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**FOUNDATION**

# Pipeline Construction Safety Roundtable

September 14, 2023

JW Marriott Galleria, Houston, Texas

# Welcome

**Kimberly Tarr**

Title, Boardwalk Pipelines



# Welcome Remarks

**Nate Healy**

Senior Director of HSE, Michels Energy Group, Inc.

Chair, Pipeline Construction Safety Roundtable Committee



# Awareness Moment

**Will Southerland**

Manager Construction, Project Execution, Williams



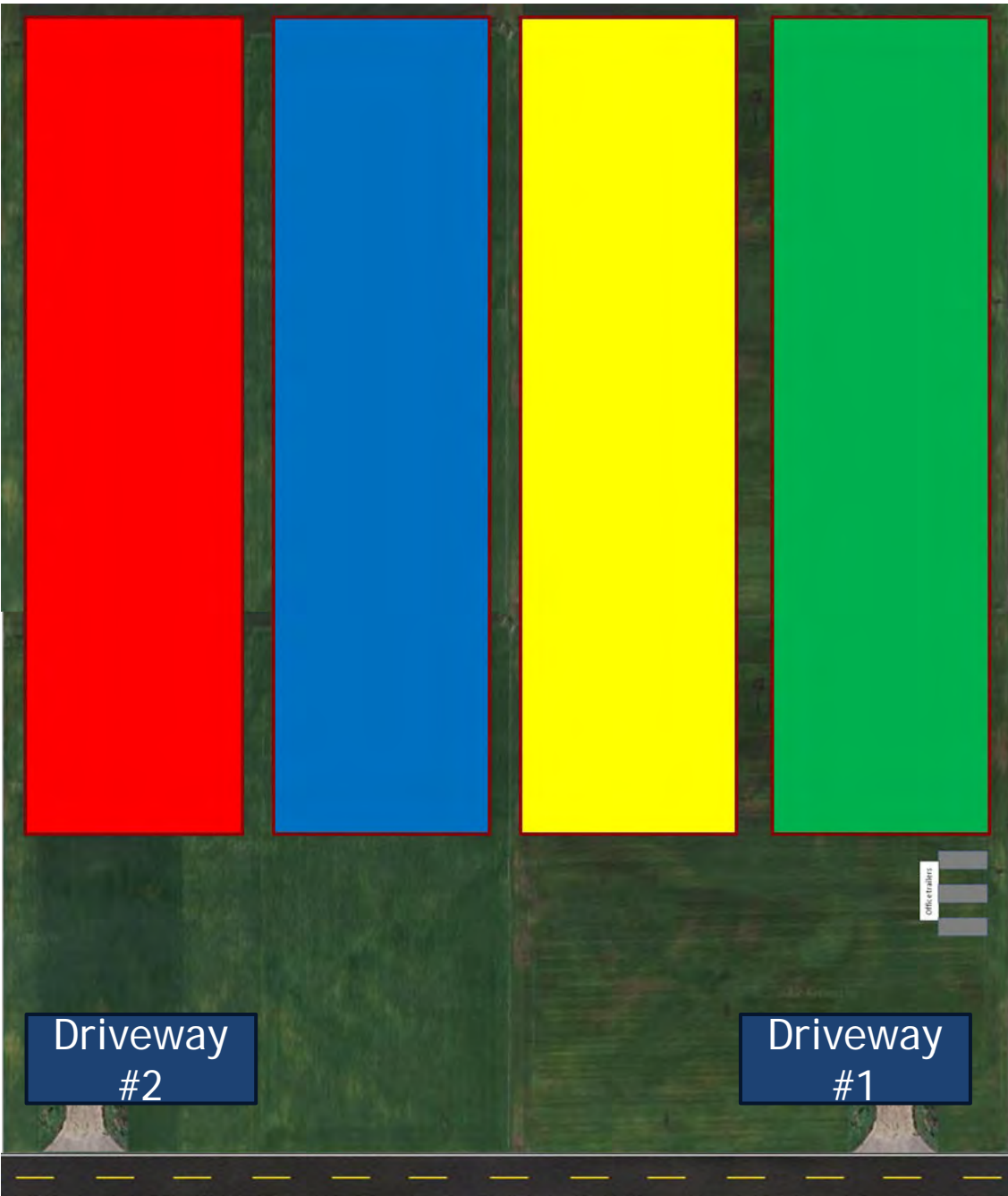


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# Effective Communication

Nate Healy, Senior Director of HSE

Michels



## Final Scenario:

- Trucks will enter driveway 1 and out driveway 2
- Blocks should be sorted by color
- Largest blocks will be placed nearest road for easy access
- Refer to drawing for where each color should be placed
- Are there any questions?
- You have 3 minutes, go.

# Effective Communication



- Results are guaranteed, but the goal is INTENDED Results
- Share the “why”
- Spending time up front will save time
- We do not all learn or comprehend the same



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**Break**

Please return promptly



# Project Life Cycle Panel

## Moderator:

Will Southerland, Manager Construction, Project Execution, Williams

## Panelists:

David Kelley, Corporate HSE Manager, Sunland Construction

Kelly Dunn, Director, US Gas Construction Services & IM Projects, TC Energy

Frank Johnson, Chief Inspector, Project Consulting Services



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# Intentional Communication in the Project Life Cycle

## Panelist

Kelly Dunn, Director, US Gas Construction Services  
and Integrity Maintenance Projects - TC Energy

David Kelly, Corporate HSE Manager, Sunland

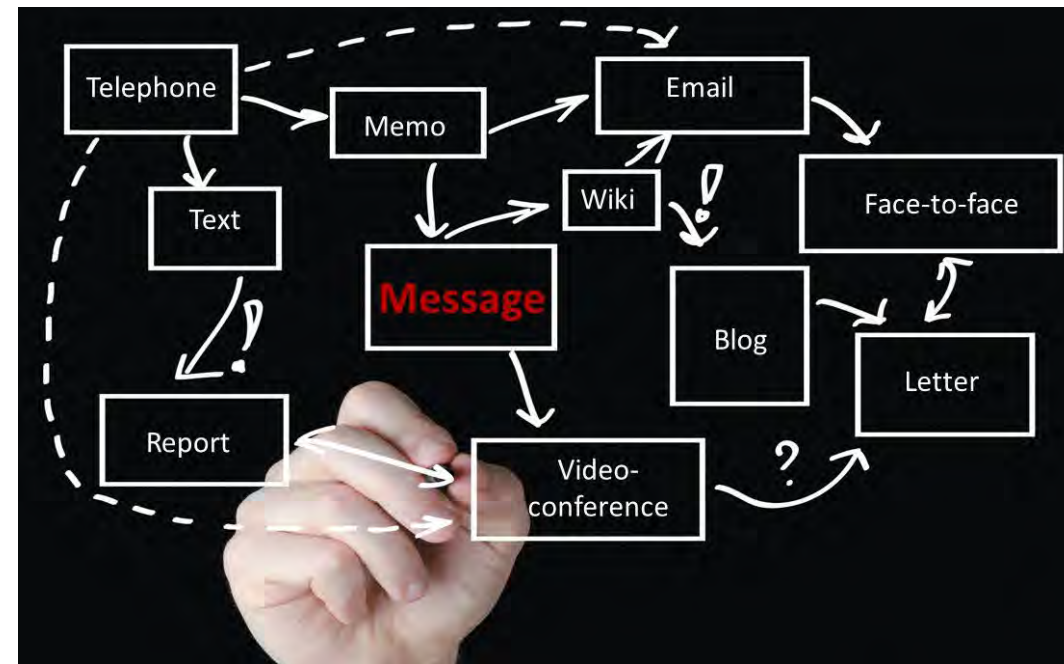
Frank Johnson, Chief Inspector, Project Consulting  
Services

# Intentional Communication in the Project Life Cycle

## WHAT WE WANT

Intentional Communication - Style of communication where both sides get their needs met. It means communicating in a way that increases likelihood that all parties truly hear each other.

