

# Top Findings From the **Safety Management in the Construction Industry 2017 SmartMarket Report**



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North America's leading provider of analytics and software-based workflow integration solutions for the construction industry.



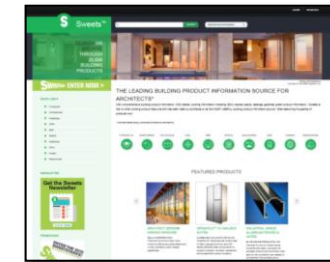
### **Dodge Global Network**

Regional construction,  
reported nationwide



### **Dodge Analytics: Market Research & Intelligence**

Off-the-Shelf and Custom  
Analytics



### **Sweets.com**

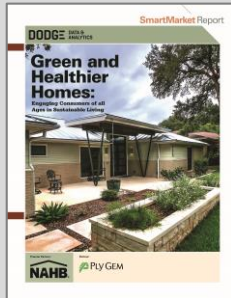
Leading source of information  
about building products

# Dodge Data & Analytics Research

Extensive industry research available for free download  
([analyticsstore.construction.com](http://analyticsstore.construction.com))

## SUSTAINABILITY

### Green Homes



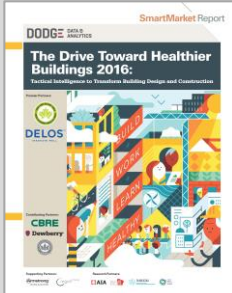
### World Green Trends



### Green Schools

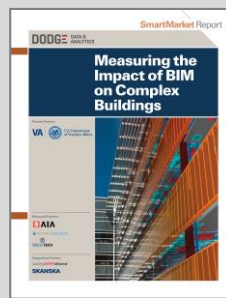


### Health

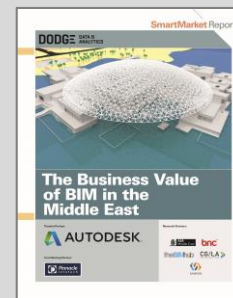


## TECHNOLOGY/INNOVATION

### Measuring BIM



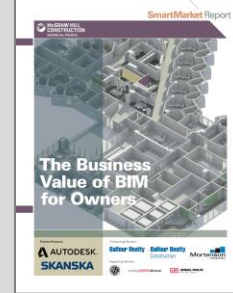
### Middle East BIM



### Information Mobility

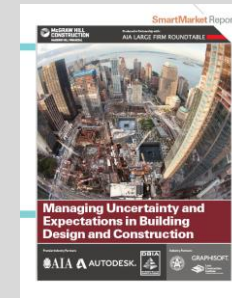


### BIM for Owners

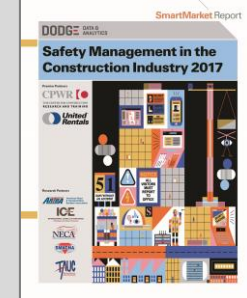


## PRACTICES/PROCESSES

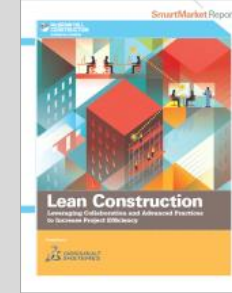
### Managing Uncertainty



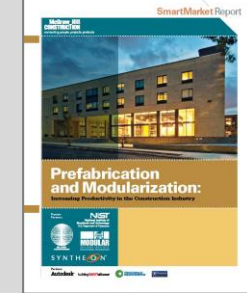
### Safety



### Lean



### Prefabrication

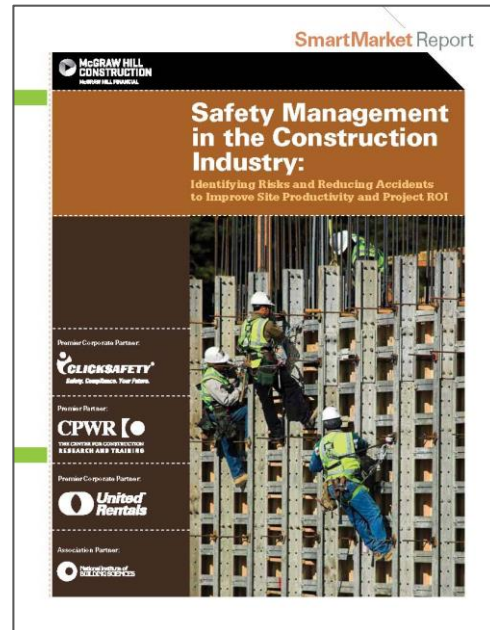




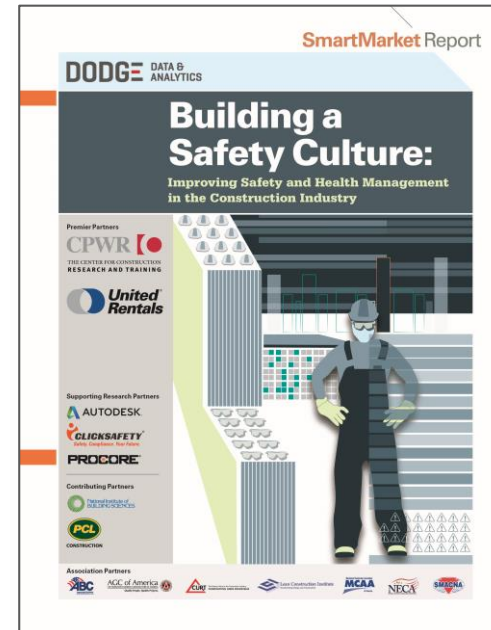
## Agenda

- **Safety Management in the Construction Industry 2017 Study**
- Safety Practices and Impacts
- Technology and Safety
- Prevention through Design
- Drivers for Safety Investments
- Training and Communication
- Conclusions

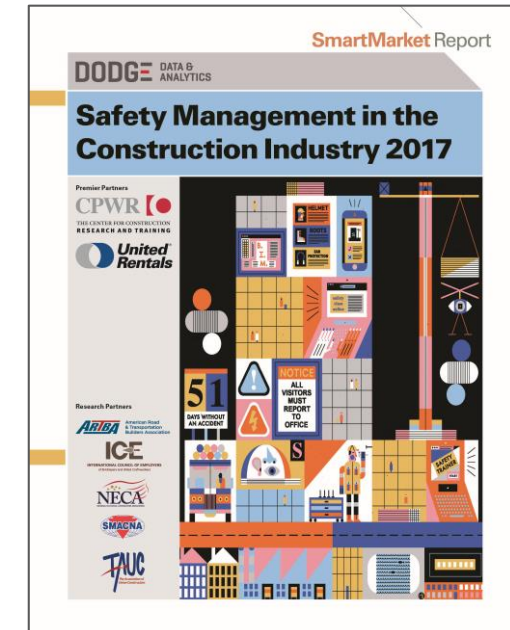
# Series of Studies on Safety



2012



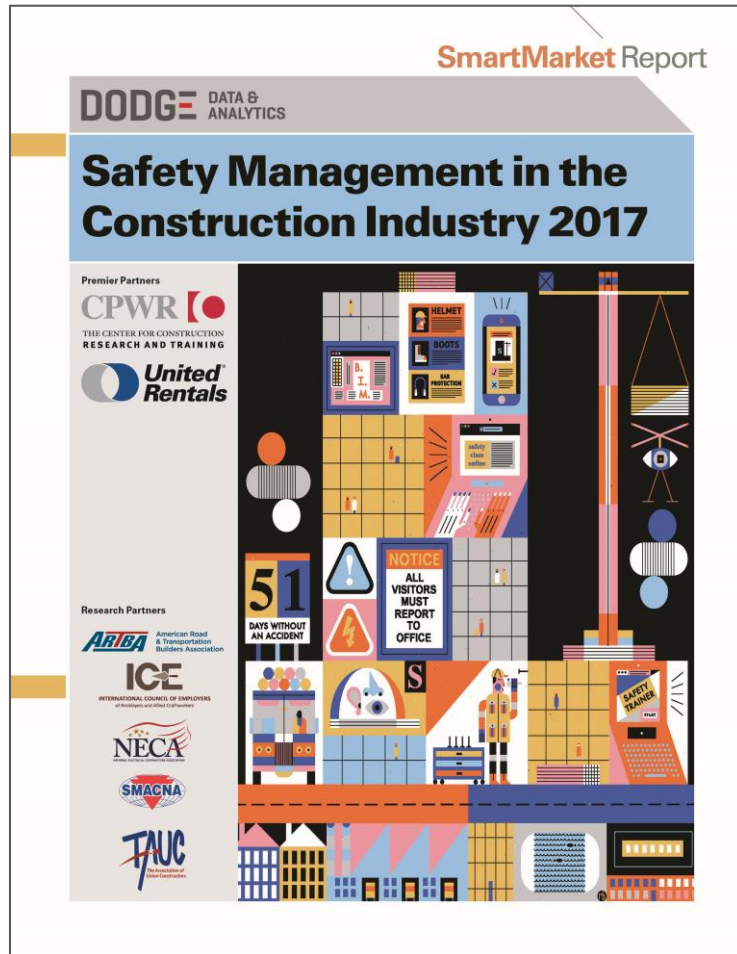
2015



2017



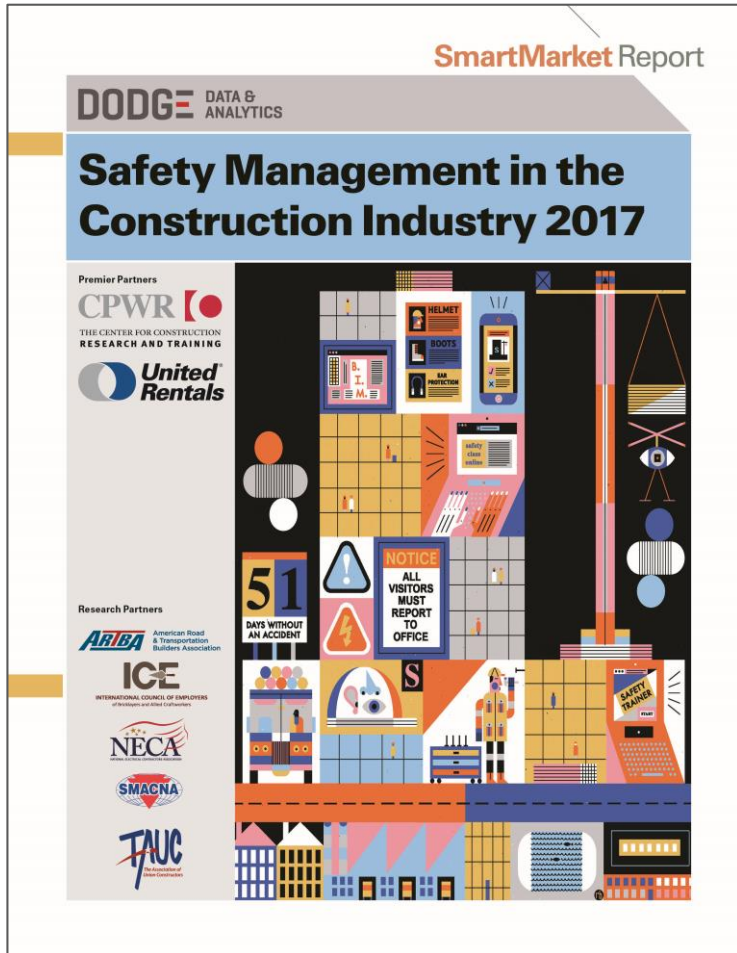
# Safety Management in the Construction Industry Study



## Contractor Study

- Online survey: June 14 to August 1 2017
- 334 contractors:
  - 56% GCs/CMs/Design-Builders
  - 44% Trade Contractors/Engineering Contractors
- Sample from Dodge Contractor Panel and from partnering organizations: ARTBA, ICE, NECA, SMACNA, TAUC
- Topics from 2012 and 2015 studies:
  - Top practices
  - Benefits of investing in safety
  - Training and communication
- Deep dive on technology: expanding up 2012 study investigation
- Examine use of Prevention through Design (PtD)

# Safety Management in the Construction Industry Study



## Architect Study on PtD

- Online survey: June 21 to 23
- 108 architects
- Sample from Dodge Architect Panel

Report available for download at:  
[www.construction.com/toolkit/reports](http://www.construction.com/toolkit/reports) and  
<https://analyticsstore.construction.com>

