HIGHLIGHTS 2011

STORIES OF IMPACT

CPWR
THE CENTER FOR CONSTRUCTION
RESEARCH AND TRAINING

Contents

Foreword to Highlights 2011


Mark H. Ayers

Those of us in the building trades are a lucky bunch, and we know it. We come out of the best training facilities in the world, drawing on the experience of generations and, thanks to CPWR, knowledge of the latest innovations in safety and health. We hone our skills in the craft we've chosen because it fits us – pouring foundations, erecting steel columns and beams, linking people and systems with electrical current. We walk onto a job site fully prepared to do what is asked of us. We know what it's like to do a hard day's work.

When our work is done, our contribution is obvious. You can drive by a building and say, "I did that."

But what if your contributions weren't set in stone. Or brick. Or concrete. For those workers not fortunate enough to be blessed with a desire to build and skill set to match, how can they see their work has impact?

I know CPWR, and CPWR makes impact. Whether it's through the data analysis that has brought such notoriety to CPWR, hours of training delivered or visits made to CPWR's growing electronic offerings, CPWR can cite ways it has an impact on our industry.

Still, isn't it better to hear a story of just how something like a ladder safety DVD or a training program has made a difference in someone's professional (or personal) life?

This year, CPWR is going to give you the best of both worlds: quantifiable results of the year's work plus "Stories of Impact." You'll meet people applying CPWR's information and programs to improve worker safety and health. In the Research section, you get a glimpse of the progress on projects to make your work easier and safer. If you are a foreman needing a quick solution for a just-detected hazard, the answer is as close as your smart phone (see page 6). Think stud welding can only be done one way? Think again (after reading page 14). Can incentives to reward safety not discourage incident reporting (also on page 14). The Stories of Impact open a window into how some of CPWR's research gets used every day in America.

The Training section is impressive. We now have more than 5,000 construction workers fully trained to step into a disaster situation and not risk their life or the lives of others while performing critical tasks. In the last grant year, CPWR administered 274 courses – nearly 80,000 hours – in various environmental hazard training specialties. I am extremely proud to announce that our Smart Mark OSHA 10-hour program has trained an average of 10,000 workers a month.

The program we christened the Building Trades Medical Screening Program (BTMed) continues to do an outstanding job serving construction workers employed on sites where nuclear weapons were produced. Today, more than 24,000 of these workers unwittingly exposed to hazards have been screened.

All this work produces impact. You'll hear it in the voices of the men who've been through the BTMed screening program. You'll catch the excitement of workers leaving a CPWR training class – or the trainer when he sees "a light bulb go on" with his students. And you'll get first-person accounts of how CPWR's research is put into practice with positive results.

I think you'll find something in this report that will connect with you and your work. Put it to use. Then tell CPWR the results, or as a stakeholder in our industry tell CPWR what else it can do to improve safety and health conditions for all construction workers.

Mark H. Ayers
President, CPWR
President, Building and Construction Trades Department, AFL-CIO

Research Training Service

We are an institution that has been quantifying results since we began our research initiative in 1990 with the first grant awarded by the National Institute for Occupational Safety and Health (NIOSH). And we know CPWR's work of applied research and training in safety and health practices has had an impact. We can count the millions of visitors to our online repository of construction safety and health information, eLCOSH. We confirm the tens of thousands of workers we've helped train. We point with pride to partnerships that bring together industry, labor and government to share knowledge and collaborate on projects to benefit all who work in construction. And we know that 98% of our BTMed medical screening participants are satisfied with the program.

But sometimes quantifying impact is best demonstrated with examples of impact.

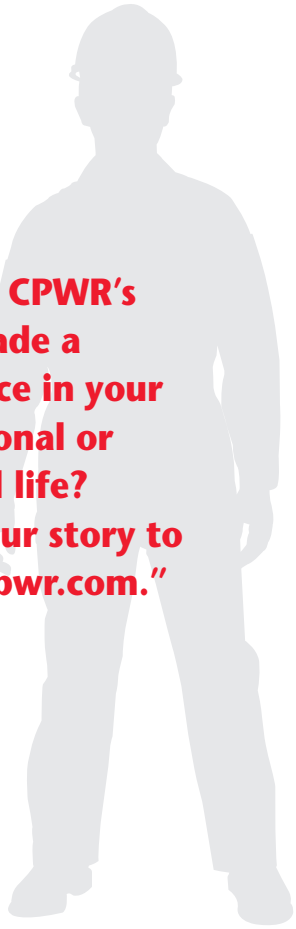
For our Highlights 2011, we took a step beyond brief statements of what we accomplished in the year. We reached out to people in the trades, in government and industry and asked them how CPWR's work has made a difference in their life, their work, their productivity, their health. The results appear on almost every page of the 2011 report – even this one. Pictured above are three young workers excelling in life through the Minority Worker

What is Your Story of Impact?

Training program, a trainer who's found our ladder safety DVD is so essential that he always has a copy handy, and a worker who found our medical screening program to be so critical that he promotes it to his colleagues.

Now let me turn this question to you: How has CPWR's work made a difference in your professional or personal life? Does your training have richer content? Have you applied what you've learned in your academic or professional career? Did you find that important nugget of information you couldn't find anywhere else? Let us hear from you. Email your "story of impact" to news@cpwr.com. We'll collect and publish some highlights. For now, turn your attention to this annual report and see if CPWR will have an impact on you.

Pete Stafford
Executive Director



"How has CPWR's work made a difference in your professional or personal life? Email your story to news@cpwr.com."

Research

If you're looking for impressive results, rigorous academic publications are a good place to start. From engineering and management to medical toxicology to leadership and organizational development,

How do you put a price tag on a person's hearing? Ability to walk or live without chronic pain or disease? Or simply, to be alive?

CPWR-funded research appeared in 14 different peer-reviewed journals during the last two years.

Yet as you see from the photos at right, CPWR researchers did much more than sit in university offices writing up results of a lab study. Our staff and consortium partners were in the field where the all-too-real hazards of the construction industry present themselves. They monitored welding fumes and silica dust in separate and distinct activities, such as stud welding, tuck-pointing, drilling into concrete, and demolition. They examined work-related asthma and exposure to isocyanates in spray-foam insulation. They measured the stress on workers' bodies when performing taxing physical labor – and they even measured workers' and managers' perceptions about this work. They collected stories of critical incidents on job sites to identify the barriers workers face in speaking up for safe work practices. And then they published.

But our researchers also know that their efforts do not end with a journal article. CPWR's vibrant research to practice ("r2p") effort is already helping them to build stronger connections with industry professionals to aid in disseminating valuable research findings. The true impact may never be adequately measured. How do you put a price tag on a person's hearing? Ability to walk or live without chronic pain or disease? Or simply, to be alive?

'Best thing our company ever did' for a safer work site.

IMPACT

CPWR's 17 on-going research projects have published in 14 different peer-reviewed journals.

A Mobile Interface to Answer Safety and Health Questions

Construction Solutions Database

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

The 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. Platner and his team have worked without pause from the project's 2004 inception to develop new solutions and make them simpler to find.

So when the mobile revolution hit the building industry, Platner saw an opportunity. Every superintendent and safety manager walking a construction site seemed to have a smart phone in hand. With Construction Solutions and their mobile phone, whenever a manager spotted a dangerous situation, the answer would be a click away. Could CPWR design the "killer app" of construction health and safety?

The project was more complicated than it sounds. A true "app" would be downloaded, which would be a formidable challenge for the large and growing database. But the Construction Solutions website was designed for a much larger laptop or desktop display and was hard to read and use on a tiny smart phone. Platner's team instead created a mobile phone interface using the alternative .mobi website (instead of .com or .org), which is designed to be user-friendly on a handheld device. After a year of design and testing, www.consol.mobi moved steadily toward its 2012 public debut. Will this be the innovation that saves the skin of countless construction workers? Stay tuned.

A STORY OF IMPACT

Safety Liaisons and Worker Training

When New Labor safety liaisons in May saw men at work on this dodgy scaffold in Newark, N.J., they approached the supervisors to fix the problem – but they were brushed aside. Seeing these workers in imminent danger, they decided they had to contact OSHA.

Fortunately, the safety liaisons, who were trained by New Labor and researchers at Rutgers University, had worked hard to establish a relationship with NJ OSHA field staff in Parsippany. When Compliance Assistance Specialist Beatriz Cabrera received the call from Edison, a safety liaison, reporting workers in imminent danger, she knew that the call came from an experienced construction worker with OSHA-10 training, and that there was no time to lose.

"Thanks to their training, these safety liaisons are highly credible when they call in a report. We welcome their help in identifying dangerous work situations in the field."

— Beatriz Cabrera, compliance assistance specialist, NJ OSHA field office

OSHA field staff went into action immediately, verified the complaint and launched an investigation. OSHA recorded significant violations and levied heavy fines on both the masonry contractor engaged in the work and the general contractor who hired the suspect firm. The investigation is still open.

"Thanks to their training, these safety liaisons are highly credible when they call in a report," explained Cabrera. "We welcome their help in identifying dangerous work situations in the field."

New Labor safety liaisons may have saved these workers' necks.

Breakthrough Research Leads to OSHA/NIOSH Guidance Document

Prevention of Nail Gun Injuries in Residential Construction

Lead Researcher: Hester Lipscomb, PhD
Duke University

Thanks to the work of Dr. Lipscomb and her team, the hazards of the contact trip nail gun, or "bump gun," have reached a steadily wider audience in recent years. Her initial work with the Carpenters District Council for Greater St Louis documented a substantial risk of injury among residential carpenters. Analysis of National Electronic Injury Surveillance System (NEISS) data indicated that nail gun accidents send 37,000 to U.S. emergency rooms every year, further indicating that nail guns are a significant danger to carpenters and consumers alike. Risk of injury is twice as high among users of a tool with a contact trigger.

