

WHY



WE DO

THIS



WORK

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**WHY**

**DID YOU  
CHOOSE  
THIS  
WORK?**

“Seeing the changed lives of community residents who complete the Minority Worker Training Program is motivation enough for my work. We are giving them a second-chance to try and do it right.”

— KIZETTA VAUGHN  
DIRECTOR OF THE MINORITY WORKER TRAINING PROGRAM

“Many good people have come before me and many good people will come after me; realizing that I’m part of something bigger than myself inspires me to keep working and to pass on the vision to others. We are making a difference one person at a time.”

— SPENCER SCHWEGLER  
DIRECTOR, OSHA & DISASTER RESPONSE TRAINING

“There is also a personal pull – my grandfather, a large crane operator, and my brother-in-law, a residential builder, both suffered traumatic injuries that were extremely disabling. I know the consequences of workplace injuries for individuals and their family members.”

— MICHELE OCHSNER, PHD, LATINO DAY LABORERS

“I began work as an ordinary seaman with the Seafarers International Union out of Baltimore, and a brief time worked as a rigger at Bethlehem Steel’s Baltimore ship repair yard organized by the metal trades. It made me realize how physically demanding and precarious work is for many.

To date, we have largely failed to implement engineering controls in construction that eliminate or contain hazards. We still depend largely on personal protective equipment and the alertness of trained craft workers. Informal sector workers that don’t know OSHA exists, self-employed subcontractors that OSHA doesn’t apply to, and unorganized workers that need work in a precarious labor market make up a majority of the U.S. construction workforce. We still experience more deaths on the job than any other industry sector. Perhaps because construction research is so difficult, it attracts a dedicated group of researchers who are not easily discouraged and are sincerely committed to saving lives.”

— JIM PLATNER, PHD, CREATOR OF CONSTRUCTION SOLUTIONS

“My grandfather and uncles were construction workers and I was one for a year – the work is dangerous. I do this so that a few more construction workers will return home every day without injuries.”

— DAVID REMPEL, MD

“My husband worked on the Hanford site for years, so a feeling of personal pride comes with every Hanford worker I help through the BTMed program. It’s particularly exhilarating when workers come back to tell me they received compensation for an illness BTMed discovered.”

— SHERRY GOSSEEN, BTMED INTERVIEWER, HANFORD

“I starting working construction in 1969 at age 18 laying sewer and drainage line. We regularly worked in trenches more than 15 feet deep with no benching, sloping or shoring. We only had a ladder in the trench to enter and exit when starting work, breaks, lunch and at the end of the day. I had absolutely no safety training other than a fellow worker cautioning me about hitting the side of a trench in sandy soil. He had been previously buried up to his waist. After college, I worked for Maryland OSHA as an industrial hygienist, and I was struck by the much greater risks on construction sites compared to the industrial settings I visited.

I have enormous respect for the skills that construction workers bring to their craft. I have seen backhoe operators shave 3" of soil out of the bottom of a trench 10' deep and ironworkers high up on the pile, safely cut up the twisted beams at the World Trade Center. I feel privileged to be able to research ways that construction workers can practice their craft more safely.”

— BRUCE LIPPY, PHD, NANOTECHNOLOGY

“Several years ago I was talking with a construction crew working on a house my wife and I were considering purchasing. I asked one gentleman who was laying tile in the master bathroom and who appeared to be in his mid-30s if he’d ever experienced back pain as a result of his work. He said a particularly bad episode recently kept him off the job for about two weeks, but the hardest part was not missing work – it was not being able to carry his 2 year-old daughter in his arms. As a new father at the time, I could appreciate his response in a way I hadn’t really been able to when I was younger.”

— NATE FETHKE, PHD, STUD WELDING

“The workers. Hearing the workers express gratitude about what they learned in a training session or having the opportunity to try a new tool that may help make their work easier motivates me to continue this work — to improve their work situation.”

— ANN MARIE DALE, PHD, PARTICIPATORY ERGONOMICS

## FOREWORD TO HIGHLIGHTS 2013



Sean McGarvey

**I**t's a question you don't hear very often: why are you in your line of work? Of the 154 million people in our nation's workforce, how many have reflected on it? And how many say, "It's a job – it pays the bills."

But people make choices – from one young worker who decides to be a pipefitter while another is ready to paint the world.

Maybe it's not just a paycheck. In the trades, it's pretty clear: If you get in and love it, you'll do it for life.

So this year, CPWR asked the people behind its programs, projects and courses why they chose their line of work. I was curious about the result because CPWR's work is so specific – finding ways through applied research, worker training and free medical screenings to improve the health and safety of America's construction workers. It's a small group of people, but it's no small task. Their work is of great consequence to those of us in the Building Trades who rely on their findings and products. They confirm and quantify the hazards to worker health, whether union or non-union. They examine causes of traumatic injuries and fatalities, then seek ways to reduce their occurrence – or even eliminate them entirely. They educate and inform all facets of the industry through their outreach. They seek out construction workers formerly employed on nuclear DOE sites to inform them of free medical screenings that could save a life. And they develop training resources and deliver training to thousands who will help us provide the most qualified construction workforce a contractor can employ.

I read the answers. The researchers, trainers and outreach coordinators of the BTMed screening program responded in ways that went far beyond what you'd hear from many Americans.

Again and again, I heard a personal connection from each voice, and so it's easy to understand the commitment CPWR professionals and its consortium partners have to construction worker safety and health. As Chairman of the Board and President of CPWR, I know firsthand the importance of CPWR's work and the impact its programs have had on our industry.

**IN READING THROUGH THIS YEAR'S REPORT, I BELIEVE YOU WILL COME AWAY WITH A GREATER APPRECIATION OF CPWR'S WORK IN FULFILLING ITS MISSION TO IMPROVE WORKING CONDITIONS IN THE CONSTRUCTION INDUSTRY.**

However, even I was impressed by the unique combination of education and technical expertise, backgrounds, work experiences, and commitment to the field of construction safety and health. In reading through this year's report, I believe you will come away with a greater appreciation of CPWR's work in fulfilling its mission to improve working conditions in the construction industry. I know I did.

You'll be reading about just some of the people behind the accomplishments and findings in this book. As you read about the projects and results, you'll gain a better understanding of why they do this work.

**SEAN MCGARVEY**  
CHAIRMAN OF THE BOARD AND PRESIDENT, CPWR  
PRESIDENT, BUILDING AND CONSTRUCTION TRADES  
DEPARTMENT, AFL-CIO

# WHAT HAVE YOU LEARNED FROM YOUR WORK YOU THINK EVERYONE IN THE CONSTRUCTION INDUSTRY SHOULD KNOW?

“In this dynamic and complex environment, safety and health CAN be improved, but only through sustained, systematic approaches.”

— BRAD EVANOFF, MD, MPH, ERGONOMICS, RESIDENTIAL FALLS

“When you hear a site fatality was a ‘freak accident,’ it most likely wasn’t. An analysis of circumstances leading to a construction worker’s death almost always points to safety measures and practices that were not in place. That’s a second tragedy: the death could have been prevented.”

— MARY WATTERS, MFA, COMMUNICATIONS/DISSEMINATION

“Things don’t need to stay as they always have been. Proven methods in other types of construction can be retrofitted for residential application. By working together researchers and construction professionals can identify simple solutions that will protect workers. Anything is possible.”

— VICKI KASKUTAS, MHS, OTO, RESIDENTIAL FALL PROTECTION

“Pre-apprenticeship training is a pre-cursor to apprenticeship that allows apprenticeship trainers to glean potential apprenticeship candidates prior to entering the workforce, saving JATC dollars; potentially addressing high apprenticeship attrition rates.”

— KIZETTA VAUGHN, DIRECTOR, MINORITY WORKER TRAINING PROGRAM

“Never be counted in the injury and illness statistics.”

— XIUWEN (SUE) DONG, DRPH, DATA ANALYSIS

“Recent improvements in safety and technology in construction have led to reduction of injuries and fatalities among workers illustrating the potential for positive changes at the worksites. But change is not possible until owners, contractors, and workers are willing to work together to make it happen.”

— ANN MARIE DALE, PHD, OTI, PARTICIPATORY ERGONOMICS

“There are good, evidence-based solutions out there for nearly all of the health and safety challenges this industry faces. We just need to do a better job of getting the word out and we need your help.”

— ROBIN BAKER, MPH, RESEARCH TO PRACTICE

“To be effective, safety interventions must be thoroughly tested by real workers performing real work.”

— DAVID REMPEL, MD, ERGONOMICS – DRILLING

“Construction hazards change quickly. Controlling risks requires continuous planning and communication; starting before the project begins and continuing through pre-task planning as you start each new effort. Unlike repetitive jobs, it’s not enough to just learn how to perform your current task safely. You need to be observant and have analytical skills.”

— JIM PLATNER, PHD, CONSTRUCTION SOLUTIONS

“Hazard communication is key. Setting up the infrastructure to allow all levels of communication can lead to a safer and healthier workplace.”

— JACK DENNERLEIN, PHD, SAFETY MANAGEMENT

“Workers can take ownership of health and safety training and the broader goal of working toward changes in construction health and safety: they can be in front of the room as peer trainers, take actions at their own worksites and create awareness with other workers.”

— MICHELE OCHSNER, PHD, LATINO WORKERS

“Any construction worker who was on a Department of Energy nuclear weapons site needs to get a medical screening through BTMed – even if you worked just one day out there.”

— GORDON ROWE, IBEW LOCAL 1579, BTMED INTERVIEWER, SAVANNAH RIVER

## MESSAGE FROM THE EXECUTIVE DIRECTOR

Here in late 2013, we are in the early stage of the last year in our current five-year cooperative research agreement with NIOSH, and 70% through our current NIEHS five-year training cooperative agreement. With all the activity generated by researchers, our training staff, and the work of BTMed, it would be easy to select the “highlights” of the multiple accomplishments that appear in this year’s *Highlights*.

But CPWR has just been through a year that brought great promise, new challenges and a good measure of attention to our work. So my report – this message – will focus on these.

On August 23, OSHA released the long-awaited *Proposed Rule on Occupational Exposure to Respirable Crystalline Silica* for public comment. Finally, public discussions about the best ways to protect workers from silica dust could get underway.

Perhaps no organization realizes the terrible toll silica can take on workers’ lungs, health and life better than CPWR. In 1993, a CPWR researcher published our first report documenting construction worker exposure to this carcinogen, based on research performed in 1992. Since that time, we’ve amassed exposure measurements and peer-reviewed journal articles and shared this information widely with industry stakeholders. We hope the results of this research will be used to build a protective standard for construction workers.

Our website launched last year, silica-safe.org, has become the go-to resource for many of our industry partners. The site not only offers a collection of federal and state regulations and voluntary procedures, as well as a comprehensive history of silica rule-making, it also offers solutions, such as tools and equipment that can capture and eliminate dangerous silica dust. We’re especially proud of the Create-A-Plan tool on the website, built for contractors who want to put in place controls to reduce exposure and thus save construction workers’ lives prior to there being a silica standard in place.

CPWR plunged into the yet-to-be-defined “safety culture” and “safety climate” discussion when we partnered with NIEHS and NIOSH in hosting a workshop in Washington D.C., on June 11-12, 2013. More than 160 industry thought-leaders attended, along with a mix of government, employers and their associations, labor, academics, and safety and health professionals. Many were already familiar with the work CPWR researchers have produced since we began funding studies on this topic in 2004. We have two current projects reported on pages 11 and 17. You’ll find a report about this workshop posted on cpwr.com.

OSHA’s modification of the Hazard Communication Standard now calls for new labeling and Safety Data Sheets, among other provisions, including new training requirements for employers to train workers by December 1, 2013. Early in the year, our training program created a four-hour hazard communication

course to inform workers of the new pictograms they’ll be seeing. The course also satisfies the general training requirements for the new standard, and was a top download from CPWR.com in 2013. We’ve received excellent feedback from the industry about the quality of the new program, which is available for free to anyone in the construction industry interested in using it.

The National Campaign to Prevent Falls in Construction launched jointly in 2012 by NIOSH, OSHA, and CPWR saw campaign partners step up to the plate – and deliver. They found new ways to bring messages of fall prevention to audiences, from mass transit promotion and free training for roofing contractors in Massachusetts, to an online training module and a traveling “educational bus” produced by the Kentucky Labor Cabinet. You can read four “Success Stories” on the official campaign website

### **PERHAPS NO ORGANIZATION REALIZES THE TERRIBLE TOLL SILICA CAN TAKE ON WORKERS’ LUNGS, HEALTH AND LIFE BETTER THAN CPWR.**

managed by CPWR, StopConstructionFalls.com. It’s invigorating to see the initiative and products of the national campaign enhanced by state and local efforts, all in the name of preventing the number one killer of construction workers: falls.

In 2013 we also published the fifth edition of *The Construction Chart Book: The U.S. Construction Industry and its Workers*. The Chart Book is now widely regarded as a leading resource for U.S. construction industry data and statistics, compiling everything we know about the industry based on national datasets available to us. You can read more about the Chart Book on page 9 and can download it from CPWR.com.

While our industry has much to cheer in 2013 accomplishments, like our research coverage in *Engineering News Record*, trade presses and union magazines, construction continues to lead the nation in the number of workers fatally injured on the job. We’ve come a long way since starting our construction safety and health program in 1990, but we still have much work to do. It’s CPWR’s mission as an organization to improve working conditions in the construction industry. It’s why CPWR does this work, and we ask you to join us in the effort.

**PETE STAFFORD**  
EXECUTIVE DIRECTOR

# WHAT WHAT HAVE YOU LEARNED FROM YOUR

# RESEARCH

# YOU THINK EVERYONE IN THE CONSTRUCTION INDUSTRY SHOULD KNOW?

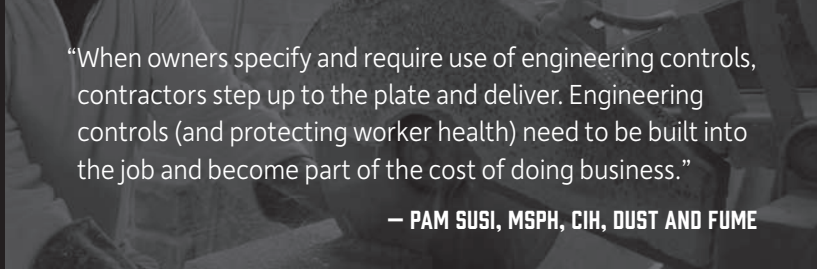
# KNOW

“Exposure controls for silica and dust generated during construction are available, effective and should be used.”

