



**FALL PROTECTION: THE GREATEST CHALLENGE IN COMPLIANCE AND RISK**

Western PA Chapter – ASSP: May 2021

THOMAS E. KRAMER, P.E., C.S.P. – LJB INC.  
(937) 416-6187; TKRAMER@LJBINC.COM

1

**SERIOUS INJURIES & FATALITIES (SIFs)**



**Falls**



**Struck by falling/moving object**



**Collapse/overturn**




**Hit by vehicle**




**Electricity**

2

 **WE CAN'T DEFY GRAVITY**

We all understand gravity...and the related risk of falls



3

 **WE CAN'T DEFY GRAVITY**

But, do we understand the risks of falls from heights and fall protection?



4

## BOTTOM LINE UP FRONT

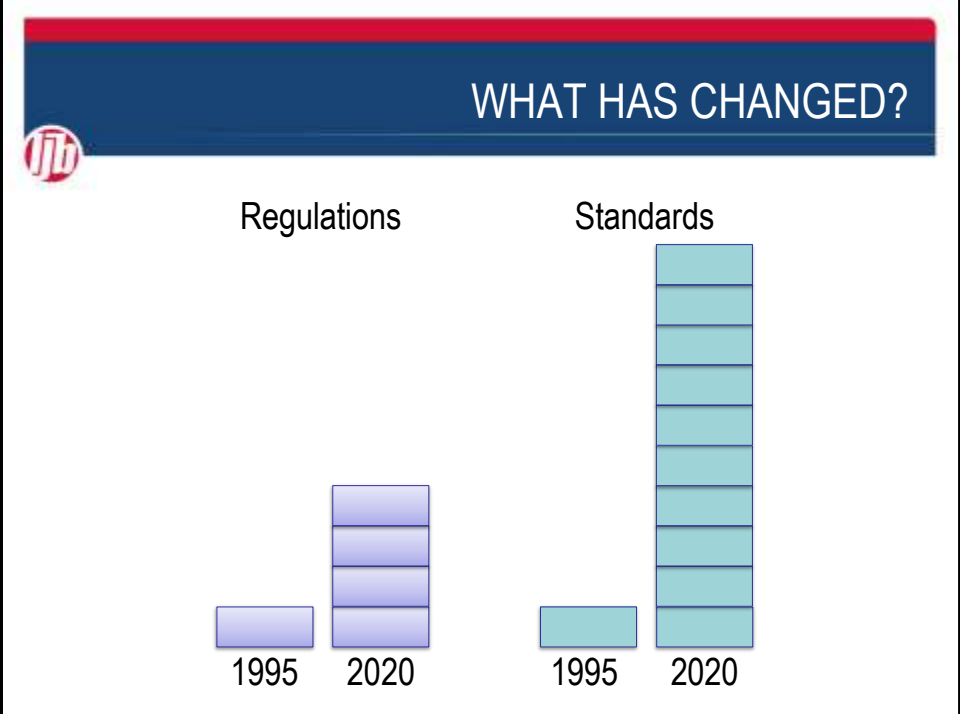
- Rely less on personal protective equipment
- Focus on system redundancies first, and skills training, second