## OFTEN, WHAT WE GET



# Typical PLC Process Deliverables Lifecycle Stages

Project Life Cycle 2.0 (PLC 2.0) Typical Key Deliverables

Version: 1.1

		G0 Discover		G1 Select		G2 Define		G3 Deliver		G4 Integrate		G5		
STAGE								3.3		3.7				
TYPICAL DELIVERABLES	Business Development & Commercial	Development strategy	Review Revised Business Case Customer buy-in or verbal agreement Draft of commercial terms with related timing Commercial risk identification (credit, insurance, etc.)	Review Final Business Case Finalize and execute commercial agreements Update commercial risks and related mitigation plans Define business integration requirements Signed Commercial Agreement					Contract terms input into financial systems Implement business integration requirements (CSD)	Review of milestone invoice (Commercial / Accounting)		Final customer contract review "Lessons learned" captured and reviewed		
	ES	<b>Discover-Level FEED Study / FEL 1</b> Hydraulic or process models Scope/Scope options Preliminary routing / Map Block Flow Diagrams (BFD) Preliminary schedule w/ major milestones Permitting & land reconnaissance Major risks identified and documented Class-5 Cost Estimate O&M estimates (rule of thumb)	<b>Select-Level FEED Study / FEL 2</b> Refined hydraulic or process models Scope/Scope options Technical alternatives description / evaluation Project maps / GIS route evaluation Block Flow / Process Flow Diagrams High-level execution and contracting plan / Preliminary construction strategy Permit table draft Land / ROW requirements WBS level 2 Cost Estimate w/ contingency Basis of Estimate Create or Update Risk Register (risk list, impact and probability evaluation) Schedule based on preliminary WBS Regulatory review / reconnaissance Design review Major equipment list	<b>Define-level FEED study / FEL</b> Final hydraulic or process models Project scope and design basis Project route maps / GIS route evaluation Block Flow Diagrams Preliminary P&IDs / PFDs Plot plans Equipment list and vendor quotes Major material list and quotes Permit table Land / ROW options secured Contractor estimates Constructability review Bid, evaluate, and award Engineering contracts Controls narrative created Development Lessons Learned Update Risk Register (risk, impact,	<b>Project Plan</b> Project Controls Plan Procurement and Contracting Plan Risk Management Plan Org Chart (if Required) Project Staffing Plan Construction Plan Document Control Plan Purging and Hot Work Plan EH&S Management Plan Environmental Permitting Plan External Outreach and Communications plan Internal Communications Plan Monte Carlo-based risk assessment (if required) Baseline Cost Estimate WBS level 3 (typ) Basis of Estimate Baseline schedule	IFC drawings Final 3D model (when applicable) Construction-levels schedule Updated Cost Estimate Create Change Management Log Contractor control docs (i.e. contractors metrics, insurance/ drug & alcohol/ DOT compliance, safety performance) Construction management plan Bid and Evaluate Construction contracts Purchase Requests issued (for major equipment) Construction safety plan ROW / Land acquisitions Bid, evaluate, and award bulk material purchase orders Management of Change (MOC) if needed Facilities Completion Plan Updated Risk Register	Award Construction contracts Work Packages issued to Pre-commissioning & commissioning plans Hand-over Plan (completed) Vendor control docs (i.e. factory acceptance tests, inspection reports)	Fabrication completion report Mechanical completion report Pre-startup Safety Review (PSSR) Operations Transition Form Commissioning Punch List Vendor Training on new systems FERC Authorization to In-Service Agency Authorization or Notifications	PowerPlant status updated to "in service" As-built drawings updated Performance testing Surplus inventory identified	Project data books completed Contracts Closed Out Close-out work orders "Lessons learned" captured and reviewed Permits closed Final Risk Register Summary Final Project Cost Report				



# Intentional Communication in the Project Life Cycle

## Owner's Perspective

- Larger projects get more time and resources to follow PLC processes, including upfront engagement with contractors.
- Companies have various factors to consider beyond execution.
- Workload balance and organizational change can affect project personnel decisions.
- Owners often wait until IFB/IFC to engage contractors. Inspectors/owner's representatives are engaged at the time of the project.

# Intentional Communication in the Project Life Cycle

## Inspection/Owner's Representative Perspective

- Adequate time needs to be allowed to understand the project needs to have clear intentioned communications in the field.
- Decisions made by owner and contractor need to be communicated to inspection/owner's representative.
- Sometimes inspection has to communicate difficult decisions as a part of their duties.
- Small projects need same level of information and communication as larger projects.

# Intentional Communication in the Project Life Cycle

## Contractor's Perspective

- Contractors are not even shown an owner's project life cycle but we're part of the team.
- Safety discussions happen too late.
- The owner's construction nuances outside of regulation are rarely communicated.
- The best BD is a job well done, we're on the same team.

# Improving Intentional Communication and Safety Outcomes

- Could we design physical hazard assessments earlier in the life cycle?
  - 3<sup>rd</sup> party safety analysis during ROM estimate (owner's complete an assessment but managing construction is different than executing it).
  - Could owners ask for feedback on how to get smarter at safety execution
- Could we align in the field on requirements and interpretation?
- Is leadership showing a united front in accomplishing the joint goal of successful project completion?



# Intentional Communication in the Project Life Cycle

Engaging in intentional communication early and often keeps our execution teams operating safely and effectively.

Be curious during discussions, try to understand the other parties' perspective and truly listen.

Action: Take this communication discussion back to your organization and begin your communication to your contractors and inspectors.



