BUILDING ON SUCCESS

HIGHLIGHTS 2019

CPWR THE CENTER FOR CONSTRUCTION RESEARCH AND TRAINING

Contents

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The International Union of Bricklayers and Allied Craftworkers
Kim Cranford
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Foreword

Sean McGarvey
Chairman of the Board and President, CPWR
President, NABTU

There are multiple ways to see the impact CPWR has in improving safety and health in the construction industry.

Numbers provide one window. Page 4 of this report documents the stakeholders CPWR reached over the past year. CPWR's websites saw more than 1.2 million visitors and almost 800,000 printed materials were mailed to industry stakeholders. Nearly 90,000 workers were trained, and over 95 percent of them trained believe it influenced them to make changes on the job. CPWR's BTMed program has provided nearly 40,000 medical screenings for former construction workers at Department of Energy (DOE) nuclear sites as of this year. One hundred percent of those receiving services under BTMed were satisfied.

Collaborations testify to the quality of CPWR's work. Its Research Consortium draws on leading university-based researchers from across the country. Its Training Program is a consortium of NABTU-affiliated international building trades unions. The BTMed program works cooperatively with the international unions and local Building Trades Councils around DOE sites. Across all programs, CPWR partners with contractors, associations, and users of construction services who are committed to safety and health.

Another way to recognize CPWR's contributions is in the range of issues it addresses. It leads, along with OSHA and the National Institute for Occupational Safety and Health, the Campaign to Prevent Falls in Construction, which remain the leading cause of death in our industry. CPWR's pioneering Research to Practice program has recently developed Best Built Plans, which provides contractors and workers practical tools to plan for safe manual materials handling, which will reduce strain, sprain, and related soft-tissue injuries. The Data Center's analyses help the field understand where progress is occurring and where needs exist.

CPWR draws on its unparalleled network to identify and respond to emerging hazards. It has a growing program for evaluating worker exposures to and controls for nanoparticles and reactive chemicals. Upcoming projects will research topics such as exoskeletons and increasing the safety and health of women apprentices.

CPWR is supporting NABTU, as well as the entire industry, in addressing the opioid and suicide crises that are disproportionally affecting construction workers. They have developed resources to support the priorities established by the NABTU Opioid Task Force and the industry. They are working closely with stakeholders and government partners to share information, prevent workers from becoming addicted to opioids, and organizing resources to support the industry as we try to provide help to workers who need it.

At the heart of CPWR's work are dedicated people. There are partners, researchers, board members, and advisors. There are the staff, who contribute their expertise through speaking, media commentary, and publishing on all construction safety and health issues.

More importantly, there are the people in the field who benefit from all of this work. The former nuclear site worker program on page 23 is just one example of how CPWR's programs reach individuals. There are the people who launch careers thanks to the Environmental Career Worker Training Program. One unsolicited message summarizes another vital aspect of CPWR's work: "Thank you for the differences you make to others daily. Although differences may be small, they still are cumulative, and require continual minute-by-minute diligence. I've noticed many gaps in training, compliance, and application, in many companies, yet you are committed to filling the gaps. Keep up the good work."

It is easy to see why this summer CPWR was awarded a new five-year—its seventh!—cooperative agreement from NIOSH to continue serving as the NIOSH National Construction Center. Starting on page 16 are descriptions of how this agreement will launch 13 multi-year research projects and programs to reduce injury, death, and disease. It will be a central part of enabling CPWR to build on its successes and continue to improve the safety and health of America's construction workers.

Executive Director's Message

In construction, and here at CPWR, it is important both to consider the past and to look forward to the future. The most visible illustration of that mix comes in our communities, where buildings created by construction workers of more than a century ago often stand next to those made by the current workforce. As we are finishing one NIOSH-funded research cooperative agreement and beginning a new one, we can build on what we have done and begin some new projects.

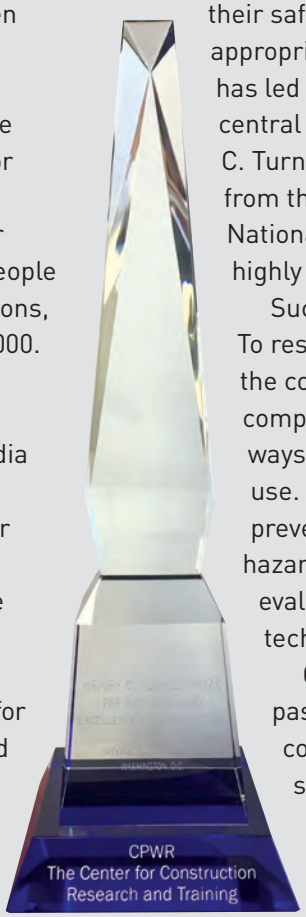
Chris Trahan Cain, CIH
Executive Director

Those of us committed to improving safety and health have a similar combination of old and new in our work. CPWR is proud of our efforts to reduce and even eliminate both persistent job site hazards and emerging dangers, and we are fortunate to have an exceptional set of federal partners—NIOSH, NIEHS, DOE, and OSHA—to collaborate with in pursuing this vital goal.

Many of the threats to today's construction workers, such as falls, silica, and work-related musculoskeletal disorders, have existed for centuries. To respond, we use printed materials that have long proven effective, such as our Hazard Alert cards and Toolbox Talks, updating them with the latest information and making them more accessible by, for example, producing them in Spanish for a workforce that is now more than 30 percent Hispanic. The growth in the distribution of our materials documents their value: last year, people in the field requested nearly 800,000 publications, a number that four years ago was below 100,000. We simultaneously use newer vehicles to find workers, contractors, and owners where they are, including through our growing social media channels and webinars.

Key parts of our work focus on meeting other needs that remain consistent year to year. Our Training Program continues to provide first-rate instruction in coordination with the national Building Trades Apprenticeship and Training systems. Classes that establish the foundation for improving safety, such as the OSHA 10-hour and 30-hour trainings, continue to be important, along with specialized classes in hazardous materials and other environmental hazards. Our BTMed program has now provided medical screenings to more than 38,500 former DOE site construction workers, 1,000 more than last year.

We are careful to build on what's working. As you'll see starting on page 16, in many cases our upcoming research expands upon previous projects. Our Foundations for Safety Leadership (FSL) program, for example, has taught more than 65,000 foremen and other frontline leaders critical skills they can use to create a stronger safety climate. In the coming years, one new project will develop an FSL for residential construction, while another will create a public, free, online resource that contractors can use to assess their safety climate, and then select and implement appropriate tools to strengthen it. Linda Goldenhar has led CPWR's safety climate work, which was a central reason CPWR was awarded the 2019 Henry C. Turner Prize for Innovation in Construction (left) from the Turner Construction Company and the National Building Museum in March. We were highly honored to receive this award.



Success also requires addressing new needs. To respond to the growing problem of opioids in the construction industry, we have developed and compiled resources and are researching better ways to communicate about preventing opioid use. Other upcoming research will address prevention through design, how to reduce hazards to women in the trades, and a national evaluation of widely used training programs and techniques, to name a few.

Our partners, our programs, and our past successes prepare CPWR well to continue playing a leading role in improving safety and health. We look forward to collaborating across the industry to promote safe and healthy futures for all construction workers.

CPWR At A Glance

RESEARCH

26
INFOGRAPHICS

50,789
YOUTUBE VIEWS

13
WEBINARS

1,846
ATTENDEES

2,655
RECORDING VIEWS*

** these views are excluded from the YouTube views*

CPWR
WEBSITE SESSIONS: **1,222,089**

KEY FINDINGS FROM RESEARCH **16**

811
TWEETS

920,462
IMPRESSIONS

2,085
RETWEETS +21%

14
CPWR UPDATE e-NEWSLETTERS

792,911 PRINTED CPWR PUBLICATIONS AND PRODUCTS

TRAINING

1,430
TRAINERS TRAINED

88,387
WORKERS TRAINED

6,590
COURSES OFFERED

SERVICE since program began...

38,500+
CONSTRUCTION WORKER SCREENINGS

6,400
LOW-DOSE CT SCANS

100%
SATISFACTION RATE

Injuries and Precarious Employment Associated with Opioid Use

Construction workers are six to seven times more likely to die of an opioid overdose than workers in other professions. With one of the highest injury rates of all industries, construction workers have commonly received opioid prescriptions to treat pain. Most construction workers have no paid-time-off or sick leave, and gaps or delays in workers' compensation settlements can produce financial pressures that lead them to return to the job site before they are healed, further increasing the odds of opioid use.