The switch to the safer sequential trigger plus training cut nail gun injuries by an astonishing 50%.

Training was initiated by the Carpenters Joint Apprenticeship Program in St Louis in response to these findings, and contractors were encouraged to provide carpenters with tools with the safer sequential trigger. The sequential trip trigger requires that the nose piece of the contact be depressed prior to pulling the trigger, reducing the chance of injuries from inadvertent firings.

Continuing surveillance demonstrates that the switch to the safer trigger and training cut nail gun injuries by an astonishing 50%. Training reduced injuries significantly but those using tools with contact triggers continued to have twice the injury rate of those using sequential trigger tools. Over the past year the team has moved its focus to West Virginia with the intent of replicating the program with nonunion framing contractors there.

Meanwhile, the project team has reached out to numerous audiences, including contractors, unions, government safety and health officials, and workers' compensation insurance carriers, speaking on the issue and distributing some 1,500 safety alerts. Longstanding conversations have continued with tool manufacturers as well, urging them to limit production of framing nail guns to those with the safer sequential trip trigger.

The safety campaign received a significant boost in August 2011 when NIOSH and OSHA jointly issued the guidance document, "Nail Gun Safety: A Guide for Construction Contractors." More than 15,000 printed copies of the guide, based largely on Dr. Lipscomb's research, have been distributed; 250,000 visitors have accessed it on OSHA's website, with thousands more going to the NIOSH website. 2011 also saw the rollout of www.nailgunfacts.org, a web resource sharing the latest information on nail gun hazards and safety.

Confronting Construction Safety's Greatest Foe

Fall Prevention in Residential Construction

Project Director: Bradley Evanoff, MD, MPH
Washington University

Falls are the number one killer of construction workers on the job, and residential construction is notorious for its high rate of workplace accidents. In the face of challenges posed by the sharp downturn in the residential construction market, Dr. Evanoff's team is moving forward with a series of innovative fall protection programs in construction.

Nailgunfacts.org launched in late 2011 to provide training tools, promote safe work practices and raise the profile of the tools most likely to cause injury.

Building on its earlier work providing enhanced fall prevention training to apprentice carpenters, the team is now reaching out to their supervisors – carpenter foremen. In addition, researchers began exploring a technology lending program intended to promote the use of new fall protection systems. The team developed and delivered a new fall protection and safety supervision training program with 27 carpenter foremen leading residential framing crews. The technology lending program has given contractors and foremen exposure to newly produced safety systems like the *Wall Walker* hanging scaffold and safety bar anchorages designed for personal fall arrest. Evanoff's team continues its alliance with the Carpenters' Joint Apprenticeship Program, as researchers perform follow-up surveys of 300 apprentices per year who participated in their new fall prevention curriculum.

Initial results of these projects have been promising. One contracting firm participating in the project changed its work practices to ensure that its workers are protected from falls when working at heights throughout all phases of home

construction. This contractor also adopted new toolbox talk procedures to prepare workers for the work tasks and conditions anticipated that day. Many contractors have borrowed the fall prevention technologies, and several have purchased the equipment and adopted new work practices as a result. Meanwhile, the team is working with the Carpenters Joint Apprenticeship Program to update the training curriculum in light of updated OSHA enforcement procedures covering fall protection in residential construction.

Construction Workers Take the Initiative for Safe Conditions

Enhancing Safety through Leadership

Lead Researcher: John Rosecrance, PhD
Colorado State University

There aren't enough effective safety managers to develop and sustain a culture of safety that permeates every workplace at every moment. But when workers acquire leadership skills in this area, momentary attention when the safety manager walks the site can be replaced by a culture in which skilled tradesmen and women take the initiative on safety issues throughout the day. Rosecrance and his team set out to identify the leadership skills that workers need to be effective safety advocates on the job. Having done so, the team is developing a curriculum to teach these skills to apprentices, journeymen, and foremen in the construction industry.

In late 2010, the project team held focus groups and collected survey data from workers recruited from multiple local unions of the United Association of Plumbers and Pipefitters, and from contractors who work with the union. Participants shared stories of critical incidents and helped identify the barriers that workers faced in speaking up for safe practices. The findings were used to generate a pilot training program in safety leadership that was tested at a large mechanical contractor in spring 2011. The experience gained during this pilot program is currently being used to refine and update the safety leadership curriculum. The team will run the refined training program in 2012 with various unions and contractors throughout the United States.

A supplemental project involves the design of an effective tool for evaluating ergonomic climate in the workplace. In recent years, social scientists have designed effective surveys to measure a work site's "safety climate" – how well supervisors and workers understand safe work practices, and what priority they assign them – but no similar tool is available for ergonomics. The team has held focus group meetings with Denver area construction superintendents and extensive sessions with employees and managers involved in the skilled trades. The result is a tool for measuring ergonomic climate on a jobsite. Early results of these surveys suggest that ergonomic climate is strongly correlated with reduced injury and accident reports.

Colorado State University student Krista Hoffmeister works with Dan Wisner, an ergonomics engineer at John Deere Des Moines Works, to distribute the ergonomic climate surveys.

Creating Products that Communicate Research Findings

Dissemination & Communications

Lead Researcher: Mary Watters, MFA, CPWR

The project to redesign and restructure eLCOSH, CPWR's flagship communications tool for disseminating research findings to a worldwide audience, made significant progress in 2011. The eLCOSH renovation team engaged 58 people (trainers, safety and health professionals, and academics) in eight different developmental testing activities – from initial testing of categories and prioritization of home page content to testing various versions of an eLCOSH prototype and finalizing that prototype. The tests were conducted at CPWR, at a Minnesota training center and remote sites across the country using online meeting tools. The team's prototype of the "new" eLCOSH received extremely positive receptions with members of the initial brainstorming group, the eLCOSH Working Group.

A STORY OF IMPACT

Reducing Pain, Fatigue and Dust

Environmental Management Solutions of New York (EMS) faced a vexing challenge. On the 30th and 31st floors of a high rise, the crew was to drill 150 large-diameter holes in concrete slab ceilings, quickly and efficiently.

"The work was ungainly and unsafe when done by hand on a ladder," said company CEO Marco Pedone. "It was difficult to get the hole drilled right, and within five minutes the workers were covered in dust."

An online search led Pedone to the UC San Francisco Ergonomics Project and its CPWR-funded Inverted Drill Press, which operates from floor level and lessens musculoskeletal injury by taking the tool out of workers' hands and elevating it to ceiling height on a telescoping mount. The drill also features a dust-control system to capture deadly silica dust.

"A job that would have taken four or five workers two weeks ended up taking three guys four-and-a-half days."

— Dr. Marco Pedone, President and CEO of EMS, clinical professor of environmental and safety engineering, Columbia University.

Within days the EMS crew had an Inverted Drill running on site.

"Our experience with the Drill has been nothing but good," Pedone said. "It is a comfortable way to drill holes, and it is a time-saver. A job that would have taken four or five workers two weeks ended up taking three guys four-and-a-half days.

"Everybody who saw it in action asked where they could get one."

Contractors seeking the Inverted Drill Press can now find a slightly modified version of the tool from safety equipment manufacturer Telpro, Inc.

The Inverted Drill Press (left) is now commercially available in a modified form through Telpro, Inc.

The next step for the renovation team was to work with web developer Conceptual Arts to confirm the specifications document, which would ensure programming would meet the structure and format of the new site. Meanwhile, the team confirmed its own transition documents and process to ensure the recategorizing the 1,000-plus items on eLCOSH would work smoothly.

While the eLCOSH renovation project was the prime work of the Communications Department in 2011, it was one of many projects undertaken and executed during the year. Highlights from the year include a new project to develop short pieces to show the impact of CPWR's research. The first Impact card was produced in November and featured the work of Dr. David Rempel's project on the overhead drilling device. Many more cards are planned. Also in 2011, the Department created and tested a new style of Hazard Alert card and chose Silica. Upon its completion, BCTD unions began placing orders for the card, quickly running through the initial printing of 10,000 cards. The Communications Department is working with union international safety and health representatives to identify all the places the cards will be disseminated and used – while taking orders to reprint the popular card.

Also of note, Communications staff created an electronic newsletter to keep interested stakeholders up-to-date on CPWR research activities and training aids. The first "CPWR Update" was sent in early September 2011. Communication staff pursued a number of outreach efforts to increase readership, and now more than 1,600 people receive the electronic publication.

Danger to Workers More Pronounced than Often Understood

Data Center Analysis Documents Risk of Disability, Death and Accident on the Construction Site

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

Aging Construction Workers Face Alarming Physical Impairments

Dong and her team analyzed the health impairments of more than 7,000 workers aged 50 or older in 1998, then for the same workers in

2008. Of the sample, 510 were identified as construction workers and 2,501 as white-collar workers. The team's findings, though perhaps not unexpected, were profound: construction workers were significantly more likely to report persistently higher rates of a variety of illnesses and injuries, including arthritis, chronic lung diseases and strokes.

Older construction workers were also more likely to report that their health problems limited their ability to work. In light of current proposals regarding increasing the retirement age, this is a crucial finding. It seems that workers in our most physically demanding jobs are suffering the greatest health impairments with age. Is it realistic to expect a plumber or ironworker to work at the calling until age 70 in order to receive Social Security benefits?

An Epidemic of Injury Underreporting by Small Contractors?

When Dong's team began to put together measurements of construction worker safety and health with a close study of disparities between Hispanic and white, non-Hispanic construction workers, they noticed something remarkable. The trend lines on occupational fatalities and on occupational injuries, particularly for Hispanic workers, were moving in sharply different directions. Between 1992 and 2006, reported fatalities continued to climb, while reported injuries rapidly declined. What could be happening?

