

# Preventing Struck-By Incidents: Learning by Experience

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**Welcome:** G. Scott Earnest, PhD, PE, CSP, Associate Director for Construction, Office of Construction Safety & Health, NIOSH

**Moderator:** Bradley Sant, Senior Vice President, Safety and Education, American Road and Transportation Builders Association

**Presented by:**

- Kevin Carnahan, Regional Safety Manager, Granite Construction Co.
- Emmett Russell, Director of Safety (retired), International Union of Operating Engineers; Industry Master Instructor
- Jacob Ladd, Director, Wilmington Area Office, Occupational Safety and Health Administration

# Work Zone Safety

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BRADLEY SANT



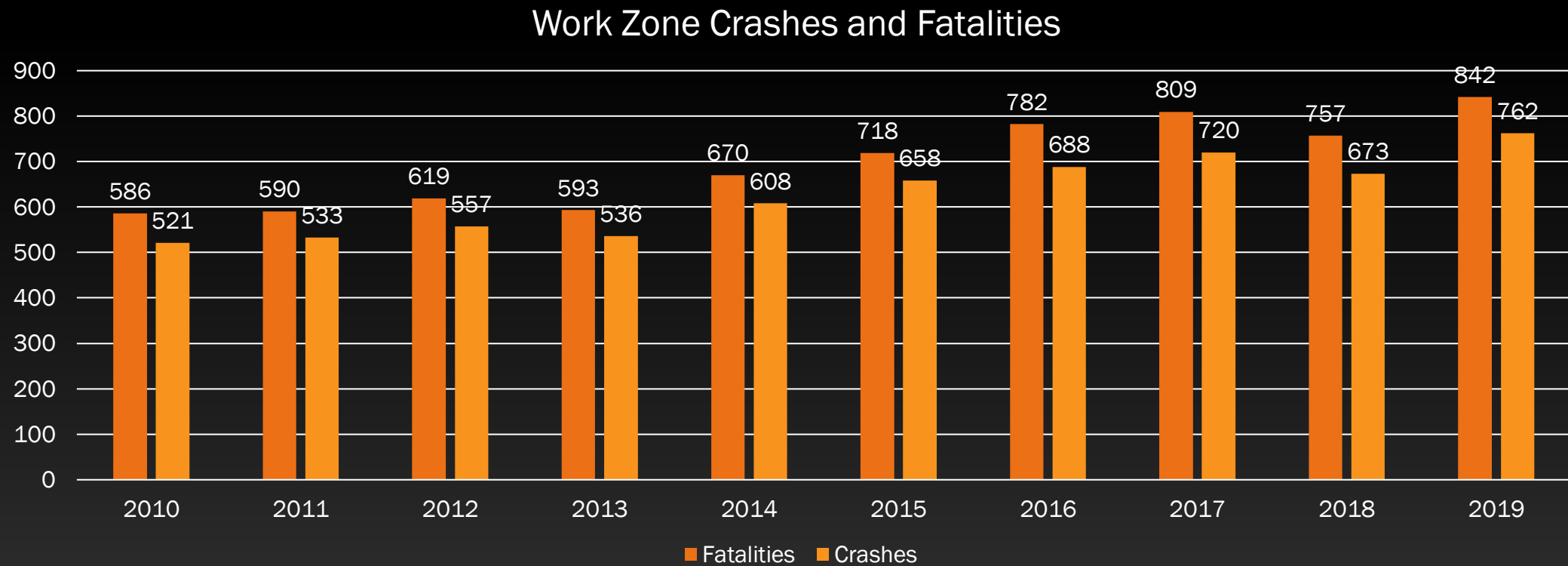
American Road  
& Transportation  
Builders Association



