



# Leveraging an Evidence-based Approach to Communicate Safety and Health Information to Small Employers and their Employees

Eileen P. Betit

Director, Research to Practice

CPWR-The Center for Construction Research and Training

# Industry is decentralized and fragmented

- **Multiple and changing worksites**
- **Seasonal and cyclical work**



Source: U.S. Bureau of Labor Statistics, CPWR 1<sup>st</sup> Quarter 2017 Quarterly Data Report,



**USE 2017**  
understanding small enterprises

[www.useconference.com](http://www.useconference.com)

# High number of fatalities

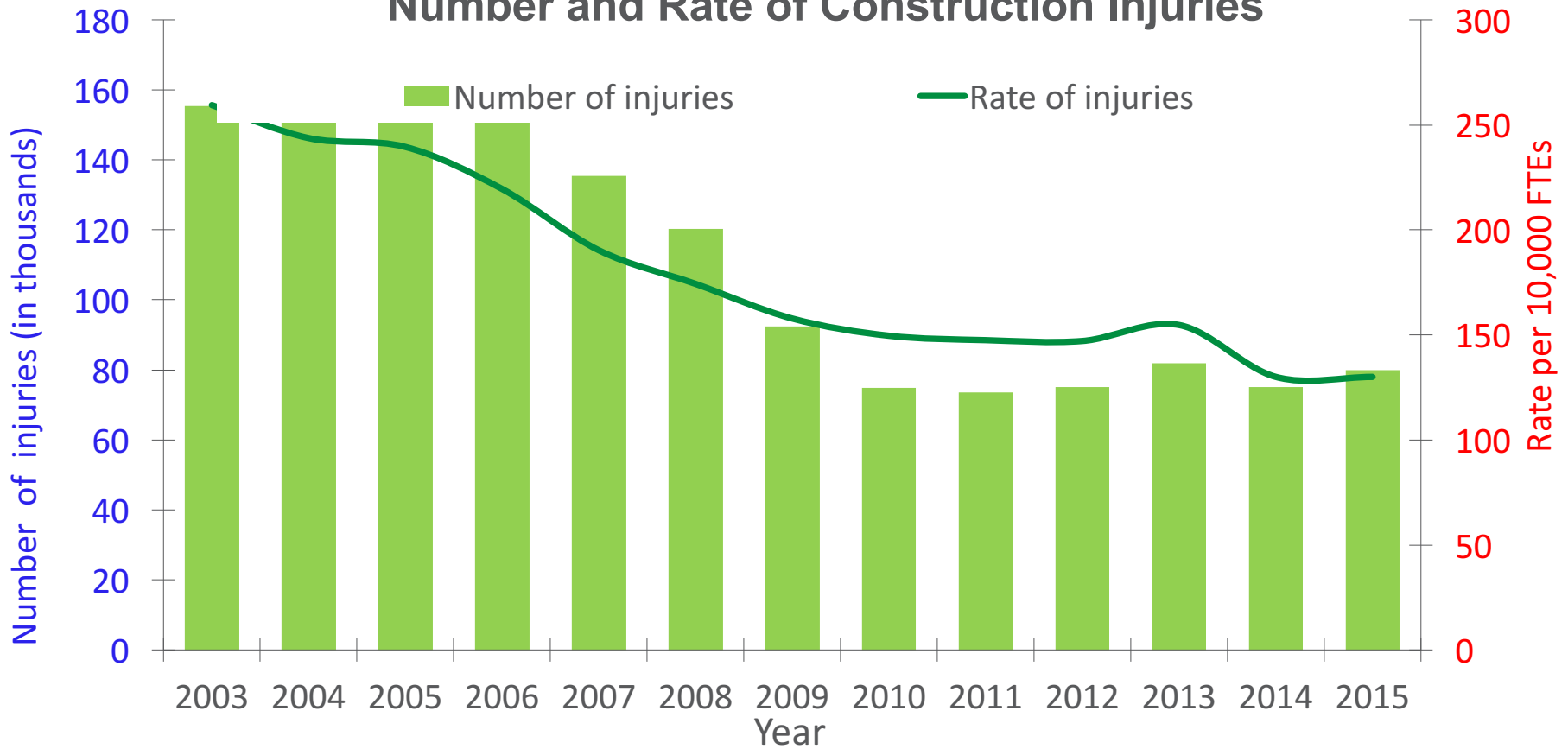


*Note: In 2011, the CFOI switched to OIICS version 2.01 which categorizes slips, trips, and falls together. In previous years, slips and trips were categorized elsewhere..*  
*Source: U.S. Bureau of Labor Statistics, CPWR 1<sup>st</sup> Quarter 2017 Quarterly Data Report.; "Data Mining, Analysis, and Visualization for Construction Fatality Prevention." Kleiner, July 2016.*