A closer look at the data showed that the contradictory reports were coming, for the most part, from the smallest contractors – those employing 10 or fewer workers accounted for nearly half of construction fatalities but less than one fifth of reported lost workday injuries!

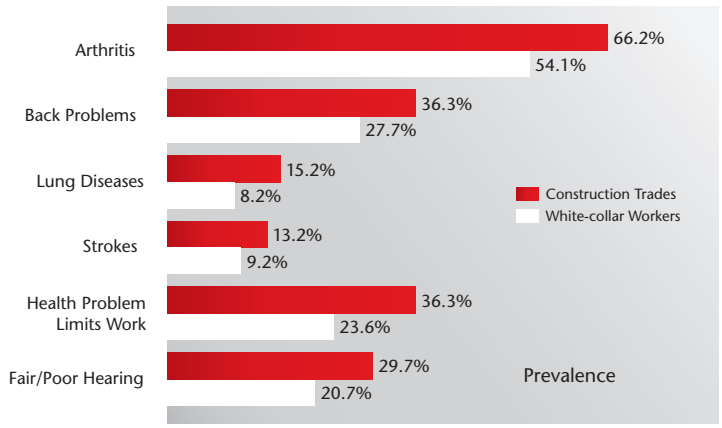
Over a 45-year career a construction worker has a 75% likelihood of experiencing a severe injury.

Researchers suspect that while fatal accidents are too difficult to hide, a growing number of small contractors are failing to report the accidents that don't result in a fatality, even serious ones. Dong and her team estimate that some 50% of lost workday injuries at these small contractors – over 42,000 per year – go unreported. For Hispanic workers, disproportionately employed at these firms, that share is an astonishing 75%.

A Lifetime of Exposure to Danger Means that Career Construction Workers Can Expect a Severe Accident

The Data Center recently released some startling statistics. Using multiple years of data from several national sources, they estimated that over a 45-year career a construction worker has a 75% likelihood of experiencing a severe injury. Additionally, over the course of a career, a construction worker has a one in 200 chance of being fatally injured on the job. A Hispanic construction worker has a 20% higher likelihood of dying from a work-related injury than his white, non-Hispanic counterpart. The study also reveals that an individual who begins construction work at the age of 20 has a 15% chance of developing chronic obstructive pulmonary disease over a lifetime.

Prevalence of Health Outcomes: Construction Trades vs. White-collar Workers (*age 60 or older*), 2008



Source: Dong, X., Wang X., Daw, C., and Ringen, K., 2011, Chronic Diseases and Functional Limitations among Older Construction Workers in the United States: A 10-Year Follow-Up Study. J Occup Environ Med. Apr;53(4):372-80.

Helping Workers Live Longer and Work Smarter with Local Exhaust Ventilation

Minimizing Exposures to Dusts and Fume in Construction

Lead Researcher: Pam Susi, MSPH, CPWR

Occupational health experts agree: the best way to control dangerous dusts and fume is to eliminate or capture the dust at the source. Pam Susi, MSPH, is assem-

bling alliances of stakeholders to work toward that goal. 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 planning how to make LEV use a standard industry practice. Susi shared her critical foundational research on LEV tools in March 2011 with the CPWR/NIOSH Engineering Controls Work Group, co-chaired by CPWR and NIOSH.

Susi's team, which includes researchers from Harvard, the University of Puerto Rico, Florida International University and a number of top notch industrial hygienists from around the country, has assembled two Partnerships for Advancing Control Technologies (PACTs): a welding PACT and a silica/tuckpointing PACT. Both have held well-attended initial meetings in which a broad cross-section of stakeholders was represented. The groups collaborated to draw up lists of promising LEV systems for their respective focus – welding and tuck-pointing – and identified the most important criteria used in the selection of such systems. Using the results and continued input from the PACTs, the team will soon begin testing the effectiveness of the three most highly rated LEV systems available on the market.

But no tool operates itself; welders must understand the hazards of welding fumes and the proper use of LEV if they are to be effective. Since a large proportion of America's boilermakers, plumbers, pipefitters, sheet metal workers, and structural steel erectors learn their trade through joint apprenticeship and training programs, cooperating with these groups is essential to

A STORY OF IMPACT

eLCOSH and the 1,000 Words

OSHA Instructor Carlos Gallegos delivers at a workshop for international safety & health officers.

Facts and figures are a mainstay of safety and health instruction, but trainers know a picture is worth a thousand words. CPWR's electronic Library of Construction Occupational Safety and Health, eLCOSH (www.elcosh.org), contains more than 1,000 items, plus hundreds of photos. OSHA's Carlos Gallegos, an avid eLCOSH user, finds the images in the eLCOSH site are his treasures.

Gallegos is in good company. From its launch in August 2000 until August 2011, the eLCOSH website received more than 5 million visitors. In December of 2011 alone, the site had 49,424 visits from 172 countries and territories.

Although Gallegos recently returned to OSHA enforcement, he spent three years teaching more than 1,000 compliance officers at the Chicago-based OSHA Training Institute in courses including accident investigation, electrical standards, scaffolding and excavation.

Gallegos' search ended on eLCOSH with this photo showing a poorly installed shield that would not restrict hazardous lateral movement.

"One time I was looking for a very specific image," Gallegos said. "I was teaching about the excavation standard on hazardous lateral movement, and I needed to show workers next to a pipe in a trench. For the life of me I couldn't find a photo like that among our own materials, but I found it on eLCOSH. The pipe was gigantic and a cave-in would make the trench box move, creating a danger for the workers. I was able to use it to show a hazard that is almost impossible for compliance officers to document in the field," Gallegos said.

"When you can get a photo that demonstrates exactly the lesson you are teaching, it's magic."

Gallegos says he puts eLCOSH stickers "all over the place," and he gladly advised CPWR on its recent overhaul of the 11-year-old eLCOSH site – which will soon provide an improved user experience for its wordwide audience.

equip workers with the skills necessary to use this equipment as it moves from research to practice. That's why the team recruited and assembled a Training Advisory Group from the Ironworkers, Boilermakers, Sheet Metal Workers, and United Association of Plumbers and Pipefitters (NIOSH representatives also participate). The group first surveyed local apprenticeship directors to assess current instruction and practice related to LEV use. Approximately 60% of respondents said LEV was rarely or never used in their area. The team then developed a draft training module and is now revising the draft based on the input of fourth-year apprentice pipefitters. The pilot training program will be field tested in three regions of the U.S. and finalized with input from the Advisory Group.

Immigrant Day Laborers and Peer-to-Peer Safety Training

Evaluating the Efficacy of Safety Liaisons and Worker Training

Lead Researcher: Michele Ochsner, PhD
Rutgers University

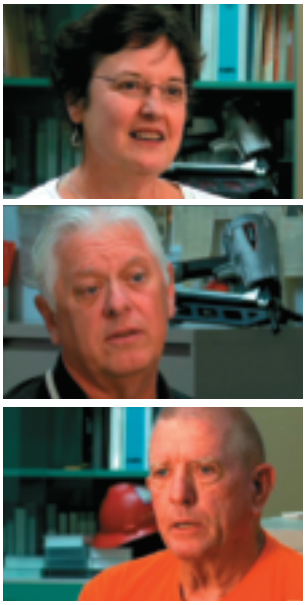
Over the past year, the team at Rutgers Occupational Training and Education Consortium (OTEC) and New Labor made significant progress in developing a network of safety liaisons among day laborers in northern New Jersey. The safety liaison program was designed to recruit a team of potential safety leaders to be peer trainers of day laborers and identify safety hazards on job sites. Once trained, these safety liaisons would be capable of monitoring safety conditions in North Jersey residential construction sites, educating their peers on

A STORY OF IMPACT

'Best thing our company ever did ...'

No one knows the gravity of the safety crisis over nail guns better than Dennis Patterson and James Nolan. The two retired St. Louis carpenters have interviewed some 500 apprentices about injuries they suffered using these ubiquitous tools.

Most often, the injuries come through the use of guns with a contact-trip trigger – a mechanism that can fire nine nails per second, since firing occurs whenever the gun tip and trigger are both depressed. Some 40,000 people go to emergency rooms per year with nail gun injuries; more than 60% are construction workers.



Hester Lipscomb (top) leads the research team that includes Dennis Patterson and James Nolan.

The stories are heart-wrenching enough to read about, but "when you're sitting across from someone face to face, that is very telling," Patterson said.

Led by Duke University Medical Center researcher Hester Lipscomb, the study showed that nail gun models with sequential trigger mechanisms are much safer. Eliminating the contact trip guns and training workers on the sequential trigger likely would make a huge dent in the injury toll.

"The contact trip triggers are just too fast," says Nolan, venting frustration at the unnecessary injuries. "This isn't right. It isn't fair to our youngsters."

Because of the guns' wide consumer use, mainstream media noticed the research. The *Sacramento Bee* published investigative articles and a gripping account of a fatal injury. More important, OSHA and NIOSH jointly issued a comprehensive guidance document in 2011, advising on sequential trigger use.

Nolan received the best kind of evidence that his work is bearing fruit. "The safety officer for the largest home-builder in Missouri told me that getting rid of the contact trip trigger nail gun was 'the best thing our company ever did' for a safer worksite," Nolan said.

health and safety issues, and intervening when they witnessed job site hazards.

The safety liaison program is part of a series of projects based on peer-led training programs aimed at immigrant day laborers in light of their increased profile in the residential construction workforce. Stepping up from the role of safety trainer to safety liaison was a significant shift for the workplace activists, who were now expected to exercise judgment and initiative in the field. When spotting an obvious safety hazard, they would have to decide: should I approach the supervisor or foreman to resolve the situation? Should I urge the tradesmen and the tradeswoman to stop work until the hazard is removed? Should I go so far as to contact OSHA and make a report?