— SUSAN WOSKIE, PHD, SILICA DUST AND NOISE

“Based on preliminary results, we have determined that the development of a strong safety climate in construction is not only dependent on management, but also on support from co-workers within one’s work-group. On a construction site where management is not always present and crews have more autonomous responsibility, co-worker support for safety is critical.”

— JOHN ROSECRANCE, PHD, SAFETY LEADERSHIP



“When owners specify and require use of engineering controls, contractors step up to the plate and deliver. Engineering controls (and protecting worker health) need to be built into the job and become part of the cost of doing business.”

— PAM SUSI, MSPH, CIH, DUST AND FUME

“We have found 207 products that probably contain nanoparticles. We will be seeing much more use of nanoparticles, but thus far hazard communication has been poor. Safety Data Sheets fail to describe the nanoscale component or use Permissible Exposure Limits for the parent material.”

— BRUCE LIPPY, PHD, CIH, CSP, NANOTECHNOLOGY

“Close attention to the public health Hierarchy of Hazard Control would prevent more injuries than focusing on individual behaviors.”

— HESTER LIPSCOMB, PHD, NAIL GUNS

“Ironworkers, as a group, are generally happy, well-balanced tradespeople and derive a great sense of pride from their work. They are also eager to contribute to research with the potential to minimize the physical demands of their work, but approach new technologies with equal measures of enthusiasm and skepticism.”

— NATE FETHKE, PHD, STUD WELDING



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# A Solution to Nail Gun Injuries is in Our Grasp

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## PREVENTION OF NAIL GUN INJURIES IN RESIDENTIAL CONSTRUCTION

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*Lead Researcher: Hester Lipscomb, PhD, Duke University*

It seems like every day we see potentially devastating nail gun injuries reported in the press. As Dr. Lipscomb's work has amply demonstrated, the combination of powerful pneumatic nailers, heavy framing nails, and contact-trip triggers adds up to severe injury for thousands of construction workers every year.

A nail gun with a sequential trigger requires users to depress the nose of the gun against the work before pulling the trigger, making an accident highly unlikely. However, many construction workers continue to work with "contact trip" nail guns (or



Researchers found nail gun injury rates declined due to increased use of sequential trigger tools and early training of users.

"bump guns") that permit users to hold down the trigger and "bump" the gun against a surface to fire it, increasing the chances of an accidental discharge substantially.

Users of tools with a contact-trip trigger face twice the risk of acute injury than users of tools with a sequential trigger. It's far too easy to "bump" a body part or a coworker instead of a piece of lumber or millwork. "Bump fire" guns will also inadvertently discharge a nail if the tip contacts anything following the recoil

that is associated with firing. Frame carpenters, who work with heavy framing nails, are at special risk of severe injury.

Interventions among St. Louis area carpenters, in partnership with the Carpenters Union and the Homebuilders Association, have proven highly effective. Increased use of tools with sequential triggers combined with improved early training in the apprenticeship school have slashed injury rates by approximately 80% in the target population. Researchers have continued surveillance to determine if sequential trigger tool use poses an increased work-related musculoskeletal disorders (WMSD) hazard; no evidence of increased WMSD hazard has been found.

The research team has partnered with investigators at WVU to test this approach with non-union builders/framers in that state. Baseline data from builders in West Virginia show markedly higher injury rates among those surveyed than currently seen in the Midwest. The team has developed and delivered a train-the-trainer to 15 individuals from non-union residential building companies using a number of the tools available on the website [www.nailgunfacts.org](http://www.nailgunfacts.org), an employer guidance document jointly published by NIOSH and OSHA (a document largely informed by the team's own research findings), and a CPWR Hazard Alert pocket card.

An obvious engineering solution to the problem exists: eliminating the contact-trip trigger altogether. The team continues to pursue a dialogue with manufacturers, OSHA, NIOSH, and the Consumer Products Safety Commission to explore this option.

## WHAT WE ACCOMPLISHED

- Researchers demonstrated a marked reduction in nail gun injury rates in the Midwest associated with increased use of tools with sequential triggers and early training of users. This has been accomplished without increasing musculoskeletal injury complaints.
- [www.nailgunfacts.org](http://www.nailgunfacts.org) – the team's repository for news and information on nail gun injuries and safety continues to be updated with news items. The site is receiving more than 2,000 unique visits per day, including a growing number of international visitors. The site offers materials for workers, contractors, academics and others with occupational safety interests. Training videos are frequently downloaded from the site.
- The team has worked with CPWR on distribution of Hazard Alert cards on Nail Guns for use in toolbox talks and safety meetings, and with NIOSH and OSHA on circulation of the nail gun guidance document informed by the team's research that is available in English and Spanish.
- Working with collaborators at West Virginia University, Dr. Mark Fullen has developed a train-the-trainer safety program to try to improve nail gun safety in the non-union sector. WVU has held four train-the-trainer sessions open to all companies willing to participate in surveys; 15 have participated so far.

## Aiming for Reduced Exposure to Dusts and Fumes

### ADOPTION OF INNOVATIONS TO MINIMIZE EXPOSURES (AIMS) PROGRAM TESTS EFFECTIVENESS OF AVAILABLE TECHNOLOGIES

*Lead Researcher: Pam Susi, MSPH, CIH, CPWR*

Welders exposed to elevated fume levels can fall victim to an array of serious occupational illnesses – illnesses that can result in asthma, brain disorders and cancer, to name a few. Bricklayers grinding mortar in tuckpointing operations generate some of the highest levels of airborne crystalline silica seen in construction, putting them at risk of silicosis, respiratory ailments and other illnesses. Local exhaust ventilation (LEV), which captures dusts and fumes at the source, can protect workers and bystanders. In 2013 the project research team engaged in extensive testing of two LEV systems, one aimed at each of the targeted operations.

With the aid of Bricklayers Local 1 in Philadelphia, the team assessed the performance of the Ermator S26 HEPA Dust Extractor used in combination with two Bosch grinders and two ICS Dust Director shrouds. Grinders are routinely employed in tuckpointing and masonry restoration. The dust capture systems cut silica exposures by 98%; grinding without the LEV system generated dust levels that were an astounding 700 times the NIOSH Recommended Exposure Limit (REL).

In Chicago, the team worked with Pipefitters Local 597 training center to test a control for welding fumes. Stainless steel welding fumes are known to contain hexavalent chromium (Cr 6), associated with lung cancer and occupational asthma.

**Grinding without controls generated dust levels 700 times the NIOSH Recommended Exposure Limits. With a combination of local exhaust ventilation systems selected by researchers, silica dust exposure was cut by 98%.**



Manganese, which is linked to neurological disorders similar to Parkinson's disease, is a common component of welding fumes generated during mild steel welding. The small portable Lincoln Xtractor 1C LEV unit slashed manganese exposures when welding mild steel by 97% and reduced Cr 6 when stainless steel welding by 94%. Average Cr 6 exposure from stainless steel welding without LEV was nearly twice the permissible exposure limit (PEL) set by OSHA but only about one-tenth the PEL when used.

Beyond equipment testing, the AIMS program seeks to promote use of engineering control technologies with industry stakeholders. Interviews with contractors, labor representatives and OSHA staff from the Chicago/Cook County area indicate that LEV use for tuckpointing is driven largely by local regulation and owner demand. For instance, Chicago requires dust control permits from contractors grinding masonry or concrete in order to reduce dust emissions from the job – but the same LEV that protects the public also protects workers. The team has been meeting with Philadelphia City government representatives to explore adoption of similar requirements.

### WHAT WE ACCOMPLISHED

- A combination of LEV systems selected by researchers reduced exposure to silica dust when grinding mortar by 98%.
- Researchers tested two LEV units (one for welding and one for tuckpointing).
- Researchers prepared and distributed two detailed reports of testing results, describing the effectiveness of local exhaust ventilation (LEV) systems for welding fume and dust exposures from tuckpointing tested during the summer of 2012 and three additional brief summary reports for LEV systems tested in Fall of 2012 and the Summer of 2013.



■ Working with the University of Puerto Rico, the team developed and pilot-tested a training program with Boilermakers in Denver on the correct use of LEV to halt dangerous fumes. After the training, the team documented improved knowledge with the entire group and reduced exposure with a smaller subset monitored while welding before and after training.

■ The research team presented findings at an international conference of occupational hygiene in Montreal, Quebec and to the CPWR/NIOSH Engineering Controls Work Group – a diverse group whose mission is the identification, evaluation and promotion of control technologies (such as the systems tested) for construction.

■ Because of this work, the City of Philadelphia is working with researchers, local building trades unions and OSHA to explore use of local codes to reduce dust levels generated from masonry restoration work.



In a test of tools (manual hand crimper vs. a powered crimper attachment designed for a cordless drill) to crimp the edge of a small round duct pipe, researchers found that the power tool performed the job faster and better, and with less hand effort for the worker, than the manual tool.

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## Can Workers Identify Practical Ergonomic Solutions?

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### PARTICIPATORY ERGONOMICS SEEKS SOLUTIONS FOR WORK-RELATED MUSCULOSKELETAL DISORDERS IN SHEET METAL, DRYWALL SECTORS

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*Lead Researcher: Laura Welch, MD, CPWR*

Catastrophic accidents like collapsing trenches and falls from high steel often earn newspaper headlines, but few occupational hazards touch more construction workers than musculoskeletal disorders. Sprains, strains, repetitive motion injuries and all manner of soft tissue damage steal quality of life from tens of thousands of construction workers. Poor ergonomic practices on the job cause chronic pain and cut short the careers of too many men and women of the trades.

Identifying the characteristic tasks of each trade that are most punishing for the human body, and proposing alternatives, can't be done in the lab alone. It's best achieved through participatory methods, where the insights of workers and contractors in the field can identify problems and seek practical solutions. Dr. Welch's team is engaged in extensive investigations of work processes in the sheet metal and drywall sectors to do just that.

Workers identified solutions that could ease work strain, but the rapidly moving construction environment is thick with barriers to effective implementation. The research team revised the training program to overcome some of these barriers: for instance, increasing managers' participation in activities and providing toolbox talks compatible with the groups' regular safety training activities rather than demanding significant extra time commitments.

The team administered the participatory ergonomics program to four contractor groups in 2012, covering an additional 70 workers – 42 from the sheet metal groups and 28 from a carpenters' drywall installation group. For three out of four groups, a safety manager assisted with coordinating site visits and ergonomics training meetings and in some cases led or contributed to the content of meetings. Preliminary analyses showed improvement in worker behaviors for manual material handling

tasks: compliance with composite measure of safe behaviors emphasized in training increased from 65% to 81%.



Researcher Lisa Jaegers, MS, got a chance to exhibit at a St. Louis SMACNA trade show in September and display ergonomic hand tools proven to reduce wear and tear to sheet metal workers. She increased the opportunity for dissemination by including the Overhead Drill developed by fellow researcher David Rempel, MD, and enlisting CPWR support to send materials and a display booth.

The team's intervention research in sheet metal was not limited to training, but included careful testing of tools and equipment to assess both ergonomics and productivity. For instance, the team compared the performance of a manual hand crimper and a powered crimper attachment designed for a cordless drill. Using both tools to crimp the edge of a small round duct pipe, researchers found that the power tool performed the job faster and better, and with less hand effort for the worker. Combining both labor and tool costs, the power tool paid for itself (had a positive return on investment) after just two hours of use. The team also demonstrated Dr. David Rempel's Overhead Drill System to sheet metal contractors, who tested its usability for various tasks and activity and provided feedback on the benefits and limitations of its current design.

## WHAT WE ACCOMPLISHED

- **Trained 96 workers; nearly 100% felt researchers gave them useful ergonomics information and that they could apply this knowledge on the job.**
- **Developed return on investment (ROI) metrics for ergonomic tools, including a ride-on scraper for flooring removal and a power crimper for prepping metal duct materials.**
- **Development of Ergonomics Training Talks for dissemination of ergonomics training resources.**
- **Contractor partner C&R Mechanical Contracting won the national SMOHIT safety award (9/2013).**
- **Four local presentations to organizations and conferences, including a booth demonstration of ergonomic tools and techniques at the St. Louis SMACNA Trade Show, and one regional presentation; two national presentations; two international presentations; one article published in the *American Journal of Industrial Medicine*.**

## Creating Awareness, Educating for Action

### FALL PREVENTION IN RESIDENTIAL CONSTRUCTION

*Project Directors: Bradley Evanoff, MD, MPH, and Vicki Kaskutas, MHS, OTD, Washington University School of Medicine in St. Louis*

Falls remain the number one killer of construction workers despite more stringent fall prevention standards for residential construction. Falls also account for many construction worker injuries and much work-related disability, especially in residential construction. In an effort to put a stop to these preventable tragedies, the Washington University



**Carpenter guides roof trusses into place while using a Wall Walker, a hanging scaffold system with a walking surface hung from braced walls of a home. If used over 6', guard rails must be installed.**

research team is working with residential contractors and the Carpenters' union through three innovative initiatives targeting apprentices, foremen and contractors. Those entering the trade learn how to work safely at heights through the revised apprenticeship training; seasoned foremen and small residential contractors learn how to choose fall prevention methods appropriate for the situation then communicate these methods to their workers. Contractors can "try out" fall protection equipment for their worksites through this research study.

This research is making a difference. Participants in the foremen's fall prevention and safety communication training have demonstrated increased fall prevention knowledge. More importantly, the crewmembers that work for these foremen are demonstrating similar improvements, showing that the foremen are training their workers. Participants are communicating these fall prevention methods more often through toolbox talks that address site-specific hazards. Informal safety communication and feedback are also increasing. Both foremen and crewmembers have reported increased worksite safety behaviors when working at heights, which is the ultimate goal of this training.

The research team has been awarded additional funding through CPWR/NIOSH to create a single-focus website that catalogues all available fall prevention technologies appropriate for residential construction. In addition, the team has been very involved in planning and executing the national fall prevention campaign. Future funding to widely disseminate the foremen's fall prevention and safety communication training through an online teaching platform is the next goal. The Washington University team wants all workers to be protected from falls from heights at residential construction sites across the country.