5

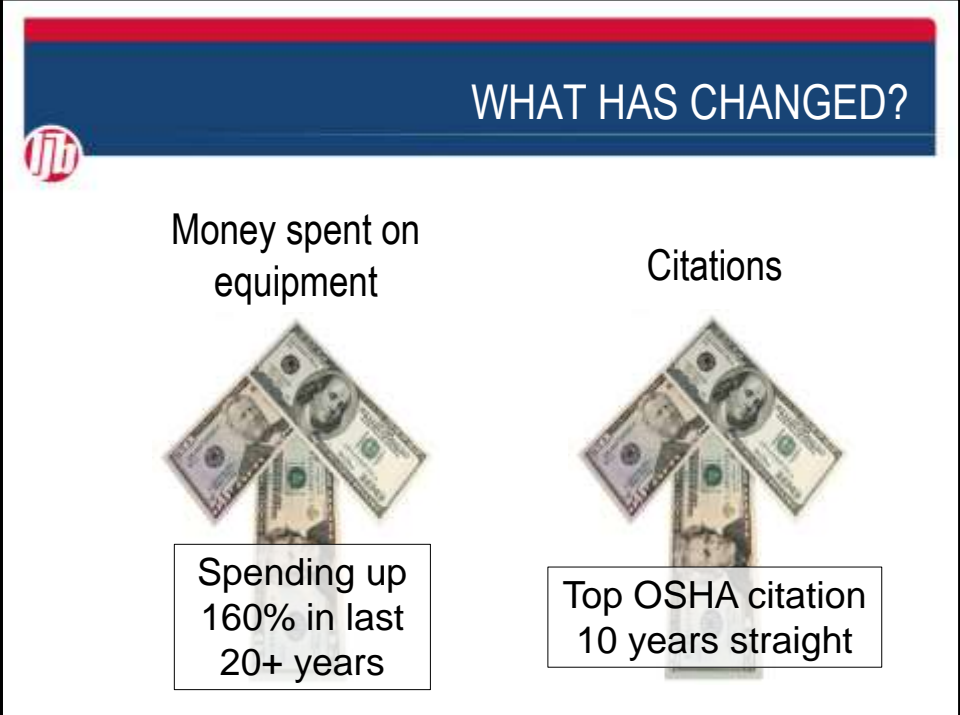
## A LITTLE HISTORY SINCE 1995



6




7



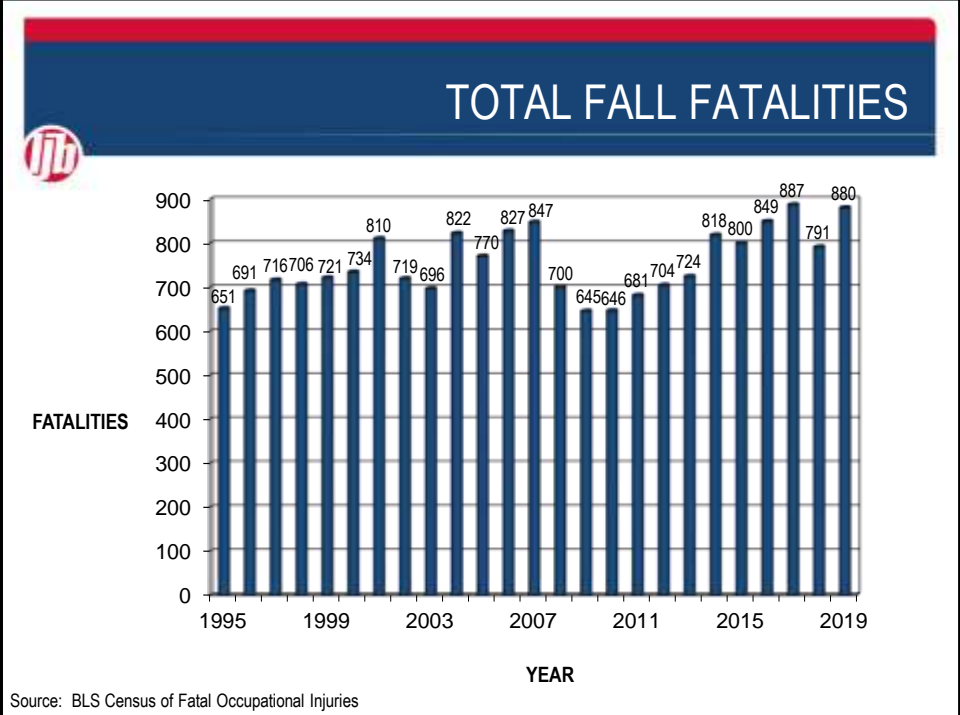
8

**WHAT HAS CHANGED?**

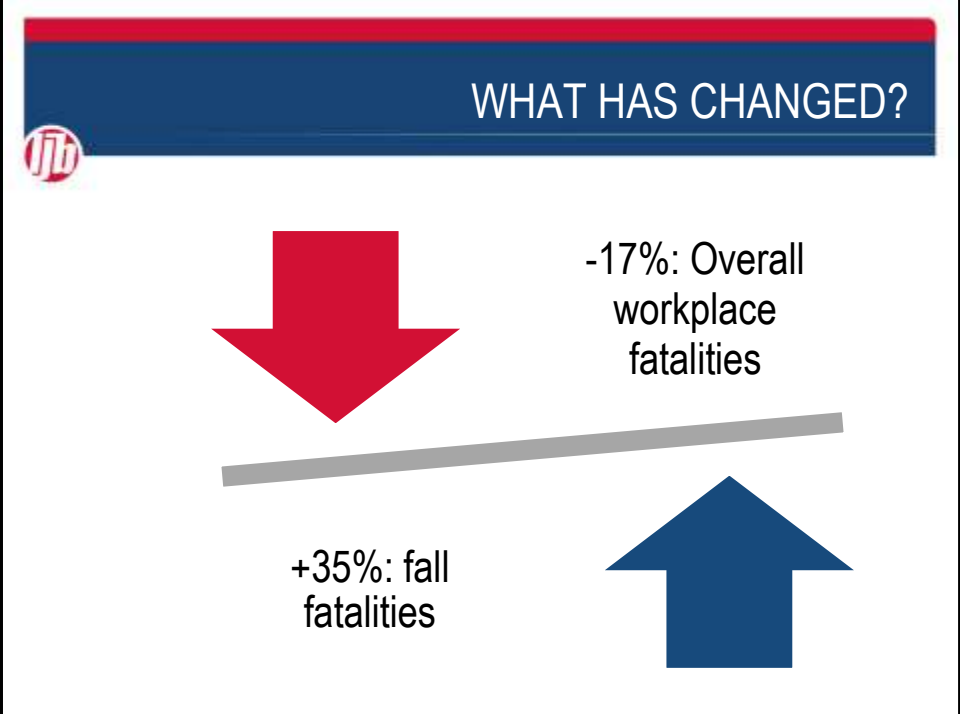


-17%: Overall workplace fatalities

9



10




11

**WE CAN'T DEFY GRAVITY**

But, do we understand the risks of falls from heights and fall protection?