The liaisons have begun organizing regular 'consejos' or 'worker councils' every three weeks featuring demonstrations of safety issues as well as strategy discussions. The liaisons have also performed more than 100 "curbside safety audits" documenting predominant industry safety hazards, finding that 56% of scaffolds had a level, stable base but only 23% featured fall protection. Hard hats were provided and worn on fewer than 40% of job sites.

Interventions by the liaisons have eliminated major hazards from multiple worksites (see page 6 IMPACT). For those cases in which contractors refuse to fix dangerous work situations, the liaisons have established a regular relationship with the regional OSHA office through a bilingual staff representative. Five complaints are currently under OSHA investigation following referral by safety liaisons, and in one case a fine has already been imposed.

Redlich's team wants to know … how safe is spray foam insulation for the workers using it?

Investigating Spray-Foam Insulation and Occupational Asthma

Assessment and Prevention of Isocyanate Exposures in the Construction Industry

Lead Researcher: Carrie Redlich, MD, MPH
Yale University

The popularity of polyurethane spray-foam insulation is growing by leaps and bounds. A highly effective insulation, it is popular with homeowners, businesses and government agencies who want to cut utility bills and environmentalists who want to reduce energy consumption. But how safe is it for the workers who apply it?

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

The project has moved out of the lab and into the field. Among the few dozen workers surveyed, the team has confirmed three cases of isocyanate asthma. Workers who contract asthma from this exposure may never fully recover: although their symptoms may diminish, their asthma may persist after they leave insulation work. Unfortunately, once such workers develop asthma, exposures such as dusts, particulates, fumes, and cold weather can exacerbate their asthma, making employment in other segments of the construction industry difficult.

Making Concrete Drilling Easier

Highway and Bridge Construction Drilling

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

With insights gained from the success of his overhead drill press (see page 9 IMPACT), Dr. David Rempel has pivoted to an even heavier project. Rempel's team is developing a new device to help construction laborers better wield 30-lb. pneumatic rock drills and 20-lb. electric combi hammers used to renovate bridges or buildings.

A "seismic upgrade" to prepare a large structure to resist earthquakes, or renovation of an overpass bearing tens of thousands of vehicles per day, frequently requires pouring new supporting concrete that must be "tied in" to the original structure. This means drilling large diameter holes in the concrete – often tens of thousands of them – in order to insert heavy rebar dowels. Rempel's new "highway drill jig" permits a machine, rather than the laborer's body, to absorb the punishing forces generated by the job. Field testing of prototypes is underway at UC Berkeley's Memorial Stadium, and the device has already been employed on bridge and tunnel jobs as well.

But the stress on the body of a vibrating 30-lb. tool that must be held in place and guided isn't the

only hazard. Drilling into concrete produces dust laden with deadly crystalline silica. So the team has created a tool designed to accommodate a cowl and dust capture system that promises to reduce workers' inhalation of silica in the course of the work. Tests of the dust control element at the Laborers training center in Alameda County, Calif., have successfully brought silica exposure levels below limits recommended by the National Institute on Occupational Safety and Health (NIOSH).

Rewarding Safety without Discouraging Incident Reporting

Effectiveness of Employee Safety Incentives in Construction

Lead Researcher: Jack Dennerlein, PhD
Harvard University

If the superintendent gives work crews a reward or bonus for working 60 days without a recorded injury, is he encouraging workers to be safe – or just to keep accidents and injuries off the record? How can you tell? In the health and safety field, and much of the building industry, there is a widespread concern that traditional behavior-based incentive programs don't work. There is an acknowledged desire for an empirically proven alternative.

Jack Dennerlein and his team at Harvard have designed a study that intends to do both, by focusing on *leading* rather than *lagging* indicators of safe practices, and creating a reward program based on leading indicators, eliminating the perverse incentive to underreport injuries. Over the past year, Dennerlein's team put the program through a trial run on two major Harvard-owned construction projects, comparing the new leading-indicator reward program at one site with a more traditional program at the other.

During the new worker safety orientation, tradesmen and tradeswomen were briefed on a safety incentive award program based not on recorded injuries but on the result of workplace safety audits by the site owner. If the monthly overall site safety score at the leading-indicator site exceeded 96.3%, all workers would receive a free lunch and be eligible to participate in a free one-month parking spot raffle, giving workers an incentive to take preemptive action for safety. At the traditional site, the rewards depended on achieving 60 injury-free days.

Based on feedback and experience from this trial run, researchers have modified the program for full-scale testing. Now branded as "Building Safety for Everyone: Building Safety for Every-one" and featuring a full comple-ment of tool box talks, hard hat stickers and other supports, it will be tested against traditional lagging-incentive programs over the next three years. By evaluating the performance of both systems in safety audits, the researchers hope to gain valuable insight about the efficacy of both leading and lagging indicator safety incentive programs.

Saving Ironworkers' Backs and Lungs

Ergonomics and Welding Fume Exposure during Stud Welding

Lead Researcher: Nathan Fethke, PhD
University of Iowa

Stud welding is a grueling, repetitive task for the ironworkers who perform it, whether on a beam for a bridge span or on the steel decking for the concrete floor of a commercial building. The worker is hunched over at almost a right angle for 20 minutes or more at a time welding the floor-level studs, a posture virtually guaranteed to produce serious back pain. Ironworkers also could be exposed to dangerous levels of toxic welding fume while engaged in this task.

Nathan Fethke and his team at the University of Iowa received a CPWR Small Study Grant to explore just how physically demanding this task was on the body. The team measured workers' posture and muscle effort using the conventional approach and compared the results with an alternative, tool-based technique already in use by some contractors. The alternative device is a mobile cart with an adjustable arm

Traditional method: Toxic fume and aching backs.

New method: No stooping, no fume.

to hold the arc welder, allowing workers to weld in an upright position, reducing back strain and possibly fume inhalation. Researchers confirmed that the tool offered relief to workers' backs but that manipulating the adjustable arm increased demands on their shoulder muscles. The manufacturer responded to these findings and is modifying the tool.

Fethke's promising findings from the pilot study led him to seek – and receive – CPWR support for a comprehensive follow-up study. The team will measure workers' exposure to welding fumes using the two methods and repeat his measurements of posture and muscle effort with a larger sample of ironworkers.

Seeking a Better Way to Measure Health and Safety Performance

Safety and Health Metrics

Lead Researcher: Janie Gittleman, PhD
CPWR

As a construction contractor, how can you tell if your team is meeting the mark in health and safety? Up until now the building industry has lacked a useful, consistent, and objective system of health and safety metrics for assessing firm performance. Securing one is the ambitious goal of Dr. Gittleman's project.

Gittleman has assembled a wide-ranging Metrics Advisory Committee including not just general contractors and construction owners, but health and safety consultants, academics, insurance company representatives, and federal, state and local government regulators. Their task was to find measurements that went beyond factors like recorded injuries – which at best offer only a retrospective measurement of safety, and often not even that when injuries go unreported. Moreover, turning from such "lagging indicators" to "leading indicators," like adoption of best practices, can put the industry a step ahead, intervening before accidents happen rather than just counting them later.

The researchers organized focus groups with hundreds of construction firms, small and large, from every part of the United States, that rated hundreds of potential metrics proposed by the advisory committee. They found a remarkable degree

A STORY OF IMPACT

Preventing Falls

If you ask Andy Smoka to name the ideal place to show the DVD *Don't Fall For It!*, his answer just may be "yes."

As an early adopter of CPWR's 11-minute industry-standard ladder safety program, Smoka keeps *Don't Fall For It!* in his training toolbox for myriad uses. It's critical in an industry where falls are the leading cause of death, and where ladders cause nearly one-fourth of fall injuries.

Smoka is the Principal Safety Consultant for Minnesota OSHA Consultation, with some 40 years in the field. His work touches apprentices, foremen, building owners and everyone in between. He presents the DVD during closing conferences following inspections, in OSHA-500 training sessions, in mandatory re-license sessions for contractors, and in on-request awareness sessions for students and others. More than 1,100 people have viewed it as part of Smoka's training sessions, he estimates; 600 were contractors going for their license renewals.

Principal Safety Consultant Andy Smoka, Minnesota OSHA Consultation

While those viewings most often have occurred in classrooms, he adds, "If I see any situation where a person misuses a ladder, I will pull out my laptop and show the DVD in a jobsite office. I'll show the foremen and leave copies so they can play it for the rest of the workers."

Don't Fall For It! is an eye-opener for many who insist that they already know all the ladder-safety rules before watching the DVD. At the very least, it "reminds workers of what they're supposed to do" to work safely, Smoka says.

And the need is great. "We've had two fatalities of workers who were standing on top of a two-foot-high stepladder."

of consensus on the 12 most important areas for evaluating safety conditions and practices *before* an accident occurs:

- Accountability of supervisors for their safety responsibilities
- Inclusion of safety and health in project planning
- Reporting of unsafe conditions by employees
- Involvement of employees in job hazard analysis
- Site-specific hazard training for everyone on the job
- Pre-task safety and health briefings
- Elimination of hazards and risks
- Creating and following safe work procedures
- Site-specific training for safety
- Employee knowledge of construction hazards
- Employee ability to identify hazards
- New employee orientation and training

The next challenge for Gittleman and her team is to create valid measurements for each of the 12 categories and to test them in the field. Twenty-three contractors across the United States have already committed to participate.

Translating Research Into Action

r2p: "Research to Practice"

Lead Researcher: Robin Baker, MPH, CPWR

In the fall of 2010, CPWR launched a new effort to amplify the impact of construction health and safety research. The Research to Practice (r2p) program seeks to link researchers with those who make health and safety decisions "in the trenches and on the steel." A three-pronged approach includes: developing effective dissemination plans for current and completed research, launching research translation projects for high priority findings, and promoting partnerships for prevention. A newly established ***r2p Working Group*** with representatives from CPWR, OSHA and NIOSH coordinates and enhances the r2p efforts.