# High injury rate

## Number and Rate of Construction Injuries



Source: U.S. Bureau of Labor Statistics, 2003-2015 Survey of Occupational Injuries and Illnesses.



**USE 2017**  
understanding small enterprises

[www.useconference.com](http://www.useconference.com)

# Dominated by small employers

- 90% have <20 employees
- About 80% have <10 employees
- Most have **low profit-margins** and are **under-resourced**

*Sources: U.S Census Bureau; CPWR Construction Chart Book 5<sup>th</sup> Edition; CPWR 2<sup>nd</sup> Quarter 2015 Quarterly Data Report*



**USE 2017**  
understanding small enterprises

[www.useconference.com](http://www.useconference.com)

# Mobile and diverse workforce

- **Multiple employers and projects in a year**
- **30% Hispanic**
- **Roughly 14% are employed by temp agencies**



Sources: U.S Census Bureau; CPWR Construction Chart Book 5<sup>th</sup> Edition; CPWR 2<sup>nd</sup> Quarter 2015 Quarterly Data Report; photo courtesy of eLCOSH and Hoar Construction



**USE 2017**  
understanding small enterprises

[www.useconference.com](http://www.useconference.com)

# Challenges to communicating safety & health information to small employers

- Limited safety & health knowledge
- Perception that regulations are costly
- Lack of resources for formal training



**Can toolbox talks address the challenges and be an effective method to communicate S&H information to small construction employers and their employees?**





# Toolbox Talks (also called tailgate talks) are:

- **Used in construction for decades**
- **Focused on a specific hazard**
- **Brief (10-20 minutes)**
- **Conducted on a job-site in preparation for the days work**
- **Delivered by the employer (foreman, etc.)**
- **Used as sign-in sheet to document attendance**
- **Affordable & accessible**



# Can toolbox talks address the challenges and be an effective method to communicate safety?

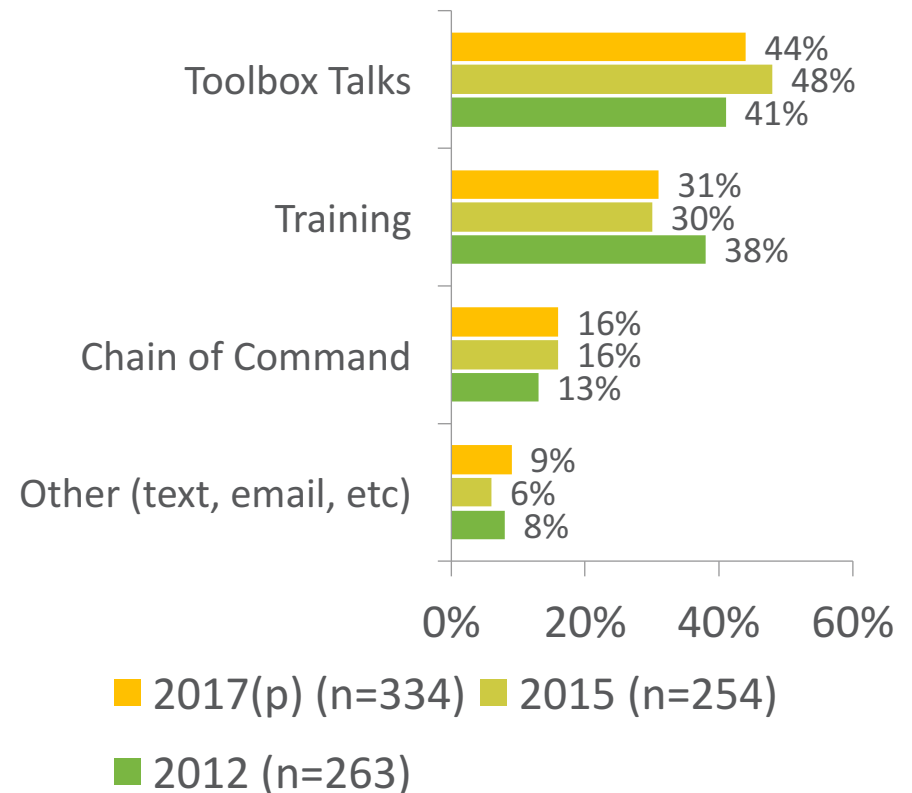
## What the research says...