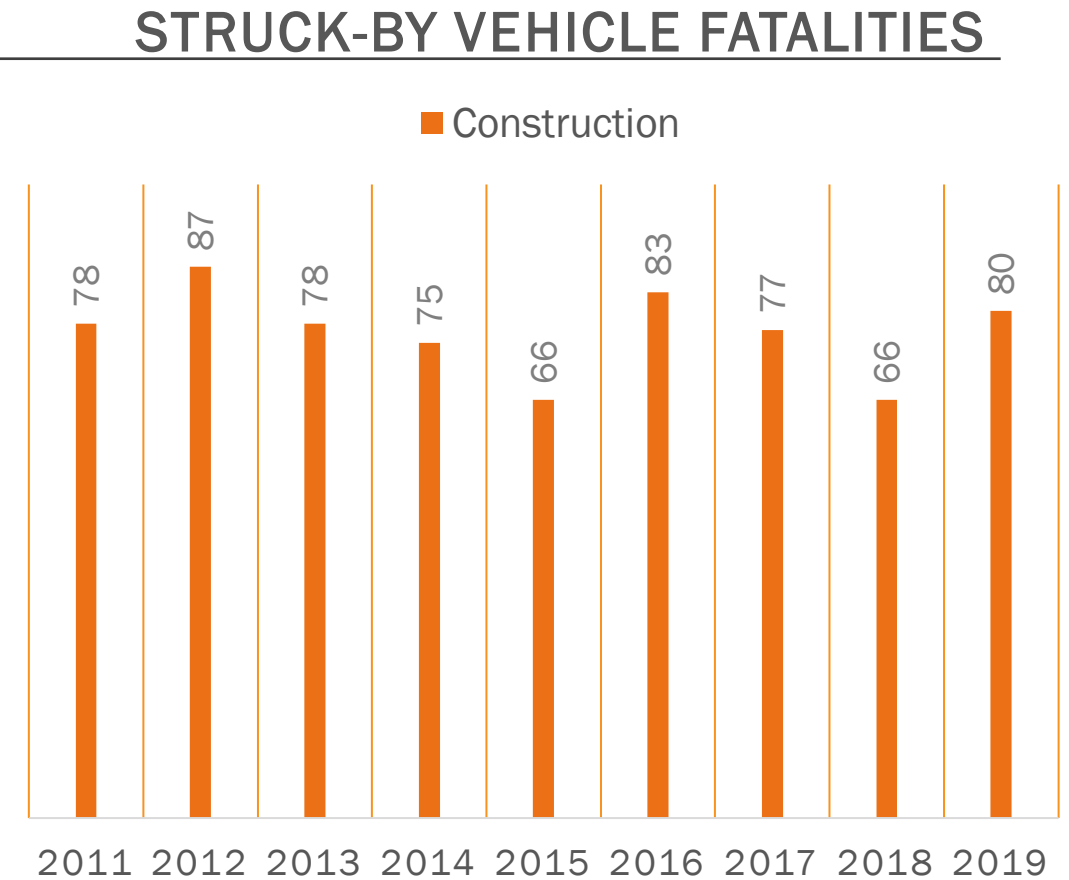
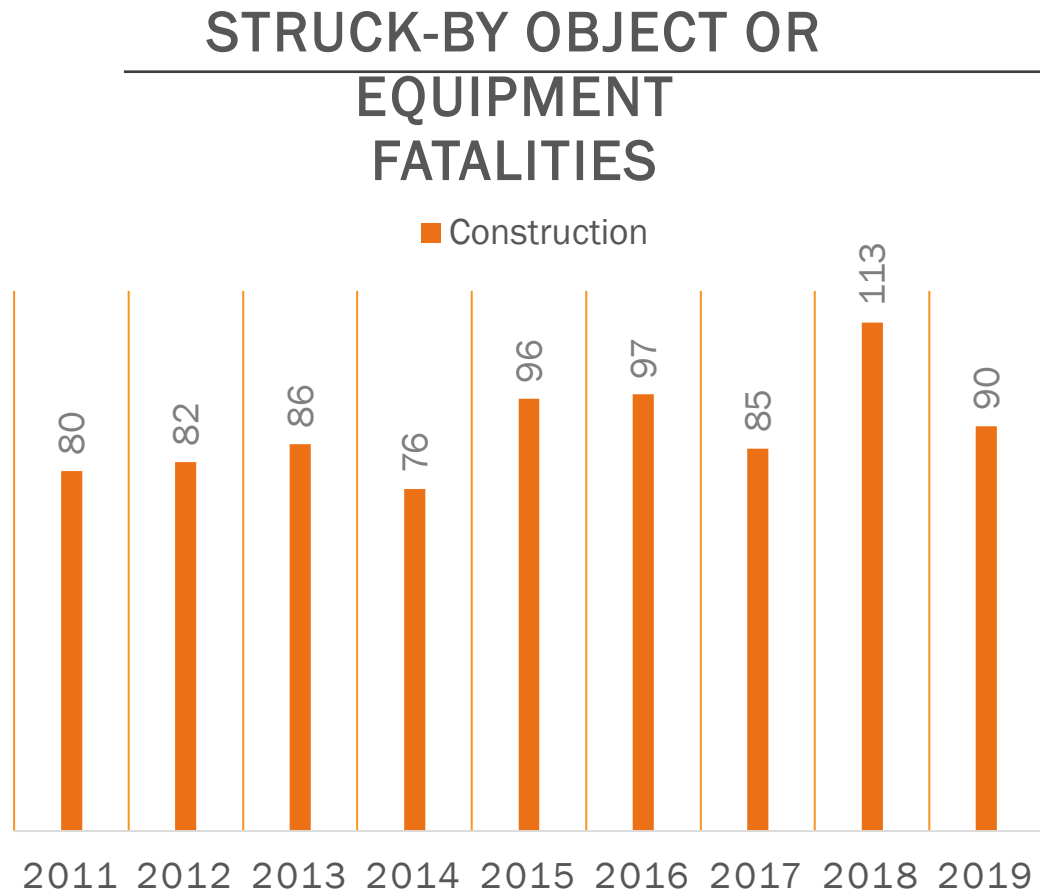
How Big is Our Problem?

