Construction Activities at NIOSH

Western States Occupational Network (WestON)
Eighth Annual Meeting
September 17, 2015, Denver, Colorado
Christine M. Branche, Ph.D., FACE
Principal Associate Director, and Director, Office of Construction Safety and Health
National Institute for Occupational Safety and Health
Presentation Outline

NIOSH’s Construction Program

Products from NIOSH Research Outcomes

Preventing Falls in Construction

Prevention through Design and Sustainable Construction
“Provide … leadership to prevent work-related illness, injury, disability, and death by … gathering information, conducting … research, and translating the knowledge gained into products, solutions, and services tailored to meet construction needs.”
Program Structure and Focus Areas

NIOSH Construction Safety and Health Program

Intramural Research
- Basic Research
- Surveillance
- Methods Research
- Exposure Assessment
- Controls Development
- Applied Research
- Research to Practice

National Construction Center
- Industry Characterization
- Applied Research
- Industry Liaison
- Intervention
- Research to Practice

Extramural Investigator-initiated Grants
- Innovative Ideas
- Opportunities
- State Initiatives

CPWR
The Center for Construction Research and Training
Dissemination Planning and Tracking Tools

Part 1: Purpose & Destination of your dissemination journey
- Cargo (intervention/findings)
- Directional heading (health & safety goals)
- Point of departure (dissemination already conducted)
- Recipient of cargo (target audiences)

Part 2: Plan your Route
- Audience type (end user or intermediary)
- Desired action
- Local guides (partners)
- Types of vehicles (dissemination strategy)
- Transmission of message (communication channel(s))

Part 3: On the road: rest stops, detours and mile markers
- Rest stops (dissemination efforts)
- Relief drivers (next steps for others)
- Fuel (resources)
- Potential roadblocks (barriers)
- Detours (addressing barriers)
- Mile markers (measures & indicators of success)
Nail Gun Safety:
- Guide for Construction Contractors
- Straight Talk About Nail Gun Safety
- Online topic pages
Overlapping Vulnerabilities: The Occupational Health and Safety of Young, Immigrant Workers in Small Construction Firms

May 2015

A joint effort with the American Society of Safety Engineers (ASSE)

PIs: Mike Flynn and Tom Cunningham at NIOSH

“overlapping vulnerabilities” = the combination of risk factors

Change in data collection

Identify and significantly improve their outreach and intervention efforts
Construction Safety Culture and Safety Climate

June 11-12, 2013 Workshop

Safety Culture and Safety Climate in Construction: Bridging the Gap Between Research and Practice

Buy Quiet

A commitment to buying quieter equipment:
- Reduces your risk of hearing loss
- Reduces the noise impact on our community
- Encourages manufacturers to design quieter equipment

Nearly 50% of construction workers suffer hearing loss
HEARING LOSS IS PREVENTABLE and you can do something about it...

What You Can Do
Ladder Safety Application for Smart Phones

The free APP quickly and easily positions extension ladder at correct angle

Inclination indicator

Graphic-oriented aid
I worked construction for 10 years before my fall. It shattered my body and my livelihood.

Work safely. Use the right equipment.

FALLS FROM LADDERS, SCAFFOLDS AND ROOFS CAN BE PREVENTED!

PLAN ahead to get the job done safely.
PROVIDE the right equipment.
TRAIN everyone to use the equipment safely.

www.osha.gov/stopfalls.gov
1 (800) 321-OSHA (6742) • TTY 1-877-889-5627

Osha Occupational Safety and Health Administration
National Safety STAND-DOWN
TO PREVENT FALLS IN CONSTRUCTION
JUNE 2-6, 2014

Stop Falls Stand-Down
- Plan a toolbox talk or other safety activity
- Take a break to talk about how to prevent falls
- Provide training for all workers

For more information:
www.osha.gov/StopFallsStandDown
#StandDown4Safety | (800) 321-OSHA (6742)

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MAY 4-15, 2015

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Embedded Safety Features

Recommendations for building owners and designers
For retrofits, renovations, new construction
Connecting point for fall protection systems.

Preventing Falls from Heights through the Design of Embedded Safety Features

Description of Exposure

Construction is one of the most dangerous industries (Toole and Embry 2016), and falls are a frequent cause of fatal injuries in this industry. Of the 4,809 fatal work injuries that occurred in 2011, 533 (11%) were the result of falls to a lower level. Fatal falls in construction accounted for 4% of all work-related fatal falls in 2011 (BLS 2012). OSHA estimates that each fall from an elevated position in construction (both fall and nonfall costs) costs between $10,000 and $100,000 (OSHA 2012). Workers are at risk of falling during initial construction, and after completion during operation, maintenance, renovation, and demolition of buildings. Fall prevention strategies include floor and roof slabs, ledges, stairways, and guardrails. Falls can occur from temporary structures used in construction and maintenance such as scaffolding, ladders, or other locations such as roofs.

Standards

OSHA Standard 29 CFR 1926.502 covers requirements for fall protection systems. One of the following is always needed to protect workers from falls:

- Job-built or commercially available guardrails that meet OSHA height and strength requirements [29 CFR 1926.505(b), Robock et al. 2010].
- Properly designed anchor points with appropriate personal fall arrest systems and fullness [Robock et al. 2003].
- Other forms of fall protection such as safety netting [29 CFR 1926.102(c)].

See American national standards Institute A123. Standards [2007] ANSI Z59.9 through Z59.16 allowable safety requirements for fall arrest systems. 49 CFR Standard 20,784.9 addresses personal fall protection through design guidelines for hazards in the design and execution processes.