- *“Effective tailgate trainings (brief job site safety meetings) can be a powerful tool to **promote hazard awareness** and **safe work practices**.”*  
(Harrington, et.al., 2008)
- *“Done well, these talks can improve communication, empower workers, reduce injuries and **improve safety**.”* (Kaskutas, et.al., 2016; Gillen, et.al., 2013)

# What the industry says...

- Dodge Data Analytics – contractor surveys:
  - ✓ 30% or more of respondents <50 employees
- Ways to communicate safety to jobsite workers:
  - ✓ Toolbox Talks most often used
  - ✓ Toolbox Talks most effective method

Top-3 Most Effective Communication Methods  
% Ranked First



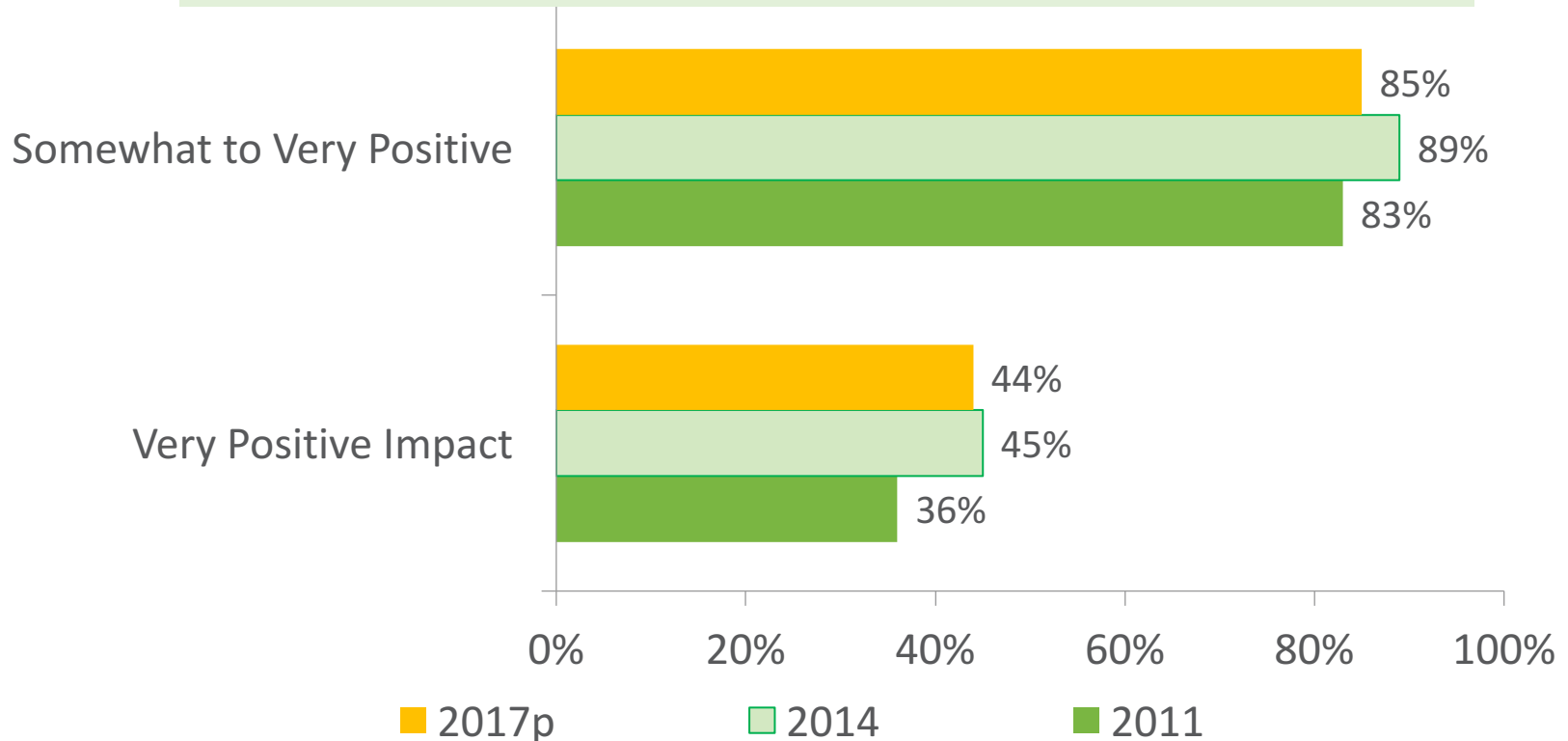
# What the industry says...

