

20 YEARS OF PARTNERSHIPS

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Foreword to Highlights 2010



Mark H. Ayers

The Building Trades joins CPWR in marking its 20th year of research – and concurrently celebrating 20 years of partnerships. Highlighting partnerships comes as no surprise. Nothing in the labor movement is done in isolation, and that’s certainly true of the building trades.

From the earliest days of our construction unions, the building trades formed labor-management partnerships to share the work that would benefit both workers and contrac-

tors: training the next generation of workers, providing health and welfare benefits to members to maintain a strong workforce, and securing the safety and health of workers who do the work a single contractor could never accomplish alone.

Now we enter the second decade of the 21st century, and we see CPWR turn and look back at what it has accomplished. Not surprisingly, it mirrors the work of centuries-old craftsmen: attention to detail, structure, cooperation, and collaboration. CPWR’s accomplishments are grounded in applied, evidence-based research, input from our unions, employers, and owners, an investigator’s interest in pursuing the cause of the health hazard or threat to physical safety, the collaboration and sharing of research findings among academics and stakeholders, and creating the bonds of partnerships that gave researchers access to journeymen with an encyclopedic knowledge of a craft.

In the past 20 years, CPWR researchers have burrowed deeply into the causes of construction fatalities, injuries and illnesses. This consortium of staff and university researchers have documented the hazards of breathing welding fumes and silica dust, the skin problems caused by Portland cement and hexavalent chromium, and the injuries and even fatalities from use of common tools: ladders and nail guns, as well as cranes, aerial lifts, and elevators and escalators, to name just a few. CPWR researchers have explained the benefits of asking architects and engineers to “design out” the hazards before workers even enter a jobsite. Other CPWR researchers sought to examine the causes of musculoskeletal injuries and reduce these injuries by redesigning tools, like tin snips and an overhead drilling device that reduces the physical force to a worker’s body by 10 times that of

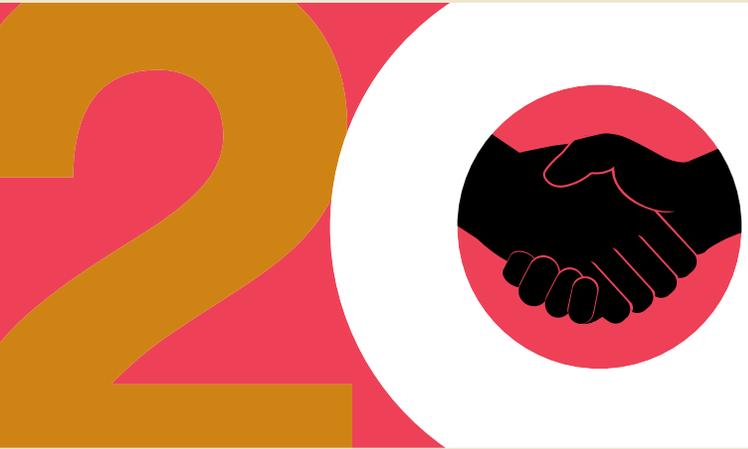
the traditional method. Still others have forged into new areas: identifying hazards within “green construction,” and studying an organization’s safety culture of work practices, near misses and communicating hazards, to name a few.

Obviously funding organizations understand how CPWR’s connection with trainers, workers and contractors enables it to go further than many other non-profits. CPWR is the National Construction Center for the National Institute for Occupational Safety and Health (NIOSH). CPWR received the NIEHS award to again deliver environmental hazards training and manage a minority worker training program. CPWR became the “go to” organization for two federal agencies when they want to reach construction workers who had been on sites where nuclear weapons were manufactured. Other organizations could win grants that take valuable tax dollars and share it with academics to conduct research. But CPWR offered a special prize: the ability to link a researcher with real-world workers, apprentice trainers, site safety managers, and contractors.

It gives me great pleasure as CPWR’s president and president of the Building and Construction Trades Department to provide a Foreword to the 2010 edition of *Highlights*. An overview of their partnerships prefaces the impressive and productive ongoing research. Next are milestones in their training programs plus current news, and a brief history of the BTMed program. The United Against Diabetes program is explained, and the report closes with a look at recent CPWR products.

Please take a moment to read over this work. No matter your profession or position in the construction industry, I think you’ll find information here you’ll be happy to know – and use.

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



20 YEARS OF PARTNERSHIPS

When CPWR began its research program in 1990, we recognized that one of our key strengths, as a non-profit created by the Building and Construction Trade Department, AFL-CIO, was the linkages with construction industry stakeholders. We developed close ties to the 15 international unions in the United States and Canada, their employer groups and joint labor-management training funds. Beginning with these core relationships, our partnerships have expanded over the years, to the point where our research findings have been applied to safety and health training of tens of thousands of workers annually. Our researchers speak at gatherings of safety and health professionals and publish in peer-reviewed scientific journals. Our reports, Hazard Alert cards and other information on our websites have reached millions in the U.S. construction industry, including owners, contractors, regulators, researchers, associations, unions, and of course workers – union and non-union.

In 2010, we embraced our role as the NIOSH-funded National Construction Center to take the lead in research-to-practice or “r2p.” The National Academies’ review of the NIOSH Construction Program identified CPWR as the institution that could best move research findings to worksites. To better serve this mission, in 2010 Robin Baker, a health educator and former director of the Labor Occupational Health Program at UC Berkeley, joined CPWR as our new Director of Research to Practice. We’ve hired additional staff for the new Department and have already made excellent progress in building on the foundation of partnerships we have created over the years.

You will find more information about our r2p activities in this edition of *Highlights*, in addition to the many other research, training, medical screenings, and service projects and activities now underway at CPWR.

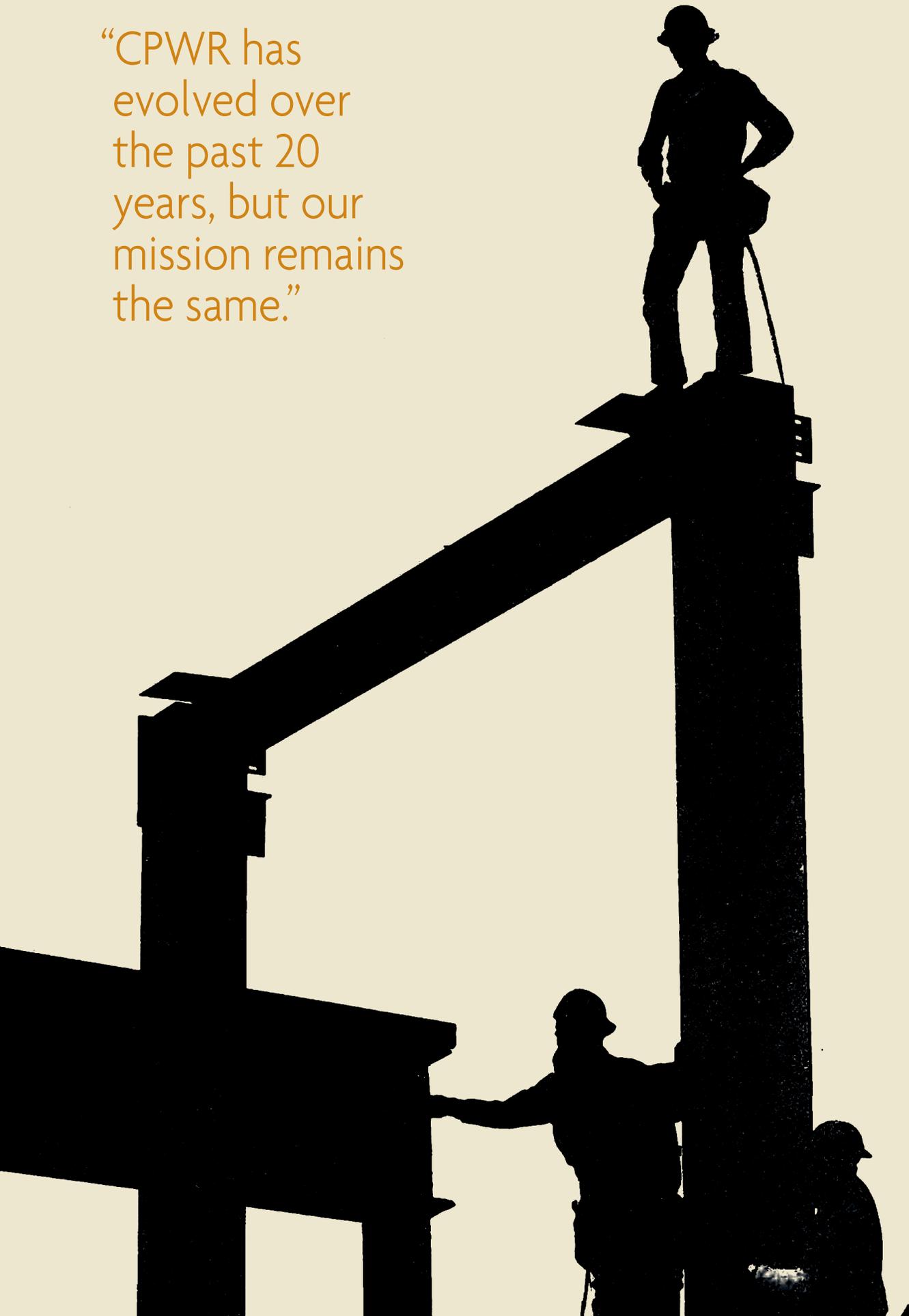
Our organization has obviously evolved over the past 20 years, but our mission has always been the same. Our aim is to advance worker safety and health in the construction industry, and we are convinced the best way to accomplish it is through partnerships with any and all organizations with a stake in construction safety and health.

While a great deal has been accomplished since the inception of our program in 1990, we also have a great deal more to do. If we continue to build on the successes and partnerships highlighted in this publication, I have every reason to believe that we will continue to make strides in achieving our mission.

I would like to thank all of those organizations and individuals who have worked with CPWR over the years, and I look forward to continuing our work together.

Pete Stafford
Executive Director, CPWR

“CPWR has evolved over the past 20 years, but our mission remains the same.”





20 YEARS OF P

1990 Safety & Health Committee, BCTD

When CPWR began its research agenda as a NIOSH grantee in 1990, the organization gained a seat on the Safety and Health Committee of the Building and Construction Trades Department (BCTD). This committee of safety and health representatives from 15 international unions in the U.S. and Canada, plus representatives of employer associations and joint labor-management training funds, has become a partner – and a friend – of CPWR staff. Researchers look at the group as a “first stop” in discussing research topics and findings, and they gain access to journey-level workers, apprentices, trainers and jobsites. CPWR’s applied research provides the statistics and analysis needed to identify threats to worker health and safety and promote safe worksites.



1994 The Construction Economic Research Network

Established by CPWR in 1994 to measure the economic impact of safety and health on the construction industry, the Construction Economics Research Network (CERN) has evolved from a group of social scientists from 20 academic institutions sharing their research to one that focuses on topical areas of interest to industry stakeholders. Over the past decade, meetings have expanded to include representatives of labor unions, employers, owners, and government. Together they have collaborated on initiatives of mutual interest, including the impact of prevailing wages on industry training and injury/illness surveillance. David Weil, PhD, of Harvard chairs; Dale Belman, PhD, Michigan State, coordinates.

