



HIGHLIGHTS 2012

# Getting RESULTS

THE VALUE OF CPWR

**417**  
**Courses**  
offered

**76 Presentations**  
delivered by researchers

**1,927**  
**IMPACT Cards**  
distributed

**556,275**  
**eLCOSH visits**  
in one year

**98%**  
**Graduation Rate**  
from the Minority Worker Training Program

**69,355 Workers**  
trained in OSHA 10/30

**25,899**  
**Screenings**  
by BTMed

**CPWR**   
THE CENTER FOR CONSTRUCTION  
RESEARCH AND TRAINING

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## FOREWORD TO HIGHLIGHTS 2012



Sean McGarvey

Despite the deep divisions and entrenched positions we see in Washington at the end of 2012, America's Building Trades Unions maintain our focus on finding common ground and getting results.

So it gives me great pleasure to introduce CPWR's report on 2012 that catalogues and confirms the extremely positive work performed on behalf of the 10 million men and women in construction. "Getting Results – The Value of CPWR" gives the details of CPWR's groundbreaking research and expert training of workers that no other private institution in our nation is doing. This organization is going about the tough work of saving the lives and livelihoods of America's construction workers. And, I am happy to report, the group is getting results.

The results come in as many ways as there are projects. Research results can be pure numbers or answers to health and safety problems that have plagued workers since we began chiseling granite and hauling rock. That rock (and concrete) dust is a health hazard first identified by ancient Greeks during their building boom 2,500 years ago. The dust contains silica, an agent so deadly that at least 400 workers died from the lung disease silicosis while drilling a tunnel in West Virginia in the 1930s. Unfortunately, regulations do not fully control silica dust, so many workers are still exposed to this airborne hazard. But in 2012, not only did CPWR researchers evaluate (and even build) tools to reduce workers' exposure to silica, they even created an entire website to give contractors all they need to know about controlling silica on a jobsite. All the information is free – and prepared so you don't need a degree in industrial hygiene to protect workers' lungs.

Construction workers still perform physically demanding tasks, like those ancient Greeks. CPWR has been researching solutions to prevent the strains and sprains that start out annoying and become debilitating over a lifetime of work. By testing tools and changing work practices, the ergonomic advances described in this report will improve workers' health – and maintain the knowledgeable, productive workforce we've built over decades. That's incredible value for contractors – and for workers who will not have to "work through the pain."

Yet as proud and strong as our industry is, we carry a terrible burden. We experience tragedies unheard of among most Americans: death on the job. Our industry loses an average of three workers a day. This year, CPWR, OSHA and NIOSH combined forces with construction safety leaders from private industry to combat the No. 1 killer of construction workers: falls. If you are not already involved in this national campaign to stop construction falls, I urge you to join. Find out more inside.

For every worker who leaves a worksite without injury and without the beginning of career-ending, life-shortening health problems, we see the value of CPWR. Every day.



These topics are just the beginning. As you go through this year's report, you'll be impressed with the number of new trainers CPWR developed, or be surprised at the 98% graduation rate of the Minority Worker Training Program – a figure U.S. schools would love to report. You can take pride in a program that conducts medical screenings of construction workers on sites where our nation created nuclear weapons. Your pride will swell as you read of workers who received life-saving benefits from this work.

All of this leads to value. The BCTD instituted the phrase "Value on Display – Every Day" as a reminder of the benefits our trained workforce and strong organization bring to industry leaders, day after day. We recognize the incalculable value CPWR brings to our nation's workers. For every worker who leaves a worksite without injury and without the beginning of career-ending, life-shortening health problems, we see the value of CPWR. Every day.

Sean McGarvey

Chairman of the Board and President, CPWR

President, Building and Construction Trades Department, AFL-CIO



## MESSAGE FROM THE EXECUTIVE DIRECTOR

Every year CPWR's connections with our partners deepen. And every year we find new organizations – and people – seeking the information and resources CPWR brings to the construction industry.

We found 2012 was no exception to that trend. In fact, 2012 was an exceptional year, as we amassed an impressive display of Research Products and Events & Accomplishments, which you'll see displayed on the following pages. I'd like to expand on two of these items.

"Falls to a lower level" has been the top killer of construction workers for as many years as the Bureau of Labor Statistics has collected these figures, and that has been 20 years. These annual figures frustrate the industry because we know these workplace deaths are preventable. To bring attention to the issue, we had the pleasure to work through the NORA Construction Sector Council to plan and launch a national falls fatalities campaign in partnership with NIOSH, OSHA and other interested stakeholders. Secretary of Labor Hilda Solis launched the campaign on Workers' Memorial Day of 2012. CPWR, along with industry, government, academia and labor created this national awareness campaign to provide employers and workers with life-saving information and educational materials about working safely from ladders, scaffolds and roofs.

CPWR built the campaign's website, [www.StopConstructionFalls.com](http://www.StopConstructionFalls.com), while also participating on committees to develop new materials, vet existing information, and promote the campaign. CPWR also created an online, interactive "map" to locate each construction-related fatality in 2011 and 2012. See for yourself on Page 6 and then visit the website for the true impact.

A second accomplishment with partnerships as a central component: convene the world's construction safety and health leaders to discuss their latest challenges and response. CPWR hosted a symposium in Boston for the International Social Security Association (ISSA) Construction Section. Presentations focused on best practices in all phases of construction, from planning to demolition, and effective methods of worker training. The symposium revealed diverse experiences and findings – from an analysis of safety/health training for low-literacy workers building a subway system in Istanbul, to best practices/lessons learned while building venues for the 2012 London Olympics. Panels of

senior decision-makers responded to the presentations with their views on implementing these practices given constraints and differences among participating countries. Those attending, including a number of CPWR trainers, gained rare insights into safety and health practices from European Union nations, such as Germany, Denmark and France, to far-flung nations of Turkey, South Africa, Cameroon, and Chile.

While we can count many accomplishments for the year, we know that the nuts and bolts of our work would not have the same impact without our dedicated partners. Not only do they give us access to construction sites and training centers to make

**If you are not yet a partner in CPWR's work, I invite you to join us. We welcome innovators ...**

strides in research and educate workers, our partners bring results to U.S. job sites. Our work reappears as safer work practices, use of validated safety equipment, a better-trained workforce, and improved means of communicating vital safety

information on the job site. In 2012 two new partners – the Labor Occupational Health Project at UC Berkeley and PhilaPOSH – have joined our group of unions, employer associations, national and international organizations, and safety and health professionals who understand the implications of our work and want to be a part of it.

If you are not yet a partner in CPWR's work, I invite you to join us. Opportunities arise several ways, such as our Small Study grants program to joining in support of the falls campaign or efforts to reduce silica on the job. We welcome those innovators who want to improve construction safety and health for all.

Pete Stafford  
Executive Director

# PARTNERSHIPS

## NEW

### Latino Fall Prevention Partnerships:

#### PhilaPOSH and LOHP

CPWR allied with Philadelphia Area Project on Occupational Safety and Health (PhilaPOSH) to begin building a sustainable, community-based, fall prevention and leadership development program for Latino



workers. PhilaPOSH is a partner with resources. Not only does it have a professional network focused on improving job safety since 1975, it has the beginnings of a fall prevention partnership through its OSHA-sponsored training programs for contractors.

An old friend of CPWR's, the Labor Occupational Health Program (LOHP) at U.C. Berkeley, is planning a social marketing campaign with NIOSH to reduce falls among Latino workers. CPWR's r2p team coordinates the process and will evaluate the outcome.

### Engineering Controls Work Group

This group of labor, contractor, industry, academia and government professionals co-convened by CPWR and NIOSH has been working together for more than 15 years. In 2012, CPWR researchers got an insight that simply could not be found in a lab. After hearing presentations on silica dust and welding fumes control systems, contractor and labor representatives identified the systems that were "the most likely to be used on worksites." Those will be the systems selected for evaluation on their efficacy.



### r2p Partnership with NIOSH and OSHA

Three organizations, all with a common purpose of improving worksite safety for construction workers, worked separately for decades. In 2011, CPWR began a dialogue with NIOSH and OSHA through its r2p (research to practice) initiative to share information rather than work in isolation. This partnership became the primary instrument in the formation of the National Fall Prevention Campaign. It planned and coordinated outreach on nail gun hazards, including the OSHA/NIOSH publication, Employer's Guide to the Safe Use of Nail Guns.

### International Social Security Association (ISSA) Construction Section

This organization provides industry, policy makers and academia a rare opportunity to coordinate their work on a global scale. A symposium held every three years engages participants in sharing research findings, hearing the needs of policy makers, then discussing what the collective priorities should be.

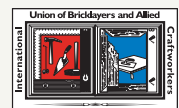
### International Commission on Occupational Safety and Health (ICOH)



CPWR took the lead in the global search for research findings when it convened an International Roundtable on Construction Safety and Health in 1994. Continued participation in ICOH, a committee of about 30 members from more than a dozen nations, ensures CPWR stays abreast of developments. It is the only international forum to share research knowledge about construction safety and health.

### Masonry r2p Partnership

With CPWR's research on silica exposure while tuckpointing and MSDs from lifting, it was natural for CPWR to develop a partnership with the Bricklayers union, its training institute, and employer association. This Masonry r2p Partnership, now in its second year, had another extraordinarily productive period, developing a website on mast climbers, completing two national baseline surveys of workers and contractors, and establishing relationships with two national equipment manufacturers to address safety and health issues involving hand tools. See more on Page 19.



### The Construction Economics Research Network (CERN)

The CERN, a network of economists assembled by CPWR in 1994, again proved to be a valuable asset to those seeking a better understanding of internal industry decision-making. Scholars took particular interest in forecasting labor demand in the U.S. construction industry. The annual meeting's focus was construction job rules and fitness for duty.

# EVENTS & ACCOMPLISHMENTS

Every year brings new challenges to CPWR. Every year produces new research findings to build the knowledge bank in our field. In 2012, CPWR not only continued its applied research projects, it ventured into new territory to address unmet needs and find new ways to support the cause of preventing deaths, injuries and illnesses to construction workers.

## OF 2012

## National Fall Prevention Campaign

OSHA, NIOSH and CPWR joined forces to attack the No. 1 killer of construction workers – falls – with a national campaign to raise awareness of the problem and provide information on fall prevention for contractors and workers. CPWR participated in all phases of the campaign's planning and took on the task of developing the campaign's featured website, [www.StopConstructionFalls.com](http://www.StopConstructionFalls.com). More on Page 19.



Fatality Map showing Jan-Oct 2012 deaths. Every pin is the death of a construction worker. Clicking on the pin opens a box with details of the fatal incident.

## The Fatality Map

An idea that had long percolated among several members of the NORA Construction Sector Council was the creation of a map that would pinpoint the location of each construction fatality within one year. As part of the National Fall Prevention Campaign, CPWR took on the challenge of creating a map to reveal the undeniable tragedy of hundreds of deaths. Taking the idea one step further, CPWR developed an interactive feature; a user clicking on the pinpoint can find details, such as the age and sex of the worker, city and state, cause of death and even a link to the OSHA fatality inspection report. More on Page 12.



