2011 Summary Report for CPWR – The Center for Construction Research and Training, recipient of a NIOSH Center of Excellence cooperative agreement award OH009762.

1. Introduction

In 2011, CPWR's National Construction Center continued its high volume of construction safety and health research projects, and also initiated new research activities under its cooperative agreement with CDC/NIOSH. These research projects and activities, either carried-out directly by CPWR or its network of collaborating organizations, are listed below in Table 1.

TABLE 1
CPWR's National Construction Center Research Projects

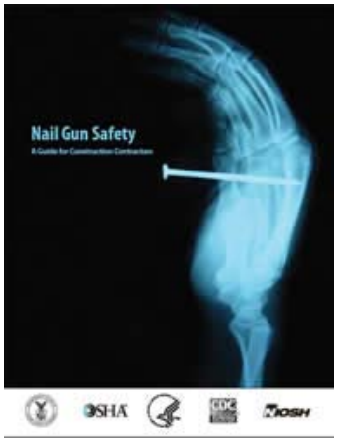
Administrative Core	CPWR
Construction R2P Impact	CPWR
Fall Prevention in Residential Construction	University of Washington/St. Louis
Partnering to Prevent Exposure to Silica, Dust and Noise in Construction and Demolition	University of Mass./Lowell
Adoption of Innovations to Minimize Exposure to Dust and Fumes in Construction (AIMs)	CPWR in conjunction with Harvard U., and U. of Puerto Rico
Participatory Ergonomics	CPWR in conjunction with U. WA/St.Louis
Effectiveness of Employee Safety Incentive Programs in the Construction Industry	Harvard University
Enhancing Safety through Leadership	Colorado State University
Longitudinal Study of Construction Worker Health Across the Life Span	CPWR
Assessment and Prevention of Isocyanate Exposures in the Construction Industry	Yale University
Construction Solutions Database	CPWR
Prevention of Nail Gun Injuries in Residential Construction: Reaching a Broader Target	Duke University
Highway and Bridge Construction Drilling	University of California/San Francisco
Evaluating the Efficacy of Safety Liaisons and Worker Training	Rutgers University
Safety and Health Disparities Among Construction Workers	CPWR
Safety and Health Metrics	CPWR
Construction Safety and Health Tracking Plan	CPWR
Dissemination Plan	CPWR
Ergonomics and Welding Fume Exposure	Iowa University
Measuring the Effects of Green Jobs on Construction Worker Safety and Health	CPWR

2. Selected 2011 Highlights

For a detailed description of CPWR's National Construction Center safety and health research projects & activities, please see CPWR's website at www.cpwr.com and www.elcosh.org, which serves as our national repository of construction safety and health information.

Selected highlights are as follows:

Prevention of Nail Gun Injuries in Residential Construction: *Reaching a Broader Target Breakthrough Research Leads to OSHA/NIOSH Guidance Document*



Due primarily to the research of Dr. Hester Lipscomb and her team at Duke University, in 2011 NIOSH and OSHA, for the first time in many years, co-published a guidance document, "Nail Gun Safety: A Guide for Construction Contractors." Over 15,000 of the printed copies have been distributed, and 250,000 visitors have accessed the document on OSHA's website, and thousands more have accessed in on the NIOSH website. The document is available on both the OSHA and NIOSH websites, www.osha.gov and www.cdc.gov/NIOSH.

CPWR has also developed a companion Hazard Alert card for workers, which NIOSH and OSHA plan on co-producing in 2012.

Analysis of National Electronic Injury Surveillance System (NEISS) data indicate that nail gun accidents send 37,000 workers and consumers to U.S. emergency rooms every year. To educate them about nail gun hazards, in 2011 Duke U. also developed and launched the website, www.nailgunfacts.org.

Construction Solutions Database (www.cpwrconstructionsolutions.org)

The CPWR Construction Solutions database is designed as an easy-to-use online tool for construction firms seeking ready-to-use solutions for safety and health hazards on the jobsite. The database now contains analyses of hundreds of common workplace hazards, and offers

one or more effective solutions for each, from alternative work techniques to commercially available tools.

During 2011, the website has averaged approximately 15,000 page views every month, and also in 2011 two additional activities were developed or refined. First, CPWR's research team recognized that almost every superintendent and safety manager walking a construction site seemed to have a smart phone in hand. CPWR therefore has created an alternative .mobi web site designed to be user-friendly on a handheld device. The site, www.consol.mobi, was tested throughout 2011 and is ready for public debut in early 2012. With construction solutions and their mobile phone, whenever they spotted a dangerous situation, the answer will be a click away.