1994 International Roundtable



Dr. Knut Ringen, CPWR’s first executive director, tapped his global network of researchers to create the International Roundtable on Construction Safety and Health, which first convened in 1994. At that time, many industrialized

countries were out-performing the U.S. in terms of construction safety and health. As the U.S. strengthened its research to identify causes and preventions of injuries and illnesses, the International Roundtable became a forum to exchange information among participants on mutual areas of concern, such as the aging construction workforce, immigration, and reaching small and mid-sized employers. These activities now continue through the International Social Security Association (ISSA) Construction Section Council. CPWR will sponsor that organization’s 2012 meeting in Boston.

1994 Engineering Controls Work Group

CPWR convened the first meeting of the “Controls Work Group” in 1994 to bring CPWR researchers together with NIOSH’s Engineering Controls Technology Branch staff. During its 15 years of working meetings, this group has expanded to include government officials, manufacturers and end users of construction equipment. Working together they have developed practical, effective tools and identified substitute materials to control workers’ exposure to silica dust, metal and welding fumes, asphalt fumes, isocyanates and other health hazards. Successful partnerships: CPWR, NIOSH, the Painters union and the New Jersey Department of Transportation investigated abrasive alternatives to silica sand, and CPWR, NIOSH and the Bricklayers union evaluated local exhaust ventilation for silica generated during tuck-pointing. See a 2010 white paper on mast climbing work platforms on page 30.

1990

1994

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1995-2004 “Big Dig”

CPWR joined with researchers at the University of Massachusetts Lowell’s Department of Work Environment and contractors on Boston’s “Big Dig” highway and tunnel program. After talking with workers on site, academics identified an ergonomic problem that caused workers’ shoulder, back and neck injuries when they drilled holes overhead in concrete to install hangers for ceiling panels. Collaboration between workers and academics led to a journeymen-recommended solution that reduced contractor costs and eliminated the need for overhead drilling. That success led to other ergonomic-related research initiatives, including the handling of concrete forms and controls for silica dust exposure.

2000 Bringing new researchers into the field

Working with the American Public Health Association’s Occupational Health Internship Program, CPWR has sponsored professional development grants offering graduate students an opportunity to bring new ideas to a wide spectrum of occupational safety and health problems. Recently a team from UCSF went on site to investigate whether an adaptation to a jackhammer would decrease back and shoulder strain in construction workers. The device met with mixed reviews from workers; students came up with a list of recommendations to improve it.



B-REACTOR, RICHLAND, WASH.

1996 Medical screening program began

CPWR initiates the Hanford Building Trades Medical Screening Program, which forms the basis for a National Building Trades Program to screen former workers of DOE sites where nuclear weapons were produced. See page 26.

1997 Smart Mark

When employers and unions wanted to ensure all workers had the same basic safety and health training, CPWR developed a series of training modules, now known as Smart Mark. See page 22.

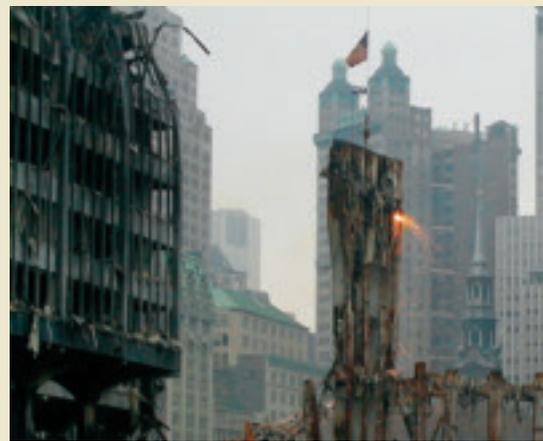


1999 CPWR Training Department created

Protecting workers from environmental hazards is a major focus of CPWR training, as is developing Master Trainers through OSHA 500 training. See page 20.

September 11th Responding to WTC workers

“Second responders” received hazard training. See page 20.



2000 eLCOSH.org launched

Online repository of information for researchers, trainers and safety managers. See page 15.





20 YEARS OF P



2003 Disaster Response Training began

CPWR applied 9/11 training lessons and created a new program. See page 21.

2007 Data Users Advisory Committee to the Bureau of Labor Statistics

By having a seat – and a voice – on this committee whose appointees are a national cross-section of public, private and academic sectors, CPWR has helped focus the Bureau’s attention on construction safety and health data to better identify illness, injury and fatality trends that guide research initiatives in construction. CPWR also has also had input on the quality of the data BLS collects, tabulates and analyzes in its national surveys. One direct outcome of CPWR’s participation: creation of a national database called the Census of Fatal Occupational Injury Data (CFOI).

2003 Administering DOL employment verification program

CPWR began helping the U.S. Labor Dept. locate records verifying work history for construction workers on DOE nuclear sites. See page 28.

2004-2009 Ladder Safety Partnership

As a partner with researchers from the Harvard School of Public Health and the Liberty Mutual Research Institute for Safety, CPWR and NIOSH facilitated access to the Consumer Product Safety Commission’s National Electronic Injury Surveillance System (NEISS), which collects patient information from a national probability sample of participating hospitals for every emergency room visit involving an injury associated with consumer products. The team was able to identify the scope and magnitude of falls from ladders by construction workers who were treated at one of 65 hospital emergency departments sampled by NEISS. The researchers then visited work sites to understand the causes of falls from ladders and how to protect workers.

2007 National Conference on Immigrant Workers in Construction

Working with the California State Building Trades Council and UC Berkeley’s Labor Occupational Health Program, CPWR devised the first-ever conference for unions working with immigrant workers. Workshops and roundtable discussions engaged presenters and participants on overcoming obstacles of language, culture, and safety and health training, moving apprentices to the worksite, and developing Latino leaders. Presenters were building trades trainers, AFL-CIO staff, faith-based organizations, government officials, language skills training providers, the National Day Laborers Organizing Network, and CERN economists. A full report can be found on CPWR’s website.



2008 Las Vegas Site Safety Assessment CityCenter

CPWR led a team conducting site safety assessment of CityCenter in Las Vegas, the largest commercial construction worksite in U.S. history. Four reports and detailed recommendations spurred the contractor to re-evaluate its communications policies and work practices across many levels of its organization.



2005 BTMed created

See page 26.



ARTNERSHIPS

2008 Prevention through Design

Prevention through Design is an initiative the NORA Construction Sector Council developed in 2008 to educate architects and engineers about eliminating safety hazards before they build, instead of incurring expensive workarounds and avoidance training later. One of the successes was a CPWR-funded research project undertaken in 1999, well before the NORA initiative. University of Oregon and Oregon State University researchers helped Intel plan construction of a semiconductor factory in Portland, Ore. Among the design changes Intel adopted was an eight-foot-high sub-flooring instead of the more conventional four-foot crawl spaces. This modification enabled workers to install pipe, electricity and HVAC standing up, not on their backs. CPWR also sponsored a national conference on design-based safety in 2003.



From Pecados Ajenos. Courtesy NBC/Telemundo

2008 Telemundo Partnership on Ladder Falls

CPWR worked with USC's Hollywood Health & Society and NIOSH to create a plot line about a construction worker who suffers a ladder fall for a Telemundo telenovela. The storyline appeared in the popular show "Pecados Ajenos" for two

weeks in April of 2008. Researchers measured viewing audience response and found knowledge of ladder falls increased after watching the show. A public service announcement directed viewers to a CPWR-constructed, Spanish-language website, www.MiTrabajoSeguro.org, (My Safe Worksite) on ladder safety information.

2008 Technical Advisor to NIOSH ERC

As technical advisor to NIOSH's newest university-based Education and Research Center, the Mountains and Plains ERC at Colorado State University, CPWR has bolstered one of the first training programs in occupational health psychology relative to worker safety in the construction industry. CPWR helped channel large and small grants to young researchers eager to gain new insights on a variety of sector-specific topics such as an aging workforce, tool development, leadership and management.



2008 National Academies gives NIOSH/CPWR high marks

An independent scientific panel, convened by the National Academies of Science, released an extensive report Nov. 6, 2008, citing "significant progress" within NIOSH's research program for preventing occupational injuries, illnesses, and deaths in the construction industry. The program was rated "5" out of a possible 5 in relevance and addressing priority needs, and "4" out of 5 in impact, or getting research incorporated on worksites. Two of the panel's recommendations address continuing and expanding the role of the external "National Construction Center," the work performed by CPWR.

2008 Construction Solutions launched

An online database of hazards and ways to control or eliminate them. See page 10.

2010 Masonry Industry r2p Partnership

In 2010, CPWR created the Masonry Industry r2p Partnership, which is intended to serve as a model of an effective, sustainable research-to-practice (r2p) partnership that can be replicated by other industry segments. The group's goal is to establish a structure and process to advance the "application and acceptance of research findings and interventions on construction sites."

The group's first meeting was held November 2010, and included representatives of the Bricklayers union, its employer association, and the International Masonry Institute. Working together, these industry partners and CPWR developed a preliminary list of evidence-based solutions for review and discussion.

During 2011, the partnership plans to identify other potential partners, establish a governance structure, prioritize evidence-based interventions to pursue, and develop methods to overcome potential barriers to acceptance.



2010

Partnerships are a key element of CPWR's research program. While it begins with ties to construction industry stakeholders, CPWR's research program is funded through a competitively awarded grant from the National Institute for Occupational Safety and Health (NIOSH). CPWR's mission to prevent injury, illness and death in the construction sector compliments the goals and objectives of the National Occupational Research Agenda. CPWR salutes our 20 years of collaboration with NIOSH, and we look forward to continuing research to support all aspects of the U.S. construction industry.

Safety and Health Performance Metrics

Lead Researcher: Janie Gittleman, PhD, MRP, CPWR

The ultimate goal of this research is to create a practical product or tool that can track safety and health performance using leading, lagging and financial metrics in the construction industry, and also can be scaled to an organization's size for its own use. The end product could be a checklist or a hand-held device that would set a new benchmark or best practice for field operations to prevent and reduce work-related injuries and illnesses. Although that end product has yet to be determined, interested parties, such as construction owners and contractors, insurance companies and regulatory agencies, have expressed strong interest in the outcome.

In Year One, the work of this team can be summed up in one word: outreach. First, the researchers recruited a group of experts representing a variety of perspectives related to construction safety and health performance to join a National Metrics Advisory Committee composed of general contractors, regulatory agencies, consultants, academics, insurers plus national organizations such as the Construction Safety Council, NIOSH and the Chicagoland Safety Council.

Researchers reviewed safety and health performance metrics literature, talked with practitioners and identified an expanded list of 223 metrics across six Occupational Safety and Health Administration performance categories: employee involvement, subcontractor safety and health, worksite hazard analysis, hazard prevention and control, health and safety training, and management leadership. CPWR's National Metrics Advisory Committee narrowed the list to 95 metrics.

