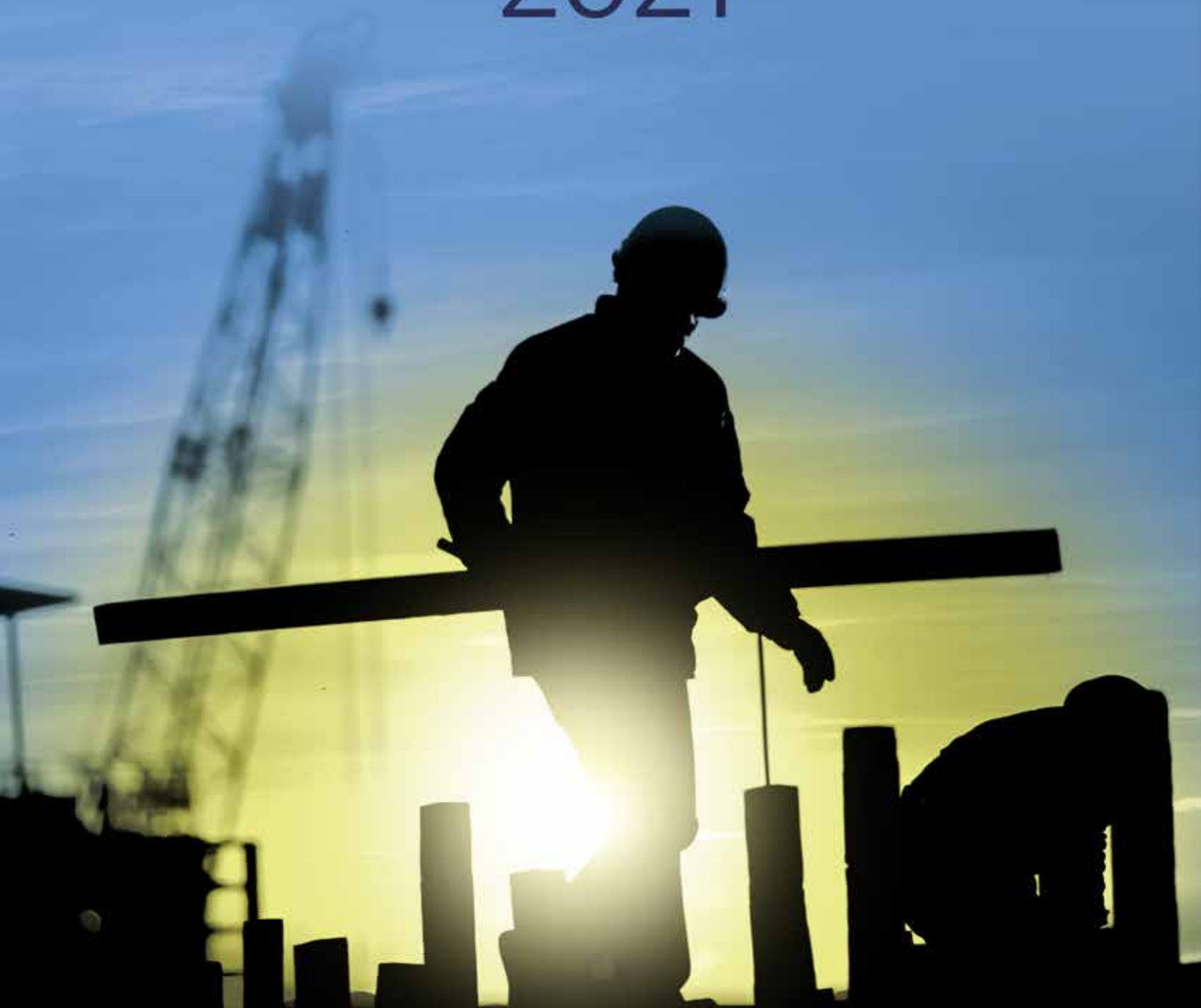


HIGHLIGHTS 2021



CPWR At A Glance

RESEARCH



8,769
ATTENDEES

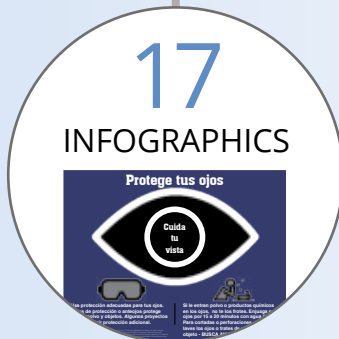
17,792
ON-DEMAND VIEWS



1,914
LINKEDIN FOLLOWERS

35%
GROWTH IN LINKEDIN FOLLOWERS

13 KEY FINDINGS FROM RESEARCH

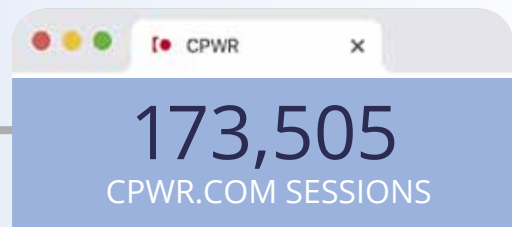


13,379
UPDATE SUBSCRIBERS
23%
GROWTH IN UPDATE SUBSCRIBERS



83,129
YOUTUBE VIEWS

Includes on-demand webinar views



TRAINING

5,204
COURSES OFFERED

1,703
TRAINERS TRAINED

52,672
WORKERS TRAINED

SERVICE

SINCE BTMED PROGRAM BEGAN:

42,000
CONSTRUCTION WORKER SCREENINGS

7,800
LOW-DOSE CT SCANS



100%
SATISFACTION RATE

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Foreword



SEAN MCGARVEY
*Chairman of the Board and
President, CPWR
President, NABTU*

This past year offered an ongoing reminder that people are at the heart of CPWR's work.

That statement might seem obvious, given an organizational mission to reduce injuries, illnesses, and fatalities among the nation's construction workers. But in a time fascinated with technology, it's easy to forget that the most important factor in getting workers home each day are people who understand and are committed to occupational safety and health.

CPWR's staff are leaders in that effort. They offer our industry expertise in key hazards like falls, struck-by incidents, and musculoskeletal disorders. Their knowledge extends into broader areas that help protect workers, such as safety culture and data analysis.

Multiplying the staff's impact is the network of people and organizations CPWR has built over three decades. There are university-based research partners, including those currently addressing concerns both new (like exoskeletons) and persistent (like chemical exposures). There is the training consortium embedded across the NABTU family, with offerings from the introductory OSHA 10-hour class to advanced courses supporting trainers so they're more effective in showing workers how to manage asbestos, confined space, hazardous waste, infection control, and many other hazards. There is the network of medical clinics providing screenings to former construction workers who built and maintained our nation's nuclear weapons sites.

CPWR's collaborations reach even farther. Its partnerships with key government agencies are critical. These partners include leaders at NIOSH, OSHA, DOE, and NIEHS, as well as in state and local governments. CPWR collaborates with safety and health professionals at contractors and consulting firms, sharing approaches and lessons, and it identifies and works with researchers with specialized knowledge when the need is clear.

Two examples show how the people at CPWR lead, respond, and collaborate. One, not surprisingly, is COVID-19. Education is crucial for stopping the spread of the coronavirus, and CPWR has continued to employ its many resources to make our industry smarter about how to create safer worksites. It manages two websites focused on COVID-19, collecting material from dozens of sources and sharing it with thousands of people each month. Its Training Department has shared guidance on effective distance learning so vital courses can continue where needed. Its webinar series continues to feature topics related to the pandemic, this year hosting seven that provided updates on both the latest data and new techniques. Its materials, such as FAQs about the value of vaccines and guidance about proper ventilation, offer straightforward science-based guidance.

Throughout the year, the people at CPWR also kept addressing—and keeping our industry aware of—other hazards. They've continued to be leading organizers of events like the Annual National Safety Stand-Down to Prevent Falls in Construction and the National Stand-Down to Prevent Struck-By Incidents. They've shared knowledge about mental health issues and opioids. They've enabled construction firms, unions, and workers to understand better conditions across the industry, thanks in part to the interactive dashboards the Data Center introduced.

The following pages provide more detail about all this work and more. Together, they show how the people at CPWR and throughout its network are helping workers get home safely to their families.

Executive Director's Message

2021 proved to be another challenging year in the effort to keep construction workers safe on the job. Yet thanks in large part to the readiness and responsiveness of people across our industry, including our staff, researchers, and partners, there was progress worth highlighting.

CHRIS TRAHAN CAIN, CIH

Executive Director

Our Data Center was again an unparalleled resource for documenting areas needing attention. Both its continuing series of Data Bulletins and its new Data Dashboards provided timely information about conditions in construction, from rapidly changing hazards such as COVID-19 to persistent ones like falls and struck-by incidents.

As was true last year, CPWR helped our industry respond to the pandemic in multiple ways. Our researchers provided many forms of guidance, including FAQs about vaccines, our webinar series, and infographics showing good job site practices. Our partners in industry, universities, and government continue to be crucial in our efforts to develop and disseminate current and relevant information.