The slide contains two images: on the left, a baby in a pink outfit crawling on a brick surface; on the right, a black mannequin torso wearing a blue fall protection harness.


12



### UK VS. US STATISTICS – 2016

	US	UK
GDP	18.6 tn USD	2.62 tn USD
New construction	1.23 tn USD	0.14 tn USD
Total workplace fatalities	5,190	137
Construction fatalities	991	30
Total fall fatalities	849	25

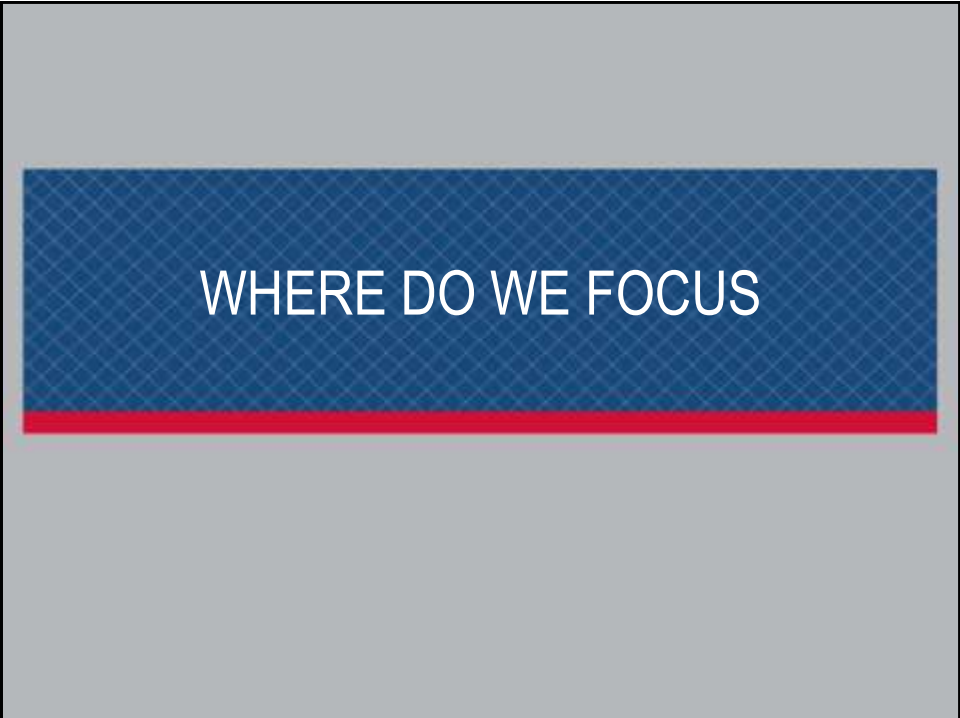
13



### UK VS. US STATISTICS – 2016

	US	UK
<b>7.1x</b> GDP	18.6 tn USD	2.62 tn USD
<b>8.8x</b> New construction	1.23 tn USD	0.14 tn USD
<b>37.9x</b> Total workplace fatalities	5,190	137
<b>33x</b> Construction fatalities	991	30
<b>34x</b> Total fall fatalities	849	25

14



15



16



## CAUSES AND CONSEQUENCES OF FALLS

**Culture**

**Behavior**

**Competence**

---

**Equipment**

**Failure**



**Staying Alive:**  
Preventing Serious Injury and Fatalities while Working at Height  
All-Party Parliamentary Group on Working at Height  
Inquiry report February 2019

17

## Z359 FALL PROTECTION CODE

- 2020
  - > Program management
  - > Design
  - > Testing
  - > Components – harnesses to anchorage connectors
  - > Construction industry included
  - > Getting to 1,000 pages




**ANSI/ASSP Z359.1-2020**  
The Fall Protection Code

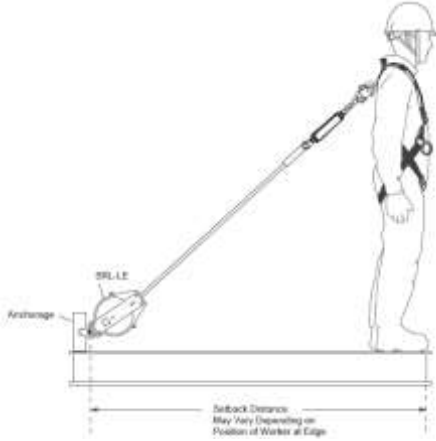
AMERICAN SOCIETY OF SAFETY PROFESSIONALS  
ANSI

18

## EQUIPMENT FAILURE

1992      2007





2012

19

## FALSE SENSE OF SECURITY



The question is: are you good or just lucky?