The team also sought content validation of the metrics by soliciting performance metrics ratings from a broad spectrum of construction stakeholders, contractors and safety and health representatives of contractors. In these rating sessions, contractors ranked metrics based on leading, lagging (such as workers' compensation) and financial (such as cost of training and personal protective equipment) metrics they deemed important and likely to use on the job.

To date more than 230 contractors nationwide have rated these performance metrics for construction safety and health. They have also provided essential information on barriers and challenges to implementing metrics on construction sites and offered ideas for future products. Many contractors also requested the team's rating worksheet as a tool to evaluate their own internal operations.

RESEARCH TEAM & PARTNERS: Colorado State University; Stewart Burkhammer and Paul Esposito, C&R Consulting; Chicagoland Construction Safety Council; National Safety Council Construction Steering Committee; Tennessee Valley Authority Labor Management Committee; The Association of Union Constructors (TAUC); CPWR's National Metrics Advisory Committee; National Association of Construction Executives; and more.

Nail Gun Injuries

Lead Researcher: Hester J. Lipscomb, PhD, Duke University

This research team's success in reducing pneumatic nail gun injuries over a 10-year period among union carpenters in residential construction in St. Louis and southern Illinois has prompted similar efforts in the non-union sector, including recruitment of contractors in West Virginia. As before, the focus remains on training in tool use, specifically the use of the safer tool: nail guns with a sequential trigger.

With the support of the West Virginia Home Builders Association, researchers have begun to recruit small non-union subcontractors. They hope to kick off the initial training in the first quarter of 2011.

Meanwhile, to evaluate the impact of training on both union and non-union workers, injury and hazard surveillance specific to residential sites continues. As might be expected, data collection among the union population is further along. However, the economic downturn in residential construction in the Midwest has caused a slowdown in the gathering of that data and a reduction in the number of potential respondents. Fortunately, the researchers' ties to two training schools have enabled them to meet with apprenticeship leaders and instructors to review the logistics of data collection. Thus far, the team has collected surveys from more than 700 apprentices.

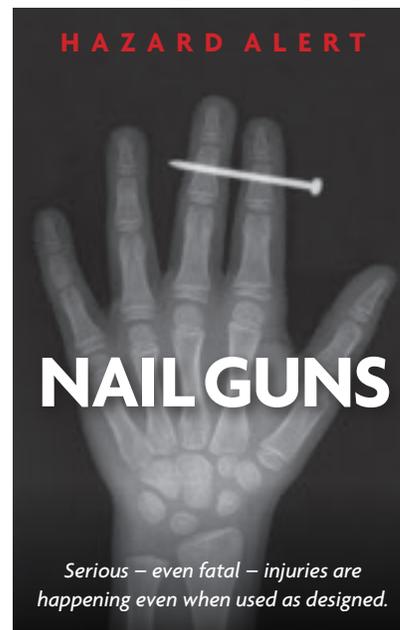
To monitor their progress and assess medical problems associated with tool use, researchers have developed a questionnaire for the collection of surveillance interview data from carpenters reporting musculoskeletal disorders. They have also modified this tool for non-union workers to establish baseline measures for evaluating the residential non-union sector.

To put their own findings in perspective, the team is tracking national injury patterns among consumers and workers based on emergency department visits for nail gun injuries captured by the National Electronic Injury Surveillance System (NEISS) data for 2008-2012. So far, 2008 is the most recent year for which NEISS data is available.

The project also has a public policy component -- to bring about changes that 1) promote use of the safer sequential trigger mechanisms, and 2) define minimal training requirements for nail gun use. To that end, the team has shared its research with the Safety and Research subcommittee of the National Association of Homebuilders, the OSHA Stakeholders meeting and a group of safety investigators attending a symposium in Copenhagen, Denmark.

To create awareness about the hazards of nail guns among end users and the general public, the team has created a Safety Alert and enlisted help from a variety of stakeholders in distributing it. The latter includes the Massachusetts Department of Public Health, Virginia Tech's construction advisory board and Liberty Mutual Insurance Co. The researchers have also secured funding for development of a website that will serve as a repository of resource materials on nail gun injuries for contractors and academics alike.

RESEARCH TEAM AND PARTNERS: Carpenters District Council of Greater St. Louis and Vicinity; Carpenters Joint Apprenticeship Programs, St. Louis, Mo., and Belleville, Ill.; Mark Fullen, EdD, West Virginia University; West Virginia Home Builders Association.



Construction Solutions and its Return-on-investment (ROI) Calculator

Lead Researcher: James Platner, PhD, CIH

Construction Solutions, CPWR's free, web-based resource designed to help construction owners, contractors and workers identify job-related hazards and evaluate interventions, expanded its inventory of information and began offering users a new tool: a return-on-investment calculator.

The CPWR Construction Solutions link to the ROI Calculator, www.safecalc.org, enables contractors to evaluate the financial impact of safety interventions – new equipment, materials or work practices – on their bottom line. The ROI project began in 2004 under the direction of CPWR Medical Director Laura Welch, MD, working with economics professor Supriya Lahiri, PhD, of the Lowell Center for Sustainable Production and Center for Women and Work, both of the University of Massachusetts Lowell. During 2010, consultant Sharon Garber, PhD, conducted usability testing, with assistance from CPWR staff Chris Le and Eileen Betit. CPWR reached out to employer associations, contractors, labor representatives, and safety and health professionals to test the site to assure this tool is user-friendly to a wide audience.

To increase user understanding and promote the implementation of safety and health interventions, the ROI calculator includes several specific examples to show the financial impact of using selected solutions that make the business case for an intervention:

- Lightweight CMUs vs. Heavyweight CMUs
- Sequential Nail Gun vs. Contract Trip Trigger Nail Gun
- Aerial Work Platform vs. Mobile Tower
- Welding Helmet with Auto-Darkening Lens vs. Welding Helmet with Passive Lens

The Construction Solutions site, launched February 2008, is becoming a popular destination. The site includes information on safety and health hazards facing construction workers and provides practical solutions to reduce, control or eliminate those hazards. The information is broken down by work activity, task and related hazards, and includes specifics on the safety and health risk, a description of how the proposed solution(s) will address the risk, other potential benefits to contractors and workers, and where to purchase or how to implement the solutions. All of the solutions in the Construction Solutions database have been authored by a safety and health professional and peer-reviewed.

Initially, the site focused on interventions for musculoskeletal diseases. Since then, the site has expanded to include methods for controlling exposures to silica and other construction dust, chemicals, epoxies, and noise. The database currently contains roughly 100 solutions, with an additional 46 in the development and review phases. Use of the site has been growing steadily. For the 12-month period ending Aug. 31, 2010, the average number of unique visitors to the site per month was 8,241, a gain of roughly 9 percent compared to the same period in 2009.

During 2011, the CPWR development team will continue to expand the number of hazards and solutions available through Construction Solutions and to develop return-on-investment examples that correspond with these evidence-based interventions. Both of these web-based tools will also be used to support many of the research-to-practice (r2p) initiatives underway, including the Masonry Industry r2p Partnership, which will identify, evaluate, and increase the use of interventions by masonry contractors and workers.

Visit our sites www.cpwrConstructionSolutions.org and www.safecalc.org.

PARTNERS: Jeff Nelson, Conceptual Arts, Inc.; Daniel Anton, PhD, Eastern Washington University; Bruce Lippy and Michael Cooper, The Lippy Group, Inc.; Mark Fullen and Paul Becker, West Virginia University; Sharon Garber, PhD, consultant. Numerous contractors, safety and health professionals, employer associations, and trainers from all building trades.



Safety Culture/Safety Incentives

Lead Researcher: Jack Dennerlein, PhD, Harvard University

The risks of working in the construction industry are many and sometimes overwhelming for a safety officer, often the only person on site with the sole responsibility for safety. Although there may be an implicit expectation that workers practice safe working conditions, the priority that they give to these activities usually depends upon the safety culture of the contractors and safety climate of the jobsite. Researchers are investigating whether incentive programs aimed at reinforcing acts that reduce risk (leading indicators) are more effective than traditional incentives based on rates of reported injuries/illnesses (lagging indicators). Their approach is novel because no program reported in the literature to date has been evaluated with a control group.

How the Program Works

Each week Harvard conducts safety inspections on site. Inspectors take note of unsafe conditions as well as safe work practices and assign a score to each subcontractor. These scores, as well as an overall safety score for the site, are displayed on a worksite poster. If the site's monthly safety score is above 96.3%, all workers receive a free lunch.

Steps

Like many innovations, the rewards program described above did not emerge at once. Rather, it evolved during Year One. Throughout, however, the goal remained: to provide feedback to workers along with specific rewards to improve the project's safety performance.

Development of the program hinged around a few concepts: partnerships, measurement, and communication. Dr. Dennerlein noted that partnering with the owner and general contractor was key to implementation. That relationship was also pivotal in quantifying eligibility for the incentives. After securing access to Harvard's safety inspection data, the team crafted plans on how to use this data to determine which contractors would receive the safety rewards. An analysis of the university's safety scores over an 18-month period helped the researchers come up with an overall safety score (96.3%) that was attainable but also competitive.

Communication

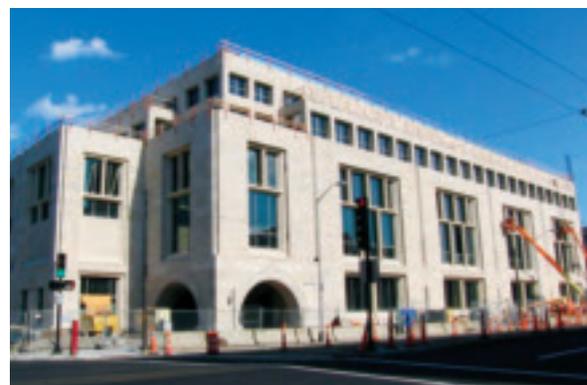
Traditionally, feedback for project safety performance is limited to management. Dr. Dennerlein's idea was to expand that loop to include workers who could have a direct impact on mitigating safety hazards. Since this was a new concept, researchers made an effort to secure buy-in from foremen early. During Year One, study staff also attended weekly meetings with foremen to encourage them to share their safety scores with workers. They also took other steps to create awareness. The team hired a consultant, Dana-Farber Health Communications Core, to develop a "brand" for the program that will be applied to graphics and print materials to make the program visible. Based on conversations with foremen, workers, and management, researchers developed a 10-minute toolbox talk to introduce the incentives program to new workers during their safety orientation meeting. The team also refined its reward scheme so that the whole site gets the reward lunch or it doesn't. Their original approach was to reward individual contractors, but management and workers told them this type of incentive did not foster a positive group dynamic onsite.

RESEARCH TEAM AND PARTNERS: Harvard School of Public Health, Harvard Construction Services Group, Predictive Solutions, Turner, Skanska, and DFCI Health Communications Core.

Harvard researchers are taking advantage of on-going university construction, providing weekly project safety performance feedback to include foreman and workers to mitigate safety hazards.