Our Training team resumed some in-person training while continuing to adapt and improve distance learning to remain effective where needed. Our Building Trades National Medical Program instituted new protocols to safely resume vital health screenings to former construction workers on U.S. Department of Energy nuclear sites.

One of this year's Data Bulletins and one of the Data Dashboards showed, unfortunately, that falls remain the leading cause of fatal injuries on the job site. While we continue to lead the Campaign to Prevent Falls in Construction and fund a research project to reduce falls in residential construction, it is clear our work will continue in this struggle.

We also remain dedicated to reducing the most common non-fatal injuries for construction workers, musculoskeletal disorders (MSDs). One of our current research projects involves identifying methods to strengthen our Best Built Plans program, which targets manual materials handling, and a recently completed Small Study focused on another major cause of those injuries, concrete formwork.

Mental health issues are a growing concern for our industry. To respond, we worked closely with colleagues at unions and universities to update our Opioid Awareness Training Program. Feedback from participants in that program led us to develop a separate curriculum about broader mental health issues, to be available later this year.

Our work also considers emerging technologies. Our researchers are examining the potential hazards of nanomaterials and reactive chemicals, sharing their findings with workers and other industry groups. Our Small Study program has supported several projects that look at using drones and other technologies to improve worker safety and health.

There remains much to be done on each of these issues and many others. Our ability to respond gives us confidence that progress on keeping construction workers safe on the job will continue.

CPWR's Continuing Response to COVID-19

COVID-19 remained a dominant issue for the construction industry this year, and CPWR remained a central part of the industry's efforts to keep workers safely on the job.



Our work continued and expanded the responses we developed when the coronavirus first emerged, with a focus on sharing current, accurate information. In 2021, the joint CPWR-NIOSH webinar series hosted seven more webinars, which had a total live attendance of nearly 2,500, and the entire collection of 21 COVID-19 webinars received 3,545 on-demand views. Four of our Data Bulletins considered the impact of COVID-19 on the industry, and the Data Center's new

Data Dashboards included one focused on vaccinations among construction workers.

Visitors kept using our two COVID-19 websites. The COVID-19 Clearinghouse had 21,124 page views since the last edition of Highlights, and the COVID-19 Exposure Control Planning Tool, released in September 2020, has had 7,065 users and 9,492 sessions.

We also regularly added resources to our main website. We developed guidance such as "Quick Tips to Increase Ventilation at Indoor Construction Sites Without Operating HVAC Systems" in English and Spanish, as well as publishing the report "Ventilation to Reduce COVID-19 Spread in Enclosed Work Areas During Cold Weather: A Survey of Construction Contractors." Research from our NIEHS-funded Training Program provided the foundation for "Best Practices for Distance Learning," three one-page handouts to help instructors and students get the most from online training. We partnered with the University of Texas Health Science Center at Tyler and NIOSH to develop and promote materials that explain the science and value of COVID-19 vaccines and have regularly updated our vaccine FAQs and infographics.

Our Training Department continued to adapt to restrictions on hands-on instruction, finding ways to offer effective classes on a range of safety topics. Working with our consortium of trainers, they redeveloped curriculum that previously required in-person interaction and have introduced new methods that enable students to demonstrate their knowledge virtually.

The spread of the coronavirus last year initially shut down much of the work of our Building Trades National

CPWR THE CENTER FOR CONSTRUCTION RESEARCH AND TRAINING

Quick Tips to Increase Ventilation at Indoor Construction Sites Without Operating HVAC Systems

COVID-19 is airborne and spreads faster and further in enclosed areas than outdoors. Although many construction tasks are conducted outside, bad weather and different phases of building can force workers inside or under enclosed work areas. Since ventilation guidance issued by OSHA, the CDC, and other organizations largely focuses on workplaces with working HVAC systems, below are some suggestions on how to improve ventilation on construction sites.

It is important to remember that improved ventilation is only one element of a layered approach to reducing the risk of COVID-19. It does not replace the need for physical distancing, respiratory protection, face coverings, or planning to reduce the number of workers in proximity to one another.

TIPS TO IMPROVE VENTILATION

- ☐ Increase the introduction of fresh outdoor air into the space by opening windows, doors, or other openings in the structure as weather permits.
- ☐ Use fans/air movers to introduce additional outdoor air and aid in the distribution of that air.
- ☐ Fan placement will vary based on room/area configuration. Air flow from one outdoor opening through a workspace to another outdoor air opening is ideal. In other words, draw fresh air into a workspace via a window or door on one side and exhaust it out of the workspace on the other side.
- ☐ Place fans so they blow potentially contaminated air away from workers. Avoid placing fans in a way that could cause contaminated air to flow directly from one person to over and around another.
- ☐ In spaces with poor ventilation or in areas of isolated air movement, use commercial quality portable High Efficiency Particulate Air (HEPA) air cleaners rated for the expected use/duty.¹ Choose an air cleaner with a sufficiently high clean air delivery rate (CADR) as discussed in the EPA Technical Guide on air cleaners.²
- ☐ The use of fans/air movers that introduce fresh air and include air cleaning filters (e.g., HEPA filters or minimum MERV 13 filtration) are preferred. Pedestal fans are not recommended because they are more of a mixing device than a ventilation device.
- ☐ If your fan is not designed or rated to use with filters, you should verify the actual flow rate from the fan once the filter is installed. Flow rates may be significantly reduced depending on the type of fan and the pressure drop across the cleaning device.
- ☐ Inspect and change filters according to the manufacturer's instructions. Clogged filters decrease air flow, stress the fan motors, and reduce the filter's ability to improve indoor air quality.

Medical Screening Program (BTMed), but BTMed's team developed safety protocols that allowed our network of health providers to resume the vital screenings they provide for former Department of Energy construction workers. They are now addressing the waiting list that had developed.

COVID-19 remains a serious danger to the country and to our construction colleagues. The creativity and commitment of our staff and partners have helped make workers safer on the job and receive the services they need, but we still have much work to do.

CPWR-NIOSH COVID-19 Webinar Series

These sessions were hosted by Chris Trahan Cain, Executive Director, CPWR, and G. Scott Earnest, Associate Director for Construction, Office of Construction Safety and Health, NIOSH.

Date	Title	Description	Panelists	# of Attendees	On-Demand Views
12/17/20	NIOSH Activities Supporting the Optimization of Respiratory Protection	A staff member from NIOSH's National Personal Protective Technology Laboratory described NIOSH research related to respirators and face masks, what it means, and how to use those findings.	Maryann M. D'Alessandro , NIOSH	252	252
1/28/21	Vaccination & Ventilation: A Conversation about Next Steps in COVID-19 Prevention	A discussion about vaccines and ventilation, two things that can make a big difference in the fight against the coronavirus, as well as presentations on new CDC resources, findings from a CPWR survey on ventilation for COVID-19, and general information about vaccines.	Scott Earnest , NIOSH Jessica Bunting , CPWR Jeffrey Levin , University of Texas Health Science Center at Tyler Doug Trout , NIOSH	602	345
2/25/21	Protecting Construction Workers: Guidance on Mitigating and Preventing the Spread of COVID-19 in the Workplace	Members of OSHA's Directorate of Construction and Directorate of Technical Support and Emergency described new guidance designed to help employers and workers identify risks of being exposed to and/or contracting COVID-19 at work and to help them determine appropriate control measures to implement.	Scott Earnest , NIOSH Chris Trahan Cain , CPWR Amanda Edens , U.S. Department of Labor Scott Ketcham , OSHA Tim Irving , OSHA Christina Dragon , OSHA	464	450
3/18/21	An Update on COVID-19 Vaccinations and Q&A with CDC's Essential Workers Team	The leader of the CDC's Essential Workers Team followed up January's session by elaborating on knowledge about COVID-19 vaccines.	Lisa Delaney , Centers for Disease Control and Prevention	290	156
4/14/21	OSHA's National Emphasis Program for COVID-19	OSHA staff shared information on its COVID-19 National Emphasis Program (NEP), created to ensure that employees in high-hazard industries or work tasks are protected from the hazard of contracting COVID-19.	Larry McGowan , OSHA Scott Ketcham , OSHA Timothy Irving , OSHA	257	267
5/13/21	COVID-19 Science and Policy Update with Dr. John Howard	The director of the National Institute for Occupational Safety and Health provided the latest information and research on COVID-19 transmission, testing, variants of the virus, vaccination and vaccine programs, and other return-to-work issues.	John Howard , NIOSH	329	174
7/9/21	Update on OSHA Guidance for Workers Not Covered by the COVID-19 ETS	A presentation and Q+A on OSHA's updated guidance to help employers and workers not covered by the Emergency Temporary Standard (ETS) identify COVID-19 exposure risks and take appropriate steps to prevent exposure and infection.	Christina Dragon , OSHA Larry McGowan , OSHA	275	457
TOTALS				2,469	2,101