## Masonry contractors surveyed

2011 = 145; 2014 = 152; 2017(p) = 132

## Use of toolbox talks on all jobs:

2011 = 76%; 2014 = 76%; 2017(p) = 74%



# What makes an effective toolbox talk?


- **Brief, scripted text**
- **Developed with input from stakeholders**
- **Relevant to the jobsite**
- **Includes visual**
- **Culturally relevant**
- **Available in native language**
- **Narratives that include ‘real-life’ stories**
- **Prompts to encourage discussion & problem solving**



# NIOSH Study: Value of toolbox talks with case studies & discussion questions

- Developed case studies with stakeholder input
- Created 2 formats:
  1. “Treatment Group” Toolbox Talks
    - contained a graphic, case study, discussion questions, safety information, sign-in sheet.
  2. “Conventional Group” Toolbox Talks – excluded the case studies and discussion questions

**Figure 1. – Sample Toolbox Talk Containing Story**



### Preventing Falls from Extension Ladders

NIOSH Toolbox #BC-2

In building construction, falls from ladders occur frequently, and for a variety of reasons. In fact, of 110 workers who died in falls from ladders in the year 2000, over half, 56, were construction workers. One type of ladder that is hazardous is the extension ladder.

**Fatal fall from ladder.** Two workers were replacing the roof on a bank building. To finish the job, they decided to use the two halves of an extension ladder separately. They placed the lower section of the ladder the section that had feet against a roof over top the drive-in banking lanes. One worker took the upper section—with rounded end caps but no feet—to finish a small section of roof over a bank entrance. He completed the task and then placed the upper section against the roof beside the lower section. He picked up tools and a broom and began to climb the upper section of ladder. He had nearly reached the roof when the ladder slid outward at the bottom. The worker fell with the broom. The broom struck the pavement, and then the victim's head struck the handle end of the broom stick. The worker was semi-conscious when the emergency squad arrived and transported him to a local hospital. From there he was taken by air ambulance to a regional trauma center where he died the next day.


1. What do you think went wrong that may have caused this fatal fall?
2. How could this fall have been prevented?
3. Have you ever fallen or nearly fallen from a ladder, or do you know anyone who has fallen from a ladder? What happened?

**Preventing falls from extension ladders:**

- Place the ladder base 1 foot from the building for every 4 feet of ladder length up to the resting position (see illustration). A good rule of thumb: stand with your feet at the base of the ladder, and with your arms fully extended, grasp the sides or rungs of the ladder. If you can do this while the top of the ladder is resting against the building, the angle is about right (that is, a 1 to 4 ratio).
- Never separate the sections of extension ladders for individual use.
- Secure the ladder at both top and bottom if possible.
- Always have 3-point contact, such as 1 hand and 2 feet, when climbing up or down a ladder.
- Wear shoes with slip-resistant soles.

**Other tips for safe ladder use:**

- Make sure the side rails of the ladder extend at least 42 inches above the roof to be safe.
- Inspect ladders before each use for cracked or broken parts such as rungs, side rails, feet and locking components.
- Load no more weight on the ladder than it is designed to support.
- Use only ladders that comply with ANSI design standards.