In recent years a partnership of labor, management, government

A STORY OF IMPACT

'A Critical Reference'

One of CPWR's most-requested products is *The Construction Chart Book: The U.S. Construction Industry and Its Workers.*

High demand for its reliable data interpretations and engaging graphics on economics, employment, training, and safety and health has confirmed the Chart Book's status as "…a critical reference source for anyone…interested in the construction industry and its workers," according to David Weil of Harvard University's Kennedy School of Government and the Boston University School of Management.

CPWR has distributed some 2,600 print copies of the book's fourth edition since its 2008 release. Registered with the Library of Congress, the Chart Book is offered on Amazon.com, Yankee Book Peddler's A-Plus list, and World Cat. Academic listserves and industry, labor and government press all have spread the word of the book's availability.

Also in 2008, the Chart Book was posted on cpwr.com and on the eLCOSH online database. It has received a combined 45,132 page-views at the two sites.

When viewed online, the Chart Book material is especially rich. It includes hot links to source data from the Bureau of Labor Statistics and charts that are available in presentation-ready Powerpoint.

Each year, about a dozen peer-reviewed journal articles have cited Chart Book information. Its data has been referenced in several reports by The National Academies Press and in numerous other publications, including a report on Latinos in construction by the National Council of La Raza, a Rhode Island examination of the construction skills gap, a Cornell study on project labor agreements in New York, and an article on advances in dissemination of safety information by *EHS Today*.

A fifth edition of the Chart Book is scheduled to roll out by early 2013.

agencies, manufacturers and occupational health professionals helped reduce paving workers' exposure to hazardous asphalt fumes. In 2011, the r2p Group began an in-depth case study of the asphalt partnership as a model of successful action, and sponsored the first of several new partnerships – the Masonry r2p Partnership (see below). Partnerships targeting fall prevention among Latino workers are in formation.

CPWR's r2p staff has designed a systematic approach for reviewing and prioritizing research for r2p, inspiring quick starts for three critical projects:

- **Tech Transfer.** Too often, it seems, promising safety innovations remain isolated on university campuses while industry soldiers on with yesterday's techniques – and construction workers pay the price in unnecessary injuries. The technology transfer initiative seeks to smooth the path from the classroom to the construction site for technologies that advance worker safety. A May 2012 symposium bringing together academic researchers and construction professionals with equipment tool manufacturers will explore drivers and barriers for technology transfer in our industry.
- **Silica-safe Website.** Significant research is available on silica exposures and related controls. The research findings as well as information on controls developed in response are dispersed throughout many different websites and publications. As a result, many stakeholders are still unaware of the seriousness of the hazard and believe it is not feasible to control silica dust. This new website will address these misperceptions by providing a one-stop, user-friendly source of practical information for contractors, workers and other stakeholders to use to identify silica exposures and controls, and put them into practice.
- **Nail Gun Facts**. Thanks to the work of Dr. Lipscomb and her team, word is getting out about the thousands of workers who visit emergency rooms each year due to the contact-trip trigger nail gun, or "bump gun." In 2011 Lipscomb's research informed a joint NIOSH-OSHA guidance document, "Nail Gun Safety: A Guide for Construction Contractors." Several months later, Lipscomb's team launched a new website, www.nailgunfacts.org. (For details, see Dr. Lipscomb's report on page 7.) The r2p Working Group is working to get these vital resources out in the industry.

Dr. Hester Lipscomb's research on nail guns provided the basis for an OSHA-NIOSH guidance document on nail gun safety for contractors.

Making Masonry Safer with an r2p Industry Partnership

The key to moving research to practice in the construction industry is a successful partnership with major industry stakeholders. Without buy-in from workers and contractors, the most promising safety and health innovations may never leave the pages of a journal or become commercially available.

The Masonry Industry Research to Practice (r2p) Partnership is a pioneering effort to build such a partnership from the ground up. In 2011 representatives from the International Union of Bricklayers and Allied Craftworkers, the International Council of Employers and the International Masonry Institute, developed a list of craft-specific occupational hazards and interventions and reviewed them with more than 100 labor and management representatives to establish safety and health priorities. This list of priorities will guide the Partnership's efforts in 2012 and beyond.

One area where both workers and contractors see promise is a greater use of powered "mast climbing" or other adjustable scaffolds. Such scaffolding enables workers to perform work between knee and shoulder height – reducing the risk of musculoskeletal injuries and often improving productivity as well. To encourage contractors to consider mast climbers and to promote the safe use of this type of scaffold the Partnership launched a new mast climber website. This one-stop resource includes information on the productivity benefits, new research, safety and training programs, purchasing and rental resources, rules and regulations, and related news articles. Information on mast climbers generated by the Partnership is available on the CPWR website and has been published in both union and trade publications.

In other areas the Partnership:

- documented and evaluated their activities and progress in order to develop a model r2p partnership,
- initiated discussions with equipment manufacturers to

address safety issues surrounding masonry tools and equipment,

- surveyed masonry contractors and workers to establish baseline industry measures of health and safety practices, and
- worked with other CPWR teams to evaluate engineering controls to reduce workers' exposure to airborne silica.

Working with Business and Labor for Better Respiratory and Hearing Protection

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

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

Civil construction and "knock-down" building demolition often call for breaking up significant volumes of concrete and masonry. Such work means a construction site thick with jackhammers, compressors, and perhaps wrecking balls or other heavy equipment. For laborers employed there it also often means heavy exposure to two well-established workplace hazards: airborne crystalline silica dust and excessive noise levels. Consequently, too many construction workers face an old age marred by lung damage and hearing loss.

Dr. Susan Woskie and Dr. Susan Shepherd of the University of Massachusetts at Lowell are working with civil contractors and laborers represented by the Laborers' District Council to test multiple methods of dust control on the job. Dr. Shepherd has designed an "air curtain" dust control for the job site: this device minimizes the spread of dust by creating a wall of high-pressure airflow, and is undergoing field testing by a bridge substructure repair contractor. Meanwhile, researchers are working with a large demolition contractor to test whether supplemental water pressure can increase the efficacy of water cannons in suppressing dust. The research team also is creating a database of commercially available dust controls for hand tools.

On the noise reduction front, the University of Massachusetts, Lowell team identified leaking air hoses as a major – and easily remedied – contributor to noise hazards on sites with pneumatic tools in use. Researchers are working with the contractors to assess the performance of "noise-perimeter zone control" strategies in which areas with dangerous noise levels are identified, marked and designated for limited access.

Work Shouldn't Be a Chronic Pain

Participatory Ergonomics

Lead Researcher: Laura Welch, MD, CPWR

Every 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.

Breaking tile, not backs, can be done with a ride-on floor scraper, the "Terminator."

During 2011, Dr. Welch's co-investigators at Washington University in St. Louis worked with the St. Louis-area District Council of Carpenters and a group of floor-laying contractors whose workers are represented by the union. A close analysis of Carpenters' health insurance fund claims will in time provide clues to the joints and body parts most at risk. An initial review has shown that the Carpenters' health and welfare fund, rather than the workers' comp carrier, is bearing most of the costs of treating these job-related injuries.

The carpenters were often able to identify not just the location of the discomfort and MSDs they experienced laying carpet and tile, but also commercially available solutions – like substituting a mechanical carpet stretcher for a knee-kicker when stretching carpet tight before tacking it down. However, a number of available ergonomic solutions remain on the shelf – or the showroom, such as the powered, ride-on floor scraper used to remove old tile when remodeling. The team is currently identifying barriers that keep firms and employees from adopting these ergonomic solutions as standard industry practices.

Big Findings in CPWR Small Studies

The CPWR Small Studies program is a little like venture capital for safety and health scholars. Applicants submit proposals for novel exploratory research projects with a budget of up to $30,000. These theory-building exercises can pave the way for a full-scale study – or illustrate unforeseen problems with an innovative idea.

Small studies can test big ideas. A survey of 2004-2009 small study authors found that over 60% had published their findings in peer-reviewed journals, and a similar number reported that their small study work led to additional research proposals. Notable 2011 small study discoveries included:

- *Workers' compensation claims filed by older workers were significantly more costly than those filed by their younger counterparts.* Observers of the aging construction workforce will be interested to learn that the medical costs of a claim increased 1.1% for each year's increase in age over 18, and the indemnity costs of a claim – largely, lost wages and benefits – increased 3.5% for each year. (Since other researchers have demonstrated that older workers file claims *less frequently* than younger workers, it is not possible to say which group is actually generates higher *per capita* costs.) Researcher: John Rosecrance, PhD, Colorado State University.

- *Motivating positive ergonomic changes in the industry may require two distinct campaigns, one targeted at employers and another at workers.* Researchers in California found that contractors needed to be assured that ergonomic tools would not reduce worker productivity, but were receptive if they promised to reduce workers comp insurance costs. Workers – who often prided themselves on the ability to work through pain – said that they would be more likely to adopt ergonomic techniques "for their families" and because they "couldn't *afford* to get injured" than simply to preserve their own health. Researcher: Debra Chaplan, MS, State Building and Construction Trades Council of California.

- *Latino construction workers in Illinois filing workers' compensation insurance claims received significantly smaller awards than white, non-Hispanic workers with similar injuries.* This discovery emerged after researchers linked findings from the Illinois Workers Compensation Commission with two medical record databases: the Illinois Trauma Registry and the Hospital Discharge Database. Researcher: Lee Freidman, PhD, University of Illinois at Chicago.

