Impact of NIOSH Construction Program 2007-2017

Christine M. Branche, Ph.D., FACE
Principal Associate Director and Director,
Office of Construction Safety and Health

NECA Safety Professionals Conference
May 22, 2018

The findings and conclusions in this presentation have not been formally disseminated by the National Institute for Occupational Safety and Health and should not be construed to represent any agency determination or policy.
Disclaimers

- “The findings and conclusions in this report are those of the author(s) and do not necessarily represent the official position of the National Institute for Occupational Safety and Health, Centers for Disease Control and Prevention.”

- Mention of any company or product does not constitute endorsement by the National Institute for Occupational Safety and Health, Centers for Disease Control and Prevention. In addition, citations to websites external to NIOSH do not constitute NIOSH endorsement of the sponsoring organizations or their programs or products. Furthermore, NIOSH is not responsible for the content of these websites. All web addresses referenced in this document were accessible as of the publication date.
The sole federal government organization charged with conducting occupational safety and health research.
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
Topics Selected for Review

Silica
Musculoskeletal Disorders
Noise and Hearing Loss Prevention
Highway Work Zones
Preventing Falls
Origins of NIOSH research on construction silica dust controls

  - Grinding concrete; chipping concrete; cutting brick, block, and concrete; tunneling; spraying gunite, tuckpointing
- NJ Silica Partnership – 1999
  - Jackhammering, pavement milling, sawing concrete, dowel drilling, clean-up
  - Concrete sawing, concrete pavement dowel and vertical drilling, concrete grinding, concrete abrasive blasting, pavement milling
- OSHA presentation at AIHCE – 2000
  - Abrasive blasting, block sawing, concrete grinding, concrete sawing, jackhammering, tuckpointing
NIOSH Research Contributions to Table 1

- 18 tasks in Table 1
- 11 based on NIOSH research
- Two examples:
  - Asphalt milling
  - Cutting fiber-cement siding
National Occupational Research Agenda (NORA): National Construction Agenda
Construction Fall Prevention Campaign

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-Osha-1977 (TTY 1-877-889-5627)
2017 Goal Statement

Create a new measure of participation and evaluation method for the construction falls prevention campaign
Who are partners reaching with the Falls campaign?

Five respondents (4 contractor orgs, 1 safety org) reported reaching **30,760 organizations** about the Falls Campaign.
What are these organizations working on?

- When asked what Falls Campaign activities their organization specifically has participated in, 63 organizations reported 327 total activities.
- The types of activities that partners participating in indicate that the level of engagement with the Falls Campaign decreases with the complexity of the task.

![Bar chart showing the distribution of activities by type.]

- Distribution or posting of materials: 50 activities
- Newsletter articles or blog posts: 44 activities
- Email promotions: 44 activities
- Training or Toolbox Talks: 35 activities
- Safety meetings: 28 activities
- Creation of materials: 24 activities
- Equipment or Personal Fall Arrest: 22 activities
- Presentations or webinars: 20 activities
- Sharing of videos: 16 activities
- Drills or practices for falls: 16 activities
- Equipment inspections or audits: 12 activities
- Other: 9 activities
- T-shirt or other giveaway: 7 activities
Is the falls campaign reaching those most at-risk?

“In your audiences, from your perspective, are the people most at risk of falling being reached by the Falls Campaign? (N=58 Respondents)

<table>
<thead>
<tr>
<th>Response</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>7</td>
</tr>
<tr>
<td>Other</td>
<td>14</td>
</tr>
<tr>
<td>Unsure</td>
<td>10</td>
</tr>
<tr>
<td>Yes</td>
<td>19</td>
</tr>
<tr>
<td>Yes, but could be improved</td>
<td>8</td>
</tr>
</tbody>
</table>

“I think the Falls Campaign is a wonderful activity and should continue. However, I worry that we don't reach the smaller companies (residential construction/roofing specifically).”

– Government Partner
Number and Rate of Fatal Falls to a Lower Level among Roofers, U.S., 2011-2015

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 • (600) 321-OSHA (6742)
Mission: To prevent occupational injuries, illnesses, and fatalities through the inclusion of prevention principles in all designs that impact workers.