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**Break**

Please return promptly

# Communications Bedrock of PSMS

**Ashley Donnini**

Founder of Lola Link Consulting, LLC

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

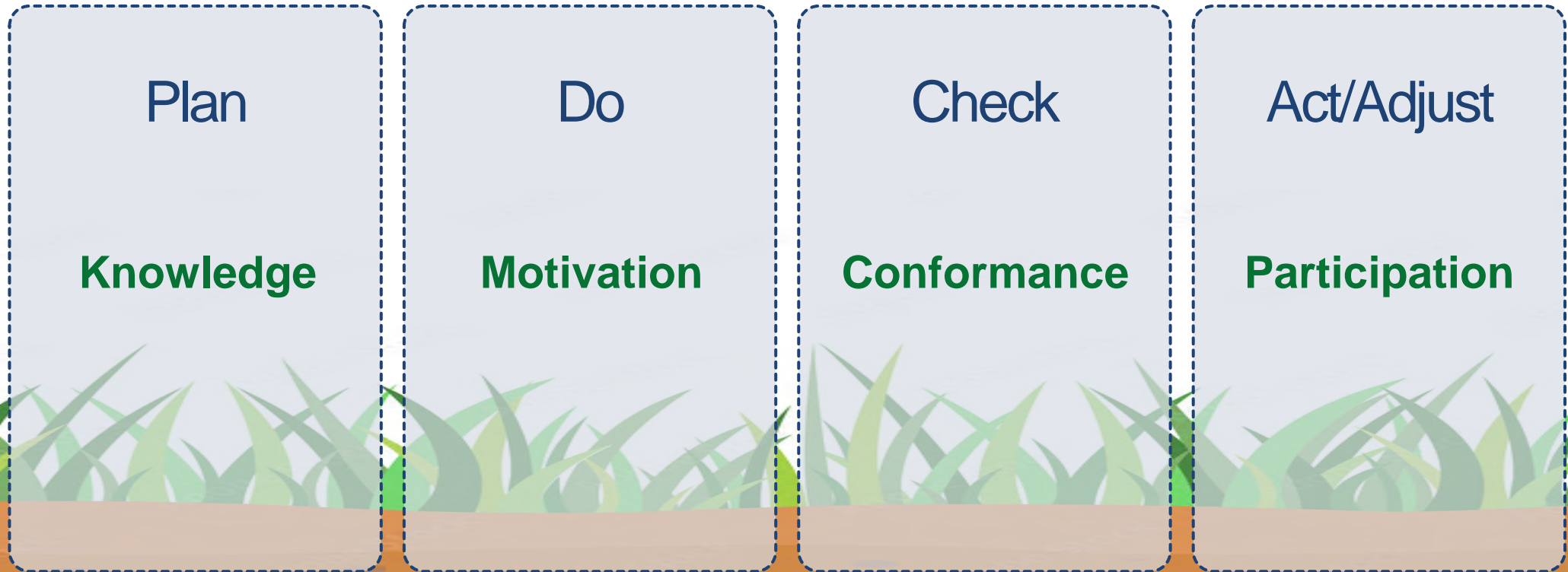




Communication is the bedrock of SMS.



# In a PSMS Framework



10 Pipeline SMS Elements

Great  
communication  
requires  
GREAT  
Leadership.

01

Energy

02

Clarity

03

Empathy







01

We cannot NOT communicate, ever.

02

We cannot get it all out of our brains.

03

We have superpowers to make others feel.

04

Effectiveness hinges on retell-ability.

05

Our beliefs will our actions.

Bedrock  
Self  
Evident  
Truths



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# THANK YOU

Ashley Donnini

Lola Link Consulting, LLC

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

+ 1 757 550 4114



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# Lunch

Please return promptly at 1:00 pm

# Awareness Moment

**Peter Petro**

HSSE Manager, US Environmental Services, Stantec





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# Individual Risk Assessment

By Peter Petro, CSP, CHMM

# Concept:

- Provide a tool to staff to evaluate site conditions
- Simple, repetitive, and resilient
- Provide resources for the process and hazard identification
- Individual authority to not proceed
- It doesn't need to be documented
- If it is documented, make it paperless with offline access

# Variations of Risk Assessment Tools:



LMRA



Every 20 minutes, take 20 seconds and look 20 feet around you.

### SafeStart™

**SAFESTART**

These four states...

- Rushing
- Frustration
- Fatigue
- Complacency

can cause or contribute to these critical errors...

- Eyes not on Task
- Mind not on Task
- Line-of-Fire
- Balance/Traction/Grip

...which increase the risk of injury.

Copyright © 1998-2009 by Electrolab Limited. All rights reserved. #2-CARD-TECH  
1-800-267-7482 www.electrolab.ca

ZeroHarm™ EMRA

### Every Minute Risk Assessment

**Cardno ZERO HARM**  
EVERY JOB. EVERY DAY.

- Step back and think**
  - Take the time to think the task through.
  - What could go wrong?
  - What is the worst thing that could happen if something does go wrong?
- What does safe look like?**
  - How well I could help?
  - Do I have experience?
  - Do I have the right tools?
  - What are the hazards?
- What are the hazards?**

Brasfield & Gorrie

LPS™ SPSA

### GLOBAL REAL ESTATE & FACILITIES

## SPSA SAFE PERFORMANCE SELF-ASSESSMENT

#### SPSA Discussion Card

Begin the SPSA discussion with a casual, informal conversation.

Describe how to **ASSESS** the risk. Ask:

- What task are you are doing right now/about to do?
- What are the hazards of this task (see side 2)?
- What could go wrong?
- What is the **WORST** thing that could happen if something does go wrong? ★
- How would the risk outcome you identified affect your life?

Describe how to **ANALYZE** to reduce the risk. Ask:

- What is the correct way to perform the task?
- How will you eliminate or reduce the risk?
- What training, knowledge, procedures or experience is required to perform this task?
- What tools, equipment or PPE is required to perform this job the correct way?

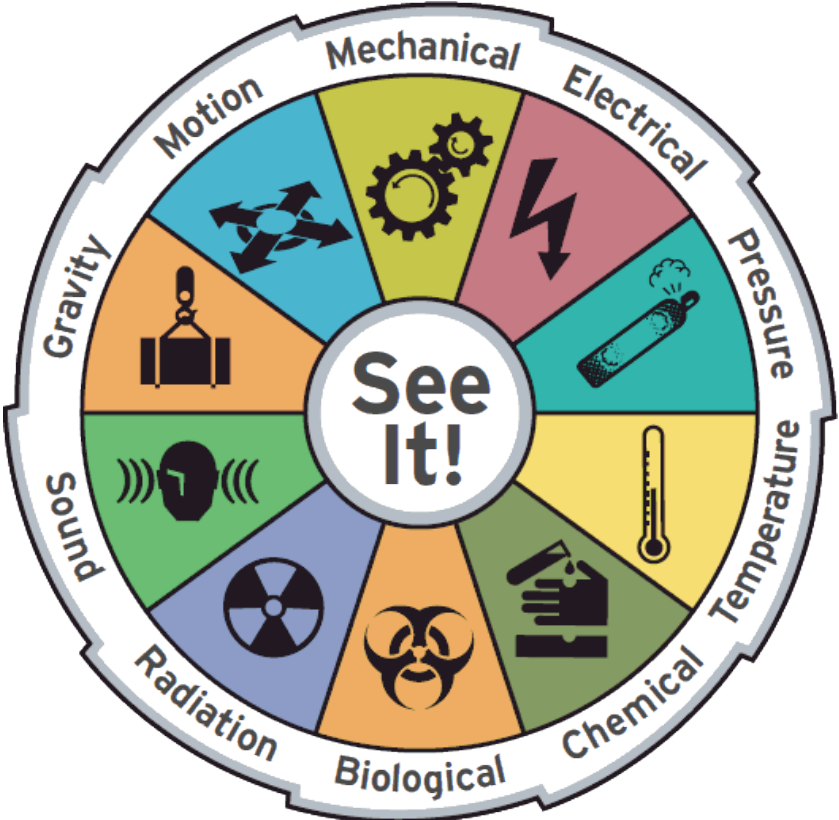
Describe how to **ACT** to ensure safe operations. Ask:

- What actions did you take, or will take, to protect yourself and others from these hazards and risks?

Providing feedback is the last step!

- Point out specifically how the SPSA was used well.
- Convey your appreciation for taking action on risk scenarios that could have caused harm.
- Coach the person if the SPSA was not satisfactory or incomplete.
- Share learnings with others.