CONTRACTOR	SAFETY SCORE (as of 12-2-10)
Contractor A	96.32%
Contractor B	99.42%
Contractor C	98.23%
Contractor D	98.11%
Contractor E	99.01%
Contractor F	96.64%
Contractor G	95%
Contractor H	96.39%
Contractor I	100%
Contractor J	98.71%
Contractor K	100%
Contractor L	95.51%
Contractor M	96.9%
OVERALL	97.52%

Each week researchers conduct safety inspections and give scores. If the month's overall safety score is above 96.3%, all workers receive a free lunch.



Isocyanate Exposure

Lead Researcher: Carrie Redlich, MD, Yale University

This research reads like a math problem that contains certain givens:

- Isocyanate chemicals are well-known sensitizers and one of the most commonly reported causes of occupational asthma.
- The construction industry is one of the largest markets in North America for products containing isocyanates, including polyurethane (PU) foam insulation.

What is unknown is the many different types of applications and work settings in which the construction industry uses PU products and the potential adverse health effects they pose for workers through skin and/or respiratory exposure.

What brings a sense of urgency to solving this problem is that “going green” means large numbers of construction workers are installing blown-in PU foam insulation and other products.

In Year One, Dr. Redlich discovered that a large number of different PU spray foam products are increasingly being used in new construction and renovation projects. Her database contains approximately 130 products used in construction. To better understand which products may present greater risk of isocyanate exposure, she gathered specifics about their use, physical form, type of isocyanate they contain, and the presence of other potentially harmful chemicals, among other parameters – when that information was available.

The Material Safety Data Sheets (MSDS) for many of these products are frequently inadequate on the risks of exposure. Some of the MSDS and technical data sheets omit recommended practices. Others cite proprietary reasons for offering no information. MSDS may exist for the finished fully-cured products, but MSDS for the single or two components that the user handles are often not readily available. As a result, there is a general lack of awareness of potential exposures and health risks to construction workers who apply them. Yet many of these products are marketed as “green,” which implies being good for the environment, and can mislead workers (and consumers) to assume there are no human hazards.



“Going green” means construction workers are installing blown-in polyurethane foam insulation, which contains isocyanates – one of the most commonly reported causes of occupational asthma.

But workers can face real health hazards with these products. Over the past year, Dr. Redlich has diagnosed new work-related asthma in four spray foam insulation workers due to exposure to the PU spray foam. These cases, the first that the team was aware of, will be the subject of an upcoming publication.

The team is trying to learn as much as possible about who is using these products and under what conditions through outreach activities. They have begun recruiting workers for their surveillance program, based on contacts made in their outreach activities. The surveillance program, which includes questionnaires, spirometry (breathing test), and a blood

test that can detect isocyanate exposure, may identify additional cases of occupational asthma or other health problems related to these PU products. Through responses to questionnaires, the team also expect to collect information about tasks, workflow and the types of products used so as to identify the duration and form of potential skin and inhalational exposure to PU products, about engineering controls that may be in place, and the extent to which the workers wear personal protective equipment from set-up through clean-up.

RESEARCH PARTNERS: Small contractors, local unions, state health departments.

Organization of Work

Lead Researcher: Peter Chen, PhD, Colorado State University

Although it may be intuitive that leaders can have a significant impact in creating a culture of safety on construction sites, this team set out to empirically identify and validate the skill set necessary for individuals to be successful in this role. The researchers did it by conducting eight focus groups among people who should know – safety directors, union foremen, apprentices, construction superintendents, and training instructors in three locations: Denver, San Francisco and Chicago.

The outcome of these focus groups yielded a list of 193 skills that contribute to being a good leader. By combining similar statements and eliminating duplicate responses, the team condensed this list to 69 vital skills. The next step was to use those results to develop surveys that would zero in which skills to focus on while designing a safety leadership pilot program. The targets of this pilot program are apprentices in their last two years of training and construction management students in their junior and senior years of college. By Dec. 1, 2010, validation surveys had gone out to a total of 1,787 journeymen and 1,090 apprentices in three regions—Denver, Portland and Chicago.

One additional bonus of the focus groups was that the participants suggested strategies and tips for crafting the pilot program. As a result, researchers have decided to design an interactive leadership training program that centers on the long-term sustainability of behavioral change. The team is eager to hear from potential partners who would like to collaborate on the project in Year Two. Researchers and contractors can reach them through this website: <http://csuohp.org>.

Thus far, results from Year One indicate that the full-range leadership model, which encompasses transformational, transactional and non-leadership, is a good fit for the construction industry and a good predictor of safety climate and other safety outcomes.

The Role of Ergonomic Climate

In May of 2010, the team received approval for a supplemental project to investigate the role of ergonomic climate, which is related but distinct from safety climate, in the construction industry. In Year One, the researchers' goal was to investigate the construct and then develop a survey to measure it. Focus groups with experts revealed that ergonomic climate is an important factor to consider in workplace health and safety. Furthermore, the experts suggested that ergonomic climate is multifaceted and that when employees form opinions and ideas about the way management values ergonomics in the workplace, they take many things in their environment into consideration, such as leaders' behaviors and the policies and practices of the organization. A review of the literature on climate and ergonomics substantiated these suggestions; responses from the focus groups along with relevant literature will serve as the basis for developing an assessment tool for measuring ergonomic climate in organizations and decreasing accidents and injuries.

RESEARCH TEAM & PARTNERS: John Rosecrance, PhD, Krista Hoffmeister, BA, BS, Colorado State University; United Association of Plumbers, Fitters, Welders, and HVAC Service Techs; Mechanical Contractors Association of America; Plumbers Local 3, Pipefitters Local 208, Steamfitters and Pipefitters Local 290, Local 597 Pipefitters; Reconstruction Experts, Inc.; Intel Ronler Acres.



Superintendents talk with researcher Krista Hoffmeister about strategies for implementing leadership training that could significantly impact safety culture on construction sites.

Residential Fall Protection

Lead Researcher: Bradley Evanoff, MD, MPH, Washington University, St. Louis

Given that falls from heights remain the leading cause of fatalities at residential construction sites, Dr. Evanoff and his team used surveys and focus groups of apprentices and residential foremen in Year One to identify gaps in on-the-job fall prevention training and mentorship. Among the team's findings are:

- Most apprentices want direct mentorship and feedback. However, foremen say they are uncomfortable in giving positive feedback.
- Foremen are unclear where OSHA standards end and company policy begins. They feel a constant need to juggle safety with production and find it difficult to routinely follow fall prevention methods.
- Inexperienced apprentices want senior carpenters to show them how to apply what they learned in school to specific work situations, but apprentices see a disconnect when senior carpenters perform unsafe acts.

- Apprentices say toolbox talks could be more helpful if they were relevant to actual work tasks.

Prevention Technologies

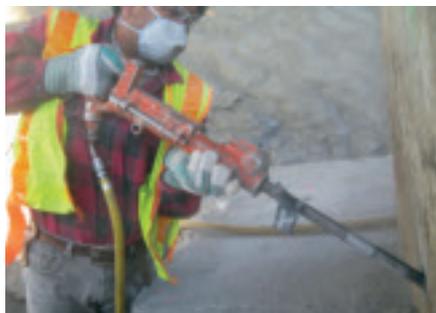
The researchers identified fall prevention technologies to protect workers during roof truss layout and installation. After piloting the “wall-walker” hanging scaffold system at 15 worksites, they found fall risks decreased due to less work from ladders and less walking on the truss. Most crew members found the system easy to use.

RESEARCH TEAM & PARTNERS: Victoria Kaskutas, OTR/L, OTD, Washington University, St. Louis; Hester Lipscomb, PhD, Duke University; Carpenters District Council of Greater St. Louis and Vicinity; Carpenters Joint Apprenticeship Program.

Highway and Bridge Construction Drilling

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

A hand-held, air-powered rock drill weighs up to 60 lbs., and workers drilling into concrete experience tremendous force and vibration from the work, often drilling to a depth beyond 12 inches. Dr. Rempel's project is building a rock drill support tool that reduces force and vibration to the drillers' hands, arms, shoulders, and body while increasing speed and quality of work.



The traditional method vs. a new tool. Rempel's team is developing a rock drilling support tool that reduces force and vibration to the worker's body, controls silica dust, and increases the speed and quality of work.

The team has already built several prototype rock drill supports for testing at commercial construction sites where rod and dowel work is done. They will recruit 12 contractors who do structural renovation on foundations and bridges and whose health and safety staff are supportive for collecting data on their sites. Workers will be asked to compare the drill support to the usual hand-held method of drilling and also offer suggestions to improve the tool's design.

Another project goal was met when the team identified building retrofit and expansion projects, such as stadium seating, that may offer another outlet for this new system and improve safety in work outside bridge and highway sound wall drilling. The researchers determined that the proposed system should accommodate drilling at any angle and height; this will improve worker safety in other settings.

Researchers further expanded the project to include respiratory concerns. California contractors, faced with a new state regulation on silica dust exposure, expressed interest in controlling dust during concrete drilling. The team responded and, working with DustControl Inc., developed a system to capture the large volume of silica dust generated during drilling. Silica dust can cause debilitating lung disease.

RESEARCH TEAM & PARTNERS: University of California at Berkeley Ergonomics Program; California Department of Public Health – Occupational Health Branch; Laborers International Union of North America (LIUNA); RM Harris; PCL Construction; Cahill Contractors; Alten Construction; WebCor Builders; AGC-California; DustControl Inc., and Atlas-Copco.



Safety and Health Disparities among Construction Workers

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

In Year One, this project focused on trends in safety and health disparities during the current economic downturn. Major findings are published in Data Briefs on the CPWR website under *What's New*.

Hispanic Employment during the Economic Downturn

- Hispanic employment in construction grew from 646,000 in 1992 to nearly 3 million in 2007, and then in 2008-2009, shrank by 719,000.
- Foreign-born workers accounted for most of the workforce growth and decline in construction. Hispanic immigrant workers increased from 0.4 million in 1992 to 2.3 million in 2007, then declined to 1.6 million during the economic downturn. By contrast, native Hispanic employment in construction was relatively stable for this period.

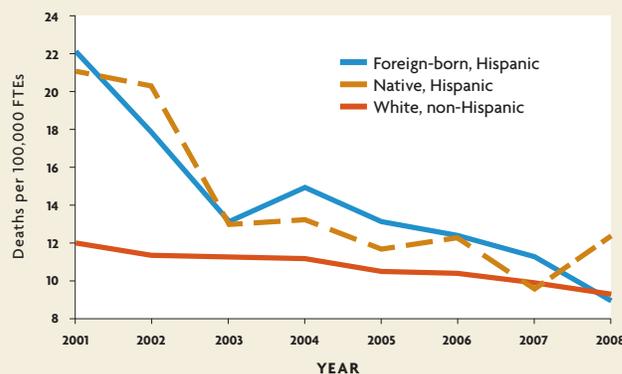
Health Insurance among Hispanic Construction workers

- About 64% of Hispanic construction workers did not have health insurance in 2008, compared to 23% of their white, non-Hispanic counterparts.
- Nearly 75% of unionized Hispanic construction workers had health insurance through their employment, compared to only 24% of non-union Hispanic workers.
- In small construction establishments with 1-10 employees, only 18% of Hispanic workers had employment-based insurance.

