintained. Sometimes there are no sanitary facilities available for women to use. Due to the lack of facilities, women report that they avoid drinking water on the job, risking heat stress and other health problems. Courts have found that the lack of appropriate sanitary facilities is discriminatory and violates OSHA standards.

Unclean facilities can result in disease as well as urinary tract infection (for those who delay urinating rather than using such facilities). The availability and cleanliness of restroom facilities are major concerns for tradeswomen. In CWIT's report, 80% of tradeswomen have encountered worksites with dirty toilets or no toilets. Respondents to the CWIT survey said that facilities, when available, were filthy or were some distance from the site. Thirty-five percent of the women in the second NIOSH survey answered "false" to the statement, "There are clean toilets at most jobsites."

Inadequate, unsanitary toilet facilities were the subject of a 1987 U.S. Appeals Court decision.¹³ Eileen Lynch, a female carpenter apprentice with the Tennessee Valley Authority (TVA), was fired for using the large, clean, fully-equipped restrooms in the main building of the plant, which was off limits to construction personnel. She used these restrooms occasionally after her doctor diagnosed her with a bladder infection. Some of the men she worked with used them regularly and were not disciplined. The construction site contained two portable toilets for women, one at each end of the work area, and 21 other portable toilets not designated by sex, but primarily used by men.

The portable toilets were dirty, often had no toilet paper or paper that was soiled, and were not equipped with running water or sanitary napkins. In addition, those designated for women had no locks or bolts on the doors and one of them had a hole punched in the side. To avoid using the toilets, Ms. Lynch began holding her urine until she left work. Within three days after starting work she experienced pain and was advised that the practice she had adopted, as well as using contaminated toilet paper, frequently caused bladder infections.

Holding urine

**in the
bladder for
more than
an hour leads
to a higher
incidence
of urinary tract
infections**

The scientific literature and recorded evidence indicate that holding urine in the bladder for more than an hour after experiencing the urge to urinate leads to a higher incidence of urinary tract infections. ¹⁴

The Appeals Court ruled that the condition of the toilets limited female Construction Service Branch employees in a way that adversely affected their status as employees based solely on their sex. It held that any employment practice that adversely affects the health of female employees, while leaving male employees unaffected, has a significantly discriminatory impact. It said that the employer created an unacceptable situation in which Ms. Lynch and other female construction workers were required to choose between submitting to a discriminatory health hazard or risking termination for disobeying a company rule.

The TVA argued that portable toilets had been approved by the commission established under the Occupational Safety and Health Act and that female employees must accept them as part of construction work. However, the court said that the issue was not the decision to use portable toilets. It was the failure to furnish adequate and sanitary facilities to female workers who had been shown to suffer identifiable health risks from using portable toilets in the deplorable conditions of those furnished by the TVA at the construction site.

In the previously discussed *Hall v. Gus Construction Company* sexual harassment case of female flagpersons at a road construction site, male crew members would also refuse to give the women a truck to take to town for bathroom breaks. When the women would relieve themselves in the ditch, male crew members observed them through surveying equipment. The foreman knew about the practice but did not discipline anyone. The women miners at Eveleth mine also testified that they were sometimes denied bathroom facilities.

In the CWIT study, a number of women mentioned they would not use restroom facilities until they found a clean one at lunch time. A plumber reported,

The toilet was so dirty I couldn't make myself use it. I was lucky there was a restaurant across the street where I could go during breaks and at lunch, but even that was inconvenient.

Another NIOSH study participant said,

There are certain times of the month when you don't want to go to the woods or whatever. Yes, this is a big issue.

**"There are
certain times
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An electrician related:

Today I used a portable toilet without a hood. They can see your head. I felt like the whole world was watching. You know they pee on the seat, so I didn't want to sit down.

Most women agreed that this problem also extends to male co-workers, but that the men have accepted this health problem as part of the work culture. One woman said,

I think the guys have problems also, but they take it for granted. They accept the conditions as part of this rough world that they function in. And also, many times if there is no near bathroom, they'll just pee....

The lack of water for washing up was also a problem. Women have a more frequent need for washing, especially during monthly menstrual cycles. One woman suggested that simply having a bucket of chlorinated water for hand-rinsing before and after visiting the porta-john/jane would be helpful.

As one electrician said,

I'd just love to be able to wash my hands before lunch.