# Work Zone Fatalities are Increasing

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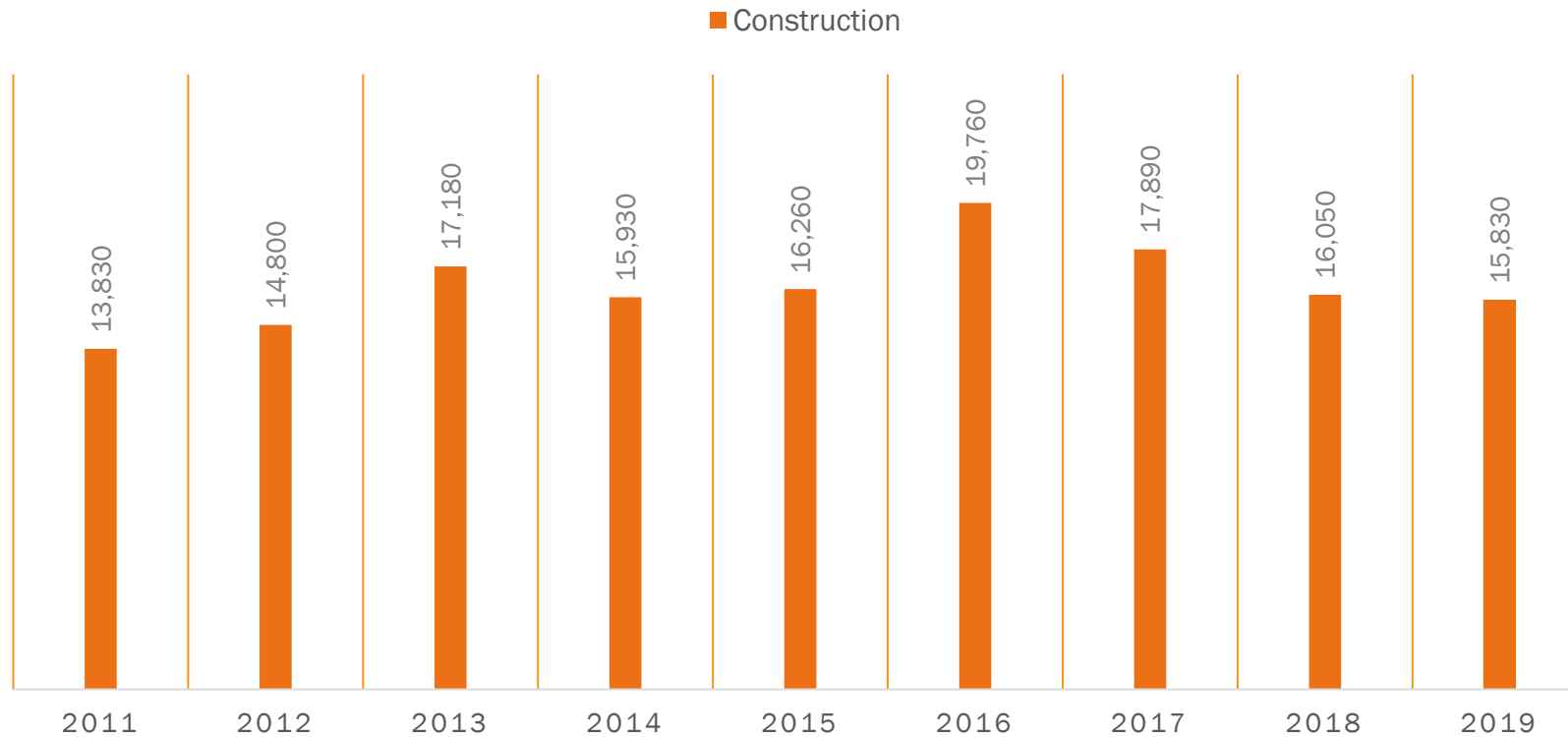
# Why a National Stand-Down for the Construction Industry?