# Hosting an International Symposium



CPWR brought together leaders from 16 nations when it hosted the 30th International Symposium of the ISSA Construction Section on Occupational Safety and Health in the Construction Industry in Boston Oct. 16-18. The International Social Security Association (ISSA) Construction Section meets every three years, and this was the first time the event was held on U.S. soil. CPWR identified global decision-makers to discuss the techniques they use to safely manage construction throughout a building's lifecycle (from pre-construction through demolition). Experts in safety and health training shared innovative practices, such as peer-led training, and discussed methods of evaluating programs.



## A “renovated” eLCOSH

The electronic Library of Construction Occupational Safety and Health ([www.elcosh.org](http://www.elcosh.org)) needed a make-over. The site's wealth of information had grown steadily since its introduction in August of 2000, yet the site had made few changes to accommodate the bulging library of information and the new technology churned out in the past 10 years. CPWR completed its redesign and restructuring of the site in early October – and what a change it was. More on Page 22.

## Silica Made Simple

Contractors often shy away from exploring health hazard controls because the information can be difficult to find, highly technical, or scattered among many sources. CPWR eliminated the barriers to getting simple, direct information on a deadly lung diseases when it launched a website focused entirely on silica: [www.silica-safe.org](http://www.silica-safe.org). More on Page 20.

## Tech Transfer Symposium

Researchers who develop tools to eliminate a hazard are experts in testing and refining equipment to improve workers' physical health. But those same researchers are not experts at getting tools to market – and eventually to contractors and workers. To assist researchers facing this dilemma, CPWR organized and hosted the symposium “Best Practices for Health and Safety Technology Transfer in Construction” held May 30-31 in Silver Spring, Md. Researchers engaged representatives of government, manufacturing, contractor associations, labor, and the insurance industry in discussions of barriers and strategic approaches to diffuse health and safety technologies across the construction industry. More on Page 20.



This photo is rare. Cutting concrete block usually creates clouds of dust – and that dust contains silica, which can cause silicosis and lung cancer. That's why CPWR researchers tested this saw using water suppression to control dust. The research is one of 14 projects, each searching and validating ways to make worksites safer – and make photos like this more common.

# RESEARCH





5

**New Websites**  
from research

1,927

IMPACT CARDS DISTRIBUTED

26

peer-reviewed  
**Journal  
Papers**

22,808

**Hazard Alert** cards distributed

76

PRESENTATIONS  
DELIVERED  
BY RESEARCHERS

“Building Safety for Everyone  
[safety recognition and  
communication program]  
increased the level of  
awareness around safety  
conditions on site,” said an  
employee who is actively putting

## Can Timely Feedback Help Workers Build Safety for Everyone?

### Safety Coaching Can Replace Rewards Based on Lagging Indicators

Lead Researcher: Jack Dennerlein, PhD  
Northeastern University

**S**afety inspections shouldn't just amount to playing "gotcha." They should be an opportunity to help both workers and field supervisors identify and fix problem areas, and to provide positive reinforcement for safe work practices. Communicating all relevant inspection observations to workers provides them with a clearer and more robust picture of worksite safety.

Jack Dennerlein and research team have designed a safety recognition and communication program, Building Safety for Everyone, to accomplish this. What began as a simple search for alternatives to safety programs that reward workers for accident-free days – and inadvertently discourage reporting of injuries – has grown into something larger.

The team has partnered with four Boston-area general contractors to implement Building Safety for Everyone and then to evaluate safety conditions, safety climate, and injury rates at intervention and control worksites. Through this process, the team has adapted the program for worksites of varying sizes, phases of construction, and management structures. They will continue to evaluate the program through the next year with current and new industry partners.

On intervention sites, workers are introduced to Building Safety for Everyone at safety orientations. At weekly meetings, foremen receive safety observation reports focused on their company and its employees, while the whole site's safety performance is tracked on several centrally-located posters. The entire site is recognized if the monthly overall safety score for the entire worksite exceeds a pre-determined threshold, and all workers are rewarded with a free lunch and a raffle for a free one-month parking spot.

Workers and site management report that Building Safety for Everyone leads to an increase in site teamwork and safety awareness. A site superintendent who participated in Building Safety for Everyone implementation observed, "The key ingredient of this program is that it promotes teamwork." The team has also developed a program manual, which will provide general contractors and owners with all materials, guidelines, and information required to implement the Building Safety for Everyone program independently on their own worksites.

An employee said that "[Building Safety for Everyone] increased the level of awareness around safety conditions on site.... Instead of cutting corners, we'd do it right."



Workers at an intervention site line up for a safety recognition lunch. A program focus is positive reinforcement for safe work practices.



Building Safety for Everyone sign adjacent to the pre-task planning board serves as a reminder. Site managers report an increase in safety awareness and teamwork.

## RESULTS

- Site management and employees credit increased site teamwork and safety performance awareness to the **Building Safety for Everyone** program.
- Industry partners who participated in the evaluation of **Building Safety for Everyone** have expressed interest in adopting the program. The research team has developed an extensive program manual to guide implementation for use by owners and general contractors.
- Researchers have presented findings in five regional conference presentations, four poster presentations and a paper published in *Safety Science*.

## Clearing the Air for Construction Workers

### Minimizing Exposures to Dusts and Fumes in Construction

Lead Researcher: Pam Susi, MSPH, CIH, CPWR

**C** PW's unique partnerships make cutting-edge construction health research possible in a way conventional, university-based research programs can't match. Pam Susi and her team have leveraged those partnerships to create a widely-cited series of studies on occupational exposure to welding fumes and airborne silica dust – and what can be done to control and prevent hazardous exposure.

Bringing together contractors, labor organizations, equipment manufacturers, academic researchers, and government agencies, her team is evaluating commercially available local exhaust ventilation (LEV) technologies that could protect workers from deadly silica dust and toxic welding fumes – and working with partnerships to make LEV use a standard industry practice.

Drawing on research generated by the team on promising LEV systems, the Partnerships for Advancing Control Technologies (PACTs) – a welding PACT and a silica/tuckpointing PACT – selected systems for further evaluation. Susi's team is assessing the performance of the selected systems. Access to joint labor-management apprentice training facilities and skilled trades has enabled them to perform much needed industrial hygiene research.

At the United Association of Plumbers and Pipefitters Local 597 training center near Chicago, the team tested the Trion AirBoss One-Man Portable LEV unit manufactured by Air Purifiers, Inc., finding that it reduced exposures to hexavalent chromium in stainless steel welding fumes by 88% and manganese in mild steel metal fumes by 56%. Hexavalent chromium is associated with lung cancer and occupational asthma, and OSHA standards require use of engineering controls such as LEV when exposures exceed permissible exposure limits. Manganese has been associated with neurological disorders similar to Parkinson's disease.

And in Philadelphia, at the Bricklayers Local 1 Training Center, the team assessed the performance of a Metabo grinder & ICS Dust Director shroud with a Dustcontrol 2900 vacuum. Grinders, routinely employed in tuckpoint-



This welding hood with an integrated, battery-powered air-purifying respirator protects the welder from hazardous fumes.

ing and masonry restoration, can generate immense amounts of hazardous airborne silica dust. The system reduced silica exposure by 96% and collected an astonishing 24 pounds of dust per hour, some of which might otherwise have ended up in the worker's lungs. Without LEV, exposure was 127 times the NIOSH Recommended Exposure Limit (REL).

Correct use of LEV is critical for it to be effective. In 2011, Steamfitters Local 420 in Philadelphia, Pa., reviewed and critiqued the team's draft material for an apprentice training program on correct use of LEV. Based on apprentice steamfitter and instructor input and a subsequent review of revised materials by sheet metal worker apprentices in Atlanta, the team is refining the draft. It will be pilot tested at two sites over the next two years – one in the western and one in the eastern United States.

We are also beginning to learn why some areas use LEV for tuckpointing while others do not. Working with the Bricklayers, Chicago/Cook County Building Trades, OSHA and others, we are preparing a case study describing how the Chicago area became a leader in the use of LEV for tuckpointing. Some of the lessons learned in Chicago are being used to promote greater use of LEV in Philadelphia.

## RESULTS

- Researchers prepared reports that describe commercially available local exhaust ventilation (LEV) systems for controlling fume and dust exposures.
- Researchers evaluated and documented exposure data from the highest rated LEV systems in each category (welding fumes and silica dust).
- The team designed and performed initial testing on a training program to educate welders on the dangers of fume inhalation and measures to take for protection.



- The research team presented findings in eight presentations to stakeholders and journal articles in the *Annals of Occupational Hygiene* and the *Journal of Occupational and Environmental Hygiene*.
- At least one masonry contractor has already implemented a research-related vacuum system to protect workers from inhalation of airborne silica dust.

## Data Reveal Truths, Charts Make It Real

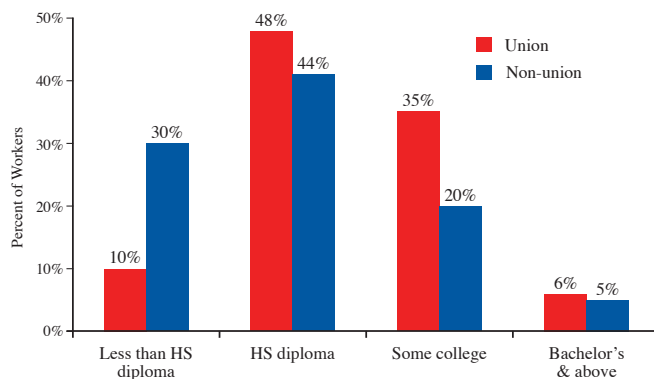
### CPWR Data Center Projects

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

#### The Construction Chart Book: 5th Edition

The Data Center has been working steadily to provide an update of CPWR's flagship publication, *The Construction Chart Book*. The fifth edition of this go-to reference for all construction stakeholders marks the 15th year since it was first published in 1997. While this edition continues to update statistics on topics covered in previous editions, it delves into emerging issues within the construction industry, such as green construction, and explores topics

**30b. Distribution of educational attainment among construction workers, by union status, 2010 (Production workers)**



One of more than 200 charts that will appear in the fifth edition of *The Construction Chart Book*.

such as the aging workforce and displaced workers. In addition, several datasets are added to the analyses, including the Green Goods and Services Survey, Occupational Information Network, Health and Retirement Study, Occupational Supplement to the National Health Interview Survey, and others.

#### Findings from Studies of Aging Construction Workforce

The program year began with a remarkable announcement by the American Public Health Association (APHA) News Release: "Nearly all construction workers will experience one or more work-related injuries or illnesses over a lifetime plus a greater risk of premature death." The finding has attracted

a wide range of attention from the media (such as U.S. News) and general public after lead researcher, Sue Dong, delivered her presentation.

In another major study based on longitudinal analysis, Dong and her colleagues found that nearly 40% of construction workers over the age of 50 suffered from persistent back pain or problems. Longest-held jobs in construction, high physical exertion, and job stress significantly increased the odds of back disorders. The findings were published in the *International Journal of Occupational and Environmental Health* (2012 Apr-Jun;18(2):99-109).