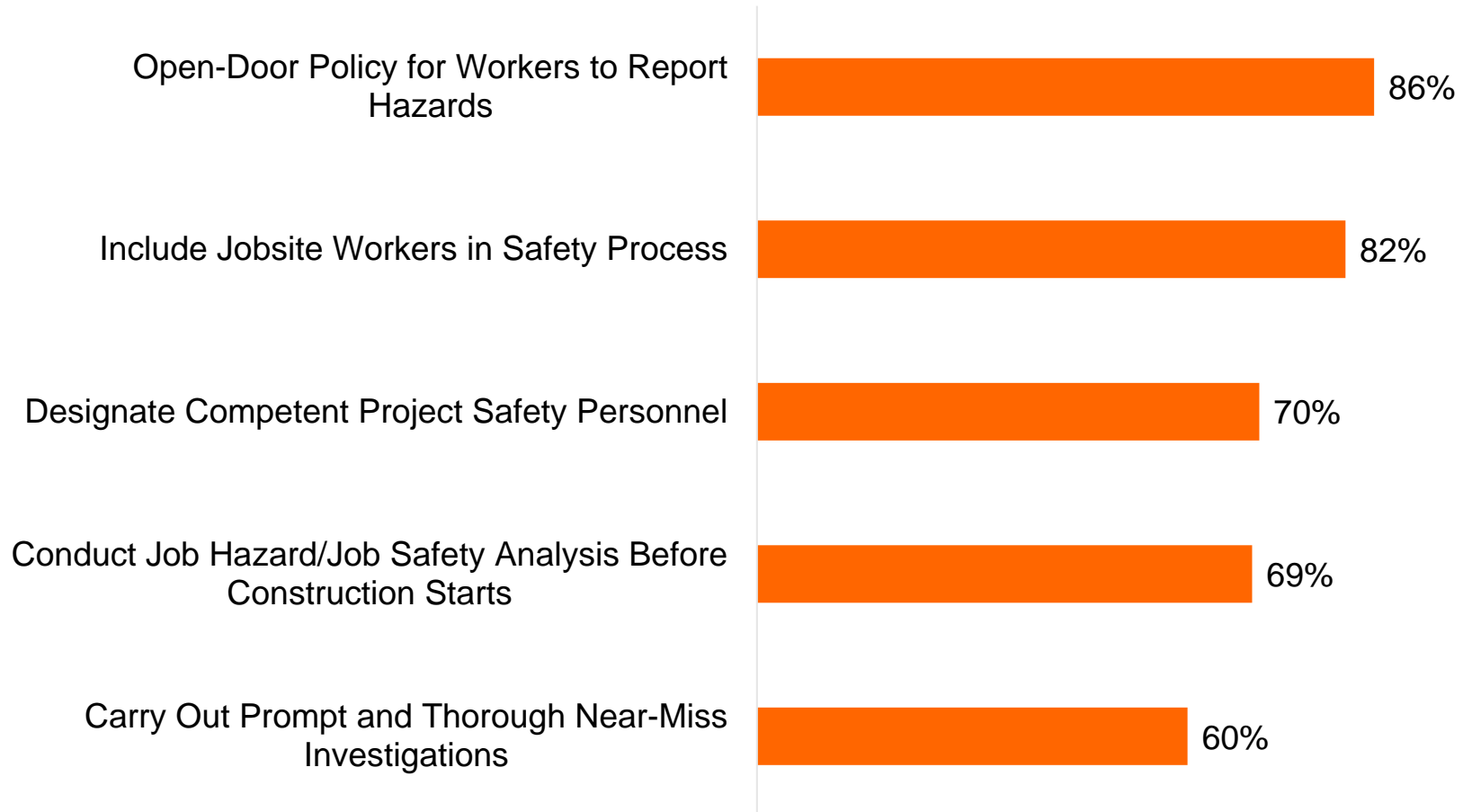


## Agenda

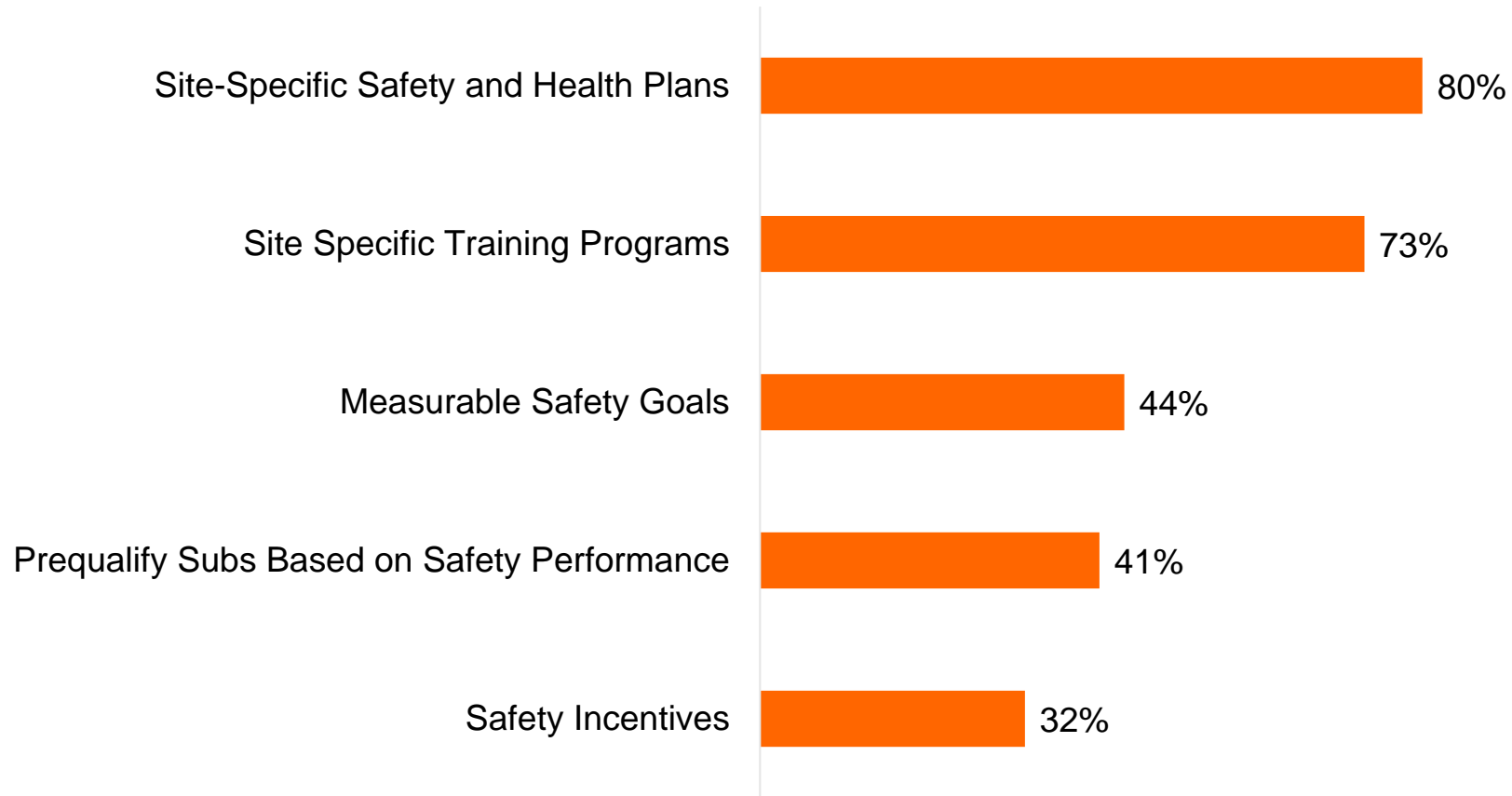
- Safety Management in the Construction Industry 2017 Study
- **Safety Practices and Impacts**
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# Practices Used to Promote Safety

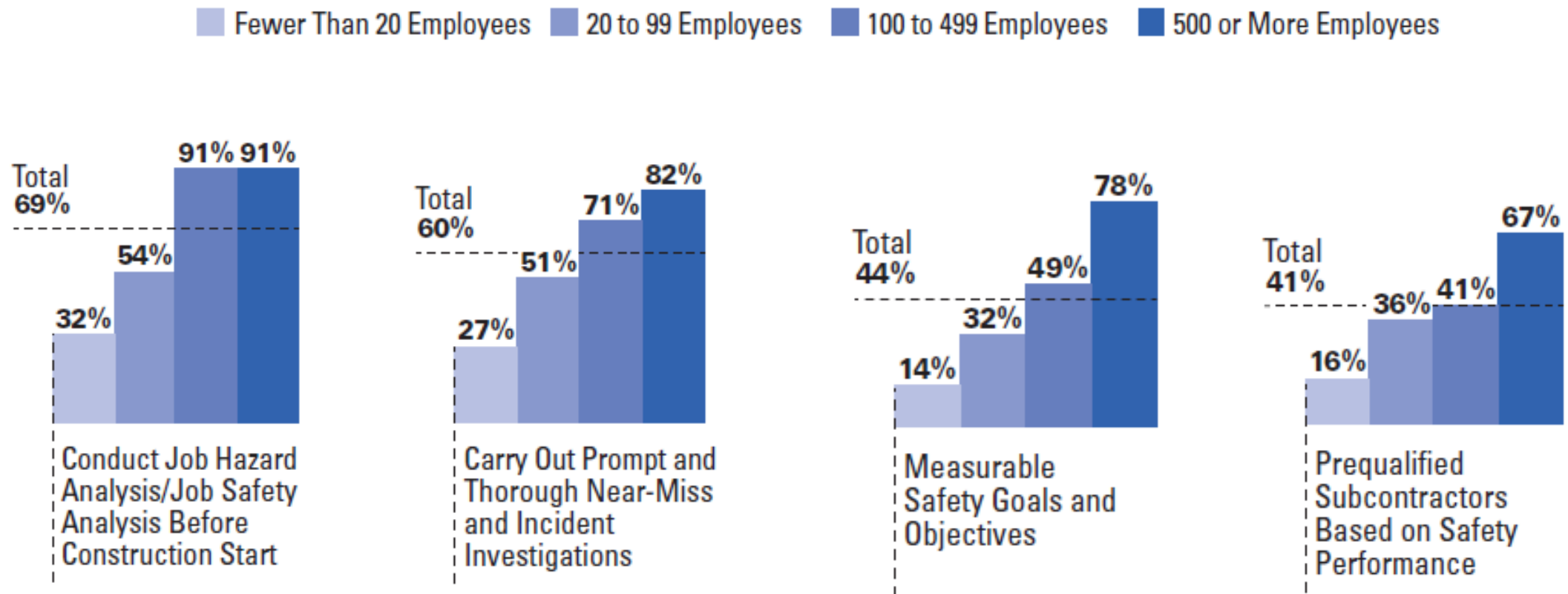


## Policies Used to Promote Safety



# Practices/Policies With Biggest Gap in Use by Large and Small Contractors

**All practices and policies are used more by large companies than by small ones. The charts below show some of the very large gaps in use.**



# Top Five Safety Culture Indicators That Have the Greatest Impact on Improving Safety Outcomes

## Training at All Levels

**41%** **36%** **77%**

## Empowering and Involving Employees

**26%** **41%** **67%**

## Ensuring Accountability at All Levels

**25%** **33%** **58%**

## Aligning and Integrating Safety as a Value

**24%** **26%** **50%**

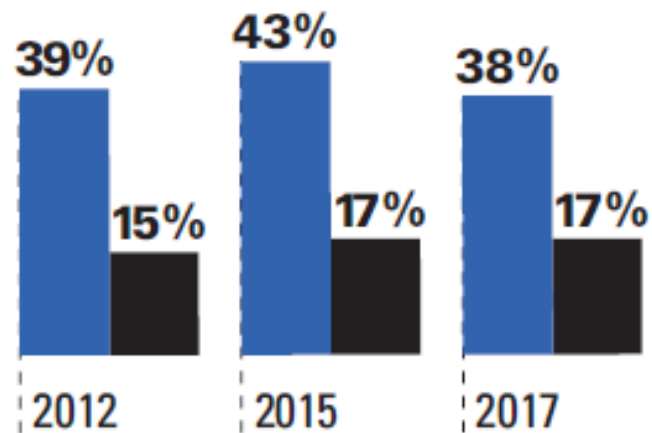
## Demonstrating Management Commitment

**20%** **38%** **58%**

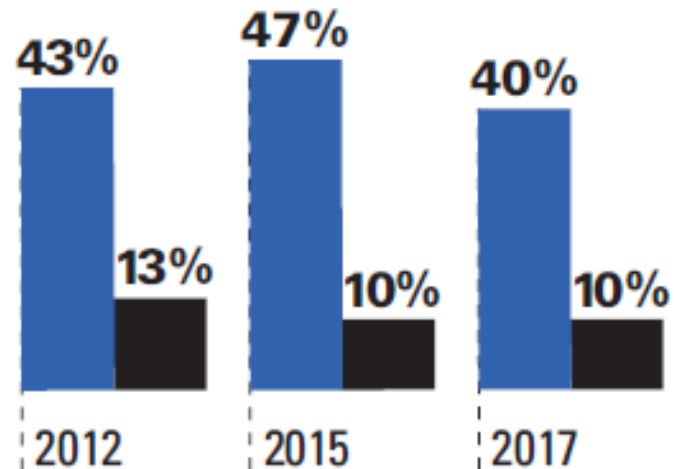
**Ranked First**  
**Selected as a Top Factor**