Source: CPWR Data Reports on BLS data for fatal injuries in both private and public sector construction: <https://www.cpwr.com/wp-content/uploads/DataBulletin-February-2021.pdf>

# Why a National Stand-Down for the Construction Industry?

## STRUCK-BY OBJECT OR EQUIPMENT NON-FATAL INJURIES



Source: CPWR Data Report on BLS data for nonfatal injuries in construction: <https://www.cpwr.com/wp-content/uploads/DataBulletin-December2020.pdf>

# Construction vs All Industries Combined

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Between 2011 and 2016, 532 construction workers were killed at road construction sites, more than double the total for all other industries combined.



# Construction Sectors

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According to previous years' data (BLS data by subsector not provided for 2019):

The Highway, Street and Bridge sector has the highest number of fatalities (more than 70%).

The Plumbing, Heating and Air Conditioning subsector has the highest number of injuries.

The Masonry subsector has the highest rate of injuries.



# The Pandemic is Making it Worse

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During the Spring of 2020:

- Travel on roadways dropped 40 percent
- Fatal work zone crashed increased during the same period.



# Impact of COVID

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Roads emptied.

Created opportunities to speed up projects employing “essential” transportation construction workers.

Speeding increased significantly; speeds in DC area clocked at over 130 mph (Washington Post).

Roadway deaths went up. (NSC)

Reports increased of workers being struck by intruding vehicles.





# For Workers, the Information is Lacking

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- National Highway Traffic Safety Administration (NHTSA)
  - Fatality Analysis Reporting System (FARS)
    - Pedestrians vs. Workers
- Bureau of Labor Statistics
  - Worker Classifications
- Difficult to reconcile DOT data with DOL data (BLS)



# Many Types of Workers at Risk (*Various Employers*)

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Construction Workers

Maintenance Workers

Inspectors

Engineers

Surveyors

Landscapers

Emergency Responders

Roadside Cleaning Crews

# Data Correlation

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We need cooperation:

A formal, annual alignment  
between FARS data and U.S.  
Bureau of Labor Statistics data.

- Independent analysis of BLS data indicates over 200 annual worker fatalities in the roadway construction industry.

Continue work with state and local enforcement agencies to classify the activity of the pedestrian victim.

