

HIGHLIGHTS 2018

RESEARCH TRAINING SERVICE



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Foreword

Research. Training. Service. Those three words describe what CPWR does, but they do not fully capture the scope of work and the positive impact CPWR's programs have on the safety and health of the U.S. construction workforce.

As a result of relationships developed over the last two and a half decades, CPWR is well-positioned to bring together leading academic researchers in occupational safety and health, the most knowledgeable and experienced safety and health trainers from every trade, and a network of caring medical professionals with the expertise to respond to the needs of workers who suffer from serious health issues as a result of their work on Department of Energy (DOE) nuclear weapons production sites. In addition, through extensive partnerships with employers, labor, and government, CPWR is able to identify and respond to the research and training needs of industry stakeholders.

CPWR's **Research** program is funded by the National Institute for Occupational Safety and Health (NIOSH) and serves as NIOSH's National Construction Center. In this role, CPWR coordinates the work of a consortium of leading academic and dedicated staff researchers. This work was recently recognized in an expert independent review of NIOSH's construction program, which gave the program and the National Construction Center a score of 9.5 out of 10 – the highest score given to a NIOSH program by an independent review to date. In this edition of **Highlights**, you'll read about the progress that has been made this year. Some of this research is focused on protecting construction workers from emerging hazards, such as engineered nanoparticles. The nano project's research team is testing conventional local exhaust ventilation to see if it protects workers from exposure to airborne nanoparticles. Other projects focus on providing new tools, information, and resources to address existing hazards and improve the industry's overall safety climate and performance.



This year saw continued and increased coordination between CPWR's **Training** and Research programs, as well as significant progress in training union trainers and workers. As the single largest occupational safety and health training program in the nation, CPWR and NABTU provided OSHA 10-hour and OSHA 30-hour outreach training to more than 75,000 workers during the year. In addition, with support from the National Institute of Environmental Health Science (NIEHS)

and the DOE, CPWR's Environmental Training Program worked with union instructors to deliver information critical to preserving the health of our members employed rehabilitating nuclear sites and hazardous waste sites. Through CPWR's Environmental Career Worker Training Program, new opportunities were created so that workers in struggling communities can realize the American dream.

CPWR's **Service** program addresses the needs of those who have already spent careers delivering construction services on DOE sites – serving as a reminder that we do not abandon workers once they retire. The DOE-funded Building Trades Medical Screening Program (BTMed) continued to provide free health screenings to the generation of workers who preceded us – screenings that now include a growing Early Lung Cancer Detection program that has already saved many lives.

In 2019, CPWR will complete this five-year cycle of research as the NIOSH National Construction Center. Given its track record and the support of industry stakeholders, I have every confidence that CPWR will once again – as it has since 1990 – be funded by NIOSH to continue to conduct critical safety and health research and tackle new challenges for the next five years.

Sean McGarvey

Chairman of the Board and President, CPWR

President, NABTU

Executive Director's Message

When we began discussing the theme for this year's annual report, we realized that this was the appropriate year in our funding cycle to focus on our core functions – **Research, Training, and Service**. This year's report provides just a snapshot of our accomplishments during the year and our plans moving forward as we continue to collaborate across programs to take advantage of expertise and maximize efforts to respond to our stakeholders' safety and health needs. In the fourth year of our five-year research program, our research projects began to shift their focus to converting the research knowledge gained into findings and interventions that can be put into practice by trainers, contractors, and workers.

I am pleased to report that our hard work, achievements and progress were recognized in an independent review of the NIOSH Construction Program, which gave our work and that of our colleagues at NIOSH high marks for engaging in research that is *"highly relevant and impactful... r2p efforts [that] have improved the use of ... research and products in the construction community..."* and partnerships that have resulted in *"significant intermediate outcomes."*

One example of our work that was referenced by the review panel is our flagship publication **The Construction Chart Book** produced by our Data Center. As you'll read in this report, the sixth edition was released this year and includes important findings about the safety and health of Hispanic construction workers, which represent a growing and important part of the construction workforce. Users of

The Chart Book know that about one-third of the construction workforce is Hispanic; that one-quarter of construction workers are foreign-born; and that about 30% of construction workers speak a language other than English at home – usually Spanish. Consequently, our **Research and Training** programs coordinated efforts to translate materials such as our Toolbox Talks, Hazard Alert Cards, **Foundations for Safety Leadership** training program, and the **Hazardous Waste Training Manual** into Spanish.

Another example cited by the review panel was our work to reduce exposures to noise, silica, and risks for musculoskeletal disorders. As you will read in this report, our Test Bench project has already found ways to reduce exposures to noise, silica, and vibration without jeopardizing productivity – a win-win situation for workers and employers. In coordination with our Ergonomics Community of Practice, our **Training and Research** staff joined forces to create a comprehensive series of training and planning resources to reduce the risks associated with materials handling in an effort to reduce strain and sprain injuries.

That's just a start. In **Highlights 2018: Research, Training, Service**, you will read about other tools, research findings and training programs that are benefiting our industry stakeholders, such as our new Exposure Control Database, new tools to measure and improve job site safety climate, research on emerging hazards, and the increasing reach and achievements of our **Training and Service** programs.

Finally, I would like to give a special thanks to our many stakeholder partners, NIOSH, and OSHA. We could not do what we do without your critical support. With your help CPWR's **Research, Training, and Service** programs will continue to make progress toward our collective goal of safe and healthy jobs for every construction worker.