Together with the North American Building Trades Unions (NABTU) and funding from NIOSH, CPWR is working to frame optimal communications strategies to highlight the importance of working conditions as a pathway to opioid use. CPWR has developed a wide range of resources—all available on our website—to help the construction industry respond to opioids, including a two-hour awareness training program, a Toolbox Talk, and a Hazard Alert. There is also good evidence that peer-support networks can have positive effects on addressing this national epidemic. CPWR is beginning to study how the construction industry can learn and adopt best practices for treatment and maintaining recovery with these networks, as well as how to advocate for workers with substance use disorders to be able to return to or maintain employment with the support they need.

CPWR Opioid Resources:

HAZARD ALERT

CPWR THE CENTER FOR CONSTRUCTION RESEARCH AND TRAINING

OPIOID DEATHS IN CONSTRUCTION

Why are Construction Workers at Risk?

- The construction industry has one of the highest injury rates compared to other industries.[1]
- Opioids are often prescribed to treat the pain caused by these injuries.
- Long-term opioid use can make people more sensitive to pain and decrease the opioid's pain-reducing effects.

According to the CDC, 1 out of 4 people prescribed opioids for long-term pain become addicted.[2]

Injured Construction Workers Often...

- Cannot continue to work while injured.
- Suffer a loss in income. Even if an injured worker receives workers' compensation, it is often not enough to make up for lost pay.*
- Experience anxiety, stress, and depression, which can add to the pain.

*Source: The Demolition of Workers' Comp. https://www.propublica.org/article/the-demolition-of-workers-compensation

Overdose Deaths are On the Rise.

- In 2016 alone, more than 63,000 people died in the U.S. from an overdose – over **42,000** of which involved an **opioid**, according to the Centers for Disease Control and Prevention (CDC).
- One study showed that more than half of those who died from an overdose had suffered at least one job-related injury.[3]
- Overall, overdose deaths that occurred on the job increased by 30% between 2015 and 2016.[4]
- In Ohio, for example, construction workers were **7 times** more likely than other workers to die from an **opioid** overdose between 2010 and 2016.[5]

Protect Yourself!

1 Prevent Injuries

Work shouldn't hurt – your employer must provide a safe workplace to prevent an injury from occurring. A commitment to safety reduces the risk for injury and need for pain medication.

Follow safe work practices.

Getting help lifting heavy materials can reduce the risk for injury.

2 Talk to a Doctor

Opioids are addictive and can have side effects.

Ask about:

- Other forms of pain medication that are not addictive and have fewer side effects.
- Other forms of pain management such as physical therapy or acupuncture.

Opioids should be the last option to treat your pain. If opioids are prescribed they should be used for the shortest possible time. Safely dispose of any unused medications.

3 Get Help

Opioids change how your brain works. They trigger one part of your brain to take more and change another part that makes it hard to resist.[6] Check with your union or employer to find out if they have a program to help, such as:

- an employee assistance program (EAP); or
- member assistance program (MAP).

Or ask your doctor for help to find the best addiction treatment option for you.

Remember addiction is an illness that can be treated.

Call this confidential national hotline:

1-800-662-HELP (4357)

If you or someone you know needs help:

- Contact the Substance Abuse and Mental Health Services Administration at https://www.samhsa.gov/ or call their confidential national hotline: **1-800-662-HELP (4357).**
- Visit Facing Addiction's online Addiction Resources Hub: https://resourcesfacingaddiction.org/.
- Contact your union.
- Find a list of common opioids at: https://tinyurl.com/common-opioids.
- Give your doctor the Physician's Alert on Pain Management among Construction Workers from https://tinyurl.com/physicians-alerts.

Find out more about construction hazards.

To receive copies of this Hazard Alert and cards on other topics, call

301-578-8500

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Sources: 1) CPWR. The Construction Chart Book. 2018. Chart 38a. 2) Centers for Disease Control and Prevention. Promoting Safer and More Effective Pain Management. https://www.cdc.gov/drugoverdose/pdf/Guidelines_Factsheet-Patients-a.pdf. 3) Cheng et al. Comparison of Opioid-Related Deaths by Work-Related Injury. American Journal of Industrial Medicine 56:308-316. 2013. https://www.ncbi.nlm.nih.gov/pubmed/23143951. 4) Bureau of Labor Statistics. Census of Fatal Occupational Injuries. News Release. 2016. https://www.bls.gov/news.release/cfoi.nr0.htm 5) Opioid overdose deaths. Which jobs are at risk? http://www.cleveland.com/metro/index.ssf/2017/11/opioid_overdoses_deaths_which_j_.html 6) National Institute on Drug Abuse for Teens. Out of Control: Opioids and the Brain. 2018. https://teens.drugabuse.gov/blog/post/out-control-opioids-and-brain

www.cpwr.com

RESEARCH

Using Research to Improve Safety and Health

From our start in 1990, CPWR has recognized the power of research to identify and find solutions to the hazards facing construction workers across the trades and across the country. Since that time, our staff and consortium of university-based researchers, along with stakeholders from the government, employers, insurers, owners, and unions, have compiled insightful data, set a relevant research agenda, identified best practices, shared crucial results, and led successful efforts to translate research into practice. The following stories show how all that work continues and expands.

The Impact of Data and Analysis

Our Data Center remains a leader in providing the kind of high-quality information that drives research priorities. The data the center generates and analyzes helps identify key areas in construction safety and health, such as emerging hazards, high-risk worker groups, and effective interventions. Through multiple vehicles—including publications such as the Construction Chart Book, Quarterly Data Reports, articles, presentations, social media, webinars, and our websites—the work of the Data Center benefits academics, unions, trade associations, trainers, government, contractors, and, most important, workers.

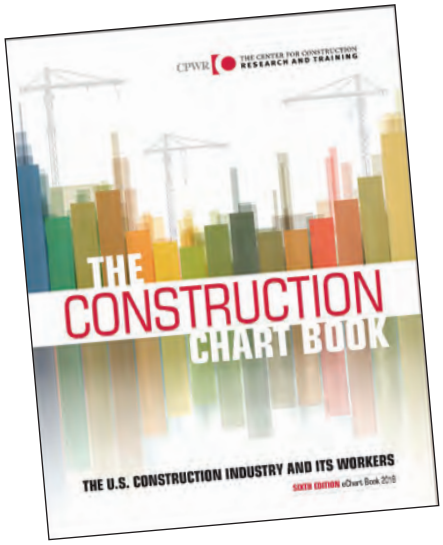


Chart Book Continues as the Authoritative Data Source

Now in its sixth edition, the Construction Chart Book: The U.S. Construction Industry and Its Workers remains cited widely by industry stakeholders, and its importance is clear from the hundreds of visitors who each month use the online features added last year, including access to all its charts and data and the addition of hyperlinks to references, citations, and databases.

PROJECTS: Disparities Research; Data Tracking (CPWR)

Quarterly Data Report Highlights Industry Concerns

Our Quarterly Data Reports (QDR) continue to examine significant topics and emerging issues in the industry. The past year's QDRs focused on death and injuries related to elevators and escalators; nonstandard employment; fall injuries; and work-related musculoskeletal disorders (MSDs). The findings show that falls remained the leading cause of fatalities in construction, with 75 percent of those deaths occurring to workers at companies with fewer than 20 employees and Hispanic and immigrant workers facing a higher risk. Although work-related MSDs in construction (based on BLS data) dramatically declined in recent years, self-reported MSD symptoms were still prevalent in the industry, particularly among older construction workers.

PROJECTS: Disparities Research; Data Tracking (CPWR)

Increase in Heat-Related Worker Deaths May Be Tied to Global Warming

Although construction workers compose only 6 percent of the total U.S. workforce, they accounted for 36 percent of all occupational heat-related deaths in this country—and climate change may be a significant cause. The Data Center's recent study documenting these figures has received wide attention since the American Journal of Industrial Medicine published it, raising awareness of how rising temperatures are impacting construction workers.