# NIOSH findings shared with CPWR


- **52 Draft Toolbox Talks**
- **Case studies & discussion questions increased workers' safety knowledge and influenced safety attitudes**
- ***Needed* - Research on other techniques to enhance the impact of toolbox talks**



# CPWR built on the research findings

- Modified the format
- Revised the content for readability and technical accuracy

**Figure 1. – Sample Toolbox Talk Containing Story**



## Preventing Falls from Extension Ladders

ANSI Z39.1-2009

In building construction, falls from ladders occur frequently, and for a variety of reasons. In fact, of 119 workers who died in falls from ladders in the year 2006, over half, 56, were construction workers. One type of ladder that is hazardous is the extension ladder.

**Fatal fall from ladder:** Two workers were replacing the roof on a bank building. To finish the job, they decided to use the two halves of an extension ladder separately. They placed the lower section of the ladder—the section that had feet—against a roof over top the drive-in banking lanes. One worker took the upper section—with rounded end caps but no feet—to finish a small section of roof over a bank entrance. He completed the task and then placed the upper section against the roof beside the lower section. He picked up tools and a bottle-head broom and began to climb the upper section of ladder. He had nearly reached the roof when the ladder slid outward at the bottom. The worker fell with the ladder. The broom struck the pavement, and then the victim's head struck the handle end of the ladder. The worker was semi-conscious when the emergency squad arrived and transported him to a local hospital. From there he was taken by an ambulance to a regional trauma center where he died the next day.


1. What do you think went wrong that may have caused this fatal fall?
2. How could this fall have been prevented?
3. Have you ever fallen or nearly fallen from a ladder, or do you know anyone who has fallen from a ladder? What happened?


**Preventing falls from extension ladders:**

- Place the ladder base 3 feet from the building for every 4 feet of ladder length up to the resting position (see illustration). A good rule of thumb: stand with your feet at the base of the ladder, and with your arms fully extended, grasp the sides or rungs of the ladder. If you can do this while the top of the ladder is resting against the building, the angle is about right (that is, a 3 to 4 ratio).
- Never separate the sections of extension ladders for individual use.
- Secure the ladder at both top and bottom if possible.
- Always have 3-point contact, such as 1 hand and 2 feet, when climbing up or down a ladder.
- Wear shoes with slip-resistant soles.

**Other tips for safe ladder use:**

- Make sure the side rails of the ladder extend at least 42 inches above the roof to be used.
- Inspect ladders before each use for cracked or broken parts such as rungs, side rails, feet and locking components.
- Load no more weight on the ladder than it is designed to support.
- Use only ladders that comply with ANSI design standards.





## Falls: Extension Ladders

Each year, about 50 construction workers are killed by falls from ladders. The main cause is falling from an extension ladder. The falls are frequently caused by either the slippage or movement of the supports or by workers losing their balance.

**Here is an Example**

Paul was descending a 24-foot extension ladder from an overhead area when the ladder slipped causing a fall of approximately 12 feet to the concrete surface. Paul suffered head injuries, broke his hand, and was taken to a hospital.


1. Do you use extension ladders?
2. Have you ever fallen or do you know anyone who has fallen from an extension ladder? If so, what happened?
3. Do you know that OSHA has a free smart phone app for checking that a ladder is at the right angle?

**What Are We Going to Do Today?**

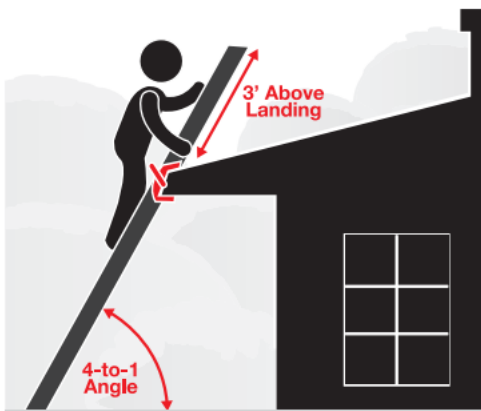
What will we do here at the worksite today to prevent falls from extension ladders?

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

©2013, CPWR – The Center for Construction Research and Training. All rights reserved. CPWR is the research, training, and service arm of the Building and Construction Trades Dept., IFC, DDC, and other trade unions or otherwise safety and health focused construction workers base on the job. Production of this card was supported by Grant CH-400710 from the National Institute for Occupational Safety and Health (NIOSH). The contents are solely the responsibility of the authors and do not necessarily represent the official views of NIOSH. [www.cprw.com](http://www.cprw.com)



## Falls: Extension Ladders



• Set your ladder at the correct 4 to 1 angle.  
• Tie off the top of the ladder to prevent it from slipping sideways.  
• Extend the ladder three feet above the landing.