Chris Trahan Cain, CIH

Executive Director



Earl Dotter/CPWR

RESEARCH

New Findings = Safer Job Sites and Healthier Workers

Research progresses at different rates. Some of our research projects produce findings and products early in our grant cycle for immediate use by construction employers, workers, and trainers, such as the findings from the Career Technical Education project completed last year.* Others, particularly those more exploratory in nature, generate findings and implementable actions later in the cycle. As we close out year four and enter the final year of our current grant cycle, all of our research projects are generating findings that will have a positive impact on safety and health outcomes. The following sections provide a quick snapshot of results and resources generated from our current research initiatives.

* <https://www.cpwr.com/research/osh-education-post-secondary-career-technical-education-construction-programs>

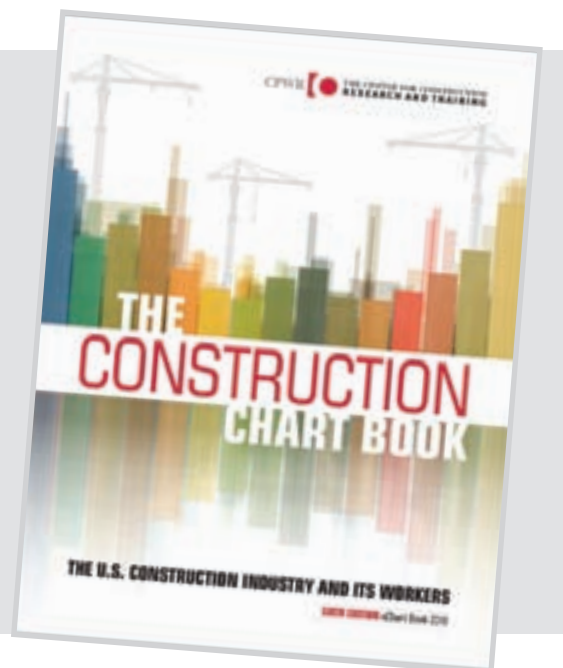
State of the Industry: Data to Policy

Data drives research priorities. Our Data Center and related research projects ensure that we have sound, reliable information to use when identifying research needs, construction populations at disproportionate risk, emerging hazards, and the influence of policy on safety. The data generated and analyzed is shared with academics, unions, trade associations, trainers and other industry stakeholders through publications such as the **Quarterly Data Reports**, presentations, articles, webinars, social media, and our websites.

Sixth Edition of Construction Chart Book Released

This year, the Data Center released the sixth edition of **The Construction Chart Book: The U.S. Construction Industry and Its Workers**. This flagship publication is widely used and cited. As noted in the National Academies' 2018 report, The Chart Book "*presents extensive analysis of data on construction safety and health and other facets of the U.S. construction industry.*" To make it more accessible and easy to use, this new edition offers online access to all charts and data, and includes interactive features, such as hyperlinks to references, citations, and databases that allow users to quickly find related resources.

PROJECTS: *Disparities Research; Data Tracking (CPWR)*



Construction Fatalities in the USA

JAN 1 – JUNE 30, 2018

Putting a Focus on the Need for Prevention

Since 2011, the Data Center has used online maps to share data and provide visual representations of annual U.S. construction fatalities, as well as those specifically due to falls. These maps are updated throughout the year and provide a sobering reminder of the risks construction workers face – proving the old saying that ‘a picture is worth a thousand words.’



Quarterly Data Report Focuses on Industry Concerns:

Fatal Injuries at Road Construction Sites among Construction Workers

The Data Center continued to generate **Quarterly Data Reports** to provide a more in-depth look at specific topics of concern to the industry, such as the trends and patterns of fatal occupational injuries among workers at road construction sites. In this report, the Data Center found that from 2011 to 2016, 532

construction workers were killed at these sites, more than double the total for all other industries combined. This finding is particularly important given the potential for growth in this sector as the nation rebuilds its aging roadways. The report concluded with information on work zone injury prevention and solutions.

PROJECTS: *Disparities Research; Data Tracking (CPWR)*

OSHA Inspections & Workers' Compensation Affect Fatality Rates

A new two-year study is exploring state-level data to understand the effects of OSHA inspections and penalties, workers' compensation, and non-policy factors on construction fatality rates. Preliminary findings show that a higher rate of construction safety inspections (per construction establishment) leads to lower fatality rates. The researchers found a similar correlation when they examined the waiting periods for workers' compensation benefits, with shorter waiting periods leading to lower fatality rates. In the project's final year, the researchers will examine fatality patterns within states and industry sectors, and among construction workers in traditional employment relationships and those self-employed.

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



Improving Safety Climate: Tools and Training

Everyone in the construction industry has a role in job site safety climate. Several research projects are exploring ways to strengthen these roles through training, procurement, and safety and health management.



SAVE Training Increases Awareness & Action to Prevent Injuries

The Safety Voice for Ergonomics (SAVE) project is improving safety climate by providing the newest entrants to the industry – apprentices – with the skills and knowledge to speak up about ergonomic hazards. With the support of the Masonry r2p Partnership (page 12), which includes labor, management and trainers, the researchers have developed and tested this novel training program. As the Project enters its final stage, preliminary findings indicate that the training has a positive impact on participants' knowledge, attitudes and behavior. The study findings and final **SAVE Program** will be shared in the year ahead as the Partnership begins integrating the Program into its apprenticeship training program.