Second, to determine if providing information of return on investment (ROI) for safety and health solutions results in greater implementation, a ROI calculator, www.Safecalc.org, has been developed. The ROI calculator is a free web-based tool designed to help contractors assess the economic impact of moving to a safer piece of equipment, material or work practice. The calculator allows the user to evaluate the purchase/rental, training and deployment costs, the impact on productivity, and the potential savings from injuries or illnesses avoided. It includes extensive 'help' sections and five examples: Lightweight vs. Heavyweight CMUs; Sequential vs. Contact Trip Nail Guns; Aerial Work Platform vs. a Mobile Tower; Passive vs. Auto-darkening Welding Lens; and Traditional Overhead Drill Methods vs. Inverted Drill Press. More examples are planned. The ROI Calculator and the CPWR Solutions Database are closely connected, for example, the Overhead Drill solution in the Solution's database contains a field directing the user to the related example in the ROI calculator.
http://www.cpwrconstructionsolutions.org/structural_steel/solution/628/inverted-drill-press.html

r2p: "Research to Practice"
Planning, Partnerships and Translation of Research Findings

Throughout 2011, CPWR continued its efforts to amplify the impact of construction health and safety research. The Research to Practice (r2p) program seeks to link researchers and those who make health and safety decisions "in the trenches and on the steel." A three-pronged approach includes: developing effective dissemination plans for current and completed research, launching research translation projects for high priority findings, and promoting partnerships for prevention. A newly established *r2p Working Group* with representatives from CPWR, OSHA and NIOSH has coordinated efforts throughout 2011. A triage tool/checklist to assess the readiness for translation of completed research projects into practice, and a road map to guide r2p efforts for current projects have been developed and made available to NIOSH and the NORA Construction Sector Council.

Partnerships

In recent years a partnership of labor, management, government agencies, manufacturers and occupational health professionals helped reduce paving workers' exposure to hazardous asphalt fumes. In 2011, the r2p Group began an in-depth case study of the asphalt partnership as a model of successful action, and sponsored the first of several anticipated new partnerships – the Masonry r2p Partnership. Another partnership targeting fall prevention among Latino workers is in formation.

Masonry Industry r2p Partnership
Labor and Management Help Move Research to Worksites

In 2011, the Masonry Industry Research to Practice (r2p) Partnership continued its work to increase the use of evidence-based interventions and develop a model r2p partnership for the construction industry. The Partnership, which includes representatives from the International Union of Bricklayers and Allied Craftworkers, the International Council of Employers and the International Masonry Institute, focused in 2011 on interventions that reduce the risk of musculoskeletal injuries, such as mast climbing scaffolds that allow workers to perform tasks between knee and shoulder height.

During the year, a section of CPWR's website devoted to mast climbing scaffolding was developed and publicized through articles in BAC and ICE publications. Preliminary discussions were held with equipment manufacturers and outside researchers to address tool and equipment related safety priorities, and support and guidance were provided to other masonry-related research projects on silica and mast climbing scaffolds.

In response to industry concerns about the hazards of mast scaffolds, CPWR published, *Reaching Higher-Recommendations for the Safe Use of Mast Climbing Work Platforms,* and throughout 2011 coordinated national distribution with industry stakeholders. CPWR's report was presented to the OSHA Construction Advisory Committee (ACCSH) and, based on its recommendations, OSHA continues to send the publication to OSHA Area Offices across the country. In 2011, CPWR's Executive Director was appointed Chairman of ACCSH, and has initiated efforts to involve the Advisory Committee in providing guidance to OSHA on r2p efforts.

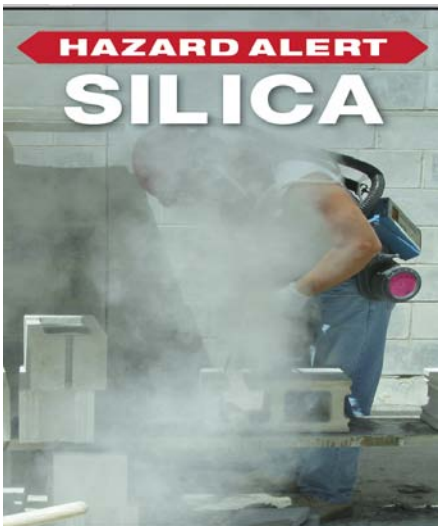
CPWR's r2p staff has also designed a systematic approach for reviewing and prioritizing research for r2p, inspiring quick starts for the following three activities in 2011:

- *Tech Transfer Symposium*. Too often, promising safety innovations remain isolated while industry soldiers on with yesterday's techniques – and construction workers pay the price in avoidable injuries. The tech transfer initiative seeks to smooth the path from the laboratory to the construction site for technologies that advance worker safety. CPWR assembled an advisory team and started planning a Tech Transfer Symposium now scheduled for May 2012. The Symposium will bring together academic researchers, construction professionals, and tool manufacturers to explore drivers of and barriers to technology transfer in our industry.