22

## RECOGNIZE SYSTEM LIMITATIONS

The infographic features a central profile of a human head with a green brain. To the left, 'SYSTEM 1' is described as 'Intuition & instinct', with a 95% orange circle. Below it are the traits: 'Unconscious', 'Fast', 'Associative', and 'Automatic pilot'. To the right, 'SYSTEM 2' is described as 'Rational thinking', with a 5% orange circle. Below it are the traits: 'Takes effort', 'Slow', 'Logical', 'Lazy', and 'Indecisive'. The source is cited as 'Daniel Kahneman'.

**SYSTEM 1**  
Intuition & instinct

**95%**

Unconscious  
Fast  
Associative  
Automatic pilot

**SYSTEM 2**  
Rational thinking




**5%**

Takes effort  
Slow  
Logical  
Lazy  
Indecisive

Source: Daniel Kahneman

23

## WHICH ONE ARE YOU?

		
No tolerance	Low tolerance	High tolerance

24


## WHICH ONE ARE YOU?

		
Rooftoppers	Adventure sports	Ziplines

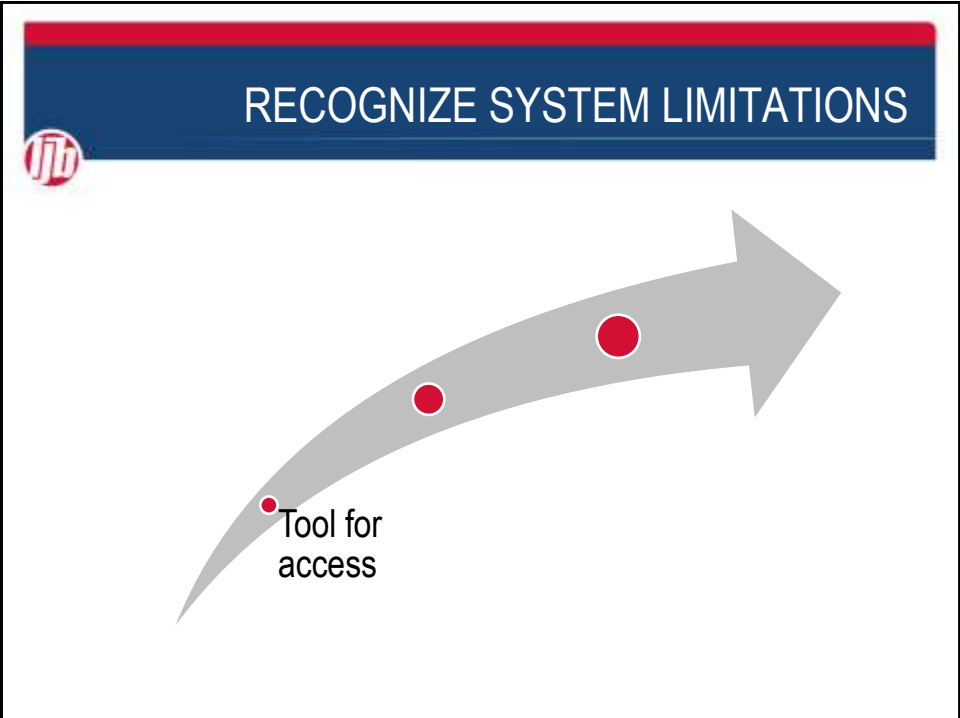
25

## NOT YOUR AVERAGE PPE

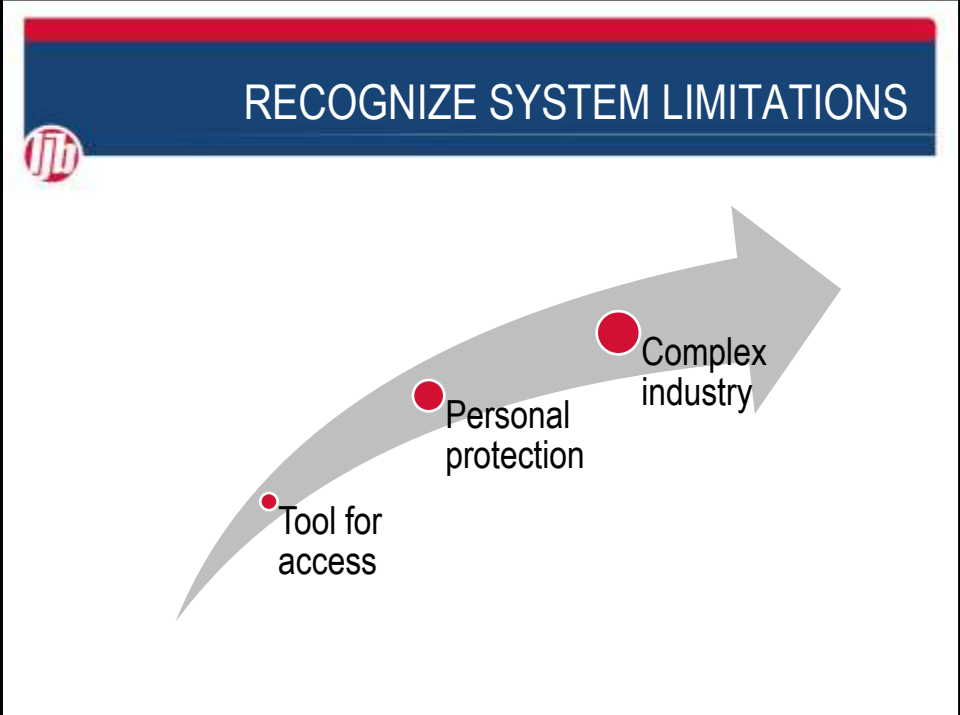
- ⦿ Fall protection PPE is not intuitive
  - > Hats, glasses and boots are worn in other aspects of life
  - > Proper harness fit is not easy



26



27



28

**RECOGNIZE SYSTEM LIMITATIONS**

**SYSTEM 1**  
Intuition & instinct

**95%**

Unconscious  
Fast  
Associative  
Automatic pilot

**SYSTEM 2**  
Rational thinking

**5%**

Takes effort  
Slow  
Logical  
Lazy  
Indecisive

Source: Daniel Kahneman

29