Fatal and Nonfatal Injuries among Hispanic Construction Workers, 1992-2008

- The rate of fatal injuries for Hispanic construction workers was about 41% higher than white, non-Hispanic workers in 1992 -2006, but the rates appear to have

Rate of work-related deaths from injuries, Hispanic foreign-born, native, and white, non-Hispanic workers in construction, 2001–2008



FTE = Full-time equivalent, defined as 2,000 hours worked per year.
Source: Bureau of Labor Statistics; Census of Fatal Occupational Injuries, Current Population Survey.

converged in 2007-2008. No disparity was found in nonfatal injuries from the BLS data.

Nonfatal Injuries among Hispanic Construction Workers

- This study of Medical Expenditure Panel Survey data found that Hispanic construction workers were more likely than their white, non-Hispanic counterparts to suffer medical conditions from work-related injuries. This suggests underreporting in nonfatal injuries captured by BLS.

The findings were published in the *American Journal of Industrial Medicine* (2010;53(6):561-9).

RESEARCH TEAM: Xuanwen Wang, PhD, and Christina Daw, PhD.

Getting the Word Out: Dissemination/Communications

Lead Researcher: Mary Watters, MFA

Although CPWR's Communications Department is engaged in many activities to disseminate critical research information, the overarching research project for 2010-11 is the reorganization and redesign of CPWR's electronic Library of Construction Occupational Safety and Health, www.elcosh.org.

To provide direction and guidance, Communication staff assembled two eLCOSH Working Groups comprised of safety and health professionals from contractors, labor, government, and research. The groups met online, using free technology that enabled participants from Hawaii to South Carolina to discuss site content and formats to better meet their needs. Consultant Sharon Garber, PhD, developed tests and conducted surveys

with eLCOSH users, both in person and online, to create a "mental model" of how users categorize safety and health information. Eileen Betit, a professional with more than 20 years in union communication activities, brought added resources for recategorizing and analyzing the site information. The team, plus CPWR's Jim Platner, PhD, will continue working with web development firm Conceptual Arts to present a new eLCOSH in 2011.

RESEARCH TEAM AND PARTNERS: Conceptual Arts; Eileen Betit; Sharon Garber, PhD; Jim Platner, PhD. Members of the eLCOSH Working Group 1 & 2: contractor safety and health professionals, government, researchers, union trainers.

Construction Worker Health Across the Lifespan

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

The CPWR Data Center has embarked on a new longitudinal study of construction worker safety and health from the time workers enter the industry through retirement. Year One focused on older workers, age 55 and over.

Aging Workforce during the Economic Downturn

The average age of construction workers jumped during the economic downturn, from 39.6 years in 2007, to 41.4 years in 2009.

As they become older, workers whose longest jobs were in construction trades are more likely than white-collar workers to have arthritis, back problems, chronic lung disease, functional limitations and work disability.

This trend corresponds to the considerable decline in Hispanic construction workers, who tend to be younger, as a significant proportion of the construction workforce.

Chronic Diseases and Functional Limitations among Older Construction Workers

This longitudinal analysis found that:

Working primarily in construction trades exacerbates the usual decline in overall health, increasing likelihood of functional limitations, arthritis, back problems, chronic lung disease, and stroke in later years. The gap in these health problems between construction trade workers and white-collar workers increases over time. These findings will be published by the *Journal of Occupational and Environmental Medicine*.

Fatal Falls among Older Construction Workers

This study found that:

The rate of work-related deaths steadily increases with age. In 11 out of 14 construction occupations, the risk of fatal falls is significantly higher in workers age 55+ than in younger workers. The fatal fall rate for older roofers (the highest risk occupation) was 60.5 per 100,000 full-time equivalents (FTEs), nearly *triple* the rate of 23.2 per 100,000 FTEs for younger roofers (under age 55). Falls from roofs accounted for nearly one-third of construction fatal falls overall, but falls from ladders caused a larger proportion of deadly falls in the older decedents than in the younger group.

RESEARCH TEAM: Xuanwen Wang, PhD, Christina Daw, PhD.

Construction Safety and Health Tracking Plan

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

Year One research and key findings include:

Injury Underreporting among Small Construction Establishments

This study found that small construction establishments are most likely to underreport injuries, especially those of Hispanic workers. From this analysis, it is estimated that BLS captured just 25% of severe injuries among Hispanic workers and 60% of severe injuries among white non-Hispanic workers in small construction establishments.

Findings will be published in the *American Journal of Industrial Medicine*.

Trends in Fatal and Nonfatal Injuries, 1992-2008

The number of fatal injuries in construction increased about 35% from 1992 to 2006, then dropped 18% between 2007 and 2008. This trend reflects the fluctuation in overall construction employment during this period.

Overall, both fatal and nonfatal injury rates in construction declined. The death rate decreased 33% from 14.3 to 9.6 per 100,000 full-time-equivalents (FTEs) from 1992 to 2008, while

nonfatal injury rates involving days away from work (DAFW) declined around 67% from 529.5 to 174.3 per 10,000 FTEs during this period.

These findings can be found in a report on the CPWR website.

Fatal Falls among Construction Workers, 1992-2008

Injuries from falls continued to be the No. 1 cause of fatalities in construction – a total of 6,304 deaths over 1992-2008. The percentage of fatal falls went up from 28% of deaths in 1992 to 33% in 2008. More than 60% of fatal falls occurred at construction establishments with 10 or fewer employees.

Findings were included in the Proceedings of the 2010 NIOSH International Conference on Fall Prevention and Protection.

Collaborations to Improve Existing Data Collection and Measurement

The Data Center collaborated with federal agencies and labor organizations including NIOSH, BLS, OSHA, and AFL-CIO, to improve existing surveillance data collection and measurement.

RESEARCH TEAM: Christina Daw, PhD, Xuanwen Wang, PhD, CPWR Data Center

Silica and Noise Controls

Lead Researcher: Susan Woskie, PhD, University of Massachusetts, Lowell

Since silica dust and noise continue to present serious risks to construction workers, the researchers began partnering with two contractors to evaluate the effectiveness of proven controls.

For a demolition contractor, the team reviewed two configurations of local exhaust ventilation controls used on a pneumatic needle gun scaler for scarifying concrete floors on a new building. Preliminary evaluation of the data indicates the use of an enclosing cowl on the needle gun reduces dust to a greater degree than an off-gun arrangement.

With the second contractor who does concrete repairs on bridges, the team is evaluating new technology, including a custom dust control method. These results will be compared to their current dust control methods.



The silica dust hazard is clear in this photo of workers scarifying concrete. The hazard that can't be seen is the noise level.

In both situations, the researchers conducted on-site interviews to collect data on the incentives and barriers to using various dust control systems. They are weighing the pros and cons of systems and will work with the contractor on improvements and innovations based on quantitative sampling results and the qualitative information from interviews.

Noise Control

Both contractors have agreed to measuring noise exposures on their sites. So far, the team has identified one problem and the contractor has devised a practical solution.

RESEARCH TEAM AND PARTNERS: Susan Shepherd, PhD, University of Massachusetts, Lowell; Suffolk Construction, Aulson Company, SPS New England.

Participatory Ergonomics

Lead Researcher: Laura Welch, MD, CPWR

Although tools, equipment and work methods have been developed to reduce the body's wear-and-tear of physically demanding construction tasks, the construction industry has been slow to use them.

CPWR's Medical Director Laura Welch is examining the use of participatory ergonomics, a collaborative effort engaging management, workers and ergonomists, as an effective way to speed the



Assessing construction hazards is difficult because workers perform many tasks over time within a single job, and each task has different physical hazards.

adoption of interventions in the construction industry. The ergonomics team learns how to assess hazards, evaluate work practices and make changes to improve health and other outcomes. Participatory ergonomics draws on concepts of empowerment learning in which workers learn and develop through direct participation in the redesign of work. Benefits include enhanced worker motivation and job satisfaction, plus greater acceptance of change by participants, in addition to reduction of injuries and days lost from work.

Assessment of hazards in construction is difficult because trade workers perform many tasks over time within a single job, and each task entails different physical hazards. In Year One, the team used several methods – direct measurement, observations and worker ratings – to obtain an overall exposure assessment of the physical hazards of a job. These specific measures will be a baseline measure for use in interventions.

Researchers are also using health claims for musculoskeletal disorders to target the types of work with the highest injury rates.

RESEARCH TEAM & PARTNERS: Washington University in St. Louis; University of Massachusetts Lowell; Carpenters' District Council of Greater St. Louis; Carpenters' Health and Welfare Trust Fund of St. Louis; Floor Layers Local 1310; Sheet Metal Local 36; Sheet Metal Local 36 Benefit Fund.

Vulnerable Worker Training and Safety Liaisons

Lead Researcher: Michele Ochsner, PhD, Rutgers University

Will “safety liaisons” (peer safety leaders) trained to identify common hazards and share information and safe work practices with co-workers and supervisors be able to make a difference in health and safety on union and non-union residential construction sites? The Rutgers research team seeks to answer this question during its five-year project.

In Year One, the research team recruited seven members of Laborers Local 55 and nine Latino day laborers in construction for a series of one-day meetings to discuss project goals and health and safety issues in residential construction. These meetings culminated in a five-day train-the-trainer session. The English/Spanish curriculum included the residential construction health and safety curriculum developed by the Rutgers Occupational Training and Education Consortium/New Labor, plus new learning activities to build participants’ understanding of the role of a safety liaison, especially in conducting worksite audits. All meetings and trainings were conducted in English and Spanish to build teamwork and respect among African-American and other minority workers from Local 55 and the immigrant Latino day laborers. The bilingual challenge was resolved by having participants wear earphones for simultaneous translation of instructions and discussion. One powerful outcome: workers realized that they share the same motivations to work hard for their families, and they experience the same struggles and hazards on jobsites.



Members of Laborers Local 55 and immigrant Latino day laborers in construction came to a powerful understanding: They all shared the same motivations to work hard for their families and experienced the same hazards on jobsites.

During Year One, the safety liaisons also helped researchers create a bilingual safety audit/checklist to record hazardous worksite conditions and changes made to correct problems identified. Data collection using this instrument is underway.

RESEARCH TEAM & PARTNERS: Carmen Martino, Rutgers University; Betsy Marshall, PhD, the School of Public Health, University of Medicine and Dentistry of New Jersey; New Labor, a worker center in New Jersey; and LIUNA-NJ Local 55.

Minimizing Exposure to Dust and Fumes

Lead Researcher: Pam Susi, MSPH, CPWR

Previous research has established the need for engineering controls for fumes generated during welding and silica dust generated during tuck-pointing. While controls exist that reduce exposure to varying degrees, researchers agree there is room for improvement. In addition, these controls are rarely used on construction sites. This research team draws on resources and contacts from the previous grant cycle to identify effective local exhaust ventilation systems in construction then the team will use industry partnerships and apprenticeship training to encourage greater and more

effective use of the equipment. Pilot research revealed that apprentice welders using local exhaust ventilation (LEV) were still subject to high levels of exposure to hazardous metal fumes because they had limited or no training in how to position and use the LEV equipment. The expanded research team met in Chapel Hill, N.C., in November of 2010 to begin planning and coordinating activities for this four-year project. CPWR’s new r2p Director, Robin Baker, MPH, joined the research team for part of the meeting to map out possible dissemination strategies to make sure research findings have a wide reach and are likely to increase demand for this equipment within the industry.