Dong and her colleagues also found that lack of health insurance is common among older construction workers before they are eligible for Medicare. Healthcare utilization significantly increased among uninsured workers after they were eligible for Medicare, suggesting that lack of insurance may delay needed healthcare among older construction workers. The findings were presented at the 2012 APHA Annual Meeting.

#### Safety and Health Disparities during the Economic Downturn

CPWR's study of safety and health disparities has embraced numerous demographic groups, but none receives as much attention as our examination of the Hispanic workforce. In past years, CPWR has documented the rapid growth of Hispanic participation in the construction labor force and identified worrisome trends. However, the recent downturn in construction markets points to a new storyline in the data: fewer Hispanics emigrating to seek work in the U.S. construction industry. For the first time in decades, the Hispanic share of the construction workforce has stopped climbing.

The Data Center also examined health insurance coverage and healthcare utilization among Hispanic construction workers during the economic downturn. Results suggest that healthcare disparities in construction remain and even continue to grow. The findings were presented at the 2012 Summit on the Science of Eliminating Health Disparities.

#### Emerging Issue: Green Construction

This project responds to the emerging priority to make green jobs safe in the construction industry by developing measures to define and track the effects of green jobs on construction worker safety and health. Green and sustainable construction practices and projects have increased dramatically in the last decade. The value of green building construction starts increased 50% from 2008 to 2010 alone. In 2010, almost 7% of construction jobs were green — more than three times the rate of 2.1% for all industries combined. By 2011, 71% of construction establishments were involved in green technologies and practices in some way. The findings were presented at the APHA Annual Meeting, and the statistics will be summarized in the fifth edition of the Chart Book.

#### New Fatality Map: A Grim but Needed Guide to America's Construction Fatalities

The fatality map was another major highlight of CPWR's construction safety and health tracking activity. The initiative is housed on CPWR's Stop Construction Falls website where it helps users grasp the vast toll construction falls take on workers' lives.

Using a combination of OSHA inspection data and mass media reporting, the map is a graphic representation of construction fatalities in the U.S. By clicking on the pinpoint, visitors can locate where a construction worker lost his or her life on the job, and learn how the incident happened and how the information was gathered.

## RESULTS

- The CPWR Construction Chart Book continues to be a go-to resource on construction safety and health. A Google search yielded more than 20,000 results for “The Construction Chart Book” as of 8/31/2012. In addition, more than 46,000 page-views were counted through [www.cpwr.com](http://www.cpwr.com) and [www.elcosh.org](http://www.elcosh.org). Users are from all walks of life, both domestic and international.
- The Fatality Map, housed at [www.stopconstructionfalls.com](http://www.stopconstructionfalls.com), proved to be one of CPWR’s most popular online offerings. By the end of October, the website attracted 127,707 page views, inclusive of 15,607 unique visitors since it was launched.
- Researchers presented findings at the APHA Annual Meeting, National Occupational Injury Research Symposium, the CPWR Research Consortium Conference, InterConstruct: Virtual Conference, and the Summit on the Science of Eliminating Health Disparities.
- Two articles were published in the *International Journal of Occupational and Environmental Health* and *Human Factors*. An upcoming article is in press for the *Journal of Safety Research*.

## Growing Numbers Turn to *Construction Solutions* for Construction Solutions

### Construction Solutions Database

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

**T**he CPWR Construction Solutions database was designed as an easy-to-use online tool for construction firms seeking ready-to-use answers to their health and safety questions and control options to address task-related hazards. This storehouse of information contains analyses of hundreds of common workplace hazards, from accidents waiting to happen to poorly designed equipment. For each hazard, the database offers one or more effective solutions, from alternative work techniques to commercially available tools.

In the past year the team has added dozens of new solutions and hazard analyses to the database and linked the solutions to appropriate items in the renovated eLCOSH (see Page 22). 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

Four of the 32 new solutions to construction hazards posted on Construction Solutions.



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!

## RESULTS

- The team enriched the database with nine new hazard analyses, 32 new solutions and two new technology examples for the ROI calculator.
- The team promoted Construction Solutions with two webinars and multiple 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.

## How Can We Make Stud Welding Safer?

### Ergonomics and Welding Fumes Exposure

Lead Researcher: Nathan Fethke, PhD  
University of Iowa

**I**ronworkers welding floor-level studs may be hunched over at almost a right angle for 20 minutes or more at a time, putting terrible stresses on the lower back and exposing them to inhalation of dangerous levels of toxic fumes. With thousands of workers engaged in this grueling task while erecting bridges or buildings, Nate Fethke and his team are exploring an engineering solution.

In a pilot study, Fethke’s team measured workers’ posture and muscle effort using this conventional approach and compared the results with an alternative system. The system includes a mobile cart to hold the arc welder, allowing workers to weld from an upright position, reducing back strain and possibly fume inhalation. Researchers confirmed that the system offered relief to workers’ backs but increased demands on their shoulder muscles, and a full-scale study is underway.

The cart's manufacturer has relied on the findings of the pilot study to inform important design modifications during the past year. A preliminary laboratory-based examination suggested that new features of the mobile cart may reduce low back and shoulder muscle activity levels between 12% and 60% when compared to the system as tested during the pilot study.

The project has also entailed evaluation of another new technology in industrial hygiene: a portable, handheld instrument capable of measuring personal exposure to hazardous fume particles in real time — particles smaller than those detected by conventional field instruments. In extensive controlled testing, the team compared results from the new device with results gathered by laboratory-quality instruments. The new instrument's performance was validated, adding an important tool to the arsenal of industrial hygienists studying exposures to all manner of fumes, aerosols, and nanoparticles.

## RESULTS

- The research team tested and validated a new handheld industrial hygiene device — the DiSCmini — for measuring weld fume exposures in real time.
- Manufacturer New Rule Products used preliminary findings to modify its ergonomically designed welding cart, considerably reducing back and shoulder stresses.
- Researchers presented findings in two seminars and one poster presentation.

## Immigrant Day Laborers Act for Safety on Residential Construction Sites

### Evaluating the Efficacy of Safety Liaisons and Worker Training

Lead Researcher: Michele Ochsner, PhD  
Rutgers University

Over the past year, the team at Rutgers Occupational Training and Education Consortium (OTEC) and New Labor worked to build leadership skills and expand the visibility of their Latino day labor safety liaison network. Project safety liaisons have recruited more than 90 Latino workers and residential subcontractors to a series of two-day OSHA-10 classes and partnered with worker centers in Asbury Park, N.J., and in Queens, N.Y., to expand their reach. In this process they have developed a database of more than 150 Latino construction workers interested in future health and safety activities.

In June, four new day laborers joined eight continuing Latino safety liaisons for an intensive four-day training retreat addressing how to use a safety checklist to monitor worksite conditions, educate their peers on health and safety issues, and communicate with co-workers and supervi-



Typical New Jersey residential construction conditions faced by safety liaisons as recorded by project staff. Intervention can save the lives of workers at risk of a fatal fall.

sors about safer work practices on residential construction worksites, with experienced liaisons mentoring the newcomers.

The liaisons continue to meet bi-weekly as a “consejo” or “worker council” to strategize with project staff, plan outreach and recruitment efforts, deepen their knowledge of health and safety, and meet with other workers from the community to discuss cases in which employers violate worker rights. Surveys of the program's OSHA-10 participants make the risky working conditions of Latino residential construction workers abundantly clear, with large numbers indicating exposure to ergonomic, safety and chemical hazards (see table).



## Frequency of Self-Reported Hazardous Exposures (previous 6 months) among 117 Latino Construction Laborers Attending OSHA-10 Training in New Jersey, 2010-12

HAZARDOUS EXPOSURES	OFTEN	ONCE & A FEW TIMES		NEVER
Noise so loud you have to shout to be understood	28%	59%		13%
Operating power tools	57%	37%		6%
Potential for falling objects from above	6%	64%		30%
Heavy equipment operating nearby	12%	51%		37%
Heights of 2 meters (6ft.) or higher	47%	47%		5%
Trenches more than 4ft. Deep	9%	50%		41%
Working close to exposed wires/electrical hazards	18%	54%		27%
Breathing concrete, brick, or stone dust	54%	42%		4%
Working in enclosed space breathing diesel or gasoline fumes	15%	51%		34%
Exposed to debris/dust from lead paint	29%	48%		23%
Using adhesives, solvents, or cleaning chemicals	24%	47%		29%
Lifting/carrying loads of 40 lbs or more	62%	36%		2%

Source: Rutgers Occupational Training and Education Consortium, UMDNJ School of Public Health, and New Labor, [marshaeli@umdnj.edu](mailto:marshaeli@umdnj.edu)

Interviews with liaisons, however, demonstrate that these safety leaders are learning to intervene and solve problems on job sites. Some can be dramatic and lifesaving, as when a liaison urged a worker to get out of an unshored trench with 10-foot walls – which collapsed minutes later. In three cases, employers proved so resistant that liaisons had to file safety complaints with OSHA Region 2 offices. Two of these resulted in investigations and one in an assessed penalty.

But most problems can be solved short of legal action, and most interventions are less dramatic. “I started to communicate with my boss about the importance of hard hats and safety glasses,” said a liaison. Now, “[the boss] has forced everyone to use them for the past year and a half.” While such actions may seem routine, the day-to-day changes in safety culture brought to the job site by trained liaisons may hold the most promise for long-term safety and health improvements affecting vulnerable day laborers.

## RESULTS

- The team presented findings presented at six national or regional conferences and in a journal article published in *New Solutions*.
- Trainers administered three OSHA-10 classes for 87 Latino laborers and three contractors.
- OTEC and New Labor partners recruited and trained four new safety liaisons.
- Safety liaisons eliminated hazards on multiple residential construction sites, in interventions ranging from consultations with contractors and workers about airborne dust control and hard hat use to OSHA complaints resulting in two investigations and one assessed penalty.

## Is Polyurethane Spray-Foam Insulation a Problem for Workers?

### Assessment and Prevention of Isocyanate Exposures in the Construction Industry

Lead Researcher: Carrie Redlich, MD, MPH  
Yale University

**S**pray-foam insulation can seal a building like nothing else. It can be a great benefit to homeowners seeking to save on energy bills, but how safe is it for the workers who apply it?

Dr. Carrie Redlich is taking a close look at this question.

Applying this airtight insulation is a component of many “green” construction and renovation programs, but the major 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.



Proper protection from isocyanates in spray-foam insulation can prevent work-related asthma.

The team's surveillance has 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. This is no small matter, because workers who contract asthma from this exposure may not fully recover. While their symptoms may diminish as they leave insulation work, their asthma may persist, and they may also respond to dusts, particulates, fumes, and cold weather, making employment in other segments of the construction industry difficult.

Based on these findings, Redlich and her team are developing an intervention program in collaboration with several of the larger spray-foam insulation firms in the area. Researchers will be assessing the intervention and will report results in future years.

## RESULTS

- Findings presented to audiences at union halls and contractor events and at one national conference.
- 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.