# Hazard Identification Tools:



**Exposure**

- Temperature Extreme
- Radiation
- Noise
- Chemical Burn
- Hazardous Atmosphere
- Animal, Insect, Plant

**Caught/Crushed**

- In
- Under
- Between
- By

**Ergonomics**

- Lifting/Carrying
- Pushing/Pulling
- Bending/Twisting/Squatting
- Over-Reaching
- Repetitive/Static Task
- Contact Stress/Vibration

**Contact**

- Struck Against
- Struck By
- Harmful Contact with Sharp Edges

**Fall**

- Slip/Trip
- Fall on Same Level
- Fall from Height

**Energy Source**

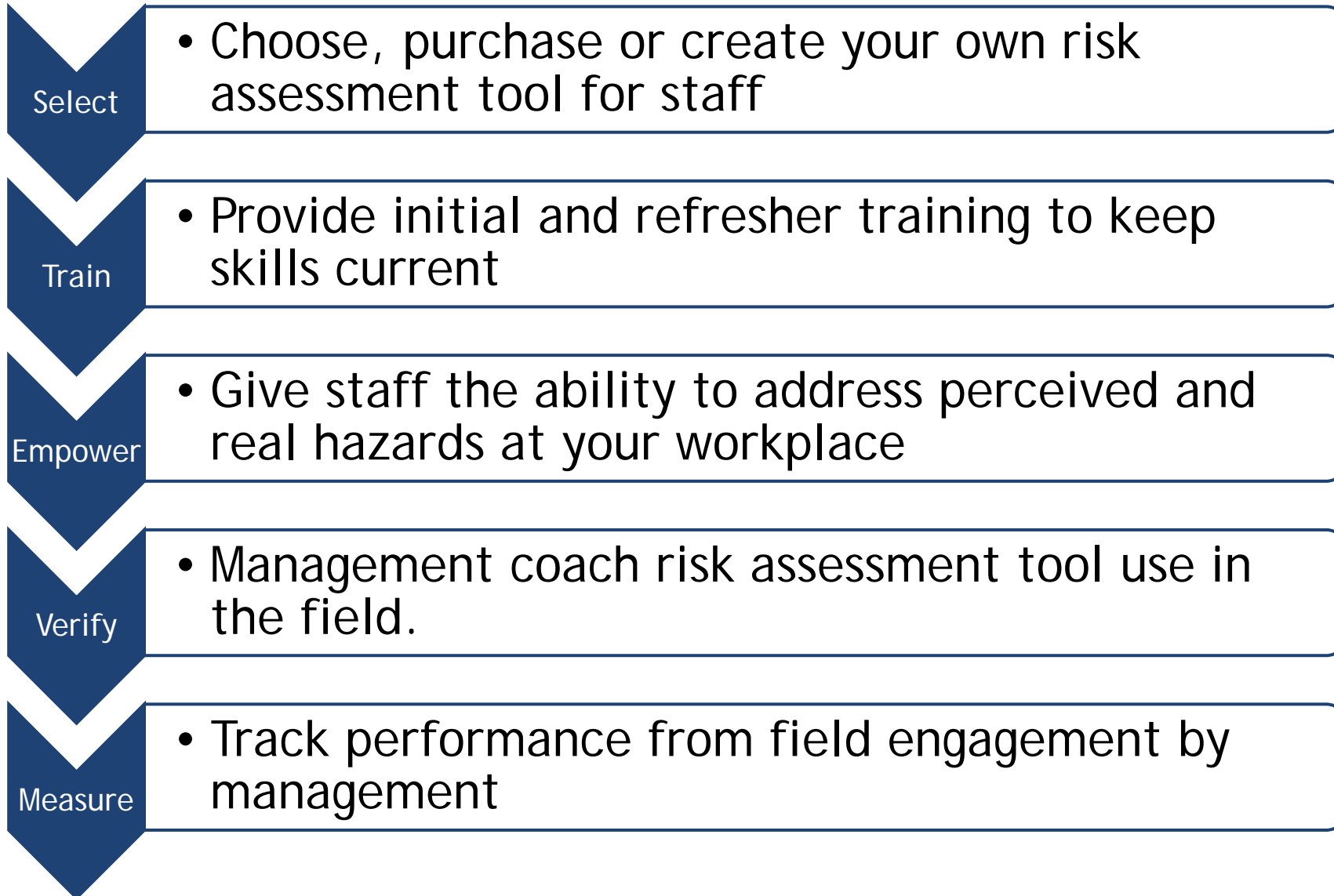
- Electricity
- Pressure
- Compression/Tension
- Rotating Equipment

**What could go wrong?  
What is the worst thing that could happen?**





# Set up for Safety Success:



# Safe Driving Panel

## Moderator:

Louis Dunham, Sr. Safety Advisor, Enbridge

## Panelists:

Gary Johnson, Head of Safety and Compliance Strategy, Motive

Keith Pellegren, Producer, Ross & Yerger

Kevin Weigel, Director of HSE, Michels Energy Group, Inc.





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# PCSR WORKSHOP

## Driving Safety

SEPTEMBER 14, 2023

LOUIS DUNHAM

# PCSR WORKSHOP

## DRIVING SAFETY

### ENBRIDGE - SAFE DRIVING PROGRAMS & POLICIES

- Vehicle Operations Standard
  - Circle of Safety (360° Check)
  - Vehicle Telematics
  - Distracted Driving
  - Driver Improvement Training
  
- Driving Safety (Life Saving Rule)
  - *I will only operate a motor vehicle or mobile equipment when free from the adverse effects of alcohol or any substance that causes impairment.*



# PCSR WORKSHOP

## DRIVING SAFETY

### ENBRIDGE - SAFE DRIVING PROGRAMS & POLICIES

- *DriveWISE*
  - Behavior Focus (Walk, Immerse, Secure, Exit)
- Safe Driving Awareness Resources
  - Wildlife
  - Seasonal Driving Tips
  - Skid Control
- Journey Management
- Fatigue Management



# PCSR WORKSHOP

## DRIVING SAFETY

### Challenges

Contributory/Preventable Motor Vehicle Incidents (MVIs)*	2020	2021	2022	2023**
Number of Events	27	24	21	20
Motor Vehicle Incident Frequency	0.81	0.75	0.72	1.11

MVI Mechanisms (3 Years + Current Avg.)	Rear-End	Reversing	Stationary Objects
	21%	27%	46%



\* Gas Transmission Business Unit Only  
 \*\* As of September 5, 2023



# PCSR WORKSHOP

## DRIVING SAFETY

### Heading In The Right Direction

- Enterprise-Wide Driving Safety Sharepoint
- Increased number of certified trainers in field operations
- Increased frequency of “behind the wheel” refresher sessions
- New fleet vehicles equipped with safe technology, i.e. back-up/360° cameras, audible alarms, fatigue alerts, etc.
- Low rate of incidents with high actual/potential severity

# PCSR WORKSHOP DRIVING SAFETY

Louis Dunham, CSP

Sr. Safety Advisor

[louis.dunham@enbridge.com](mailto:louis.dunham@enbridge.com)

(281) 536-0812





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**Gary Johnson**

Head of Safety and Compliance  
Strategy

Motive

# The 2023 State of Safety Report

- 1,100 fleets surveyed on their approach to safety.
- Surveyed included **fleet managers, business owners, and transportation managers.**
- Respondents manage a total of **904,000 vehicles.**
- Conducted by **Researchscape International**, an independent marketing research firm.
- Survey was in the field between **January - February 2023.**