PROJECTS: Disparities Research; Data Tracking (CPWR)

Number of fatalities in construction and all industries

HEAT-RELATED DEATHS VERSUS ALL FATALITIES, 1992-2016

YEAR	HEAT-RELATED DEATHS			ALL FATALITIES		
	Construction*	All industries*	Percent of all industries	Construction	All industries*	Percent of all industries
1992	8	12	66.7%	963	6,217	15.5%
1993	12	22	54.5%	971	6,331	15.3%
1994	10	27	37.0%	1,077	6,632	16.2%
1995	9	36	25.0%	1,098	6,275	17.5%
1996	9	17	52.9%	1,095	6,202	17.7%
1997	6	22	27.3%	1,136	6,238	18.2%
1998	9	37	24.3%	1,207	6,055	19.9%
1999	9	37	24.3%	1,228	6,054	20.3%
2000	5	21	23.8%	1,183	5,920	20.0%
2001	11	29	37.9%	1,265	5,915	21.4%
2002	16	38	42.1%	1,153	5,534	20.8%
2003	9	29	31.0%	1,171	5,575	21.0%
2004	8	18	44.4%	1,278	5,764	22.2%
2005	12	47	25.5%	1,243	5,734	21.7%
2006	16	44	36.4%	1,297	5,840	22.2%
2007	16	32	50.0%	1,239	5,657	21.9%
2008	9	29	31.0%	1,016	5,214	19.5%
2009	11	35	31.4%	879	4,551	19.3%
2010	18	40	45.0%	802	4,690	17.1%
2011	18	60	30.0%	781	4,693	16.6%
2012	14	30	46.7%	849	4,628	18.3%
2013	13	36	36.1%	856	4,585	18.7%
2014	9	19	47.4%	933	4,821	19.4%
2015	17	37	45.9%	985	4,836	20.4%
2016	11	37	29.7%	1,034	5,190	19.9%
Total	**285**	**791**	**36.0%**	**26,739**	**139,151**	**19.2%**

Building a Research to Practice Infrastructure for Continuous Learning and Improvement

The construction industry's complex structure creates challenges for reaching and influencing employers' and their employees' use of research findings and interventions that could improve job site safety and health. Through our partnerships with government, researchers, and industry stakeholders, we have developed an infrastructure to support construction-related research to practice (r2p) activities and a system for continuously learning from and improving the process. Our progress was recognized in the *2018 National Institute for Occupational Safety and Health Construction Program Review* and in the independent program review panel's report, which stated that the program has made "substantial progress in encouraging stakeholder use of safety and health research, equipment designs, and r2p products, which creates impact." The following are examples of this year's r2p and communications initiatives.

Piloting New Resources to Prevent Painful Injuries

Our Ergonomics Community of Practice continued to focus their attention on finding the best mix of resources to motivate and facilitate contractors and workers to take steps to prevent painful, often debilitating, strain and sprain injuries. A group of contractors piloted our Best Built Plans (BBP) program's resources and told us what worked, what didn't, and what else was needed. Other stakeholders who weren't part of the pilot provided feedback as well. This feedback led us to develop an app version of the Planning Tool and Interactive Training & Coaching Resources, a Spanish version of the Planning Tool, a video (in English and Spanish) on use of the planning resources, and a new ergonomics training program. This new ergonomics program builds on the training resources in the BBP program and findings from a CPWR university-based ergonomics research project (see page 12) and makes the connection between pain prevention, treatment, and the use of opioids. With support from The United Association of Journeymen and Apprentices of the Plumbing, Pipefitting and Sprinkler Fitting Industry of the United States and Canada, the Mechanical Contractors Association of America, and our Training staff (see page 20), we developed and piloted both worker and contractor training modules.

PROJECT: Prevention Partnerships in r2p (CPWR)

Stakeholders Drive Demand for CPWR Products

To ensure that research findings reach a broad cross-section of construction industry stakeholders, we maximized our use of promotional mailings, social media, webinars, UPDATE e-newsletter, and web-based outlets (see page 4), including cpwr.com and the Construction Safety & Health Network, to share research findings, gather input on stakeholder needs, and connect the industry with new resources. These efforts contributed to increased demand for new and existing materials. This year alone, nearly 800,000 printed materials were distributed, a remarkable rise from the less than 100,000 in the first year of this five-year grant cycle.

Making Research Findings Accessible to More Stakeholders

Our webinar series again proved to be a valuable platform for connecting researchers and stakeholders. The 13 webinars held this year recorded 1,846 participants and 2,655 views on-demand, and webinars from prior years were viewed an additional 5,798 times. To continue making our materials more accessible to Spanish-speaking contractors and workers, two of our webinars—one on the Foundations for Safety Leadership program and the other on CPWR's Spanish-language resources—were re-recorded in Spanish. In addition to translating the BBP resources (see page 8), we also translated our Construction Noise and Hearing Loss Prevention Training Program and nail gun safety online resources, and added to our inventory of Spanish Toolbox Talks, Physicians' Alerts, Hazard Alert Cards, infographics, and videos.

PROJECT: Communications Plan; r2p Coordinating Project; Prevention Partnerships in r2p (CPWR)

Facilitating Continuous Learning and Collaborations to Advance r2p

The annual r2p Seminar and Partnership Workshop, initiated in 2015 and held in conjunction with the annual meeting of CPWR's Research Consortium, is an integral part of the system we created to facilitate continuous learning and collaborations to advance r2p. This meeting provides a platform for researchers to report on their projects' progress and findings, receive feedback from industry stakeholders, and explore how best to translate research into actionable information, engage partners, ensure use of findings and interventions, and evaluate progress. At this year's meeting, our research teams updated participants on the final stage of their projects, and with the help of representatives from our Environmental Career Worker Training Program (see page 21), we held a Partnership Workshop to brainstorm how to better reach the industry's most vulnerable workers with critical safety and health information and evaluate use of research findings. Once again, attendees found value in participating. Ninety-eight percent of those surveyed rated the meeting "Good" or "Excellent," and the same percentage said it was relevant to their work and provided ideas to improve their own r2p efforts.

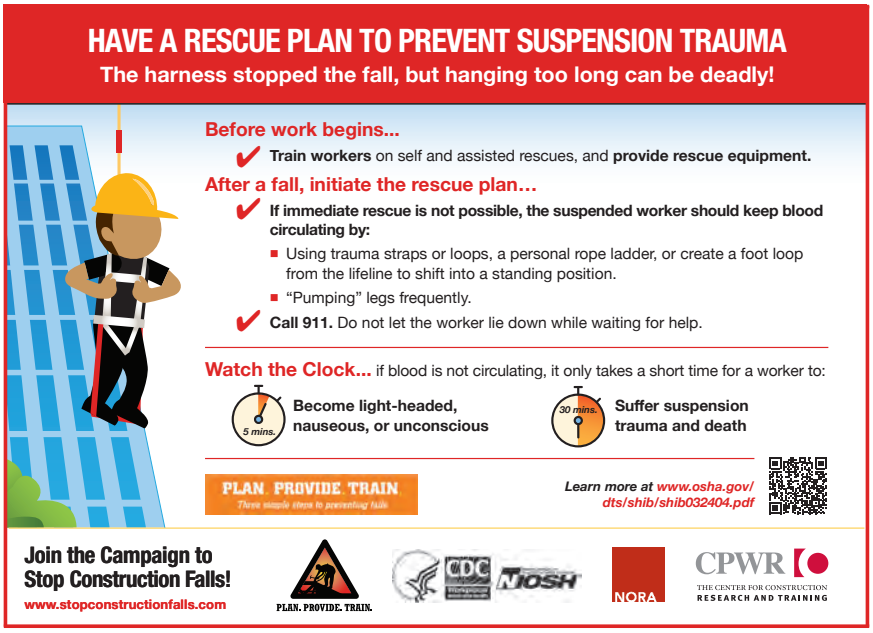
The lessons learned, new projects, and collaborations that have come out of the Seminars and Workshops during the past five years are documented in a Summary Report that was shared with attendees and published in our r2p Tool Library on cpwr.com.

PROJECT: r2p Coordinating Project; Prevention Partnerships in r2p (CPWR)

Partnering in Support of National Campaigns

During the year, we again partnered with OSHA, NIOSH, and other safety and health organizations and industry stakeholders to support several national campaigns, including the Safe + Sound Campaign, the My Safe Summer Job Campaign, and the National Campaign to Prevent Falls in Construction (Falls Campaign).

This year marked the eighth year of the Falls Campaign and the sixth annual Safety Stand-Down. As a lead partner, we focused on creating and sharing materials. For example, in preparation for the 2019 Stand-Down, we added a "One-Stop Shop" page for easier access to our resources, developed four NIOSH-CPWR co-branded infographics in English and Spanish, updated the 5-Day Stand-Down plan, created a generic written fall protection plan and a social media guide, and worked with our industry partners to develop videos and other materials (see below, Roofing r2p Partnership). We also printed and distributed our entire supply of 350,000 2019 Stand-Down hard hat stickers, along with more than 278,000 fall-related Hazard Alert Cards to stakeholders through an online ordering form on stopconstructionfalls.com.



Sources: (1.) U.S Department of Labor, Occupational Safety and Health Administration. Orig. 2004, Updated 2011. *Safety and Health Information Bulletin: Suspension Trauma/ Orthostatic Intolerance.* https://www.osha.gov/dts/shib/shib032404.pdf. (2.) Weems, B. 2003. *Will Your Safety Harness Kill You?* Information originally published in Occupational Health & Safety Magazine, accessed from eLCOSH: http://elcosh.org/document/1662/d000568/will-your-safety-harness-kill-you%3F.html.