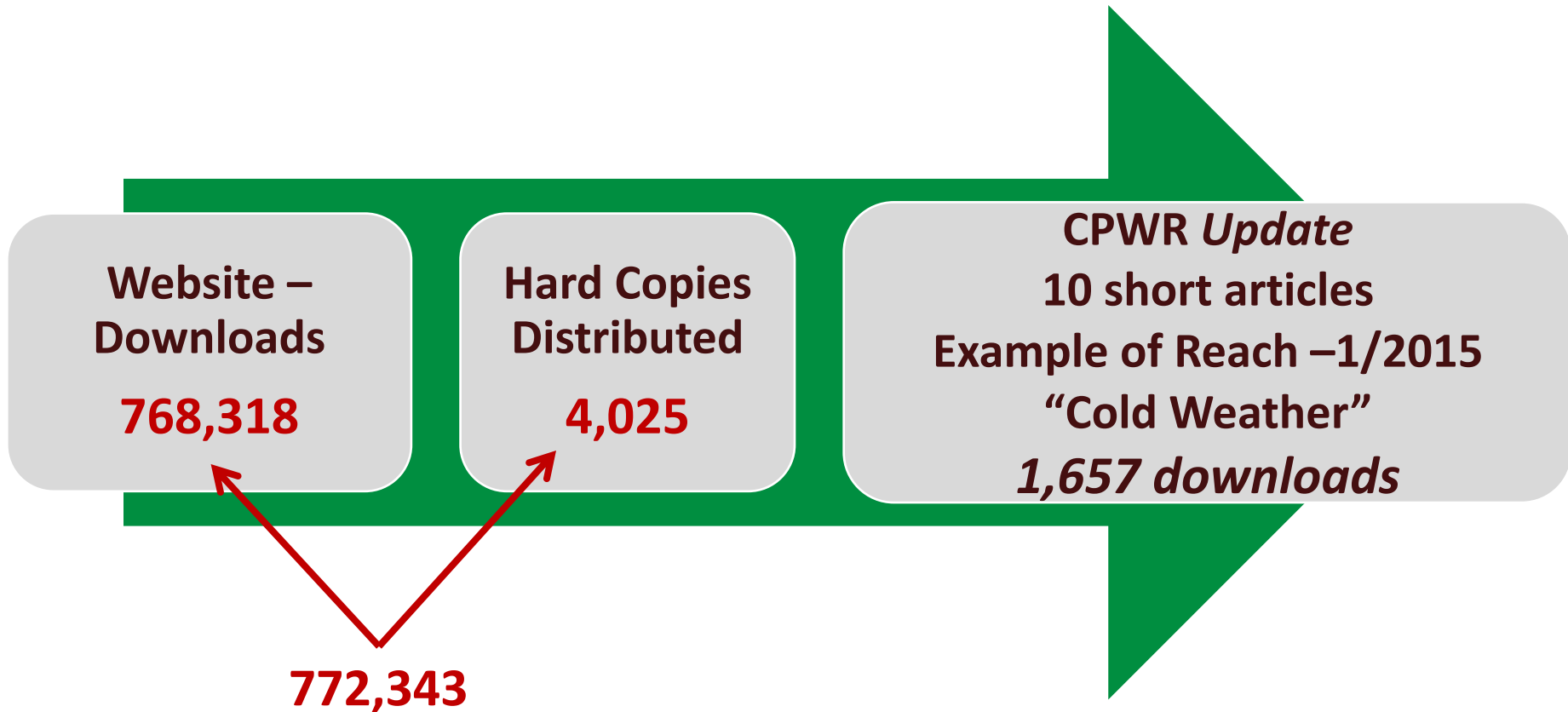






# Evidence of use...

## Promoted - August 2013 – August 2017



# Evidence of use...

January 2014 – August 2017 – 46 posts

December 9, 2015  
“Scaffolds”  
130 downloads



June 14, 2016  
“Working in Heat”  
750 downloads



April 27, 2017  
“Fall Protection”  
141 downloads



# Building on the research – *New Directions*



CPWR [ ] TOOLBOX TALK  
THE CENTER FOR CONSTRUCTION RESEARCH AND TRAINING

## Nano-Enabled Wood Coatings and Stains

High-efficiency particulate air (HEPA) vacuum

Orbital sander

Use your orbital sander, running to a vacuum with a HEPA filter to capture the dust that gets into the air.