## Keeping Frame Carpenters from Getting Nailed

### Prevention of Nail Gun Injuries in Residential Construction

Lead Researcher: Hester Lipscomb, PhD  
Duke University

The nail gun research team has clearly documented the hazards of the contact trip framing nail gun, or “bump gun,” as well as the dangers of assuming an easy-to-operate tool can be used safely by untrained users. Their early work with the Carpenters District Council of Greater St. Louis documented a substantial risk of injury among residential carpenters, with the risk of injury twice as high among users of tools with a contact trigger than with a sequential trigger. (A sequential trigger requires that the nose of the gun be depressed before the trigger is pulled in order to fire, preventing the common inadvertent firing of the contact gun.)

Data collected in 2012 show remarkable progress in the prevention of acute injuries as more carpenters are being provided tools with sequential triggers in the Midwest; 40% of apprentices reported working for contractors that now require the use of the safer sequential trigger.

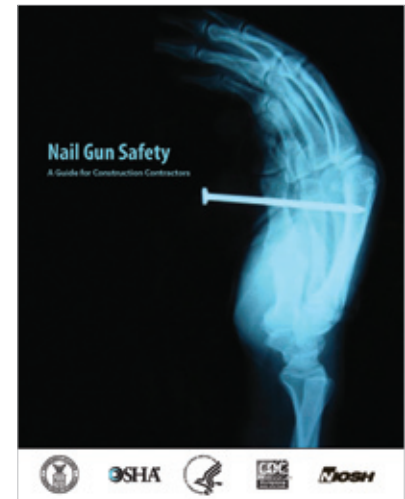
Seventy-three percent (73%) of apprentice carpenters who were surveyed reported some access to tools with sequential triggers while 62% continue to have access to tools with contact triggers. Now 88% of these apprentices are receiving training early in their career prior to sustaining

injuries. As expected based on the injury epidemiology that has been well documented by this research team, acute injury rates continue to decline in the Midwest with increasing use of tools with the safer trigger and training. Injury rates in 2012 (based on estimates of actual hours of tool use) were 71% less than they were in 2005.

Through a partnership with investigators at WVU, the team is trying to focus efforts on non-union builders/framers in that state. Preliminary data from builders in West Virginia show markedly higher injury rates among those surveyed than currently seen in Midwest. The finding demonstrates the need to find ways to engage this group even though reaching the workforce in residential construction remains challenging. A train-the-trainer program has been developed using a number of the tools, including the website [www.nailgunfacts.org](http://www.nailgunfacts.org), an employer guidance document jointly published by NIOSH and OSHA, and a CPWR Hazard Alert pocket card.

Recent surveillance efforts among St. Louis carpenters have focused on identifying and monitoring risk for work-related musculoskeletal disease (WMSD). It appears that concerns that sequential triggers contribute to increased WMSDs are unwarranted: musculoskeletal problems are no more severe for users of sequential triggers than contact trip triggers.

The project team continues to reach out to numerous audiences, including contractors, unions, government safety and health officials, workers' compensation insurance carriers, attorneys, and policymakers at



Dr. Lipscomb's work provided the basis for the OSHA-NIOSH employer guide to nail gun safety, now in English and Spanish.



**[www.nailgunfacts.org](http://www.nailgunfacts.org)**

The informative site receives approximately 60 visits a day from 30 nations on five continents.

the federal level. Efforts to more widely spread the word about control measures for this injury risk have been helped by the recent Spanish translation of the NIOSH/OSHA guidance document, “Nail Gun Safety: A Guide for Construction Contractors.”

The team continues to strive for policy-level influence through collaboration with OSHA and NIOSH, outreach to the Consumer Products Safety Commission (CPSC), and legal consultations, as well as their longstanding conversations with tool manufacturers, urging them to limit production of framing nail guns to those with the safer sequential trip trigger.

## RESULTS

■ **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.**

■ **www.nailgunfacts.org – the team’s repository for news and information on nail gun injuries and safety – receives 60 visits per day from more than 30 different countries on five continents. The site offers materials for workers, contractors, academics and people with occupational safety interests. As much as 2GB of data were downloaded in a given month.**

■ **Working with CPWR, the team has created and begun distribution of an eye-catching new Hazard Alert cards on Nail Guns for use in toolbox talks and safety meetings.**

■ **NIOSH and OSHA have released a Spanish-language version of their widely circulated nail gun guidance document informed by the team’s research.**

■ **Working with OSHA and NIOSH partners, Dr. Lipscomb has led webinars for American Society of Safety Engineers and *Occupational Health & Safety Magazine* audiences.**

■ **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.**

## Keeping Workers from Getting Floored by WMSDs

### Participatory Ergonomics Seeks Solutions for Work-related Musculoskeletal Disorders

Lead Researcher: Laura Welch, MD, CPWR

**E**very year, tens of thousands of construction workers suffer sprains, strains and cumulative stress/repetitive motion musculoskeletal problems that cost days off work. An even greater number of workers endure chronic pain without taking a day off – too often, earning their weekly paycheck by enduring permanent physical damage. Identifying the characteristic tasks of each trade most punishing for the human body, and proposing alternatives, can’t be done in the lab alone. It’s best achieved through participatory ergonomics that relies on the

insights of workers and contractors in the field to identify problems and seek practical solutions.

In 2012, investigators at Washington University in St. Louis worked with a group of flooring contractors whose employees belong to the St. Louis-area District Council of Carpenters. Using Multimedia-Video Task Analysis software, the team analyzed 45 videos of 32 floor layers at work to determine the time in task, forces, postures, and repetitive hand movements entailed in the installation of four common flooring materials. The results indicated high exposures to stress and strain in multiple body parts. Prolonged and potentially hazardous kneeling positions, poor neck and low back postures, and repeated stressful hand grip forces merited special concern. Analysis of medical claims data confirmed what the task analysis suggested: not just knee injuries but back, shoulder and hand stresses are important problems of the trade. Next, researchers tested workers’ knowledge and attitudes about ergonomic safety.

For the participatory intervention program, researchers conducted a training program with floor layers in ergonomic principles and then held group problem-solving sessions to identify tools and equipment that could reduce stresses to the body.

While workers had a high average (86%) for post-training knowledge, 82% of workers preferred the truly participatory nature of group problem solving over training. The group sessions created numerous solutions: use of an extended handle on a spray could reduce back bends and low back discomfort when applying spray sealant to a floor, and wrist discomfort could be reduced by an electric carpet puller when pulling carpet glued to the floor.

Later, researchers visited job sites to find out how successfully workers integrated the techniques into their day-to-day work, leading to unexpected discoveries: researchers found that a useful and popular tool was sitting unused at one work site while floor layers toiled elsewhere using the old, stressful methods. This sobering exercise highlighted many of the practical obstacles that can hinder occupational health interventions in the complex construction environment and yielded important findings to improve the program. Additional follow-up and study will include comparing a worker’s willingness to change with their ability to identify – and comply – with solutions. Researchers will also conduct a follow-up health status and report on physical exposures workers face.

## RESULTS

■ **Workers identified 92 solutions to reduce strains of problematic floor laying tasks.**

■ **Researchers developed and administered both a training program and a format for holding group problem-solving sessions to reduce exposures leading to WMSDs.**

82% of workers preferred the truly participatory nature of group problem-solving over training.



- The research team tested ergonomic benefits of a variety of tools available here and abroad, publicizing tool-based solutions for floor layers locally and in national presentations.
- The Carpenters' District Council – partly as a result of the team's work – has incorporated ergonomics as a component of annual safety training for carpenters and floor layers.
- The team presented findings at eight academic conferences and in an article published in *Work: A Journal of Prevention*.

## Naming the Culprits of Noise, Walling off Dust

### Partnering to Prevent Exposure to Silica, Dust and Noise in Construction and Demolition

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

**R**oad and bridge construction and “knockdown” building demolition are often accompanied by dangerous levels of dust and noise. Breaking up large volumes of concrete and masonry usually means a construction site thick with jackhammers, compressors, heavy equipment – and clouds of dust. Can we protect the laborers employed on these sites from inhaling airborne silica dust and from a continuous exposure to loud equipment, leading to hearing loss? Dr. Susan Woskie, Dr. Susan Shepherd and students at the University of Massachusetts at Lowell



Silica dust and noise are a given on road construction and demolition sites. Dr. Woskie and her team seek protections through research.

are working with concrete and demolition contractors, laborers represented by the Laborers' District Council and others toward that aim.

One highlight of the past year's work was the design and testing of an “air curtain” dust control specially designed for use on bridge and overpass jobs. Air curtains, which create a wall of airflow, are routinely used by warehouses and large retail establishments to prevent loss of heat or air conditioning through building openings. This one is deployed to remove the dust created by chipping concrete during bridge substructure repair from the breathing zone of the workers. To assist in improving the design of the air curtain, a contractor partner has loaned a large commercial air compressor to the team for use in the laboratory where modifications suggested by site personnel can be tested to see if sufficient airflow can be maintained. The modified versions can then be brought back onto the work site for further evaluation.

Noise presents special challenges. Construction workers suffer epidemic levels of hearing loss. The team has evaluated the noise generated by powered hand tools and auxiliary equipment in construction and has identified some major culprits, like leaking air hoses. However, much of the noise is generated not by the tools themselves but their contact with the work surface – a much greater challenge to developing effective engineering controls.

## RESULTS

- In cooperation with a partner contractor, the UMass Lowell researchers have built and tested a dust control intervention (air curtain) specifically for bridge sub-structure chipping work. Focusing on the continued improvement of the dust control equipment has increased worker participation in protecting their own health and boosted their awareness of what they can do on the job to control dust exposures.
- Researchers presented findings at one national conference and paper on gas-powered saw dust control was accepted for publication.

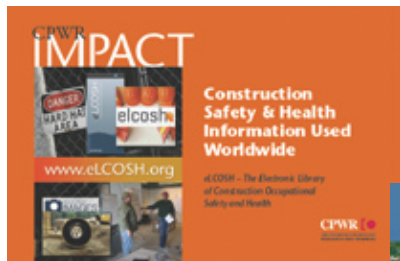
## r2p: “Research to Practice”

Lead Researcher: Robin Baker, MPH  
CPWR, University of California – Berkeley

### Partnerships Lead to Progress

**T**urning promising research findings into practical safety and health action is an ongoing challenge. Partnerships that bring together researchers, contractors, labor and government regulators are one way to make this happen.

To help inform the development and coordination of new partnerships, the r2p team completed an in-depth case study of one of the early and most successful examples of a construction safety and health partnership. The Asphalt Partnership brought together road builders, equipment manufacturers and labor organizations to craft effective engineering solutions that protect workers from unhealthy fume exposures.



Highly successful research projects were profiled in nine Impact cards, each detailing "What made this project a success."

The new Masonry r2p Partnership focused on collecting and getting information on its safety and health priorities into the hands of workers and contractors and began to see important results this year. For example, a follow-up poll of workers to get more information on the use of hand-tools and hearing protection found that 42% of those surveyed "always" use hearing protection, an improvement from only 30% in the partnership's baseline survey.

