

2012 Annual Report, CPWR-The Center for Construction Research and Training
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Introduction

2012 was an exceptionally busy year for CPWR’s National Construction Center. Now past the midpoint of its five-year cooperative agreement as the CDC/NIOSH-funded research center, CPWR continued to produce research results and publish in peer-reviewed journals, while getting research findings into the hands of industry partners and stakeholders. The Center built internal staff capacity with the addition of two senior researchers. Drs. Linda Goldenhar and Bruce Lippy were hired to focus on intervention effectiveness and emerging issues, respectively. With the addition of the new staff to the already stellar leadership team, CPWR Executive Director Pete Stafford was able to assume the role of chair of ACCSH, the tripartite federal advisory committee to the Secretary of Labor and OSHA on construction safety and health priorities.

Internal synergies are many. One example of the Center’s collaboration within the industry was the creation of a system to distribute a training curriculum online – [eSmartMark](#). CPWR worked closely with training experts to develop, implement, and evaluate the acceptance of a cutting-edge method of dissemination with the training community, while revising and updating the curriculum, drawing from recent CPWR-funded research.

- **Result:** A study of the online distribution system shows wide acceptance of the distribution platform and an increase in the use of safety and health curriculum via the website compared to the system to order booklets through an office.

Selected 2012 Highlights: Dissemination - r2p – Partnership Development

For a detailed description of all safety and health research projects and activities within the CPWR National Construction Center, please visit www.cpwr.com. The following list provides a brief snapshot of CPWR’s 2012 research products:

- 1 New Tool** developed by CPWR consortium researchers—the Universal Drill Jig
- 5 Websites** developed by CPWR researchers to move research findings into the construction industry’s hands
- 5 Training Programs** developed and delivered by CPWR researchers →
- 6 Posters** presented by CPWR researchers
- 7 Active research partnerships**
- 8 New Hazard Alert** cards
- 9 Tool Innovations** by CPWR researchers who have modified, improved, or found new, safer uses for existing tools
- 9 IMPACT** cards
- 9 Video segments** produced by researchers →
- 9 CPWR Reports** generated by CPWR researchers
- 26 Peer-reviewed Journal Articles** by CPWR researchers
- 32 New Solutions to Hazards** added to Construction Solutions
- 41 Outside newsletters** disseminated CPWR research findings
- 46 Trade press articles** reported on CPWR research
- 65 Data Requests** to our data center
- 76 Presentations** by researchers on CPWR-sponsored projects



B-Safe training program poster



Video posted on www.nailgunfacts.org

As shown by the Products list, CPWR focused not only on practical and real-world research, but also in making the results of that research available to the widest possible audience in multiple formats, such as the widely used Hazard Alert cards produced in Spanish and English in an electronic format. CPWR’s success in packaging research findings into palatable and understandable resources is highlighted by a new series of publications and communications.



In 2012 CPWR produced seven [IMPACT](#) cards, bringing the total number of IMPACT cards to nine. The folding cards are aimed at industry decision makers, and they highlight the challenges, results and successes of Construction Center projects.

- **Results – 1,927 cards distributed**

CPWR [Small Study grants](#) generated four reports on diverse topics: investigating factors of ergonomic change, aging workers, and efficacy of OSHA 10 training.

CPWR retooled its popular [Hazard Alert cards](#) to include photos and key messages. Seven cards were revised and redesigned, and a new card (Nail Guns) was developed as part of the NIOSH/OSHA effort to educate contractors and workers on the dangers of that tool. The photo-driven cards aimed at educating workers were a hit, especially with trainers.

- **Results – 22,808 cards distributed**
- **Trainer reactions to [Nail Gun Hazard Alert cards](#):** “This piece of literature would be an immeasurable source of information for our young carpenters. I would like to give one to each of our pre-apprentices to enhance their awareness of just how dangerous a tool this nail gun can be.”
– One of more than 100 trainers and safety professionals requesting cards.



The distribution of these printed products is far reaching, and the web distribution through www.cpwr.com and www.elcosh.org is limitless.

CPWR developed a template to highlight Key Findings from Research, which condenses information from peer-reviewed journal articles and CPWR Small Studies into an overview and bulleted points.

- **Results:** A CPWR Training Director is now using them in his presentations to Master Trainers and Instructors. He suggests trainers use these “key findings” in their worker training programs.
- From 2009-2012, CPWR trainers have trained 69,355 workers in OSHA 10- or 30-hr classes – a large audience for research findings.



Our [UPDATE](#) electronic newsletter, first launched September 2011, continues to put research findings into the hands of construction industry leaders and the trade press. To power the enews, CPWR developed an outreach database containing nearly 3,500 industry leaders.

- **Results:** UPDATE subscribers climbed from 1,277 to 2,024, a net 58% increase.
- Editors/reporters at industry magazines used UPDATE content to generate 34 articles.
- UPDATE content appeared in 20 non-CPWR enewsletters, most content was unedited.