PROJECT: Safety Voice for Ergonomics (Eastern Washington University)

Two New Resources Now Available in Spanish to Strengthen Safety Climate

This year, a Spanish-language version of the successful **Foundations for Safety Leadership (FSL)** training program and the online **Safety Climate Assessment Tool (S-CAT)** were released. This step ensures that these research-based tools for improving safety leadership and strengthening a company's safety climate are now available to an important and growing segment of the construction industry. In the final year, the researchers will continue creating supporting resources and disseminating them for widespread use throughout the industry.



PROJECT: Enhancing Safety Climate through Leadership (CPWR)

Evidence Mounts for Pre-Qualification Based on Leading Indicators



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

The Assessment of Contractor Safety (ACES) pre-qualification tool was created to help buyers of construction services, such as project owners and general contractors, understand and score the safety management systems of prospective contractors and subcontractors. This year, the research team finalized the ACES tool, began analyzing data collected through worker surveys and use of the tool, and launched a website (www.acesprequal.org). Preliminary findings at the company level are encouraging, with contractors who scored well on safety components also tending to have fewer recordable workplace injuries. Survey data from workers tell a similar story. These findings suggest that companies earn higher safety climate scores from their employees when they score well in the following **ACES tool** categories: employee involvement, employer trust, safety communication, safety recognition, safety programs, OSHA programs and training, diversity and language, and injury and illness analysis.

Finding Connections Between General and Subcontractor Safety Practices

The effects of general contractors' safety programs on the safety performance and culture of their subcontractors is being explored by a research team in St. Louis, MO. Preliminary findings indicate that a general contractor's safety management program has an influence over their subcontractors' programs, with one out of five subcontractors relying almost entirely on their general contractor's program. From the employee perspective, it appears that workers employed by subcontractors with more comprehensive safety management programs feel their projects are safer than projects led by subcontractors with weaker programs. In a related activity in this project, the research team is finalizing a model program to help contractors address ergonomic hazards, which can be included as part of an overall safety management program.

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



MStudio West / Matt McFarland

ABOVE: Workers discuss project safety plans. **BELOW:** Routine deck inspection before a concrete pour.



MStudio West / Matt McFarland

Finding Solutions for Construction Hazards

When it comes to improving construction safety and health, providing contractors and workers with practical solutions and information on existing and emerging hazards enables them to take steps to create a safer workplace. Several research initiatives are helping the industry stay up-to-date on new materials and equipment to identify and address hazards.

Safety Equipment Reduces Exposure to Nanoparticles

Engineered nanomaterials are being added to a growing number of construction materials and products, but oftentimes it is hard for workers and contractors to know if engineered nanoparticles are in the materials they are using and if



they could be hazardous. To address this unknown, our nanotechnology research team maintains a growing online

inventory of nano-enabled construction products and is testing products to assess the exposure risks. This year, the team measured exposures during spraying and sanding paint. They found that workers spraying paint without respiratory protection could potentially be exposed to nano-titanium dioxide above NIOSH's recommended exposure limit. The team is continuing to test products and share information on this emerging hazard with industry stakeholders.

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



Earl Dotter/ CPWR

ABOVE: Industrial hygienist checking nanoparticle counter prior to measuring exposures during sanding of plywood coated with a nano-enabled paint.
BELOW: A tradesperson uses an airless spray painting system to apply nano-enabled paint to plywood before he sands the dried paint with a power sander attached to local exhaust ventilation.



Earl Dotter/ CPWR

Investigating Exposures to Isocyanates & Epoxy Resins



Painters applying an isocyanate-based top coat inside an enclosure on a highway bridge.

Reducing exposures to reactive isocyanates and other harmful agents during spraying is the focus of a study by a research team at the University of Massachusetts, Lowell. Their work has resulted in several new testing and analytical methods to quantify respiratory and skin exposures and the efficacy of protective measures, such as respirators and gloves. This year, the team released a Hazard Alert Card and Toolbox Talk, in coordination with the r2p project, to share what they have learned about the health risks associated with isocyanates found in spray foam insulation. The team is now turning its attention to reactive chemical resins found in epoxies used in paints and coatings, and has already developed new methods to test for exposures to these chemicals in air, skin and urine, and through gloves.



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

Exposure Control Database Goes Live

This year, the Construction Solutions research team released the **Exposure Control Database (ECD)**. The ECD is a free, interactive online tool that allows health and safety professionals to calculate exposures to four hazards (silica, welding fumes, noise and lead) based on the task being performed and



worksite conditions. Developed with stakeholder input, this resource highlights the benefits of engineering controls and can help employers identify situations where personal protective equipment is needed. It also provides a way for stakeholders to find sources of

data that may be considered objective data under OSHA's silica standard. This year also saw continued expansion of the related **Construction Solutions Database** to roughly 2,000 hazard analyses for different work and task combinations and more than 300 evidence-based solutions.

PROJECT: *Construction Solutions (CPWR)*

Construction Solutions YEAR-OVER-YEAR DATA



Buy Smart: Sharp Drill Bits and Electric Rotary Drills Improve Safety

Research on safer drilling practices began making the transition from research to practice in year four. Using a test bench system, developed and validated in year one of the study, the research team found that exposures to respirable silica dust, noise, and vibration could be reduced, and productivity maintained or improved, by using an electric rotary drill instead of a pneumatic drill, and by using sharp drill bits. The construction industry is taking notice of these findings, with drill bit manufacturers incorporating wear marks on bits so contractors know when they should be replaced, and articles on the researchers' findings and recommendations appearing in stakeholder publications.