Perhaps the most high-profile partnership of the year was the national Fall Prevention Campaign launched on Workers' Memorial Day (April 28, 2012) by the NORA (National Occupational Research Agenda) Construction Sector Council. This campaign is a joint effort by OSHA, NIOSH, CPWR, and a host of labor, community and business organizations to fight the number one killer of U.S. construction workers: falls from scaffolds, rooftops and ladders. The r2p team helped develop and launch the

campaign's official website, and is leading the effort to evaluate the campaign's progress and learn about the use of social marketing to promote construction health and safety.

Building on the campaign's efforts, the r2p team launched two new local partnership efforts for fall prevention aimed at identifying winning strategies to get to hard-to-reach small contractors and their Spanish-speaking employees and influence fall prevention practices.

### Taking Action on Completed Research

The new "triage tool" developed by the r2p team streamlined the identification of cross-cutting topics, challenges, dissemination channels, and research ready for further dissemination. Based on this review and with input from our r2p Working Group with NIOSH and OSHA, three high-priority dissemination projects were undertaken: 1) to get the word out on the safe







use of nail guns (see Page 16), 2) to facilitate getting new safety technologies to market, and 3) to prevent exposure to dangerous levels of silica dust. In addition, an outreach database called CONDOR was created.

Three additional follow-up projects were also recently launched by the r2p Working Group: defining and influencing safety culture and safety climate; identifying opportunities to build information exchange networks with vocational and technical training programs; and working with the residential sector to find new effective communications approaches and dissemination research opportunities.

In addition, the review of research turned up numerous examples of the need for translational products that explain results in clear, accessible language. Providing construction audiences with ready online access to research findings and safety and health tools is one way to do this at low cost. The r2p program is sharing stories through a new presence on the CPWR website, but that's only the beginning.... Other online resources include:

**Plan, Provide, Train.** That's the bottom line of [www.stopconstructionfalls.com](http://www.stopconstructionfalls.com), the home base of the NORA falls campaign. This website is being used to build awareness, share information and resources on fall protection, and recruit new stakeholders to join the cause.

**Work Safely With Silica!** [www.silica-safe.org](http://www.silica-safe.org), is designed as a one-stop resource for contractors, workers and other stakeholders. The website features information and tools to identify silica hazards, understand the health risk, and find suitable equipment and methods to control the dust. It even includes an e-tool for creating a job-specific plan for controlling silica exposures.

The content of the **Mast Climber website** ([www.cpwr.com/mastclimbers.html](http://www.cpwr.com/mastclimbers.html)), developed in Year One as a Masonry r2p Partnership initiative, continues to expand in terms of content and reach to trainers and other stakeholders.

### From Invention to Intervention: Tech Transfer

People say that if you build a better mousetrap the world will beat a path to your door, but innovators in health and safety technology have found that it's not quite so simple. In May, CPWR brought together representatives from academia, government, manufacturing, contractor associations, labor, and the insurance industry to identify barriers, challenges, and strategic approaches to move occupational health technologies from the lab to the workplace. The Best Practices for Health and Safety Technology Transfer in Construction Symposium featured seven panelists who have faced this challenge and asked them to share what they learned.

One of the panelists, Dr. David Rempel, discussed the pathway to getting an inverted drill press, designed to reduce injuries due to overhead work and reduce dust exposure into production. Panelists agreed that productivity is paramount in the highly competitive construction sector and that it's often difficult for contractors to measure the economic value of health and safety improvements. Tools that support technology transfer, and a library of successful examples, can help.

### CONDOR Takes Flight

An early r2p Work Group initiative resulted in CONDOR, the CPWR, OSHA and NIOSH Database Outreach Resource. This outreach database contains postal, telephone and/or email contact information for nearly 3,500 academic, government, industry, labor, and media figures, and can be searched and sorted by over a dozen categories. The database makes it possible to engage in targeted appeals and dissemination to those interested in construction safety and health. For example:

CPWR sent an email to almost 2,000 construction industry leaders to unveil the [www.stopconstructionfalls.com](http://www.stopconstructionfalls.com) website in conjunction with the launch of the falls campaign.

OSHA made one-on-one telephone calls and sent emails to promote a new pocket guide on noise hazards in construction.

NIOSH conducted personalized outreach to labor, industry, occupational health, and media contacts to get the word out on the Spanish-language version of the Guide to Nail Gun Safety.

CPWR sent a targeted mailing to 400 industry and labor contacts when it released a new Hazard Alert card detailing the dangers of working in trenches.



## RESULTS

- r2p findings were presented at four national or international conferences and published in two CPWR reports.
- Several new tools and resources were developed and posted on the new r2p web pages, including a research “triage” checklist to assess dissemination gaps and priorities and a series of CPWR Impact Cards that highlight stories of research making a difference.
- CPWR created two one-stop web resources on major construction hazards: [www.stopconstructionfalls.com](http://www.stopconstructionfalls.com), [www.silica-safe.org](http://www.silica-safe.org), and continued to develop the mast climber website.
- The team created CONDOR, an outreach database containing nearly 3,500 industry leaders interested in construction health and safety issues.

## Taking the Load Off Bay Area Laborers and Electricians

### Universal Drill Jig Adapted for Large Hammer and Rock Drills

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

**D**owel and rod drilling typically involves drilling holes about 1 inch in diameter 1 to 2 feet deep into concrete in order to epoxy in rebar for structural upgrades. When done manually with 30-lb pneumatic rock drills, it's noisy, dusty and physically exhausting work.

Dr. David Rempel and senior development engineer Alan Barr, both of the Division of Occupational Medicine within the University of California San Francisco and the Ergonomics Lab at UC Berkeley, have continued development of their Universal Drill Jig, a tool that eases the strains and stresses this task imposes on a worker's body.

In 2012 the UCSF team tested different versions of the Universal Drill Jig on construction sites in the Bay Area, receiving feedback from workers and contractors leading to important improvements:

- A new universal saddle readily accepts very large electric hammer drills and pneumatic rock hammers.
- The remote on-off switch is more reliable and easier to use.
- A new disc brake and caliper allows the drilling arm to be set to any drilling angle, without cumbersome removal and resetting of bolts.

Proven Management, a Bay Area contractor, is currently using the jig to perform a seismic retrofit on the BART towers in Walnut Creek, Calif. The work involves multi-hole drilling on all faces of the towers. The surfaces are vertical, overhead, and at 45 degrees, and the new device is capable of drilling at all of these angles (see photo). All of the laborers preferred the new way of drilling.

Besides rod and dowel work, the Universal Drill Jig has been used extensively for overhead tasks, drilling holes and setting anchors to mount



The Universal Drill Jig performed miles of overhead drilling, enabling the company to finish the project well ahead of schedule.

ducts or conduit. At the request of Shimmick Construction, the research team developed a jig design that supported two drills on top of the column; use of the jig enabled the company to perform miles of overhead drilling and finished the project well ahead of schedule. On a subsequent project, Shimmick requested a variation accommodating four drills at once in order to drill holes to secure custom designed four-hole brackets. The added weight required addition of a pneumatic piston – effectively reducing the load on the worker to zero. Some of the electricians were initially skeptical about the value of the Universal Jig, but at the end of a day of use they were completely converted.

## RESULTS

- 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 10 jigs to use on seven commercial construction sites, including a seismic retrofit of the BART towers.

- **New overhead drill jig heads allow the option of drilling two or four holes simultaneously – one contractor successfully used the dual drill jig to install miles of electrical conduit in half the expected time.**
- **The team added a pneumatic piston to the column of the overhead drill for lifting the four-drill set, reducing load on the worker to zero.**
- **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*.**

## Visualizing Safety: Creating Materials with Impact

### Dissemination/Communication

Lead Researcher: Mary Watters, MFA, CPWR

Is a picture worth a thousand words? Maybe so, given the overwhelming user response to CPWR's renovated, photo-driven Hazard Alert cards. The year saw an extreme makeover for six of the blue pocket cards based on the best occupational and health communications research, combining eye-catching images, reduced text – tested for clarity using the CDC-approved Gunning-Fog and Fleisch-Kincaid indices – and

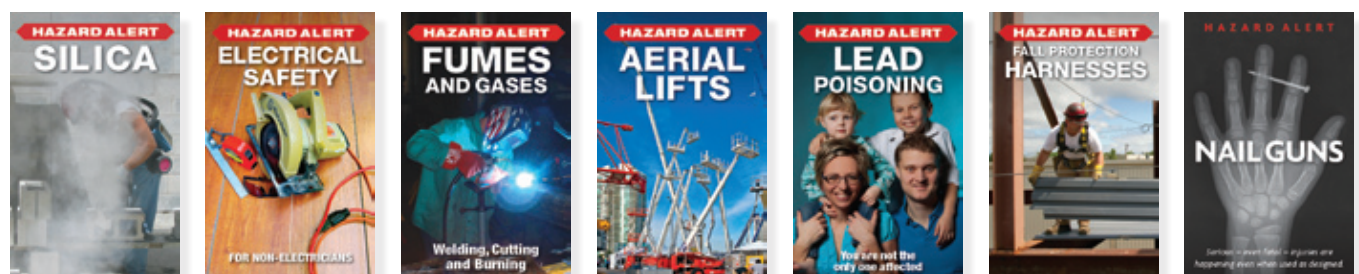
reviewed for accuracy by subject matter experts. The result? Demand for the cards was 20 times greater than in the previous year.

Another high-profile CPWR product undergoing a major redesign was eLCOSH, the electronic Library of Construction Occupational Safety and Health. CPWR's most popular product, this repository of roughly 2,000 occupational safety and health documents, videos and images draws nearly 40,000 visitors every month – but relatively few relied on the site's home page and search options to find what they needed. Working with current eLCOSH users as well as workers and trainers unfamiliar with eLCOSH, CPWR greatly improved the search filters' efficiency. Consequently, use of the eLCOSH search functions has nearly doubled since the October 2012 rollout.

Our new electronic publication, the CPWR UPDATE, has rapidly become a critical source of information for opinion leaders in construction occupational safety and health. Distributed monthly to more than 2,000 recipients in business, academia, government, labor and the media, the UPDATE keeps key stakeholders abreast of major findings and new CPWR publications and products. The UPDATE has also become a go-to source for the trade press, with stories frequently appearing in industry magazines and in dozens of electronic newsletters. At least 26 stories published in the trade press can be traced to the UPDATE since its September 2011 debut. CPWR research



Brief, image-driven Hazard Alert cards provide simple, direct messages for protection against safety and health hazards and make an excellent handout for toolbox talks.



on lifetime risks for construction workers earned substantial media attention as well. Overall, it was a banner year for CPWR in the industry press, with 48 documented appearances in trade outlets – triple the number identified in the prior year.

Other projects: a new product, CPWR Impact cards, showcased research from our consortium (see Page 19). CPWR wrote, designed and produced nine folding cards and devised a two-page PDF to display the information online. In addition, the Department created a new format for “key findings” from CPWR Small Study Reports and peer-reviewed journal articles published by CPWR researchers. CPWR Key Findings are posted on [www.cpw.com](http://www.cpw.com).