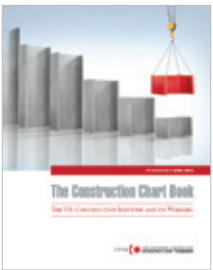
## WHAT WE ACCOMPLISHED

- Fall prevention safety has improved at participating foremen’s worksites, and these improvements have been maintained six months after the training.
- Safety communication to address hazardous work at heights has increased.
- Contractors are trying new fall protection equipment and many are adopting it.
- Presentations at four national conferences; two papers published in peer-reviewed journals, one case study for the national fall campaign website, and seven trade magazine articles written by the research team.
- Materials prepared through this research for the national fall prevention campaign have been consumed widely: our case study has 344 downloads and the Facebook page we administer is regularly viewed by over 200 followers in 10 states and 16 countries.

## Data Driven

### CPWR DATA CENTER PROJECTS

Lead Researcher: Xiuwen (Sue) Dong, DrPH, CPWR



#### THE CONSTRUCTION CHART BOOK: FIFTH EDITION

In April 2013, CPWR published the much-anticipated fifth edition of *The Construction Chart Book: The U.S. Construction Industry and its Workers*. The Chart Book has served as a go-to reference for construction stakeholders

for 16 years. Like previous editions, the new Chart Book characterizes the changing American construction industry and workforce, monitors the impact of such changes on worker safety and health, and identifies priorities for future safety and health interventions. The new edition updates statistics on topics traditionally covered, but also delves into emerging issues within the construction industry, such as green construction, the aging workforce, employment projections, and OSHA inspections, violations, and citations. This edition contains more than 250 charts and tables in 55 topic pages.

#### INVESTIGATING FATAL INJURIES USING THE NEW BLS CODING SYSTEM

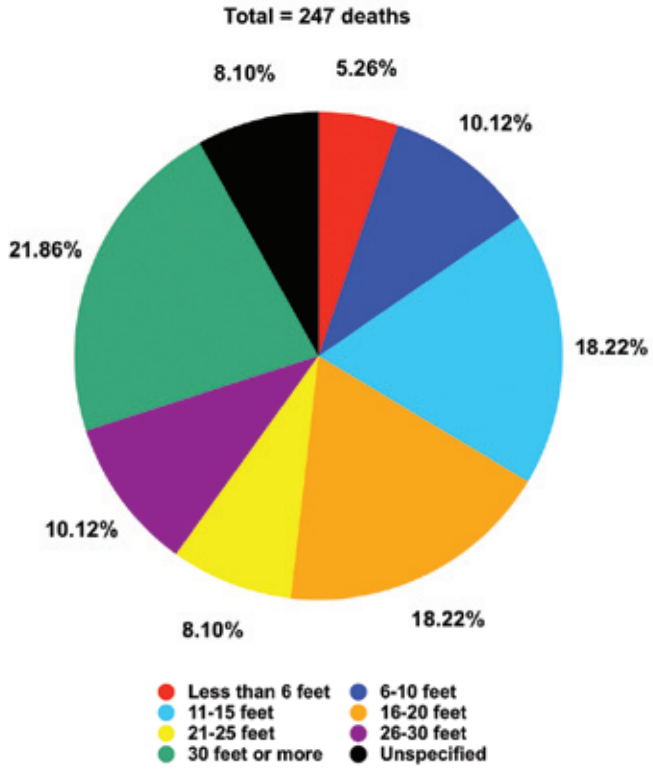
The Data Center obtained more detailed injury information in construction using the new BLS Occupational Injury and Illness

Classification System (OIICS 2.01). In 2011, about one-third of construction fall fatalities were falls from 15 feet or less. Such measures and level of detail were not available in previous years. In addition, while nearly 70% of fatal falls in 2010 were simply coded “Floors/ Ground” under the old OIICs system, OIICS 2.01 offers more explanatory categories like “Roofs” or “Ladders.” Data Center findings were presented at the BLS conference, Celebrating 40 Years of Safety and Health Data, in May 2013, and accepted for publication in BLS’ *Monthly Labor Review*.

#### FATAL FALLS FROM ROOFS AMONG U.S. CONSTRUCTION WORKERS

Between 1992 and 2009, falls from roofs accounted for about one third of fatal falls in construction, with a disproportionate percentage (67%) of these occurring in small construction establishments (1–10 employees). Categories of workers at elevated risk included roofers, ironworkers and residential construction workers. Data Center researchers also found an increased rate of fatal falls from roofs among the youngest (<20 years) and oldest (>44 years) workers, Hispanic workers, and immigrant workers. Findings from this research were published in the *Journal of Safety Research*.

#### FATAL FALLS TO LOWER LEVEL IN CONSTRUCTION, BY HEIGHT OF FALL, 2011\*



Source: U.S. Bureau of Labor Statistics (BLS), 2011 Census of Fatal Occupational Injuries.  
 Note: Deaths that do not meet BLS publication criteria are excluded. Data for this chart were obtained from the U.S. BLS through a special data request.  
 \* Uses new BLS classification system, OIICS 2.01.

## WEB-BASED FATALITY MAP: SUPPORT THE NATIONAL FALL PREVENTION CAMPAIGN

Using a combination of OSHA inspection data and mass media reporting, the Data Center has created a graphic representation of construction fatalities in the U.S. By clicking on the pin-points, users can locate where a construction worker lost his or her life on the job, learn how the incident happened, and read how the information was gathered.

## SAFETY AND HEALTH DISPARITIES AMONG CONSTRUCTION WORKERS

CPWR's study of safety and health disparities draws from a wide variety of construction industry subgroups, with a special research focus on the Hispanic workforce. A recent study examined the impact of language barriers on healthcare utilization among Hispanic construction workers. Hispanic workers – particularly those who lack proficiency in English – lagged far behind their white, non-Hispanic counterparts in healthcare utilization. Data Center staff presented these findings at the 17th Annual National Hispanic Medical Association Conference and published the results as a book chapter, “The Impact of Language Barriers on Healthcare Utilization among Hispanic Construction Workers,” Owen T Jackson & Kathleen A Evans (Eds.), *Health Disparities: Epidemiology, Racial/Ethnic and Socioeconomic Risk Factors and Strategies for Elimination*. Hauppauge, NY: Nova Science Publishers, Inc. The Data Center presented findings on Hispanic workers at the 3rd Annual Southeastern Occupational Network (SouthON) Meeting in October 2013.

## AGING WORKFORCE INCREASINGLY EVIDENT IN THE CONSTRUCTION INDUSTRY

The average age of construction workers jumped to 41.5 years in 2010, two years older than in 2007, and 5.5 years older than 25 years ago. Demographic changes are reflected in the injury data. The age group suffering the largest proportion of both fatal and nonfatal work injuries has shifted from those aged 25-34 years in 1992 to those aged 45-54 years in 2010. The injury types and patterns differ significantly among age groups. While older workers had a lower rate of nonfatal injuries than younger workers, they spent more days away from work after an injury, which significantly increased their workers' compensation costs.

## LIFESTYLE FACTORS ASSOCIATED WITH BETTER HEALTH AMONG CONSTRUCTION WORKERS

Construction workers are more likely to engage in risky behaviors than workers in other industries, particularly younger construction workers. However, construction workers with healthy lifestyle habits – for instance, those who refrained from smoking, exercised, slept an average of 7 to 9 hours per night – were more likely to report excellent or very good health, when compared to those with unhealthy lifestyles. Initial findings from

this study were presented at the 141st Annual Meeting of the American Public Health Association.

## GREEN CONSTRUCTION

Nearly half a million (487,709) wage-and-salary workers in the construction industry had “green” jobs in 2011, a 26.4% increase from 2010. This indicated faster growth than any other industry in the U.S.; construction accounted for 19.4% of all green employment in the private sector that year. Within construction, participation in green jobs differed among subsectors. Building Equipment (NAICS 2382) had the highest proportion of green jobs (11.9%), compared with only 3.7% in Land Subdivision (NAICS 2372). In addition, companies with 100 or more employees were more likely to provide training on green technologies than companies with fewer than 10 employees (27% vs. 18%). Companies that require OSHA-10 or OSHA-30 training were more likely to train workers on green technologies than companies not offering OSHA training.

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## Finding an Engineering Solution to Stud Welding Hazards

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### ERGONOMICS AND WELDING FUMES EXPOSURE

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*Lead Researcher: Nathan Fethke, PhD, University of Iowa*

Imagine spending your workday hunched over at a right angle for 20 minutes at a time, bearing heavy tools while at risk of inhaling toxic fumes. That's the job of ironworkers welding floor-level studs – for instance, while securing floor decks to a new skyscraper's steel frame. Every year thousands of workers toil at this task while erecting bridges or commercial buildings.

Nate Fethke and his team are partnering with an innovative equipment manufacturer to explore an engineering solution.

Fethke's team has measured workers' posture and muscle effort using both the conventional approach and an alternative: a mobile cart to hold the arc welder. This new tool allows workers to weld from an upright position, reducing back strain and possibly fume inhalation.

The research program has been an object lesson in the hurdles to efficient technology transfer. Building a device that can meet workers' demand for safety and contractors' demand for productivity has been a daunting challenge. Initial prototypes relieved strains on workers' backs but increased demands on their shoulder muscles, and a wheeled cart effective on a flat surface encountered in bridge construction may have less mobility when encountering obstacles like waffle decking.

Meanwhile, the demands of this research design have generated important collateral benefits for the field. Industrial hygienists who want to establish worker exposure levels to very

fine particles (smaller than 300 nanometers) during a particular work task have long wished for a personal monitoring system that could measure these in real time. A new device, the DiSCmini, promised to do this – but first scholars had to assess and validate its performance.

The team needed just this technology to assess worker exposure to contaminants in welding fume. They evaluated the DiSCmini aerosol monitor by testing its performance against two reference instruments currently in use: a scanning mobility particle sizer (SMPS) and a handheld condensation particle counter (CPC). The results verified that the DiSCmini could be useful to measure metal aerosols, such as welding fume, for personal task-based exposure monitoring, as well as many other occupational settings where very fine particles of interest are present.

Thousands of workers welding floor-level studs are hunched over at a right angle, controlling a heavy tool while risking toxic fume inhalation. Researchers partnered with an innovative manufacturer to build and test a mobile cart that allows workers to stand, reducing back strain and possibility fume inhalation.



## WHAT WE ACCOMPLISHED

- The research team published a paper in the *Journal of Occupational and Environmental Hygiene* describing the validation of a handheld device – the DiSCmini – for measuring welding fume exposures in real time.
- Researchers were presented with the “Paul Barron Student Poster Award (Aerosol Technology Committee)” and a “Best of Session Poster Award” at the 2013 American Industrial Hygiene Conference & Exposition for a poster describing their work with the DiSCmini sampler.

## Management and Workers Make Safety a Way of Life

### CREATING A SAFETY CULTURE BY CULTIVATING SAFETY LEADERSHIP AT ALL LEVELS

Researchers: John Rosecrance, PhD, Krista Hoffmeister, MS, Natalie Schwatka, MS, Colorado State University

Advances in engineering controls like improved fall protection systems, mechanical assists for lifting heavy materials and safer tool designs have helped reduce occupational injuries and deaths in construction significantly over the decades. However, construction workers, who are just one-tenth of the American labor force, still account for an alarming 17% of all job-related deaths in 2012. This project seeks to go beyond the visible elements of occupational health like lifting techniques and tool design to investigate the critical role of psychology – the human factor – in injury prevention.

This Colorado research team brought together psychologists and human factor specialists to focus on the determinants of safe and unsafe behavior. The team concluded that construction employers serious about safety must work actively to develop and sustain a high level of safety culture. Their findings also presented more questions: Owners and managers create an organization’s overarching safety culture, but construction is a field in which workers frequently work autonomously on tasks, having little interaction with upper management. In this context, the day-to-day interactions of the foremen with the production workers – and even the tradesmen and tradeswomen with one another – play an essential role in fostering a safety culture on a worksite. Are workers rewarded or penalized when they point out unsafe conditions? Are they respected for speaking up – or for working while hurt? Does the on-site supervision send a message that production is paramount, or that safety is their top priority?

The team sponsored two major training programs to develop safety leadership on the job site, one aimed at construction apprentices and one at on-site supervision. The first, designed to

build future leaders in construction, is an apprentice training curriculum administered to 180 apprentices in the mechanical trades from three regions around the country in the past year. These apprentices have been taught safe practices during their training but are often reluctant to “make waves” on the job, even when they witness dangerous conditions. The program seeks to instill the leadership qualities that encourage workers to speak up about unsafe practices before an accident occurs. The curriculum is undergoing repeated rounds of testing and revision.

The second training program is aimed at site supervision, which has both the responsibility for creating and fostering a safety culture on the construction site and the authority to do so. A total of 120 project managers, superintendents and foremen participated in the four-hour workshop in an experimental design comparing outcomes for two groups, one that receives



**The team assembled by Colorado State researchers developed and sponsored two major training programs to develop safety leadership on construction sites: one program was aimed at apprentices and the other for on-site supervisors.**

two monthly review sessions and another that receives no follow-up training. Post-training testing of participants’ (site supervisors and their crews) safety knowledge, behaviors and perceptions of safety is currently underway.

One of the team’s related projects drew an extraordinary amount of attention from the industry in 2013. It is widely suspected that significant numbers of construction workers who suffer work-related injuries conceal rather than report them. The team surveyed 614 construction workers in the Northwest United States in an exploratory study about the phenomenon. More than one quarter of them acknowledged a work-related injury they had not reported; these workers seemed to consider injuries a part of their job, and many feared employer retaliation if they filed a compensation claim. When “Construction workers’ reasons for not reporting work-related injuries: An exploratory study,” appeared in the *International Journal of Occupational Safety and Ergonomics*, it inspired a flurry of coverage in the trade press, with several magazines – including industry powerhouse *ENR* (*The Engineering News-Record*) – doing feature stories on the research.

## WHAT WE ACCOMPLISHED

- Published three papers in peer reviewed journals.
- Presented findings at the 2013 annual conference of the American Public Health Association.
- The team’s study exploring why construction workers fail to report injuries generated seven different trade magazine stories, including a treatment in industry giant *ENR*.

## Moving Up and Moving Out

### DAY LABORER SAFETY TRAINING PROGRAM EXPANDS IN REGION – AND BEYOND

*Lead Researchers: Michele Ochsner, PhD, and Elizabeth Marshall, PhD, Rutgers University*

This year the Rutgers and New Labor worker center project team forged important new partnerships with unions, worker centers and researchers. These partners enabled the team to share its innovative safety training curriculum with a wider audience and to increase our team’s own safety training capabilities.