**RECOGNIZE SYSTEM LIMITATIONS**

*“Safety is not the absence of accidents. Safety is the presence of defenses, stop seeing safety as an outcome and start seeing safety as a capacity.”*

**Todd Conklin**

Source: Daniel Kahneman

30

## CULTURE

Fall protection is not...

- > "I'll be careful"
- > "I'm not that high"
- > "It will only take a minute"
- > "I've got a harness on"
- > "I'm tied off"

**Repeat the lie  
loudly and  
frequently...and it  
will become "true."**

31

## OPERATIONAL IMPROVEMENTS


**ANSI/ASSP Z359.2-2017**  
Minimum Requirements for a Comprehensive  
Managed Fall Protection Program  
Part of the Fall Protection Code

This American National Standard (ANSI) was developed by a committee of experts, including safety professionals, who have extensive experience in the field of fall protection. This standard is intended to provide a minimum level of safety for workers who are exposed to fall hazards. It is not intended to be used as a substitute for a comprehensive fall protection program. For more information, visit [www.ansi.org](http://www.ansi.org).


 AMERICAN SOCIETY OF  
SAFETY PROFESSIONALS 



32



## ASSP MANAGED FALL PROTECTION





90+ Safety Courses  
96% Recommendation Rate  
Earn 5.6+ CEUS  
February 13-20 Las Vegas, NV

safety  
**FOCUS2020**

- Managed Fall Protection Course
  - > <https://store.assp.org/PersonifyEbusiness/Events/ASSPEducationalEventsCalendar>