Research Team, left to right: Sergio Caporali, PhD, University of Puerto Rico; David Feldscher, Pipefitter L.U. 120; Marc Weinstein, PhD, Florida International University; Mike Flynn, ScD, University of North Carolina; Robin Baker, MPH, UC-Berkeley/CPWR; Mark Goldberg, PhD, Hunter College; Mike Cooper, MPH, CIH, The Lippy Group; Pam Susi, MSPH, CPWR; Robert Herrick, ScD, Harvard University; John Meeker, PhD, University of Michigan.

Small Studies

CPWR's Small Studies program provides a unique way to improve workplace safety. The program funds pilot projects at a maximum of \$30,000, with a completion time of one year. In the 18 years of its operation, this NIOSH-sponsored program has received more than 160 letters of intent and funded 80 studies. The funded projects have provided an impressive diversity in terms of scientific aims, applicant organizations, and geographic representation. Research topics include equipment design, training evaluation, safety controls, behavior-based safety programs, green building design, and economics. The projects identify needed policy changes or potential interventions, and can help determine whether large-scale investigation is warranted.

Small studies can include, but are not limited to:

1. Providing initial support for investigators to develop new or innovative approaches/lines of investigation, especially addressing NORA construction agenda goals, emerging issues, and r2p;
2. Exploring innovative or new directions representing a significant departure from ongoing funded projects in construction sciences; and
3. Encouraging investigators from other fields of study to apply their expertise to construction safety and health issues and NORA national goals.

CPWR Small Studies funded in 2010:

- Data linkage of state registries for assessment of construction injuries, University of Illinois at Chicago.
- Design for safety techniques for green building components, University of Colorado at Boulder.
- Evaluation of the implementation and impact of the Massachusetts construction OHS training rule, University of Massachusetts Lowell.
- Creating the climate for making ergonomic changes, State Building and Construction Trades Council of California.
- Behavior-based safety program in the home construction industry, Duke University.
- The role of aging on the type, nature and cost of construction injuries, Colorado State University.

A CPWR Small Study from 2010

Green and Healthy Jobs elevates worker safety as a priority

Building and remodeling structures to make the planet healthy shouldn't endanger the health and safety of the people doing the work.

That's the position Helen Chen, J.D., M.S., of University of California – Berkeley's Labor Occupational Health Program took when she analyzed jobs created by "green construction" and the inherently high-hazard construction work faced daily in those trades. The report, *Green and Healthy Jobs*, funded through a CPWR Small Study grant, examined unexplored areas of the new green jobs industry, categorized the jobs and assessed the associated hazards to workers. Chen also redefined a "green job" to be a job that 1) contributes significantly to preserving or enhancing environmental equality, 2) provides a living wage with benefits to workers, and 3) promotes the health and safety of workers and the public

One worker died and another was injured at a wind farm under construction in Oregon in 2007. The workers had less than two months' experience and no supervisor was on site. See report for more details and case studies of green jobs fatalities.

living near the project. She then offered five recommendations for elevating construction safety as a priority within the green building community. Included in the report are case studies of worker fatalities in green jobs, giving causes and prevention strategies.

The report, written for any audience, is posted on CPWR's website and on eLCOSH.org.



COURTESY MIKE McDONALD/SEATTLESTAGELIGHTING.COM

CPWR develops training programs in response to needs identified by Building Trades unions and their employers. CPWR created Smart Mark, a series of training modules on falls, electrical safety, tools, and more, when basic outreach training was needed. In 1999, CPWR expanded its training program into environmental hazard training, OSHA Trainer courses, and minority worker training programs. The most recent training developed, disaster response training, was born of a national tragedy (below and right), and it embodies CPWR's commitment to keep construction workers safe under any circumstances.

Responding to September 11th

November 2001 – April 2002

After the World Trade Center attacks on September 11th, construction workers joined firefighters, police and emergency responders in rescue and recovery operations. Working amid obvious safety and health hazards in the debris, the building trades workers' unions expressed concern for their members, who were spending untold hours at Ground Zero. To ensure that a coordinated effort was undertaken to protect the health and safety of the workers, the building trades unions chose a tried and true model for action: a labor-management partnership.

As the labor-management partnership was formed, CPWR, as the safety and health research and training arm of the Building and Construction Trades Department, was brought to support the work of the New York Building Trades Council. CPWR met with representatives of New York City's Department of Design and Construction (acting as owner of the site), union and health representatives, prime contractor safety directors, OSHA, Liberty Mutual Insurance Co., firefighters, Port Authority representatives, and safety equipment manufacturers in early November of 2001 to work closely with this group.

Based on the safety and health concerns brought up during the partnership meetings and proposed recommendations from CPWR, CPWR was asked to develop and deliver a WTC site safety and health orientation program. With National Institute of Environmental Health Sciences (NIEHS) supplemental funding, a training curriculum was developed and a train-the-trainer program was conducted. The training for workers included site-specific information like maps, emergency phone numbers and likely hazards. From November 2001 to April 2002, it is estimated that at least 2,500 workers received training.

Early in the response, the site was chaotic. There was an uneven adoption of respirator use among workers; some weren't wearing any at all, and some were only wearing paper dust masks. Later, workers who were trained with the site orientation were advised to wear a half face respirator at all times to protect against site dusts, fumes, and vapors. Compounding the problem, there was no OSHA enforcement of respirator use on the site. As a result of exposure to airborne toxins on the site, many workers developed what has been commonly known as the "World Trade Center Cough," and a myriad of long-term health effects.



Building trades unions expressed concern for members spending untold hours at Ground Zero. CPWR developed and delivered a site safety and health orientation program that trained 2,500+ workers.

A Legacy of 9/11: Disaster Response

2003 – Present

CPWR's response to September 11th had unintended consequences within the organization. As they trained building trades workers in safe work practices at Ground Zero, CPWR staff realized the tremendous need for construction workers who already knew how to respond to disaster situations safely. Construction workers often provide skilled support by assessing building damage, clearing debris, or aiding in search and rescue after a flood, tornado, or building collapse. These workers can jump in to help without a thought to their own safety.

CPWR's Ground Zero experience led to the development of a new curriculum designed specifically for a safe response to a catastrophic event. The program, the OSHA 7600: Disaster Site Training for Construction Workers, launched in 2003.

To develop the program, CPWR was awarded an NIEHS grant then partnered with NIOSH, OSHA, the 15 building trades unions and the BCTD, the International Association of Firefighters, Alaska Works Partnership, and Construction Safety Alliance, as well as many state and local building trades councils, employer associations, and local government emergency preparedness planning officials. The training program's primary tool is a DVD giving examples of hazards a worker could encounter through interviews of workers deployed to the WTC site and guidelines on how to work safely in a dangerous setting.

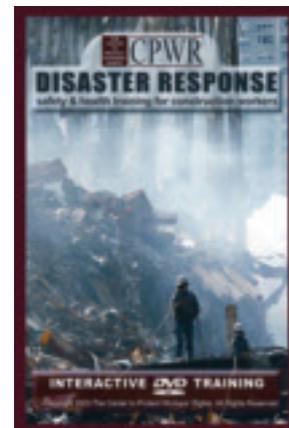
Beyond hazards, the DVD also has information about how to work within an Incident Command structure, which allows for a coordinated response in emergency situations. A video portion, which seems more like a movie than a training film, allows workers to follow construction workers who are involved life-and-death decisions during search-and-rescue situations requiring immediate action. Trainees can select a decision and see what the outcome can mean for the construction worker and other people involved.

Now every trainer who takes CPWR's OSHA 500 modified class is also trained to deliver the OSHA 7600 to construction workers. CPWR has trained trainers in every state and municipal area in the United States to reach an important goal: a cadre of construction workers in every community who are trained prior to a disaster occurring.

Nonetheless, the curriculum also can be used to quickly and effectively train construction workers to be emergency responders after a disaster strikes.



A scenario in the interactive DVD gives workers a chance to make decisions and learn the Incident Command System.



Free Disaster Response Training

CPWR has grant funds to support local unions and building trades councils in providing the disaster response course to their members. Contact Chris Trahan of CPWR for details.

Smart Mark: A program forged in partnership

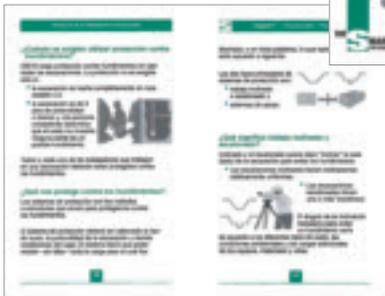
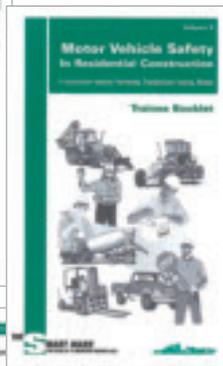
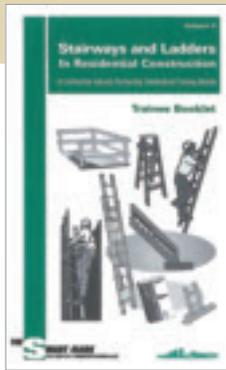
1997 – Present

In the late 1990s, unions and employers began discussing a common concern: They had no clear way to ensure that every construction worker who walked on a jobsite had the same basic level of safety and health knowledge. Although some individual building trades had developed craft-specific training for the OSHA 10-hour Construction Outreach program, courses varied in terms of content, quality, and appearance.

So in 1997, labor and management took action. The Construction Industry Partnership (CIP), comprised of representatives from 15 construction unions affiliated with the Building and Construction Trades Department (BCTD) and seven national employer associations, turned to

“It’s a professionally made course. Everyone gets the same information but as an instructor, you have choices of presentation style.”

—Master Trainer, UA



CPWR to build a consistent training program. Drawing from years of research, CPWR worked with CIP members to develop the training program CIP named “Smart Mark.” The initial 10 modules covered falls, electrical safety, tools, health hazards, and more.

Smart Mark helps instructors deliver a large amount of information to workers in an effective way. The program uses PowerPoint presentations with discussion-provoking questions, explanatory pictures, bullet points, and quick quizzes. Low-cost trainee booklets

contain essential information plus graphics that serve as a reference long after workers leave the class. A Bricklayer master instructor said that “Smart Mark makes essential information easy to understand, especially for first-timers. It brings us all down to earth. It’s a great tool for apprentices.”

The program’s information is not just easy to understand, but it also is sound. A former OSHA Labor Liaison commented, “The Introduction to OSHA module has all the information needed by the worker in the field.

One of the great things is, anytime you show a slide, it refers back to the OSHA standard.”