PROJECT: r2p Coordinating Project; Prevention Partnerships in r2p (CPWR)

Promoting Safety in the Roofing Industry

The Roofing r2p Partnership, which is supported by the United Union of Roofers, Waterproofers & Allied Workers and the National Roofing Contractors Association, initiated the *#RooferSafety365* social media campaign, which aims to improve safety in the roofing industry. In support of that initiative and the Falls Campaign, the Partnership also developed a new video focused on ladder safety in English and Spanish. It covers important information on using ladders safely to prevent a fall, including how to use NIOSH's free ladder safety app. Though developed with roofers in mind, this video is available to everyone who uses a ladder as part of their work.

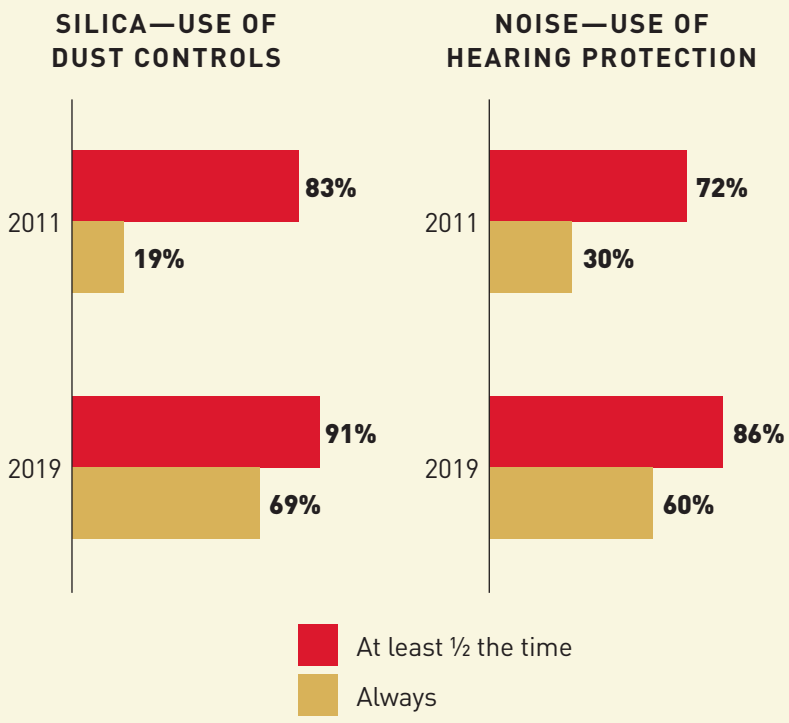
PROJECT: Prevention Partnerships in r2p (CPWR)

Masonry r2p Partnership's Efforts to Raise Awareness of Hazards and Use of Controls Pays Off

Follow-up surveys conducted by the Masonry r2p Partnership of members of the International Union of Bricklayers and Allied Craftworkers (BAC) found that progress is being made in raising awareness of hazards and use of controls. In 2019, 86 percent of BAC members surveyed said they use hearing protection when working around loud noise half the time or more, and those who said they "always" use hearing protection increased to 60 percent from only 30 percent in 2011. Results for use of silica controls were similar. In 2019, the percentage of BAC members who said they use dust controls when engaging in silica-generating tasks increased to 91 percent, and those who said they "always" use controls reached 69 percent, compared to only 19 percent in 2011. To help identify new and effective controls, the Partnership has continued to support new research, including a recent NIOSH study that explored the use of lower-dust-generating equipment when removing mortar during masonry restoration work.

PROJECT: Prevention Partnerships in r2p (CPWR)

BAC Member Safety & Health Surveys



Earl Dotter/SNC-Lavalin

ACES Pre-Qualification Tool Uses Leading Indicators

The Assessment of Contractor Safety (ACES) pre-qualification tool responds to demand among project owners and general contractors for an effective method for evaluating potential subcontractors' safety practices and history. While many assessment tools rely only on lagging indicators, such as injury rates, ACES uses leading indicators—such as safety programs and policies—to understand and score the safety management systems of prospective contractors and subcontractors. This year, the research team concentrated on analyzing data, finding that work sites with contractors who scored well on safety components also tended to have fewer recordable workplace injuries. Next, they will examine which ACES tool category—such as employee involvement or employer trust—is most associated with positive results.

PROJECT: Development and Evaluation of Contractor Safety Pre-Qualification Tool (Northeastern University)

Connecting General Contractor and Subcontractor Safety Practices


M-Studio West

A research team in St. Louis continued its examination of how general contractors' safety management programs flowed down to subcontractors and to what extent ergonomics was a part of these programs. The team looked at small, medium and large subcontractors, finding that smaller firms were the least likely to have well-developed safety programs. Although the nearly 80 subcontractors in this study changed their programs to work on specific projects, medium-sized firms tended to continue improved practices on subsequent projects but smaller companies lacked the capacity to. The researchers also discovered that ergonomics were rarely present in safety programs and that making them standard elements requires a sophisticated existing program and time. The research team is now finalizing a model program to guide contractors in addressing ergonomic hazards (see page 16).

PROJECT: Interventions to Improve Safety Climate and Ergonomics in Construction Small and Medium Sized Contractor Enterprises (Washington University in St. Louis)

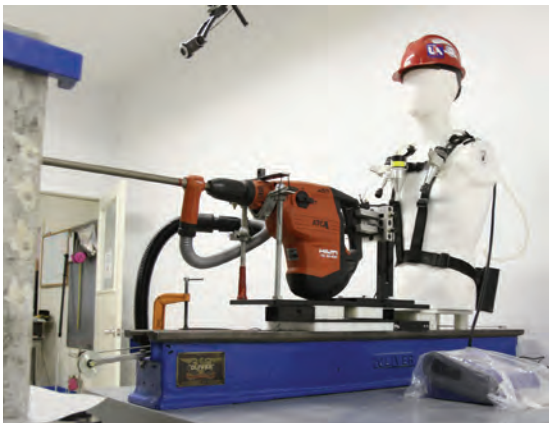
SAVE Expands Outreach to Masonry Trade to Prevent Injuries

A randomized control trial found that Safety Voice for Ergonomics (SAVE), which improves job site safety climate by providing apprentices with skills and knowledge to speak up about ergonomic hazards, increases apprentices' knowledge and prompts them to change workplace safety behaviors. In addition, more than 100 International Masonry Institute (IMI) instructors have received SAVE train-the-trainer instruction over the last two years, and IMI is integrating SAVE into apprenticeship programs nationwide. The program has also been shared via webinars and presentations to union leaders and leading researchers. SAVE's curriculum and materials, developed with the support of the Masonry r2p Partnership (including labor, management and trainers), are available from CPWR.

PROJECT: Safety Voice for Ergonomics (Eastern Washington University)

Safer Drilling: Progress in Research and Practice

Over the past year, the value of this project's research on safer concrete drilling practices became even clearer. Papers and presentations shared findings on how to reduce silica dust, vibration, and noise: for example, a new paper showed that a hollow-bit localized exhaust ventilation (LEV) system was as effective at removing dust as the shroud LEV. These and other results were presented widely to contractors, safety professionals, and tool manufacturers. The benefit to workers of this research was highlighted in the spring, when a pipeline company received Alaska's "Governor's Innovation in Safety Award" for using the drill support system this project developed to reduce hazards during drilling of 3500 large-diameter holes at a marine terminal.



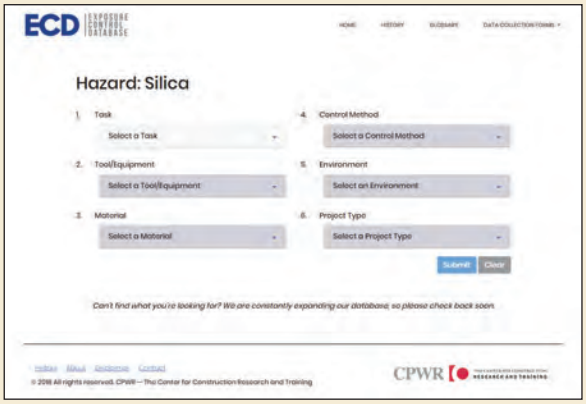
PROJECT: Test Bench for Evaluating Concrete Drilling Methods (University of California, San Francisco)

Investigating Exposures to Reactive Chemicals

A research team at the University of Massachusetts Lowell continued developing and disseminating data-driven interventions to reduce construction workers' exposures to reactive isocyanates and epoxy resins, including spray polyurethane foam insulation and metal structure coatings. Isocyanates and epoxies of Part A of these reactive systems are potent respiratory and skin sensitizers. The researchers have developed new methods to measure respiratory and skin exposures, as well as exposure biomarkers in urine; to identify tasks with highest exposure; and to evaluate current work practices and the efficacy of exposure controls such as respirators and gloves. This year the team concentrated on epoxies and on finding ways to share its latest findings, including ways to help contractors choose gloves and coverall products. See page 18 for related upcoming research.