33



## LEADING EDGE ISSUES

34





35



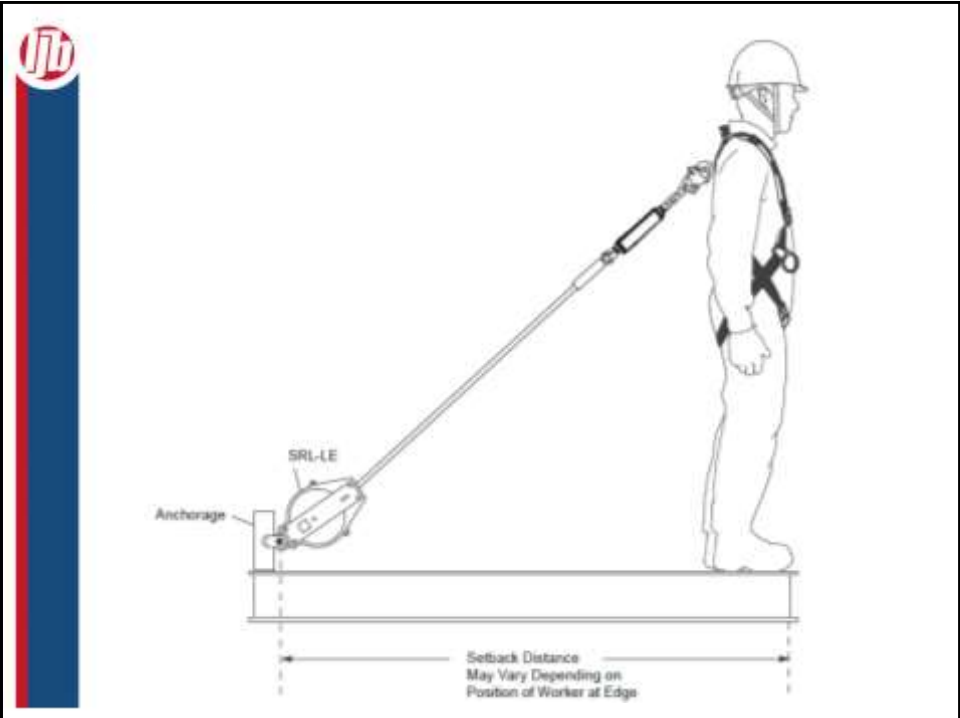
36



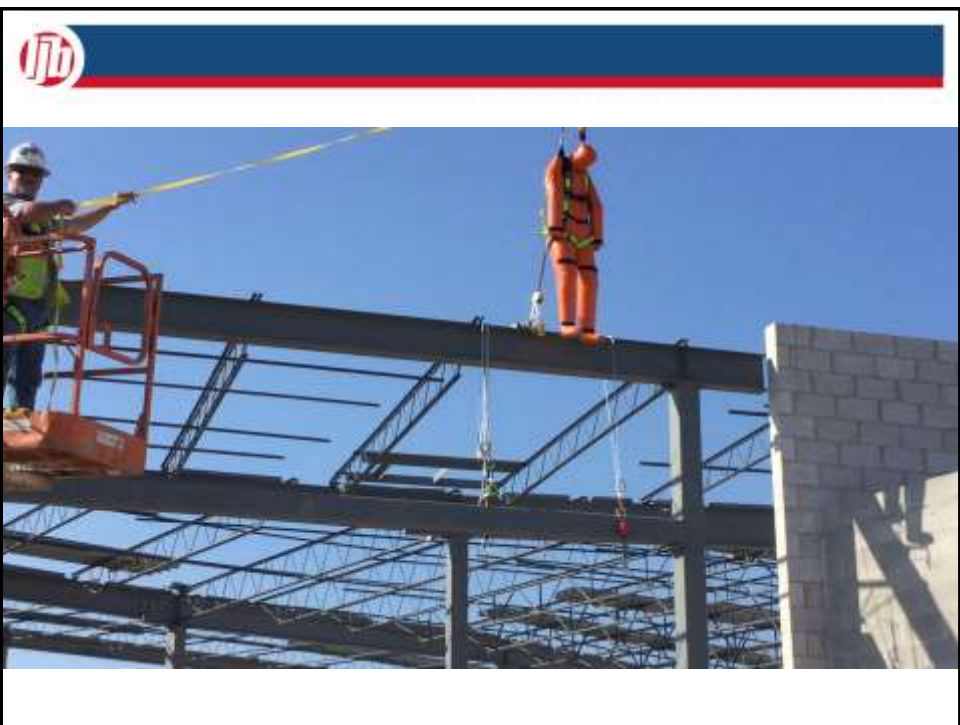
37



38



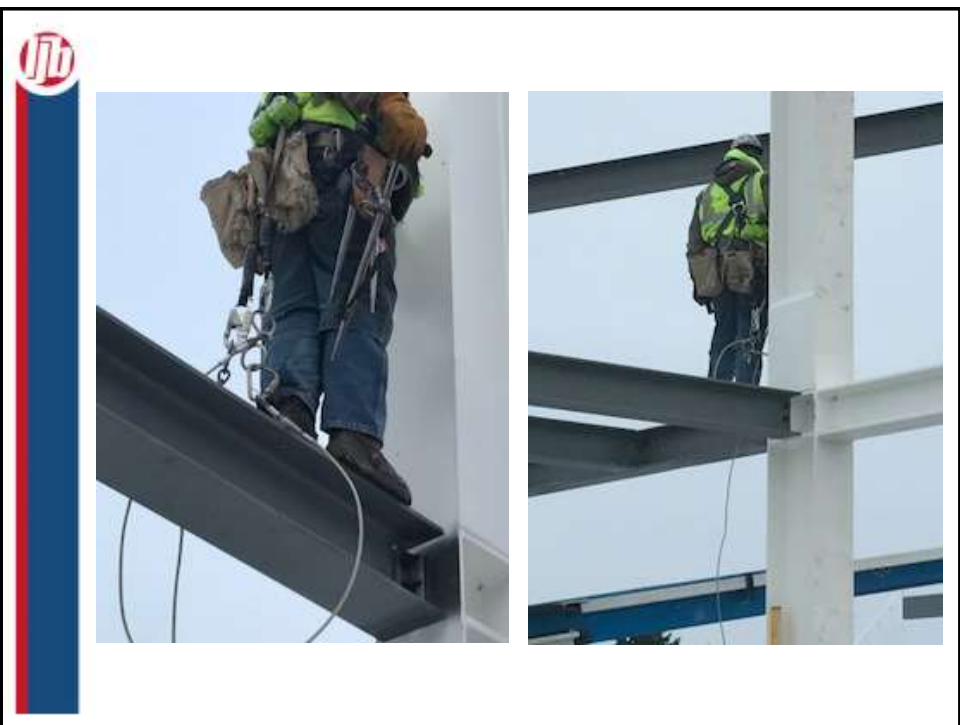
39



40



41




42



## CRITICAL SRL-LE "SURVIVABILITY" INPUT

- Site specific – controlled by user's organization
  - > Worker weight
  - > Setback (greater = better) and offset (greater = more severe)
  - > Edge – type and sharpness
- Equipment specific
  - > Line constituent – wire rope or webbing
  - > Energy absorber
  - > SRL brake type
  - > Part of line constituent that strikes the edge
  - > Tolerances associated with product elements

43



## SRL-P VS TWIN LEG LANYARDS

44



## COMMON PEA LANYARD OFFERINGS

Dorsal connection

- Standard snaphook (in limited cases, a sewn loop)
- Single and twin leg, some adjustable

Personal energy absorber (PEA)

- One or two energy absorbers with various types

Anchor location

- 6-foot free fall