The team began an exciting collaboration with the Tony Mazzocchi Center (TMC), an arm of the United Steelworkers Union with a long tradition of peer-led occupational health and safety training similar to that of the project team. The Steelworkers, who are working with workers’ centers in a growing number of cities, were interested in the Rutgers/New Labor curriculum for construction day laborers and the delivery techniques employed. In turn the TMC provided advanced instruction to four safety liaisons and two New Labor staff who are now authorized OSHA Outreach Trainers, able to deliver the OSHA 10-hour construction hazard awareness course to other immigrant workers.



**New Labor safety liaisons along with day laborers and staff from Brooklyn-based Workers Justice Project celebrate conclusion of a three-day training retreat, where they learned how to facilitate the small group activity curriculum and strengthen outreach and communication.**



These new capabilities, and partnerships with New York-based workers centers like Make the Road and Workers Justice Project enabled project safety liaisons to recruit and train more than 120 New York and New Jersey construction workers in the OSHA-10 curriculum. The annual safety liaison training retreat included 11 continuing safety liaisons and four new liaisons drawn from New Labor and its new partners. After New Labor opened an office in the Ironbound section of Newark in February, both New Labor and the safety liaison project began seeing greater interest among contractors, some of whom have brought their crews to OSHA-10 classes.

Thanks to national partners like Chicago-based Interfaith Worker Justice (IWJ) and the Los Angeles-based National Day Labor Organizing Network (NDLON), the researchers' curriculum has touched workers across the United States. Over three years, nearly 500 workers in seven cities earned OSHA-10 cards using the curriculum (sometimes modified for local conditions).

Hurricane Sandy cleanup occupies a large number of immigrant construction workers. Demolition and remediation prior to rebuilding can expose workers to chemical, mold, and electrical hazards seldom encountered in new construction. With support from an OSHA grant, safety liaisons are doing street corner outreach, conducting brief hazard awareness training programs targeted at workers in this sector.

Safety liaisons continue to perform curbside safety audits, assessing safety practices at their own and other neighborhood construction sites, and collecting data for reporting on general safety conditions in the industry and setting safety training priorities. In 2012, these efforts earned Rutgers labor educator Carmen Martino and the "New Labor Team" the COSH National Education and Training Award.

## WHAT WE ACCOMPLISHED

- The team presented findings in two peer-reviewed journal articles, one CPWR report, and four national conference presentations.
- Peer trainers facilitated five OSHA-10 classes, with 127 Latino, Brazilian and Portuguese laborers and ten contractors participating.
- The team recruited two new safety liaisons to join the existing team of 11.
- Safety liaisons completed 50 safety audits on residential construction sites. Liaisons reported discussing hazards with supervisors at 42% of these sites and with workers at 60%. They also filed two OSHA complaints, one of which resulted in an investigation and citations.

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## Partnering to Prevent Exposure to Silica, Dust and Noise

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### CHANGES TO DEMOLITION PRACTICES TO IMPROVE WORKER HEALTH

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*Project Director: Susan Woskie, PhD,  
University of Massachusetts, Lowell*

Jackhammers and pavement breakers, concrete saws and backhoes: the work of the equipment operator and the laborer who build bridges, pave roads and knock down old buildings is synonymous with dust and noise. When workers aren't protected from these hazards, respiratory disorders and hearing loss are just a matter of time.

Dr. Susan Woskie, Dr. Anila Bello and their research team at the University of Massachusetts at Lowell have been working with concrete and demolition contractors, workers, and the Laborers' and Operating Engineers' unions to explore the effectiveness and viability of a variety of controls to keep these dangers in check.

Researchers captured the attention of contractors and hygienists alike last year with a series of tests showing that



The manufacturer of the Dust Boss water cannon and a demolition contractor joined with researchers to evaluate dust and silica reduction from this water suppression method.

outfitting concrete saws with water attachments could reduce dangerous airborne silica levels by 85%. But that's not the only way wetter is better to control dust. In collaboration with a major demolition contractor, UMass researchers investigated the impact of simply spraying water from hoses and water cannons during demolition. Results indicated that this water suppression reduced workers' exposure to silica and other dusts well below the OSHA PEL. The researchers are now partnering with a manufacturer of one brand of water cannon, the Dust Boss, to conduct field experiments to estimate the amount of dust and silica reduction from the use of this water suppression method.

The team has completed testing of an "air curtain," a dust control specially designed for use on bridge and overpass jobs. Application of the air curtain significantly reduced dust exposures in workers' breathing zones, although it didn't eliminate the need for respirators during chipping. Its feasibility in the workplace would depend on some modifications, a maintenance program, and worker training in its proper use.

In collaboration with the Operating Engineers' Training Center, researchers have evaluated noise exposures generated by many types of heavy construction equipment. Results indicate that for most equipment the safe (85dbA) noise perimeter was 2-3 feet, but some equipment generated noise levels calling for workers to keep 16 to 42 feet away in the absence of hearing protection. The team is evaluating how to apply the noise perimeter zone and engineering controls to reduce worker exposure and hearing loss.

## WHAT WE ACCOMPLISHED

- In partnership with a demolition contractor, the UMass researchers have evaluated the efficacy of water suppression methods such as the Dust Boss on reducing silica and dust exposures in demolition sites.
- Researchers have completed field testing of the air curtain to control dust exposures during chipping concrete for bridge substructure repair.
- The safe noise perimeter zone for each piece of heavy equipment used at the Operating Engineers Training Center has been determined.
- A journal article on Controlling Dust from Concrete Saw Cutting was published in a scientific journal and in a trade magazine.

## Preparing Workers for the Benefits and Risks of Nanomaterials

### RESEARCH IDENTIFIES NANOMATERIALS USED IN CONSTRUCTION

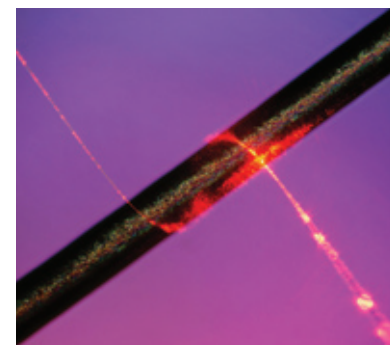
*Bruce Lippy, PhD, CIH, CSP, Director of Safety Research  
Gavin West, MPH, Researcher and Biostatistician*

Nanotechnology is transforming many U.S. industries – including construction. A nanometer is one billionth of a meter. A human hair is 80,000 nanometers wide. So consider that the nanoparticles changing the face of construction measure only **1 to 100 nanometers**.

By adding engineered nanoparticles (ENP) to familiar construction materials, scientists have created concrete that conducts electricity, glass that cleans itself, and coatings that cut smog. But are these materials safe for the workers who use them?

The risks to construction workers are uncertain, but animal studies have given some cause for concern. For instance, the same carbon nanotubes (CNTs) that can make concrete strong, flexible and crack-resistant have also been shown to induce mesothelioma in mice. Unfortunately, contractors and workers are seldom aware of these particles in the construction products they use. It is not currently required to label products containing nanomaterials.

CPWR has created a nanotechnology team to address these issues in construction. The team has already generated the following important products:



Carbon nanotube curled on a human hair.  
Photo courtesy Harvard University

©2006 Mazur Group, Harvard University

## WHAT WE ACCOMPLISHED

- The most comprehensive inventory of nano-enabled construction products in the world. The CPWR inventory currently contains 207 items. This inventory has been provided to the NIOSH nanotechnology research team.
- Industrial hygiene data for construction worker exposure during the cutting, drilling and nailing of roofing tiles containing ultrafine titanium dioxide. Sampling was performed with a variety of industrial hygiene methods at a realistic outdoor site and also inside a large, environmentally-controlled test chamber.



Although researchers were collecting data on worker exposure to nanotubes in roof tiles, the demonstration photos show the obvious: cutting roof tiles creates a thick haze of dust, which includes silica along with other fine particles, unless engineering controls are used.



■ **A two-hour worker awareness program for peer trainers on identifying and controlling exposures to construction products containing nanomaterials. These trainers will use the course materials, which include a PowerPoint, a student handout and an Excel spreadsheet containing the product inventory to instruct others in their craft about specific products they may encounter and how to control exposures.**

■ **A survey of the level of awareness among experienced construction tradespersons of the existence of nano-enabled products in general and in their specific jobs.**

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## r2p Highlights

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### **PARTNERSHIPS FOR ACTION – TAKING IT TO THE NEXT LEVEL WITH R2P**

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*Project Director: Robin Baker, MPH, CPWR*

In its third year, CPWR’s Research to Practice (r2p) initiative is making significant progress in raising awareness and advancing the adoption of evidence-based safety and health practices in construction through the study and promotion of partnerships.

The Masonry r2p Partnership, which was developed as a model national industry partnership, regularly convenes contractors, union representatives, manufacturers, government officials, and academics to develop initiatives to protect those working in the masonry industry. Important new efforts initiated

this year focused on protecting one of the workers’ most valuable assets – their hands. Through this initiative, the partnership took available research on preventing skin disorders and hand and wrist injuries and translated it into practical information that workers and contractors can use to select hand tools that are “ergonomically” designed for individual workers, and to raise awareness of the types of gloves and additional protective measures to avoid dermatitis and other skin disorders caused by chemicals in products commonly used.

The Partnership was also among the valued contributors to the Work Safely with Silica website, and labor and management members of the partnership were among the first to sign on as official supporters of the site. This website, [www.silica-safe.org](http://www.silica-safe.org), is a one-stop source of information to help contractors, workers, and other stakeholders prevent silica-related illnesses. The site includes an innovative tool, “Create-A-Plan,” which allows contractors to develop job-specific plans to control silica dust and prevent exposures. The Work Safely with Silica website is fast becoming a recognized source of reliable information, with OSHA listing it on its Silica Rulemaking website as one of only six recommended “Scientific and Technical Resources.”

Multiple partners have joined the effort to thwart the No. 1 killer of construction workers: falls from heights. The r2p team’s evaluation of the national fall prevention campaign, Safety Pays, Falls Cost, documented exciting local initiatives that take social marketing messages to a deeper level. Two Latino Fall Prevention partnerships identified promising approaches to reach Latino workers and the small contractors who employ them. In Philadelphia, PhilaPOSH has worked with OSHA to identify contractors in need of help with their fall prevention practices and provided bilingual training. In California, the Labor Occupational Health Program at U.C. Berkeley has been working with an advertising agency to develop marketing messages for

employers of Latino construction workers and with workers' comp insurers to help get out the message.

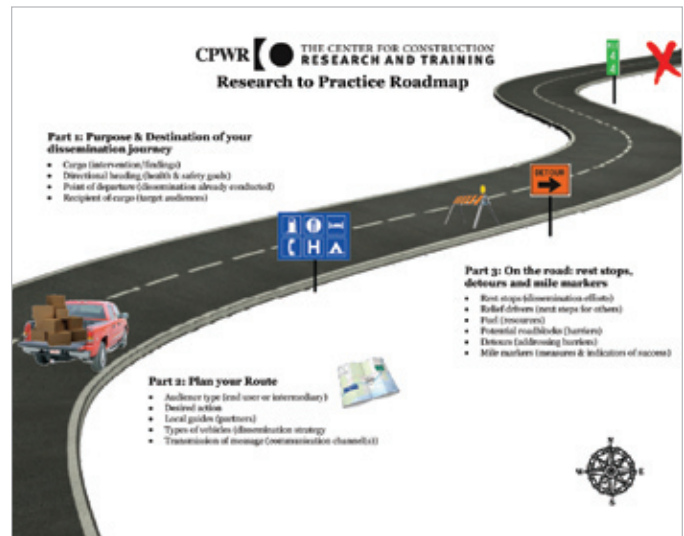
CPWR, OSHA, and NIOSH continued their collaboration through the r2p Working Group to support multiple research-to-practice efforts, including:

- Wide promotion of information on the dangers of nail guns,
- A patent and licensing guide, developed based on a recommendation from the CPWR Technology Transfer Symposium, to facilitate technology transfer from the research to the worksite,
- A continuing exploration of avenues to communicate with small residential construction contractors, a hard-to-reach industry sector which incurs a disproportionate number of workplace injuries and deaths,
- An interagency workshop on the critical concepts of “safety culture” and “safety climate” – how we influence them and how we measure them, and
- Outreach to Career and Technical Education programs (formerly known as “vocational education”) to engage these training programs in safety outreach.

In June 2013, CPWR convened a first ever meeting of construction safety and health partnerships. Representatives of seven partnerships, including ones identified through the case studies and those established through CPWR's r2p initiative, met to share and advance partnership best practices and provide guidance on a new “Partnership Toolkit” – a collection of case examples, tools, and resources.

Drawing from the lessons learned from these partnership successes and models, CPWR is generating interest among other industry groups to form partnerships to promote occupational safety and health in the construction industry.

**A small group discussion of safety and health thought leaders tackles critical issues at an interagency workshop, Examining Safety Culture/Climate, in June. CPWR's r2p researchers provided guidance, support and evaluation.**



The r2p team's Roadmap offers a way for researchers to begin planning their dissemination strategy and identifying partners to aid in diffusion of research findings.

## Mapping the Way

The r2p team completed and refined a “Research Dissemination Roadmap” to guide CPWR's Research Consortium members as they plan how to promote the use of their findings “in the trenches and on the steel.” Researchers are urged to consider – among other things – their “cargo” (the intervention or findings to be delivered), their “point of departure” (dissemination steps already taken), “local guides” (knowledgeable local partners who can help in the r2p effort), and the best “vehicles” for the journey (dissemination strategies that will be most effective).

## WHAT WE ACCOMPLISHED

- Held two national workshops, one related to Safety Culture and the other to r2p Partnerships.
- Published several reports and other documents, including: A full Asphalt Partnership report, a success story summarizing the Asphalt Partnership case study, an *Intellectual Property Patent & Licensing Guide for Construction Safety & Health Researchers*, and additional reports: *Safety Culture/Climate Assessment and Improvement in Construction: Existing Evidence and a Path Forward*; a *Literature Review and Environmental Scan for Better Translation of Research to Practice in Residential Construction*; and *Integrating Occupational Safety and Health Training into Career Technical Education in Construction: Formative Research Findings*.
- Updated both [www.silica-safe.org](http://www.silica-safe.org) and [www.stopconstructionfalls.com](http://www.stopconstructionfalls.com), and promoted the sites through various trade journals and other outlets.

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## Safety Communication & Recognition:

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### MOTIVATION FOR WORKERS - BUILDING SAFETY FOR EVERYONE

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*Lead Researcher: Jack Dennerlein, PhD, Northeastern University*

Three years after implementing the Building Safety for Everyone program on their first construction site, Jack Dennerlein and his research team are wrapping up data collection on their tenth and final site. The team has partnered with five Boston-area general contractors to implement Building Safety for Everyone, a safety communication and recognition program aimed at improving safety performance on the construction worksite through novel feedback mechanisms.