PERSONAL PROTECTIVE EQUIPMENT AND CLOTHING

**Poor fit
compromises
the protection
offered by
the garment
or equipment**

Many women in nontraditional jobs, such as the construction trades, complain of ill-fitting personal protective clothing (PPC) and equipment (PPE). Clothing or equipment that is not sized, or does not fit, properly can compromise personal safety. It also may not function effectively in the manner for which it was designed.

Poor fit compromises the protection offered by the garment or equipment. The lack of appropriate PPC and PPE can cause serious safety and health risks for women, and men of smaller sizes, who rely on protective clothing and equipment to help them keep safe. Having inadequate or ill-fitting clothing, boots, gloves, or safety equipment presents a safety hazard for any worker.

Studies by NIOSH and the U.S. Department of the Army found that most tools, equipment, and clothing are not designed for a women's physique. ^{15 16} When asked if they could easily find protective clothing to fit, 46% of women in the second NIOSH said "no" with respect to work shoes and 41% with respect to finding work gloves. One survey of manufacturers of protective equipment, taken at a National Safety Council Annual meeting, found that only 14 percent offered ear, head, and face protection in women's sizes. The highest percentage, 59 percent, were manufacturers who offered foot protection in women's sizes.

Ill-fitting personal protective equipment may be due to unavailability (i.e., manufacturers don't make or distributors don't stock), limited availability, or lack of knowledge among employers and workers about where equipment designed for a woman's body structure can be obtained. Personal protective equipment intended for use by women workers should be based upon female anthropometric (body measurement) data.

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Work gloves must fit properly. Overly large gloves impair the transfer of sensory information from the hand, resulting in excessive force being applied. Tight gloves can restrict blood flow. Hand tools should be designed so that the stress concentrations can be spread evenly throughout the hand.¹⁷

A recent NIOSH review found that few tools, equipment, or clothing are designed for a woman's physique. A recent study commissioned for the U.S. Army had similar findings.

Women in the first NIOSH study were particularly outspoken about this concern. One of the participants said:

When I went through the welding apprenticeship, ...they issued us welding boots, size 9-1/2, I had to wear two pairs of socks to wear them. They gave me a welding leather jacket that was a foot longer than my hand. I had to roll it up. And they said that they couldn't order anything smaller. They gave me gloves so humongous, I couldn't even pick anything up.

Another woman's story reflects the frustration felt by these women

I went to get up in a full suit the other day, and you couldn't see me! I mean, I don't want these. Just give me my coat, and I'll put on a couple pairs of coveralls. Sizes...we need our sizes...women's sizes.

Beyond frustration is fear and the real danger of poorly fitting and ineffective clothes and personal protective equipment.

You can be hurt.... If you happen to have a pair of gloves on, and they're too big, and say you're doing some work, that glove could get wrapped up in a fan belt or... anything... with moving parts... you can get hurt... if your clothing is not fitted right.

They need to get in touch with apprenticeship programs, with contractors, and push if they have women's work boots and women's gloves for non-traditional trades. The information is not getting out there.

"They do not make hand tools for women, and women come in all sizes, just like men."

Recent studies have shown that to reduce work-related musculoskeletal disorders, tools, materials, and equipment should be designed based in part on ergonomic considerations.¹⁸ Tools and equipment, like clothing, are often designed to be used by average-sized men.¹⁹ As one woman in the NIOSH study noted:

They do not make hand tools for women, and women come in all sizes, just like men.

Handle size and tool weight are designed to accommodate the size and strength of men, yet the average hand length of women is 0.8 inches shorter than the average man's. Their grip strength averages two-thirds the power of a man's grip.²⁰ The grips of tools are typically too thick. Tools like pliers require a wide grasp which puts inappropriate pressure on the palm, leading to the loss of functional efficiency. In addition, women do not receive training on how best to use tools and equipment designed for men.

Similarly the epidemiological studies, which provided the strongest basis for the NIOSH guidelines on lifting, were predominantly based on male workers.^{21 22} There is a critical need to increase our knowledge of the "safe limits" for women for lifting and other motions, such as forward flexion of the trunk (bending over). This information would be useful for preventing low back disorders among women working in construction. Back disorders, the most commonly compensated injury in the workplace, are particularly problematic in construction.²³

Women's size and body build require reconsideration of techniques for lifting and material handling. Not only do women come in all sizes and with varying degrees of muscular strength, their pelvic structure is different and their center of gravity is lower than men's. This would impact jobs that require standing at a work station. Lower equipment handles would facilitate the use of body weight in pushing and pulling tasks. Women's muscular strength is more equal to men's in their legs. Women would be on more equal footing with men if the work load could be transferred downward, with less reliance on the strength of hands and arms.