Use a face shield to protect your eyes from the dust and hearing protection when using a vacuum system like this.

CPWR [ ]  
THE CENTER FOR CONSTRUCTION RESEARCH AND TRAINING

© Construction Research and Training. All rights reserved. CPWR is the research and training center for the building trades unions. Production of this document was supported by cooperative agreement with the National Institute for Occupational Safety and Health (NIOSH). The contents are the authors and do not necessarily represent the official views of NIOSH.

## Falls: Extension Ladders

HF&C  
Loss Control Excellence  
Haylor LC<sup>x</sup>

**Remember This**

- Whenever possible, use an aerial lift or scaffold when working at heights.
- Conduct regular inspections and maintenance on extension ladders.

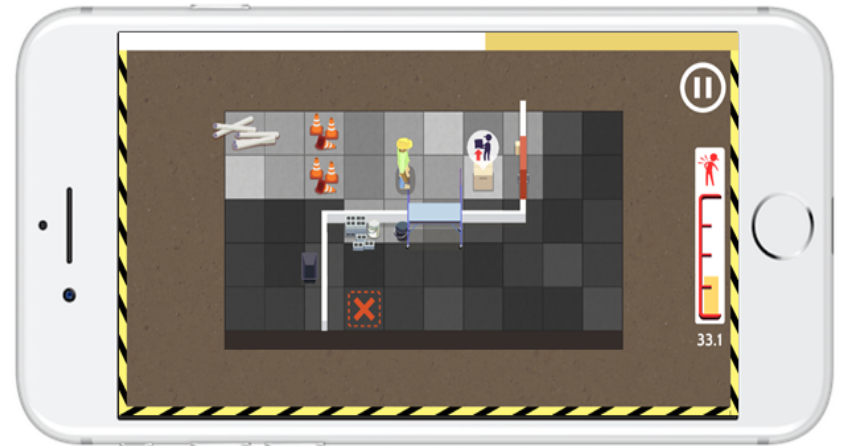
*Each year in the United States, about 50 construction workers die from ladder falls. Most of these falls are from extension ladders and occur when the ladder slips, the supports move, or the worker loses balance.*

**Raul's Story**



# Building on the research – *New Directions*

## Developing and testing microgames




# Building on the research – *New Directions*

## Supporting New NIOSH Research

*“Adapting NIOSH-CPWR toolbox talks for Spanish-speaking construction workers”*

## Evaluating microgames



The poster features a red toolbox icon at the top left with the text 'NIOSH CPWR Toolbox Talk'. The title 'Lifting and Carrying Materials' is in the top right. The central illustration shows three construction workers in hard hats: two are lifting a stack of bricks, and one is using a red dolly to move a stack. The background shows a construction site with a crane and a concrete pour. Below the illustration are three safety tips in Spanish, a QR code, and logos for CDC, NIOSH, and CPWR. A small disclaimer at the bottom right states: 'August 2016, The National Institute for Occupational Safety and Health (NIOSH), of the Centers for Disease Control and Prevention (CDC), produced this card in partnership with CPWR, The Center for Construction Research and Training. This document is in the public domain and may be freely copied or reprinted. Mention of any company or product does not constitute endorsement by NIOSH.'

**Lifting and Carrying Materials**

- ✦ Whenever possible, use mechanical equipment like a dolly to horizontally move heavy objects.
- ✦ Never try to lift an item weighing over 50 pounds by yourself.
- ✦ Plan your lifts; make sure the path is clear and you are facing the direction of travel before lifting.

August 2016, The National Institute for Occupational Safety and Health (NIOSH), of the Centers for Disease Control and Prevention (CDC), produced this card in partnership with CPWR, The Center for Construction Research and Training. This document is in the public domain and may be freely copied or reprinted. Mention of any company or product does not constitute endorsement by NIOSH.

# Questions?