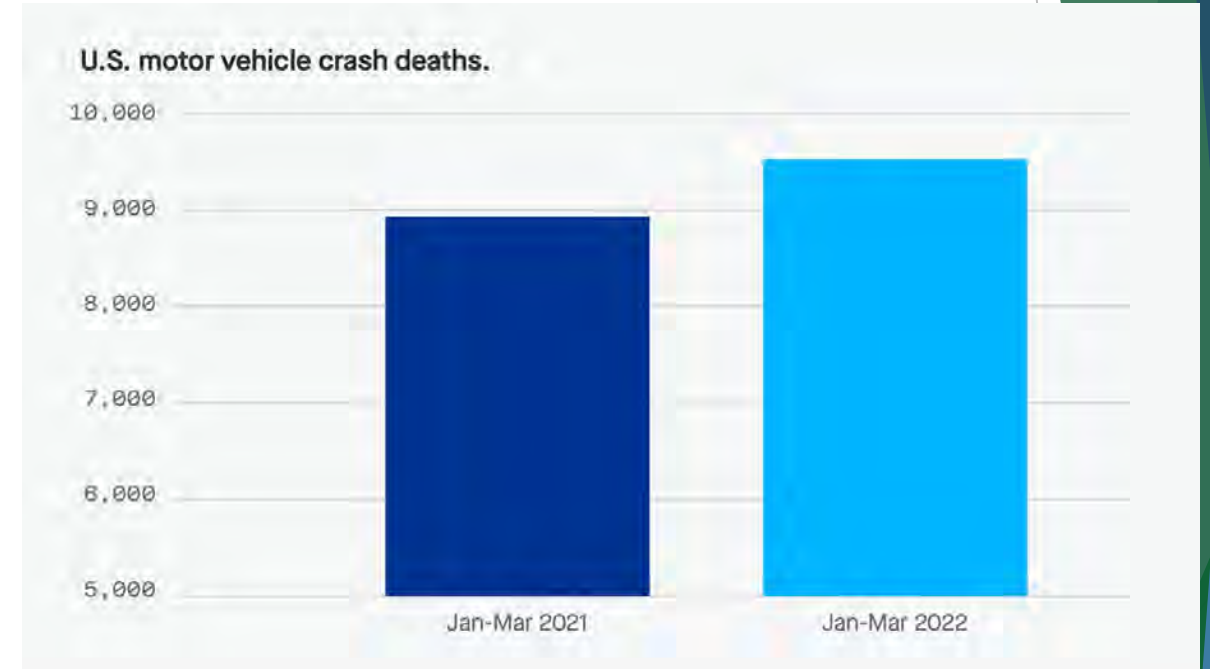
[Download report here](#)



# Current state of safety

- Recent data from the National Highway Traffic Safety Administration (NHTSA) shows traffic deaths reached a 16-year high in 2021, with truck crash deaths jumping 13%, YoY.
- **9,560 people died** in motor vehicle traffic crashes in the first quarter of 2022\*
- **7% increase** as compared to the 8,935 fatalities projected for the same quarter in 2021.
- Highest number of first-quarter fatalities since 2002.

\* [National Highway Traffic Safety Administration \(NHTSA\)](#) data.



# Current state of safety

- Crashes can happen in a split second



\* [National Highway Traffic Safety Administration \(NHTSA\)](#) data.

# Current state of safety

**\$1,700,000**

Average cost of a **fatal** motor vehicle crash\*

**\$3,600,000**

When a large commercial vehicle is involved\*

\* [National Safety Council](#)

\* [FMCSA data](#)



# Shifting priorities: Is safety *really* a focus for fleets?

When surveyed:

- Is driver safety performance a priority?  
**Yes - 95%**
- Rank top priorities for 2023?
  - 1. Increasing revenue**
  - 2. Minimizing expenses**
  - 3. Improving Safety**

What are the top priorities for your organization in 2023?

1. Increasing revenue
2. Minimizing expenses
3. Improving safety

# Shifting priorities: Is safety *really* a focus for fleets?

When surveyed:

- What are the biggest challenges that your organization's fleet has faced this past year?

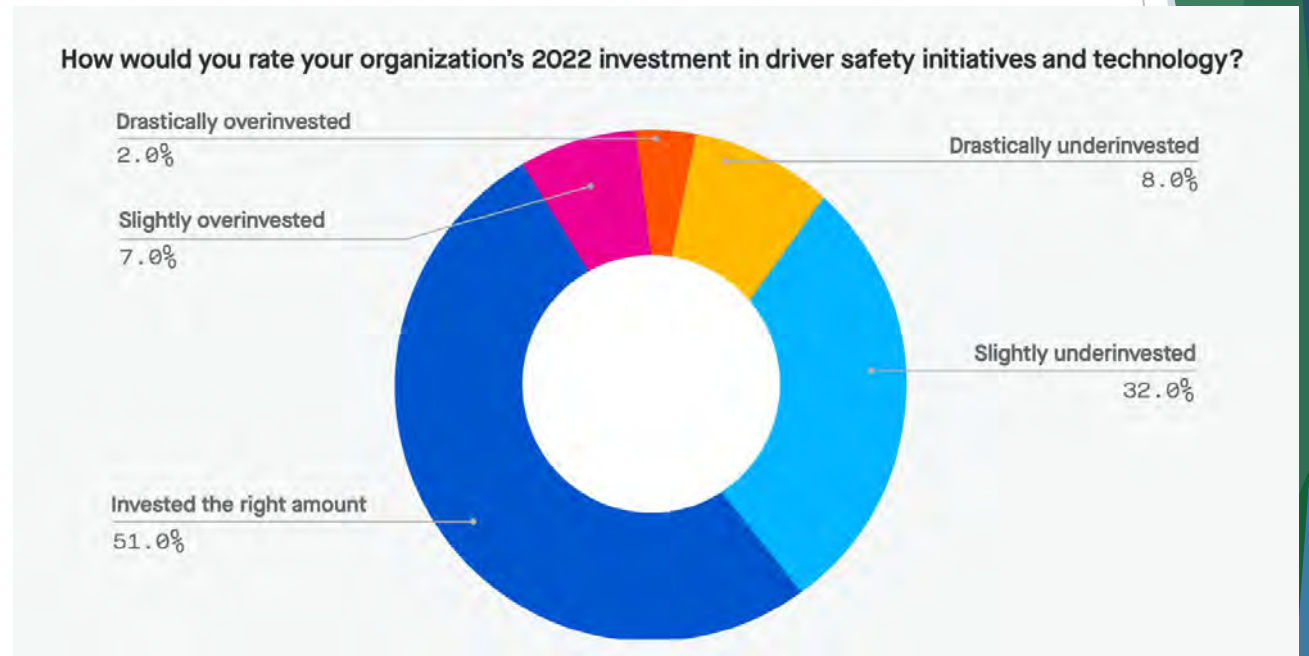
**What are the biggest challenges that your organization's fleet has faced this past year?**