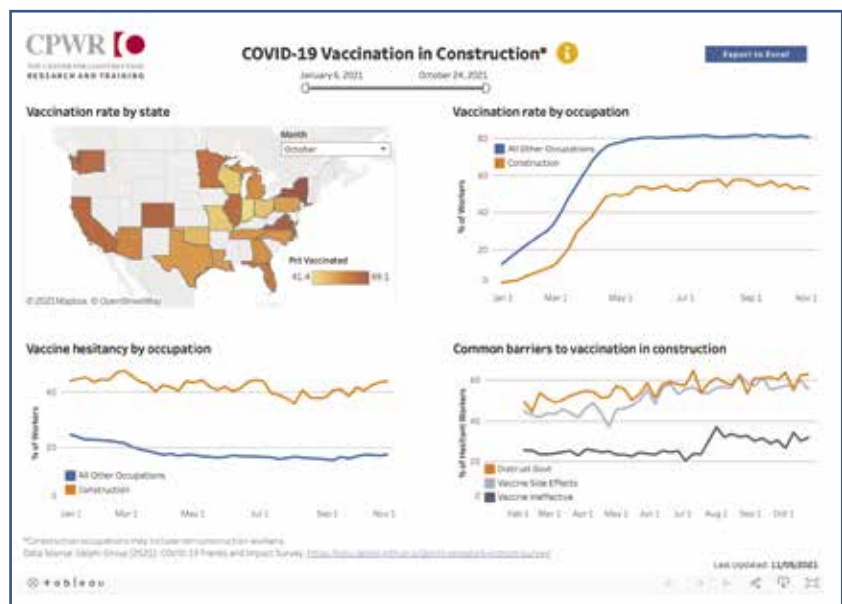
Improving Safety by Researching Hazards Old and New

Our Research Program produces an enormous range of work: data, guidance on safe practices, job site handouts, research papers and presentations, and more. By drawing on the knowledge of contractors, unions, government officials, insurers, our consortium of university-based researchers, and our staff, we translate research into practice and help keep workers safer on the job.

Data Center Dashboards Provide New Tool for Construction Research and Training

To respond to changing industry and stakeholder needs, this year the Data Center launched interactive Data Dashboards. The dashboards draw on newly available data from government and private organizations to cover topics such as construction fatalities, severe injuries, COVID-19 vaccinations, Hispanic workers, OSHA inspections and citations, and characteristics of construction businesses. They provide timely data and flexible charts, making key and detailed statistics related to construction safety and health more accessible than ever before. Stakeholders have praised these new resources and use them heavily: the COVID-19 Vaccination Dashboard receives more than 300 visits per week and has inspired multiple media inquiries. We

update each dashboard when new information becomes available, and dashboards on additional topics will be added in the future. The dashboards will be compiled as an *Interactive Construction Chart Book*, continuing the Chart Book's role as a comprehensive resource and convenient data tool.



PROJECT: Construction Industry Data and Statistical Core (CPWR)

Data Center Remains a Leading Information Provider about Construction

This year the Data Center produced six Data Bulletins, including several documenting COVID 19's substantial impact on construction, in areas from employment to safety management. Other Data Bulletins supported the national stand-downs to prevent struck-by incidents and falls in construction. The most popular bulletin titled "Fatal Injury Trends in the Construction Industry" was downloaded more than 700 times and widely cited. The Construction Chart Book continues to be a vital data resource and was downloaded more than 1,000 times and received nearly 20,000 online views this past year. The Data Center also frequently responds to industry data requests about persistent and emerging issues in construction safety and health.

PROJECT: Construction Industry Data and Statistical Core (CPWR)



Data Center's Study Addressed Injury Inequality in Construction

In construction, minority workers are more likely to suffer work-related injuries than white, non-Hispanic workers. To better understand racial and ethnic inequalities in work-related injuries among construction workers, the Data Center analyzed data from the National Health Interview Survey. This study, published in the Journal of Occupational and Environmental Hygiene, revealed that injury differences among races and ethnicities were strongly associated with demographic differences and socioeconomic inequalities. Lower socioeconomic status, such as lower educational attainment, lack of health insurance, and income below the poverty line among minority workers, underlay the injury disparity. The findings were widely cited and promoted in NIOSH eNews.

PROJECT: Construction Industry Data and Statistical Core (CPWR)

CPWR KEY FINDINGS FROM RESEARCH

Racial and ethnic inequalities in work-related injuries among construction workers

Injury inequalities among U.S. construction workers

Samantha Brown, Raina D. Brooks, and Xiuwen Sue Dong, *Journal of Occupational and Environmental Hygiene*, 2021

Overview

Despite progress towards equality, studies show that minority workers in construction still lag behind their white, non-Hispanic counterparts in education, wage rates, family income, health insurance coverage, pension plans, training, and occupational safety and health interventions. This study uses data from the 2004-2017 National Health Interview Survey, a nationally representative household survey, to explore racial and ethnic inequalities in work-related injuries among construction workers. Racial/ethnic disparities in demographic, socioeconomic, and injury status were examined, and injury differences were evaluated in multiple logistic regression analyses controlling for potential confounders.

Key Findings

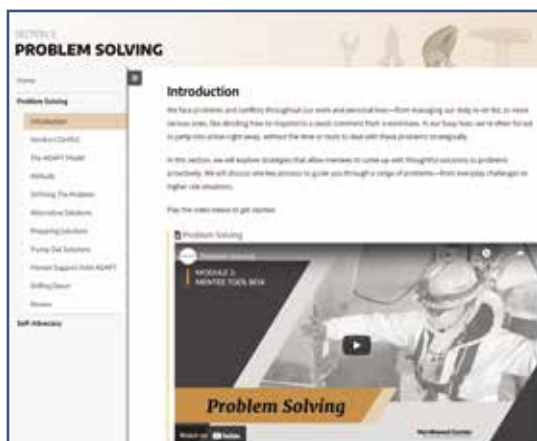
- III In construction, minority workers are more likely to suffer work-related injuries than white, non-Hispanic workers. This study reveals lower socioeconomic status (e.g., lower educational attainment, lack of health insurance coverage, and family income below the poverty level) among minority workers underlying the injury disparity.
- Injury differences among races and ethnicities were strongly associated with demographic and socioeconomic inequalities.
- The odds of work-related injury were significantly higher among workers who were younger, male, not college-educated, blue-collar, or had a family income below the poverty threshold when race/ethnicity and other variables remained constant.
- Injury differences by race/ethnicity were no longer statistically significant after controlling for major demographic and socioeconomic factors.
- III The findings suggest:
 - Injury differences among races and ethnicities were strongly associated with demographic differences and socioeconomic inequalities.
 - The identified higher risks among vulnerable worker groups in construction should be addressed through injury interventions.

For more information, contact:
Xiuwen Sue Dong, xdong@cpwr.com
Read the abstract:
<https://doi.org/10.1093/joc/hyab001>

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Building a Mentorship Program for Women Sheet Metal Workers



Text and video elements came together in the online portion of the mentorship training program, which mentors worked through at their own pace.

This project continued developing a mentorship program to promote safety and well-being among female apprentices with the Sheet Metal, Air, Rail and Transportation Workers (SMART) union. We completed and launched an online, self-paced curriculum that provides mentors training on relationship building, goal setting, active listening, problem-solving, and self-advocacy. Mentors also received a workbook, which summarizes the training, provides space to take notes and track progress with mentees, and helps identify external resources. Four synchronous training sessions gave mentors the chance to practice their skills and support each other. The research team developed and employed a survey to collect baseline data from mentors, mentees, and control apprentices. In the coming year, the first group of matched mentors and mentees will begin to work together, and a second class of mentees will be recruited.

PROJECT: Promoting Safety and Well-being among Sheet Metal Worker Women through Mentoring (University of Washington)

Potential Hazards from Part B Chemicals

To continue their work on reducing the hazards of Part B chemicals in reactive systems, this project's research team focused on assessing organophosphate flame retardants (OPFR) and amine catalysts in spray polyurethane foam systems. A systematic review of product formulations in metal coating systems was also conducted to identify target chemicals for further field studies. For example, using methods it developed for collecting air and skin exposure samples, the team analyzed 85 air and glove dosimeter samples and 100 urine samples for a panel of OPFR and will present the findings at the 2022 American Industrial Hygiene Conference. The team also published papers on exposures to and urinary biomonitoring results of epoxies



in metal structure coatings. To share its findings with three key audiences—construction workers, safety and health professionals, and industry groups like the American

Chemistry Council—the researchers spoke at professional conferences, on webinars, at meetings with industry groups, and are developing Hazard Alert Cards.

PROJECT: Reactive Chemical Systems: Part B—Developing Data-Driven Interventions (University of Massachusetts Lowell)

FSL4Res: Reducing Falls in Residential Construction

This project is adapting CPWR's popular Foundations for Safety Leadership (FSL) training to create the FSL4Res (Foundations for Safety Leadership for Residential Construction), which will teach frontline workers in the residential sector leadership skills they can use to strengthen safety climate and reduce falls—the cause of two-thirds of that sector's job site fatalities. Despite delays caused by COVID-19, this year the FSL4Res research team developed three scenarios demonstrating fall-related safety situations and ways to address them using the FSL skills. In the coming year, the team will be working closely with partners in the homebuilding industry to help find and train instructors, recruit foremen for pilot testing, and disseminate the final FSL4Res program.