# Impact of Safety Practices on Projects

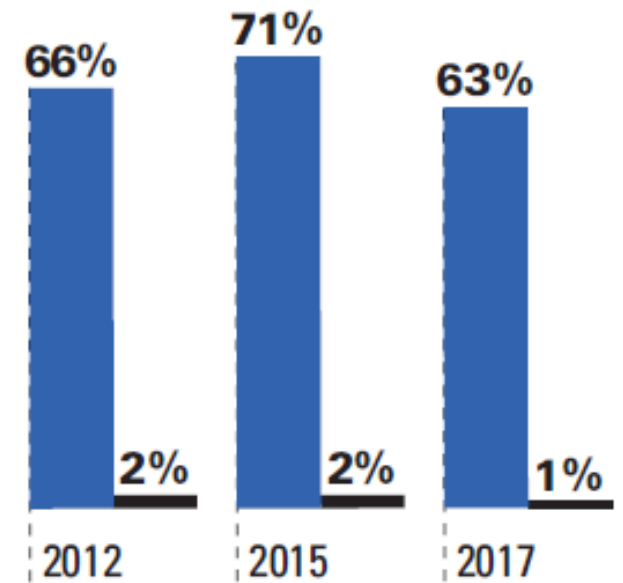
## Impact on Budget



## Impact on Schedule



## Impact on Quality



■ Positive Impact ■ Negative Impact

# Top Impacts of Safety Practices on Businesses

Contractors Reporting a Positive Impact From Their Use of Safety Practices



72%

**Standing in  
the Industry**

67%

**Ability to Contract  
New Work**





## Agenda

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- **Technology and Safety**
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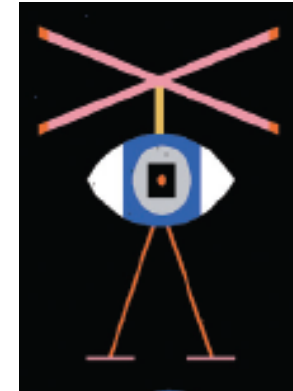
# Impact of Three Types of Technologies



**Building  
Information  
Modeling (BIM)**

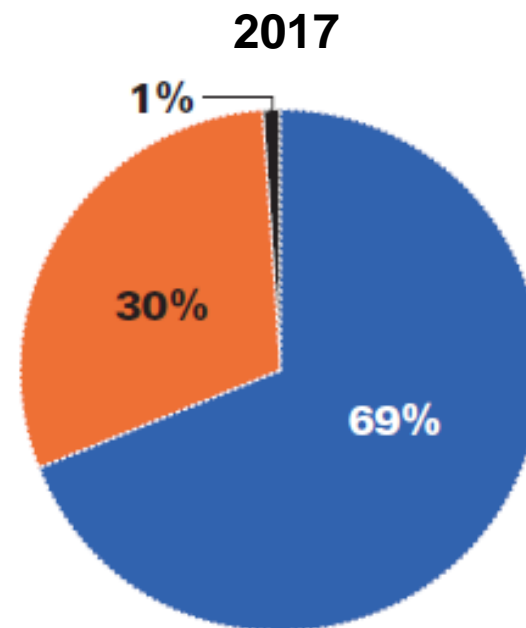
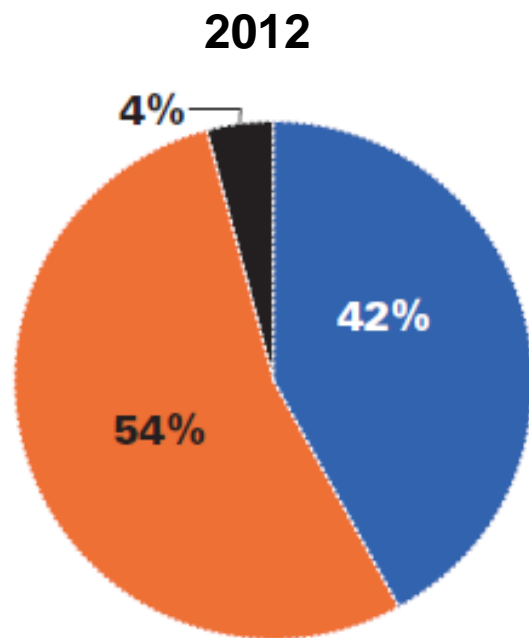
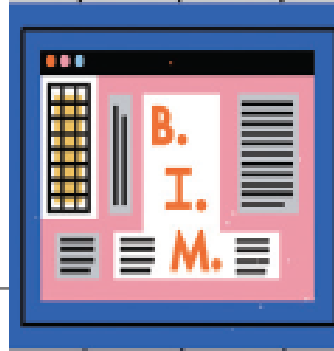


**Mobile Devices  
and Tools**



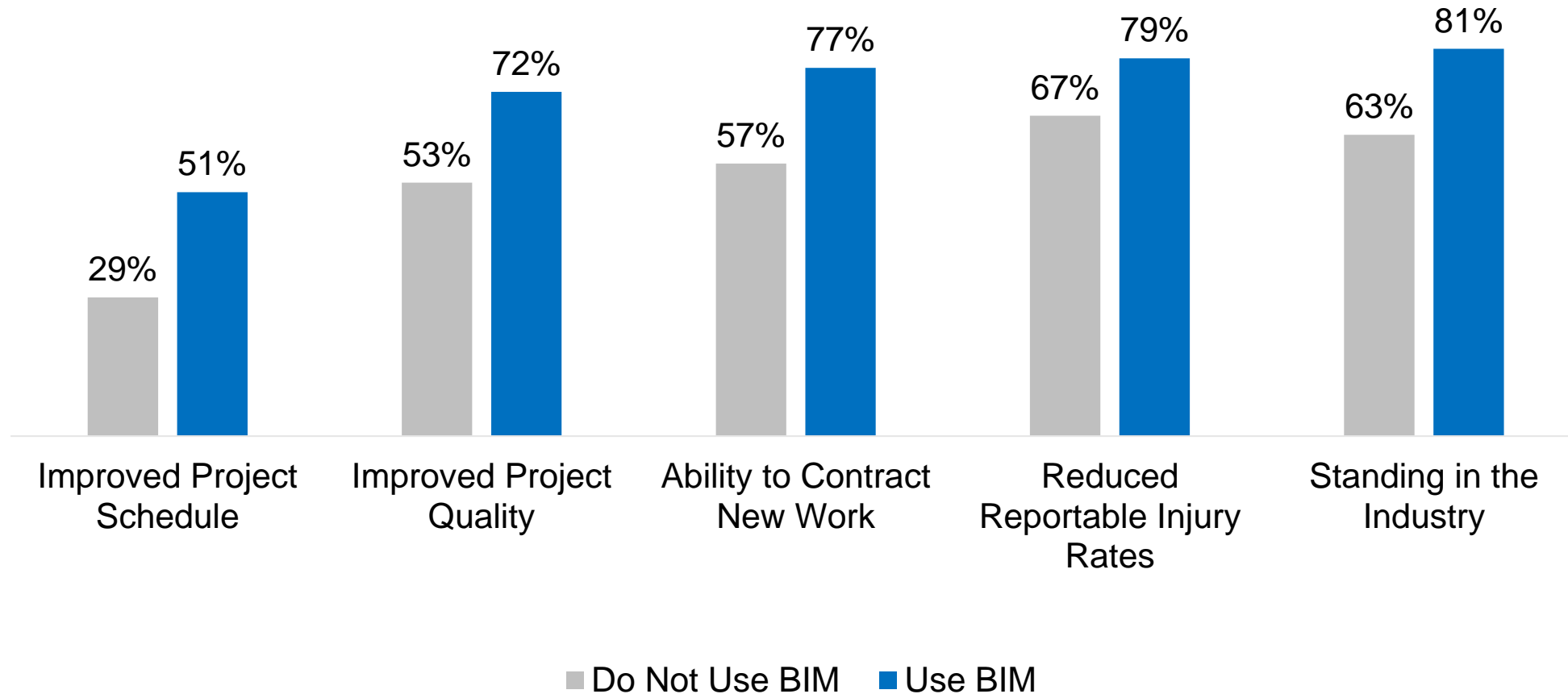
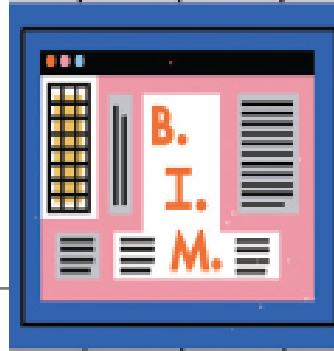
**Emerging  
Technologies  
(e.g., drones,  
wearable  
devices, laser  
scanning)**