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

Research and Tools to Advance Research to Practice (r2p)

Our research projects and new initiatives undertaken through the r2p, partnership and communications projects led to the development and testing of new materials, technologies, and resources stakeholders can readily access and use to improve job site safety. These initiatives also added to our understanding of stakeholders' needs and the value of r2p-focused partnerships.



Measuring Reach: A Social Network Analysis

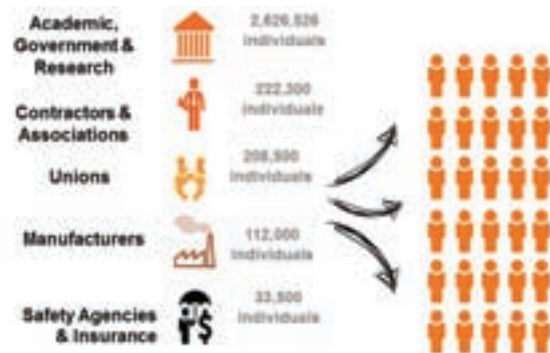
Sending out materials and information about research findings is just one step in moving research into practice. Another step is understanding who is being reached and what is happening with the materials distributed. A **Social Network Analysis (SNA)** pilot project focused on the National Campaign to Prevent



Falls in Construction was conducted this year to help answer those questions. Seventy-seven active partner organizations identified by the OSHA-NIOSH-CPWR r2p

Working Group participated in the SNA survey. These participants identified an additional 117 stakeholder organizations, bringing the total number of organizations recognized as being part of the Campaign to 274. Overall, 75% of the survey participants said they have seen “a great deal” or “a fair amount” of change in fall prevention activities within their organization or the industry as a whole as

Social Network Analysis WHO ARE PARTNERS REACHING WITH THE FALLS CAMPAIGN



a result of the Campaign. The SNA findings are being used to inform future Campaign activities, and have demonstrated how this evaluation approach can be used for other research projects.

PROJECT: r2p Coordinating Project (CPWR)



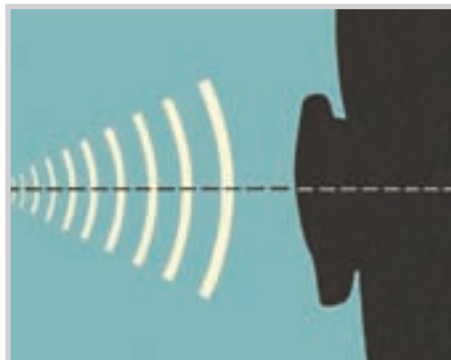
New Online Platform to Share Research and Resources Launched

This year, we launched the online **Construction Safety & Health Network** (<https://safeconstructionnetwork.org>). This network provides users with a new platform to easily share research findings and other safety and health information with their individual networks, and also facilitates connections between researchers and stakeholders with shared interests. At the time of its public launch in March 2018, more than 100 researchers and industry stakeholders had already registered to take advantage of the networking and notification features.

PROJECT: Prevention Partnerships in r2p (CPWR)

TRU-Net Demonstrates the Value of Trainer-Trainee Involvement

Thanks to more than 200 union trainers and more than 4,000 union trainees who participated in surveys on noise-related training and hearing loss, gaps in current training resources were identified and a new program was developed – the **Construction Noise and Hearing Loss Prevention Training Program**. This program addresses the gaps and includes research findings and helpful resources such as NIOSH’s Sound Level Meter App. Based on feedback from



trainers, the program is designed to give users the flexibility to structure training classes and activities to meet the time available and needs of their trainees. This pilot project demonstrated the value of engaging trainers and their trainees in research projects and led to new resources to help prevent hearing loss.

Helping Contractors and Workers Work Safely with Silica

New research and resources continue to be added to the Work Safely with Silica (www.silica-safe.org) website, one of the first projects undertaken by the OSHA-NIOSH-CPWR r2p Working Group. This year, to help workers and contractors understand and comply with the OSHA silica standard, we updated the free Create-A-Plan tool to reflect the standard’s Table 1 requirements, developed a guide to help contractors understand the medical monitoring provision, and added new training resources. Use of the site and resources continues to grow. This year alone, the site recorded more than 260,000 sessions.



PROJECT: r2p Coordinating Project (CPWR)



Raising Awareness of Safety and Health Research

The most promising occupational safety and health research findings cannot impact worker safety and health if they are not delivered to an audience with the capacity to use that information. This year, the r2p and communications projects coordinated efforts to reach a broad cross-section of construction stakeholders through our web-based outlets, promotional mailings, social media, webinars, and our UPDATE e-newsletter. In addition, we published a series of 16 annotated bibliographies on critical construction safety and health topics including falls, musculoskeletal disorders, noise and hearing loss, safety culture and climate, and prevention through design (PtD). These efforts led to substantial increases in demand for CPWR’s construction safety and health offerings and greater awareness of our resources.