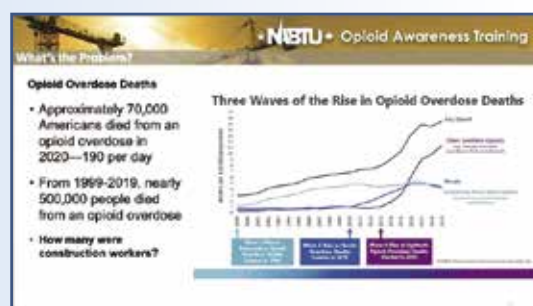
PROJECT: Improving Safety Leadership and Fall Prevention Training in Residential Work (Washington University in St. Louis)

Responding to Mental Health Needs of Construction Workers

Mental health issues such as suicide and opioid use disorder profoundly affected construction workers even before COVID-19. The pandemic has exacerbated those issues, and CPWR has been collaborating with industry partners to respond.

Our work this year included leading train-the-trainer sessions for the NABTU Opioid Awareness Training, updating the training materials with the latest resources and data, sharing our opioid-related work at APHA's Conference, hosting a mental health awareness and suicide prevention webinar, and partnering with local unions and building trades councils to create short videos that highlight CPWR resources. We also published an article in the journal *New Solutions* detailing our efforts to reduce opioid-related harms in our industry.

CPWR is using feedback about the mental health section of the Opioid Awareness Training to create a separate discussion- and activity-based course on that topic. This new training is currently being pilot tested and improved for apprenticeship and other trainers.



Influencing Large Firms' Adoption of Respiratory Risk Controls



Angle grinding, with and without dust capture.

This project is implementing and evaluating a strategy to increase the use of interventions to control respiratory risks facing construction workers in asphalt roofing, concrete, masonry, and welding. Despite challenges created by COVID-19, the research team engaged more than 250 firms, having them use an online training platform that encourages the adoption of these controls through resources such as videos, return-on-investment calculations, and gamification. This year the project focused on large firms, including analyzing the data collected; up next is similar work with medium and small firms.

PROJECT: Health Hazard Controls Industry Diffusion: Evidence-based Intervention Strategy (Virginia Tech)

Liberty Mutual Award Recognizes Three Safety Innovations

In 2021, Liberty Mutual Insurance and CPWR again recognized new products to improve construction workers' safety. The Liberty Mutual Safety Innovation Award in Construction honors innovative evidence-based technologies, work practices, and programs designed to reduce or eliminate construction hazards that lead to injuries and pain. Anchor Thread from Ajustco won the grand prize. Anchor Thread is installed on formwork pre-pour and becomes a permanent anchorage point in the superstructure, available for use in multiple ways. Honorable mention went to ViCAS, which uses artificial intelligence to detect proximity, mitigate blind spot accidents, and prevent collision between heavy vehicles and workers. Also chosen as a finalist was the Hilmerson Safety Rail System, an engineered steel guardrail kit that can be quickly deployed on a variety of surfaces.



Building Bloc Building Services, LLC

Evaluating Approaches for Reducing MSDs

This study continued its evaluation of the benefits from the Best Built Plans program's training to reduce risks to workers from manual material handling (MMH), including musculoskeletal disorders. Although the pandemic slowed the launch of this work and contractors still face many challenges in fully resuming operations, this year the research team began collecting and analyzing field observations of workers performing material handling. Preliminary results showed several tasks scored high risk of injury from MMH, particularly residential workers raising walls, roofers handling demolition materials, and others mixing/handling mortar or handling cabinets. Workers reported mixed results from ergonomic policies and training in their contractors' safety programs: 44% said they often exceeded the recommended lift limit of 50 pounds, but 71% report materials are located close to where they will be installed and about half have received training on how to lift properly. Delivery of the intervention is now underway with plans to improve the program.

PROJECT: Evaluation of the Best Built Plans Manual Material Handling Tool for Construction (Washington University in St. Louis)

Partnering to Address Priority Hazards in Construction

CPWR's r2p Program continues to work closely with the industry—including contractors, unions, OSHA, NIOSH, and the NORA Construction Sector Council Work Groups—to address persistent and emerging hazards such as falls, struck-by incidents, heat, strain and sprain injuries, COVID-19, and mental health. To address these other hazards, we created a wide range of resources such as infographics, toolbox talks, best practices for trainers, and guidance for employers.

Our collaboration with the NORA Struck-by Work Group led to a successful second Annual National Stand-Down to Prevent Struck-by Incidents, which added crane and lift safety to last year's focus on work zone safety. We updated the struck-by section of cpwr.com, hosted two virtual events with Work Group members (attended live 882 times and viewed on-demand 459 times); printed and shared hardhat stickers; and developed two struck-by toolbox talks and four infographics, all in both English and Spanish. We also continued to lead the joint OSHA-NIOSH-CPWR

PROJECT: Research to Practice (r2p) Core (CPWR)



Falls Campaign and Annual National Safety Stand-Down to Prevent Falls in Construction:

- ▶ Creating a Stand-Down Plan and Social Media Guide.
- ▶ Developing two and updating two infographics.
- ▶ Hosting eight fall-related webinars and participating in a ninth.
- ▶ Printing and disseminating hardhat stickers.
- ▶ Producing two fall-related podcast episodes.
- ▶ Updating stopconstructionfalls.com.

To address a broader range of industry partners, one of the Stand-Down webinars was conducted entirely in Spanish for the first time, thanks to help from partner organizations specializing in outreach and training for Spanish-speaking construction workers. Together the webinars were attended live 3,118 times and viewed on-demand 3,506 times.

Identifying the Underlying Causes of Falls from Heights



We launched the first-of-its-kind fall experience survey to understand root causes of falls and how underlying factors interact with one another. Partnering with the NORA Construction Sector Falls Work Group and the ANSI Z359 National Work at Heights Task Force, the r2p Program fielded the survey in English and Spanish,

generating more than 650 responses. Preliminary results highlight the importance of pre-job and pre-task planning for fall prevention and fall rescue, the need for relevant worker training, and the impact of instituting fall protection requirements on the job site.

PROJECT: Research to Practice (r2p) Core (CPWR)

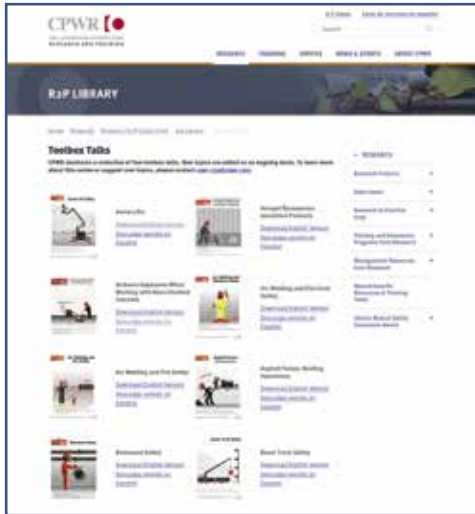
Webinars Inform the Industry on COVID-19, Falls, Struck-By, and More

CPWR's Informational Webinar Series was again a powerful tool for sharing significant information on construction safety and health. This year it offered 27 webinars, including continuing the joint COVID-19 series with NIOSH to keep the industry apprised of the latest information on risks, resources, and control measures. Other webinars featured experts talking about topics such as falls, heat, and struck-by incidents. The quality and the relevance of these events draw both repeat and new participants: in the 12 months since our last report, live attendance totaled 8,769, while recordings of these and older webinars garnered 17,792 on-demand views.

PROJECT: Research to Practice (r2p) Core (CPWR)

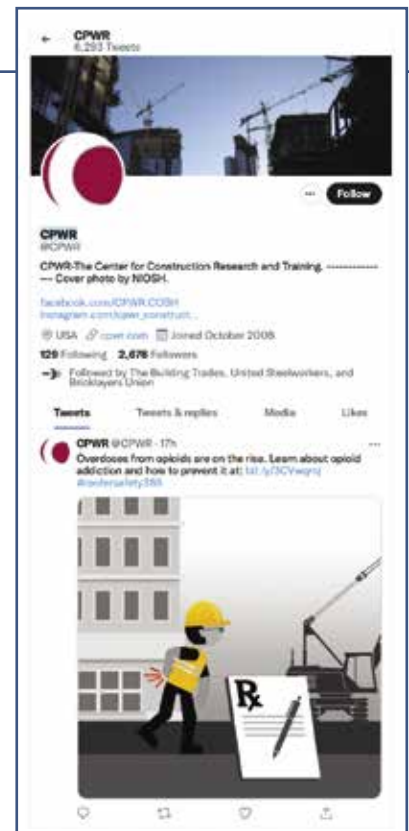
Making Our Outreach More Effective

This year CPWR focused our communications work in two areas. We continued to expand the number of contacts receiving our updates: for example, subscribers to our monthly e-newsletter rose 23 percent; Twitter followers, 10 percent. We



also began several projects designed to increase the impact of what we share. We are studying perceptions of Prevention through Design, including barriers to broader adoption; examining, in coordination with the r2p Program, better ways to convey risk; and establishing more sophisticated analytic tools that will help us better understand audience interests.