## RESULTS

- **With the production of the photo-driven Hazard Alert cards, demand skyrocketed. External requests jumped from three individuals in the previous program year to more than 60 in the current year. While more than 1,000 Hazard Alert cards were distributed in program year 2011, CPWR distributed 22,808 in the current program year.**
- **CPWR UPDATE subscribers have climbed from the base of 1,277 contacts to 2,024 a year later – a net 58% increase.**
- **The eLCOSH redesign was only one month old but it significantly boosted use of the search functions. In November 2012, unique visitors to the eLCOSH home page increased by nearly 50% and visits to eLCOSH that began on the home page nearly doubled.**
- **The eLCOSH site received 556,275 visits in the program year 2011-2012.**
- **In the past program year, 46 trade press outlets and 41 e-newsletters relayed CPWR news and research to a wider industry audience, tripling the previous program year's output.**

## Workers Lead the Way to Improved Safety Performance

### Creating a Culture of Safety

Lead Researcher: John Rosecrance, PhD  
Colorado State University

**C**an construction workers learn the leadership skills they need to foster a culture of safety on the job? John Rosecrance thinks they not only can but must. Craft training enables workers to acquire the skills of their trade; Project LeAD (Leadership, Assessment,

Development) seeks to make safety leadership a critical component of worker training.

Creating a culture for safety at work is one of the most effective means of promoting a healthy and productive workplace for everyone. However, safety culture doesn't develop overnight; it develops through a process of interactions between employees and management. To enhance the culture of safety among construction organizations, it is important that leaders communicate safety values.

Leaders create culture by exemplifying their expectations on the worksite – if your leader wears a hard hat, so will you. If your leader talks about near misses, so will you. The purpose of this project is to provide current and future construction leaders with the non-technical leadership and initiative skills to create and sustain a positive safety culture on jobsites throughout the country.

2012 witnessed the pilot testing of the new LeAD curriculum by upper-level apprentices at three local unions affiliated with the United Association of Plumbers and Pipefitters (Locals 3 and 208 in Denver and Local 597 in Chicago). Based on participant evaluation, the program has been modified to include additional video exercises that present examples of typical safety challenges as a basis for group discussions. Plans are currently underway to offer the program to foremen at a Chicago-area mechanical contractor, then others in Portland, Ore.

Leaders create culture by exemplifying their expectations on the worksite – if your leader talks about near misses, so will you.

## RESULTS

- **The leadership development program created in previous years has been refined into a five-week program that includes an expanded library of video clips of safety scenarios, testimony from safety leaders, core skill development, and hands-on practice of leadership skills.**
- **Apprentices in Denver and Chicago participated in the leadership program and submitted feedback.**
- **The research team has partnered with contractors in other areas of the United States to administer the program to their workers in the coming year.**
- **Researchers presented findings at three academic conferences and published papers in *Epidemiologic Reviews* and the *American Journal of Industrial Medicine*.**



# Residential Fall Prevention

## Fall Prevention in Residential Construction

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

**F**alls remain the number one killer of construction workers on the job, accounting for all of the deaths of home framers in 2010. Falls are also responsible for many work-related accidents and much work-related disability among construction workers. After a long lull, new home starts are on the rise, and the team led by Bradley Evanoff and Vicki Kaskutas is helping protect workers re-entering the field from falls from heights and to keep them motivated to work safely throughout 2013.

Twenty construction foremen, two superintendents and two owners – drawn from three residential contracting companies in the metropolitan St. Louis area – participated in the team's fall prevention and safety communication training for foremen this year. Despite the steep downturn in new home starts, the team is on target to reach its goal of training 60 foremen. These foremen work in small groups to identify how to protect workers from falls during each phase of the homebuilding process. Crew leaders also learn how to communicate safe work methods to workers they direct, and use feedback to encourage positive safety behaviors on the job.

In June 2011, OSHA rescinded the interim fall protection guidelines for residential construction, putting residential construction under the general industry standard. As a result, conventional fall protection must be used at all times. The team's "fall protection loan project" gives home builders the opportunity to try fall protection equipment for several weeks to evaluate if it will meet their fall protection needs, enabling both firms

and crews to participate in the purchase decision. Contractor feedback, in turn, helps the research team understand the usability of the equipment and the diffusion of new safety technologies. With residential homebuilders required to adapt to OSHA's new requirements, this is a rapidly evolving area of study.

The team continues to monitor the efficacy of the revised fall prevention curriculum at the Carpenters' Joint Apprenticeship Program through annual surveys of 300 carpenter apprentice participants.

## RESULTS

- Foremen are requiring that their workers use personal fall arrest more often. After the training, 29% more of the foremen participants and 20% more of their crew report that personal fall arrest is used



Researchers devised a fall prevention curriculum with hands-on and classroom applications. Apprentices get the feel of a fall protection harness in a safe environment (above); an instructor shows worksite photos to gauge students' perceptions of fall risk.

always at work, and research auditor observed a 12% increase in personal fall arrest use.

- Foremen's safety communication has improved. They are giving daily toolbox talks more often (increased from 18% to 55%), engaging workers in discussions about high risk work tasks, and approaching workers to discuss and provide positive feedback on a more frequent basis.

- The apprentice training continues to have an impact, with a 32% increase in apprentices reporting that personal fall arrest is used at work.

- Contractors are trying new fall protection equipment; some are adopting the equipment for regular use.

- Researchers presented findings at one international conference, four national conferences, and a journal article in *Work: A Journal of Prevention, Assessment and Rehabilitation*.

# Small Grants Can Start Something Big

## Seed Money for Small Studies

**S**upporting initiatives with a budget under \$30,000, the CPWR Small Studies program provides seed money for pursuing promising ideas. Many major research projects – like Dr. Nate Fethke’s search for ergonomic interventions for stud welders – have begun with a small study to demonstrate their viability or test their approach. But others represent important stand-alone projects: a survey of 2004-2009 small study authors found that more than 60% had published their findings in peer-reviewed journals.

Notable 2012 Small Studies included:

- **Injury underreporting and behavior-based safety programs.** Duke University’s Hester Lipscomb’s survey of 1,020 carpenter apprentices in the Midwest documented the remarkable extent of injury underreporting in the building industry. Fewer than half of these workers surveyed reported that injuries were reported “always” or “most of the time” on their job sites. Fifteen percent of them knew of coworkers who sought medical care through their private insurance rather than filing a workers’ compensation claim. The apprentices’ comments – “if you get hurt and report it, you will be replaced” – reflected a widespread fear of reprisal. Most workers (58%) reported programs on their current job sites that disciplined workers who reported accidents or rewarded those who did not. Researchers found significant evidence that programs disciplining workers for accidents discouraged workers from reporting them in the first place. The study was published in the *American Journal of Industrial Medicine* and reported in the *BNA Occupational Safety and Health Reporter*.

**Do you see a problem that needs to be solved by research?**

**Have an idea to make job sites safer?**

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).

- **Evaluation of the Implementation and Impact of a Massachusetts Construction OHS Training Rule.** Since 2008, Massachusetts has required that all workers on publicly funded construction projects complete a U.S. Occupational Safety and Health Administration-approved 10-hour safety class known as the “OSHA-10” for construction. While several states now require the training, Massachusetts was the first state in 2008 to enact such a law. Dr. Cora Roelofs and her University of Massachusetts, Lowell-based research team interviewed 13 industry leaders and surveyed 100 construction workers to assess the measure’s impact on the industry. Worker surveys suggested a significant increase in OSHA-10 training following passage of the Massachusetts law. Nearly three quarters of industry workers were aware of the OSHA-10 requirement on public construction jobs, and a majority now believed that having OSHA-10 certification was helpful in finding work. Moreover, the 13 “key informants” representing contractors’ associations, labor organizations, health and safety professionals and government agencies gave the law positive reviews. It seems that construction contractors, far from considering the law a burdensome regulation, were sometimes carrying the requirement over to workers on private commercial construction projects.



To learn about Small Study grants, review the guidelines at [www.cpwr.com/smallstudies](http://www.cpwr.com/smallstudies).

## RESULTS

- 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 *Journal of Occupational and Environmental Medicine*.
- Three small studies were published as CPWR Reports.
- Articles based on Small Study findings appeared in *ENR Mountain States*, *Greensource*, *Architectural Digest*, *EHS Today*, and the *BNA Occupational Safety and Health Reporter*.

# CPWR PRODUCTS OF RESEARCH

CPWR research was the subject of or mentioned in 46 media stories and covered in 41 e-newsletters.

- 1** New Tool\*
- 3** Abstracts
- 5** Websites
- 5** Training Programs
- 6** Posters
- 8** Key Findings
- 8** New Hazard Alert cards
- 9** Tool Innovations\*\*
- 9** IMPACT cards
- 9** Video segments
- 9** Reports
- 13** CPWR Updates
- 19** Fliers and Handouts
- 26** Peer-reviewed Journal Articles
- 32** New Solutions to Hazards\*\*\*
- 65** Data Requests
- 76** Presentations

\*One new tool, but this Universal Drill Jig can be used for one drill or two drills used simultaneously. Tool will have two versions: powered drive and manual.

\*\*Modifying and improving existing tools or testing and validating a tool's use for another purpose.

\*\*\*Solutions to job/task hazards for Construction Solutions database.

elcosh

Electronic Library of Construction  
Occupational Safety & Health





If you're a construction worker in a training class, imagine the surprise when your instructor is an expert – and a construction worker. That's the kind of trainer CPWR relies on. Whether it's OSHA 10-hour safety training or specialized environmental hazards and confined space training shown below, our peer-led trainers speak with experience and authority.

# TRAINING



# 98%

## Graduation Rate

for Minority Worker Training program

WORKERS TRAINED – OSHA 10 OR OSHA 30

# 69,355

# 887

Outreach  
Instructors  
trained

“ The instructors seemed to have a very good understanding of the average construction worker and know what it’s like to go to work every day. ”

# 650

workers trained in  
**Disaster  
Response**

# 6,761

WORKERS TRAINED IN HAZARDOUS  
WASTE HANDLING AND ABATEMENT

## Hazardous Waste Worker Training: CPWR Helps Union Construction Workers Clean Up America

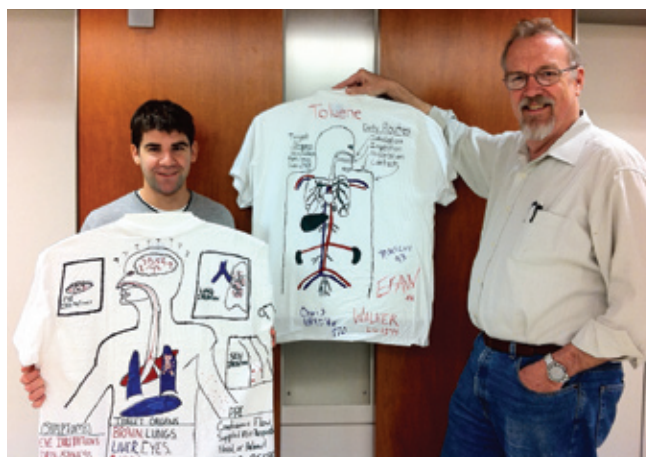
**C**PWR and our 11 Building Trades Union partners in the Construction Consortium for Hazardous Waste Training committed to train 5,216 workers across the United States in the course of the 2012 program year – then surpassed that target by 30%. In the process, some 6,761 workers, technicians and support staff learned how to protect themselves while working with hazardous materials. Some 4,500 were positioned for possible work in Department of Energy administered nuclear sites because of this training program, while more than 2,000 participated in training aimed at remediating Environmental Protection Agency (EPA) Superfund sites. At a time when our nation's workforce needed a boost, the training program brought new skills and job opportunities to these workers.