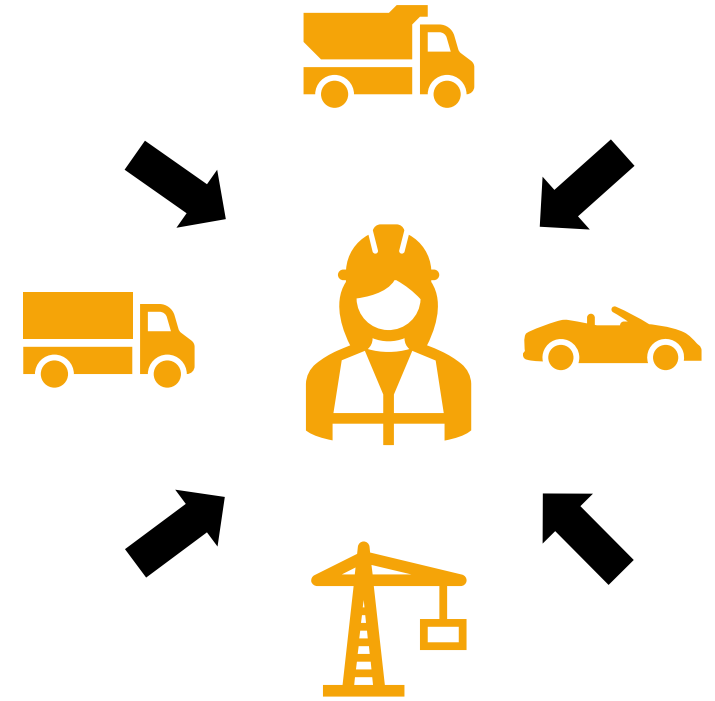


# Appreciating the Hazards

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It's Struck-by, not so much Falls.

- Primary cause of death and injuries.
- We can't close our jobsites.
- Risks from typical construction hazards plus motorists, including large commercial carriers.



# What is hitting us?

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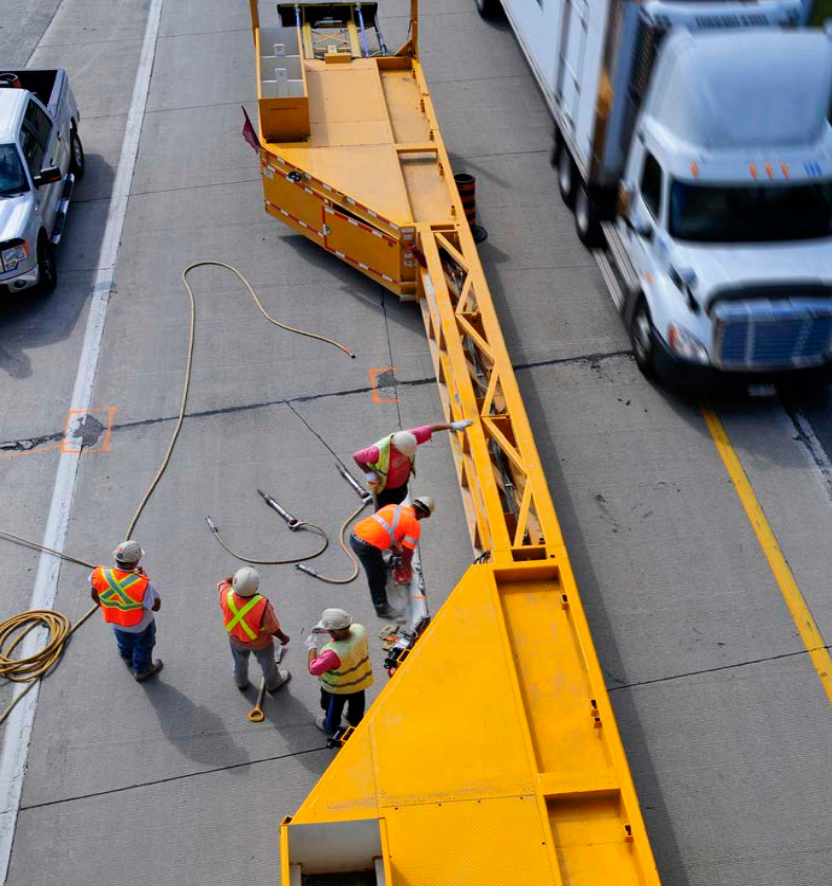
## Dump Trucks

Blind Spots  
Entering/Exiting the Workspace  
Internal Traffic Control Plans



## Motorist Intrusions

Distracted Driving  
Speeding  
Positive Protection/Separation



# Countermeasures

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Proper Temporary  
Traffic Control

Positive Separation/  
Internal Traffic Control



# Work Zone Intrusion Fatality

Granite Construction Co.