Since, on average, women tend to have less upper body strength than do men, they cannot use all of the techniques men use for lifting and material handling. Out of necessity, tradeswomen have to develop ways that make the job possible and safer for a woman. For example, a plumber from the first NIOSH study stated:

You learn what not to do.... I have a body, I can use it from here [top of head] down to my feet. I don't have to use my upper body. They [male workers] have upper body strength where we have it [strength] from here [top of head] to our toes. The guys will ... grunt and groan and struggle ... and I'll sit down, put my feet on one side [of the wrench], and pull on the other.... That's what I consider using my brain instead of my brawn.

Another tradeswoman concurred, saying,

How to lift and how to bend – I didn't learn this until I ended up on physical therapy. I think that it's something we really need to look at, especially for individuals going into non-traditional work, is the way you lift and bend and move.

REPRODUCTIVE HAZARDS

There are more worksite exposures known to affect male sperm development than known to produce birth defects

There is inadequate information on the extent to which female construction workers are exposed to reproductive hazards in the workplace. Reproductive hazards are defined as chemical, physical, or biological agents that can cause either reproductive impairment or adverse developmental effects on fetuses. Epidemiologic studies involving reproductive hazards are difficult to perform due to such factors as small sample sizes, confounding factors, and measurement difficulties.

Only a few agents or conditions have been identified as being capable of producing structural abnormalities or birth defects, with a fraction of those being common to construction sites (PCBs, hypothermia, and, for hazardous waste workers, ionizing radiation.) However, several agents such as lead, solvents, and pesticides have been recognized to affect sperm development.²⁴ The vast majority of both male and female construction workers are of reproductive age and, thus, are at risk of potential harm if exposed to chemicals and conditions which have not been fully studied with respect to their reproductive hazards in humans.

Although there are more worksite exposures known to affect male sperm development than known to produce birth defects, some employers find it easier to resolve potential problems by denying jobs to women, especially pregnant women. This is in spite of Supreme Court rulings prohibiting employers from continuing this practice. While these actions may be well intended, their effect is needless limitation on work opportunities for women. This can lead to discriminatory treatment toward tradeswomen and result in a tradeswoman hiding her pregnancy, possibly endangering herself and/or her unborn child. It can also

"The safety

director told me he had a problem with me working at all since I was pregnant."

result in tradeswomen suffering economic hardships due to the lack of job opportunities. Tradeswomen in the CWIT study commented:

I knew they'd tell me I couldn't work if they knew I was pregnant, so I just wore big clothes and said nothing. No one knew, and I worked through my eighth month.

When I got pregnant my company agreed to give me light duty. But then they laid me off when everybody else was still working. My union wouldn't help me get another job after that, even though they were usually pretty good.

When I asked for a job in the fabrication shop instead of climbing a ladder and working the sledge hammer, the safety director told me he had a problem with me working at all since I was pregnant.

The American College of Occupational and Environmental Medicine adopted reproductive hazards management guidelines in April 1994, encouraging persons responsible for workplace health and safety to assess their workplaces for potential reproductive hazards and to implement appropriate responses for managing such hazards. Appropriate responses include: communication about potential risks and hazards, temporary reassignment, hazard elimination, and exposure control.

HEALTH AND SAFETY TRAINING

31% said that at times they are assigned a task and are not sure how to do it

Inadequate information, and the lack of education and training, about workplace safety and health greatly concern women workers. The culture and attitudes of construction workers, supervisors, and companies about health and safety often condone risk taking and unsafe work practices, passing "bad" habits from one generation of workers to the next.

The workers in the studies commented that the attitudes of some journeymen and other co-workers toward apprentices, particularly female apprentices, affected (mostly negatively) the amount and kind of on-the-job training that was provided. Apprentices are not always provided with information and training on how to work correctly and safely, and opportunities to learn through practice may be withheld. Female workers are not always given sufficient opportunity to learn or test new skills. Due to the hostility that often accompanies it, women in particular do not benefit from the informal training common among their male peers. Tradeswomen also do not benefit from misguided attempts to protect female workers from difficult assignments.