- *Green building may expose workers to additional dangers on the job.* Several LEED (Leadership in Energy and Environmental Design) credits promoted by the US Green Building Council are associated with increased risk exposure – for instance, installing solar panels and green roofs can mean complicated procedures performed at dangerous heights. In interviews, contractors and engineering professionals involved in green building projects perceived a 36% increase in lacerations, strains and sprains from recycling construction materials; a 24% increase in falls to lower level during roof work because of the installation of on-site renewable energy (e.g., PV panels); a 19% increase in eye strain when installing reflective roof membranes; and a 14% increase in exposure to harmful substances when installing innovative wastewater technologies. Researcher: Matthew Hallowell, PhD, University of Colorado.

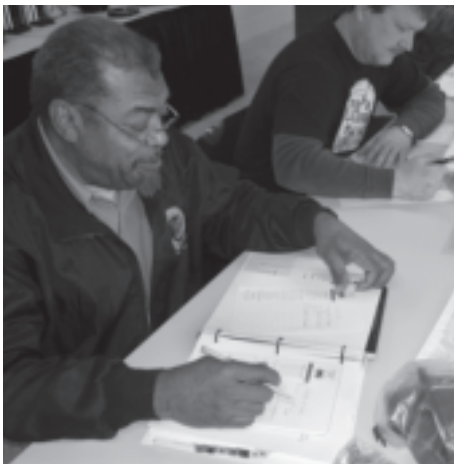
Installing solar panels to save the planet also comes with associated risk.

Training

Delivering critical safety and health information to apprentices, journeyworkers and even contractors is not necessarily an easy task. As any teacher, professor or instructor knows, adult learners are often eager for information, particularly if they've chosen the class. But even the most attentive student can get bleary-eyed watching a lengthy Powerpoint presentation or listening to a lecture-only format.

The 'fall that didn't happen' or the 'fatality that didn't occur' may be the best impact of all.

CPWR understands adult learners – and has understood them from day one. Our trainers understand people in the building trades because our trainers are the building trades. They live and breathe the peer-led training model. Their students engage in interactive learning experiences through hands-on manipulation of equipment and real-world situations. Instructors put the learning in context: students share the hazards they've encountered at work or break into groups to assess controls for a safety problem or health threat. They participate in simulations to know how to handle a critical situation when it happens. This is the model used in all CPWR programs: hazardous waste removal, confined space, general safety training, and disaster response. The impact of CPWR training is obvious in what the students and trainers say. The impact that's not obvious is the "fall that didn't happen" because of ladder safety instruction or the "fatality that didn't occur" because a worker knew not to venture into a confined space without first testing the air. Isn't that the best impact of all?



"Every construction worker needs to take this course. It could save lives."

IMPACT

An average of 10,000 union members are being trained every month in OSHA 10-hour courses.

Building a Reserve Army of Disaster Responders

More than 5,000 Building Trades Union Members Stand Ready to Answer when Duty Calls

September 11, 2011 marked the 10th anniversary of the horrific terror attacks on the twin towers in New York. CPWR joined other Americans in remembering the construction workers who rushed to the scene to assist in rescue operations. Day after day, week after week, these heroes in hard hats toiled to clear the steel, concrete and hazardous debris in a search first for survivors and then for remains. Volunteers put their life and health at risk in those early days to use their trade skills to help at Ground Zero.

Two things were soon evident. First, emergency responders at the scene of massive natural or man-made disasters desperately needed the assistance of experienced journeyworkers who could safely address live electrical wires, broken gas mains, torn asbestos pipe insulation, and towers of crumbled steel and masonry. Second, construction workers responding to a flood, earthquake or similar catastrophe needed some special training on hazards common to the scene – and in cooperating with the incident command structure established by the first responders.

CPWR answered the challenge in two different ways: first, by developing and delivering a site safety and health orientation for Ground Zero workers, and second, by creating a new training curriculum: Disaster Site Training for Construction Workers. Consulting with NIOSH, OSHA, the firefighters' and building trades unions, construction contractors, and local emergency personnel, CPWR's training curriculum was designed around an interactive DVD and led by an experienced trainer. Workers learn about typical dangers of a disaster scene and have an opportunity to explore life-or-death decisions well before they confront them in the field, and are awarded an OSHA-7600 card upon completion of the class.

The program has been deployed across the country, and now more than 5,000 union tradesmen and tradeswomen in cities from the East Coast to the West Coast stand ready to respond in the event of a major disaster.

A STORY OF IMPACT

Electricians Charge to the Rescue after Joplin Tornado

"Whenever our apprentice or journeyman electricians come in for OSHA 10-hour safety training, I push them hard to take the OSHA 7600 Disaster Response class too," said IBEW Local 124 Instructor Justin Brockway. "As a former firefighter, I recognize just how much our tradesmen and tradeswomen can offer to our first responders – if they have the proper training."

AP/WIDE WORLD PHOTOS

Construction workers trained in disaster response were welcome after a tornado strike on Joplin, Mo., 2011.

That training by the Kansas City local union proved useful after the devastating May 2011 tornado strike on Joplin, Missouri. Electrician Bill Iiams had received the Disaster Response Training, giving him and his colleagues at Green Wave Technology the confidence and preparation to sweep into action a few hours due south.

"We packed food, water and tools and brought the team down to help," said Green Wave General Manager and IBEW member Mark Dresslaer. The National Guard had barricaded the roads, realizing that untrained volunteers, however well-meaning, were as likely to injure themselves as to help others. "But when we showed up, they sent us right through to the first responder location. 'You are exactly the people we need inside,' they said."

The 10 Hours That Can Save a Life: OSHA Training

Tens of thousands of union building trades workers depend on CPWR's National Resource Center for critical "OSHA 10" and "OSHA 30" occupational health and safety training. How do we do it, with a staff of three?

It begins with CPWR and an all-star team of 50 "master trainers" drawn from the ranks of every construction trade. These master instructors gather every other year at the National Labor College to learn about the latest health and safety developments, changes in OSHA regulations and guidance, and new worker protection tools and techniques.

The master trainers then fan out among their brothers and sisters and train a small army of outreach instructors in each trade. Our corps of outreach instructors includes more than 5,000 craftsmen and craftswomen who have carried tools on the job and now are bringing their passion for health and safety to fellow union members.

Unlike many private and for-profit institutions delivering the 10- and 30-hour OSHA programs, CPWR relies exclusively on such worker-trainers, rather than safety professionals. Peer-to-peer training with hands-on exercises means a safety program that is tailored to your trade – and delivered by an instructor familiar with the language, tools and terms of your craft, and experienced in its characteristic challenges and hazards.

And that's how CPWR and our Building Trades partners brought safety training to 300,000 U.S. construction workers from coast to coast in the last three years.

A STORY OF IMPACT

Apprentice Attacks Unsafe Scaffold after OSHA-10 Training

Jonathan Hammock, training director for Insulators Union Local 86, with Insulator Apprentice Greg Chrisman.

Insulator Apprentice Greg Chrisman had only been in the program nine months but thanks to his CPWR/Insulators Union OSHA 10-hour training he knew what to do when confronted with an unsafe scaffold. "Greg saw the contractor had a jerry-built scaffold together. He refused to work on it and the contractor dismissed him," explained Jonathan Hammock, training director for Insulators Union Local 86 in Hermitage, Tenn.

"But Greg knew what he was doing, and took a picture with his camera phone. When he sent it to me, the agent and I went to the contractor and told him unsafe work practices would not be tolerated. The superintendent fixed the problem, and the union gave Greg a letter of commendation."

After OSHA 10-hour training, Apprentice Greg Chrisman refused to work on this jerry-built scaffold. The union stepped in to fix the unsafe condition; Chrisman received a commendation.

This Training Curriculum Hits the Mark ... for More Than 600,000 U.S. Construction Workers

"The Smart Mark program has been a tremendous success," observed Building and Construction Trades Department President Mark Ayers. "In the 10-hour program alone, an average of 10,000 union members are being trained every month." For the past 15 years CPWR and the Building Trades have relied on their creative, customized Smart Mark Curriculum to provide top-quality safety instruction for the union sector construction industry. Since Smart Mark was launched in 1997, more than 600,000 workers have been trained using it. The program grew from 10 to 19 modules in 2008, adding topics like Silica and Motor Vehicle Safety.

THE SMART MARK
THE SIGN OF A SMARTER WORKPLACE

CPWR will help the BCTD make Smart Mark more readily available via a secure online system.

In 2012, CPWR plans to help the BCTD make the Smart Mark curriculum more readily available to all building trades trainers via a secure Internet-based distribution system. CPWR will also seek to expand the available topics to help instructors meet OSHA's expanded content requirements and evaluate how building trades trainers and unions embrace the new distribution system.

A STORY OF IMPACT

What Instructors Say about Delivering Training

Our CPWR instructors take pride in the way their work has helped many students save life or limb, or just generally made the workplace safer and healthier.

- "I receive comments all the time about how attending these classes has made each employee more aware of their surroundings and how trainees have been given the tools/knowledge it takes to work safely on projects, as well as deal with management regarding safety issues."
- "During the training class, one can observe the light bulbs go on in the student's heads remembering jobs they have performed and were not aware of the hazards they had faced. No one had explained to them any of the potential dangers or precaution the job entailed. Many students stated that they were glad to have attended the class."
- "Our contract is being negotiated, and I have recommended OSHA language be included in our new contract and specifically a respiratory safety program with proper fit testing."

CPWR Hazardous Waste Worker Training Helps Union Construction Workers Clean up America

Across the United States, the CPWR and our 11 Building Trades Union partners in the Construction Consortium for Hazardous Waste Training exceeded training targets by more than 20%. In the process, some 5,095 workers, technicians and support staff learned how to protect themselves and safely handle hazardous wastes.

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

Of course, not every worker is a natural-born trainer. 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. CPWR also provides the instructors with updated instructional materials and training enhancements as they continue in their health and safety training careers.