Other Smart Mark users have noted that it is superior to other classroom training formats. A master instructor for the United Association of Plumbers and Pipefitters (UA) concurred: “There is nothing that compares with it for quality of completeness. It’s a professionally made course. It’s uniform, everyone gets the same information. But as an instructor, you have choices of presentation style.”

Since Smart Mark was introduced, nearly 600,000 workers have been trained using it. The program has grown from 10 to 19 modules. In 2008, 10 years after it was initially launched, Smart Mark was updated with six new topics including silica, motor vehicles, and residential construction hazards. Upon its re-launch in 2008, BCTD President Mark Ayers declared that the program had been a tremendous success and envisioned a growing number of workers being trained.

The Smart Mark curriculum has also been translated into Spanish to reach Hispanic construction workers. Union trainers interested in using either the Spanish or English language version should have their international union’s training department contact the BCTD for ordering information.

Minority Worker Training Program: Supporting Community Partnerships

2000 – Present

CPWR administers a federal grant to provide safety and health training to disadvantaged ethnic minorities in three U.S. cities near EPA Superfund sites. The main goal of the program is to prepare the students for employment in hazardous waste work in the communities affected by the hazards. Over the years, CPWR has found that the training can actually prepare students to advance into a construction trade.

To make maximum use of the federal grant dollars, CPWR taps into its existing networks and resources. By partnering 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 worker classes, students receive training in asbestos abatement, scaffold erection, basic construction skills, 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. CPWR will conduct training annually for 60 trainees through its partner network: JobTrain, a community-based organization in East Palo Alto, Calif.; the Louisiana Regional Council of Carpenters JATC in New Orleans, La.; and both Merrick Community Services and St. Paul Building Trades Council in St. Paul, Minn.

In 2010 the program trained 182 students through two funding sources, resulting in job placements for 115 of the trainees. To date, 2,135 students have been trained since CPWR began the program in 2000. Of those, only 71 dropped out, producing a group of 2,064 graduated students. Of those, 1,515 have been placed in jobs, for 73.4% placement rate during a 10-year period.

Success in St. Paul

Joseph Grevious, a single parent with custody of his son, applied to the Minority Worker Training Program because he wanted a career that would provide long term stability. Joseph was underemployed, only making minimum wage in a part-time job with no benefits. Just prior to beginning the training, his work hours were reduced and he lost his apartment. Joseph and his son stayed with relatives in a one-bedroom apartment.

Despite these hardships, Joseph received high marks from all his trainers. They reported that he and his team partner were usually the first ones done with their project and their work was always done correctly.

After graduation, Joseph was hired by S. M. Hentges & Sons, a concrete, bridge, site development and utilities contractor in Jordan, Minn.

Once employed, Joseph was able to purchase a car with a no-interest loan through a partnership through Merrick Community Services with Community Action Partnership of Ramsey and Washington County Car Loan Program. Merrick Community Services, a community-based organization, is a CPWR partner in the Minority Worker Training Program. Joseph's future is much brighter now: He and his son moved into their own apartment July 1, 2010.



Joseph Grevious receives training in weatherization through the Minority Worker Training Program. The young father now has a steady job with S.M. Hentges & Sons, a family-owned contracting firm.

Environmental Hazards Training in 2010

1999 – Present

CPWR, working in partnership with our Construction Consortium for Hazardous Waste Worker Training comprised of 11 Building Trades unions, delivered over 500 courses in various environmental hazard categories in 2010. These courses reached more than 9,000 construction workers and totaled nearly 150,000 training contact hours. These courses were delivered in 29 states and Puerto Rico.

Workers taking these courses are involved in many types of hazardous work, including asbestos removal, asbestos glove-bag abatement, lead removal, general hazardous construction clean-up, tank cleaning, contaminated duct removal, boiler repair, radiological decontamination, and contaminated materials handling, among other tasks.

In 2010, CPWR continued offering opportunities to create newly minted instructors who could conduct life-saving courses on working safely in a confined space. CPWR delivered a Confined Space Train-the-Trainer course Feb. 1-5, 2010, in Raytown, Mo. Thirty-four participants from the Plumbers & Pipefitters, Sheet Metal Workers, Electrical Workers, Painters, Plasterers/Cement Masons, and Bricklayers unions attended.

CPWR also found ways to enhance instructor skills: CPWR trainers delivered a Training Techniques workshop for new union instructors at the HAMMER Training Center in Richland, Wash., Sept. 20 - 24, 2010. Partnering with the HAMMER training center and using union peer instructors, CPWR delivered 92 courses there in 2010, as the need for developing new union trainers is ever present. One of the most gratifying results of CPWR's instructor development training can be seen in the excitement and success of new instructors' experience.

CPWR's Environmental Hazard Training Department also provides master instructors to mentor union trainers when they deliver their first environmental hazard courses. Such was the case when two experienced CPWR instructors teamed up with two brand-new Painter instructors when they delivered their first Hazardous Waste Worker courses in Long Island City, N.Y., in February 2010. Likewise, a Bricklayer instructor who successfully completed the Confined Space Train-the-Trainer program in February 2010 worked with two CPWR instructors to deliver a series of three Confined Space courses just one month later in Warren, Mich. An Electrical Worker safety instructor worked with a team of experienced, multi-trade CPWR instructors to deliver his first Confined Space training in May 2010, in Gulfport, Miss. Finally, CPWR provided two instructors to support the Hazardous Waste Worker training delivered by three Pile

Driver instructors in June 2010, in Boston, Mass. While these instructors were experienced in delivering Hazardous Waste training, this was their first time utilizing CPWR's new supplied-air respirators, so CPWR instructors familiarized them with the equipment. The mentoring program has provided new Train-the-Trainer graduates with indispensable support and has cemented their excitement in learning how to successfully deliver this critical training.

CPWR Trainer Spencer Schwegler (far right) instructs a group in inspecting self-contained breathing apparatus (SCBA) during a hazardous waste operations emergency response (hazwoper) class in December at IUPAT DC 91 - Local 460 in Merrillville, Ind.



Preserving *human* resources in Green Construction

2008 – Present

The U.S. Green Building Council (USGBC) developed a system that architects, engineers, contractors and owners could follow to produce a “green building” – the Leadership in Energy and Environmental Design (LEED) rating system. LEED buildings are designed to reduce consumption of energy, water and resources, improve indoor air quality, and manage the site responsibly. The USGBC says occupants of green buildings are healthier and more productive.

These improvements for occupants, however, do not extend to construction workers on the job site, something that was exemplified by the CityCenter project. Six of the 12 workers who died on Las Vegas Strip construction sites over a 19-month period worked on CityCenter, which later received a LEED Silver Certification as a Green Building.

But how can a building be considered “green” and healthy for people and the planet if a worker died during its construction? What of those injured? And what if a worker, after being exposed to hazardous materials, develops cancer? Those are a few of the questions Don Ellenberger, CPWR’s director of hazardous waste training, posed on April 1, 2010, in a presentation to OSHA’s Directorate of Cooperative and State Programs - Small Business Forum. The program, “Green Construction Health and Safety: A View from under the Hard Hat,” was recorded and broadcast via webinar to OSHA federal and state participants. The recorded webinar can be accessed at this web site:

<https://www.osha.gov/dcsp/smallbusiness/forums.html>. A similar presentation was provided by the Training Department on July 29, 2010, to OSHA’s Alliance Program Construction Round Table. He also raised this topic at the OSHA 500 Master Trainer meeting Oct. 1 in Silver Spring, MD, and again at a CPWR Construction Economic Research Network meeting on green construction Oct. 28.

CPWR’s suggestion to improve safety in construction, green or otherwise, is to make

safety training a priority at all levels. Just as architects and engineers are trained to identify ways to improve the building’s efficiency at heating and cooling occupants, they should also be trained to identify hazards to human health and safety during the construction process. Their design work could reduce or eliminate many hazards. Safety training for field supervisors and workers should also be a priority. A general contractor who prepares a safety plan that outlines potential hazards then sets a reasonable work pace enables supervisors to ensure workers receive the needed hazard training. Awareness, training and planning all play vital roles.

At every opportunity, CPWR communicates the imperative that construction worker health and safety must become an integral part of the green construction movement. Researchers have developed tools to rate construction projects on how well they incorporate worker health and safety from the conceptual/design phase and throughout the entire project. Partnering with the Blue/Green Alliance, CPWR’s Training Department has approached the USGBC to consider avenues to elevate construction worker health and safety beyond the minimum regulatory requirements. These efforts did not end at the close of 2010, but continue on, as CPWR encourages the development of a LEED-like standard that encompasses the safety and health of construction workers.



The CityCenter project in Las Vegas received a LEED Silver Certification as a “green building.” Six construction workers died on the project.

CPWR encourages the development of a LEED-like standard that encompasses the safety and health of construction workers.

More than 600,000 building trades workers put themselves at risk of life-threatening ailments while building, repairing and maintaining facilities dedicated to our nation's nuclear weapons. These "Cold War heroes" have had significant exposures to hazardous materials that can cause cancer and other serious, even fatal, health problems. Through CPWR's network of industry partners, we are able to offer a free medical screening program to these workers, powered by funding from the U.S. Department of Energy. This program and other outreach efforts form the basis for CPWR's service to the construction industry and its workers.

BTMed History

1996 – Present



The Building Trades National Medical Screening Program (BTMed), managed by CPWR since 1996, continues to fulfill and carry out the critical mandate that was designated by the U.S. Congress. The 1993 Defense Authorization Act called for the Department of Energy (DOE) to provide medical screening services, at no cost, to all DOE workers (former DOE federal, contractor, and subcontractor employees) who contributed to the advancement of national security of the United States.

Many former workers have had significant exposures to asbestos, beryllium, cadmium, chromium, lead, mercury, radiation, silica, solvents, or other health hazards. Exposures to these hazards can cause cancer and other serious health problems.

In 1996, CPWR created the Hanford Building Trades Medical Screening Program to screen former workers for health problems related to their work at the Hanford DOE site. That same year, the University of Cincinnati (UC) began the Knoxville Building Trades Medical Screening Program for Oak Ridge workers using a protocol derived from the Hanford protocol. In subsequent years, CPWR and UC added new sites for free medical screenings. In 2005, CPWR combined these programs and formed the Building Trades National Medical Screening Program (BTMed), then added new sites. Today, BTMed administers 23 free medical screening programs, all based on that first program at Hanford.

The screening is an easy process that consists of two steps: a work history interview and a medical exam. In step one, a specially trained building trades worker or work site expert conducts a work history interview to determine what exposures to hazardous material the former worker may have had. The interview can be done in person, over the phone, or online. In step two, the former worker receives a free medical screening examination, at a clinic close to his/her home, to test for illnesses that may have developed from exposure risks, as well as other general health problems. Following the exam, the results are sent to the worker indicating any medical findings.

2010 BTMed Highlights

- A pilot project beginning in 2011 will provide a low-dose, high-resolution helical computerized tomography (CT scan) to eligible former workers. The CT scan can detect small malignant lung nodules at an early stage. According to a recent study released by the National Cancer Institute, CT scans can significantly reduce the number of lung cancer deaths by 20% compared to traditional x-rays.
- To date, 33,000 workers have expressed interest in the program; almost 23,000 have been screened.
- Participant satisfaction ratings are above 96%.
- BTMed helps participants improve their health and thereby reduce future health care use and costs.