PROJECT: Communications Plan; r2p Coordinating Project (CPWR)



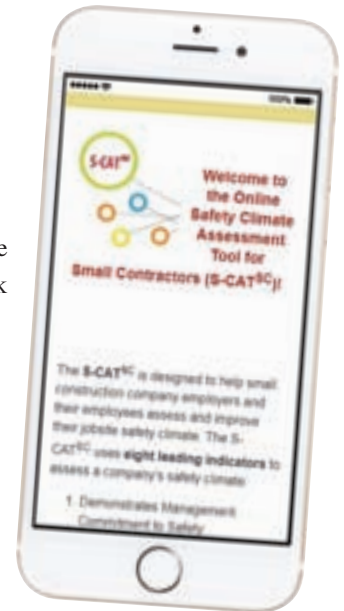
Taking Steps to Reduce Sprain & Strain Injuries

CPWR's Ergonomics Community of Practice continued to work with industry stakeholders to understand what resources are needed to reduce strain and sprain injuries caused by manual materials handling. A small group of contractors is currently trying out and reviewing the resources available through the **Best Built Plans** program (www.bestbuiltplans.org) to begin answering that question. The program has been the subject of numerous articles in insurance and trade publications, and a July 2018 webinar had 182 participants and has been viewed more than 100 times since. In addition, the web-based resource has been accessed roughly 5,000 times.

PROJECT: Prevention Partnerships in r2p (CPWR)

Roofing r2p Partnership Develops S-CAT^{sc}

The Roofing r2p Partnership piloted the **Safety Climate Assessment Tool for Small Contractors (S-CAT^{sc})** with roofing contractors, finalized it, and developed an online assessment tool that contractors and their employees can use on a tablet, smartphone or computer. This online version automatically generates a customized report with the user's results, areas where improvement is needed, and a link to relevant resources. The results will be aggregated to identify areas where small contractors need help and drive future resource development. The final version, which was introduced in February 2018 during an OSHA-led webinar conducted as part of the Safe + Sound Campaign, was attended by 560 construction stakeholders and has been viewed more than 700 times since. Coming soon: a Spanish version of the S-CAT^{sc}.



PROJECT: Prevention Partnerships in r2p (CPWR)

Masonry r2p Partnership Supports New Research & Technology

The **Masonry r2p Partnership** continued to support two NIOSH research projects and the CPWR SAVE project (page 6). With the Partnership's support, the NIOSH researchers exploring better ways to reduce workers' exposures to silica during tuckpointing have had access to a local training center and the trainers and trainees critical for the project's success. The Partnership invited researchers from NIOSH's Mining Division to explore the potential use of their new Helmet Cam technology in the construction industry. This new



NIOSH researchers set up the new Helmet Cam technology on BAC Local 18 OH apprentice Caleb DeLaVega before he begins tuckpointing.

technology uses a camera worn by the worker to capture a visual of the dust generated during a task and a dust monitor to measure the worker's actual exposure. The two are then linked so the video can be viewed simultaneously with the exposure data, allowing the researchers to determine how much dust the worker is exposed to in real time and the source of the highest exposures. Testing of this technology during a masonry task demonstrated that this mining technology has promising applications for construction.

PROJECT: Prevention Partnerships in r2p (CPWR)

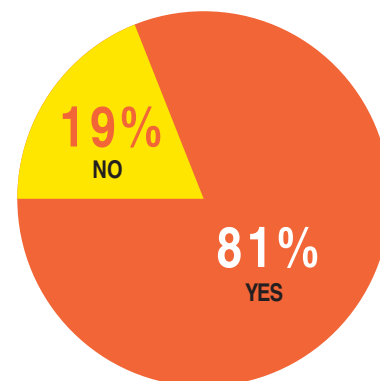
Exploratory Research

Nanotechnology: Study Shows Need for Training

In support of our ongoing research on construction products that incorporate nanoparticles (page 8), this small study explored understanding and use of nanotechnology applications among union leaders, apprenticeship program staff, and construction contractors in heavy industrial/ commercial construction. This study found that while most of those surveyed recognized terms such as “nanotechnology” and “nanoparticles,” only 25% were aware they are used in construction materials. However, when shown a list of nano-enabled construction products, 44% said they recognized or had used these products on the job. These and other findings underscore the need for training on this emerging hazard.

PROJECT: *Nanotechnology: Assessing Awareness and Training Needs among California Construction Trades*

**Have you heard of...
NANOTECHNOLOGY,
NANOPARTICLES, NANO-
ENABLED MATERIALS,
ENGINEERED NANOMATERIALS?**



Adoption of Safety Technologies in Highway Construction

Highway construction is commonly associated with high injury rates, but work zone intrusion alert technologies that can reduce the risks are not widely used. This exploratory



study examined the role technology plays in improving worker safety and identified factors that limit its use. Barriers to adoption include concerns about the effectiveness of the technology, the cost, and failure to perceive potential safety and cost benefits. The study found that the technology

was more likely to be used if it was perceived as easy to use, supported by respected colleagues, and had no false alarms. This study also identified future needs, including developing adaptable standard tools that can help bridge the knowledge gap between manufacturers of the technology and potential end-users.

PROJECT: *Reducing Highway Construction Fatalities Through Improved Adoption of Safety Technologies*

What's Next...

Small studies currently underway are looking at a wide range of issues, including:

- ◆ **Recent trenching accidents, analysis of causes, and recommendations to reduce them.** Researchers from Ruth Ruttenberg and Associates are reviewing causes of the recent increase in trench fatalities through data analysis and discussions with individuals involved.
- ◆ **Application of end-of-shift respirable crystalline silica monitoring to construction.** Researchers from Zefon International are collecting data that can be used to determine if a novel method for assessing workers' exposure to respirable crystalline silica in the mining industry can be used for the construction industry.
- ◆ **Impacts of policy changes on worker safety outcomes in NYC construction sites.** Researchers from Cornell are assessing the impact of policy changes resulting from the enactment of New York City's Local Law 196 in October 2017. This new law links building permit issuance and renewal to compliance with new safety training requirements.