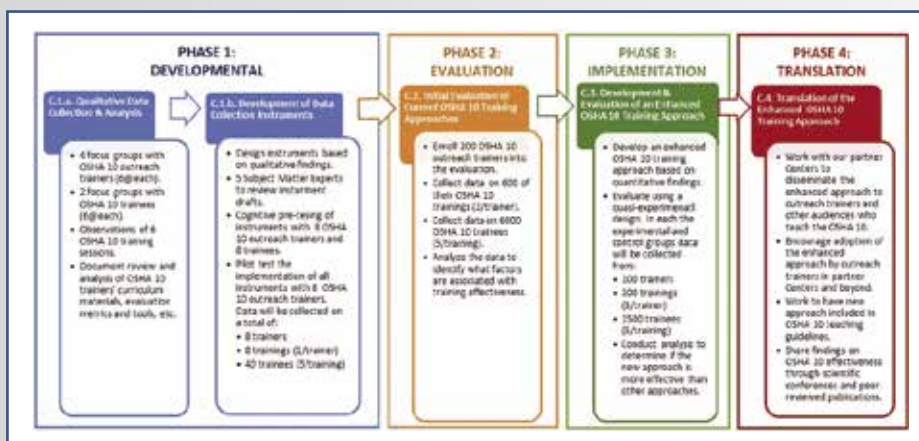
PROJECT: Communications, Outreach and Education Core (CPWR)



Evaluation of the OSHA 10-Hour

This project continued to evaluate the OSHA 10-hour Construction Safety and Health training, one of the most common approaches for providing basic safety training to construction workers. This year the research team conducted interviews of 14 trainers

and 14 trainees, drawing on its earlier analysis of previous OSHA 10 studies, adult education and worker training literature, and feedback from its advisory committee. The trainers said they wanted guidance, materials, and ideas that would help them deliver



PROJECT: Evaluation and Improvement of OSHA 10-Hour Construction Safety Training (West Virginia University, Boise State University)

content in more engaging ways; trainees expressed a similar desire, asking for coursework to be more hands-on and student-led. These findings are helping the team structure the next stage of its work, which will develop an enhanced OSHA 10 approach and determine if it is more effective in improving workers' safety knowledge.

Developing and Sharing Knowledge about Nanomaterials

This project seeks to understand possible hazards of nanomaterials in construction by investigating exposures, controls, and effective safety training. This year, the researchers enlarged the eLCOSH nano online inventory

to more than 750 products, adding nanomaterial-containing products like electrically conductive concrete and windows that act as solar cells. The team informed the industry in other ways, such as developing three

new Toolbox Talks and delivering its train-the-trainer curriculum to union instructors. It also published a study on exposure to silver nanoparticles used in paints and hosted a virtual session at the American Industrial Hygiene Association annual conference. It is now working with the International Masonry Institute to pour test slabs of cement mixed with graphene for upcoming exposure measurements and has begun testing a new web-based tool to help manufacturers of nanomaterial-containing products create more informative Safety Data Sheets.



View of real-time instruments for measuring particles generated during spraying and sanding of paints and coatings.

PROJECT: Manufactured Nanomaterials in Construction: Evaluating Exposures, Controls and Worker Training (CPWR)

Increasing Safety Through Better Pre-Task Planning

This project, which aims to improve the safety and health of workers and their overall performance by optimizing pre-task planning, focuses on electrical construction. The research team is initially exploring task factors and project attributes that increase workers' task difficulty and exposure to hazards. They will then identify interventions that mitigate these factors and enhance overall performance. This year, the team completed a gap analysis of common job hazard analysis (JHA) documents, conducted additional interviews with management teams on JHA obstacles and solutions, and developed a preliminary design for an electrical tasks repository. In collaboration with an industry advisory group, the team also began developing enhanced JHA content and delivery methods.

PROJECT: Prevention through Augmented Pre-Task Planning (CPWR)

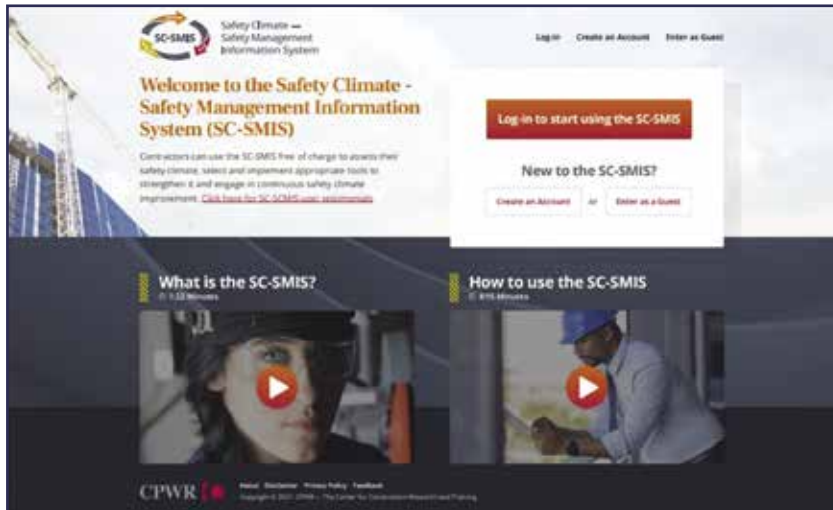


Online Tool for Strengthening Safety Climate using Safety Management Resources Launches This Year

The Safety Climate-Safety Management Information System (SC-SMIS) is the next step in CPWR's award-winning work to help construction companies build a strong job site safety climate. Firms begin

by measuring their safety climate using CPWR's Safety Climate Assessment Tools (S-CAT or S-CAT^{sc}). They then identify and select evidence-based practices, policies, procedures, or templates contained in the SC-SMIS resource

repository to strengthen low-scoring indicators, create a plan to facilitate implementation, and monitor progress. Over the past year, the project team worked closely with an industry user development team to design the system and create a prototype. Feedback from the usability test of the prototype was incorporated into the final beta version of the SC-SMIS, which is currently being piloted at 25 companies from the U.S. and Canada.



Home page of the SC-SMIS website.

PROJECT: Safety Climate-Safety Management Information System (SC-SMIS) (CPWR)

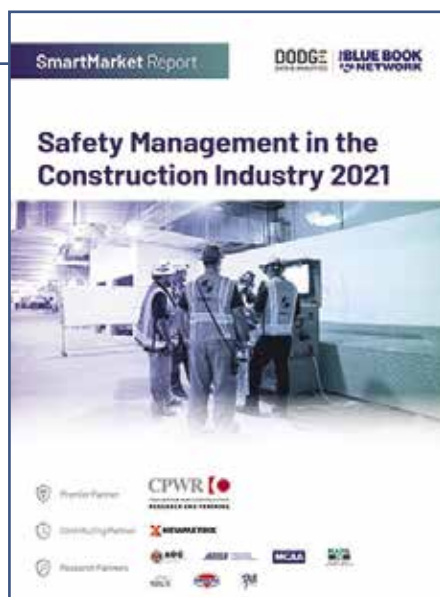
Optimism for and Concerns about Exoskeletons

The research team followed up its survey from last year, which collected responses about the benefits and risks of exoskeletons (EXOs) from more than 350 construction industry stakeholders, in two ways. First, it disseminated through presentations the results of that survey, which revealed both optimism about the ability of EXOs to reduce physical demands and fatigue or increase productivity, but also concerns about hazards such as falls, slips, and struck-by incidents. Second, the researchers developed an additional survey to hear from Latino workers, who were vastly underrepresented among the initial respondents. The project is now expanding its testing, including a full day of safety assessment that includes an agility test (obstacle course) assessing balance, working in confined spaces or risks of getting snagged.

PROJECT: Evaluation of Trunk and Arm Support Exoskeletons for Construction (University of California, San Francisco and Virginia Tech)



Safety simulation exercises.



Latest Dodge Report Looks at Impact of COVID-19, Technology

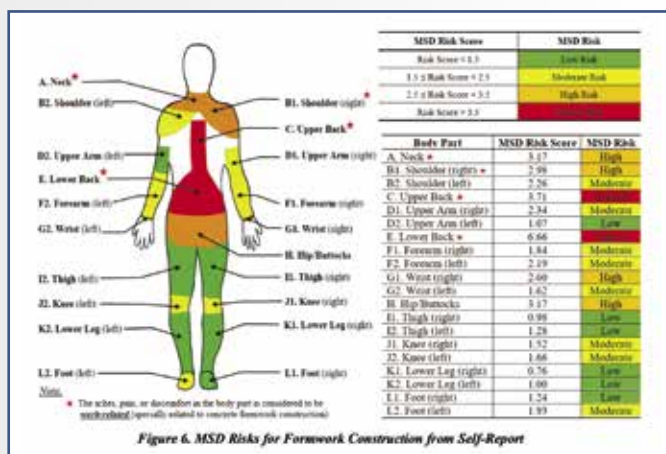
CPWR again collaborated with Dodge Data & Analytics to examine safety management practices in construction. This year's study, *Safety Management in the Construction Industry: 2021 SmartMarket Report*, considered how COVID-19 and new technologies are creating significant changes in how contractors manage safety. The report—the fifth in the series—also shows stark variations in how companies of different sizes are responding, with small employers lagging behind their larger peers. The SmartMarket Report also looked at types of training conducted, and implementation of wellness initiatives. The Dodge Reports provide an important tool for tracking changes in industry management practices and inform CPWR's research and training programs.