The 274 courses and nearly 80,000 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. A new addition this year was Lead Renovation, Repair and Painting class (see below).

Getting the Lead Out: New NIEHS/CPWR Program on Lead Renovation, Repair, and Painting (RRP)

The latest addition to the CPWR training consortium's Hazardous Waste Training curriculum comes courtesy of the Environmental Protection Agency.

Lead-based paint was banned from residential use in 1978, for good reason. Even ingesting small amounts of lead put children at risk of brain damage and learning disabilities.

Millions of homes and schools built before 1978 still have walls and trim coated in lead-based paint. Undisturbed and kept in good repair this poses little danger, but when construction workers perform renovation work, the chips and dust fly and children are put at risk. That's why the EPA issued its "Lead Renovation, Repair, and Painting" rule in April 2010.

Under "RRP," contractors and journeyworkers whose renovation or repair work will disturb lead paint in a home, school or child care facility must first be trained in lead-safe practices. CPWR responded to the challenge, incorporating the EPA-developed curriculum and supplementing it with dynamic hands-on activities. CPWR, now an EPA-accredited Lead RRP training provider, offered its inaugural class for members of the International Brotherhood of Electrical Workers in Binghamton, N.Y., in June 2011.

A STORY OF IMPACT

Q: How do you clean up a nuclear weapons site?

A: With a HAMMER

Got Training? Hanford is the single biggest site of CPWR-NIEHS hazardous waste training.

For more than five decades, the Department of Energy made Hanford, a small town in Washington state, synonymous with our nation's security. The nuclear reactors there processed the plutonium for the atom bomb that ended World War II and for the nuclear weapons that kept America safe for the duration of the Cold War – decades of service that generated massive quantities of radioactive waste. In 1989, the Department of Energy, Environmental Protection Agency and the State of Washington agreed on a plan to restore the site by removing or remediating the billions of gallons of liquid waste and tons of solid waste left behind by the nuclear operations.

Today, with over 11,000 workers involved in the cleanup, Hanford is the single biggest site of CPWR-NIEHS Hazardous waste training. In the last program year, 1,802 tradesmen and tradeswomen were trained to safely participate in hazardous waste remediation at Hanford in the state-of-the art Hazardous Materials Management and Emergency Response – or HAMMER – facility. Workers benefit from the instruction of fellow tradesmen and tradeswomen, all of whom still work at the Hanford site when not teaching, and enjoy unique training opportunities – like an exercise where they suit up in protective gear and enter a simulated contaminated site.

Minority Worker Training Program

While there are countless "job training" programs on the books, the building trades' unions apprenticeship and training

programs 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.

CPWR administers a federal grant to provide safety and health training to disadvantaged workers in underrepresented groups in three cities near EPA Superfund sites. The U.S. government launched the program to give workers in the communities affected by the hazards the skills to be employed in their cleanup and abatement. CPWR and its partners in the building trades have done these workers one better – not only training them, but placing them in jobs with union contractors performing cleanup work and giving them a career ladder into good construction careers when that work is finished.

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 skilled instructors working in well-equipped training centers. In addition to the Superfund-focused hazardous waste workers classes, students receive training in asbestos abatement, scaffold erection, basic construction techniques, adult literacy, job readiness, and life skills.

The National Institute for Environmental Health Sciences (NIEHS) awarded the Minority Worker Training Program a new five-year NIEHS Grant in 2010. In its past program year, CPWR recruited 311 applicants in its three targeted communities of East Palo Alto, Calif., St. Paul, Minn., and New Orleans, La. Sixty-three of these were

A STORY OF IMPACT

An Industry Where Women are the Minority

CPWR's Minority Worker Training Provides Keeley Entry into Cement Masons, Leadership

When you say "minority" in America, people generally think about racial and linguistic groups. But in construction, women are the minority. While black and Latino workers are now seen in virtually every corner of the industry, men outnumber women in the trades by more than 25 to one. Today the Minority Worker Training Program is giving women a new path into the profession.

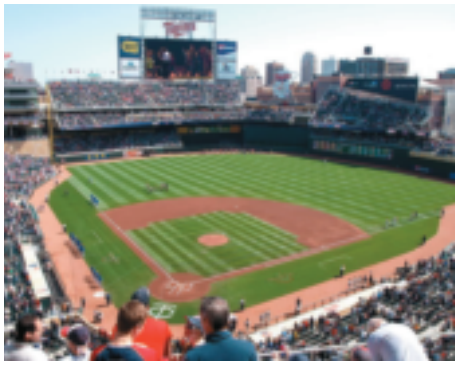
Jessica Keeley, OPCMIA

When the Minneapolis plant where Jessica Keeley had worked closed down 10 years ago, she was thrown out of work – and looking for a new career. Fortunately she encountered CPWR's Minority Worker Training Program, a federally funded program that helps women and minority workers find a path to good union jobs in construction. The pre-apprenticeship program allowed her to try her hand at each of the trades, and Keeley took quickly to the work of the cement mason. She was soon indentured as an apprentice at OPCMIA Local 633.

"For a woman, a career in construction is a good place to learn about your strength and character – working with all men," she said. She won the respect of her male colleagues and was elected to two terms on the union's executive board.

When asked her most memorable job, it was no contest: building the new Twins Stadium. "We were doing pours one after another in the heat of the summer," she said. "It was the hardest job I ever did, but now I can look back at it and say, I built that.

"We built it with union hands, with skill, pride, safety and quality in mind," said Keeley. "I would definitely recommend a career in construction to other women I know."



Keeley poured concrete for Twins Stadium: "I built that."

admitted for training, and the program secured a remarkable 95% graduation rate. (In contrast, only 50% of U.S. students who enroll in college complete their degrees!) Despite the challenges of the economic downturn, fully 80% were placed in jobs averaging a respectable $14.77/hour wage.

Progress in East Palo Alto

How does the union connection boost the CPWR success rate in the Minority Worker Training Program?

The program secured a remarkable 95% graduation rate. Only 50% of U.S. college students complete degrees.

Well, the San Francisco Public Utility Commission and San Francisco Building Trades negotiated a Project Labor Agreement (PLA) ensuring that contractors enjoying public contracts for infrastructure upgrades will place community residents on these work sites. Already eight program graduates have found work as laborers or operators on these utility upgrade projects, some with leading national contractors like Granite Construction and Kiewit. Of East Palo Alto's 32 graduates, 27 are currently working as apprentices among various trades. CPWR's Hazardous Waste Worker, OSHA-30, and Confined Space training helped prepare students for this industry.

A STORY OF IMPACT

What Students Say about CPWR Training

Peer instructors – all of whom are current or former tradesmen and tradeswomen – are the cornerstone of all CPWR safety and health training programs. The instructors' combination of technical knowledge and real-world experience is a hit with class participants as this post-training feedback attests …

"Great course. Every construction worker needs to take this course. It could save lives."

"I have turned in a couple of egregious workplace hazards to authorities since the training."

"It was a great class, well informative, wonderful instructors who really knew their stuff. I really enjoyed the hands-on activities."

"I would like to thank the local and OSHA for training me on many issues I knew nothing about. The class was very informative."

"Instructors discussed the highs and lows of confined space training. This other company I had worked for didn't go into detail like these guys did, also with the hands on."

"I believe I learned what I need to know to be safe and get through an emergency."

"This course improved my knowledge on job sites. I have learned what it takes to be safer around chemicals. I learned also to be safe and aware of what one is working around."

Hands-on training gets a thumbs up from students.

Service

Our nation asked much of the men and women who dedicated their career and very lives to the intense and secretive work of producing nuclear weapons. From World War II to the sputtering end

Who asked the construction workers in these plants to sacrifice their health – or even life – for this effort?

of the Cold War, government and civilian workers toiled in giant plants, often in remote locations, to maintain a nuclear supremacy for this country.

But what of the workers who built new structures at these facilities? Or repaired and maintained the existing buildings? Or even demolished old buildings where hazardous materials once were used? Who asked them to sacrifice their health – or even life – for this effort?

Congress eventually moved to establish a program to evaluate the medical condition of those workers. In 1996 the Building Trades National Medical Screening Program (BTMed) began reaching out to the trades to connect with members and retirees who worked at these Department of Energy nuclear facilities. Since that time, BTMed has reached more than 24,000 affected workers. The impact of the program is felt individually by the thousands of workers who have gone through the medical screening program – and by their families. The workers are proud of their contributions, even though they were unwittingly exposed to toxic materials. The results are clear: a 98.3% satisfaction rating among BTMed participants. So read the stories and feel the impact.

"This program saved my life."

— Dan Obray, Painter
Idaho National Lab

BTMed has screened more than 24,000 of these unsung heroes since its start in 1996.

IMPACT

Building Trades National Medical Screening Program (BTMed)

The BTMed program has been coordinated by CPWR since inception in 1996, and is supported by the Building and Construction Trades Department, AFL-CIO.