Bridge painting presents major challenges in controlling exposures to isocyanates.

PROJECT: Assessment and Control of Exposures to Reactive Chemical Resins in Construction (University of Massachusetts Lowell)



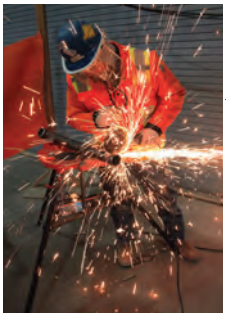
Exposure Control Database Expands Resources for Protecting Workers

Last year, CPWR successfully released the Exposure Control Database (ECD). This free, interactive, online tool allows health and safety professionals to estimate a worker's probable exposure to four significant hazards—silica, welding fumes, noise and lead—based on the task being performed and worksite conditions. The ECD also highlights the benefits of engineering controls and helps practitioners select the most effective measures to protect workers. This year, in close collaboration with the construction industry, we examined additional resources and expanded the ECD by increasing its number of exposure measurements. The ECD now contains over 1,000 measurements across the four hazard categories. Public response has been strong: during its first year, the ECD received nearly 11,000 page-views from almost 2,000 users, primarily in the U.S. but also from 40 other countries. Over the past year, the related Construction Solutions Database continued to grow as well, and it now offers more than 326 evidence-based solutions for different task and hazard combinations.

PROJECT: Construction Solutions (CPWR)

Examining Connections Between Fatality Rates and Other Policies

New evidence from an ongoing study has identified a number of factors correlated with higher construction fatality rates. For example, states that do not require small construction firms to have workers' compensation coverage have disproportionately high fatality rates among those firms. Higher rates also appear in states with longer waiting periods before indemnity benefits are paid and where federal OSHA operates the enforcement program rather than the state itself. The study continues to explore state-level data on construction fatalities.



Earl Dotter/SNC-Lavalin

PROJECT: Assessing Public Policy Intervention Impacts on Construction Fatality Rates (University of Pittsburgh)

New Resources Increase FSL's Ability to Improve Safety Culture

The Foundations for Safety Leadership (FSL) training program was completed at the end of 2016 and soon afterwards became an official elective in the OSHA 30-hour course. By this spring, more than 65,000 foremen and other frontline leaders had participated in the training, where they learned critical leadership skills they can use on the job site to create a stronger safety climate and improve safety and health outcomes. We continue to create resources the industry can use to reinforce the program's key ideas, including train-the-trainer videos, skill sheets and refresher videos.

PROJECT: Enhancing Safety Climate through Leadership (CPWR)

Sharing the Latest on Nanomaterial Exposure Risks and Controls

CPWR researchers received the Nanotechnology Working Group Best Paper award at the American Industrial Hygiene Conference and Expo.

Building on last year's work, which resulted in an award-winning study on nano-titanium dioxide in paint, our research team tested a paint containing silver nanoparticles. The new study confirmed our prior research, showing that ventilation attached to power tools can effectively reduce workers' exposures to nanoparticles. Measurements during spraying and sanding of the paint will be compared to an upcoming and revised NIOSH recommended exposure limit for silver nanomaterials, which is intended to prevent workers from developing adverse health effects. The researchers also ramped up efforts to share information—including trusted guidance from NIOSH and our findings about nanomaterial applications, exposures and controls—with industry stakeholders, researchers and safety professionals.

PROJECT: Nanomaterials in Construction: Tracking Product Diffusion and Measuring Exposures (CPWR)

New Report on Contractor Use of Safety Best Practices

CPWR continued its partnership with Dodge Data & Analytics to create "Contractor Use of Best Safety Practices," which reported on two surveys examining a range of safety topics, including materials handling, safety leadership skills, and communications with workers; differences in the practices of large, medium and small contractors; and the use of lean construction. The study revealed opportunities for greater implementation of safety best practices, especially among smaller firms, and it also documented ways firms are improving safety leadership, including by mentoring subcontractors, developing skills in supervisors, and communicating effectively. This report also found that contractors familiar with lean construction are more likely to recognize the important connection between supervisor and foreman leadership skills and enhanced safety.

CPWR's Small Studies Produce Important Results

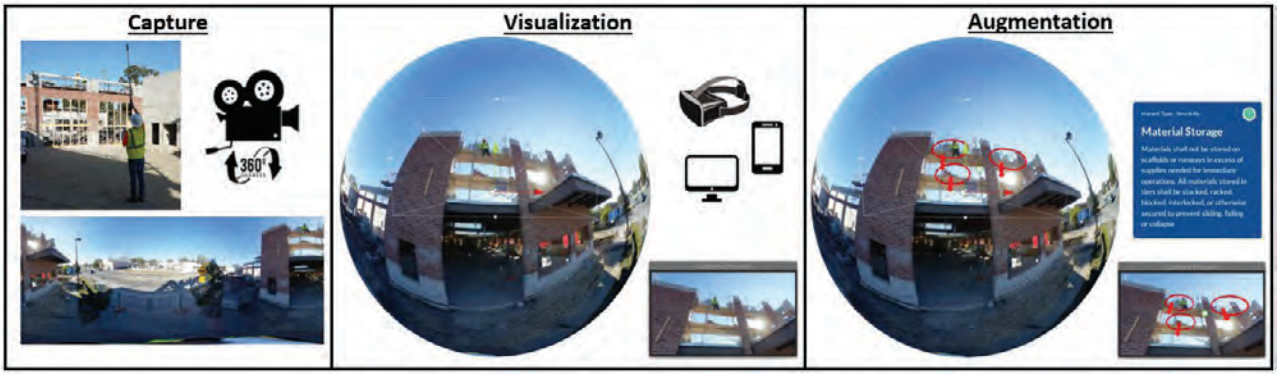
Our Small Studies Program has funded 119 researchers with seed money of up to $30,000 over the last three decades to investigate promising new areas like the use of drones, reaching high-risk sectors, research-to-practice, and safety culture. Many major research projects began with a Small Study that demonstrated their viability, and others resulted in important stand-alone projects. Funding is open: learn how to apply at www.cpwr.com.

PROJECT: PARS: Using Augmented Panoramas of Reality for Construction Safety Training. Traditional Virtual reality (VR) simulations can provide construction workers safe and controlled training experiences of potentially unsafe scenarios, but they are expensive and time-consuming to develop and often do not offer true representations of real-world conditions. A research team from the University of Florida used augmented panoramic images of real job sites to create PARS (PAnoramas of Reality for Safety), a training tool that enables workers to identify, observe and navigate hazards in the complex context of real construction sites. The team tested its tool against a traditional VR-based system and found that PARS offers a low-cost, simple-to-capture representation of real settings, creating a realistic, interactive look-around experience of a job site.

Other recent studies have looked at a wide range of issues, such as:

- **A Baseline for Evaluating Ergonomic Interventions for Construction Glass and Glazing Work.** Construction glass and glazing workers have high rates of work-related musculoskeletal disorders but little has been known about the factors contributing to their risks. A team led by the University of Nebraska–Lincoln conducted worksite observations and interviewed workers, who reported that their most challenging tasks are manual handling of heavy materials, handling material in dirty/muddy environments, working above the head, and in extreme weather.
- **Development of a Workforce Sustainability Model for Construction.** The construction industry has experienced high turnover and poor safety performance over the last few decades, and it has also struggled to recruit new workers. Researchers from Oregon State University interviewed industry professionals and academics to identify the characteristics of a sustainable construction workforce and created an instrument employers could use to assess workforce sustainability.
- **Embedded Safety Communication System for Robust Hazard Perception of Individuals in Work Zones** A team from the University of Nevada, Las Vegas developed a prototype Embedded Safety Communication System to convey imminent hazards to construction workers. The researchers used a system that transmitted signals through vibrating motors, then tested optimal configuration for motors embedded in a waist belt worn by a worker.

Find a complete list of funded studies and final reports at **www.cpwr.com/research/small-study-program**.



From the report on PARS, showing 360-Degree Panoramas Capture, Visualization, and Augmentation.

Upcoming Research Projects

CPWR's new five-year cooperative agreement with NIOSH to continue serving as the National Construction Center means that we welcome new and continuing university partners into our research consortium. It also signals the start of 13 multi-year research projects and programs, all designed to reduce construction worker injury, death, and disease. We've also added new coordinating and planning activities, including working more closely with our industry stakeholders to better understand the perspective of small employers and how best to reach them.