1. Fuel costs
2. Increased insurance premiums
3. Driver shortage



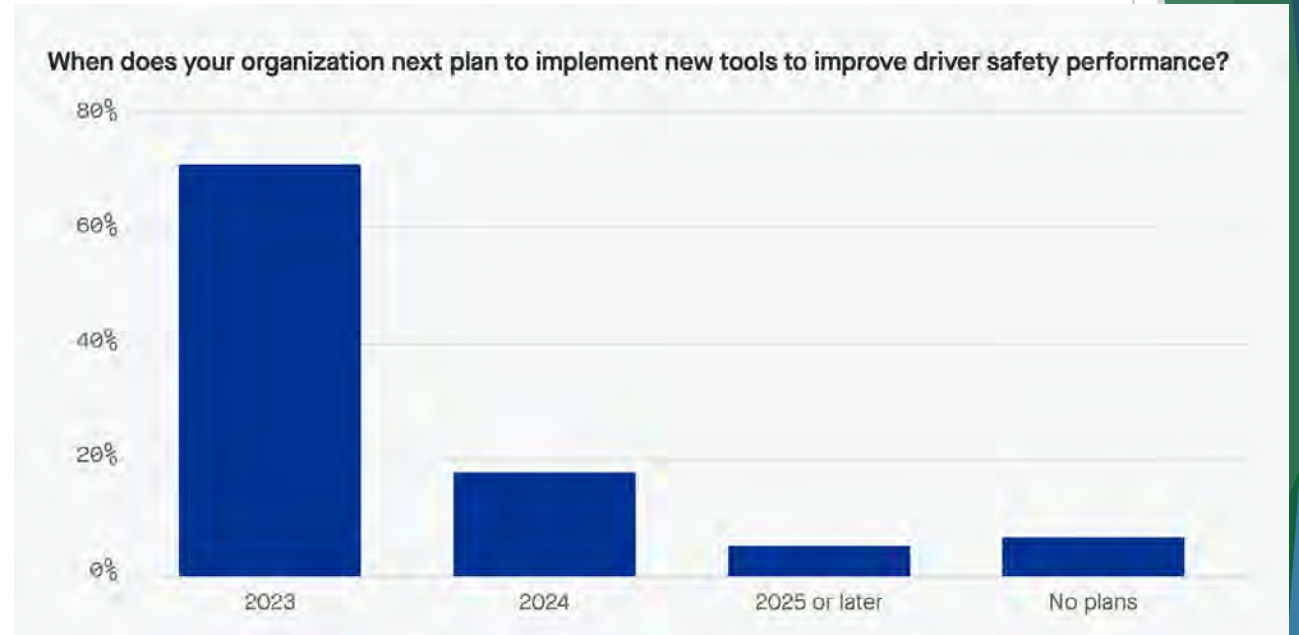
# Shifting priorities: Is safety *really* a focus for fleets?

- 40% of organizations said they were underinvested in driver safety initiatives and technology in 2022
- 8% responding that they were drastically underinvested.



# Shifting priorities: Is safety *really* a focus for fleets?

- **52%** of fleets surveyed implemented new tools to improve driver safety in 2022.
- **89%** plan to implement new tools, with **71%** of respondents targeting this year (2023)
- **18%** waiting until 2024.



# Safety by the numbers

44%

of organizations with driver safety programs report seeing insurance savings

57%

of fleets report a decrease in unsafe driving after implementing an AI-powered solution

61%

of fleets report having at least one accident in 2022

\$910k

average cost of 10 large commercial vehicle crashes, according to the FMCSA

# Incremental improvements, real results: The bottom-line impact of fleet safety



# Safety roadblocks: What is stopping fleets from going all in?

When surveyed:

- Why they haven't implemented a driver safety coaching program?
  1. "We don't have the resources to actively coach drivers" (32%)
  2. "We don't feel we would benefit from a coaching program" (31%)
  3. "We don't know how to develop a coaching program" (24%)

## Why haven't you implemented a driver safety coaching program?

1. We don't have the resources to actively coach drivers.
2. We don't feel we would benefit from a coaching program.
3. We don't know how to develop a coaching program.

# Safety roadblocks: What is stopping fleets from going all in?

When surveyed:

- Why they haven't deployed dash cams in their vehicles?
  1. **"Don't have the budget" (34%)**
  2. **"Don't have the resources" (29%)**
  3. **Concerned about driver pushback" (24%)**

## Why haven't you deployed dash cams in your vehicles?

1. We don't have the budget.
2. We don't have the resources.
3. We're concerned about driver pushback.

# Safety roadblocks: What is stopping fleets from going all in?

When surveyed:

- When it comes to managing a driver safety program, what are the biggest challenges?
  1. **“Lack of budget to purchase tools” (42%)**
  2. **“Lack of resources to staff effectively” (41%)**
  3. **“Driver pushback” (39%)**

**When it comes to managing a driver safety program, what are the biggest challenges?**

1. Lack of budget to purchase tools.
2. Lack of resources to staff effectively.
3. Driver pushback.

# Conclusion:

- Fleets of all sizes and industries believe safety is a priority. While some think investing in a safety program will unlock revenue opportunities and cut expenses, too many fleets still think of safety programs as costly “nice-to-haves.”
- Businesses need to shift their mindset; they need to stop seeing safety as a cost center and start treating it as a profit center. Until that disconnect is reconciled, fleets will focus on safety when it’s convenient or, even worse, after a potentially disastrous accident or incident.



# Safe Driving Panel

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Kevin Weigel, Director of HSE, Michels Energy Group, Inc.

# Construction Leadership Guideline

**Sean Nicholson**

Vice President of HSEQ, Michels Corporation





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# Leadership Development for Frontline Supervisors

Construction Leadership Consensus  
Guidelines  
CLG-1



“The greatest leader is not necessarily the one who does the greatest things. He (she) is the one that gets the people to do the greatest things.”

-Ronald Reagan

# Construction Leadership Guideline Doc

We assembled a task team of leaders from owner/operators and service providers to assess the task-at-hand and create the framework

Chris Smith (Cheniere Energy)

Marty Jorgensen (Barnard)

Brian Seaman (Kinder Morgan)

Kevin Parker (MearsGroup)

Chris Rhudy (Southland Safety)

Jason Leger (Sunland Construction)

- Josie Long (P-PIC)
- Victor Flores (TC Energy)
- Tucker Rutherford (Epcon Partners)
- Mike Farris (Ceco)
- Crystal Christopher (Kinder Morgan)
- Sean Nicholson (Michels)

Thank you to the team...

# Just Some Stats...

In a 2020 survey, the most critical elements to developing a successful safety program were:

- Worker involvement

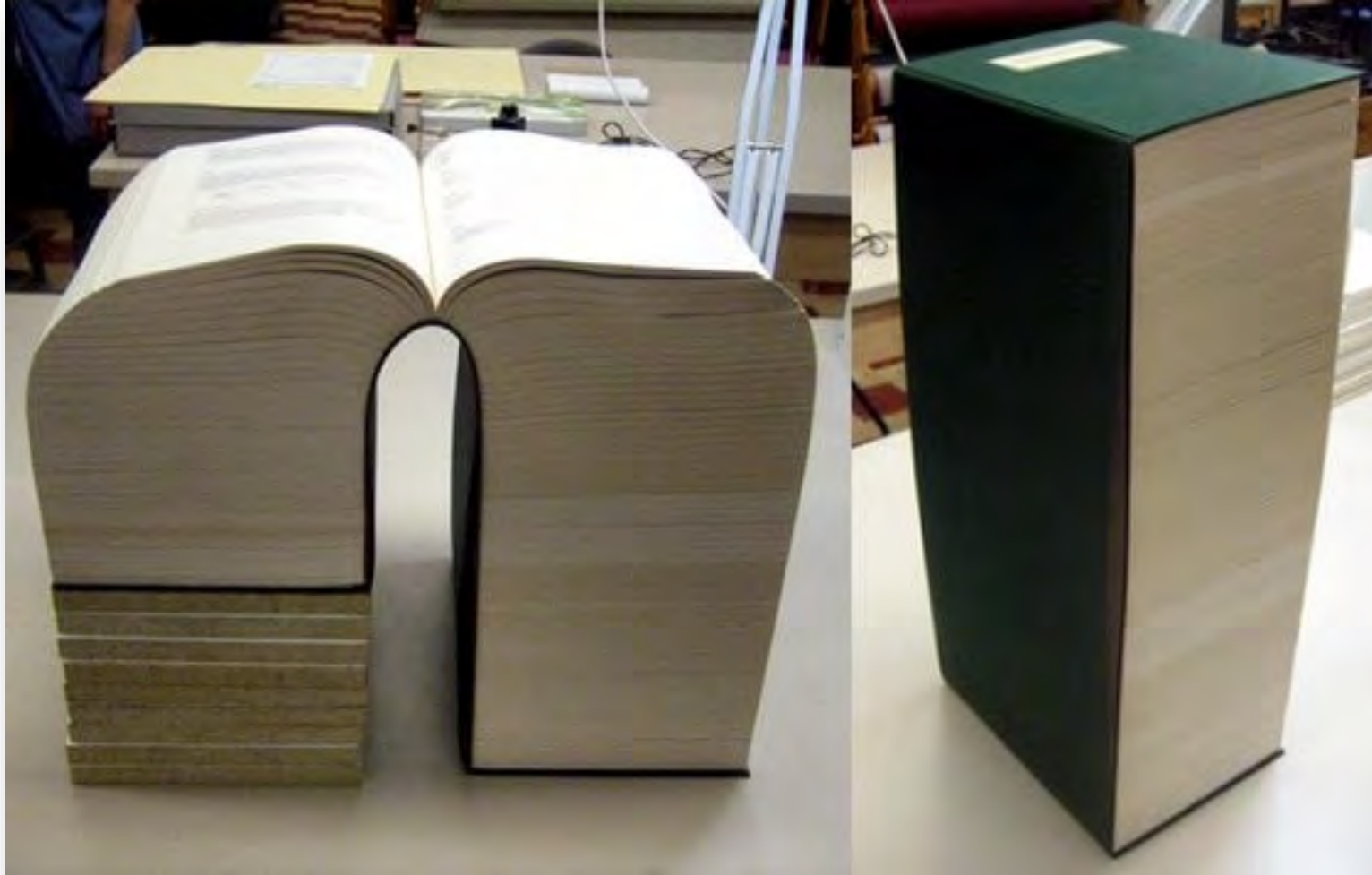
- Strong safety leadership abilities in in supervisors

- Regular safety meetings with jobsite workers and supervisors

- Access to safety training for supervisors and job site workers

73% of companies rely on their supervisors and foremen to deliver safety training and overall leadership to front-line workers.

We're getting close...





# PURPOSE

The Leadership Development for Frontline Supervisors document:

Focuses on front line supervisors and entry level managers

Highlights fundamental leadership development elements

Key focus areas:

- Communication (“communication is hard because it requires great leadership” - Ashley’s presentation)

- Leadership/mentorship

- Conflict resolution

- Development of the “soft skills”

# Overview of the Guideline Document

## Responsibilities

Senior Management, Middle Management, Front-line Supervisors,  
Front-line workers

## Leadership Development Program Elements

## Training

## Continuous Improvement

## Resources

**DEVELOPING LEADERS IS ESSENTIAL TO ACHIEVING POSITIVE MORALE, BEING SAFETY-MINDED, AND ATTAINING HIGH-LEVEL JOB PERFORMANCE.**

- CLG-1

# Path Forward

- The Leadership Development for Front-Line Supervisors guidance document will be available on Member Clicks once it is completed/finalized.
  - Goal is within the next 4-6 weeks
- Please email [foundation@ingaa.org](mailto:foundation@ingaa.org) with any questions regarding content.



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# Break

Please return promptly



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# Beyond the Resume

A look at competency standards

# Competent vs. Qualified



Competence is the ability to undertake responsibilities and to perform activities to a recognized standard.



Qualified is to be recognized as being trained to perform a particular job.

# Title 49 CFR Part 192, §192.803

*Qualified* means that an individual has been evaluated and can:

- (a) Perform assigned covered tasks; and
- (b) Recognize and react to abnormal operating conditions.



Does holding a certification like API 1169 make a person competent?

Yes

No

It  
Depends

# Let's look at a typical resume



**Jon Doe**  
jdoe@illinois.edu

**Current Address**  
123 Green Street  
Champaign, IL 61820  
217-123-4567

**Permanent Address**  
45678 Anystreet  
Anytown, IL 60001  
123-456-7890

**OBJECTIVE** To obtain a full-time position that utilizes communication, analytical, and leadership skills in the accounting industry

**EDUCATION** **University of Illinois at Urbana-Champaign**  
Master of Accounting Science May 2012  
Bachelor of Science in Accountancy May 2011  
Cumulative GPA: 3.4/4.0

**EXPERIENCE** Deloitte, LLP Chicago, IL  
*Audit Intern* January 2011 – April 2011

- Tested and audited cash for clients
- Prepared benefit plan worksheets
- Priced, referenced, and filed audit reports for client portfolios
- Researched accounting practices for client's quarterly filing

University of Illinois-Accountancy Department Champaign, IL  
Student Assistant August 2010 – December 2010

- Researched and developed questions for interviews with intra-department professors
- Interviewed and established relationships with university professors
- Created visual and audio media used in Accountancy 202 lectures

University of Illinois Foundation Champaign, IL  
*Student Development Representative* June 2009 – September 2010

- Developed and maintained existing alumni relations
- Trained new employees on computer system
- Updated and maintained alumni information on computer system
- Organized and facilitated contact information about university campaigns

**LEADERSHIP** Alpha Kappa Psi (Professional Business Fraternity) Spring 2008 – Present  
*Mentor/Mentee Chair* (Spring 2009)