For a complete list of small studies underway visit:
www.cpwr.com/small-study-program/whats-next.

TRAINING

A Positive Impact on Worker Safety

Each year, our training programs reach tens of thousands of trainers and workers, delivering information critical to keeping workers safe on the job site. In fact, working in collaboration with NABTU, we operate the nation’s largest safety and health training network. This year alone, our training programs collectively conducted 6,491 classes, providing training directly or through our affiliated unions to 1,848 trainers and 84,973 workers.

A key component of our training program is instructor development. OSHA 500-level training courses give the building trades’ apprentice and safety trainers the opportunity to explore OSHA’s construction regulations in depth and prepare them to teach workers in the field the foundational OSHA 10- and OSHA 30-hour outreach training courses in construction safety. This year we taught 88 of these “train-the-trainer” courses, reaching 1,403 outreach instructors. Many participants in these

classes also took our **Disaster Site Worker Instructor Training**, enabling them to prepare construction workers to work safely in disaster recovery zones.

We also continued to provide support for new and ongoing research projects. Through our Trainers and Researchers United Network (TRU-Net), occupational safety and health researchers gained access to trainers’ expertise while bringing cutting-edge research findings to them and those they instruct (page 11).

Earl Dotter/CPWR



Updated Hazardous Waste Workers Manual – Now in Spanish!

According to the latest edition of **The Construction Chart Book** (page 4), the proportion of Hispanic workers in construction has rapidly increased from 9% of the construction workforce in 1990 to 28.6% in 2015. For many of these workers, English is their second language. In recent years, our training staff has delivered dedicated bilingual train-the-trainer programs in order to encourage the participation of bilingual minority instructors, and we have translated a growing number of training materials into Spanish. This year, we updated our **Hazardous Waste Workers Manual** and presentations with the most up-to-date safety information and created a Spanish-language version of this important curriculum.

DOE Training Reaching More Workers and Providing Safety Orientation to Reduce Risks

Working in a Department of Energy (DOE) nuclear facility is not like working on other construction or industrial worksites. The DOE work environment has unique hazards and special policies, procedures, and practices intended to address them. That is why this year we created a special one-day **DOE Safety Orientation** program for construction workers who may work at these facilities. The program, which builds on CPWR's pioneering **Foundations for Safety Leadership** curriculum (page 6), incorporated special content focused on improving DOE's safety culture and addressing the unique hazards and regulations found on DOE sites. The resulting **"FSL4DOE"** train-the-trainer has already been presented to dozens of participants at the Oak Ridge, TN and the Hanford, WA nuclear facilities, as well as at the 2018 NIEHS Trainers' Exchange.



New Fall Protection Curriculum Targets Top Construction Safety Hazard

Falls from height are the leading cause of death on America's construction sites, claiming 384 lives in 2016. This year our training staff introduced a new training

program focused on fall prevention. Our intensive train-the-trainer program prepares instructors to offer an 8-hour class, which covers topics such as fall hazard identification, terminology, anatomy of a fall, fall clearance calculations, fall protection systems,

personal fall arrest system (PFAS) selection, equipment inspections, and rescue considerations. The trainers who participate acquire in-depth knowledge of OSHA's and the U.S. Army Corps of Engineers' fall training requirements and applicable ANSI standards.



RIGHT: participants who have completed the 40-hour program at the Ironworkers Training Center in San Diego





Environmental Career Worker Training Program (ECWTP) Earns a Gold Star for Graduate Placement

Offered in four cities (East Palo Alto, CA; New Orleans, LA; St. Paul, MN; and Flint, MI), the **ECWTP** recruits unemployed and underemployed community members and trains them to clean and restore the environmental health of nearby polluted industrial sites. Through this program, we connect these residents with promising careers in construction or environmental remediation. Last year, the ECWTP Consortium once again exceeded goals by recruiting 217 individuals and enrolling 86 in the training program. The program achieved an impressive 98% graduation rate, with 9 out of 10 graduates placed in good jobs with an average wage of \$19.02 per hour. The best part is that these are jobs with a future: more than 80% of those who found employment through ECWTP last year were still employed a year later.

LEFT: St. Paul ECWTP students practice decontamination line activities.

Helping the Next Generation Up the Career Ladder

Scott Adams, a 48-year-old father of three, graduated from the East Palo Alto, CA **ECWTP** program in 2010 and went to work on the San Andreas pipeline project. From there, he won admission to the International Union of Operating Engineers' (IUOE) Local 3 Construction Inspector program and was able to enter the training program at an advanced level due to his construction experience. Today, Adams credits ECWTP with helping him start a solid, family-supporting career. He is giving back by serving as a member of the ECWTP Technical Advisory Committee and recruiting promising program graduates to join Local 3.



JobTrain

ABOVE: Students at the East Palo Alto ECWTP taking part in hazardous waste worker training.