Traditional incentive programs measure performance and provide rewards for reduced rates of reported injuries and illnesses. However, experts in the field – and OSHA – have expressed concern that this approach may reduce injury reporting instead of reducing actual injuries. Building Safety for Everyone takes a more proactive approach, emphasizing hazard recognition and control, thereby improving safety. In Building Safety for Everyone, safety personnel record safe and unsafe physical working conditions and generate a safety performance score. The score provides a snapshot of safety performance *before* an incident occurs.

Centrally-located posters throughout the worksite track safety performance with displays of safety scores for the overall site and individual subcontractors active there, fostering a healthy competition to reduce hazards. Additionally, safety personnel provide detailed and relevant safety inspection reports to foremen every week and encourage the foremen to share the results with their crews.

Preliminary feedback has been encouraging:

- “The key ingredient of this program is that it promotes teamwork.” – Site superintendent at a Building Safety for Everyone intervention site
- “It [Building Safety for Everyone] created common ground between all of the trades.” – Worker at a Building Safety for Everyone intervention site
- “There was a lot more talk about safety on this job, and they [workers] never used to talk about safety.” – Worker at a Building Safety for Everyone intervention site

The amount of survey data (over 1,100 individuals surveyed and followed over time) has enabled the research team to document the movement of individuals on and off worksites, something previous researchers have been unable to quantify. Preliminary results show a consistent pattern across all worksites: approximately 50% of individuals on-site at the beginning of a given month will remain on-site at the beginning of the next month, 25% will remain at the end of the following month, and so on.



**The Building Safety for Everyone program measures and scores a site's safety performance among its many subcontractors. When the scores make the grade, as they did at this intervention site, workers receive a safety recognition lunch. A program focus is positive reinforcement for safe work practices.**

The research team is analyzing this data in more depth; however, early results indicate that these patterns are independent of the project's phase or a worker's trade.

## WHAT WE ACCOMPLISHED

- On-site managers and employees attributed an increase in teamwork, safety awareness, and communication to the Building Safety for Everyone program.
- Construction industry partners have expressed interest in adopting the Building Safety for Everyone program for other worksites. The research team has developed an extensive Building Safety for Everyone program manual and is developing a dissemination strategy to promote wider use.
- Researchers have presented findings in seven regional conference presentations, four poster presentations and a paper published in *Safety Science*.

## Sharing What We've Learned

### PRODUCING AND DISSEMINATING CPWR'S KNOWLEDGE

Lead Researcher: Mary Watters, MFA, CPWR

Good research that goes nowhere can't help anyone. The Communications Department's task is to disseminate the findings, tools and products of CPWR researchers and ensure they reach audiences that can take action to make workers safer on the job.

An important way to reach those audiences is the trade press – commercial publications that serve construction contractors. Through targeted and tailored outreach to these publications, CPWR earned at least 50 stories in newspapers and trade magazines in the 2012 grant year, including three stories in McGraw-Hill's *Engineering News Record*, the industry powerhouse. Nine of these articles were authored by CPWR researchers so they could speak directly to contractors in the pages of publications like *Equipment Today*, *Rental Equipment Register*, *Occupational Health and Safety*, and *EHS Today*.

Another 20 of the articles were generated from stories appearing in our monthly e-newsletter – the CPWR UPDATE – avidly read by a growing roster of industry opinion leaders. The newsletter, which began two years ago with a distribution list of fewer than 1,300, is now delivered monthly to more than 2,300 subscribers spanning the government, contractor, union, academic, and media worlds. (Are you subscribed? You should be.)

The fifth edition of CPWR's flagship reference publication, *The Construction Chart Book*, appeared in April 2013. The department guided design and production of the book from Word files and Powerpoint slides to its final form. The department's publicity efforts broke past distribution records, exhausting almost the entire print run in a single year and

The opening messages of the new Back Injuries Hazard Alert card. At right, eLCOSH.org topped 15 million pageviews since its launch in 2000.



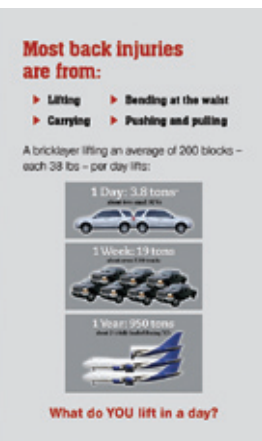
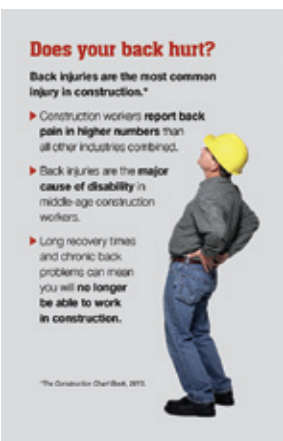
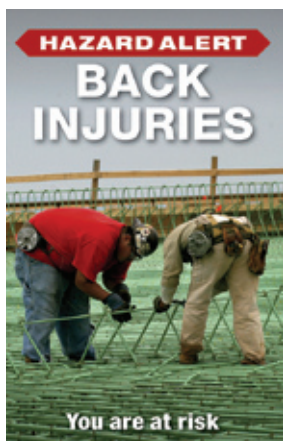
In *A Simple Task*, the first of three videos illustrating NIOSH FACE Reports, a worker falls from a stepladder while washing windows to prepare for a new building opening.

feeding the year's highest web traffic to the book's online home at [www.cpwr.com](http://www.cpwr.com).

Meanwhile, continuing an effort from 2011, the department updated and printed seven more new image-driven Hazard Alert cards for safety training. The folding pocket-size cards cover topics like ladder safety, noise and the new Hazard Communication symbols. The renovation of these cards, combined with targeted promotion to contractors and union safety trainers via email and postal mail promotions, caused demand for the cards to skyrocket. From 2010-2011, CPWR received only three external requests for a total of 1,052 cards; in 2012-2013 we received 145 external requests for 51,208 of the cards.

CPWR's website got a new look, when the redesigned site was launched in late September. Changes to the structure plus the image-driven Publications section have improved the user experience.

And yet, there was much more, such as our restructured eLCOSH.org, which made its debut in October 2012. Its new navigation system has proven popular with users who enter from its home page and use its search tools to access materials in this free national repository of construction safety and health information. In 2013, the site broke 15 million pageviews since



its launch in 2000. In the social media world, the eLCOSH Facebook page has developed an avid community of active followers and more than 10,000 Facebook users “like” the page.

## WHAT WE ACCOMPLISHED

- Seven new “Key Findings from Research,” a one-page document summarizing the results of a CPWR study or peer-reviewed journal article in a readable, bullet-point handout.
- Twelve issues of CPWR’s UPDATE, the e-news publication received by more than 2,300 subscribers.
- Organized and promoted two webinars in cooperation with OH&S magazine: one for the Campaign to Prevent Falls in Construction and one introducing the Silica-Safe website.
- Three videos turning NIOSH FACE reports into short (2-3 min.) stories showing the hazards on the site, animating the fatality and illustrating the NIOSH investigator’s recommendations identifying what should have been done to prevent the tragedy.
- A podcast highlighting *The Construction Chart Book*, in cooperation with *American Painting Contractor* magazine, which used CPWR’s article about the book as its cover story.
- Nine trade magazine articles written and placed.
- Coverage of CPWR in at least 45 trade magazine articles.
- One Chart Book published in print and online; 1,458 hard copies distributed.
- Seven new Hazard Alert cards published; an eighth, Beryllium, published only as a PDF. 51,208 total new Hazard Alert cards distributed.

## Solutions to Construction Safety Hazards are No Fairy Tale

### CONSTRUCTION SOLUTIONS DATABASE

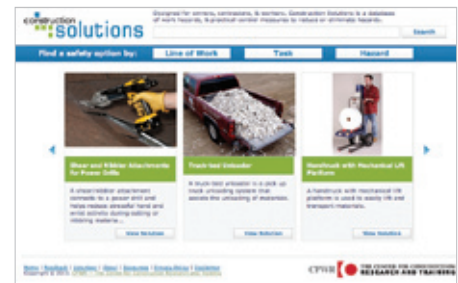
Lead Researchers: Jim Platner, PhD, and Chris Le, MPH, CPWR

Where can construction superintendents direct their smartphones to find reliable solutions when they witness a hazard on the jobsite? The CPWR Construction Solutions database, of course. In fact, whether you are a superintendent, safety rep, occupational health consultant, or trades employee, if you have a connection to the internet and want to control hazards on the job, Construction Solutions is for you.

This CPWR database was designed as an easy-to-use online tool for construction firms seeking ready-to-use answers to their

health and safety questions. This storehouse of information contains analyses of hundreds of common workplace hazards. For each hazard, the database offers one or more effective solutions, from alternative work techniques to commercially available tools. Most of the tools described also feature links to a manufacturer or dealer in case users wish to explore the features and cost of the device in detail.

This year the team made subtle but critical improvements to the navigation system guiding users through the site. The most important: adding a navigation guide that remains visible to site visitors throughout their journey. The guide – known in web design circles as a “breadcrumb trail” – enables users to find their way back to the search page after finding a solution. The navigation improvements have slashed sudden exits from



Construction Solutions improvements included a redesign and changes to site navigation.

the site, so that the average visitor in September 2013 spent 35% more time there than they had a year before.

In the past year, the team also added and updated solutions and hazard analyses to the database and linked the solutions to appropriate items in the renovated eLCOSH website (see previous page). With help from contractors and their associations, the team has also created new examples for its Return-on-Investment (ROI) calculator. The online tool was designed to help firms contemplating a purchase to evaluate its costs and benefits. It’s no wonder that hundreds of visitors each month now use the Construction Solutions search function to assess hazards currently affecting workers on the job, then find practical, available solutions to control those hazards and to check out possible answers for a common construction safety or health dilemma!

## WHAT WE ACCOMPLISHED

- The team enriched the database with 35 new solutions and two new technology examples for the ROI calculator.
- The team promoted Construction Solutions with a webinar and 5 presentations to industry audiences.
- Each month Construction Solutions draws thousands of visitors – hundreds of whom use its search functions to seek answers for a common construction safety and health challenge, averaging four pages viewed per visit.

## Universal Drill Jig Adapted for Use in Commercial Building Sector

### TOOL FITTED TO REDUCE AIRBORNE SILICA

*Lead Researcher: David Rempel, MD,  
University of California, San Francisco*

For four years, Dr. David Rempel and development engineer Alan Barr have worked to design a universal drill jig that can relieve construction workers from the extreme physical stresses endured during concrete and rock drilling. Tunnel construction and necessary seismic upgrades of large buildings have created significant demand for this task on the West Coast. The UC-San Francisco/UC-Berkeley based team met the challenge with successive versions of their new device, which reduces the fatigue associated with using by hand a heavy pneumatic or hammer drill while drilling hundreds of dowel holes into concrete.

In 2012 the UCSF team tested different versions of the jig on construction sites across the Bay Area. Worker and contractor feedback informed important improvements:

- A universal saddle that accepts large electric hammer drills and pneumatic rock hammers,
- A more reliable remote on-off switch,

**Laborer at a San Francisco site using drilling jig set up for 2 drills but only drilling with one. Concrete dust is captured during drilling with a new hollow bit system.**



- A new design that allows the drilling arm to be set to any drilling angle, without cumbersome removal and resetting of bolts, thereby reducing bending and reaching during drilling,
- A new bearing system that makes the jig easier to use and more robust,
- A drill saddle design that allows using two drills simultaneously.

The jig is gaining fans across the country.

Massachusetts Electric Construction is using 10 rigs, each bearing two drills, on a year-long tunnel project in Chicago. Moreover, commercial building contractors are demonstrating increased interest in the tool. McCarthy Construction is using

10 rigs on an eight-story renovation in San Francisco. The project involves drilling over 20,000 holes over a three-month period; the jigs in use speed work by drilling two perfectly spaced holes simultaneously. Laborers on the job not only prefer the new way of drilling, they have adopted their jig by naming it and wear t-shirts with an image of the jig!

Equally important, Rempel and Barr have enlisted the drill jig in the war against silica hazards. Tasks like dowel drilling and overhead or lateral drilling in rock or concrete can generate significant amounts of dangerous airborne crystalline silica. Workers who inhale the particles are vulnerable to silicosis and related respiratory problems, an occupational health concern severe enough that OSHA has proposed a new rule requiring more stringent workplace controls.

Reduce exposure, Rempel and Barr have incorporated a new dust capture system on the drill. Dust control is achieved by one of two methods; the most common is a dust shroud over the bit that attaches to the jig. A new innovation from Hilti, using a hollow bit with a vacuum port, was deployed on the McCarthy project. The vacuums are mounted on the jig for ease of movement.



**Users were so enthusiastic about the drill jig that they had t-shirts made with a cartoon showing the power and speed of the tool.**

## WHAT WE ACCOMPLISHED

- Using feedback from laborers and electricians who used the jig, the team improved its design with a universal drill saddle, an improved remote on/off switch, and a new method for rapidly adjusting drilling height and angle.



■ Bay Area contractors have put the drilling jigs to use on seven commercial construction sites, including a seismic retrofit of the Bay Area Rapid Transit (BART) towers.

■ New drill jig heads allow the option of drilling two holes simultaneously – one contractor successfully used the dual drill jig to install miles of electrical conduit in a tunnel in half the expected time.

■ The team has presented findings to four national and local contractors' health and safety meetings, three union health and safety meetings, six scientific conferences and in an article published in the *Journal of Occupational and Environmental Hygiene*.

■ A local manufacturer, Ergomek.com, is now producing a commercial version of the jig called the DrillBoss.



Photo courtesy of Chicagoland Spray Foam Inc.

Trained spray foam applicator applying open cell foam. Redlich's team is collaborating with large spray foam companies and small local installers to develop and implement an intervention program aimed at educating workers and reducing their exposures.

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## Will This 'Green Product' Be Hazardous for Workers?

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### ASSESSMENT AND PREVENTION OF ISOCYANATE EXPOSURES IN THE CONSTRUCTION INDUSTRY

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*Lead Researcher: Carrie Redlich, MD, MPH, Yale University*

Spray-foam insulation holds considerable environmental promise. After applying a layer of the polyurethane product on roof decking and on the walls of a building, you can control the climate inside with a fraction of the energy you'd need otherwise. Homeowners looking to save on their utility bills have driven a rapid expansion in the spray-foam insulation market.