This year, the International Social Security Association's Construction Section invited Hazardous Waste Training Director Don Ellenberger to explain CPWR's network of worker-trainers to a global audience. Hundreds attending the prestigious international symposium on construction health and safety learned how CPWR taps an incomparable human resource by recruiting instructors from the ranks of experienced union tradesmen and tradeswomen. 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.

Of course, very few workers – or even foremen – can turn from tradesman to trainer in the blink of an eye. That's why CPWR relies on a corps of master instructors who administer "train-the-trainer" courses and mentor new instructors as they teach their first courses. Instructors continue to receive updated instructional materials and training enhancements from CPWR for years after their initial instructor training. The 417 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.

### RESULTS

- **6,761 workers trained in Hazardous Waste handling and abatement.**
- **417 courses offered.**
- **105,235 contact hours of instruction delivered.**



Director of Hazardous Waste Training Don Ellenberger (right) and CPWR staffer Miles Fisher with two t-shirts illustrating body systems showing a toxin's effect – all created by workers who could be exposed to these chemicals.

## The Visible Toxin

### T-Shirt Exercise Hits Home for Hazardous Waste Students

**A**re you old enough to remember "The Visible Body"? In those colorful anatomy books, you could flip transparent pages and look beneath the "skin" of the illustrated figures to view the organs beneath. CPWR's Hazardous Waste Training Consortium instructors use a similar exercise to make the dangers of toxic chemicals real to the workers who could be exposed to these chemicals at work.

After a short review of basic anatomy, students consult NIOSH pocket guides describing the potential hazards of a chemical substance and break into small groups. Each group is issued a blank white T-Shirt and a set of markers. Students are then directed to draw the vulnerable organs – noting

### What do the students say?

#### Comments submitted by students on course evaluations

"It was a great class. It opened my eyes to a lot of job-related problems."

"It's hard to focus on safety for 30 hours, but [Name of Instructor] makes it interesting."

"Best refresher in my 24 years."

"I am very excited to use this information in my daily activities! Thank you!"

"The instructors seemed to have a very good understanding of the average construction worker and know what it's like to go to work every day."



the potentially toxic effects and symptoms — on the shirts. When finished, one will display the shirt at the head of the class while other members of the group will explain possible points of entry for the hazardous substance, which human organs are affected (plus how and why), and what measures workers can use to keep safe.

“It’s one thing to try and tell people that a chemical like xylene can hurt them,” explained Don Gundrum, Training Coordinator for International Union of Painters and Allied Trades (IUPAT) District 53 in Charleston, W. Va.. “It’s a different thing to show them. That really makes an impression.” Moreover, he explains, by switching up the targeted chemicals the lesson can easily be customized to address the typical hazards of different trades. “I can have painters work out the effects of lead and solvents, but boilermakers might be more concerned about the manganese and hexavalent chromium in welding fumes — so that’s what they’ll learn about.”

## OSHA Training Programs and Disaster Response Program

### A Well-Kept Secret

It’s one of the best kept secrets in occupational safety and health: America’s largest peer-training network. Its members are drawn from the ranks of experienced construction workers in every trade and craft, teaching their brothers and sisters life-saving skills at hundreds of training centers, job sites and union halls across the country. And CPWR plays a vital role in making it all work.

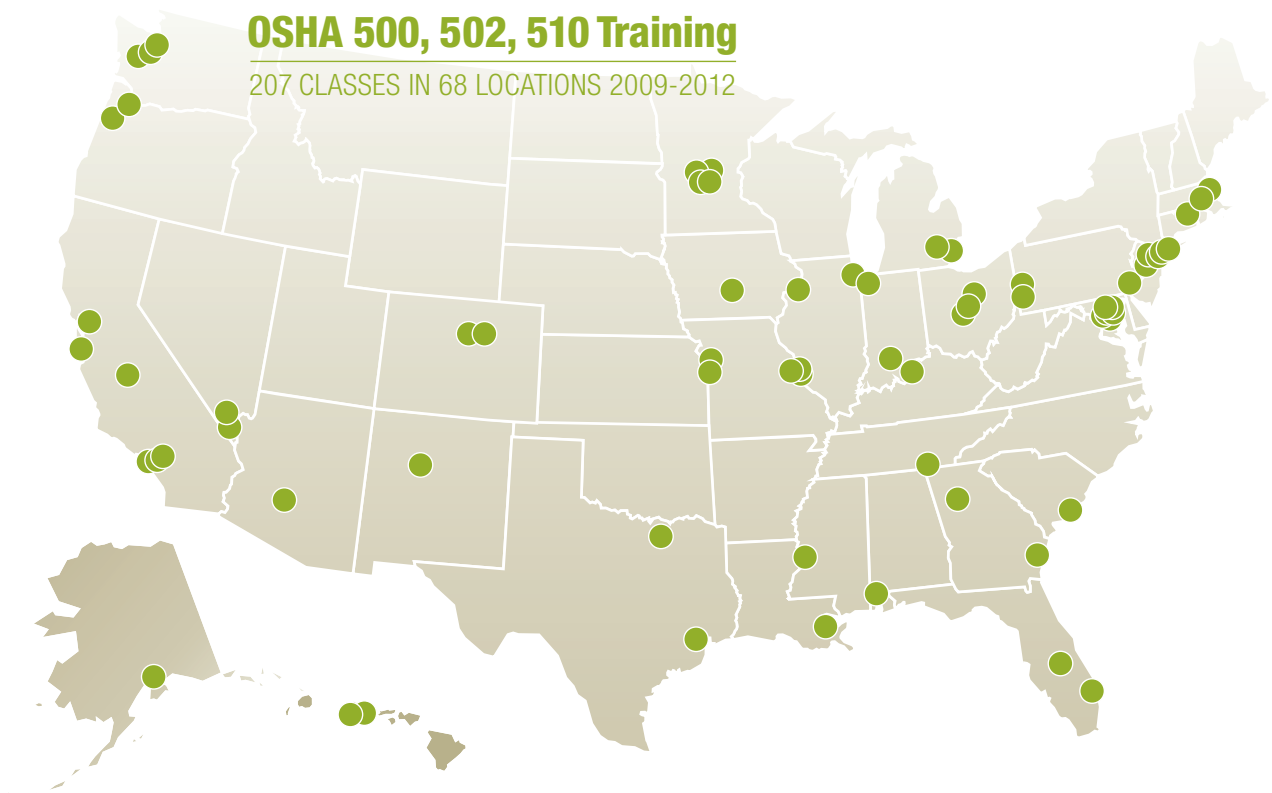
### How?

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 will teach hazard recognition to tens of thousands of their peers in every corner of the nation and industry.

### Demand Rebounds after the Downturn

Demand for CPWR-supported construction safety and health training is bouncing back toward historic levels after the lull caused by the Great Recession. OSHA Outreach training instructors conducted more than 5,400 OSHA 10- and OSHA 30-hour training classes in the 2012 program year, reaching nearly 70,000 students. These peer instructors working in state-of-the-art training facilities across the country spanning 11 construction trades impact the health and safety of thousands more workers as they carry the lessons learned in class to their worksites every day.

To keep this extensive network of outreach instructors fully staffed, CPWR’s 50 master trainers delivered 74 “Train the Trainer” level courses. These classes included not only the familiar Trainer Course in OSHA Standards for Construction (OSHA 500) and Update for Construction Industry Outreach Trainers (OSHA 502) but the outreach trainers’ prerequisite class, Occupational Safety and Health Standards for Construction (OSHA 510).



## Did you know?

A growing number of construction owners and general contractors see the value of OSHA-10 training, and they are requiring that everyone working on a job site under their control hold a card. Recently, Dr. Cora Roelofs interviewed Massachusetts building industry leaders about OSHA-10 after the state began requiring such training for those employed on state-owned construction projects (see Small Studies, Page 24). Most praised the program, and it appears that many large contractors had carried over the requirement to their privately owned construction work as well.

## eSmartMark

The world is changing. These days, people get their books, software, movies and music by downloading them – shouldn't they be able to get their training curriculum and materials the same way? In 2012 CPWR helped the Building Trades launch eSmartMark, an electronic distribution system for the Department's popular curriculum. During the last decade, hundreds of thou-



sands of men and women of the trades have encountered the

Building Trades' SmartMark construction safety and health training program in their OSHA-10 and -30 classes. Now our corps of trainers can acquire the program online in an enhanced format that incorporates traumatic injury statistics and important new research findings. eSmartMark notched nearly 1,000 separate downloads in the first few weeks after launch!

## RESULTS

- 74 Train-the-Trainer courses offered.
- 650 Workers trained in disaster response.
- 887 Outreach Instructors trained.
- 5,400+ OSHA 10- and 30-hour construction safety classes presented.
- 69,355 workers trained in OSHA 10 or OSHA 30 classes.

## Standing Ready for Sandy

### Hundreds of New York and New Jersey Construction Workers Certified in Disaster Response

**A**s Hurricane Sandy bore down on New York City and the Jersey shore, much of America was shaken to learn that some 45 Superfund-designated toxic waste sites sat within a half-mile of coasts vulnerable to flooding. A decade ago the 9-11 terrorist attacks had exposed New Yorkers – especially those involved in the rescue and cleanup – to a worrying variety of toxins. Would it happen again?



**In the wake of Hurricane Sandy, debris and destruction can be seen in and around the houses in Breezy Point, N.Y. More than 100 houses burned to the ground as flood waters isolated the community from fireman. Hurricane Sandy was the largest Atlantic hurricane on record.**  
(U.S. Navy photo by Chief Mass Communication Specialist Ryan J. Courtade/Released)

In one way, the region was better prepared in 2012 than on that grim day in 2001. After the towers collapsed, a stream of everyday heroes from the construction trades unions descended on lower Manhattan to assist with the recovery. Their contributions were vital, but they had courted considerable risks to life and health.

CPWR responded. Consulting with NIOSH, OSHA, the firefighters' and building trades unions, construction contractors, and local emergency personnel, CPWR created a new training curriculum: Disaster Site Training for Construction Workers. Designed around an interactive DVD and always led by an experienced trainer, the course gives workers an opportunity to learn about typical dangers of a disaster scene and to explore life-or-death decisions well before they confront them in the field. The program has been deployed across the country, creating a 5,000-strong reserve army of construction workers trained in disaster response. In the past four years alone, more than 400 such workers have been trained in New York and New Jersey.