Thirty-nine percent of the women interviewed in the second NIOSH study answered "strongly agree" or "agree" to the statement, "Overall, I wish that I had been better trained before ever working on a construction site." Thirty-one percent said that at times they are assigned a task and are not sure how to do it.

Availability of Training

"[The men] had a lot of little tricks that made the job easier. But no one ever showed me those tricks."

Often the on-the-job skill-based training done in construction is by observation, rather than by direct instruction. The learning methods are frequently cited by tradeswomen as inadequate. Women observed that:

I think a lot of that [health and safety] information doesn't get to the hands of the people who need to know....

Men have a lot of ways of doing a job easier. They have shortcuts. Let me tell you, I used to watch those guys.... I just used to watch them because they had a lot of little tricks that made the job easier. But no one ever showed me those tricks.

Many women think that their male co-workers are more adept at gaining skills and learning the tricks of the trade, due in part to the benefits they receive from mentoring, coaching and general acceptance by their male colleagues. Women are often precluded from this type of informal training as a result of being less welcome on a site or because of hostile behavior and attitudes of male co-workers and supervisors. When their training is limited to observation and when they lack formal training, women feel they are at a distinct disadvantage. Women report that often they are not given the variety of assignments needed to adequately learn their trade. Instead they are assigned to routine, unskilled tasks like cleaning and sorting tools. Rather than progressing to more complex tasks, they do the same task over and over. For example, a cement finisher in the CWIT study reported:

Nobody really talked much to me on my first day on the construction site. But at the end of that first day one fellow said, 'I'm not going to train her so she can take my job.'

A carpenter told:

They won't show how they're actually feeling. But they do these little snotty things, set things up backwards and so on. I learn how to do things backwards before I learn the right way. You have to figure it out yourself.

An electrician said:

My supervisor thinks he's doing well by us [women] by having us do the easiest jobs, but I'm almost a third year apprentice, and I should be more advanced. He's one of those overprotective kind of people.

One woman summed it up by saying:

You can't learn safety by chance, you need direction.

Lack of Support for Workplace Training

Some female workers also expressed the concern that many of their male co-workers did not seem interested in participating in on-the-job safety education and training, and that some supervisors and bosses did not necessarily encourage such training. Related to this issue was the sense that, in many instances, productivity comes before safety. Seventy-eight percent of the tradeswomen in the second NIOSH study reported that significant shortcuts are taken, which could put a worker's health and safety at risk. These sentiments are reflected in the following comments by tradeswomen in the first NIOSH study.

**"The boss
doesn't
say, 'You'd
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safety
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because
I don't want my
workers' comp
bill going up.'"**

Many don't want to go to safety meetings. I don't know if it's a machismo thing or what. They're getting paid. But then there's always the contractor or boss breathing down your neck, saying 'how come this [work] wasn't done?' The boss doesn't say, 'You'd better go to that safety meeting because I don't want my workers' comp bill going up this year.'

One tradeswoman reported:

Sometimes they [workers] are just under pressure. They feel they need to produce; they need to be quick; they don't want to seem like too fussy.

Despite OSHA regulations, women often feel that they have to take things into their own hands, as reflected in the following comment:

We should insist the employer take responsibility, but they often don't. If we, as a very small group, can have some autonomy to make some changes for ourselves, like to tell women, 'bring your earplugs, bring your masks, bring your eye protection'.... [We could] get a start on protecting ourselves.

Another participant said:

You also run across attitudes [that], 'It's not gonna happen to me. I can take a chance here and there and it's not gonna happen to me.'

She also observed that the unsafe habits of the older workers are picked up by younger workers:

I work with apprentices and they're the younger ones that are coming up and they're out there and they're picking up these nasty, crappy attitudes and stuff from the journeymen that they're working around, because that's what they see them doing, and it seems to work fine and, you know, you can't combat that without ... an attitude change.

INJURY AND ILLNESS DATA AND RESEARCH

**Among
tradeswomen,
female painters
have the most
injuries and
illnesses
involving
days away
from work,
followed by
carpenters and
electricians**

It is a well known fact that employment as a construction worker may have negative health consequences. The 1980-1989 fatality rate in the U.S. construction industry was 3.5 times higher than that for all manufacturing industries.²⁵ Given the level of risk associated with construction work, it is surprising that little research has been conducted focusing on the health and safety concerns and practices of construction workers. In particular, health research on female construction workers is virtually nonexistent.