But how safe is it for the workers who apply it? Dr. Carrie Redlich is examining this question – and finding some concerning results.

First, there are hazardous substances involved. Polyurethane spray foams contain isocyanates, tertiary amine catalysts, blowing agents, and other chemicals. Isocyanates, potent sensitizers, are one of the leading causes of occupational asthma; amines can irritate mucous membranes and cause blurred vision.

Her team's early work uncovered high rates of work-related asthma among the study subjects: 25% of the insulators exhibited work-related asthma symptoms – a frequency several times greater than the general construction labor population. Workers who contract asthma from this exposure may not fully recover. While their symptoms may recede after they leave insulation work, exposures such as dusts, particulates, fumes, and cold weather can trigger their asthma symptoms, making employment in other segments of the construction industry difficult.

Redlich and her team caught the attention of industry when delivering presentations at contractor events and at a National Isocyanate Research Conference (Isocyanates and Health: Past, Present and Future, April 3-4, 2013, Potomac, Md.). Redlich is collaborating with several larger spray-foam companies that also provide equipment and training, as well as smaller local installers, to develop and implement an intervention program aimed at educating workers and reducing their exposures. The intervention includes feedback to individual workers with their personal health and exposure data, an educational presentation summarizing the study findings to-date, specific recommendations for each company/manager tailored to their spray foam operations, and a check-list of safety and protective measures to be used daily by each team of workers at each worksite.

Researchers will be assessing the intervention and will report results in future years.

### WHAT WE ACCOMPLISHED

■ Findings presented to audiences at union halls, OSHA-sponsored and contractor events and at one national conference (mentioned above).

■ Creation of an intervention program to reduce worker exposures to isocyanates and amines, in collaboration with local insulation companies.

■ Local contractors will implement the intervention program; researchers will assess results.

## SMALL STUDIES DRAW BIG AUDIENCE

CPWR Seed Money Supports Groundbreaking Small Studies

Research initiatives with promising ideas and a budget under \$30,000 can find a home in the CPWR Small Studies program, which provides seed money for pursuing and study of a vast range of obstacles to safe work on construction sites. Interestingly, some of the most widely reported CPWR studies of 2013 emerged from the Small Studies program. From coast to coast, people were talking about CPWR's partnership with McGraw Hill to poll contractors on their safety practices, about the Workers' Defense Fund and its investigation of working conditions in Texas homebuilding, and Julie Brockman's examination of the cost of interpersonal conflict on the construction site.



### Safety Management in the Construction Industry: Identifying Risks and Reducing Accidents to Improve Site Productivity and Project ROI

#### MCGRAW HILL CONSTRUCTION



CPWR partnered with McGraw-Hill Construction to survey hundreds of construction contractors of various sizes and trades to learn about their safety management practices. Respondents were drawn from McGraw-Hill's contractor research panel and answered questions in December 2012.

Contractors identified developing a site-specific health and safety plan, analyzing potential site safety hazards before construction begins, and assigning project safety personnel before construction begins as especially effective methods to increase project safety. While large firms reported extensive use of critical safety practices, fully-inclusive safety programs were much less common in smaller firms.

### Build a Better Texas: Construction Working Conditions in the Lone Star State

#### WORKERS DEFENSE PROJECT

While McGraw-Hill looked at the construction industry from the top down, the Workers Defense Project of Austin, Texas, studied working conditions from the bottom up. With

support from the Small Studies program, the community group pilot-tested a survey instrument aimed at the largely immigrant workforce employed in the state's massive homebuilding sector. With this instrument in hand, the research team fanned out to construction sites across the state, reaching nearly 1,200 workers on the job. Sixty percent of the workers reported that they had never received basic safety training; 41 percent were misclassified as independent contractors or paid in cash, enabling employers to evade payroll taxes and workers compensation insurance requirements; 22 percent reported being victims of wage theft, left unpaid for work performed. The resulting report, *Build a Better Texas: Construction Working Conditions in the Lone Star State*, attracted widespread media attention.

### The Cost of Interpersonal Conflict in Construction

Julie Brockman

How much time and money is wasted in arguments on a construction job site? Estimating software generally doesn't include a line for "fights and arguments," but they can carry a real price tag. With support from CPWR's program, Michigan State University's Dr. Julie Brockman investigated. She studied and costed out 41 episodes of "interpersonal conflict" on the job and found they averaged a steep \$11,000 apiece.

Almost none of the incidents were the "labor conflicts" or "jurisdictional disputes" often casually attributed to organized labor. Most were just arguments arising out of crowded workspaces, poorly written job specs, or differences over the best way to approach a task. Too often, the disputes between two people or two subcontractors escalated, creating delays not just for the parties involved but for other members of the project team as well. Brockman's analysis of this often-overlooked cost attracted significant notice in the trade press, including industry giant *Engineering News-Record (ENR)*.

## WHAT WE ACCOMPLISHED

■ In 2012, CPWR Small Study findings were published in the *American Journal of Industrial Medicine, Epidemiologic Reviews, the Journal of Construction Engineering and Management, Construction Management and Economics, and the Journal of Occupational and Environmental Medicine.*

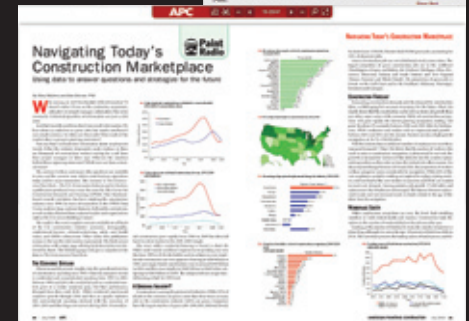
■ Three small studies were published as CPWR Reports.

■ Articles based on small study findings appeared in *ENR, Univision and the Wall Street Journal.*

# CPWR PRODUCTS OF RESEARCH

CPWR research was the subject of or mentioned in 47 media stories and covered in 44 e-mail bulletins.

- 1 Chart Book
- 1 Book Chapter
- 2 Abstracts
- 2 Renovated Websites launched
- 4 Reports
- 4 Webinars
- 5 Videos and Podcasts
- 6 Training Programs
- 6 Posters
- 7 Key Findings
- 8 Hazard Alert cards
- 9 Fliers and Handouts
- 10 Trade Mag Articles authored
- 12 CPWR Updates
- 12 Test/evaluate Technologies
- 16 Peer-reviewed Journal Articles
- 22 New Tool produced/deployed
- 35 New Solutions to Hazards
- 36 Data Requests
- 52 Toolbox Talks
- 78 Presentations



WHAT  
WHAT HAVE  
YOU LEARNED  
FROM YOUR

TRAINING

YOU THINK  
EVERYONE  
IN THE  
CONSTRUCTION  
INDUSTRY  
SHOULD  
KNOW?

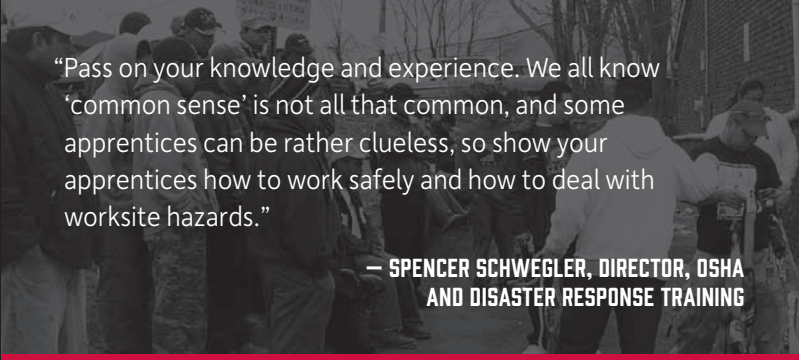
KNOW

“The worksite will only be as safe as the workers want it to be!”

— RUSS DOMINO, SAFETY AND HEALTH INSTRUCTOR, CPWR

“When workers are injured or killed at work, the focus should not be what the worker did ‘wrong,’ but rather why the hazards weren’t abated and controlled, and what the employer’s responsibilities in that regard were. While construction workers certainly have responsibilities to ‘work safely,’ it’s truly the employers’ responsibility to provide a workplace free of hazards.”

— DON ELLENBERGER, DIRECTOR, ENVIRONMENTAL HAZARDS TRAINING



“Pass on your knowledge and experience. We all know ‘common sense’ is not all that common, and some apprentices can be rather clueless, so show your apprentices how to work safely and how to deal with worksite hazards.”

— SPENCER SCHWEGLER, DIRECTOR, OSHA AND DISASTER RESPONSE TRAINING

“Safety and Health can co-exist with production!”

— GARY VON BEHREN, MASTER TRAINER

“The sad fact is that many of the members in the construction industries do not know health and safety training is available for them. The leaders should make every effort to keep the membership informed and promote the training.”

— JACK PARTRIDGE, SAFETY AND HEALTH INSTRUCTOR, CPWR

“When you hear a statistic about an injury, death or illness, you should remind yourself that the injury, death or illness has already occurred – someone has already experienced this. So do you think about the personal effects of the statistic, or do you hear impersonal numbers?”

— KELLY DYKES, CPWR EQUIPMENT MANAGER AND INSTRUCTOR

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## OSHA Outreach Training

**D**id you know that America’s building trades unions – with support from CPWR’s National Resource Center, as a tuition-supported OSHA Training Institute Education Center, operate the nation’s largest occupational safety and health training network?

Although better known for its enforcement activities, OSHA does much more than inspect jobsites for dangerous practices. The OSHA Outreach Training Program is an OSHA initiative that’s quite popular with employers – especially in construction. A growing number of state and local governments, construction owners, project managers, general contractors, and subcontractors require employees to obtain an “OSHA-10” card prior to work. (See “What is OSHA-10?” on page 26.)

For many men and women of the trades, that means scrambling to find a vendor and paying upwards of \$100 out of pocket for the needed instruction. For union members, it’s a different story. Last year, on job sites, in union halls, and in union training centers, more than 55,000 construction workers earned their OSHA-10 from experienced instructors in their trade – without digging into their wallets. Nearly 24,000 more workers earned an OSHA-30 card by attending the even more rigorous 30-hour training class.

How does it happen? It begins with collaboration between CPWR and an all-star team of 50 “master trainers” from the national building trades unions. Working together under the auspices of the Building and Construction Trades Department, AFL-CIO, the technical experts of CPWR and the union apprenticeship and training leaders forge a rigorous curriculum based on the latest research and experience from the field, plus federal and state regulations. The master trainers fan out to “train the trainers;” each year they authorize hundreds of OSHA Outreach Program Instructors from their colleagues in the trade.

These local trainers in turn teach hazard recognition to tens of thousands of their peers in every corner of the nation and industry. At any given time approximately 4,000 authorized outreach trainers are part of this building trades’ network. Continuing education is a must: every four years they must return for fresh training with the master instructors to improve their skills and learn about latest safety practices and regula-

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**NO FEDERAL REGULATION  
REQUIRES OSHA-10  
TRAINING, BUT MANY  
OWNERS AND FIRMS  
MAKE IT A REQUIREMENT.**

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Master Instructor George Newman has a packed house for an OSHA 500 (Train-the-Trainer) course in northwest Indiana. CPWR’s OSHA Training program trains an average of nearly 1,000 new trainers every year.

tions. And since it's not uncommon for construction firms to promote these skilled outreach trainers to management duties, there's a constant need to train replacements!

In the past year master trainers from the various trades led 63 classes and trained 794 new or returning outreach trainers. Our outreach trainers in turn taught 4,740 OSHA-10 and OSHA-30 classes, training 79,662 men and women of the trades in hazard recognition.

## CPWR OSHA TRAINING

Conducted 2007-2013

### OSHA 500/OSHA 502 TRAIN-THE-TRAINER

450 COURSES CREATED

**7,852**  
TRAINERS

### OSHA 10-HR

34,297 COURSES TRAINED

**489,949**  
WORKERS

### OSHA 30-HR

10,580 COURSES TRAINED

**144,575**  
WORKERS

**642,376**

UNION MEMBERS TRAINED  
NATIONALLY IN CPWR-AFFILIATED  
OSHA PROGRAMS

## WHAT IS "OSHA-10?"

OSHA-10 is a 10-hour basic hazard awareness course delivered under the OSHA Outreach Training Program. OSHA authorizes a limited number of nonprofit organizations and consortia to recruit and train local "outreach trainers." These consortia are known as OSHA Training Institute Education Centers. CPWR and West Virginia University teamed up to create an OTIEC of their own in 1994.

These OTIECs administer intensive "train-the-trainer" courses (OSHA 500, 502, and 510) to prepare the outreach trainers to teach occupational health and safety. The outreach instructors in turn deliver the OSHA-10 hazard recognition course to the men and women of the trades in every corner of the country. What's the curriculum?

Trainers have a little flexibility in designing the course, but OSHA prescribes 10 hours of instruction that include a minimum of:

1. two hours on OSHA and the rights of workers to a safe workplace;
2. four hours on the "focus four" hazards that cause the most construction fatalities – falls, electrocutions, "struck-by" (e.g. vehicles or objects), and "caught-in or caught-between" (e.g. a trench collapse);
3. 30 minutes each on personal protective equipment and on health hazards (e.g. inhaling airborne particles);
4. three hours of appropriate specialized training.

When the outreach instructor reports that a worker has satisfactorily completed the training, the OTIEC issues a worker OSHA-10 card.

OSHA-10 for construction has proved wildly popular in the building industry. No federal regulation requires OSHA-10 training, but many owners and firms have made holding a valid OSHA-10 card a work requirement and several states require a valid OSHA-10 card to work on publicly-financed construction projects like roads, schools, and government buildings.

Outreach trainers also offer a more intensive 30-hour occupational safety class. Demand for the OSHA-30 card is increasing as well, with many firms requiring supervisors, including foremen, to hold one.

## RESPONDING TO DISASTERS – SAFELY

Every year devastating tornados, floods, and earthquakes damage towns across America. These natural disasters can cause damage to buildings, compromising their structural integrity and often leading to collapse, trapping victims inside. Construction workers who want to help their neighbors at a disaster site can be invaluable to first responders as “skilled support personnel.” To do so, they must be trained in how to work safely and how to integrate into the Incident Command System used by first responders.