- *Silica-Safe Website*. Guided by the joint CPWR/NIOSH/OSHA r2p Workgroup, CPWR began planning for a new silica safe website. Significant research is available on silica exposures and related controls. The research findings as well as information on controls developed in response are dispersed throughout many different websites and publications. As a result, many stakeholders are still unaware of the seriousness of the hazard and believe it is not feasible to control silica dust. This new website will address these misperceptions by providing a one-stop, user-friendly source of practical

information for contractors, workers and other stakeholders to use to identify silica exposures and controls, and put them into practice.

- Utilizing findings of CPWR and consortium partner research on silica hazards and available controls, and with the OSHA proposed silica standard for the construction industry pending, CPWR produced a new Silica Hazard Alert Card. Thousands have been distributed, primarily to labor and management apprenticeship training programs, which will use them as training aids for workers.



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

Aging Construction Workers Face Alarming Physical Impairments

Dr. Sue Dong, CPWR's Data Center Director, analyzed data reporting the health impairments of over 7,000 workers aged 50 or older in 1998, then for the same workers in 2008. Of the sample, 510 were identified as construction workers and 2,501 as white-collar workers. Her findings, though perhaps not unexpected, were profound: construction workers were significantly more likely to report persistently higher rates of a variety of illnesses and injuries, including arthritis, chronic lung disease and strokes.

They were also more likely to report that they could no longer lift, stoop, or extend their arms as they had when younger – and were much more likely to find that their health problems limited their ability to work. In light of current proposals regarding increasing the retirement age, this is a crucial finding. It seems that workers in our most physically demanding jobs are suffering the greatest health impairments with age. This study may help policy decision makers answer the question, "is it realistic to expect a plumber or carpenter to work at the calling until age 70 in order to receive Social Security benefits"?

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

In a study presented at the 2011 American Public Health Association's Annual Meeting, CPWR's Data Center released some startling statistics. Using multiple years of data from several national sources, including the Census of Fatal Occupational Injuries, they estimated that over a 45-year career a construction worker has a 75 percent likelihood of experiencing a disabling injury. Additionally, over the course of a career, the same worker has a one in 200 chance of being fatally injured on the job. A Hispanic construction worker has a 20 percent higher likelihood of dying from a work-related injury. The study also revealed that an individual who begins construction work at the age of 20 has a 15 percent chance of developing chronic obstructive pulmonary disease over a lifetime.

Highway and Bridge Construction Drilling
Making Concrete Drilling Easier

With insights gained from the success of his overhead drill press, Dr. David Rempel's U. of California-San Francisco team is developing a new device to help construction laborers better wield 30-lb. pneumatic rock drills used to renovate bridges or buildings.

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

But the stress on the body of a vibrating 30-lb. tool that must be held in place and guided isn't the only hazard. Drilling into rock produces dust laden with deadly crystalline silica. So in 2011 the team created a tool designed to accommodate a cowl and dust capture system that promises to reduce workers' inhalation of silica in the course of the work. Tests of the dust control element at the Laborers' training center in Alameda County, CA, show it successfully brought silica exposure levels below limits recommended by NIOSH.

Evaluating the Efficacy of Safety Liaisons and Worker Training
Immigrant Day Laborers and Peer-to-Peer Safety Training

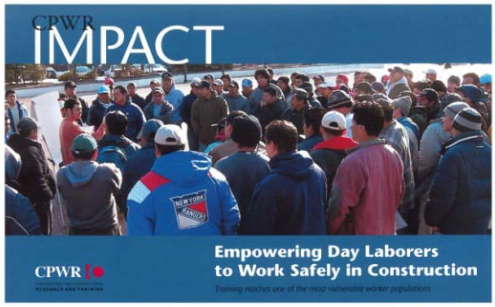
Throughout 2011, the team at Rutgers Occupational Training and Education Consortium (OTEC) and New Labor made significant progress in developing a network of safety liaisons among day laborers in northern New Jersey. The safety liaison program recruits a team of safety leaders who are current peer trainers of day laborers. Once trained, these safety liaisons monitor safety conditions in North Jersey residential construction sites, educating their peers on health and safety issues, and intervening when they witnessed job site hazards.

In 2011, the liaisons began organizing regular 'consejos' or 'worker councils' every three weeks featuring demonstrations of safety issues as well as strategy discussions. The liaisons have also performed over 100 'curbside safety audits' documenting predominant industry safety hazards, such as finding that 56% of scaffolds had a level, stable base but only 23% featured fall protection and hard hats were provided and worn on fewer than 40% of job sites.

Interventions by the liaisons have eliminated major hazards from multiple worksites. For those cases in which contractors refuse to fix dangerous work situations, the liaisons have established a regular relationship with the regional OSHA office through a bilingual staff representative.