Small Studies Examine Drones, MSDs, Robots

Our Small Study Program provides researchers with up to \$30,000 to research topics such as new technologies, reaching high-risk sectors, and small employers, and advancing research-to-practice. Four final reports were issued this year:

- ▶ **A practical model for measuring and mitigating safety hazards generated by using UASs in construction** (Oregon State University) investigated the potential safety risks associated with using unmanned aerial systems (UASs) in construction and developed of a practical model to help mitigate those risks.
- ▶ **Identification and assessment of musculoskeletal disorders (MSDs) risk for concrete formwork systems** (Oregon State University) examined the prevalence and nature of musculoskeletal disorders resulting from concrete formwork, one of the construction's most common activities in construction.
- ▶ **Nebulizer-retrofitted drone deployment at residential construction sites** (University of Utah) assessed the effect of water-dispersing drones on air quality and air temperature at residential construction sites.
- ▶ **Protocol for assessing human-robot interaction safety risks** (University of Alabama) developed a practical process and tools for practitioners to identify and quantify safety risks when using robotics and automation in construction operations.

Nine other studies are currently underway.



Part of the recently completed study on musculoskeletal disorder risks from concrete formwork.

This year the program promoted the availability of its funding through several new channels. The NIOSH Science Blog and NIOSH Research Rounds shared information about the program and how to apply. We also hosted a webinar explaining the application process and highlighting two completed studies. These efforts resulted in a substantial uptick in requests for information, and similar outreach will continue in the coming year.

Adapting and Improving Training

CPWR's staff and our consortium of trainers, which we lead in coordination with NABTU, continued to find innovative ways to provide high-quality instruction to construction workers across the country.

By adapting existing materials, creating new ones, and taking advantage of multiple technologies, our training program covered topics from the introductory OSHA 10-hour to advanced offerings in Hazardous Waste and Infection Control Risk Assessment (ICRA), as well as continuing the new courses on COVID-19 developed last year. Together the consortium, which is the industry's

largest safety network, conducted more than 5,200 classes, provided training to 1,700 trainers, and reached nearly 53,000 workers. Expanding our impact were training products from our research team—including Hazard Alert Cards, Training Programs, Toolbox Talks and infographics, many available in English and Spanish—that were used hundreds of thousands of times.



Making In-Person Training Work Virtually

CPWR's Disaster Response Training Program illustrated the challenges COVID-19 created for training courses and the instructor's creativity that helped overcome those obstacles. One of this program's main modules gives students hands-on experience with respirators: the importance of wearing one; different types, including their limitations; how and what to inspect; cleaning, maintenance, and storage; and more. Because of the restrictions on in-person training, students either picked up or were shipped a half-face respirator; they then demonstrated their ability to inspect and properly don and doff a respirator virtually. We are now examining how other programs with a hands-on component can be added to the menu of courses available virtually.

Preparing Hazardous Waste Workers for the Aftermath of Wildfires

The 2021 wildfires in Oregon were a searing reminder of the importance of proper training for workers doing hazard waste clean-up. Not only did the fires destroy over 1 million acres and thousands of homes and businesses, they also generated an enormous range of hazardous materials: household waste such as batteries, paints, pesticides, plastics, flammable liquids and electronic waste, as well as ash containing heavy metals such as antimony, arsenic,



Apprentices for the Operating Engineers training for the aftermath of wildfires.

cadmium, copper, lead, and zinc. Training conducted by a partnership of skilled trainers from CPWR and the International Union of Operating Engineers training center in Gladstone, Oregon, helped fulfill the need for

heavy equipment operators qualified to remove debris safely. The training focused on specific hazards expected during this clean-up, with the students learning to use appropriate personal protective equipment.

Changing Courses to Meet New Needs

Best Practices for Excellence in Distance Learning

CPWR
THE CENTER FOR CONSTRUCTION
RESEARCH AND TRAINING

Distance learning expanded rapidly in response to the COVID-19 pandemic. The effectiveness of a distance format is ultimately determined by the engagement and interest of the target audience as well as the skill with which information is delivered. It is important to have input from the many different types of participants in distance learning on everything from course development to classroom delivery to evaluation.

The following are principles for designing and delivering occupational health and safety training in a distance learning environment. They are recommendations for trainers and training organizations to consider prior to, during, and after the training and are consistent with best practices in adult learning and instructional excellence in occupational health and safety training. Read more at www.cpwr.com/distance-learning-report/.

Preparing to Deliver Distance Learning Courses

One of the overarching principles for training excellence in the distance learning format is being prepared prior to the training session. Below are points to consider:

- Understand the Trainees' Needs**
Gather information during the registration process by surveying the audience about what they would like to learn. Encouraging participation at the beginning through personal inquiry will more than likely lead to training that is more meaningful, relevant and useful to the audience, leading to enhanced safety of their workplace.
- Post All Course-Related Information**
Before the course begins, trainers should post all course information online, including training objectives, course outlines, associated materials, and training agendas. Making this material available ahead of time improves trainee readiness.
- Practice, Practice, Practice!**
As with in-person presentations, trainers are encouraged to conduct a practice session on the distance learning platform and, if possible, to demonstrate the presentation for an experienced trainer who can provide feedback. On top of this, familiarity with the virtual classroom application is crucial. Knowing how to use the features and tools of each platform will allow for a better experience for both the trainers and trainees.
- Conduct Trainer Coordination Meetings**
The lead trainer should coordinate meetings (pre-training and following each training session) to manage the activities of the training team (lead trainer, co-trainer, technology assistant). These meetings clarify expectations and roles to assist trainers in honing the requisite skills to meet the needs of the learners in the distance learning environment.

The restrictions on in-person training, particularly early in the year, emphasized the importance of revising our Asbestos Supervisor Refresher, Asbestos Worker Refresher, Hazardous Waste 24-hour Worker, and Hazardous Waste Refresher lesson plans so they could be conducted using distance-learning technology. Although employers continued to ask our Training Consortium partners for these courses, existing lesson plans included many in-person, small group and participatory activities that do not translate effectively to the distance-learning platforms. CPWR created new exercises, taking advantage of functions in the distance-learning platforms, such as polls and breakout rooms, as well as software and apps from third-party vendors like Kahoot! and Adobe. In addition, although EPA and state asbestos training accreditation requirements prevented adding COVID-19 materials into the Asbestos course refreshers, CPWR modified the Hazardous Waste Refresher curriculum to include our 1-hour COVID-19 Awareness materials.

Helping Department of Energy Workers Stay Safe on the Job

Courtesy DOE



After the U.S. Department of Energy's (DOE) National Training Center released its Worker Safety Culture Checklist, CPWR submitted our Safety Orientation for DOE Workers course for reciprocity approval, which would enable DOE workers to receive credit if they've taken our training, eliminating the need to repeat classes. We are proud our course was granted reciprocity, making it part of our extensive health and safety curriculum available to all NABTU affiliates working across the DOE complex. This course is designed to train workers new to DOE on the uniqueness of working on a DOE site. Topics include safety culture, an introduction to the Integrated Safety Management policy, workers' rights and responsibilities, and an overview of the expectations of working in a DOE environment.

Environmental Career Worker Training Program Back on Track

The four Environmental Career Worker Training Program sites across the country showed remarkable persistence, flexibility, and innovation this year in reopening, enabling them to keep reaching underserved, low-income residents. After local or state health department orders about COVID-19 forced training centers to close, the programs were retooled to improve service delivery during the pandemic. A significant barrier facing programs was that many participants had only limited access to technology, but generous funding from NIEHS helped CPWR purchase tablets and laptops for several of our programs. Thanks to a range of approaches—some fully in-person, others blended in-person/remote—all programs are increasingly serving their target audiences. Forty-nine graduates from this year's cohort have been placed into construction or environmental jobs. Most are entering registered apprenticeship programs, and collectively they are making an average hourly wage of \$20.41 and have a pathway to the middle class.

Continuing Training in a Difficult Year

Despite the limits the pandemic has placed on our ability to work in-person, our team of approximately 75 master trainers--representing all our international union partners-- continues to improve the safety of thousands of American construction workers. They have embraced and adapted virtual technology, showing even those who were initially resistant that online training can be highly effective. The expertise of our trainers was crucial to fulfilling our role as an OSHA Training Institute Education Center. They made it possible to significantly increase the number of OSHA 500-level series and OSHA 10-hour and 30-hour courses available, and the number of students taking online training programs has grown as well. In the past year, CPWR and our union consortium have provided training to 1,703 instructors and 52,672 rank-and-file members.