- Work premises and facilities
- Tools and equipment
- Processes
- Products
- Work methods and organization of work
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”
Design for Construction and Maintenance workers

- Key role in building lifecycle
  - Pre-Construction
  - Construction
  - Maintenance
The Bottom Line

• Green and sustainable practices should also be safe for all workers

• Construction and maintenance worker tasks need to be explicitly addressed in life cycle planning

• Potential hazards can be addressed at the design and planning stages

• Best approach = Integrate safety and health starting at the design phase
Workplace Design Solutions – The Business Case

Supporting Prevention through Design (PtD) Using Business Value Concepts

Prevention through Design

Prevention through Design (PtD) can address worker exposure to financial or non-financial measures.\textsuperscript{[AIHA 2009; Occidental College 2002]}

The National Institute for Occupational Safety and Health (NIOSH) launched a

www.cdc.gov/niosh/docs/wp-solutions/2015-198/
LEED Certification Levels

CERTIFIED
40-49 points

SILVER
50-59 points

GOLD
60-79 points

PLATINUM
80+ points

# But What is Missing?

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

U.S. Green Building Council (USGBC)

“Prevention through Design” = LEED (Leadership in Energy and Environmental Design) pilot credit

Applies to v2009 and v4

Value = 1 point

See NIOSH’s Safe, Green, and Sustainable Construction
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

“Life Cycle Safety”

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

Photo by Roberto Carlos Vergara
Awareness and Reported Practice of Prevention Through Design (According to Architects, GCs and Trade Contractors)

Dodge Data & Analytics, 2017

Aware of Prevention Through Design
Believe They Are Practicing Based on the Definition Provided

Architects: 56% aware, 19% believe
GCs: 52% aware, 34% believe
Trade Contractors: 67% aware, 66% believe

Source: Safety Management in the Construction Industry 2017, SmartMarket Report, Dodge Data & Analytics
PtD Awareness and Practice

Use of BIM: 78% of respondents who use BIM believe they use PtD, compared with 54% of those who do not.

79% of safety leadership who responded report that they use PtD, far more than any other role.

Use of Specific PtD Practices (According to Architects)
Dodge Data & Analytics, 2017

- Work With GC and Key Trades Before Completion of Schematic Design to Identify Opportunities for Prefabrication: 83%
- Perform Safety Design Reviews Before Completion of Schematic Design Exploring how the Building will be Operated and Maintained Over its Lifetime: 68%
- Use Lifecycle Safety Approach to Reduce Hazards and Improve Efficiency and Well-Being for Building Operations and Maintenance Personnel: 66%
- Perform Safety Constructability Reviews Before Completion of Schematic Design to Plan How Safety and Efficiency can be Optimized During Construction: 51%

Source: Safety Management in the Construction Industry 2017, SmartMarket Report, Dodge Data & Analytics
Design Review → BIM walk-through

Building Information Modeling Process

- Conceptual Design
- Detailed Design
- Analysis
- Documentation
- Programming
- Fabrication
- Renovation
- Construction
- 4D/5D
- Demolition
- Operation and Maintenance
- Construction Logistics

Photo by RobertoCarlos Vergara

Source: Autodesk
Missing: Safety and Health Professional
The PtD Process Needn’t be Complex

- Prepare
- First Meeting
- Next meeting
- Future meetings
- Turnover
The “UK Toolbox”

- Great **worker training** and use of **safety inspections** are some of the tools that save 5 times as many lives in the United Kingdom compared with the U.S.

- Add **leadership** that makes training and inspections happen

- Add **PtD**—as it has been a foundational law in the U.K. since 1994.

- “But we can’t apply U.K. law here” ...
• TRUE, so focus on every point where your specs touch on Training, Inspection, Management accountability, and include PtD additional provisions.

• This is LEVERAGE to save many lives.
Research – Benchmarking PtD in the UK

- Safety and health spread throughout project team
- Safety notes on drawings
- Now “safety constructability” vs “constructability”

[www.designforconstructionsafety.org/mediacontinued.html](http://www.designforconstructionsafety.org/mediacontinued.html)
Research – Benchmarking PtD in the UK

- Design duration: 77% said no change or decrease
- Construction worker productivity: 67% said increase
- Construction worker health & safety: 90% said increase

www.designforconstructionsafety.org/mediacontinued.html
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

For more information, contact CDC
1-800-CDC-INFO (232-4636)

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.