Four of Five New Websites Produced in 2012 ...



www.elcosh.org



www.stopconstructionfalls.com



[fatality map](#)



www.silica-safe.org

[eLCOSH](http://www.elcosh.org), CPWR's electronic library that serves as a national repository for safety and health information, completed its renovation in 2012. The redesigned and restructured site has been widely embraced for its ease of use and logical organization. eLCOSH now features direct linkages to CPWR's [Construction Solutions](#) database, enabling users to find more detailed and specific controls for workplace hazards.

- **Results:** The eLCOSH redesign significantly boosted use of the site's search capabilities.
- In November 2012, unique visitors to the eLCOSH home page increased nearly 50%.
- eLCOSH received a total of 533,319 visits from Jan. 1- Dec. 31, 2012.

In an effort to support the NIOSH NORA Construction Sector Council **Fall Prevention Campaign**, CPWR launched and maintains www.stopconstructionfalls.com as a clearing house for information on how to prevent falls from ladders, scaffolds, and roofs. This site also encourages the public to [join](#) the campaign with clear and direct, suggested actions that has enabled the campaign to grow.

- **Results:** The site began with a handful of founding partners then grew to [49 entities](#) as partners ranging from associations and agencies to academia and construction firms.
- The site has been a successful way to reach out to industry; it received 19,659 visits and 187,309 pageviews from April 26 through Dec. 31, 2012.
- The Fall Protection Harness Hazard Alert PDF was downloaded 532 times.

The Stop Construction Falls site houses a second site: CPWR's [fatality map](#). Through the use of readily available, real-time media reports and OSHA inspections, CPWR tracks construction worker fatalities and presents the data geographically, with details linked within the map.

- **Results:** It has been a well trafficked site with 11,363 pageviews since April 26, 2012.
- Feedback from users suggests it helps bring the battle to reduce death on the job from an abstract concept to a graphic illustration and link that tells the story of the actual worker who died in one's own community.

To **combat issues of silica exposure** to workers, CPWR launched www.silica-safe.org, aimed at industry decision makers. The site provides the tools and information needed to identify silica hazards, understand the health risk, and find equipment and methods to control the dust, as well as regulatory and voluntary efforts to minimize silica exposures.

- **Results:** User testing confirmed the site was easy to navigate and use.
- The site was accessed 3,622 times in 44 business days with 3.5 average pageviews.
- The site's Create-A-Plan online guide has received 1,072 visits in those 44 days.



International Social Security Association (ISSA) – At the ISSA Construction Section's request, CPWR hosted ISSA's international symposium for the first time on U.S. soil. The symposium, held Oct. 16-18 in Boston, brought together global **safety and health leaders from 16 nations** to share research findings, current worksite challenges and triumphs, and policy questions. Experts presented on best practices for safe management of projects from planning through construction and maintenance to demolition. Training practices, innovations and evaluations were the basis of presentations for the closing day. When posted by the ISSA office in Belgium, meeting proceedings will be made available at (www.issaboston2012.org).

CPWR organized and hosted a “**Tech Transfer**” **symposium** May 30-31 in Silver Spring, Md. Researchers engaged representatives of government, manufacturing, contractor associations, labor, and the insurance industry in discussions of barriers and strategic approaches to diffuse health and safety technologies and best practices across the construction industry.

- **Results:** Panelists agreed that productivity is paramount in our competitive industry, and it is often difficult for contractors to measure the economic value of improvements.
- Participants identified “tools that support tech transfer” and a “library of successful examples” to move solid safety and health practices forward. See [full report](#).

The **Research-to-Practice Initiative** (r2p) produced materials to aid researchers in planning outreach of information, tools and/or practices identified in their current research. The team developed new [web pages](#) on cpwr.com and posted planning materials, such as a “triage” checklist and a “road map” for dissemination.

- **Results:** Team produced a [report](#) studying the effectiveness of an asphalt partnership to improve worker safety.
- The Masonry r2p Partnership completed two national baseline surveys of workers and contractors and established relationships with two national equipment manufacturers to address safety and health issues involving hand tools.
- The r2p team initiated partnerships to build a community-based fall prevention and leadership development program among Latino workers: one with the Philadelphia Area Project on Occupational Safety and Health (PhilaPOSH) and a second social marketing campaign with the Labor Occupational Health Program at UC-Berkeley.

2012 Highlights – Applied Research from the Field

Ergonomics and Welding Fume Exposure

Ironworkers welding floor-level studs may be hunched over at almost a right angle for 20 minutes or more at a time, putting terrible stresses on the lower back and exposing them to dangerous levels of toxic fume. The University of Iowa research team tested and validated a new hand-held industrial hygiene device for measuring welding fume exposures in real time.