BTMed: Getting Back to Normal

For nearly 25 years, the Building Trades National Medical Screening Program (BTMed) has provided free, ongoing medical screening exams to construction workers previously employed at U.S. Department of Energy (DOE) nuclear weapons sites. These workers may have been exposed to toxic substances and hazardous conditions, increasing their risk for occupational illnesses. The exams help identify work-related health conditions at an early, more treatable stage and contribute to these workers' overall health and well-being. BTMed is funded by a cooperative agreement from DOE and is administered by CPWR in conjunction with Stoneturn Consultants, Duke University Medical Center, University of Maryland Medical Center, and Zenith American Solutions.

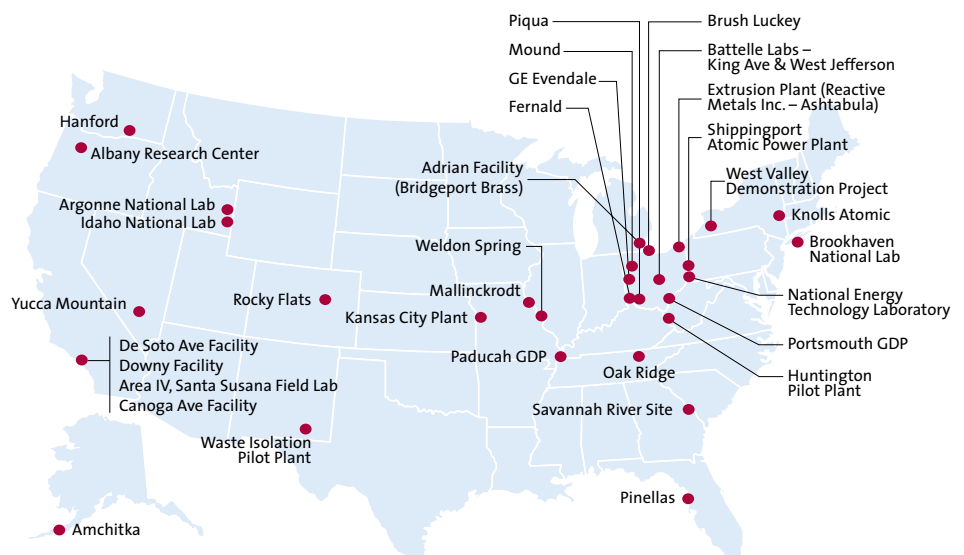
After being put on hold for over a year due to COVID-19, BTMed has resumed screenings and is quickly reducing a large backlog of workers waiting for services. Since re-starting, we have scheduled and/or provided 1,300 screening exams and 900 CT scans. BTMed also added a new location to our Early Lung Cancer Detection (ELCD) Program to provide CT scans to eligible participants in the Kansas City area and are working on a

partnership with a potential provider in Idaho.

BTMed outreach staff remain busy engaging workers and enrolling new participants through multiple methods: attending building trades meetings and community fairs, putting up billboards, placing newspaper ads, posting on social media, and promoting a new BTMed informational video. The video gives an overview of BTMed and features interviews from BTMed staff and participants. BTMed also launched a redesigned and expanded website (btmed.org) that is easier to navigate, provides more information on program benefits, features testimonials from BTMed participants, and has a responsive design that works across all devices.



DOE Sites served by BTMed



BTMed CT Scan Helps Find Liver Cancer in Former Rocky Flats Worker

BTMed provides annual lung cancer screening to eligible participants determined to be at high risk. The low-dose CT scans detect lung cancers at an early, more treatable stage and sometimes find disease in other organs that just happen to be in the field of the view. This was the case for Joseph Cousineau, a former electrician at Rocky Flats in Colorado. Working out of IBEW Local Union 68, he spent three years doing electrical maintenance and repairs around the site.

Although he wasn't sure what he may have been exposed to or if his health had been affected, Joseph decided to sign up for a BTMed screening. "It's free cancer screening once a year," he thought. "So why not?" Joseph's last CT scan showed a liver lesion, and when further evaluated by a specialist, it was found to be liver cancer. Fortunately, the cancer was at an early stage, and Joseph is currently undergoing treatment. Had it not been for a BTMed scan, Joseph says, he would not have known about the liver lesion. "I don't think I even had any symptoms at

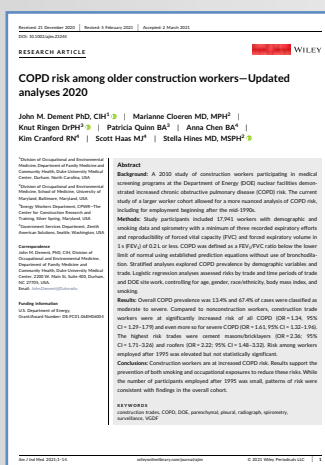


that time," he recalls, "I would've had no clue that there was a lesion there." He encourages other workers to participate in the program, even those who don't think anything is wrong with their health, because "it's free, it's easy, and it could save your life."

Supporting DOE Workers' Compensation Claims

Last year the U.S. Department of Labor again chose CPWR to maintain the BTComp subcontractor database (btcomp.dol.gov), a crucial resource for many construction workers who worked on DOE sites. Enacted in 2000, the Energy Employees Occupational Illness Compensation Program Act (EEOICPA) is the legislation that provides compensation and medical benefits to current and former workers at certain DOE sites, including contractors and subcontractors. Since subcontractors employed most construction workers at these sites, DOE records are often inadequate to verify employment and therefore to enable workers to qualify for EEOICPA. BTMed will continue to work closely with the U.S. Department of Labor, which administers EEOICPA, on the database, which now includes over 13,900 subcontractors and 4,300 documents and has been accessed over 145,000 times.

Updated Analyses of COPD Risk Among BTMed Participants



A 2010 study of BTMed participants found they were at increased risk for chronic obstructive pulmonary disease (COPD). This past year, a new study published in the *American Journal of Industrial Medicine* again looked at COPD risk among older construction workers in BTMed. This research involved a significantly larger cohort, allowing a more detailed analysis of COPD risk, including for employment beginning after the mid-1990s, when additional occupational safety and health programs and controls were implemented. BTMed researchers examined COPD prevalence by demographic and smoking information, respiratory history, and employment history among 17,941 participants. They found that compared to non-construction workers, construction trade workers were at significantly increased risk for all degrees of COPD and even more so for severe COPD. These findings support the prevention of both smoking and occupational exposures to reduce risks. BTMed is currently working on a research study on beryllium (Be) disease to characterize the clinical and claim history of program participants diagnosed with Be sensitivity.

CPWR Research Project Leads

2019-2024 EXTERNAL

Evaluation and Improvement of OSHA 10-Hour Construction Safety Training

Mark Fullen, EdD

West Virginia University

Kimberly Rauscher, ScD, MA

Boise State University

Evaluation of the Best Built Plans Manual Material Handling Tool for Construction

Ann Marie Dale, PhD

Bradley Evanoff, MD, MPH

Washington University in St. Louis

Evaluation of Trunk and Arm Support Exoskeletons for Construction

Carisa Harris-Adamson, PhD, CPE, PT

University of California, San Francisco

Maury Nussbaum, PhD, Virginia Tech

Health Hazard Controls Industry Diffusion: Evidence-based Intervention Strategy

Deborah Dickerson, PhD, MS, CIH

Virginia Tech

Improving Safety Leadership and Fall Prevention Training in Residential Work

Bradley Evanoff, MD, MPH

Ann Marie Dale, PhD

Washington University in St. Louis

Promoting Safety and Well-being among Sheet Metal Worker Women through Mentoring

Noah Seixas, PhD

Marissa Baker, PhD

University of Washington

Reactive Chemical Systems: Part B—Developing Data-Driven Interventions

Dhimiter Bello, ScD, MSc

Anila Bello, ScD

University of Massachusetts Lowell

2019-2024 INTERNAL

Communications, Outreach and Education Core

Bill Wright

Construction Industry Data and Statistical Core

Xiuwen Sue Dong, DrPH

Manufactured Nanomaterials in Construction: Evaluating Exposures, Controls and Worker Training

Gavin West, MPH

Prevention through Augmented Pre-Task Planning

Babak Memarian, PhD

Research to Practice (r2p) Core

Jessica Bunting, MPH

Safety Climate-Safety Management Information System (SC-SMIS)

Linda Goldenhar, PhD

SMALL STUDY PROJECTS

A practical model for measuring and mitigating safety hazards generated by using UASs in construction

Yelda Turkan, PhD

Oregon State University

Assessment of construction workers' mental health to improve wellbeing

Mohammed S. Hashem M. Mehany, PhD

Colorado State University

Identification and assessment of musculoskeletal disorders risk for concrete formwork systems

John Gambatese, PhD, MS

Oregon State University

Improving the assessment of noise exposure and warning signal audibility on construction sites

Nikolina Samardzic, PhD

Lawrence Technological University

SMALL STUDY PROJECTS (cont.)