CPWR Impact Cards

In 2011 CPWR began to produce Impact Cards modeled after the NIOSH "A Stories of Impact" cards, to share information about the impact of CPWR's construction safety and health research to a broader community. Two cards were completed in 2011 and eight more will be produced in 2012. Print copies are available, and the cards will also be produced in pdf format for easy access through CPWR's website, www.cpwr.com and will be posted in February 2012.



CPWR E-News Launched in 2011

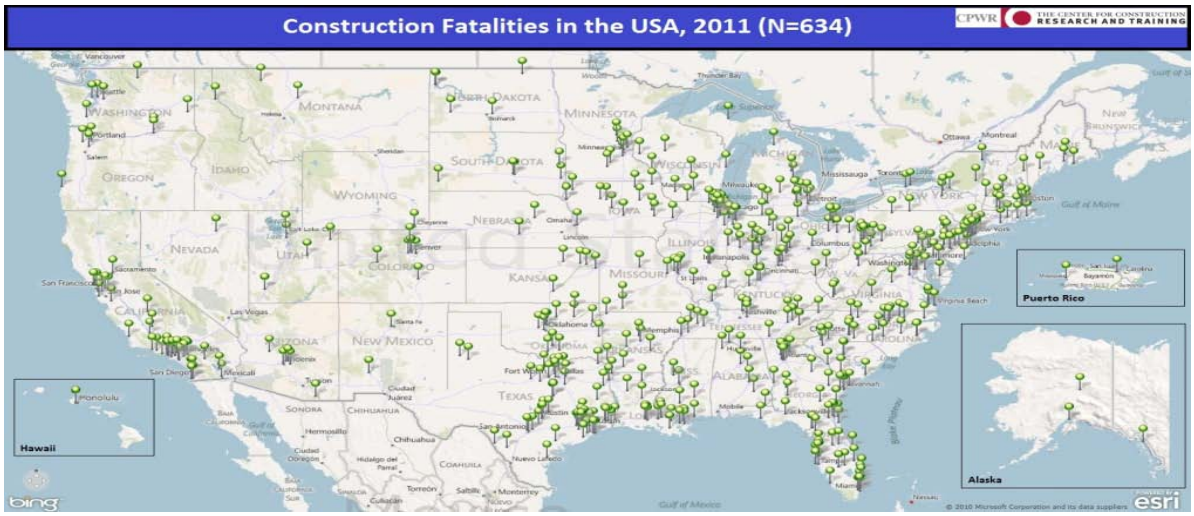
CPWR launched a monthly electronic newsletter in 2011. The newsletter provides timely updates of CPWR's National Construction Center activities, and with Constant Contact allows CPWR to add interested parties to its mailing list and track who is reading the newsletter, e.g. contractors, government, labor, academia, etc., and which articles are of particular interest to each of these groups. To be added to the distribution list to E-News, email News@cpwr.com.

Creation of a CPWR-OSHA-NIOSH Database Outreach Resource (CONDOR)

In 2011, CPWR initiated the development of a database of CPWR-generated contacts that would serve as a mailing list and also a tool for r2p efforts. The database idea was formed during meetings of the CPWR/OSHA/NIOSH r2p Working Group. The overall outcome of the database will result in a dynamic list of contacts that can be shared among researchers and between CPWR, NIOSH and OSHA. At the end of 2011 CONDOR includes more than 1,500 contacts.

Construction Fatality Mapping Project

As part of CPWR's surveillance/data tracking activities, and in support of the NIOSH/NORA Construction Sector Council National Fatalities Campaign, CPWR initiated a fatalities mapping project in 2011. The purpose of the map is to capture in real time all U.S. construction fatalities geographically throughout the U.S., using primarily data secured from OSHA and internet searches. The map, which will go live in February 2012, includes information about each of the fatalities. Through the website CPWR will encourage interested parties to submit information to include in the map about any fatalities they are aware of.



In 2011, CPWR joined with NIOSH and the NORA Construction Sector Council in the development of a national construction fatalities campaign. CPWR retained social marketing experts to develop and test campaign messaging, promotion, and evaluation, and OSHA has agreed to launch the campaign in conjunction with Workers Memorial Day, April 28, 2012.

2011 Key Research Findings posted on CPWR.com:

- *Design for Safety Techniques for Green Building Components* July 2011.
- *Genetic Testing for Beryllium: Worker Knowledge, Beliefs and Attitudes* July 2011
- *Using New Data to Improve Understanding of Construction Injuries* July 2011
- *Injury Underreporting among Small Establishments in the Construction Industry* May 2011.
- *Chronic Diseases and Functional Limitations among Older Construction Workers in the United States: A 10-Year Follow-Up Study* April 2011
- *Non-Fatal Construction Industry Fall-Related Injuries Treated in US Emergency Departments, 1998-2005* February 2011