CPWR offers a training program to equip thousands of building tradesmen and tradeswomen to become “Skilled Support Personnel” during a disaster. Building Trades people bring critical skills that fire or police personnel simply don’t possess. Construction workers can assist first responders by assessing damage to buildings, rigging and clearing debris using heavy



A dramatic search-and-rescue operation plays out in CPWR’s Disaster Response Training DVD, which teaches the Incident Command structure.

construction equipment, and assisting with live exposed power lines, as well as gas and water utilities. These skilled support personnel must work safely with the first responders to avoid becoming the next victim.

Now every trainer who takes CPWR’s modified OSHA 500 class is also trained to deliver OSHA 7600 and the new 7601. These classes enable trainers to teach rank-and-file workers to assist in times of natural or man-made disasters. CPWR has trained trainers in almost every state and municipal area in the United States. CPWR continues to expand this network of trainers and trained workers to more and more communities where our people can become important resources for first responders in difficult times.

## These Workers are Making America Safe for All of Us Who’s Watching out for Them?

### CPWR HAZARDOUS WASTE WORKER TRAINING

A century of industrial growth and a half-century of nuclear reactions made America a superpower, but in many communities, these activities left behind hazardous wastes of many kinds. The men and women of the trades are working steadily to clean up this toxic legacy. CPWR and its partners in America’s building trades unions teach them to do it safely.

CPWR and our 11 Building Trades Union partners in the Construction Consortium for Hazardous Waste Training anticipated training 5,615 workers across the United States in the course of the 2012 program year – but in fact surpassed that target by 11%. Some 6,327 workers, technicians and support staff learned at these classes how to protect themselves and safely handle hazardous wastes. More than 3,800 were positioned by the training for possible work in Department of Energy (DOE) administered nuclear sites, while some 2,500 participated in training aimed at remediating Environmental Protection Agency (EPA) Superfund sites.

By recruiting worker-trainers from the ranks of millions of experienced union tradesmen and tradeswomen, CPWR is uniquely positioned to tap an incomparable human resource. The instructors bring to bear a collective knowledge base in real-world construction that can’t be beat, and students appreciate and respect their peer trainers.



Workers donned moon-suits for a hazardous waste course simulating toxic waste clean up.

Of course, not every worker is a natural-born trainer. That's why CPWR relies on a corps of master instructors who conduct "train-the-trainer" courses and mentor new instructors as they teach their first courses. CPWR also provides the instructors with updated instructional materials and training enhancements as they continue in their health and safety training careers. The 274 courses and over 100,000 training "contact hours" administered under the National Institute of Environmental Health Sciences (NIEHS) grant covered Hazardous Waste, Confined Space, Asbestos, Fall Protection, Scaffold, OSHA 10 and OSHA 500, among others.

## Training Made the Difference

### AN INDIVIDUAL WHO TOOK CONFINED SPACE TRAINING SENT AN EMAIL SAYING:

"...We were putting non-corrosive membranes on the inner walls of the tanks at the facility. The fumes from the material we were using had a, shall we say, loud smell to it and because we were working in mid-summer the smell was almost unbearable. Our monitor kept going off. I ordered everyone out of the tank and had our shop guy bring out two fans. I had [Joe] open the hatch on top of the tank. I had my guys put a fan at the top of the tank and one at the bottom, so we could insure there was proper ventilation. After 15 minutes, I placed the sniffer inside the entrance to test the air quality. After a normal reading, we resumed work and had a safe and productive day. Had I not had the extra Confined Space Training given by CPWR-The Center for Construction Research and Training at my Union Hall, who knows how that hot summer day at DTE would have ended."



A trainee enters a simulated confined space.

## Creating a HAZCOM Curriculum for Globally Harmonized World

### CPWR PREPARES CONSTRUCTION WORKERS FOR NEW HAZARD COMMUNICATION STANDARD

Accelerating global trade means that there is a good chance many of the materials you work with were manufactured abroad. That's why occupational health experts from around the world have produced some basic, uniform guidelines for warning workers about chemical hazards in the workplace. The new system includes a series of internationally-standardized pictograms advising workers of the potential hazards of materials they encounter on the job, and mandatory labeling requirements that are consistent from one nation to the next.

OSHA mandated that by December 2013 all U.S. employers must train their workers to understand the pictograms and the new "Safety Data Sheets" (SDS) that will replace the familiar Material Safety Data Sheets (MSDS) of the past. CPWR rose to the challenge by creating a new four-hour Hazard Communication Training course in conformity with the new federal regulation. Director of Safety Research Bruce Lippy (see page 14) and Hazardous Waste Training Director Don Ellenberger combined their skills to design and test English and Spanish-language versions of the curriculum, each curriculum pairing a Powerpoint training tool and a student text in printable format. In the first month of its release on the CPWR website, the resources drew hundreds of visitors generating 364 pageviews.

CPWR also created an abbreviated, one-hour version to be used as a module in the Smart Mark OSHA-10 curriculum.



The complete Hazard Communication Training curriculum – an Instructor Manual, Powerpoint, and Student Manual (above) are available on CPWR's website at no charge.



## 'I CALLED YOU TODAY TO THANK YOU FOR SAVING MY LIFE!'

"There are so many reasons why I work in this field ... but one really stands out.

In the mid-90s, I taught a MSDS Course in North Dakota. When I taught the chemistry portion, we talked



**Safety and Health Instructor Russ Domino conducts hands-on confined space training with students. CPWR's curriculum also teaches students how hazardous gases reduce oxygen levels, which can prove fatal.**

about vapor density, vapor pressure, fire triangle, flash points, oxygen, etc. I held a five gallon empty water container over my head horizontally and told the participants that this could be considered a Confined Space under OSHA

Standards. I did lots of effective demonstrations, like squirting lighter fluid in a bottle then having students look up naphthalene in their NIOSH Pocket Guide.

A week before Thanksgiving that year, I received a call from one of the Millwrights, and in a heavy voice he said, "I called you today to thank you for saving my life!" He proceeded to tell me about a confined space he and a fellow millwright had to enter to do their job at a coal plant. He told his partner that he was not going in until the air was tested for O<sub>2</sub>. His partner entered "against my wishes," he said. When everything was said and done, the other millwright was air-lifted to a hospital. There was less than 10% of oxygen where his buddy had fallen."

— RUSS DOMINO, SAFETY AND HEALTH INSTRUCTOR, CPWR

## WHAT DO THE STUDENTS SAY?

*Comments from student evaluations of hazardous waste/environmental hazards training:*

"It's great. Really reinforced my knowledge in the type of work I do. Things will change when I take this info to my employer."

"I understand a lot more today than before I entered the class. I will feel safer with my knowledge before entering a confined space. Thank you."

"This class gave me simple insights that will enable me to greatly increase the safety of myself and others around me."

"Now I know how asbestos works!"

"I enjoyed the class. I learned something new every day..."

"The delivery was excellent. I recommend it to all construction workers."

"This was one of the very best and most easily understandable courses I have been through. The instructors were excellent at explaining things so I could understand it. Very nice job overall."

"I don't think that there is any way it could be improved. This is the best training I have ever received. The instructors are top notch with a variety of techniques and aids and have extensive knowledge and experience."

"It was great! A lot to take in, but opened my eyes."

## Beacon of Hope in Blighted Communities

### RESIDENTS BENEFIT FROM MINORITY WORKER TRAINING PROGRAM

If college graduates are hard pressed to find a good job in these difficult economic times, then they may want to consider the options offered through the Minority Worker Training Programs (MWTP), which serve economically disadvantaged community residents.

Take three cities – St. Paul, Minn., New Orleans, and East Palo Alto, Calif. When you look into their ethnically diverse, low-income neighborhoods, you'll see that local businesses closed after the economic downturn many years ago and were never able to revive. But training centers of construction trade unions and community-based organizations in these three cities

**Students gain a basic knowledge of construction and safe use of tools, as well as training in scaffold erection, confined space, hazardous waste clean-up, plus OSHA 10- and 30-hr classes.**

make up the backbone of the MWTP, a CPWR-administered program supported by a federal grant that provides construction safety and health training to disadvantaged workers.

Students who enter and complete the Minority Worker Training Program get more than a job – they get access to a career. Program graduates report to union hiring halls and are placed at work with union-signatory contractors, making for rates of job placement that put the average vocational training program to shame.

The cities housing the program weren't selected at random. All training centers are near EPA Superfund sites. With documented hazardous waste sites near these large population centers, training unemployed city residents in the skills needed to abate hazardous wastes that threaten their communities makes sense.

The program sites were strategically located so that this population can get to their training classes using public transportation. The New Orleans JATC is in the Ninth Ward. In East Palo Alto, which is 85% minority populations, the training facility is within an industrial development. The St. Paul program is located in the Eastside section of the city where a predominance of low-income, diverse ethnicities reside.



Students get state-of-the-art training in remediating hazardous materials, as well as basic construction skills and training to identify and safely use of trade-related tools. They also receive specialized scaffold erection training, confined space training, and OSHA 10- and 30-hr classes. The program also delivers adult literacy and life skills, such as budgeting, managing their paychecks and ride-sharing.

In its last program year, CPWR recruited a total of 436 applicants (an increase of 67 people from the previous year) for only 60 available training slots. Sixty-one applicants were admitted for training, and the program secured a remarkable 97% graduation rate. (In contrast, only 50% of U.S. students who enroll in college complete their degrees!) Despite the challenges of the economic downturn, fully 80% were placed in jobs averaging a respectable \$16.50/hour wage.

## WHAT WE ACCOMPLISHED

**For the three years, 2010-2013, CPWR's Minority Worker Training consortium:**

- Recruited 1,116 applicants for 180 training slots.
- Provided 139,344 contact hours of training.
- Trained 184 students, graduating 98% and placing 80% in employment.

### 'Good faith effort' yields quality workers, engaged contractors

**P**CL Construction Services, Inc. could be just another federal contractor required to make good faith efforts in recruiting and hiring a diverse workforce. After all, they're operating in Minnesota, which has a new workforce goal of 32% minority.

The company began working with the Minority Worker Training Program through Merrick Community Services and was quickly impressed with the program. Not only did it deliver the state-mandated workforce goal of minority and female workers to PCL, the workers arrived with proper training and skills, plus a willingness and readiness to work in the industry.

Because of these and other experiences, PCL became an advocate; the company serves on the program's advisory board and aids students with resume-writing assistance and interview training. PCL employees graciously made personal donation of nearly \$3,000 to Merrick's program.

The San Francisco Public Utilities Commission, another employer of MWTP's Project Build grads, continues its commitment to hire students to work on the city's Water System Improvement Program.



Randale Conner (at podium) of the East Palo Alto MWT program delivers his thanks upon receiving an outstanding graduate award at JobTrain's annual Breakfast of Champions.

## Success!

### EAST PALO ALTO MWTP GRADS TO CONGRATULATE

**R CONNER** graduated from the MWTP's Project Build in May 2010. He joined Laborers Local 261 and was dispatched to Mountain Cascade to work on a San Francisco Public Utilities Commission (SFPUC) project in Menlo Park. Conner has been a crew leader for the past two years of his three years of employment with Mountain Cascade. He is very proud to announce that he worked enough hours to journey out and is earning an hourly wage of \$28.39. He is currently talking to our liaison at the SFPUC for the next job site referral.

**E CARRIEL** graduated from Project Build in 2011. Prior to entering the training program, she had been working part-time for minimum wage at retail stores. After graduating, her initial placement was at Fairway Painting earning \$11/hour. She moved to Crescent Alliance earning \$40/hour as a solar panel installer. When that job ended, she was referred to Laborers Local 261 and was placed with San Francisco Public Utilities Commission, receiving union wages of \$17.48 /hour. She has worked steadily for the past year with contractors such as Ferma Construction, Rudolph Sletton, Malcolm Drilling, and BBCI.

**WHAT HAVE  
YOU LEARNED  
FROM YOUR**

**SERVICE**

**YOU THINK  
EVERYONE  
IN THE  
CONSTRUCTION  
INDUSTRY  
SHOULD  
KNOW?**

“There were lots of chemicals and hazardous materials on Department of Energy sites that workers simply don’t know they worked around. It’s especially true for DOE sites considering how secretive the work was.”

— **JOE HUDSON, BTMED INTERVIEWER,  
PADUCAH GASEOUS DIFFUSION PLANT, BOILERMAKERS LOCAL 40**

“Any construction worker who was on a Department of Energy nuclear weapons site needs to get a medical screening through BTMed – even if you worked just one day out there.”

— **GORDON ROWE, BTMED INTERVIEWER,  
SAVANNAH RIVER, IBEW LOCAL 1579**

“People think radiation is the worst thing on Department of Energy sites, and it’s bad. But there are other hazards out here, like asbestos and beryllium and other chemicals in the dust that you wouldn’t know you’re being exposed to. There’s not a big sign that says ‘Beryllium: Keep Out.’”

— **DAN OBRAY, BTMED INTERVIEWER,  
IDAHO NATIONAL LABORATORY (INL), IUPAT LOCAL 764**

“I didn’t know what I’d been exposed to. BTMed’s exam was very thorough. I’d encourage all workers to get one no matter how long they been out on a site.”

— **LARRY BUCKNER, SHEET METAL WORKERS LOCAL 5  
BTMED PARTICIPANT, OAK RIDGE**

“We worked our whole lives to enjoy our later years. What a shame it would be to waste that because you won’t pick up the phone to call BTMed to get your screening.”

— **WALTER CHRISTIAN, LIUNA LOCAL UNION 657  
BTMED PARTICIPANT, FERNALD**

“I encourage everybody I know to get screened. There was all kinds of stuff out there. Silica. Beryllium. Asbestos. And you don’t know how much your life’s been cut short because of it.”

— **HARRY CARVER, IRONWORKERS LOCAL 709  
BTMED PARTICIPANT, SAVANNAH RIVER**

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## Unsung Heroes of the Cold War

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### WORKERS GET HELP FROM BTMED

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For nearly five decades after World War II, America faced off with the Soviet Union in a tense Cold War. A vast nuclear deterrent secured our nation's defense. For this we thank our men and women in uniform – and the workers who exposed themselves to danger to keep us safe.

The workers who built and maintained Department of Energy

facilities generating nuclear fuel were often exposed to a host of hazardous substances in the course of their careers. There are no Veterans Administration hospitals for these unsung heroes of the Cold War, but the Building Trades Medical Screening Program (BTMed) provides an important service to these men and women of the trades.

BTMed identifies construction workers who have been employed on DOE sites and screens them for occupational illnesses. In its 17-year history, BTMed has provided 28,000 screenings to more than 21,000 workers for medical conditions

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**20,837**

COMPLETED INITIAL SCREENINGS

**7,136**

COMPLETED RESCREENS

**27,973**

TOTAL SCREENINGS

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in a network of 200 specially credentialed clinics across the country. Workers are provided an initial screening and are invited back every three years for another screening. The program has found abnormal chest x-rays in 18% of these workers, abnormal pulmonary function in 40%, and evidence of hearing loss in a striking 64%. Workers presenting symptoms like these are referred for additional testing and care.