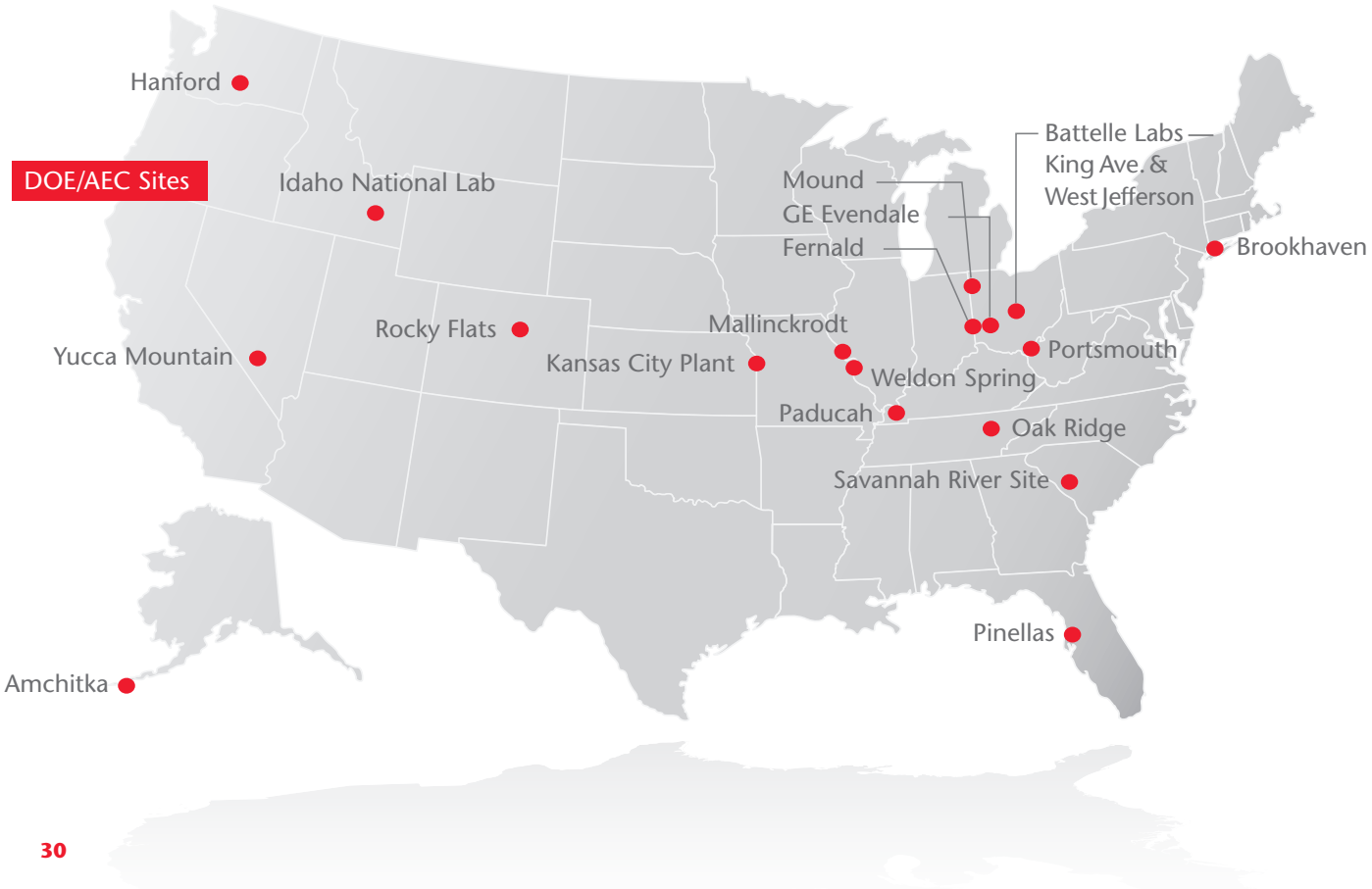
BTMed is the largest medical evaluation program of older construction workers in U.S. history.

They were the sites where the Manhattan Project was launched. They were the sites where World War II was won. They were the sites where the weapons were made that protected us during the Cold War. They were sites across the country where hundreds of thousands of construction workers labored to ensure our national security. They were the sites that bore the seal of the Department of Energy, which inherited their oversight from the Atomic Energy Commission (AEC).

Operations at these nuclear weapons facilities began during the Second World War and continued for decades. Workers there daily – and often unknowingly – found themselves exposed to hazardous substances like asbestos, beryllium, cadmium, chromium, lead, mercury, radiation, silica, toxic solvents. As a result, many would battle unforeseen illnesses years down the road. Today they face both unique conditions like beryllium sensitivity and elevated risks of more conventional hazards like lung disease, hearing loss and chronic obstructive pulmonary (lung) disorder or COPD.

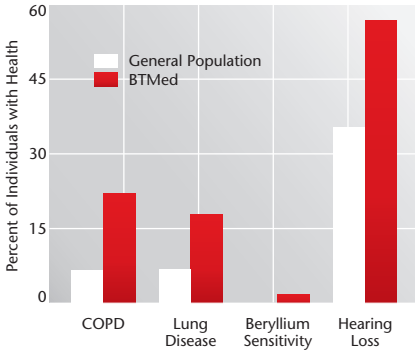
In order to protect the workers who protected us, the Building Trades National Medical Screening Program (BTMed) was created. BTMed provides free medical screening for workers once employed by construction contractors or subcontractors on Department of Energy (DOE/AEC) sites. With a work history interview followed by a medical exam, BTMed helps identify health problems in time for medical intervention.

BTMed has screened more than 24,000 of these unsung heroes since its 1996 inception, including 2,500 workers in the past fiscal year. The cumulative medical findings from BTMed show that many former DOE construction workers are afflicted by conditions that are much less prevalent in the general population. For instance, 18.2% of BTMed participants exhibited



symptoms consistent with work-related lung disease, a condition afflicting only 7% of the general population. There was an even greater difference when it came to COPD: 22.5% exhibited symptoms of this condition, in comparison to only 7.1% of the general population. Although 35.9% of the general

Health Impairments in BTMed Participants and General U.S. Population



population demonstrated hearing loss for normal speech tones, 57.2% of BTMed participants experienced hearing loss, which can mean not hearing the voice of a spouse or the questions of a grandchild.

Perhaps the test result that most distinguishes former DOE construction workers from the general population is the 2.1% who tested positive for beryllium sensitivity, a condition virtually unknown in the general population. These findings not only show the importance of BTMed's service, but also encourage all former DOE construction workers to take advantage of BTMed's free medical screening.

New Study Underway

In 2011, Duke University received research funding from the National Institute of Occupational Safety and Health (NIOSH) to complete – in conjunction with BTMed partners – one of the largest studies ever of occupational risks for chronic obstructive pulmonary disease (COPD). COPD, defined as the obstruction of airflow due to chronic bronchitis and emphysema, is the fourth leading cause of death in the nation and costs billions of dollars in annual health care expenses. The three-year study will consist of 1,500 COPD cases and 1,500 control cases from BTMed participants. The researchers seek to identify which exposures increase COPD risk and what levels of exposure demonstrate the greatest risk to health.

A STORY OF IMPACT

BTMed Detects Disease, Prompts Participant to Promote Program

UA Local 598 member awarded compensation for illness found through BTMed Screening

Courtland Smith

"Every year at Hanford, I had to give a blood sample," Courtland Smith explained, "and every year, it came back clean. It wasn't until I went through the Building Trades National Medical Screening Program that I found out I'd been sensitized to beryllium." Beryllium, a rare element, is critical to the manufacture of nuclear devices. Because exposure is rare in most workplaces, symptoms of beryllium exposure can easily be overlooked or misdiagnosed. Smith worked on the Hanford site for a decade before this disease caused his medical removal from the site. "I used beryllium tools everyday on the tank farm because they are spark-resistant, protecting against explosions. Until the day I was diagnosed, I didn't know anything about beryllium. Because the BTMed's exam checks for everything, I know all about that and much more. Some of my buddies have discovered other illnesses."

The experience convinced Smith to promote the BTMed program with his colleagues. "If the fact that this program found a disease Hanford couldn't find doesn't convince you to go through the program, I guess nothing will."

Early Lung Cancer Detection (ELCD)

During the past year, BTMed conducted a pilot screening program using low-dose CT-scans to identify lung cancer at its earliest stages, when the potential for effective treatment and survival are

"I knew all our health was affected by our work, so I definitely wanted a physical to find out if anything was wrong," says Dan Obray, a painter who worked at the Idaho National Lab from 1979 to 2004. "There's not a big sign that says 'Beryllium: Keep Out.' Instead, it can be in the dust that settles on pipes, in tool chests, or just about anywhere in a building where beryllium production has been done." Obray's BTMed screening identified serious health problems, but they were treatable. Left untreated, he may no longer be busy raising championship thoroughbreds and quarter horses. He says, "This program saved my life."

— Dan Obray, IUPAT member, Idaho National Lab, 1979 – 2004

greatest. This pilot program covered 100 former workers from Oak Ridge and found 29 nodules needing additional evaluation. For two participants immediate biopsies were recommended. Twenty-seven participants had or will have a three-month follow-up scan.

The purpose of the pilot program was to develop detailed procedures for a low-dose CT-scan for high-risk former DOE construction workers. With additional funding from the Department of Energy, the ELCD program could expand to cover more participants from more DOE sites.

DOL EEOICPA Employment Verification

CPWR Begins First Year of Five-Year Renewed Contract

The mission of the Energy Employees Occupational Illness Compensation Program is to deliver benefits to eligible employees and former employees of the Department of Energy, its contractors and subcontractors or to certain survivors of such individuals. But verifying past employment can be difficult for construction workers, many of whom were actually employed by contractors and subcontractors who may no longer be in business. That's why the Dept. of Labor (DOL) contracted with CPWR in 2003 to assist in verifying construction workers' employment.

98.3%
satisfaction rating among BTMed participants

While employers in other industries administer health and welfare and pension benefit funds, in the building trades these trust funds are managed jointly by unions and employers to provide benefits to workers employed by any signatory contractor. That's why a construction worker who completes one job with a contractor can move on to another union construction firm with no interruption in benefits. This system puts the unions in a unique position to verify work histories of members. Although the construction firm may have disappeared long ago, the health and welfare and pension funds remain with their record of hours worked. These records enable CPWR to provide employment history information for workers that are seeking compensation. With a track record of success, CPWR received a five-year renewal of its DOL contract in 2011 for this critical task aiding workers and their families.

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

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- West Kentucky BCTC
- St Louis BCTC

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