Communications, Outreach and Education Core

Lead Researcher: Bill Wright, CPWR

Working closely with the r2p Program, Communications will focus on expanding and improving existing online resources and products, growing our outreach database, and publishing our UPDATE e-newsletters and annual report. Targeted direct mail outreach, marketing surveys, and customer interviews will also be used with critical audiences to assess demand and impact, and we will maintain and expand our interdisciplinary library of construction occupational safety and health research.

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

Lead Researchers: Ann Marie Dale, PhD, and Bradley Evanoff, MD, MPH, Washington University in St. Louis

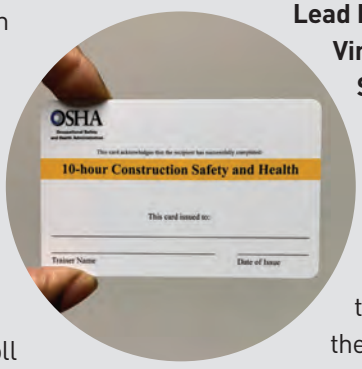
Construction workers continue to suffer from high rates of chronic musculoskeletal disorders, typically from overexertion, lifting, and manual material handling (MMH). Although there are many simple ways to prevent these injuries, contractors often lack the knowledge and resources to implement them. This project will test the Best Built Plans (BBP) program, which aims to increase use of safe MMH practices by offering firms ready-to-use resources. It will enroll three types of small and medium-sized contractors—commercial, light commercial and residential—and firms from trades with high rates of lost days from lifting materials, such as iron workers and drywall installers. The project will measure the uptake of BBP tools and the reduction of physical exposures from lifting, as well as collecting feedback on what has proven useful.

Construction Industry Data and Statistical Core

Lead Researcher: Xiuwen Sue Dong, DrPH, CPWR

The CPWR Data Center will continue to provide reliable, updated data and research findings while offering new resources to serve the industry even more effectively. It will increase publication frequency, moving from the current Quarterly Data Report to a new online data series—CPWR Construction Data Bulletin—that will be released every two months. Also coming up: expanded data dissemination and the establishment of a mechanism to evaluate the utilization of these products through close collaboration with the communications and r2p teams, other projects and programs across the National Construction Center, and external stakeholders.

Evaluation and Improvement of OSHA 10-Hour Construction Safety Training



Lead Researchers: Mark Fullen, EdD, West Virginia University; Kimberly Rauscher, ScD, MA, Boise State University

Though the OSHA 10-hour is the most widely used safety training program for U.S. construction workers, it has never been thoroughly evaluated on a national scale. This project will conduct the most comprehensive assessment of the OSHA 10 training to date, identifying its strengths and limitations and then developing an enhanced training approach that incorporates the findings and current good practices in adult education. Because of how widely used the OSHA 10 training is, the resulting enhanced approach, when translated into practice for trainers across the country, can generate far-reaching improvements in construction worker safety and health.

Evaluation of Trunk and Arm Support Exoskeletons for Construction

Lead Researchers: Carisa Harris-Adamson, PhD, CPE, PT, University of California, San Francisco; Maury Nussbaum, PhD, Virginia Polytechnic Institute and State University

The rapidly emerging technology of occupational exoskeletons (EXOs) has the potential to benefit construction workers. The ability of EXOs to provide assistive forces, especially for movements involving the back or shoulder, can reduce demands on areas of the body most affected by work-related musculoskeletal disorders. EXOs could also make construction work accessible to a broader population. Passive EXOs, which require no actuators or power supply, are the main focus of the study, as they are more likely to be widely adopted, being lighter, simpler, and more cost-effective. However, evidence is insufficient to support the safe and effective use of EXOs in construction. This project will conduct a mixed-methods assessment of EXO to: understand the perspectives of a broad set of industry stakeholders, quantify the benefits and risks of EXO use, and prevent unexpected consequences.

Examining the impact of passive exoskeletons in improving construction worker safety and health in the lab at Virginia Tech.

Capital Safety

Improving Safety Leadership and Fall Prevention Training in Residential Work

Lead Researchers: Bradley Evanoff, MD, MPH, and Ann Marie Dale, PhD, Washington University in St. Louis

Falls from height cause nearly two-thirds of worker deaths in residential construction. While effective fall prevention measures exist, too often they are not implemented by smaller employers, who lack resources and a strong safety culture. Reducing deaths and also injuries on residential sites depends on foremen, who lead safety and production. This project will adapt CPWR's successful Foundations for Safety Leadership (FSL) training program, which teaches foremen critical leadership skills for creating a stronger job site safety climate, to create the FSL4Res, which will be tailored to the unique hazards and organizational challenges of residential construction. The project will also disseminate and evaluate adoption of the FSL4Res, aiming to improve safety leadership and reduce falls in this high-risk sector.

Health Hazard Controls Industry Diffusion: Evidence-based Intervention Strategy

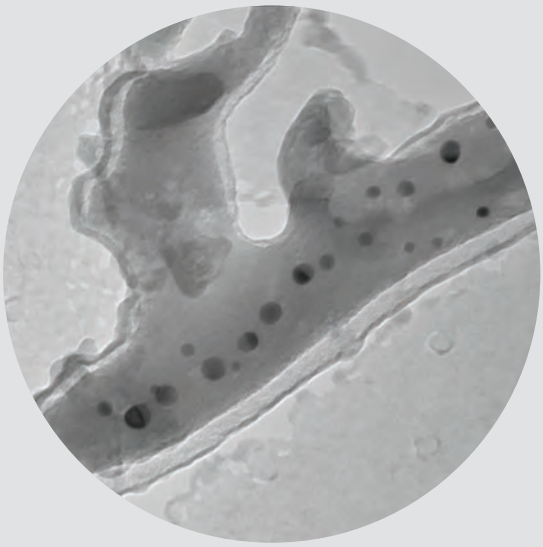
Deborah Dickerson, PhD, MS, CIH, Virginia Polytechnic Institute and State University

Prevention through Design (PtD) has the potential to address some of the most pressing health risks in construction, including in trades such as concrete and masonry, asphalt roofing, and welding. However, adoption of PtD—which aims to prevent injuries, illnesses, and deaths by "designing out" hazards—has been limited, and so this project will develop strategies to improve its diffusion. By leveraging previous NIOSH-sponsored work that developed effective interventions for a single trade, as well as an existing model for predicting readiness to adopt PtD, the project will create industry-wide interventions to increase the use of PtD to prevent occupational respiratory diseases.

Prevention through Augmented Pre-Task Planning

Lead Researcher: Babak Memarian, PhD, CPWR

Better pre-task planning has the potential to bring major improvements to worker safety and health. This project will focus on electrical construction, one of the high-risk trades. CPWR researchers will collaborate with general contractors, electrical construction associations, and unions to identify high-risk tasks; explore factors that increase task difficulties and exposure to hazards; and recommend interventions at the planning phase to reduce those factors. A new tool will also be developed so other trades can assess workers' perception of task difficulty, address contributing factors, and establish a process for continuous improvement.



Andreas Saldivar, AMA Analytical Services, Inc.

This image at over one million times magnification shows silver nanoparticles added to paint to prevent the growth of bacteria, mold, and mildew.

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

Lead Researchers: Bruce Lippy, PhD, CIH, CSP, and Gavin West, MPH, CPWR

During the next five years, CPWR researchers will identify new nano-enabled construction products and study exposures and controls to better understand risks to workers. The research will include examining how exposures change when construction materials like cement are worn down over time. Planned collaboration with toxicologists at NIOSH will help determine how uncontrolled exposures in construction could relate to potential health effects. Finally, our staff plan to develop and implement a new train-the-trainer program to increase knowledge in the trades of how nanomaterials are being used and to share the latest information on risks and safe work practices.

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

Lead Researcher: Dhimiter Bello, MESC, SCD, University of Massachusetts Lowell

Over the next five years, the team at the University of Massachusetts Lowell will expand its research on reactive chemical resin systems (see page 13) to understand exposures to Part B components. Part B contains several chemicals of concern, including solvent blends, hardeners or catalysts, engineered nanomaterials and other additives, crystalline silica, and flame retardants. Exposures to Part B components have been associated with multiple diseases, including contact dermatitis, cancer, and cardiovascular disease, as well as kidney and reproductive toxicity. The effect of exposures to part B ingredients have not been investigated, however, nor is much known about controls and their effectiveness. This project aims to develop comprehensive data-driven intervention strategies to minimize workers' exposures and health risks.

A painter applying a polyurethane topcoat on decorative railings and small bridge parts.