- 12-foot free fall

Material and connectors vary

45



## COMMON SRL-P OFFERINGS

Dorsal connection – too much weight on back?

- Carabiner for single unit
- Patented connection for twin units (most common)

Energy absorber

- Part of line constituent or device (two energy absorbers)
- Part of dorsal connection (single energy absorber)


Anchor location

- Overhead anchor only (approx. no free fall)
- Foot level anchor (6-11 feet free fall), “smooth” edge
- Foot level anchor (6-11 feet free fall), “sharp” edge

Material and connectors vary


46

## TWIN LEG LANYARD VS. SRL-P




Is the SRL-P a “safer” alternative?

- ⦿ Overhead anchorage?
- ⦿ Resiliency to misuse/overload
- ⦿ Criteria in ANSI
  - > Personal EA lanyards
  - > SRDs
- ⦿ Edge confusion: leading vs. sharp vs. soft
- ⦿ OSHA strength requirements




47

## TWIN LEG LANYARD VS. SRL-P

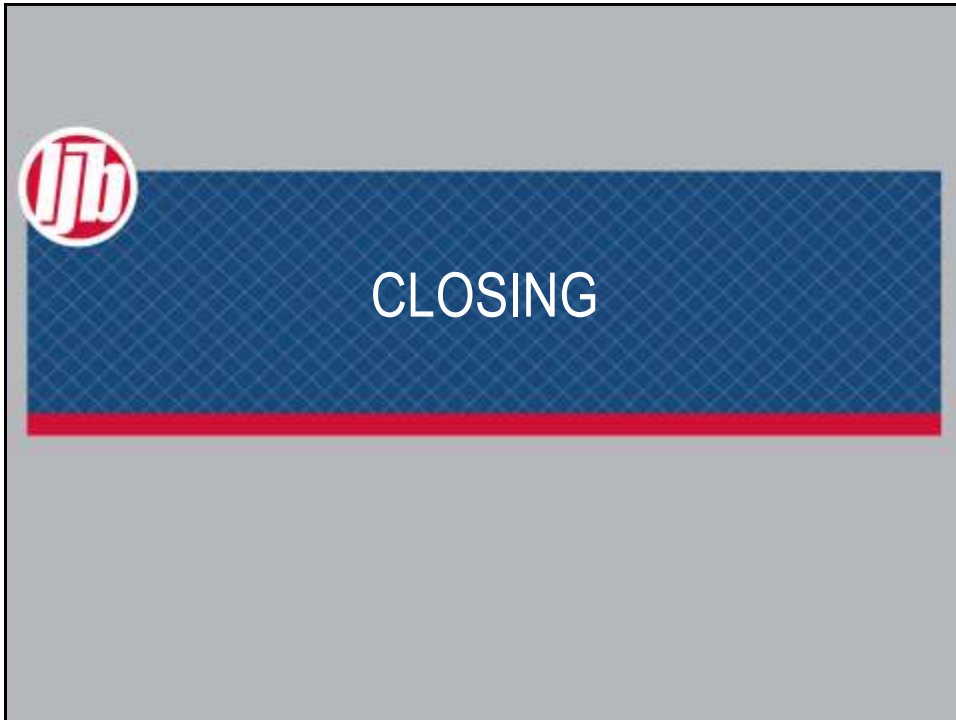


Is the SRL-P a “safer” alternative?