## Impact of BIM on Safety

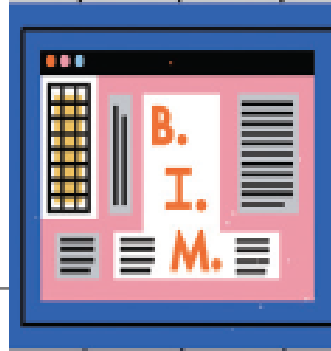


■ Positive/Very Positive Impact  
■ No Impact  
■ Negative Impact

# BIM Users Experience More Benefits From Use of Safety Practices



# Top Ways in Which BIM Improves Site Safety



Percentage of Contractors Using BIM Who Indicate Each Activity Improves Safety



Identify  
Potential Site  
Hazards



Clash Detection



Ability to  
Support  
Prefabrication

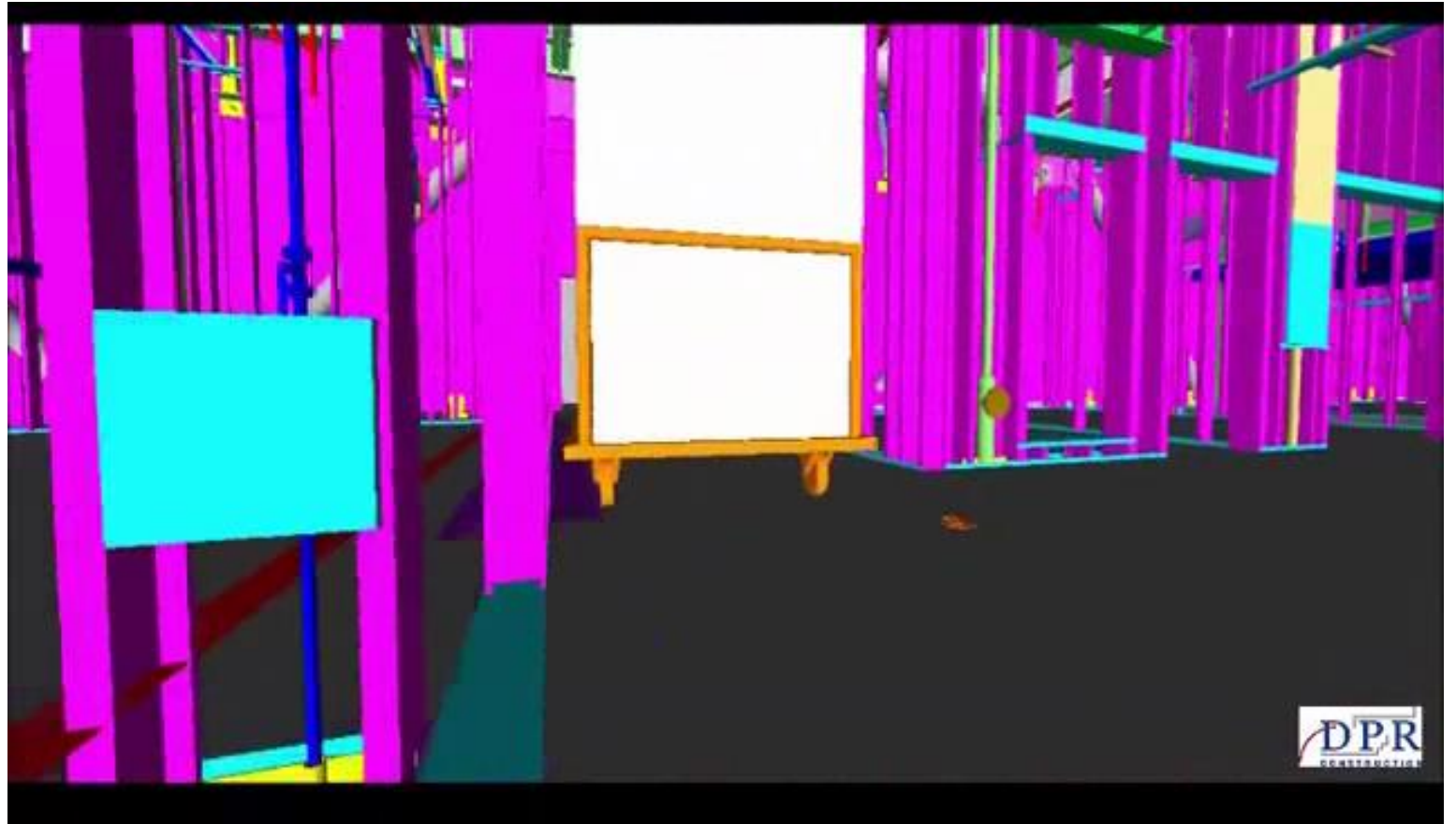


Ability to Create  
3D Images

# Key Trends

- BIM for Safety Planning

DPR:  
Hazard Identification  
in BIM





## Use of Mobile Devices Onsite

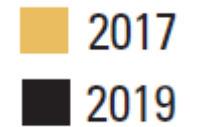
### Smartphone



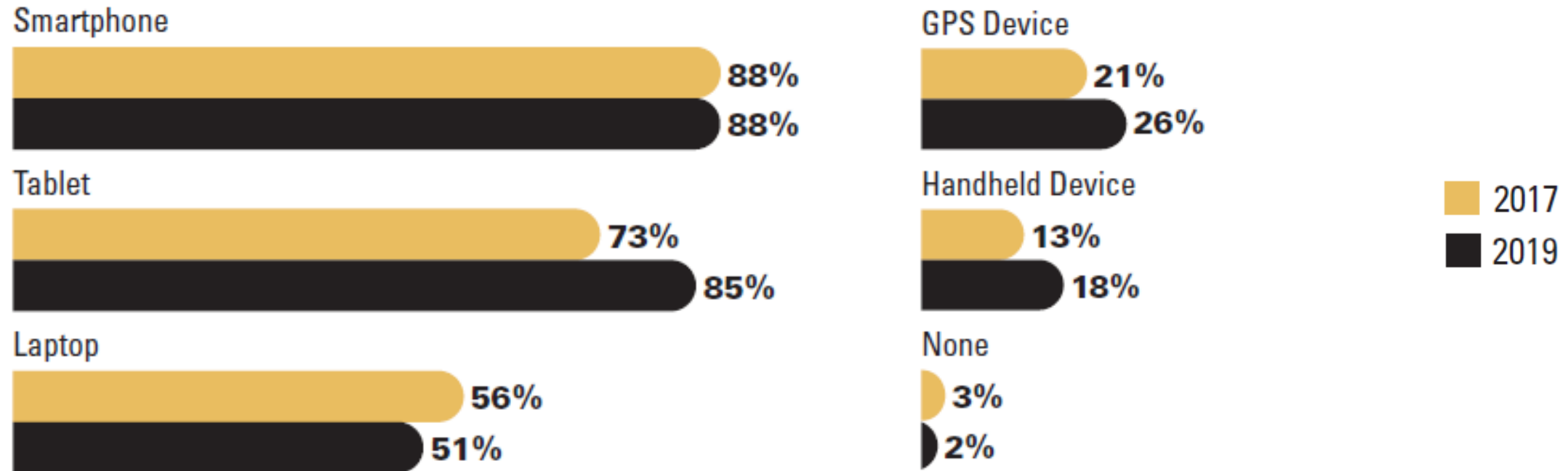
### Tablet



### Laptop



## Use of Mobile Devices Onsite



## Top Mobile Tools Used Onsite

Cameras



Project Document Sharing Software/Apps



Project Management Apps/Software



Safety Inspection Checklist  
Apps/Software



GPS or Other Mapping  
Apps/Software



Scheduling Apps/Software



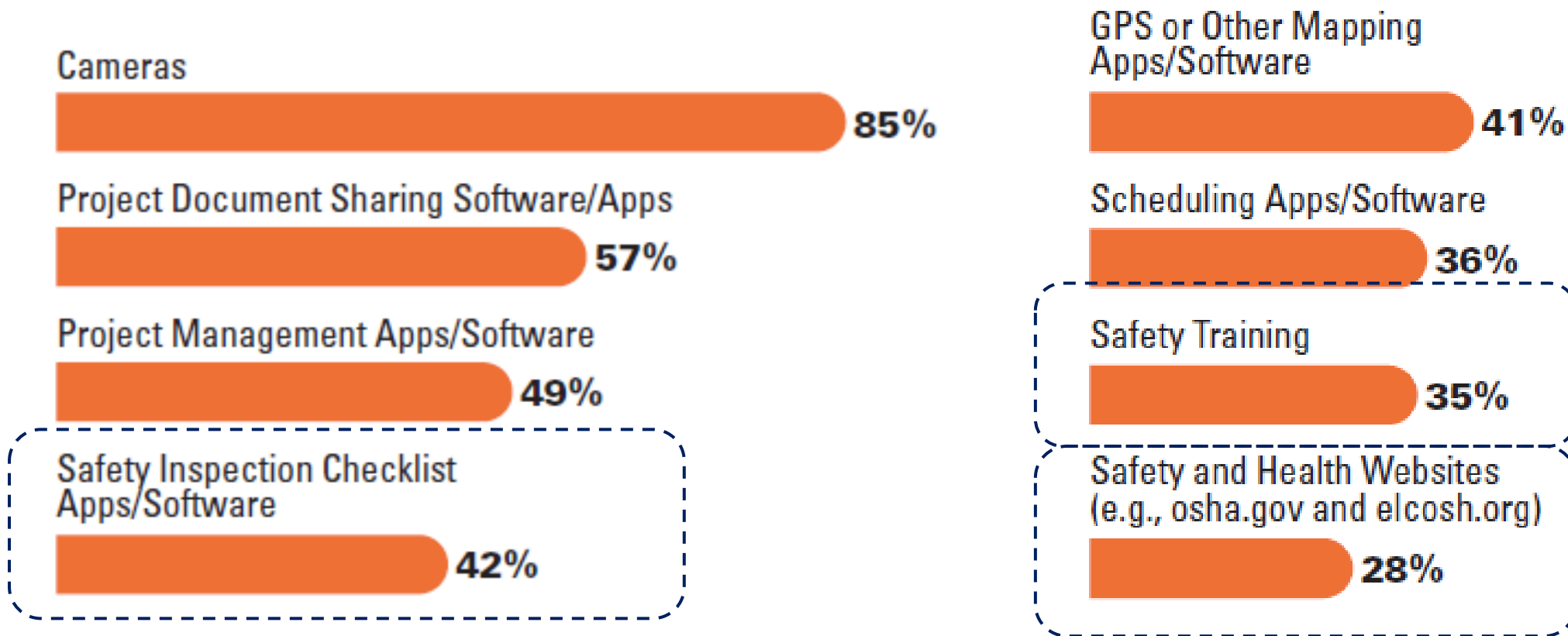
Safety Training



Safety and Health Websites  
(e.g., osha.gov and elcosh.org)



## Top Mobile Tools Used Onsite





# Use of Emerging Technologies That Enhance Safety

## Most Common Emerging Technologies

Drones (for reality capture etc.)



Laser Scanning



Wearable Devices (e.g., smart helmet, badges with coded electronic information)





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### Cutting Edge Technologies

Photogrammetry



Robotics



Optical Headmounted Display (e.g., Google Glass, Microsoft Hololens)







## Use of Emerging Technologies That Enhance Safety

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Laser Scanning



Wearable Devices (e.g., smart helmet, badges with coded electronic information)



Not Using Any Technologies Listed  
Onsite to Promote Safety



### Cutting Edge Technologies

Photogrammetry



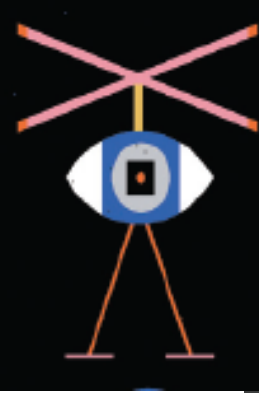
Robotics



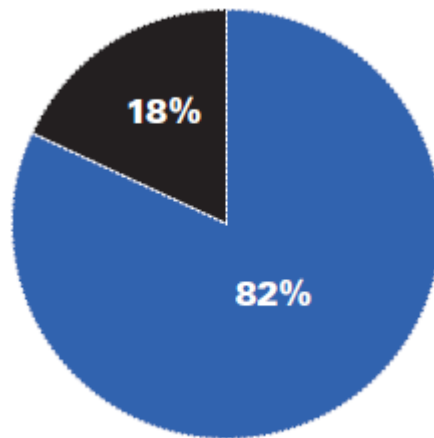
Optical Headmounted Display  
(e.g., Google Glass, Microsoft Hololens)



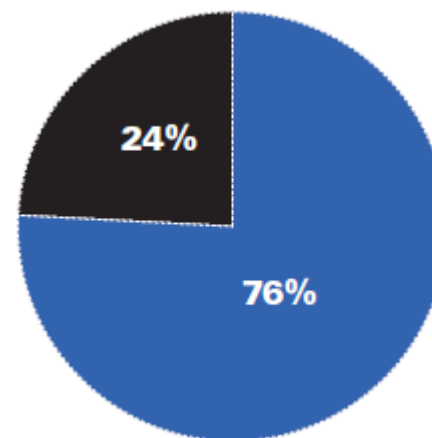
# Impact of Emerging Devices on Safety



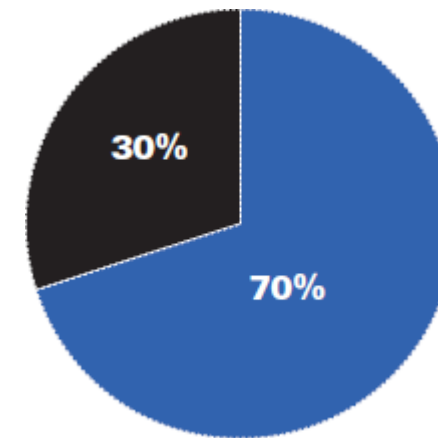
**Wearable Devices**



**Laser Scanning**



**Drones**



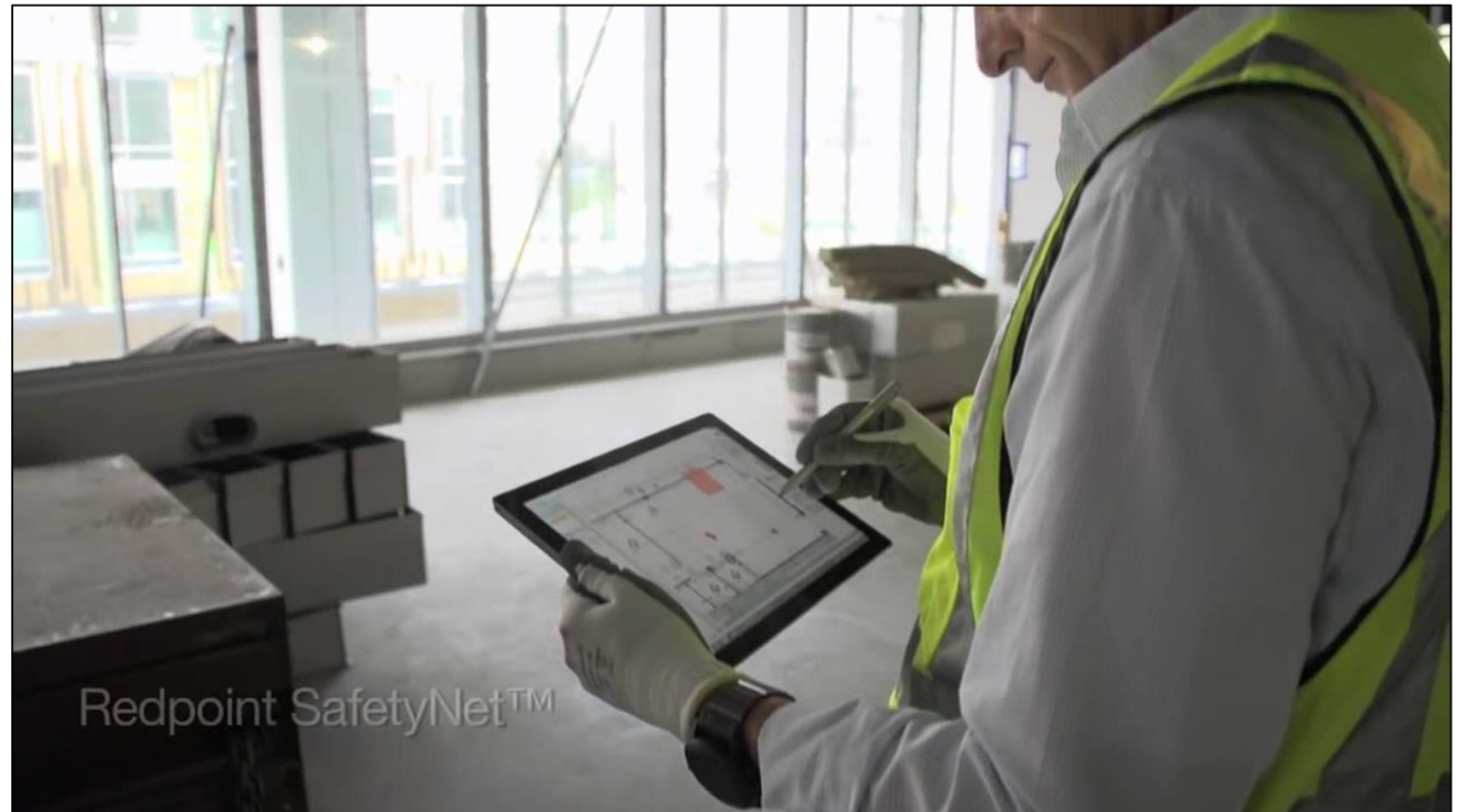
■ Positive Impact  
■ Neutral/Negative Impact