SERVICE

BTMed Provides Free Screenings at 35 Sites

Our **Building Trades National Medical Screening Program (BTMed)**, supported by a Department of Energy (DOE) cooperative agreement, offers free medical screening services to construction workers formerly employed on DOE nuclear facilities. During 2018, BTMed added another DOE site – Knolls Atomic Energy in New York – bringing the total number of sites receiving screening services to 35.

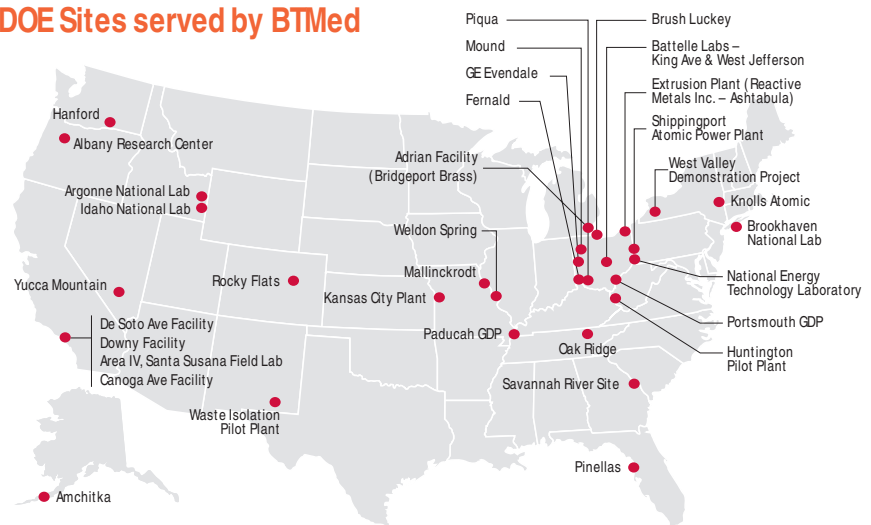
These nuclear weapons production sites were vital to our national defense, but too often workers employed on these sites were exposed to chemical and radiation hazards, putting them at elevated risk for occupational illness. As a result, for some workers, BTMed's screening can be the

difference between life and death.

This year, BTMed continued to make significant contributions by providing

thousands of former workers with valuable information about their health and potential for compensation.

DOE Sites served by BTMed



The Numbers

To-date, BTMed has delivered more than 37,500 exams to more than 26,000 workers across the country. BTMed's **Early Lung Cancer Detection (ELCD)** program has conducted more than 5,300 low-dose CT scans for workers at risk of lung cancer. A 99% satisfaction rating from the workers served reflects BTMed's dedication to providing these often life-saving services. Of those screened to date:

- ✓ **19%** had abnormal chest x-ray findings consistent with work-related lung disease
- ✓ **23%** had abnormal pulmonary function test findings consistent with obstructive lung disease
- ✓ **65%** demonstrated hearing loss
- ✓ **2%** had at least one abnormal beryllium lymphocyte proliferation test (BeLPT)
- ✓ **39** participants were found to have lung cancer. More than **71%** were detected in the early stages when treatment is most effective.



Sherry Gosseen, BTMed's Hanford outreach coordinator, participates in an outreach event.

Former Savannah River Site Worker Considers Himself Fortunate and Stays On Top of His Health

Andrew Johnson of Pipefitters Local 150 takes advantage of BTMed's free re-screens

Andrew Johnson describes his life as blessed. He was able to raise four children while working for twenty years as a pipefitter at the DOE's Savannah River Site; but after being exposed to hazards like radiation and asbestos from his work at the cold-war era nuclear facility, he knows that living a fortunate life means accepting support from others to monitor his health.



three years. From his twenty years of experience at the Savannah River Site, Andrew knows how valuable that is.

"Naturally, when they told us to put on two plastic suits and two or three pairs of coveralls and multiple shoe covers and multiple gloves, we knew that was not a perfect place to be," Andrew says. "I highly recommend that anyone who has been around any of these nuclear facilities go and get checked. You're not

BTMed offers workers like Andrew that support by screening for illnesses that may arise from the hazards linked to construction jobs at DOE sites. Everyone enrolled in the program is invited back for re-screens every

going to get a better physical, guaranteed. You don't want to go through what a lot of my friends went through," Andrew warns. "I was fortunate."



"Keep up the good work – This program helps many people.... The examination is very thorough with blood tests, breathing tests, x-rays, all at no cost. The staff is extremely helpful and courteous, making you feel comfortable and at ease. They will send you a summary of your results and make recommendations for further evaluation if needed. I would urge all union members to take advantage of this program." – Timothy Glenn, Fernald, Pipefitters Local 392



Vicky DeForrest, BTMed Oak Ridge nurse, greets former workers at an outreach event in Oak Ridge, TN.



John Wall, BTMed's Savannah River Site outreach coordinator, talks with former workers at an outreach event in Aiken, SC.



BTMed nurse Kim Cranford, RN and outreach interviewer Maria Palacios wait with Ronald Leikam, IBEW Local 68, before his CT Scan at National Jewish Health in Denver, CO.



Walter Smith and Vicki Tarpley perform outreach to former DOE workers in the Kansas City area.



Richard McCartney (IBEW Local 575) was one of the first BTMed participants to receive a CT Scan through the Early Lung Cancer Detection Program in the Portsmouth, OH area.