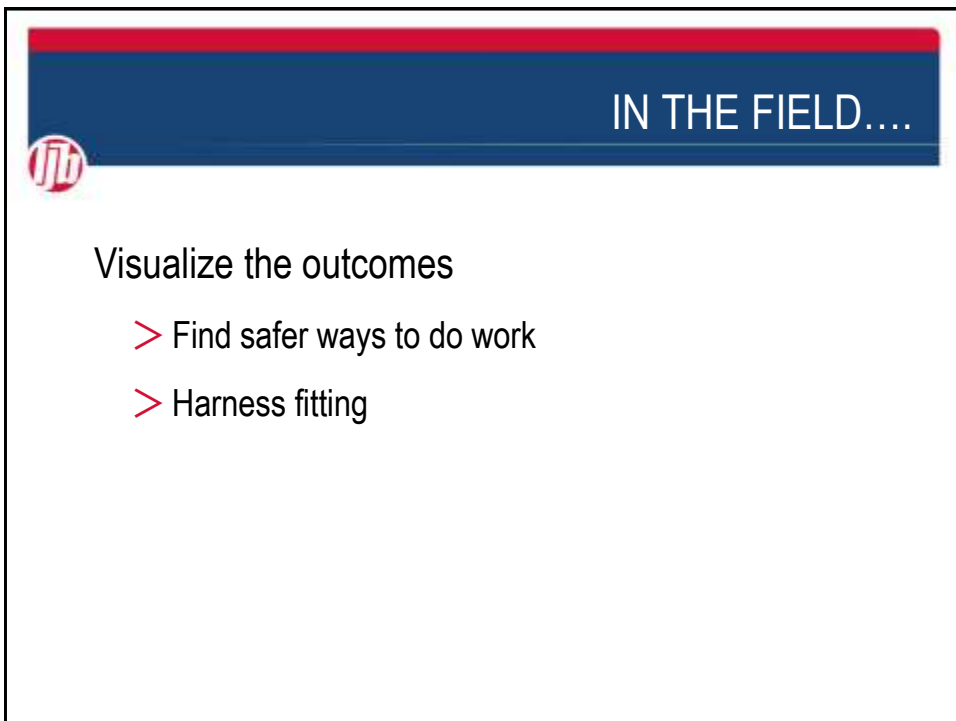
- ⦿ Tensile strength: 5,000 lbs. vs. 3,000 lbs.
- ⦿ Wishbone test: YES vs. NO
- ⦿ Dual attachment test: YES vs. NO
- ⦿ Side dee-ring test: YES vs. NO
- ⦿ Cost: \$100-200 vs. \$300-600



48



49



50





## IN THE FIELD....

Visualize the outcomes

- > Find safer ways to do work
- > Harness fitting
- > Anchorages
  - Higher is often better
  - Documentation

51



## WHAT CAN WE LEARN FROM HISTORY?




**Joe Arrants**  
Age 34  
Medina, Washington  
March, 2015

**Walter Burrows**  
Age 63  
Bellevue, Washington  
May, 2018

**Brien James Daunt**  
Age 45  
Bakersfield, California  
January, 2019

52




## CLOSING EXERCISE: IMAGINE!

Imagine every year on April 22<sup>nd</sup> at precisely 10:15 am, all of your workers simultaneously “tested” their fall protection systems.

What would happen? Are you good, or just lucky?

53




## CLOSING EXERCISE: IMAGINE!

Imagine that two Boeing 777's loaded with passengers and crew fell out of the sky every year on December 24<sup>th</sup>.

What happens next?

54



## CLOSING EXERCISE: IMAGINE!

We have nearly 900 fatal falls each and every year, and this has been the case for years, despite our best efforts. That does not include life-changing injuries or recordables.

Have we become numb to the BLS data?

55



Improving the quality of life

# FALL PROTECTION: THE GREATEST CHALLENGE IN COMPLIANCE AND RISK

Western PA Chapter – ASSP: May 2021

THOMAS E. KRAMER, P.E., C.S.P. – LJB INC.  
(937) 416-6187; TKRAMER@LJBINC.COM

56

## CASE STUDY #1

### ⚙ Just because it meets ANSI...

> Doesn't mean it's indestructible

- <http://bit.ly/2yXMjbu>
- <http://bit.ly/2y1c3pi>



57

## CASE STUDY #2

- ⚙ <https://www.seattletimes.com/seattle-news/eastside/worker-dies-in-fall-at-sound-transit-light-rail-construction-site-in-bellevue/>



58

### CASE STUDY #3

- <https://docuvision2020.com/index.php/2019/01/21/brien-james-daunt/>



59

### CASE STUDY #4

- Just because it meets ANSI...
  - > Doesn't mean it's indestructible
    - <http://on.freep.com/2xhvF16>



60

## CASE STUDY #5

### 🔗 Make an emotional connection

- > [https://www.youtube.com/watch?v=14gsJd\\_HrQQ](https://www.youtube.com/watch?v=14gsJd_HrQQ)
- > <https://www.youtube.com/watch?v=ffC9FfMYpW4>
- > <https://www.youtube.com/watch?v=ABZcf0Uiplw>
- > WorkSafe Victoria (<https://www.worksafe.vic.gov.au/>)

61