According to contractors using these devices

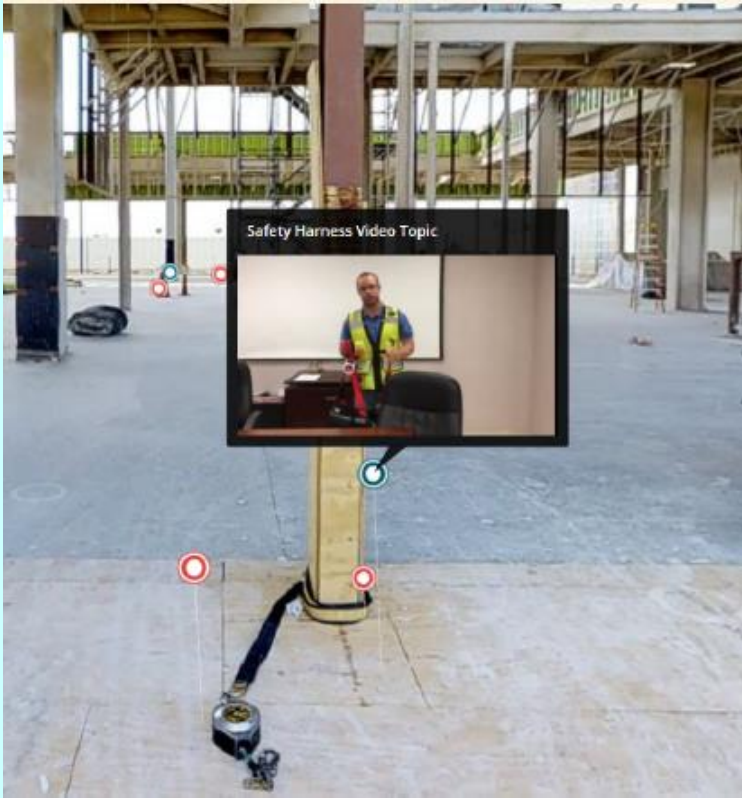
# Key Trends

- BIM for Safety Practices

Skanska:  
Jobsite Worker  
Safety Monitoring

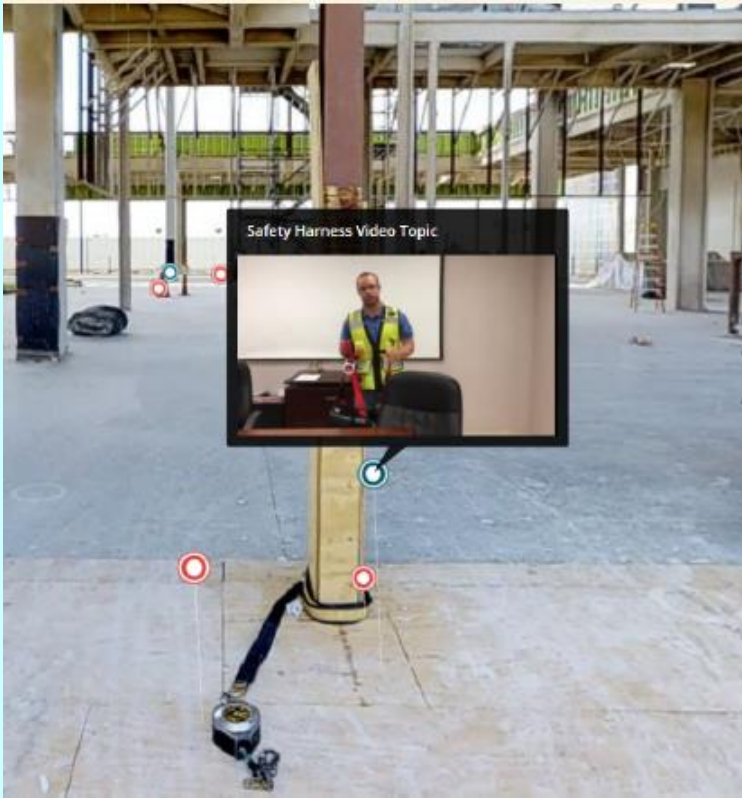


# Virtual Reality and Safety Training



- Hensel Phelps uses a 360-degree camera to capture images of existing conditions on projects (for QC purposes).
- Realized they could repurpose images to create a virtual reality that trainees could walk through and identify hazards.
- First project utilized: Austin Berstrom International Airport.
- Small buttons indicate questions that need to be answered from the manual, forcing workers to familiarize themselves with it.

# Virtual Reality and Safety Training



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- Clark Construction uses VR and a 2X8 to simulate working on a steel beam 10 stories up.
- Creates an emotional response that encourages workers to tie off in the future.



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- **Prevention through Design**
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# What is PtD?

## NIOSH's Definition

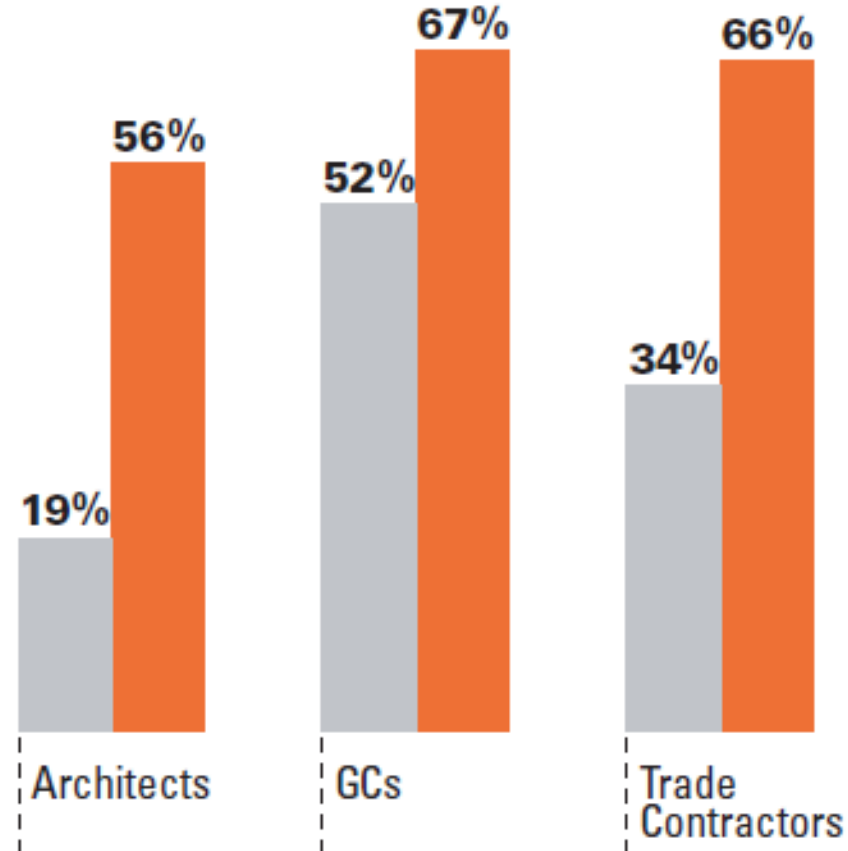
Prevention through Design (PtD) involves all of the efforts to anticipate and design out hazards to workers in facilities, work methods and operations, processes, equipment, tools, products, materials, new technologies and the organization of work.

## Potential for PtD to Impact Safety

- Multiple studies link between 22% and 63% of workplace fatalities to design-related factors.
- PtD has been mandatory in the UK since 1994, and it has a construction fatality rate one fifth that of the US.

## Awareness and Use of PtD

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



## Use of Specific PtD Practices by Architects

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%**

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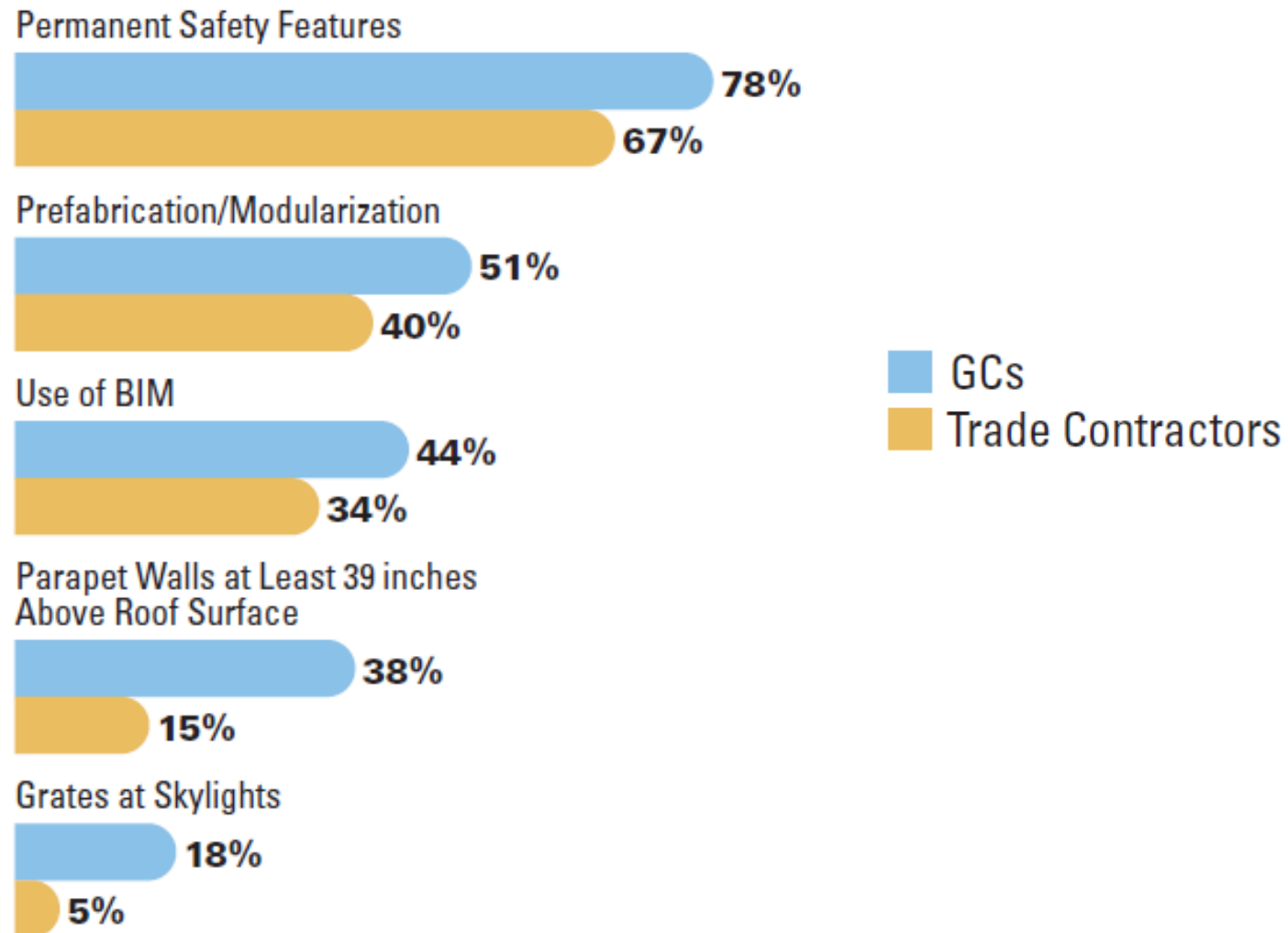
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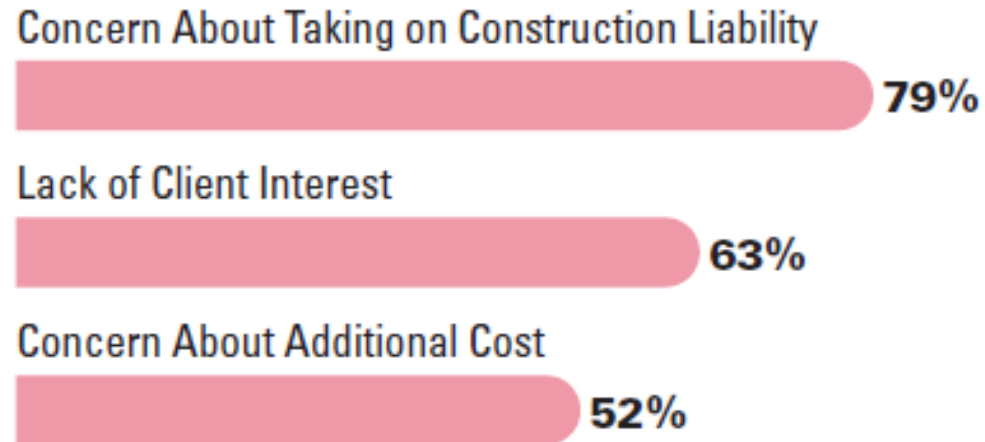
51%