## Minority Worker Training Program

### A Path to Success for Workers in St. Paul, New Orleans, and East Palo Alto

**T**hese days "job training" programs are everywhere you look – but their job placement records often leave something to be desired. The building trades' unions apprenticeship and training programs, however, are uniquely positioned for success. 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.

Just ask Stan McClenton, who was literally walking out of St. Paul Community & Technical College when he bumped into a recruiter for the Minority Worker Training Program. "I was studying painting at the College, but they couldn't promise me a job. This program could."



**Stan McClenton (right), a graduate of the Minority Workers Training Program, is now a proud member of the International Union of Painters and Allied Trades (IUPAT).**

The CPWR-administered program, supported by a federal grant, provides safety and health training to disadvantaged workers in three cities near EPA Superfund sites. The idea is simple: there are documented hazardous waste sites all too near some of our major cities. Why not train unemployed city residents in the skills needed to abate the very hazardous wastes that threaten their communities? But CPWR and its partners in the building trades have done these workers one better. Under the program workers from underrepresented groups in the industry are not just trained in job skills but placed with union contractors performing cleanup work. For many these jobs become a ladder into good construction careers with family-supporting wages, health insurance coverage and a good pension.

Today McClenton is a proud member of the International Union of Painters and Allied Trades Local 61 working for the City of St. Paul Parks and Recreation – and gives back as a part-time trade skills instructor for the Minority Worker Training Program.

To make maximum use of federal grant dollars, CPWR taps into its existing networks and resources. By working with building trades unions and community-based organizations, CPWR gains access to experienced instructors like McClendon working in well-equipped training centers. In addition to learning trade and safe hazardous waste handling, workers can receive instruction in:

- asbestos abatement
- confined space hazards
- construction health and safety (10- and 30-hour OSHA-certified classes)
- scaffold erection
- adult literacy
- job readiness
- life skills
- basic construction skills – identity and safe use of trade-related tools

In its past program year, CPWR recruited 369 applicants in its three targeted communities of East Palo Alto, Calif., St. Paul, Minn., and New Orleans, La., for 60 training slots, evidencing the demand for this type of training. Sixty of these were admitted for training, and the program secured a remarkable 100% 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 78% were placed in jobs averaging a respectable \$15.28/hour wage.

## RESULTS

**For the first two years, 2010-2012, CPWR's Minority Worker Training Consortium:**

- Recruited 680 applicants for 120 training slots.
- Provided 86,732 contact hours of training.
- Trained 123 students, graduating 98% and placing 79% in employment.

## Lunda Likes MWT Laborers

**H**enry Scott is a proud alumnus of the Minority Worker Training Program (MWT). “It changed my life,” said Scott, a member of Laborers Local 563 in Minneapolis. “Before I joined the construction program, I was stuck in dead-end jobs. I didn’t have a consistent paycheck and had no health insurance for myself or my children.” As of 2012, he has spent five years as a union construction laborer working for the Heavy Highway and Bridge division of Lunda Construction.



**Henry Scott**

Through its partnership with Merrick Community Services, the MWT program has been placing workers like Scott with the company for more than seven years.” Lunda Construction has employed multiple trainees from previous graduation years,” says Lunda’s Bruce Reihl. “We have found the trainees to be eager, willing workers.”

For Scott it’s also about a sense of accomplishment in his work. “It’s nice being part of something,” he explains. “When we finish the job, I can point out the bridge we built to my kids.”



Construction workers on Department of Energy-controlled sites where nuclear weapons were produced faced hazards that don't exist on any other jobsite. The Building Trades National Medical Screening Program (BTMed) offers these workers free screenings and a work history interview to identify health problems in time for medical intervention.

# SERVICE



9,000

cases of **hearing loss** diagnosed

“There was all kinds of stuff out there,” said Ironworker Harry Carver. “Silica. Beryllium. Asbestos. And you don’t know how much your life’s been cut short because of it.”

27

DOE SITES  
SERVED

4,100

**Asbestos-related**  
disease cases diagnosed

25,899

ELIGIBLE WORKERS SCREENED

98%

**Satisfaction Rate**  
among BTMed participants

## Building Trades National Medical Screening Program (BTMed) takes aim at COPD, Lung Cancer

America is dotted with Department of Energy (DOE) facilities where we built and fueled our nuclear arsenal. How often do we stop and think about the workers who toiled there over the past seven decades – exposed, often unknowingly, to hazardous substances like asbestos, beryllium, cadmium, chromium, lead, mercury, radiation, airborne silica, and toxic solvents?

For the Building Trades National Medical Screening Program (BTMed), the answer is, “every day.”

In 16 years of operations, BTMed has completed nearly 26,000 screenings. The results indicate that former DOE construction workers suffer disproportionately from a variety of relatively rare medical conditions. For instance, evidence of work-related lung disease appears on the x-rays of nearly one in five BTMed participants, mostly due to asbestos exposure. Perhaps the test result that most distinguishes these workers is the 1.4 per 100 testing positive for beryllium sensitivity, a condition virtually unknown in the general population. Twenty-eight of these workers have been diagnosed with chronic beryllium disease.

Today, BTMed is participating in one of the largest studies ever of occupational chronic obstructive pulmonary disease (COPD). Chronic bronchitis and emphysema make breathing difficult for people with COPD, and the condition constitutes the fourth leading cause of death in the United States. Construction workers are placed at an increased risk by their frequent exposure to fumes, dust, gases and vapors. With funding from the National Institute of Occupational Safety and Health (NIOSH), Duke University

researchers are conducting phone interviews with both COPD victims and control cases drawn from the BTMed rolls. The study will help identify the chemical agents and exposure levels that pose the greatest risk, and the information will be used to inform prevention strategies for today's workers.



“You’ll never get a physical as good as the one you receive through the BTMed. Not even from your own personal doctor.”

— Grady Boyd, Jr., OPCMIA Local 78, Oak Ridge Y-12, K-25, and X-10

Based on new data, BTMed estimates that work at DOE facilities has been responsible for approximately 20,000 cases of occupational lung cancer in construction workers. Early detection of lung cancer using CT scans with low radiation dose has recently been proven to be effective in preventing premature deaths, so BTMed is expanding a pilot screening program using CT scans. The effort relies on low-dose CT-scans to identify

lung cancer at its earliest stages, when the potential for effective treatment is greatest. In screening of 100 former Oak Ridge site workers, doctors identified 29 nodules needing additional evaluation. Two participants were diagnosed with stage IV lung cancer; follow-up scans identified two more with nodules requiring antibiotic treatment and a third diagnosed with a kidney cancer. The DOE has committed additional resources to expand the CT scan program, and BTMed is partnering with university-based lung cancer detection and treatment programs to create a highly innovative model to optimize the effectiveness of screening using CT scans.

### IMPLEMENTING ORGANIZATIONS:

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

### PARTNERS:

The Building and Construction Trades Department, AFL-CIO, with support from various state and local councils including:

- Alaska State BCTC
- Augusta BCTC
- 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

## RESULTS

BTMed has...

- Completed 25,899 screenings.
- Diagnosed almost 4,100 cases of asbestos-related disease.
- Diagnosed over 4,700 cases of COPD.
- Diagnosed nearly 9,000 cases of hearing loss.
- Earned reviews of “completely satisfied” from 98% of participants.

## BTMed Saves Lives in Savannah River

“I feel fortunate for the cancer I got,” Ironworker John Hall said casually. He meant what he said. He’d worked for decades on the Savannah River Site, one of many Department of Energy (DOE) sites that produce nuclear weapons, and he’d lost a friend who’d worked right alongside him to lung cancer.

“Donny [McDaniels] and I were working right next to each other when he began having coughing fits and complaining of back pain,” Hall said, describing how his friend realized something was wrong.

“By the time Donny found out, it was too late,” explained Harry Carver, another friend of McDaniels who watched his fellow ironworker’s health decline. “In January [2001], the doctor told Donny he had lung cancer. By March, he was gone.”



So when Hall and Carver heard that the Building Trades National Medical Screening Program (BTMed) offered free medical screening to construction workers who had been employed at DOE sites, they signed up. "I saw it was available and wanted to make sure I didn't have anything wrong with me," Carver says.

Hall and Carver were each diagnosed with cancer, yet they are grateful just to be alive. As fellow members of the Ironworkers Local 709, they worked in the same crew with Donny at Savannah River. "There was all kinds of stuff out there," said Carver. "Silica. Beryllium. Asbestos. And you don't know how much your life's been cut short because of it."

BTMed has been screening former DOE-site construction workers since 1997, currently from 27 locations (listed below). The screening begins with an interview – often by a former worker specially trained for the task – to develop a work history and determine which dangerous exposures the worker might have experienced. A medical exam follows that includes special testing for illnesses associated with these exposures. Each worker receives a full report that identifies which health conditions, if any, could be work-related.

The screenings frequently identify previously undiagnosed conditions – and in many cases workers who fell victim to work-related toxic exposures have gained access to government compensation under the Energy Employees Occupational Illness Compensation Program Act (EEOICPA).

"I encourage everybody I do know to get screened," said Carver. Hall agreed. "Because you feel it's something that's not gonna happen to you – until it does."



Ironworkers Donny McDaniels and Harry Carver worked side by side on the Savannah River DOE site. Lung cancer claimed McDaniels in 2001, so Carver jumped at the chance for a free screening when he heard about BTMed. Carver's cancer is treatable.

## BTMed Outreach



Outreach Coordinator Walter Smith sets up a BTMed information table at the Kansas City Labor Day Picnic. The retired member of Roofers Local 20 brought added signage (and attention) to his table in 2009, as he urged construction workers from DOE sites to take advantage of a free medical screening.



The annual summer picnic for Bricklayers Local 18 (Cincinnati) was a perfect opportunity for Lou Doll to promote BTMed's free medical screening. Doll, a retired UA Local 392 member, is a BTMed outreach coordinator covering eight DOE sites in Ohio.

### DOE Site/Facility Served by BTMed

Amchitka (AK)  
Argonne West (ID)  
Ashtabula (OH)  
Battelle Labs -  
King Avenue (OH)  
Battelle Labs - West  
Jefferson (OH)  
Brookhaven (NY)  
Brush Luckey (OH)

Fernald (OH)  
GE Evendale (OH)  
Hanford (WA)  
Huntington Pilot Plant (WV)  
Idaho National Laboratory (ID)  
Kansas City Plant (MO)  
Mound (OH)  
Mallinckrodt (MO)

National Energy Technology  
Laboratories (PA)  
Paducah GDP (KY)  
Portsmouth GDP (OH)  
Oak Ridge  
(X-10, Y-12, K-25) (TN)  
Piqua (OH)  
Pinellas Plant (FL)

Rocky Flats (CO)  
Savannah River Site (SC)  
Shippingport Atomic  
Power Plant (PA)  
Weldon Spring (MO)  
Waste Isolation Pilot  
Plant (NM)  
Yucca Mountain (NV)

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TRADES DEPARTMENT, AFL-CIO,  
AND AFFILIATED COUNCILS**

**INTERNATIONAL CONSTRUCTION UNIONS  
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# SULTS

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