Medical findings:

- X-rays found evidence of lung disease in about 21 percent of screened workers.
- Audiometry test revealed evidence of hearing loss in 58 percent of screened workers.
- Blood test results showed beryllium disease in 2.4 percent of screened workers.

Contributions to the science of occupational safety and health:

- Dement J, Ringen K, Welch L, Bingham E, Quinn P. Mortality among older construction and craft workers employed at Department of Energy (DOE) sites. *American Journal of Industrial Medicine*, 52:671-682, 2009
- Dement J, Ringen K, Welch L, Bingham E, Quinn P. Airways obstruction among older construction and trades workers at Department of Energy nuclear sites. *American Journal of Industrial Medicine*, 53: 224-240, 2010.

Partnerships:

The Building and Construction Trades Department, AFL-CIO

With support from:

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 Central Washington BCTC
 Colorado State BCTC
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 Florida Gulf Coast BCTC
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In cooperation with:

Duke University Medical Center
 University of Cincinnati Medical Center
 Zenith Administrators, Inc.

For more information:
www.btmed.org

After 10 Years, the Right Diagnosis



Steve Lindley

“My doctors didn’t know anything about beryllium,” said Steve Lindley, a member of Boilermakers Local 687 who worked on the Department of Energy’s Savannah River Site in the late 1970s. “They chalked it up to sarcoidosis. So I went years believing I had one illness when it was another illness that was entirely different.”

More than a decade after this misdiagnosis, Lindley enrolled in the Building Trades National Medical Screening Program. His screening revealed the true illness that eventually cost him his job due to the lung

impairment it caused: Chronic Beryllium Disease (CBD). Through BTMed, workers are tested for exposure to many hazardous materials like beryllium.

As Lindley explains, “If you get a snake bite, you need to go to a doctor who knows about snakes. The same goes for work on a Department of Energy site and the Building Trades National Medical Screening Program.”

Following the identification of his illness, Lindley filed a compensation claim with the DOL under the Energy Employees Occupational Illness Compensation Program Act and was awarded compensation. But he hasn’t stopped there.

“Right now, I’m focusing on contacting as many of my co-workers as I can to tell them, ‘You need to go to the BTMed.’ They need to know about the materials they were exposed to just like I needed to know.”

Succeeding in the Impossible:

DOL Employment Verification Contract

2003 – Present

Good partnerships can yield excellent results, especially in tough situations. The U.S. Department of Labor sought help with its Energy Employees Occupational Illness Compensation Program Act (EEOICPA) claims, reaching out to CPWR when it realized CPWR had ties with organizations and people who worked on DOE nuclear sites. Under EEOICPA, the claimants need to prove that (1) the worker was employed by the claimed contractor, (2) the contractor was under contract with DOE, and (3) the work was being done on the premises of the specified DOE site during a specific time period. Providing this evidence can be difficult for construction trades workers since most worked for subcontractors and decades-old employment records are hard to find.

Now, when DOE and DOL are unable to find employment evidence, the DOL turns to CPWR.

Because of CPWR’s unique relationship to the building trades, the impossible-to-trace work history can be found. Local unions may have dispatch records, health and welfare and pension funds may have contribution records, and training funds may have records. The DOL contracted with CPWR to administer the program because CPWR finds the documentation – or finds co-workers who can provide affidavits confirming employment.

“We have been able to provide records for *two-thirds* of the requests received. That’s pretty good considering we get the worst cases and have to complete this work in less than 30 business days,” says Trish Quinn, who manages the BTMed and DOL Employment Verification programs. “And we’ve done this some 15,000 times over the past eight years.”

Attacking Diabetes and Cardiovascular Disease:

A Work-Life Initiative

Since 1990, the prevalence of diabetes has increased by 50% for every five-year period, or close to 10% per year in all age groups among active construction workers who get a lot of physical activity. (See Chart 1) Cardiovascular diseases are the principal complications of diabetes. When both health problems are present, the cost increases exponentially (see Table 1). To adequately address the problem, it makes sense to attack both health conditions at the same time.

That is the goal of a program called United against Diabetes and Cardiovascular Disease (UAD/CVD) that the National Coordinating Committee for Multi-employer Plans (NCCMP) and CPWR created in 2006 with five years of funding from Pfizer. That partnership made sense because NCCMP focuses on health care coverage (see Box), while CPWR focuses on worksite health and safety. By fusing the strengths of these organizations, UAD/CVD is a test case for determining how to establish effective Work-Life programs in industries where either employment or worksites are intermittent, as in construction. The aims of UAD/CVD are improved prevention, earlier detection and more aggressive management of these conditions.

Already, diabetes and its complications are consuming about 15% of all costs in the health and welfare trust funds represented by NCCMP. Unless something is done, by 2020 30% of the adult population will have diabetes, and they will consume 30-40% of all health costs. The best way to address this epidemic is for unions, employers and health and welfare funds to join together in a national campaign.

So far, UAD/CVD has accomplished the following:

- Screening for diabetes and CVD in leaders from the multi-employer community has revealed that many have chronic disease but don't know it, or they have poor control over their diseases. Also, they did not understand the link between diabetes and CVD. That misunderstanding has led to much greater awareness about the need to be more proactive.
- Studies of medical claims data from health and welfare funds have found that much more needs to be done for participants to receive the highest quality of care. As a result, UAD/CVD has developed evidence-based tools and guidelines that health and welfare funds can follow. Pilot studies are under way to see how to best implement such guidelines.

The next step for UAD/CVD will be to expand its focus to cover all the prevention and wellness requirements in the new Health Care law so that health and welfare funds, employers and unions meet those requirements. CPWR's effectiveness is based on creating synergy between its safety and health research, training programs, and service delivery. By partnering with NCCMP on UAD/CVD, CPWR is extending this synergy by sending its safety and health messages through the health and welfare funds to the families of workers. CPWR is also incorporating these same messages into its training programs on safety and health. That's what we mean by Work-Life Initiatives.

For more information, go to www.UAD-CVD.org.

Chart 1: Prevalence of Diagnosed Diabetes, Among Members of the Construction Trades

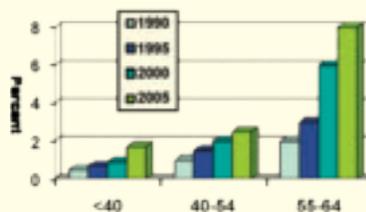


Table 1: Cost of Diabetes and Cardiovascular Disease

(Per Case/Year)		
Diabetes	Hypertension	Cost \$/Year
No	No	\$2,671
Yes	No	\$6,866
No	Yes	\$6,562
Yes	Yes	\$10,479

About NCCMP

NCCMP is an advocacy organization for multi-employer pension, health and welfare, and training trust funds. Health and welfare funds are jointly managed; trust funds provide group health coverage to workers in industries characterized by mobile workforces (such as construction or transportation) or where there are many small employers (such as retail trades). These funds are established through collective bargaining agreements. There are about 3,000 multi-employer health funds covering approximately 26 million Americans. See: www.nccmp.org.

CPWR Products

2010

Reaching Higher: White Paper on Mast Climbers

Under the direction of CPWR researcher Pam Susi, MSPH, a work group of 22 representatives from industry associations, manufacturers, contracting firms, unions, labor-management trusts,



and federal agencies produced *Reaching Higher: Recommendations for the Safe Use of Mast Climbing Work Platforms*. The 32-page white paper covers mast climbers' growing popularity, hazards when used incorrectly, and the group's recommendations.

Among them: OSHA should update its standards to provide more equipment-specific coverage to these relatively new scaffold systems. Another: new training programs, with detailed content of an awareness

training program. Other recommendations: clearly define roles and responsibilities of manufacturers, suppliers, distributors, users and site owners, and adopt engineering and administrative controls governing people and equipment.

The white paper also lists contributing factors to 12 mast climber incidents that resulted in 18 deaths between 1990 and 2010.

CPWR's work group was established in 2006 to examine problems and develop recommendations that could be used by regulators and those responsible for specifying and contracting work involving mast climbers. Work group co-chairs were Stephen Martini of the International Masonry Institute and Jim Kinatader, safety director for Fred Kinatader Masonry, Inc. Among work group members were James "Jay" Gordon, president of Klimer Manufacturing, Inc., and an SIA board member; Kevin O'Shea, chair of the International Mast Climbing Committee for IPAF and co-chair of the Mast Climbing Council; Greg Janda, chair of the A92.9 Sub-Committee and co-chair of the Mast Climbing Council; and Dr. Mohammad Ayub, director of the Office of Engineering in OSHA's Directorate of Construction.

CPWR Reports

- *Work-Related Fatal and Nonfatal Injuries among U.S. Construction Workers, 1992-2008.*
- *Occupational Exposures, Respiratory Symptoms, and Blood Lead Levels among Latino Day Workers in Greater New Orleans.*
- *Green and Healthy Jobs.*
- *Risk of Isocyanate Exposure in the Construction Industry.*
- *Construction Procurement Policies That Address Health Insurance: A Cost Analysis.*
- *Evaluation of an Intervention to Reduce Trunk Flexion among Stud Workers.*

CPWR Data Briefs

- *Fatal and Nonfatal Injuries among Hispanic Construction Workers, 1992-2008.*
- *Health Insurance Coverage and Health Care Utilization among Hispanic Construction Workers.*

Other Publications

- *Preventing Falls from Ladders in Construction: A Guide to Training Site Supervisors.* Harvard School of Public Health.
- *Leading Edge Fall Protection System – A Manual of Installation and Use.* CPWR.
- *Reaching Higher: Recommendations for the Safe Use of Mast Climbing Work Platforms.* CPWR.

These products can be found under "What's New" at CPWR.com.

Peer-reviewed Journal Articles

Eighteen different CPWR consortium researchers published in 2010, producing 19 journal articles in six publications.

Of note, both the *Journal of Safety Research* (JSR) and *American Journal of Industrial Medicine* (AJIM) devoted a special issue to construction safety and health in 2010. JSR was co-edited by CPWR's Janie Gittleman, NIOSH's Matt Gillen, and National Safety Council's Mei-Li Lin. AJIM was co-edited by CPWR Senior Scientific Advisor Knut Ringen and CPWR Technical Advisory Board member James Melius.

Protecting Workers on the Leading Edge

Leading edge work is among the most hazardous tasks in steel erection. A research project to assess a fall protection system developed by a Rhode Island contractor came to fruition in 2010 by producing both print and electronic information about the work. *Leading Edge Fall Protection System – A Manual for Installation and Use* comes with an informational DVD to guide contractors in this system to protect workers during decking installation.

CPWR's lead researcher Michael McCann, PhD, and Dan Paine of Innovative Safety evaluated studies over a three-and-a-half year period at Capco Steel Inc. During that period, the Leading Edge Fall Protection System enabled self rescue and prevented the death or injury of six ironworkers on six sites.



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