## Use of Specific PtD Practices by Contractors

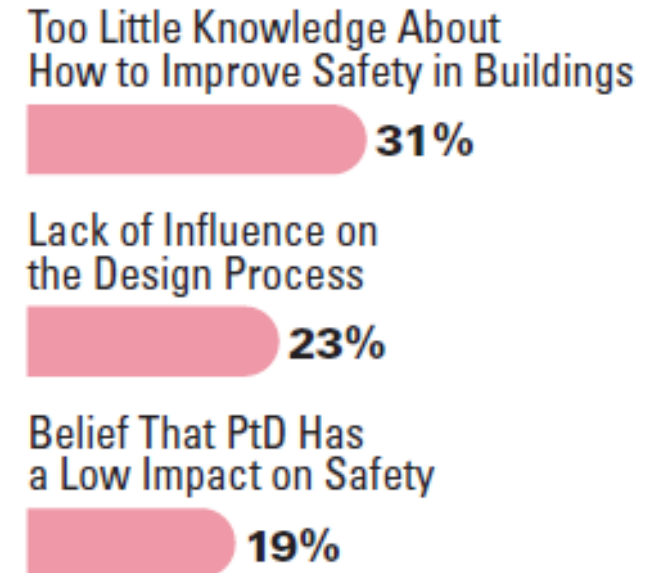


# Barriers to the Practice of PtD for Architects

## Most Influential



## Least Influential



Percentage Rating Them Influential/Highly Influential

## Barriers to Practicing PtD for Contractors

Too Little Knowledge About How to Engage in PtD



Lack of Influence on the Design Process



Lack of Client Interest

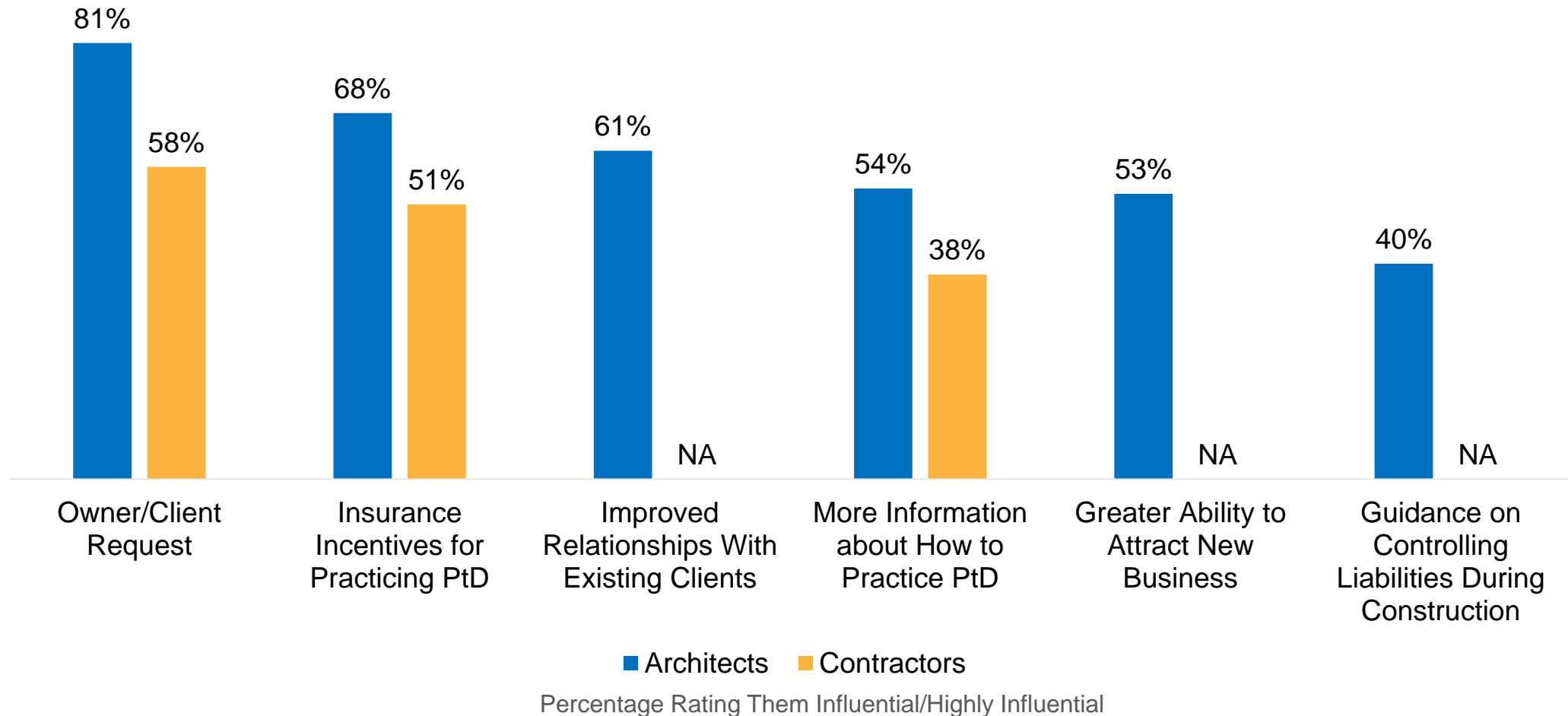


Belief That PtD Has  
a Low Impact on Safety



Percentage Rating Them Influential/Highly Influential

## Drivers Encouraging Architects and Contractors to Practice PtD







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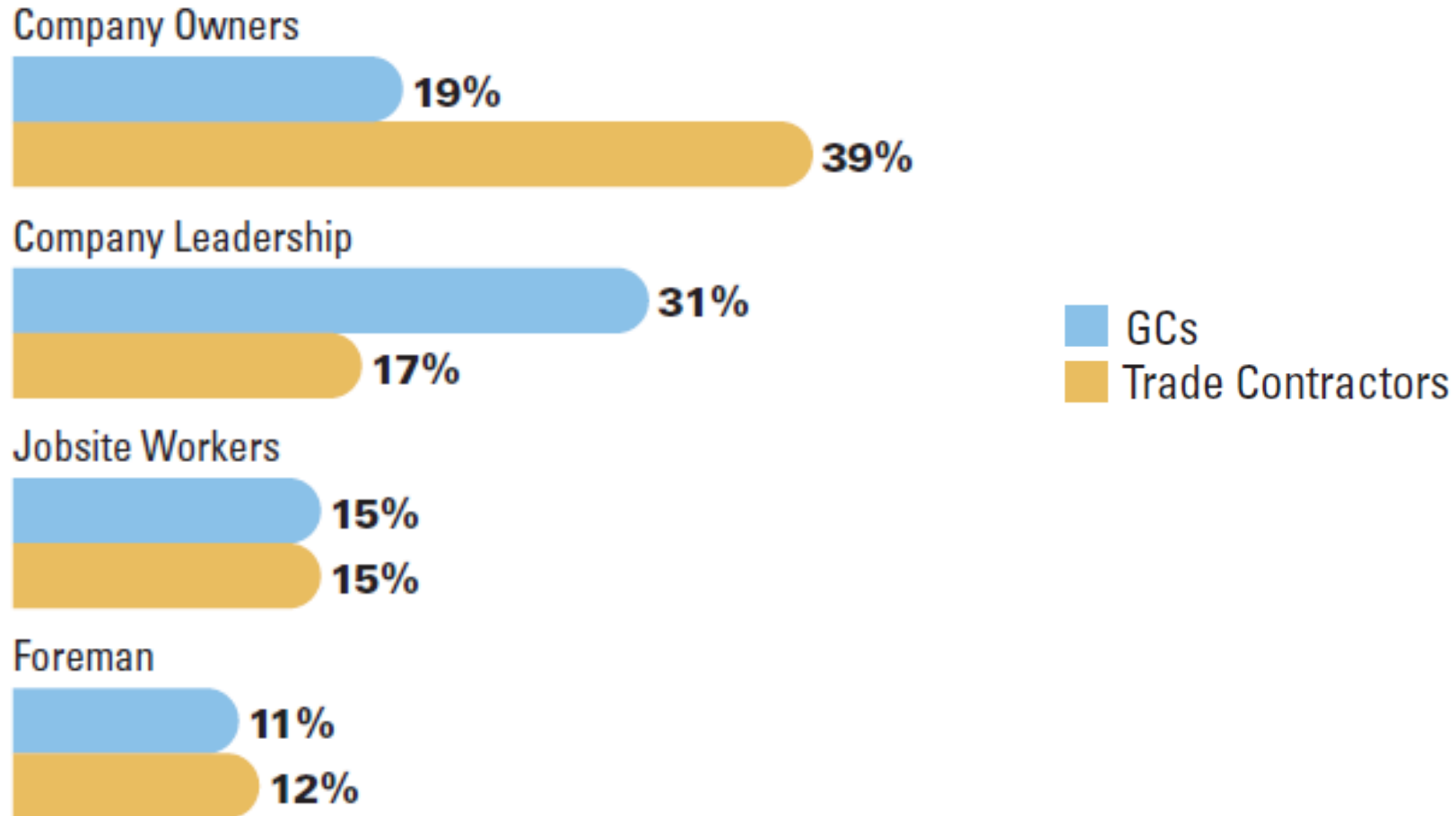
## Top Three Most Influential Factors That Encouraged Contractors to Adopt Their Existing Safety Practices



Percentage Rating Them Influential/Highly Influential

# Most Influential Roles for Improving Safety

Ranked First in Influence

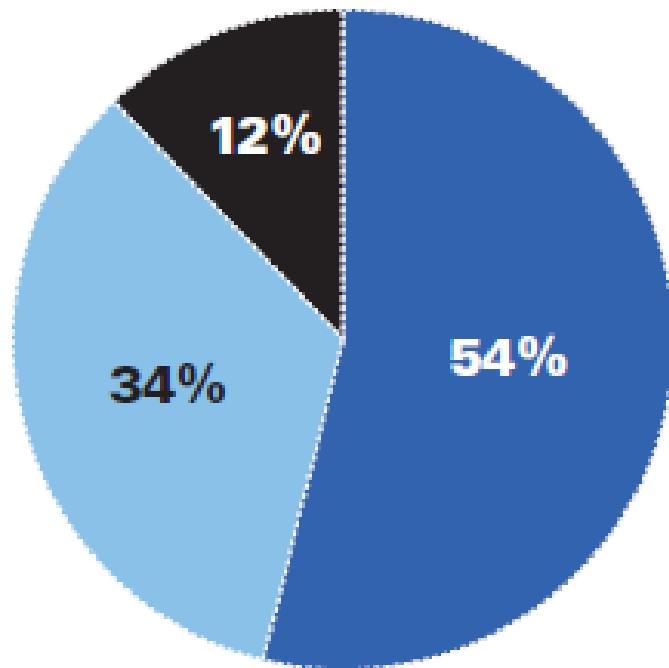


# Most Influential Factors That Would Encourage Greater Investment in Safety in the Future

C-Level		Company Leadership Other Than Safety (Vice Presidents/Directors)		Safety Leadership	
1. Reduced Insurance Rates	<b>72%</b>	1. Reduced Insurance Rates	<b>77%</b>	1. More Data on the Positive Financial Impact of Safety	<b>65%</b>
2. Increased Owner/Client Requirements	<b>58%</b>	2. Increased Owner/Client Requirements	<b>72%</b>	2. Increased Owner/Client Requirements	<b>62% (tie)</b>
3. More Data on the Positive Financial Impact of Safety	<b>42%</b>	3. More Data on the Positive Financial Impact of Safety	<b>51%</b>	2. Reduced Insurance Rates	<b>62% (tie)</b>

Percentage Rating Them Influential/Highly Influential

## OSHA Safety and Health Management Program Guidelines



- Not Aware of OSHA Safety and Health Management Program Guidelines
- Aware But Did Not Make Changes to Safety and Health Program
- Aware and Made Changes to Safety and Health Program Based on OSHA Recommendations

