Mount Sinai *Selikoff Centers for Occupational Health*

Personal Protective Equipment for Female Construction Workers: Does it Fit?

By Norman C. Zuckerman, MS (Mount Sinai); Demetrios M. Papazaharias, MPH (Mount Sinai); Lynn C. Onyebeke, MA, SM (Mount Sinai); Alice Freund, MSPH, CIH (Montclair State University); Michael McCann, PhD (Mount Sinai); Jonathan Dropkin, ScD, CPE (Hofstra Northwell); John D. Meyer, MD, MPH (Mount Sinai).

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In 2014, there were approximately 873,000 women in the construction industry, employed at every level from managers, administrative personnel and inspectors, to engineers and production staff[1]. Everyone, from managers to frontline workers must use personal protective equipment (PPE) when they walk onto a construction work site.

While the OSHA General Industry Standard states that "the employer shall select PPE that properly fits each affected employee"[2], there is no similar provision in the Construction Standard.

Previous studies on PPE and female construction workers have consistently reported that PPE commonly made available to female construction workers was not designed for women[3, 4]. This is not surprising, given most of the anthropometric data used for PPE templates are derived from studies on military personnel or the general employed population from the 1950-70s, when women were poorly represented[5, 6]. The U.S. Army recently redesigned their combat uniforms to accommodate anatomical variations between men and women after a 2008 qualitative study found that combat uniforms then in use did not account for female anthropometry[7].

As industrial hygienists at an occupational health clinical center in a large metropolitan area, we sporadically receive questions from women experiencing difficulty locating PPE, such as respirators that fit them correctly. While researching our responses to these inquiries, we noticed that one can go online and find a wide array of PPE that manufacturers claim are "designed for women." As a result, we wondered if this current apparent abundance of equipment had altered the dynamic for female construction workers. Specifically, do female construction workers still have difficulty getting PPE that fits them correctly? To answer the question, we conducted a series of focus groups with experienced female union construction workers from three different trade unions (i.e. Laborers, Carpenters and Ironworkers).

For the purposes of our research, we did not distinguish between PPE that employers are required to provide construction workers, such as fall-arrest harnesses, and PPE that employers are not required to supply, such as boots or outerwear.

Our analysis of the focus group responses indicated that many of the same problems still exist. Participants reported fit issues for all of the common types of PPE (gloves, fall protection harnesses, safety vests, welding jackets, eye wear and hard hats as well as work boots and outerwear). Several participants pointed out that size is not the sole factor determining fit, since men and women are proportioned differently. One participant, discussing purchasing protective outerwear, said "If you get something that fits your waist, it may not fit your hips… So then I would end up having to buy a bigger size, but it was huge on my waist."

As with most construction workers, the participants spoke of the overriding importance of getting the job done, which on occasion led them to either purchase their own PPE or use equipment that was less than optimal. "I have to beg them [for a small] and it just never happens, so I ended up buying my own… vest." Many participants expressed how difficult it was for women to purchase "construction-grade" PPE, such as protective clothing or boots that are functional in the workplace. We were told that much of the construction outerwear marketed to women, such as boots and work jackets, was "Barbie-fied" work gear.

The discussion also covered how ill-fitting PPE could impact safety and productivity. One of the participants related a conversation she had with her foreman over the gloves she was using while applying a chemical paint stripper: "Can you please order me a pair of gloves that'll fit me so I won't have to worry about them slipping off or dipping my hand in these corrosives and toxic …chemicals." A welder in one of the focus groups explained how ill-fitting welding gloves affected her welding: "You can't pick up the rod because … you're using oven mitts." The type of equipment the participants discussed the most, not unexpectedly, varied by trade. Welders mentioned problems associated with using overly large welding jackets and gloves; individuals working with concrete reported difficulty getting rubber boots that fit correctly.

After the study was completed, a stakeholders meeting was organized to disseminate our findings and to provide an open forum for a discussion of potential solutions. The consensus of the stakeholders, mostly union health and safety officers, was that most contractors and unions were not mindful of the issue and it was unlikely that many of the individuals in charge of purchasing safety equipment considered purchasing PPE designed for women. Participants agreed that in order to bring about the necessary changes we must first increase awareness within the industry of the challenges facing female construction workers. Somewhat surprisingly, even though there have been attempts to raise awareness, such as the OSHA Women in Construction web page, a few of our stakeholders said that they had not been mindful of the PPE issue confronting female construction workers.

Due to the changing demographics within the construction industry there may be additional sub-groups such as smaller men facing similar fit issues.

Based on the results of our study and input from the stakeholders meeting, we have developed the following recommendations:

- All employees are entitled to a safe work environment that includes uniform access to PPE that fits correctly and does not create an additional burden for the worker.
- OSHA should update the Construction Standard Criteria for personal protective equipment to include provisions that PPE fits the worker.
- Regulatory agencies, manufacturers, distributors, employers and unions need to recognize the issue facing female construction workers and promote better distribution, purchasing and supply of PPE for all employees.
- Contractors should make sure they have the means to provide all workers with properly fitted PPE in a timely manner at the beginning of the job through project completion.
- Training organizations, companies and unions should educate workers on the importance of using PPE that fits correctly and how to determine that it does fit correctly.
- Additional anthropometric research is required to determine if the PPE currently available to women and other outlier sub-groups, such as smaller men, fits them correctly.

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RESOURCES

Government

- OSHA Women in Construction, **www.osha.gov/doc/topics/women**
- NIOSH Publications on Anthropometry, **www.cdc.gov/niosh/topics/anthropometry/pubs.html**
- Ontario Women's Directorate and the Industrial Accident Prevention Association, Personal Protective Equipment for Women Addressing the Need, **www.iapa.ca/pdf/2006_ppe_women.pdf**

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This report was developed by: Norman C. Zuckerman, MS (Icahn School of Medicine at Mount Sinai); Demetrios M. Papazaharias, MPH (Mount Sinai); Lynn C. Onyebeke, MA, SM (Mount Sinai); Alice Freund, MSPH, CIH (Montclair State University); Michael McCann, PhD (Mount Sinai); Jonathan Dropkin, ScD, CPE (Hofstra Northwell); Sadie Sanchez, MD, (Mount Sinai), and John D. Meyer, MD, MPH (Mount Sinai). Thanks to Sean Brennan of the Mason Tenders Training Fund; Elly Spicer, Tamara Rivera, and Vanessa Salazar of the United Brotherhood of Carpenters and Joiners of America; Bryan Brady of the Ironworkers Local 40 and 361 JAC; Sherry Baron, DPH, The Graduate Center CUNY; Linda Goldenhar, PhD, CPWR. Funding for the study was provided by the Pilot Projects Research Training Program of the NY/NJ Education and Research Center. The Icahn School of Medicine at Mount Sinai is home to the Selikoff Centers for Occupational Health. These Centers have expertise in evaluating and treating work-related injuries and illnesses.
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