Intelligent hearing protection for construction workers exposed to noise

Tuyen (Robert) Thanh Le, PhD

Clemson University

Leveraging immersive virtual technology for job hazard analysis

Zia Din, PhD

University of Houston

Nebulizer-retrofitted drone deployment at residential construction sites

Rodney Handy, PhD

University of Utah

Protocol for assessing human-robot interaction safety risks

Chukwuma Nnaji, PhD

University of Alabama

Safety challenges of UAV integration in the construction industry: Focusing on workers at heights

Idris Jeelani, PhD, MS

University of Florida

SETU: A smartphone-based training for worker safety in excavation trenching

Erica Cochran Hameen, PhD

Carnegie Mellon University

Sheet Metal & HVAC safety intervention adoption and best practices

Kenneth Sullivan, PhD

Arizona State University

Using Building Information Modeling (BIM) for job hazard analysis of retrofit buildings

Mohammad Gharipour, PhD

Morgan State University

Using community-based organizations and partnerships to enhance reach and engagement of small construction establishments

Sue Ann Sarpy, PhD, MS

Sarpy and Associates, LLC

Special Thanks

RESEARCH CONSORTIUM

Marissa Baker, PhD

University of Washington

Anila Bello, ScD

University of Massachusetts Lowell

Dhimiter Bello, ScD, MSc

University of Massachusetts Lowell

Ann Marie Dale, PhD

Washington University in St. Louis

Deborah Dickerson, PhD, MS, CIH

Virginia Tech

Bradley Evanoff, MD, MPH

Washington University in St. Louis

Mark Fullen, EdD

West Virginia University

Carisa Harris-Adamson, PhD, CPE, PT

University of California, San Francisco

Maury Nussbaum, PhD

Virginia Tech

Kimberly Rauscher, ScD, MA

Boise State University

Noah Seixas, PhD

University of Washington

SMALL STUDY GRANTEES

Zia Din, PhD

University of Houston

John Gambatese, PhD, MS

Oregon State University

Mohammad Gharipour, PhD

Morgan State University

Erica Cochran Hameen, PhD

Carnegie Mellon University

Rodney Handy, PhD

University of Utah

Idris Jeelani, PhD, MS

University of Florida

Tuyen (Robert) Thanh Le, PhD

Clemson University

Mohammed S. Hashem

M. Mehany, PhD

Colorado State University

Chukwuma Nnaji, PhD

University of Alabama

Nikolina Samardzic, PhD

Lawrence Technological University

Sue Ann Sarpy, PhD, MS

Sarpy and Associates, LLC

Kenneth Sullivan, PhD

Arizona State University

Yelda Turkan, PhD

Oregon State University

CONTRACTOR ASSOCIATIONS

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International Council of Employers of
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Mechanical Contractors Association of
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National Electrical Contractors Association

National Roofing Contractors Association

North American Contractors Association

Sheet Metal and Air Conditioning
Contractors' National Association

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U.S. Department of Labor

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Safety and Health, CDC

National Institute of Environmental
Health Sciences

State Departments of Health

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International Association of Bridge,
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Iron Workers

International Association of Heat and Frost
Insulators and Allied Workers

International Association of Sheet Metal,
Air, Rail and Transportation Workers

International Brotherhood of Boilermakers,
Iron Ship Builders, Blacksmiths, Forgers
and Helpers

International Brotherhood of Electrical
Workers

International Brotherhood of Teamsters

International Union of Bricklayers
and Allied Craftworkers

International Union of Elevator
Constructors

International Union of Operating Engineers

International Union of Painters
and Allied Trades

Laborers' International Union of North
America

Operative Plasterers' and Cement
Masons' International Association of
the United States and Canada

United Association of Journeymen
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and Pipe Fitting Industry of the
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and Joiners of America

United Union of Roofers, Waterproofers
and Allied Workers

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Kelly Dykes

Equipment Manager and Instructor
CPWR—The Center for Construction
Research and Training

Rev. James Cletus Kiley

Director of Immigration Policy
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William Kojola, MA

Industrial Hygienist (retired)
AFL-CIO

James Platner, PhD, CIH

Associate Director for Science and
Technology (retired)
CPWR—The Center for Construction
Research and Training

Patricia Quinn

Director, Energy Employees Department
and Small Study Program Coordinator
CPWR—The Center for Construction
Research and Training

Rick Rinehart, ScD

Deputy Director
CPWR—The Center for Construction
Research and Training

CPWR Staff

Chris Trahan Cain, CIH

Executive Director
ccain@cpwr.com

Richard Rinehart, ScD

Deputy Director
rrinehart@cpwr.com

Mary Tarbrake, MBA

*Associate Director,
Finance and Administration*
mtarbrake@cpwr.com

SENIOR STAFF

Jessica Bunting, MPH

Director, Research to Practice (r2p)
jbunting@cpwr.com

Xiuwen Sue Dong, DrPH

Director, Data Center
sdong@cpwr.com

Kelly Dykes

Equipment Manager and Instructor
kellydykes@frontiernet.net

Linda Goldenhar, PhD

Director, Evaluation and Research
lgoldenhar@cpwr.com

Gary F. Gustafson

Director, Environmental Hazard Training
ggustafson@cpwr.com

Mike Kassman, MS, CSP, CHST

*Director, OSHA and
Disaster Response Training*
mkassman@cpwr.com

Chris Le, MPH

Program Manager
chrisle@cpwr.com

Babak Memarian, PhD, CSP, CHST

*Director, Exposure Control
Technologies Research*
bmemarian@cpwr.com

Patricia Quinn

*Director, Energy Employees Department
and Small Studies Coordinator*
pquinn@cpwr.com

Tom Sundly

Master Trainer
tsundly@cpwr.com

Steve Surtees

*Director, Environmental
Career Worker Training*
ssurtees@cpwr.com

Alexandra Szymczak

*Lead and Asbestos Program Coordinator,
Grants Data Manager*
aszymczak@cpwr.com

Amber Trueblood, DrPH

Assistant Director, Data Center
atrueblood@cpwr.com

Megan Tindoll, MA, CPA

Director of Accounting
mdecker@cpwr.com

Gavin West, MPH

Director, Nanomaterials Research
gwest@cpwr.com

Janice Wheeler

*Program Director,
National Resource Center*
jwheeler@cpwr.com

Bill Wright

Director, Communications
bwright@cpwr.com

ADVISORS

Donald Elisburg, JD

Senior Environmental Advisor
donald.elisburg1938@gmail.com

Knut Ringen, DrPH

Senior Scientific Advisor
knutringen@msn.com

Rosemary Sokas, MD, MOH

*Professor, Department of Human Science,
Georgetown University School of Nursing
and Health Studies
Professor, Department of Family Medicine,
Georgetown University School of Medicine*
sokas@georgetown.edu

Erich (Pete) Stafford

Retired—Executive Director
CPWR—The Center for Construction
Research and Training
pstafford@cpwr.com

CPWR also recognizes recently retired staff members whose knowledge and dedication continue to help us fulfill our mission: Eileen Betit, Sue Dong, Kelly Dykes, Bruce Lippy, and Alex Szymczak.

Online Resources



cpwr.com — The first stop for information on our research, training, service programs, and related products and resources.



elcosh.org — An online library of safety and health materials for construction workers, employers, researchers, and other stakeholders.



nano.elcosh.org — An inventory of the use of nano-enabled products — those to which nanomaterials have been added or the nano-structure has been altered — in construction. Its goal is to inform workers about these products as a first step to protecting them from hazards.



covid.elcosh.org — The COVID-19 Construction Clearinghouse offers a central resource for construction employers and workers to find the latest research, guidance documents, training and other resources to help prevent the spread of COVID-19.



covidcpwr.org — This free Planing Tool takes you step-by-step through developing your plan to protect employees from and prevent the spread of COVID-19, including what to consider when conducting a job hazard analysis, selecting appropriate controls, screening workers and visitors, training employees, and implementing the plan.



safeconstructionnetwork.org — Use this site to connect with others interested in advancing construction safety & health, uncover new resources or share your own, and identify new research or community partners.



bestbuiltplans.org — Provides contractors and workers with practical tools and information to plan for safe materials handling while staying productive and profitable. Access the jobsite planning tool, training resources, and interactive coaching exercises created to reduce manual materials handling (MMH) and prevent sprain and strain injuries.



ecd.cpwr.constructionsolutions.org — An interactive tool for the construction industry that helps predict exposure to workplace hazards using objective exposure measurements.



stopconstructionfalls.com — Visit our website and join the ongoing Campaign to Prevent Falls in Construction.



silica-safe.org — A one-stop source of information on how to prevent a silica hazard and comply with the standard, including a free online planning tool to create a silica control plan.



safetyclimateassessment.org — Use this tool to help your company gain a more detailed understanding of its safety climate.



cpwr.constructionsolutions.org — Find practical control measures to reduce or eliminate a variety of construction hazards.



safecalc.org — Evaluate the financial impact of a safer solution using this free online calculator.



choosehandsafety.org — Find information on the risks and ways to prevent hand injuries, including what to look for when choosing hand tools and gloves.



btmed.org — Learn about the Building Trades National Medical Screening Program and its goal to provide free medical screenings to construction workers who helped build our nation's nuclear defense sites.



esmartmark.org — Contact your international union to access this site created by NABTU to distribute the Smart Mark training curriculum.



8484 Georgia Ave., Suite 1000
Silver Spring, MD 20910
www.cpwr.com

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