EB Hwy. 94  
Spring Valley, CA

DOI: November 18, 2020



# Project Scope

- ~\$10M contract value
- Mill & fill RHMA paving project with electrical modifications, landscaping, flatwork improvements
- EB & WB lanes and shoulder RHMA paving
- Night work, 9PM – 5AM
- Single lane freeway traffic closures with on/off ramp closures



# November 18, 2020 – 12:05 AM

- Paving operation on EB outside shoulder with 2-mile single lane closure
- Drowsy driver traveling approx. 60 MPH in 45 MPH work zone
- Driver falls asleep striking multiple traffic cones as she drifted into lane closure
- Strikes asphalt raking laborer approx. 3 seconds after entering work zone
- Laborer pronounced deceased approx. 30 minutes after impact





and Home Centers  
Home Improvement store

P Avocado Blvd  
Park & Ride

12

Campo Rd

El Canto Dr

El Canto Dr

Calavo Dr

Madrid Way

Blvd

94

94

Avocado Blvd

Approximate location of  
breakdown Compaction  
Roller #2

Approximate location  
of paver machine

Approximate location  
of Granite Employee  
at time of accident

Del Rio Rd

Del Rio Rd

Ybarra Rd

Google

Del Rio Rd

Del Rio Way

Campo Rd

Campo Rd

m School

Direction of travel  
in EB #1 lane

Location of orange cones  
indicating lane closure

Approximate location  
of Attenuator Truck

Approximate location  
of finishing Compaction Roller #1

Approximate location of  
Compaction Roller #2

White line indicates  
approximate path of  
travel of vehicle that  
struck employee

Approximate location  
of shuttle buggy



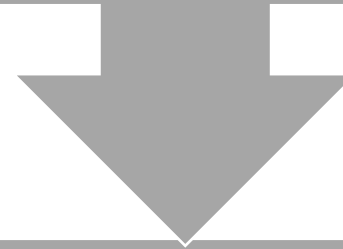






# Work Zone Intrusion Takeaways

How much risk are you willing to accept?



Work zone intrusion considerations:

Is MUTCD  
enough?

Highway  
Patrol  
support

Leading  
indicator  
analysis

Near miss  
reporting

Emergency  
procedure  
training

# Hwy. 94 – Current Status

- Paving delayed as of November 18, 2020
  - 30 paving shifts remaining
- Ongoing site safety negotiations with Cal Trans:
  - Full freeway closures (night work)
  - Increased active highway patrol presence during shift
  - Lowering speed limit through work zone
    - Addition of roadway rumble strips
  - Transfer from traffic cone to barrels
  - Limit asphalt raking through alternate engineering methods
  - Work zone intrusion alert technology

# Hwy. 94 – Business Impacts

- Loss of life
- Paving delayed since November 18, 2020
  - Schedule & Temperature
- Nearly \$150,000 cost impact night of fatality
  - Production and investigation costs
- Nearly \$500,000 paid in workers compensation death benefits
  - Legal costs TBD

# Questions?

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**In memory of Emilio Zaragoza  
November 18, 2020**



CPWR, NIOSH, ARTBA, NORA – Work Zone Week 2021  
Preventing Struck-By Incidents: Learning by Experience  
April 26, 2021

# OSHA

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**Jacob Ladd**

**Area Director – Wilmington Area Office, Region III  
Occupational Safety and Health Administration**

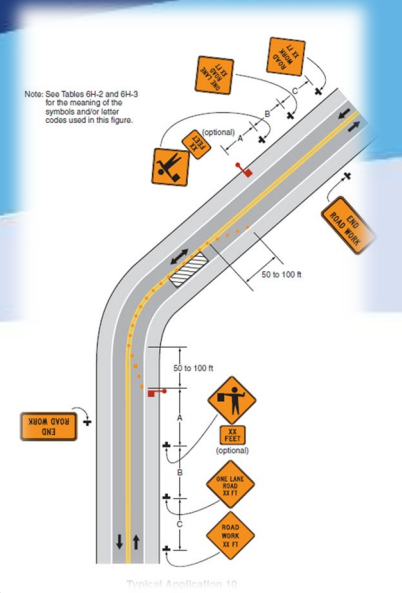
# Introduction



- Struck-by incidents account for most OSHA investigations related to work zones
- Most of these are related to backovers or internal equipment
- Often opportunities to improve the worker safety element of a project
- Smaller projects often do not have the same level of planning and oversight