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

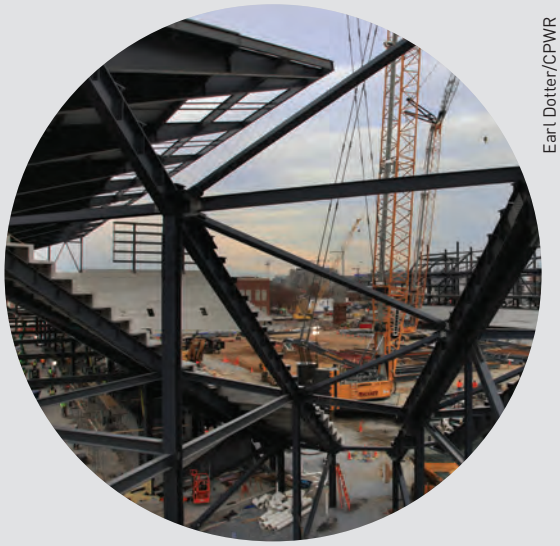
Lead Researchers: Noah Seixas, PhD, and Marissa Baker, PhD, University of Washington

The percentage of female workers in construction's skilled trades remains dismally low—3 percent. In addition to facing the industry's well-known safety and health risks, tradeswomen are subjected to discrimination, harassment, and skills underutilization. As a result, they have increased risk for injury, stress-related health effects, and high attrition rates from apprenticeship programs, all of which perpetuate their minority status. To help change these conditions, this project will develop and disseminate a mentorship program through local unions of the International Association of Sheet Metal, Air, Rail and Transportation Workers and will evaluate its success in reducing women's health and safety risks, including work stress, and in improving retention.

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

Lead Researcher: Linda Goldenhar, PhD, CPWR

Like large construction companies, smaller firms can benefit from having a better understanding of their safety climate and also being able to easily access safety management resources that have been shown to improve it. A new research project to create the Safety Climate-Safety Management Information System (SC-SMIS) will do just that. The SC-SMIS will be a public, interactive, web-based system that contractors can use to assess their safety climate, select and implement appropriate tools to strengthen it, and engage in continuous safety climate improvement. General contractors can also use the SC-SMIS to engage with their subcontractors in safety-related conversations.



Earl Dotter/CPWR

Research to Practice (r2p) Core

Lead Researcher: Eileen Betit, CPWR

Through our r2p program, we will build on our strong foundation and increase emphasis on identifying the factors that influence the final stage of translation research—implementation of evidence-based solutions on the job. We will: 1) develop and test new materials and dissemination strategies to raise awareness and use of research findings, with a particular focus on reaching construction populations at high risk; 2) support partnerships and engage stakeholders in the development and implementation of r2p plans across all our research efforts; and 3) identify and apply successful strategies that advance r2p. In addition, we will conduct new research on how to communicate risk effectively, what motivates and influences the construction industry's use of research findings, and the effectiveness of training programs for dissemination and implementation. In support of these initiatives and other research projects, we will explore new approaches to assess progress and outcomes in construction intervention research, including piloting the use of developmental evaluation and establishing panels of industry stakeholders to identify and measure intermediate and end outcomes. Lessons learned and new r2p tools developed will continue to be shared with construction safety and health researchers, OSHA, NIOSH and industry stakeholders through our r2p Seminars and Partnership Workshops held in conjunction with meetings of CPWR's Research Consortium.

TRAINING

Building Worker Safety and Health

Training remains at the heart of improving the safety and health of construction workers. In collaboration with NABTU, CPWR leads the industry's largest safety and health training network, delivering a powerful range of resources and in-person instruction. Over the last year, our consortium conducted 6,590 classes, provided training directly or through our affiliated unions to 1,430 trainers, and reached more than 88,000 workers—a 4 percent increase from the year before.

Our goal is not simply to conduct *more* training—it's to provide *even more effective* training. Our latest program evaluation found that over 95 percent of attendees believe CPWR's health and safety training influenced them to make changes on the job such as reporting unsafe working conditions and discontinuing work if the situation is unsafe. We keep looking for ways to make our trainings better: for example, drawing from research on adult learning, we are increasing the interactivity of our instruction to help students retain and apply more of what's covered in the classroom. Our classes address both time-tested topics and new hazards.

CPWR also creates materials that support greater safety and health. A survey of our affiliates' trainers found that almost half used our resources—increasingly available in both English and Spanish—such as Hazard Alert Cards, Toolbox Talks and infographics, as part of their trainings.

BAC

Pete Kohl of the Bricklayers Union demonstrating self-rescue techniques during CPWR's 40-hour train-the-trainer course.

Environmental Career Worker Training Program Builds Careers

The Environmental Career Worker Training Program (ECWTP) continues to have remarkable success in preparing unemployed and underemployed community members for construction work, particularly restoring the environmental health of polluted industrial sites. Operating in four cities—East Palo Alto, California; Flint, Michigan; New Orleans; and St. Paul, Minnesota—ECWTP last year trained a diverse group of more than 80 men and women and placed nearly 94 percent of graduates in jobs with an average wage of $19.16 per hour.

OPCMIA

Disaster Response Training led by Operating Plasterers' and Cement Masons' International Association.

Crucial Trainings to Protect Construction Workers

Our training consortium continues to offer multiple courses that collectively make tens of thousands of construction workers safer on the job. As an OSHA Training Institute Education Center, we team up with master trainers from the international building trades unions to reach workers across the country. Last year, for example, we provided 75 OSHA 500 Train-the-Trainer courses, which are designed to strengthen the expertise of apprenticeship and safety trainers by enabling them to further explore OSHA's construction regulations and equipping them with the tools to teach the OSHA 10- and OSHA 30-hour courses. In the past year nearly 80,000 rank-and-file members received training through our network of trainers.

In addition, we continue to lead long-running courses, such as the National Institute of Environmental Health Sciences-supported train-the-trainer courses. These courses prepare trainers to teach workers in a variety of safety and health topics. In response to industry demand, we now offer new titles such as OSHA #521 Industrial Hygiene, #2225 Respirator Protection, OSHA #3115 Fall Protection, and US Army Corps of Engineers EM385-1-1 Fall Protection Training. CPWR also offers a comprehensive 40-hour Fall Protection Train-the-Trainer program.

Connecting Workers and Employers

Overaa Construction is a fourth-generation, family-owned and -operated design-build general contractor in the San Francisco Bay Area. Finding employees who maintain its commitment to rock-solid reliability and bring a can-do attitude can be challenging, especially in the region's competitive economy. When Overaa began building the EPACENTER, a youth-oriented arts facility in East Palo Alto, it reached out to ECWTP local partner JobTrain. Soon two ECWTP graduates were on the project, and a third graduate has now worked for Overaa for more than a year. "Our company really benefits from the graduates' knowledge and skill," says Dale Jackson, VP of Operations at Overaa. "They understand how to work hard, safely, and smartly."

wHY architecture

IUOE

A member of the Operating Engineers working after the Camp Fire.

Handling Hazards

Almost six million tons. That's how much debris last year's Camp Fire in northern California generated, and together the state's six major fires destroyed nearly 16,000 buildings. The increasing frequency and intensity of fires, floods and other disasters across the country requires workers with specialized skills for handling hazards like paints, pesticides, and plastics. Our Hazardous Waste Worker Training Program shows them how to protect themselves from these dangers and safely conduct other potentially dangerous work, such as lead and asbestos abatement, work in confined spaces, and much more. Over the last year, CPWR's Hazardous Waste Worker Training Program and our partners trained more than 3,500 students at more than 700 employers in 43 states.

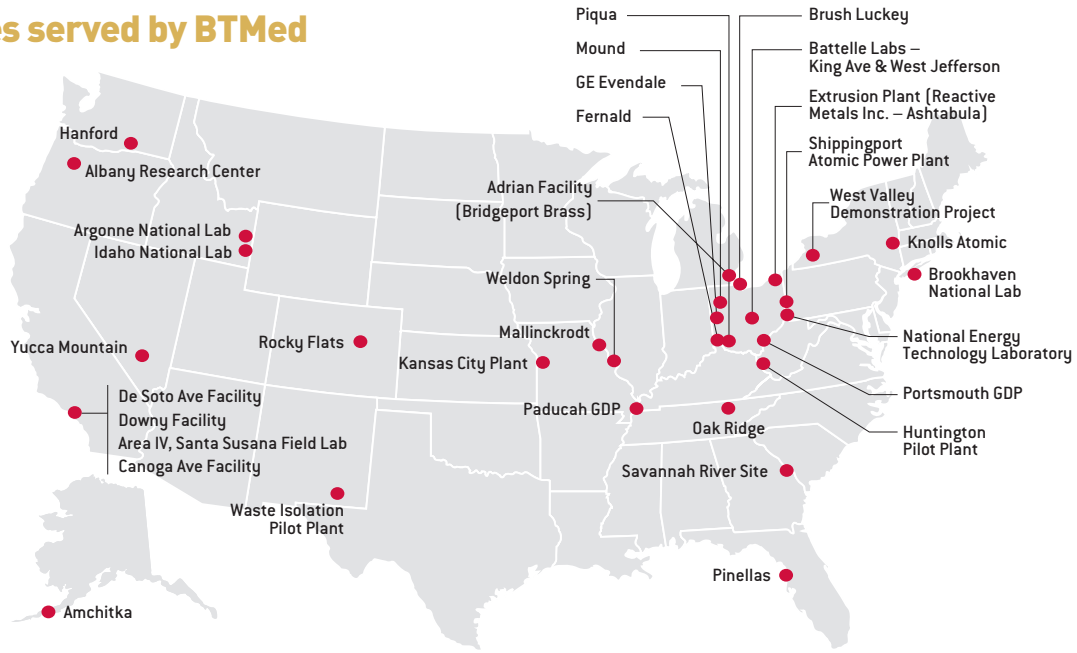
DOE Labor Training Work Group at Oak Ridge, Tennessee.