BTMed is proud to report a 97% satisfaction rate among participants in the program.

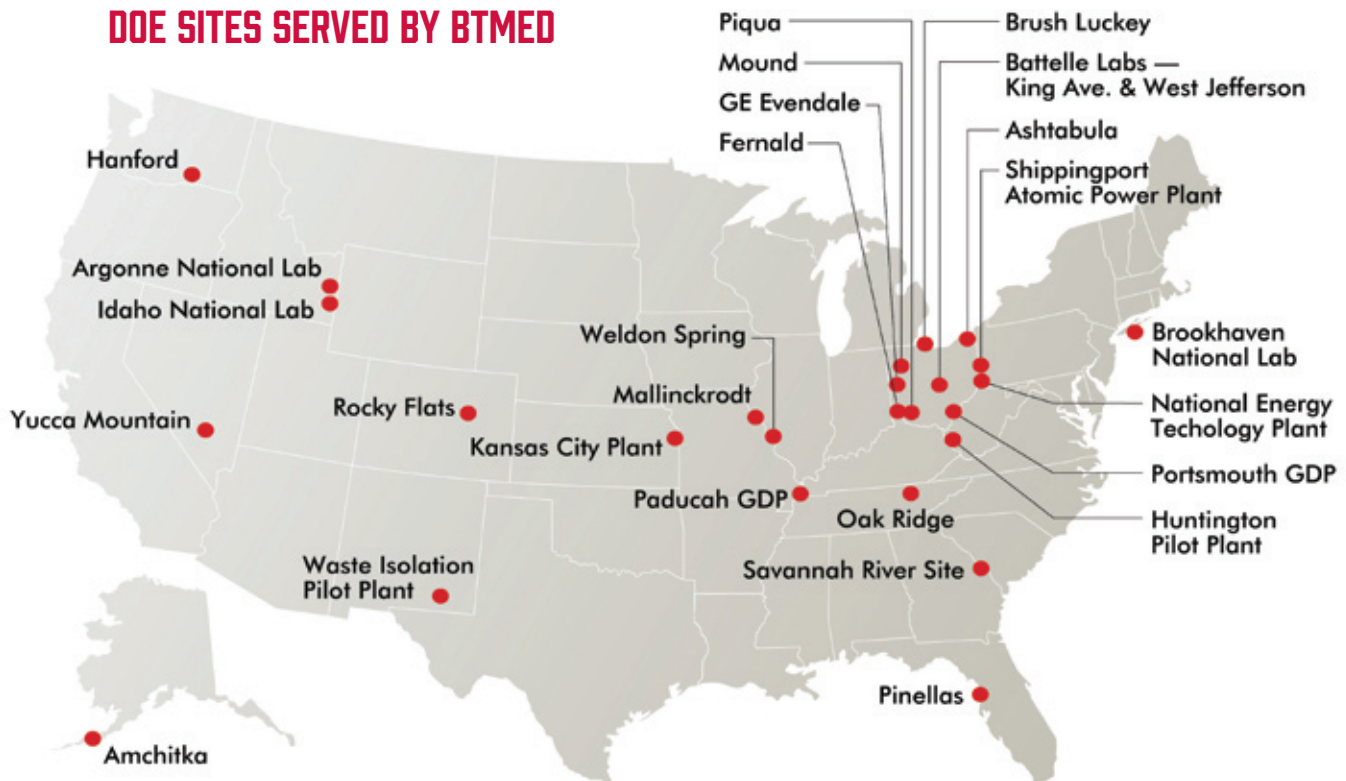
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## Early Lung Cancer Detection (ELCD)

An alarming 160,000 Americans die from lung cancer each year, and the combination of smoking with exposure to workplace dusts and toxins can put construction workers at an elevated risk. Ultra-low dose CT-scans can enable early intervention, but aren't yet covered by most insurance plans. That's where the BTMed Early Lung Cancer Detection (ELCD) program can help.

BTMed has been delivering the low-dose scan free of charge at Oak Ridge, Tenn., since 2011, and now does so at the nation's largest DOE site in Hanford, Wash. Workers with high risk factors are eligible for the low-dose scan, which can identify small nodules developing on the worker's lungs. Workers found

### DOE SITES SERVED BY BTMED





Former Hanford field supervisor, Bob Irwin, prior to his CT Scan. Irwin worked at the Hanford site for more than 42 years.

to have these nodules are referred to specialists for further testing – and if the nodules prove to be cancerous, for treatment. Lung cancer has a 16% survival rate when detected using conventional methods; early detection, like that promised by low-CT screening, can boost this rate as high as 80%. CT scans also can detect serious finding other than lung cancer as well.

**IMPLEMENTING ORGANIZATIONS:**

- CPWR – The Center for Construction Research and Training
- Duke University
- University of Cincinnati
- Zenith American Solutions

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- Alaska State BCTC
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- Central Washington BCTC
- Colorado State BCTC
- Dayton BCTC
- Florida Gulf Coast BCTC
- Greater Cincinnati BCTC
- Greater Kansas City BCTC
- Idaho BCTC
- Knoxville BCTC
- Nassau and Suffolk Counties BCTC
- Tri-State (Kentucky, Ohio, West Virginia) BCTC
- West Kentucky BCTC
- St Louis BCTC



**Low-Dose CT Scan Detects Cancer in “Healthy” Worker**

**VIGILANCE PAYS OFF FOR OAK RIDGE SHEET METAL WORKER**

After working on and off at the Department of Energy’s Oak Ridge Reservation for 15 years, Larry Buckner of Sheet Metal Workers Local 12 received a letter from the BTMed inviting him for a free medical exam. Even though he felt healthy, he participated. Buckner’s results came back from his medical exam: he was as healthy as he felt.

**“I DON’T KNOW HOW FAR DOWN THE ROAD I WOULD’VE FOUND OUT ABOUT MY CANCER HAD IT NOT BEEN FOR THAT SCAN.”**

— LARRY BUCKNER, SHEET METAL WORKERS LOCAL 5, OAK RIDGE



Two years later, he received another letter from BTMed, this time inviting him for a free low-dose CT scan of his lungs. And even though he still felt healthy, Buckner again elected to participate. This time, he wasn’t as healthy as he felt. The CT scan had detected cancer.

Diagnosed with esophageal cancer and a non-cancerous tumor that will require kidney removal, Buckner explained that he “didn’t have any symptoms. If it wasn’t for getting scanned, I wouldn’t have known about it. Not at all.”

Now undergoing chemotherapy before he is to receive radiation treatment, Buckner battles through the very demanding and exhausting treatment that he prays will save his life. “I don’t know how far down the road I would’ve found out about my cancer had it not been for that scan,” he reflected. “By then, it may have been too late.”

**Did you know?**

BTMed is more than a network of clinics offering screening: it’s a large service-oriented program that collects and searches for trends of illness and disease among construction workers using data with no names or personal identifiers. While individual test results are confidential, the aggregate data provided by the large-scale testing has informed numerous studies of construction occupational hazards.



The BTMed staff gathers for a group picture at their 2013 Annual Meeting in Nashville, Tennessee.

For an example of the latter, take beryllium. Workers engaged in abrasive blasting using certain coal slag products, or particular types of welding and brazing, are at risk of exposure to the toxic metal. The ominous sounding element was widely used in nuclear weapons facilities, and for more than a decade BTMed has tested workers for beryllium sensitivity. CPWR



**“MY DOCTORS DIDN’T KNOW ANYTHING ABOUT BERYLLIUM. THEY CHALKED IT UP TO SARCOIDOSIS, SO I WENT YEARS BELIEVING I HAD ONE ILLNESS**

**WHEN IT WAS ANOTHER THAT WAS ENTIRELY DIFFERENT. NOW I’M FOCUSING ON CONTACTING AS MANY OF MY CO-WORKERS AS I CAN TO TELL THEM, ‘YOU NEED TO GO TO BTMED.’ THEY NEED TO KNOW ABOUT THE MATERIALS THEY WERE EXPOSED TO JUST LIKE I NEEDED TO KNOW.”**

— STEVE LINDLEY, BOILERMAKERS LOCAL 687  
BTMED PARTICIPANT, SAVANNAH RIVER

researchers reviewed data from nearly 14,000 BTMed blood tests, finding that 1.4% had tested positive for beryllium sensitivity, and 15% of those with sensitivity developed Chronic Beryllium Disease, a lung disorder. The results of the study were published in the *American Journal of Industrial Medicine*. Find more information online at [www.btmed.org](http://www.btmed.org).

## THANK YOU WORKERS THANK BTMED

“Thank you for your concerns and effort to bring this matter to the attention it deserves. God bless you and your families.”

— WILLIAM MENDEZ, BOILERMAKERS LOCAL 101, ROCKY FLATS

“Great program for working person not familiar with medical terms.”

— HANFORD WORKER

“Thank you for protecting the workers.”

— GROVER SHEETS, ASBESTOS WORKERS LOCAL 80, PORTSMOUTH GDP

“If it hadn’t been for BTMed, I’d be lying in the grave right now. I did my second rescreening and they found a tumor – and it was malignant and aggressive. I wouldn’t be here talking to you today if I’d waited. Otherwise somebody else would be driving my car, riding in my boat.”

— WALTER CHRISTIAN, LIUNA LOCAL UNION 657, FERNALD

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# WHY DID YOU CHOOSE THIS WORK?

“The more accurate data we provide, the better prevention and fewer injuries and illnesses for construction workers.”

— XIUWEN [SUE] DONG, DRPH, DATA ANALYSIS

“In 1991, we were told that the average age limit (or life expectancy) of an IUPAT member was 61.7 years old. By the end of that decade, the average age had risen to the construction norm and was attributed to Safety and Health Training. Due to our training, members who never wore a respirator were now wearing and demanding them. Members and our contractors now taking S&H classes are questioning Safety and Health issues on jobsites. Some of my most memorable moments are when someone comes up to me and says, ‘You made a difference in my life as a result of a Safety and Health class.’ That alone makes it worth the time and effort.”

— GARY VON BEHREN, MASTER TRAINER, CPWR

“I was the Local 764 (IUPAT) union rep and was at a Building Trades meeting when I heard they were looking for a construction worker to manage BTMed’s INL Outreach Office. Since I worked on all parts of the site with all the crafts, INL workers can talk to me about their work out there and I know exactly what they’re saying.

What keeps me motivated? The appreciation that a lot of workers have for getting this type of help. They get answers about the work they’ve done and how it might have affected their health.”

— DAN OBRAY, IUPAT LOCAL 764  
BTMED INTERVIEWER, IDAHO NATIONAL LABORATORY [INL]

“The future of construction health and safety is not only dependent on the apprentices that will be site-superintendents building the safety culture of tomorrow, but also on the graduate students that will be future leaders in construction health and safety research. Today, these students are indispensable to our work; they keep us on our toes and will be the leaders for the next generation. Mentoring students to become leaders in occupational health and safety research is a fundamental goal built into all of our projects.”

— JOHN ROSECRANCE, PHD, SAFETY LEADERSHIP

“In teaching occupational safety and health, you quickly realize the public health burden on construction workers. The dynamic work environment and the constantly changing demands, hazards, and controls should not be a barrier to health and safety.

We have made a lot of progress, but we still have a ways to go. Understanding the barriers as well as the success stories can help us move forward. We have an obligation to keep people safe and healthy at work.”

— JACK DENNERLEIN, PHD  
MEASURING AND IMPROVING SITE SAFETY CULTURE

“The small changes that I see daily keep me motivated to continue construction research. Tackling a problem using various approaches will ultimately make a difference. I want to identify those different approaches and team up with contractors to determine if they will make a difference.”

— VICKI KASKUTAS, MHS, OTD, RESIDENTIAL FALL PROTECTION

“I studied for and earned a Masters Degree in Education at San Jose State at night. During the day I confronted the realities of hazardous working conditions in an industry that OSHA was just beginning to regulate, and at night I studied education theory and practice. Teaching was always a strong attraction for me.

The best part of my job is watching new health and safety instructors gain the knowledge, confidence and desire to contribute their time and energy to training our members. It’s highly gratifying to see someone with the construction labor background break through the trepidation that all new, aspiring instructors face when standing in front of a class for the first time, and experience success. That’s it.”

— DON ELLENBERGER  
DIRECTOR, ENVIRONMENTAL HAZARD TRAINING

“I was working various environmental abatement jobs at the Oak Ridge DOE sites, and I was asked to take a train-the-trainer course. One of the many reasons I keep training workers in confined space is that when I started delivering H&S training, the deaths of ‘would-be rescuers’ dropped from more than 60% of all confined space fatalities to less than 35%. I believe this is a true testament of training.”

— KELLY DYKES, EQUIPMENT MANAGER AND INSTRUCTOR

# SEE DO YOU SEE A **PROBLEM** THAT NEEDS TO BE SOLVED BY RESEARCH?

CPWR has funding available – up to \$30,000 per study – to investigate construction safety and health hazards on jobsites and find solutions to eliminate or reduce them.

Get more information, like our Small Study Grant Guidelines, at [www.cpwr.com/smallstudies](http://www.cpwr.com/smallstudies).



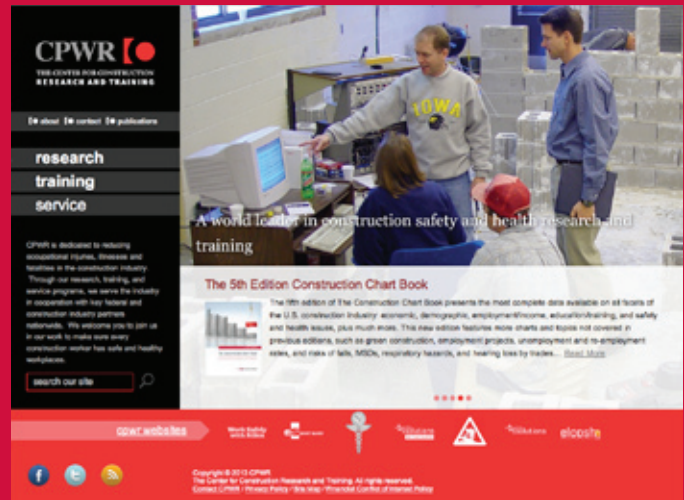
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