- **Result:** The manufacturer, New Rule Products, used preliminary findings to modify its ergonomically designed welding cart, considerably reducing back and shoulder stresses.

Evaluating the Efficacy of Safety Liaisons and Worker Training

Rutgers Occupational Training and Education Consortium (OTEC) and New Labor are building leadership skills and expanding visibility of their Latino day labor safety liaison network. Project safety liaisons recruited more than 90 Latino workers and residential subcontractors for a series of two-day OSHA-10 classes. Researchers partnered with worker centers to expand their reach. Four new day laborers joined Latino safety liaisons for training on monitoring worksite conditions, educating their peers on health and safety issues, and explaining the need for safer work practices to managers on residential construction worksites.



Safety liaisons identify workers at risk and intervene

- **Results:** Interviews with liaisons demonstrate that these safety leaders are learning to intervene and solve problems on job sites.
- Trainers administered three OSHA-10 classes for 87 Latino laborers and three contractors, and safety liaisons facilitated the elimination of hazards on multiple residential construction sites.

Safety Coaching to Prevent Injury Can Replace Rewards for “Accident-Free” Days

Using inspections to identify and correct worksite safety problems can provide workers and field supervisors with critical information to keep workers safe. Researchers found this can be accomplished through positive recognition, not punishment. The Northeastern/Harvard research team has designed a safety recognition and communication program, B-SAFE, that began as a simple search for alternatives to safety programs that reward workers for accident-free days. The team partnered with **four Boston-area general contractors** to implement B-SAFE, then the team is evaluating safety conditions, safety climate and injury rates at intervention and control worksites.



- **Results:** Site management and employees credit increased site teamwork and safety performance awareness to the B-SAFE program.
- Site industry partners who participated in the evaluation of B-SAFE have expressed interest in adopting the program.
- The research team has developed an extensive program manual to guide implementation for use by owners and general contractors.

Participatory Ergonomics Seeks Solutions for Work-related Musculoskeletal Disorders

Identifying the tasks most punishing for the human body for each trade, and proposing alternatives, can't be done in the lab alone. It's best achieved through participatory ergonomics that relies on the insights of workers and contractors. In 2012, investigators at Washington University in St. Louis **worked with a group of flooring contractors** and analyzed 45 videos of 32 floor layers to determine the time in task, forces, postures, and repetitive hand movements when installing four common flooring materials. They found high exposures to stress and strain in multiple body parts.

- **Results:** Researchers developed a format for problem-solving sessions with workers to identify tools and equipment that could reduce stresses to the body.
- Workers identified 92 solutions to reduce strains of problematic floor laying tasks.
- The Carpenters' District Council – partly as a result of the team's work – has incorporated ergonomics as a component of annual safety training for carpenters and floor layers.

Universal Drill Jig Adapted for Large Hammer and Rock Drills

Dowel and rod drilling with 30-lb pneumatic rock drills is noisy, dusty and physically exhausting. UC-San Francisco researchers have continued development of their Universal Drill Jig, a tool that eases the strains and stresses of this task. In 2012 the UC team tested different versions of the tool on construction sites in the Bay Area, receiving feedback from workers and contractors who put 10 jigs to use on seven commercial construction sites.

- **Results:** Using feedback from laborers and electricians, the team improved tool design with a universal drill saddle, an improved remote on/off switch, and a new way to rapidly adjusting drilling height and angle.
- One contractor successfully used the dual drill jig to install miles of electrical conduit in half the expected time.
- The team added a pneumatic piston to a four-drill set, reducing load on worker to zero.
- [ENR covered](#) the tool's use with contractors praising the productivity of the device.



Universal Drill Jig in action on work site

Creating a Culture of Safety

Creating a culture for safety at work is one of the most effective means of promoting a healthy and productive workplace. However, safety culture develops through a process of interactions between employees and management. Colorado State University's project goal is to develop current and future construction leaders with leadership skills to create and sustain a positive safety culture on jobsites. 2012 witnessed the pilot testing of the new LeAD curriculum by upper-level apprentices at three local unions.

- **Results:** Training has been refined into a five-week program.
- Researchers improved the program with an enlarged library of video clips of safety scenarios, testimony from safety leaders, core skill development, and hands-on practice of leadership skills.

2012 Highlights – Emerging Issues Research

Assessment and Prevention of Isocyanate Exposures in the Construction Industry

The Yale research team is examining risks associated with spray-foam insulation. Applying spray-foam insulation is a component of many "green" construction and renovation programs, but the products contain isocyanates, amines and other chemicals. Isocyanates are one of the leading causes of occupational asthma; amines can cause blurred vision.

- **Results:** Researchers found 25% of study subjects (insulators) had work-related asthma symptoms, a much higher frequency than the general labor population
- An intervention program was created in **collaboration with local insulation companies** to reduce worker exposures to isocyanates and amines.