<https://www.osha.gov/highway-workzones>

# Compliance



- Typically on large projects, compliance with the Traffic Control Plan (TCP)
- Manual on Uniform Traffic Control Devices (MUTCD) – Typical Applications
- State Supplements
- Smaller Jobs - Competent Person

[https://mutcd.fhwa.dot.gov/kno\\_2009r1r2.htm](https://mutcd.fhwa.dot.gov/kno_2009r1r2.htm)

[https://mutcd.fhwa.dot.gov/resources/state\\_info/index.htm](https://mutcd.fhwa.dot.gov/resources/state_info/index.htm)



# Challenges to Compliance



- Traffic management is generally major concern of larger projects
- Pedestrian considerations often do not include workers
- Time and conditions often begin to dictate the operations
- Use of “emergency” work
- Reliance on law enforcement and other temporary interruptions



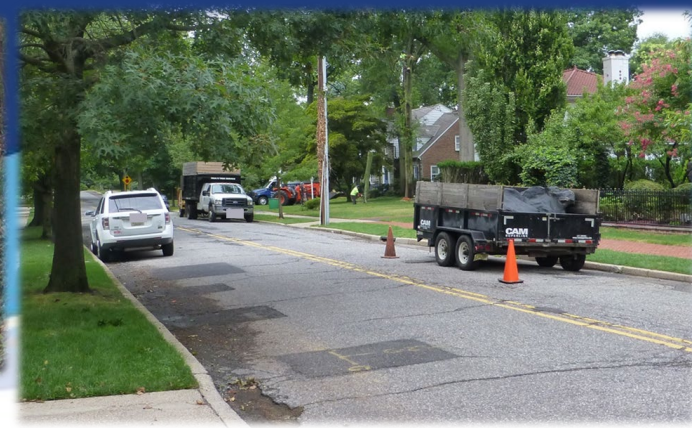
# Balancing Compliance



- Plan the outside with smooth motorist operation in mind
- Perform a separate assessment of internal operations for worker safety
- Multiple sources
- Think of “Should” statements as a test – What is the justification for NOT doing it?

[osha.gov/webpage](#) URL goes here if needed

# Sources and Differences



	OSHA				Consensus (ANSI)			
	1910	1926	MUTCD		Z133 – Arboricultural Operations	A300 – Plant Management Standard Practices	A10.47 - Work Zone Safety Highway Construction	A10.17 - Safe Operating Practices HMA
			1910	1926				
Arboricultural			5(a)(1)		X	X	X	
Landscape		200,201	5(a)(1)	200,201	X	X	X	
Contruction		200,201		200,201			X	X
Maintenance	268,269	200,201	269	200,201	X	X	X	X
Utility	268,269	200,201	269	200,201	X	X	X	

<https://www.osha.gov/laws-regs>

<https://www.osha.gov/sites/default/files/laws-regs/federalregister/2019-05-14.pdf>