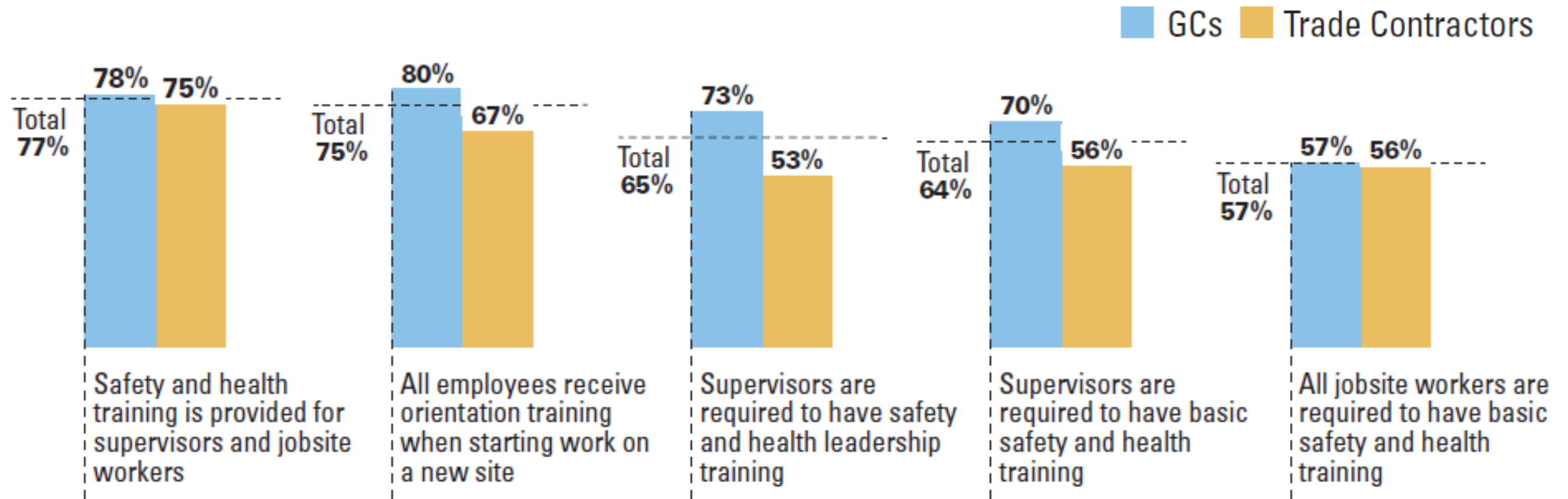


## Agenda

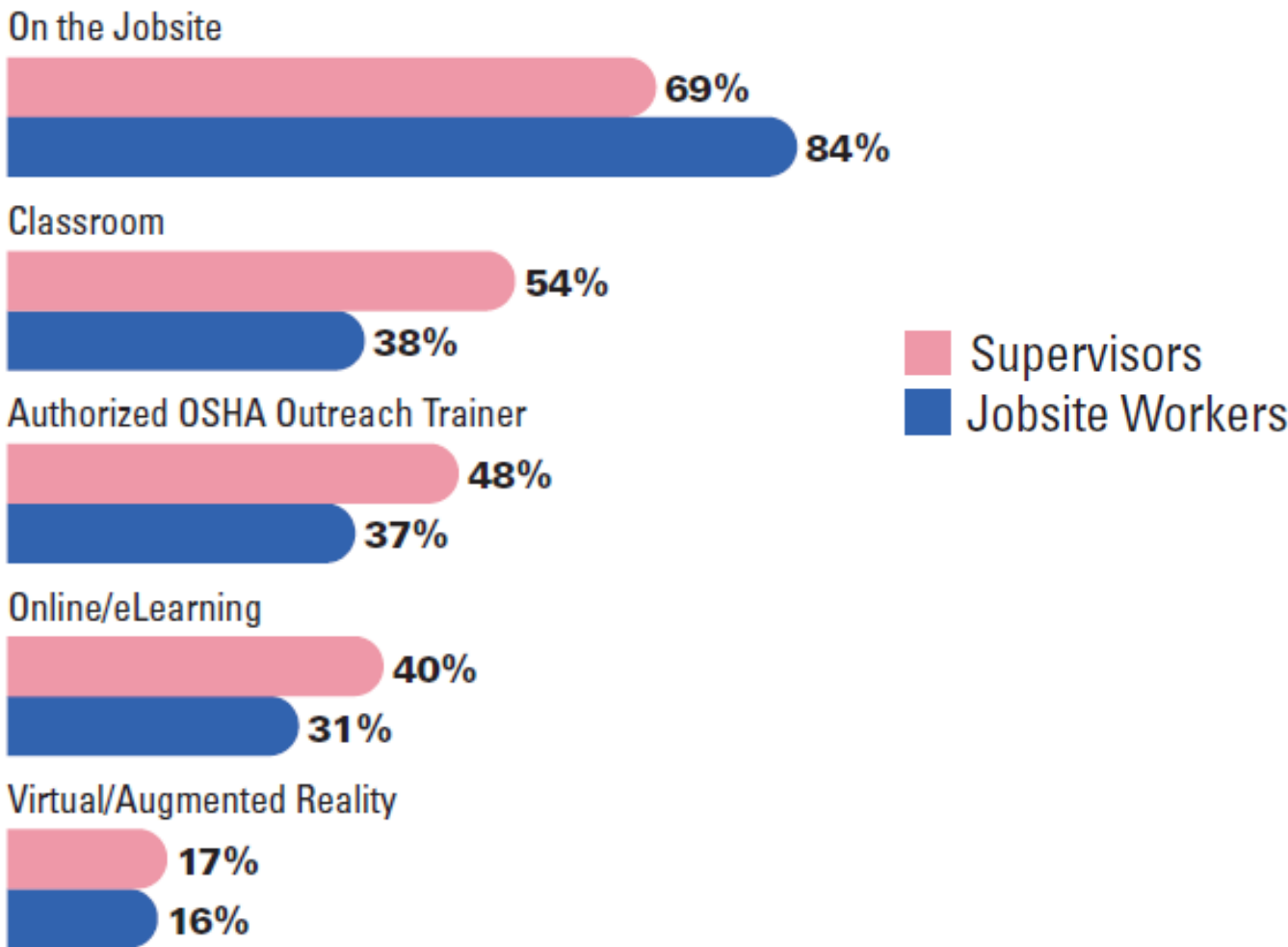
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# Contractors That Offer or Require Safety and Health Training

Percentage of Contractors Offering or Requiring Training on at Least 75% of Projects



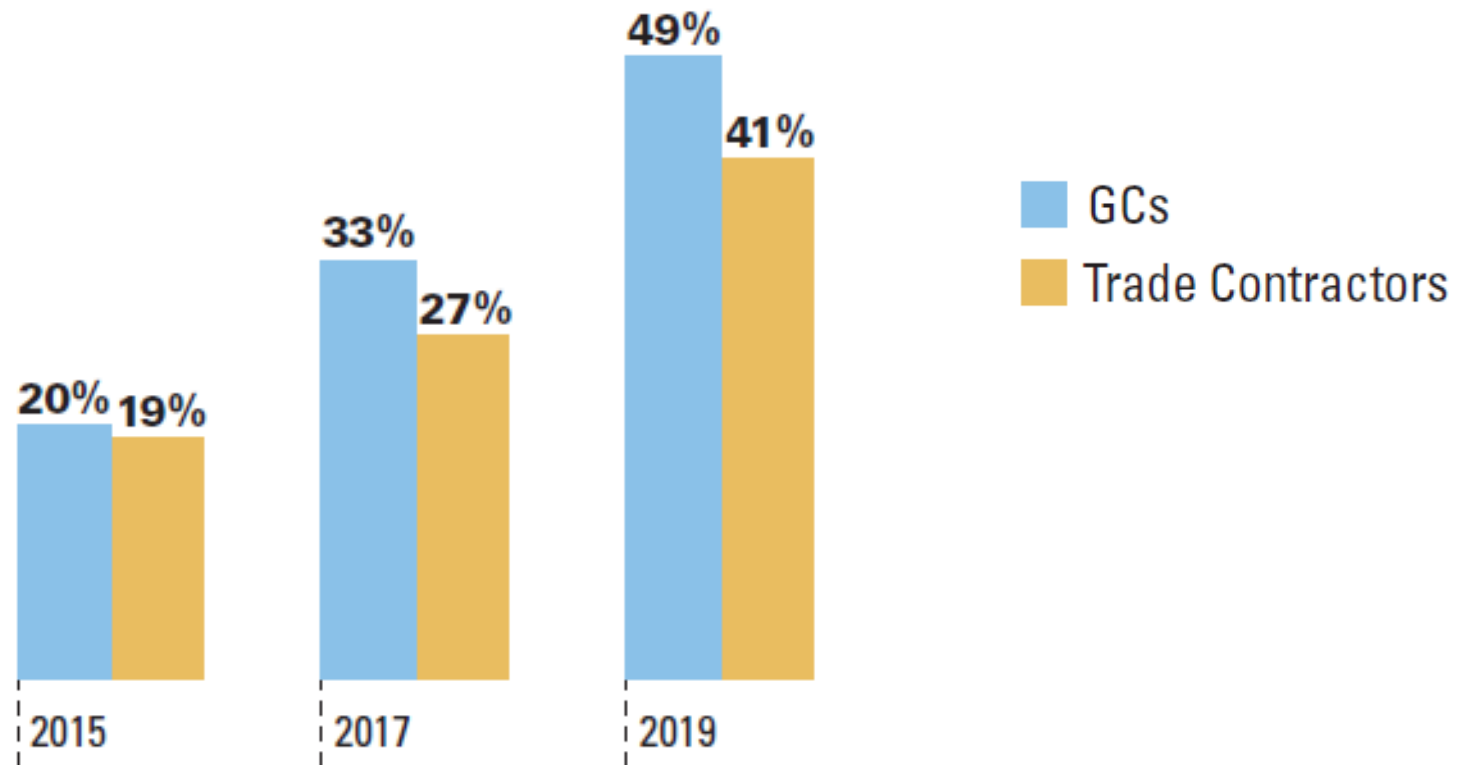
# Value of Different Training Modes for Supervisors and Jobsite Workers



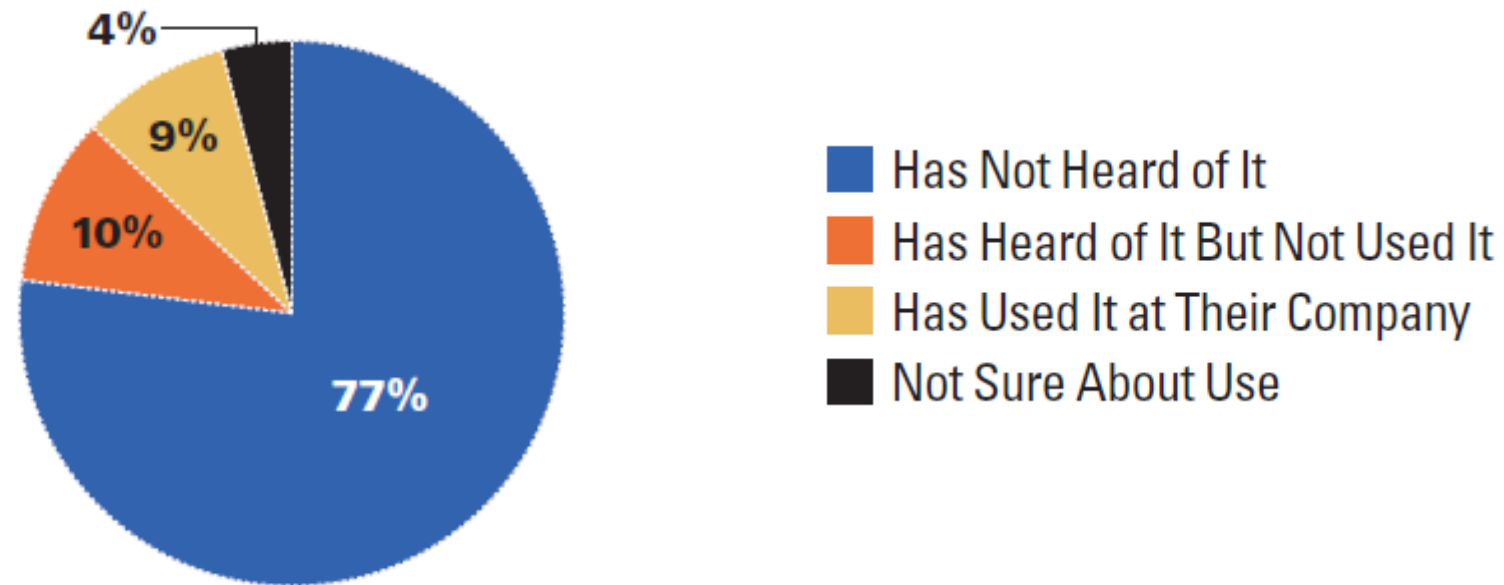
Percentage Rating Them as of Great Value