Collecting accurate data to measure safety and health concerns is the only way to keep track of problems and progress. While gender-based safety and health data are collected, they are typically not reported or analyzed. Although data from the National Traumatic Occupational Fatalities (NTOF) and Bureau of Labor Statistics (BLS) all capture gender consistently, gender-specific analyses are not typically reported, because women comprise only 2% of non-fatal and 1% of fatal injuries in construction. Analysis by gender is important to identify where there are significant gender-based differences in occupational injuries and illness. While there is little research on the injuries, illnesses, and fatalities of women in the construction industry, there is even less on their health and safety concerns.

BLS's annual Survey of Occupational Injuries and Illnesses has gathered data by gender since 1992. In 1994, there were 4,400 non-fatal occupational injuries and illnesses to women in the construction industry involving days away from work.²⁶ The data, however, have not been analyzed in detail to compare injuries and illnesses of female and male construction workers. Although we know the number of non-fatal injuries and illnesses involving days away from work by construction trade and by gender, we do not know the ratio of injuries and illnesses compared to the numbers of men and women workers. The BLS captures data on the nature of the injury or illness, the part of body affected, the source of injury/illness and the event by gender, but to date these data have not been analyzed and reported out by gender. Findings from this gender-specific analysis could help develop better ways to prevent injury and illness.

The 1994 BLS data do reveal which construction trade occupations have the most injuries and illnesses involving days away from work. Among tradeswomen, female painters have the most (527), followed by carpenters (410) and electricians (254). Among tradesmen, carpenters have the most injuries and illnesses (36,675), followed by male electricians (18,116) and plumbers and pipefitters (13,283).²⁷ The numbers need to be compared with employment statistics for the same occupation to know if the differences between men and women are significant.

CONCLUSION

**The construction
industry...cannot
afford to
overlook
the genuine
safety
and health needs
and concerns of
female
construction
workers**

As the construction labor force becomes more diversified, the construction industry as a whole cannot afford to overlook the genuine safety and health needs and concerns of female construction workers, apprentices, and job applicants. This document is intended to call attention to the real contemporary health and safety issues of women in construction. These issues merit attention to, and action by, all those who share responsibility in the arena of construction safety and health.

The final section of this report provides recommendations that address each area of concern. Some of the recommendations are directed to OSHA and other federal agencies. Other recommendations are designed for various stakeholders to implement. The stakeholders include employers, labor unions, training programs, manufacturers, and employees working in the construction industry. These recommendations will assist the entire industry to improve the acceptance, training, advancement, and working conditions for women in the field. The safety and health issues facing women in the construction trades are in direct proportion to women's overall participation and equitable treatment in the industry.

RECOMMENDATIONS

The following recommendations are action steps designed to address the health and safety concerns of female construction workers as identified in the report. The workgroup believes that with education about, and attention to, these issues, OSHA and all stakeholders can play a role in helping to bring about safe, healthy, and equitable conditions for all workers.

Specific Recommendations for OSHA and Stakeholders

Workplace Culture

- OSHA should collaborate with the Office of Federal Contract Compliance Programs to identify problems of sexual harassment in worksites where they have jurisdiction and take appropriate remedial action. This could be done through a memorandum of understanding.
- OSHA should include sexual harassment prevention training in the Safety and Health Program's proposed standards and guidelines.
- OSHA should encourage labor unions and employers to include sexual harassment prevention training in safety and health programs.
- Review all communication materials to ensure that they are gender neutral and include women. Visual materials (videos, posters, pictures, etc.) should include examples of female construction workers to promote an integrated construction workplace.
- To address the problem of workplace isolation of female construction workers, employers, apprenticeship programs, and unions (where responsible) should assign female workers in pairs, or more when possible, especially those who are relatively new to the construction trade.
- Employers, unions, and apprenticeship programs should ensure that their supervisory personnel, teachers, and representatives have training and guidelines in ensuring the safety and health and equitable treatment of female workers, members, or trainees. This would include knowledge of the issues raised in this report, sexual harassment prevention, and leadership training.