# Sources and Differences

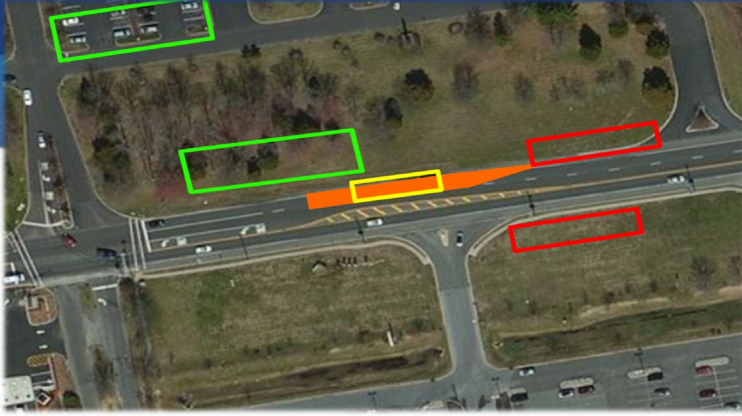


- **Consensus standards are helpful no matter what**
- Many more standards (“Shall” statements)
- Expanded discussion on hazard analysis
- Process to follow to accept or reject controls based on criteria
  - “if this, then that”
- Focus on Job hazard analysis, planning, and Internal traffic control planning

[https://www.assp.org/docs/default-source/Standards-Documents/std\\_brochure-a10-47\\_190828.pdf?sfvrsn=0](https://www.assp.org/docs/default-source/Standards-Documents/std_brochure-a10-47_190828.pdf?sfvrsn=0)  
<https://store.assp.org/PersonifyEbusiness/Store/Product-Details/productId/31090470>  
[https://www.tcia.org/tcia/News/Business/ANSI\\_Z133\\_2017\\_Revision\\_Overview.aspx](https://www.tcia.org/tcia/News/Business/ANSI_Z133_2017_Revision_Overview.aspx)  
[https://www.tcia.org/TCIA/Build\\_Your\\_Business/A300\\_Standards/A300\\_Standards.aspx](https://www.tcia.org/TCIA/Build_Your_Business/A300_Standards/A300_Standards.aspx)

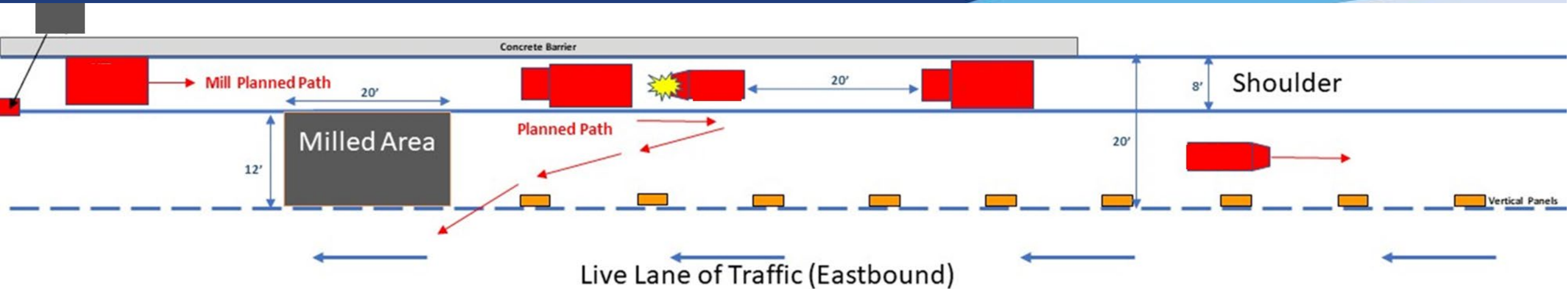
# Internal Traffic Controls

- Backing
- Parking
- Access for workers who are pedestrians
- Use of spotters
- Appropriate use of flaggers and other “emergency controls”



<https://www.cdc.gov/niosh/topics/highwayworkzones/bad/imagelookup.html>

# Examples



- Paving at midnight
  - No Illumination
- Truck that had not been used (Spare)
  - Backup alarm not properly hooked up
  - Not on "Pre-Use Checklist"
- Cleaning skid steer window
  - Dump backed
  - Employee between the two vehicles
  - No Spotter



- All safety devices present
- Backup alarm was installed
- Vehicles have "Pre-Use Checklist"
- Behavioral Safety Checklist

# Examples



- No internal traffic control plan
- No exit plan
- Backing the vehicle while unnecessary
- No coordination between companies
- No spotter

- Broad Daylight
- Backup camera installed on vehicle
- All safety devices present
- Closed worksite (barrier)
- Good visibility in pickup truck



[www.osha.gov](http://www.osha.gov)

800-321-OSHA (6742)