## Use of Online Safety Training



## Foundations for Safety Leadership Elective

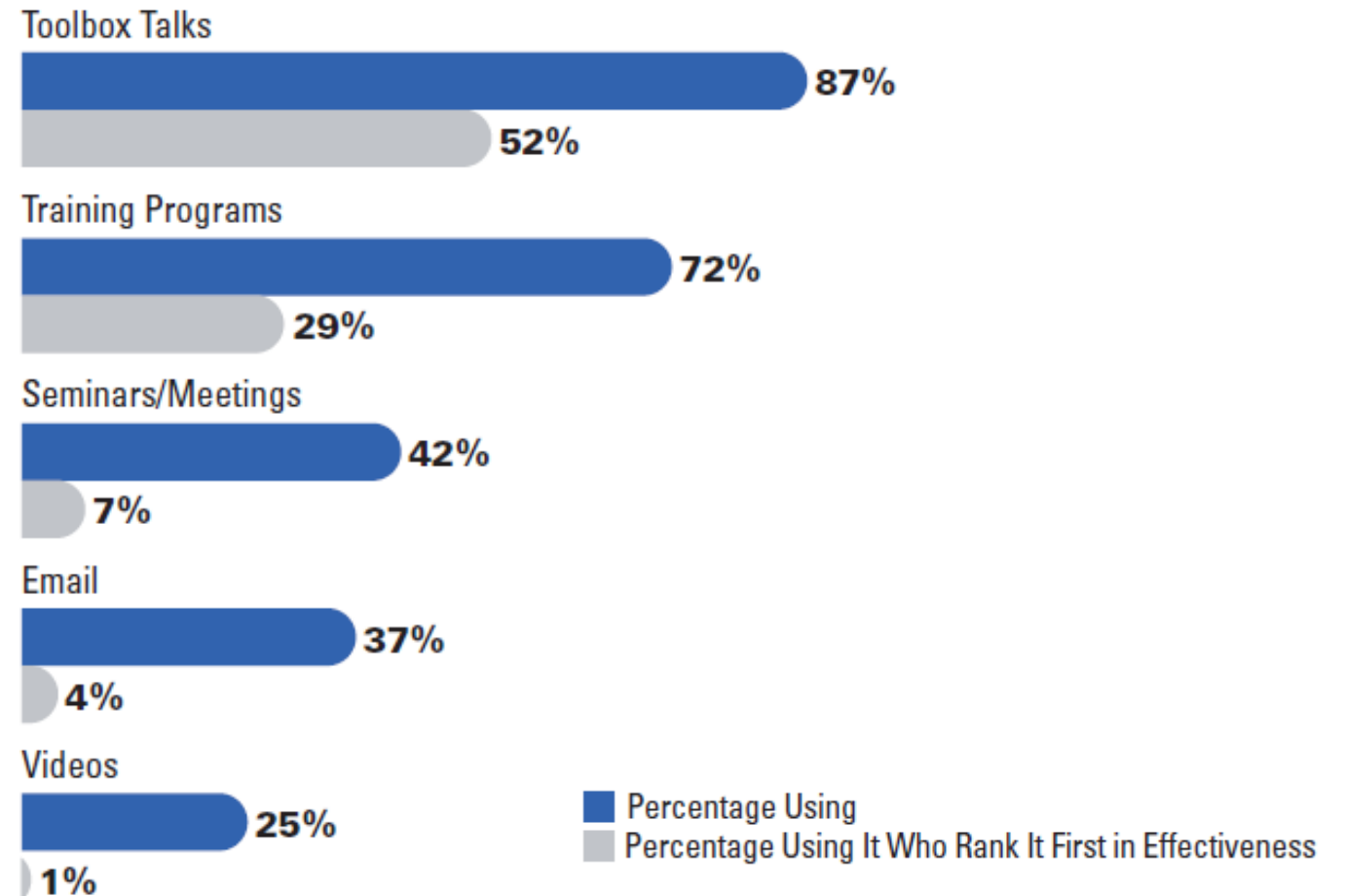


# Most Effective Means of Communicating About Safety

## Method for Communicating Safety Messages Ranked First

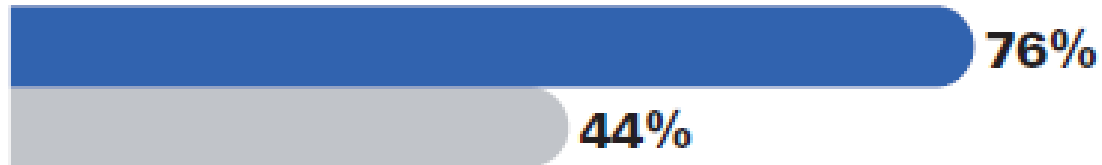


## Top Methods for Providing Information on Safer Tools, Equipment, Materials and Processes



## Top Places to Obtain Information on Health and Safety

OSHA (Occupational Safety and Health Administration)



Insurance Company

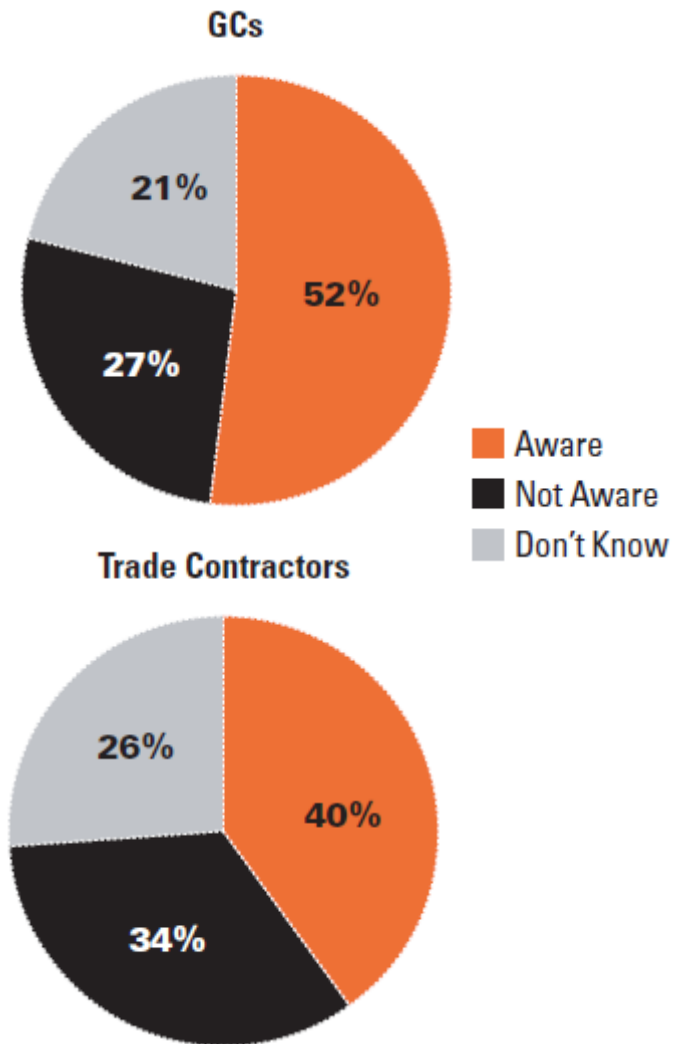


■ Where Information Is Obtained  
■ Percentage Using It Who Rank It First in Effectiveness

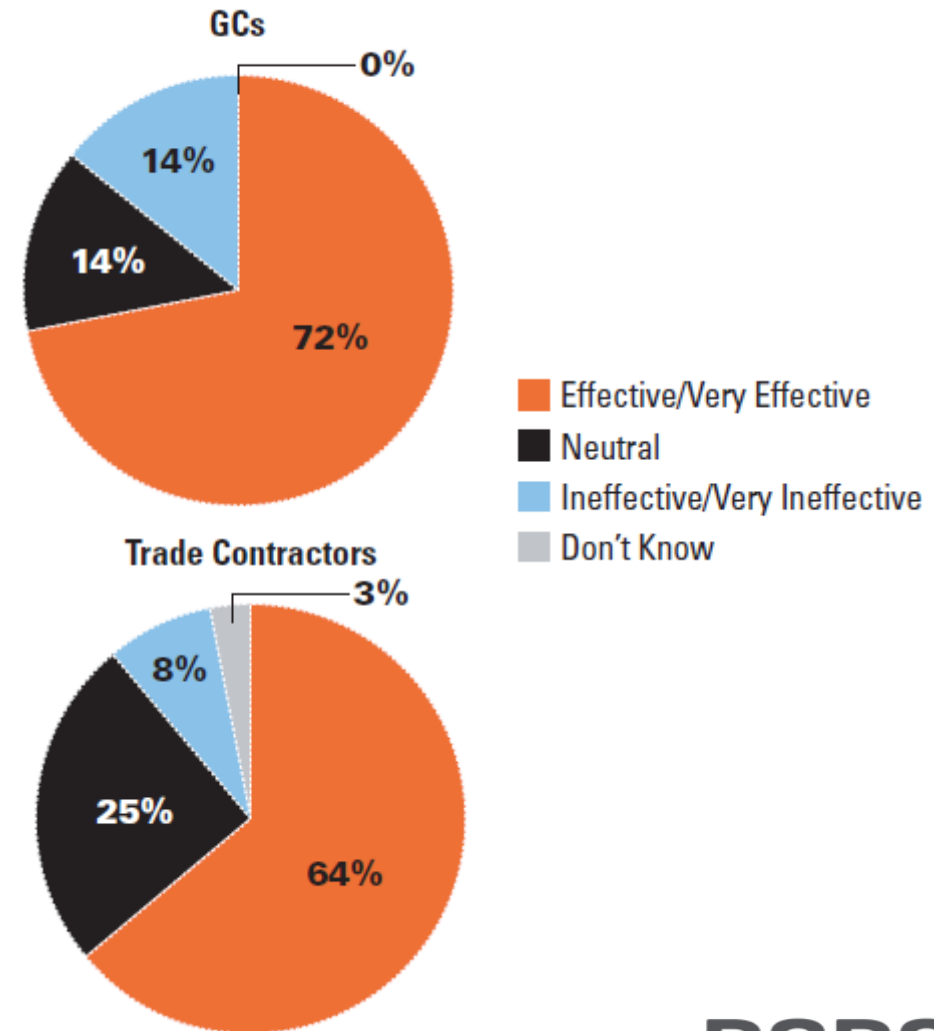
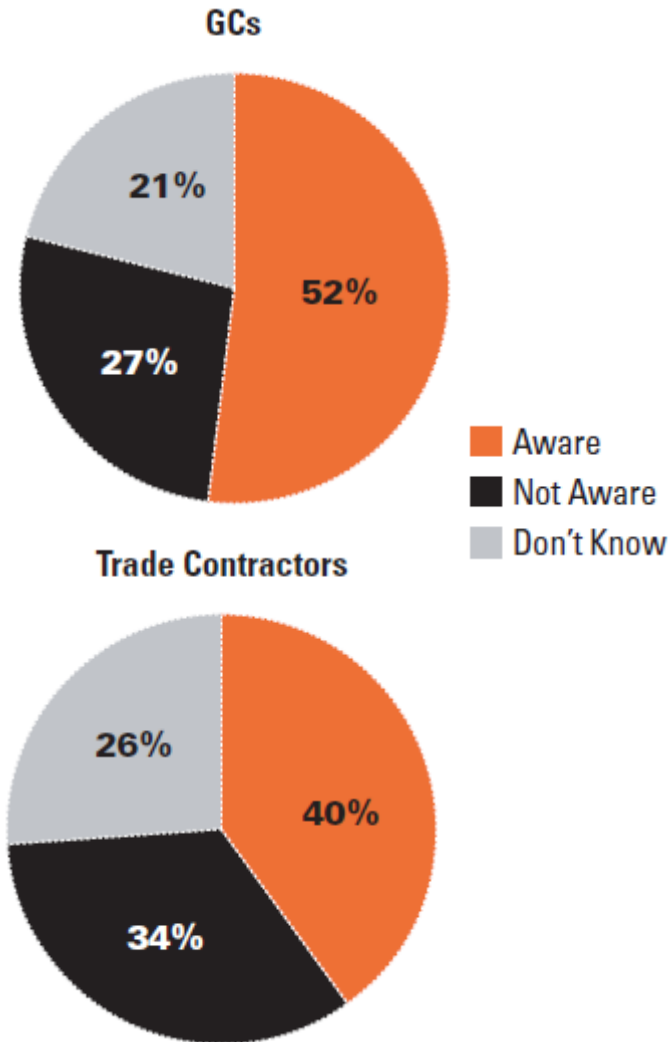
Contractor Association



# Falls Prevention Campaign



# Falls Prevention Campaign





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## Conclusions

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- Safety practices are overall more widely used than safety policies.
- The positive impacts of safety have consistently been reported across three studies, demonstrating the payoff of investing in improved safety.
- Contractors are increasingly seeing that using BIM improves safety.
- Use of emerging technologies like wearable devices and drones to enhance safety are likely to grow as their safety benefits are demonstrated.
- Wider use of Prevention through Design by architects will be encouraged by insurance companies and owners (and these are the same groups that can also best encourage increased investments in safety among contractors).
- Online training is seeing wider acceptance among GCs than trade contractors, and that disparity is likely to grow.
- Toolbox talks remain the most effective means of communicating about safety.



# Questions?

Learn more about Dodge:  
877.784.9556

or