CPWR Research Project Leads

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

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

INTERNAL

Communications Plan

Clayton Sinyai, PhD

CPWR

Construction Solutions

Babak Memarian, PhD

CPWR

Disparities Surveillance Research;
Data Tracking and Support Services

Sue Dong, DrPH

CPWR

Enhancing Safety Climate through
Leadership

Linda Goldenhar, PhD

CPWR

Nanomaterials in Construction: Tracking
Product Diffusion and Measuring Exposures

Bruce Lippy, PhD, CIH, CSP

CPWR

r2p Coordinating Project;
Prevention Partnerships in r2p

Eileen Betit

CPWR

SMALL STUDY GRANTEEES

Aluminet: Preventing Heat Related Illness
among Construction Workers

Mark Schall, PhD

Auburn University

Application of End-of-Shift Respirable
Crystalline Silica Monitoring to
Construction

Martin Harper, PhD

Zefon International, Inc.

Applying Prevention through Design (PtD)
to Solar Systems in Small Buildings

Hyun Woo Lee, PhD, MS

University of Washington

John Gambatese, PhD, MS

Oregon State University

Development of Sustainable Workforce
Model for Construction

John Gambatese, PhD, MS

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Embedded Safety Communication
System for Robust Hazard Perception of
Individuals in Work Zones

Jee Woong Park, PhD

University of Nevada, Las Vegas

Ergonomic Back Injury Risk Factors in
Construction Glass and Glazing Work

Terry Stentz, PhD, MSIE, MPH

University of Nebraska, Lincoln

Holographic Visual Interaction and
Remote Collaboration in Construction
Safety and Health

Fei Dai, PhD

West Virginia University

Impacts of Policy Changes on Worker Safety
Outcomes in NYC Construction Sites

Maria Figueroa, LPD

Cornell University

Improving Work Zone Safety Utilizing
a New Mobile Proximity Sensing
Technology

Yong Cho, PhD, MSc

Georgia Institute of Technology

Insights from Workers' Compensation
Surveillance Data

Edward Taylor, MS

University of Tennessee

iSafe: Using Panoramic Augmented
Reality to Create a Virtual Safety
Training Environment

Masoud Gheisari, PhD

University of Florida

Mistakeproofing the Design of
Construction Process

Iris Tommelein, PhD

University of California, Berkeley

Nanotechnology: Assessing Awareness
and Training Needs Among California
Construction Trades

Debra Chaplan, MS

and **Laura Boatman, BA**

State Building and Construction

Trades Council of California

Prevention through Design to
Make Solar-Ready Houses Safe
for Solar Workers

Hyun Woo Lee, PhD

University of Washington

John Gambatese, PhD

Oregon State University

Reducing Highway Construction
Fatalities through Improved Adoption
of Safety Technologies

Chinweike Eseonu, PhD, MS

Oregon State University

Recent Trenching Accidents, Analysis
of Causes and Recommendations to
Reduce Them

Ruth Ruttenberg, PhD

Ruth Ruttenberg & Associates

Silica Nanoparticle Exposures
and Respiratory Protection in
Construction Jobsites

Atin Adhikari, PhD

Georgia Southern University

USGBC's PtD Pilot Credit: Evaluating
Effectiveness and Building a Foundation
for Implementation

Michael Behm, PhD, MS

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Using Unmanned Aerial Systems for
Automated Fall Hazard Monitoring in
High-Rise Construction

Masoud Gheisari, PhD

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CONTRACTOR ASSOCIATIONS

Associated General Contractors

The Association of Union Constructors

International Council of Employers of
Bricklayers and Allied Craftworkers

Mechanical Contractors Association of
America

National Electrical Contractors
Association

National Roofing Contractors Association

North American Contractors Association

Sheet Metal and Air Conditioning
Contractors' National Association

U.S. GOVERNMENT AGENCIES

U.S. Department of Energy

U.S. Department of Labor

Environmental Protection Agency

National Institute for Occupational Safety
and Health, CDC

National Institute of Environmental Health
Sciences

State Departments of Health

LABOR ORGANIZATIONS

NABTU and Affiliated Councils

International Association of Bridge,
Structural, Ornamental and Reinforcing
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
and Apprentices of the Plumbing
and Pipe Fitting Industry of the
United States and Canada

United Brotherhood of Carpenters
and Joiners of America

United Union of Roofers, Waterproofers
and Allied Workers

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



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.



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.

CPWR At A Glance

RESEARCH



WEBINARS → **12**

9
MANUAL MATERIALS
HANDLING
INFOGRAPHICS

4
FALLS
INFOGRAPHICS

WEBINAR PARTICIPANTS → **2,146**

3 NAIL GUNS
INFOGRAPHICS

WEBINAR VIEWS → **11,514**



TWEETS → **647**

IMPRESSIONS → **+27%**

RETWEETS → **+28%**

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CPWR UPDATE
E-NEWSLETTERS

1,279,372
WEBSITE SESSIONS

44,249
YOUTUBE VIEWS

PRESENTATIONS → **84**

PUBLICATIONS → **67**

ORDERS FOR CPWR PRODUCTS → **641**

KEY FINDINGS FROM RESEARCH → **13**

524,453 PRINTED CPWR
PUBLICATIONS AND PRODUCTS DISTRIBUTED

TRAINING

6,491
COURSES OFFERED

1,848
TRAINERS TRAINED

84,973
WORKERS TRAINED

SERVICE since program began...

CONSTRUCTION WORKER SCREENINGS → **37,500+**

LOW-DOSE CT SCANS → **5,300+**

99%
SATISFACTION RATE



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