Federal Regulations. See CFR in References.

DEPARTMENT OF HEALTH AND HUMAN SERVICES
Centers for Disease Control and Prevention
National Institute for Occupational Safety and Health
LEED Certification Levels

- **CERTIFIED**: 40-49 points
- **SILVER**: 50-59 points
- **GOLD**: 60-79 points
- **PLATINUM**: 80+ points

Is Green Construction Better?
Not Always
“As green and sustainable practices become more common in the U.S, there is an opportunity to promote worker safety and health as a fundamental dimension of true sustainability. …

A sustainable product, process or technology should not only protect the environment and the consumer but also the worker. Green jobs must be safe jobs.”

NIOSH Science Blog: Going Green: Safe and Healthy Jobs, January 4, 2010

Main finding: design contributes significantly to work-related serious injury.

37% of workplace fatalities are due to design-related issues.

In another 14% of fatalities, design-related issues may have played a role.

From Driscoll et al., 2008

Photo courtesy of Thinkstock
Las Vegas CityCenter—The Wake Up Call

Development wins 6 coveted design certifications (Las Vegas, NV)
- More than three months before it opens, the $8.5 billion CityCenter development has received six Leadership in Energy and Environment Design (LEED) gold certifications from the U.S. Green Building Council. .... (Las Vegas Review Journal, September 14, 2009)

Six deaths during 2007-2008 construction phase
(Las Vegas, NV) - MGM Mirage’s CityCenter
It is common to assume that green building projects are inherently safer for workers…

EXAMPLE: “Attention to environmental issues during construction leads to a safer and healthier work site”
Los Alamos National Lab Sustainable Design Guide, p64

…and common to overlook safety and health

EXAMPLE: “There currently is a blind spot in sustainable design practice when it comes to worker safety and health... Tremendous focus is placed on materials, energy and the environment, but designers typically give little, if any, consideration to the safety and health of the people who install the green features or build the projects”

## But What is Missing?

<table>
<thead>
<tr>
<th>Type of WORKER</th>
<th>HEALTH &amp; WELL-BEING</th>
<th>SAFETY</th>
<th>ERGONOMICS</th>
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<tbody>
<tr>
<td><strong>Building Occupant</strong></td>
<td>Illness</td>
<td>Injury</td>
<td>Pilot Credits</td>
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<td></td>
<td>Major focus via IEQ credits</td>
<td>Not addressed</td>
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<tr>
<td><strong>Custodial Worker</strong></td>
<td>Minor focus</td>
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<tr>
<td><strong>Operations, Maintenance (O&amp;M), and Construction Worker</strong></td>
<td>Minor focus</td>
<td>Not addressed</td>
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</tr>
</tbody>
</table>
Why Construction Workers?

Fatalities: 751 most of any industry
Injury rate: 203/10,000 non-fatal injuries and illnesses with days away from work

Why Maintenance Workers?

Fatalities: 226
Injury rate: 307/10,000 non-fatal injuries and illnesses with days away from work
Mission: Design out hazards and minimize risks associated with:

Facilities  Work methods  Processes  Equipment  Products & new technologies
Hierarchy of Controls

ELIMINATION
Design it out

SUBSTITUTION
Use something else

ENGINEERING CONTROLS
Isolation and guarding

ADMINISTRATIVE CONTROLS
Training and work scheduling

PERSONAL PROTECTIVE EQUIPMENT
Last resort

Per ANSI/AIHA Z10-2005
Safety Payoff during Design

- Conceptual design: High ability to influence safety
- Detailed design: Moderate ability to influence safety
- Procurement: Low ability to influence safety
- Construction: Even lower ability to influence safety
- Start-up: Least ability to influence safety

Adapted from Szymerski 1997
Operations & Maintenance

Servicing rooftop HVAC equipment

Fall exposures
“Error trap” for workers
Design issues?

No access
No power
No equipment setback from edge
No fall protection

HVAC= Heating, Ventilation, and Air Conditioning

Photo: Matt Gillen
Green building is oriented towards “life cycle” thinking

Construction and Maintenance workers play key roles in the built environment “Life Cycle”
Realities and Barriers

Safety and health professionals are not designers

Architects and engineers do not always have safety in mind

There are costs

There are concerns about liabilities

A collaborative effort is needed to accomplish PtD → a “safety design review”
In February 2015, the U.S. Green Building Council (USGBC) posted a new pilot credit entitled: “Prevention through Design” to its LEED (Leadership in Energy and Environmental Design) Pilot Credit Library!

http://www.usgbc.org/credits/preventionthroughdesign (v4)
Why the pilot credit?

• Reduce illnesses and injuries
• Support high-performance, cost-effective OSH outcomes
• Design structures that reduce or eliminate potential safety and health hazards across the building life cycle
The pilot credit addresses two building life cycle phases that are important for safety and health:

1. Operations and Maintenance (O&M)
2. Construction

The pilot credit complements the existing LEED Integrative Process credit.

Construction and Maintenance workers play key roles in the built environment “Life Cycle”.
Safe, Green, and Sustainable Construction

Links to USGBC pilot credits

NIOSH White Paper on sustainable buildings and life cycle safety

CPWR pub on green construction
Thank you!

Christine Branche, Ph.D., FACE
Principal Associate Director, NIOSH
Director, Office of Construction Safety and Health, NIOSH
cbranche@cdc.gov | 202.245.0625

NIOSH Directory of Construction Resources
www.cdc.gov/niosh/construction/
Twitter
http://twitter.com/NIOSHConstruct

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