DOE Training Increases Worker Involvement to Improve Safety

For nearly 30 years, CPWR has collaborated with our NABTU partners to address the unique hazards at Department of Energy (DOE) nuclear sites, such as working around leaking, underground nuclear storage tanks and other high-level radioactive waste. More than 4,700 workers received training over the past year, in areas such as confined spaces construction, hazardous material handling, and electrical safety. CPWR continues to coordinate the DOE Labor Training Work Group, which brings together labor unions that work with DOE to improve health and safety at these sites. The group's impact is clear: its members now are helping develop a revised Radiation Worker Training Program, as well as exploring how to strengthen collaboration with DOE contractors to improve safety and health.

SERVICE

DOE Sites served by BTMed



BTMed: No-Cost Screenings for DOE Construction Workers

It's hard to receive a 100 percent satisfaction rating—but our Building Trades National Medical Screening Program (BTMed) has accomplished it.

Since 1996, we've offered free medical screening services to the thousands of construction workers previously employed at Department of Energy (DOE) nuclear weapons sites. While these sites were vital to our national defense, too often our workers were exposed to chemical and radiation hazards that raised their risk for occupational illness. CPWR partners with Duke University, the University of Maryland School of Medicine and Zenith American Solutions to carry out the BTMed program.

Participants' exceptional ratings of our DOE-supported BTMed program show the value they find from the information it provides about their health. For some of them, the screenings can even be the difference between life and death.

The Numbers

Over more than two decades, CPWR has delivered nearly 40,000 medical screenings to workers. Among their results:

- **19%** showed abnormal chest x-ray findings consistent with work-related lung disease
- **47%** showed abnormal pulmonary function test findings consistent with obstructive lung disease
- **65%** showed hearing loss
- **1.2%** showed at least one abnormal beryllium lymphocyte proliferation test (BeLPT)

Our **Early Lung Cancer Detection (ELCD)** program has completed more than 6,400 low-dose CT scans for workers at risk of lung cancer. Thirty-nine participants were found to have lung cancer, and 62 percent were detected in the early stages when treatment is most effective.

BTMed Screening Helps South Carolina Sheet Metal Worker Find Lung Cancer Early

"Hunt, fish, race." That's what Jack Quinley likes to do when he's not on the job as a sheet metal worker.

Between 1992 and 1998, Jack worked at the Savannah River Site—a Department of Energy nuclear facility—west of Charleston, South Carolina. He says he "pretty much got to see it all" there after beginning as an apprentice with Sheet Metal Workers Local 399. His work included operating equipment, building and dismantling steel structures, and cutting and installing nickel sheet and cadmium-coated metal. He worried exposures to hazardous materials might have affected his health.

Jack took advantage of BTMed's free screenings. Not long after his second screening, the program notified him of a suspicious finding on his chest x-ray. He was soon diagnosed with lung cancer, which might not have been found as early without BTMed. He's now receiving treatment.

His advice to other workers? "Get the exam!" Participating in BTMed has given Jack a better understanding of his health, and he looks forward to spending more time with his wife and family and to continuing to "kick back, and put the poles in wherever and watch the waves roll in."

Dr. Girma Assefa and BTMed Assistant Medical Director Dr. Stella Hines at the KU MedWest clinic in Kansas City, KS.

Latest Research on Health of Older Construction and Craft Workers at DOE Sites

To see if construction workers employed at DOE sites are at significant risk for diseases associated with occupational exposures, our researchers compared the mortality experience of 24,086 BTMed participants to that of the U.S. population. Their study, published in the American Journal of Industrial Medicine, found that these workers have a significantly increased risk for occupational illnesses over all time periods. Mortality was elevated for all causes: asbestosis; all cancers, including those of the bronchus, hematopoietic, lung and lymphatic systems, and the trachea; chronic obstructive pulmonary disease; mesothelioma; transportation injuries; and other injuries, particularly those caused by accidental poisoning, a possible effect of the opioid epidemic. Except for the rise in accidental poisoning, mortality patterns were similar to those previously reported. Continued medical surveillance is important for this population.

CPWR Research Project Leads

2014-2019 EXTERNAL

Assessing Public Policy Intervention Impacts on Construction Fatality Rates
John Mendeloff, PhD
University of Pittsburgh

Assessment and Control of Exposures to Reactive Chemical Resins in Construction
Dhimiter Bello, ScD
University of Massachusetts Lowell

Development and Evaluation of Contractor Safety Pre-Qualification Tool
Jack Dennerlein, PhD
Northeastern University

Interventions to Improve Safety Climate and Ergonomics in Construction Small and Medium Sized Contractor Enterprises
Ann Marie Dale, PhD
Washington University in St. Louis

OSH Education in Post-secondary Career Technical Education (CTE) Construction Programs
Diane Bush, MPH
University of California, Berkeley

Safety Voice for Ergonomics (SAVE)
Daniel C. Anton, PhD
Eastern Washington University

Test Bench for Evaluating Concrete Drilling Methods
David Rempel, MD, MPH
University of California, San Francisco

2014-2019 INTERNAL

Communications Plan
Bill Wright

Construction Solutions
Babak Memarian, PhD

Disparities Surveillance Research; Data Tracking and Support Services
Xiuwen Sue Dong, DrPH

Enhancing Safety Climate through Leadership
Linda Goldenhar, PhD

Nanomaterials in Construction: Tracking Product Diffusion and Measuring Exposures
Bruce Lippy, PhD, CIH, CSP

r2p Coordinating Project; Prevention Partnerships in r2p
Eileen Betit

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
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Washington University in St. Louis

Evaluation of Trunk and Arm Support Exoskeletons for Construction
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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
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Washington University in St. Louis

Promoting Safety and Well-being among Sheet Metal Worker Women through Mentoring
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Prevention through Augmented Pre-Task Planning
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Safety Climate-Safety Management Information System (SC-SMIS)
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Application of End-of-Shift Respirable Crystalline Silica Monitoring to Construction
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Applying Prevention through Design (PtD) to Solar Systems in Small Buildings
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Development of Sustainable Workforce Model for Construction
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Embedded Safety Communication System for Robust Hazard Perception of Individuals in Work Zones
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Ergonomic Back Injury Risk Factors in Construction Glass and Glazing Work
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Impacts of Policy Changes on Worker Safety Outcomes in NYC Construction Sites
Maria Figueroa, LPD
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Insights from Workers' Compensation Surveillance Data
Edward Taylor, MS
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iSafe: Using Panoramic Augmented Reality to Create a Virtual Safety Training Environment
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Prevention through Design to Make Solar-Ready Houses Safe for Solar Workers
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Recent Trenching Accidents, Analysis of Causes and Recommendations to Reduce Them
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Using Unmanned Aerial Systems for Automated Fall Hazard Monitoring in High-Rise Construction
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The Association of Union Constructors

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National Electrical Contractors Association

National Roofing Contractors Association

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National Institute of Environmental Health Sciences

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Online Resources

cpwr.com—The first stop for information on our research, training, and 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.

safeconstructionnetwork.org—Use this site to connect with others interested in advancing construction safety and health, find 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 job site planning tool, training resources, and interactive coaching exercises created to reduce manual materials handling (MMH) and prevent sprain and strain injuries.

ecd.cpwrconstructionsolutions.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. Visit cpwr.com for S-CAT for small contractors and other safety climate information.

cpwrconstructionsolutions.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.

nailgunfacts.org—Learn about the potential injuries workers face when using nail guns and how to reduce and eliminate the risks.

ChooseHandSafety.org—Find information on the risk of hand injuries and ways to prevent them, 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.

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