Sanitary Facilities

- OSHA should amend CFR Section 1926.51 (toilets at construction jobsites) to specify that gender-separate, external and internal locking sanitary facilities be provided on construction worksites, that employees be allowed to use such facilities as needed, be provided keys for gender appropriate facilities, that the toilet facilities be maintained in a sanitary condition and in good repair (e.g., that locks work), that clean toilet paper be provided within reach of the toilet, and that handwashing facilities be located within close proximity to toilet facilities.
- Where change rooms are provided on construction sites, they should also be gender separated and provided with inside and outside locking mechanisms.

Personal Protective Equipment and Clothing

- OSHA standards on personal protective equipment for construction (29 CFR 1926, Subpart E) should be revised to conform with the General Industry Standard for PPE (29 CFR 1910.132) which specifies that the employer select PPE that properly fits each affected employee. As discussed in the preamble to the General Industry Standard, this provision was added in part to address concerns that PPE and PPC often did not adequately fit female employees. Similar consideration should be included in the Construction PPE standard to protect all construction employees.
- OSHA should produce and promote a resource guide on sources for obtaining adequate fitting PPE and PPC for use in the construction industry.
- Manufacturers of PPC and PPE should be encouraged to expand the range of sizes offered.
- Employers should provide the best fitting PPE and PPC currently available.

Ergonomics

- New OSHA initiatives on ergonomics, such as the Technical Assistance Manual, should address the ergonomic hazards that are specific to gender. OSHA should monitor any ergonomic research conducted on its behalf to ensure methodology that includes both male and female subjects.
- As OSHA develops standards, materials, or guidance on ergonomics, it should address gender-based needs.

- Employers, unions, apprenticeship programs, and other training entities for the construction industry should review skills training curriculum to see whether alternative methods are included for getting work accomplished by workers of different sizes or strengths. All training programs should emphasize the importance of not lifting weight beyond an individual's capacity to do so in a safe manner.

Reproductive Hazards

- OSHA should adopt standards similar to the American College of Occupational Medicine's *Reproductive Hazards Management Guidelines* to protect all workers of childbearing capacity and pregnant construction workers.
- OSHA should identify additional research needed to develop a more comprehensive body of knowledge regarding reproductive hazards in the construction workplace.
- Employers should have a Material Safety and Data Sheet (MSDS) for each chemical present on the site. Employees should read all MSDS and share information with their physicians if they are pregnant or planning to become pregnant.

Training

- The OSHA Training Institute curricula and/or other OSHA-sponsored training should include gender-related safety and health issues, i.e., PPE fit, sanitary facilities, workplace culture, and reproductive hazards, whenever programs are provided to the public and to federal and state OSHA compliance safety and health officers.
- OSHA should continue to enforce current on-the-job safety training.
- Employers and unions should make skills training courses available and encourage female workers to take advantage of them. The courses should provide female workers with more opportunities to diversify their skills and minimize their chances of doing tasks incorrectly or in an unsafe manner.

Injury and Illness Data and Research

- OSHA should work with the BLS, NIOSH, and other appropriate agencies to obtain and analyze information on injuries and illnesses among female construction workers. This information should be contrasted with data for male construction workers and other non-construction workers. This analysis would provide guidance to OSHA compliance and policy development activities.

General Recommendations for OSHA

- When OSHA inspects a construction workplace, it should identify any female construction workers. OSHA inspectors should interview a representative sample of women on the site to ensure a broad, non-gender-biased perspective on health and safety concerns of all workers. In addition, female construction workers should be questioned about specific health and safety concerns or issues that are unique to tradeswomen on a jobsite. These issues may include, but are not limited to:
 - the adequacy of personal protective equipment;
 - the sufficiency and sanitary conditions of toilet facilities;
 - the adequacy of safety and health training;
 - problems of sexual harassment and other examples of hostility;
 - how sexual harassment impacts or affects safety and health; and
 - reproductive hazards.
 - All dialogue with female workers shall take place in a manner that ensures the privacy of respondents.
 - To facilitate such focused inspections, OSHA should develop a checklist for on-site inspectors that outlines a range of gender-related safety and health hazards as identified in this report. The checklist should be used to assess conditions by questioning both employers and employees. To promote and support the use of the checklist, OSHA should provide information and training for field staff.
 - OSHA should incorporate gender neutral language in standards, training documents, and communications materials. Visual materials, such as video and posters, should incorporate images of female construction workers to promote the concept of a diverse workforce.
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