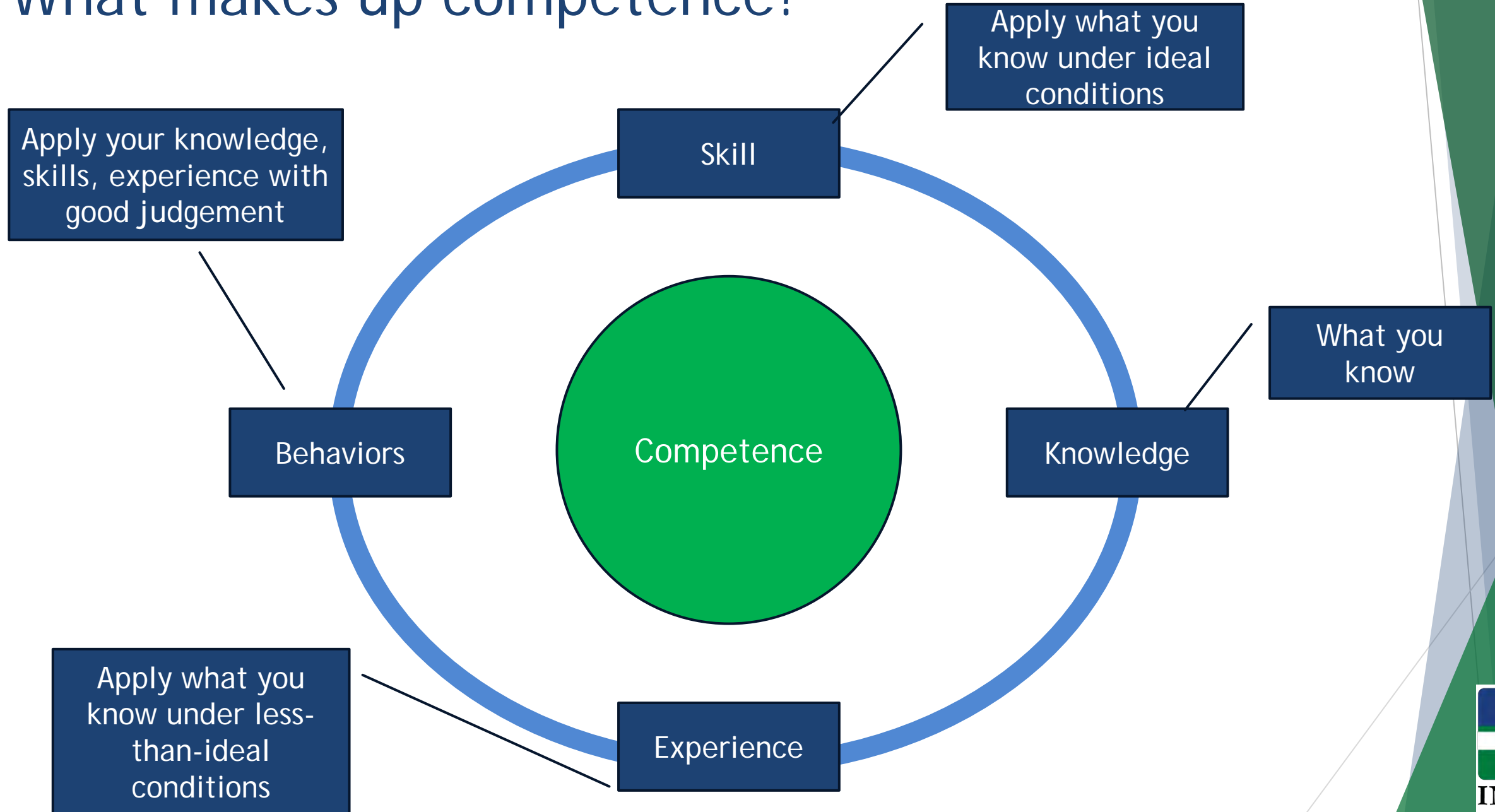
- Implemented relationships for upperclassmen to mentor underclassmen
- Provided social and professional settings to initiate mentoring activities
- Organized résumé workshops

*Pledge Coordinator* (Fall 2008)

- Organized social events to integrate thirty pledges into the organization
- Planned and implemented bi-weekly activities for over 100 members
- Acted as liaison between pledge and active members



# What makes up competence?



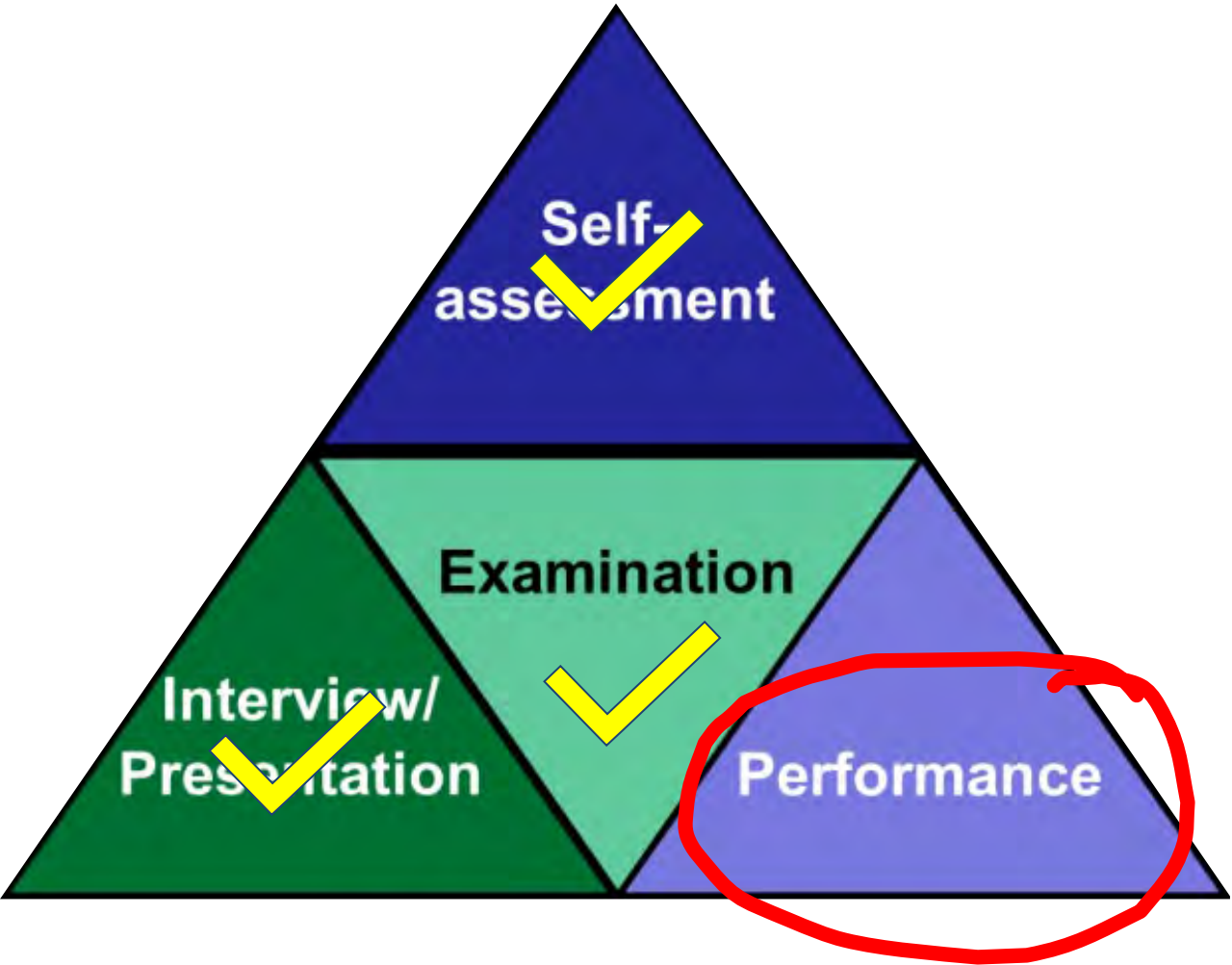
# How do you assess competent behavior?

Table discussion

# Assessing Competency



Does holding a certification like API 1169 make a person competent, qualified, or neither?



# More definitions



Competence is the ability to do something well



Competency is an important skill that is needed to do a job

# Competency Levels



Level 1: the individual is able to carry out work with supervision from someone more proficient (FOUNDATION)



Level 2: the individual is able to carry out work without supervision from someone more proficient (PRACTICIONER)



Level 3: the individual is able to train and assess others (EXPERT)



# Who is the expert?

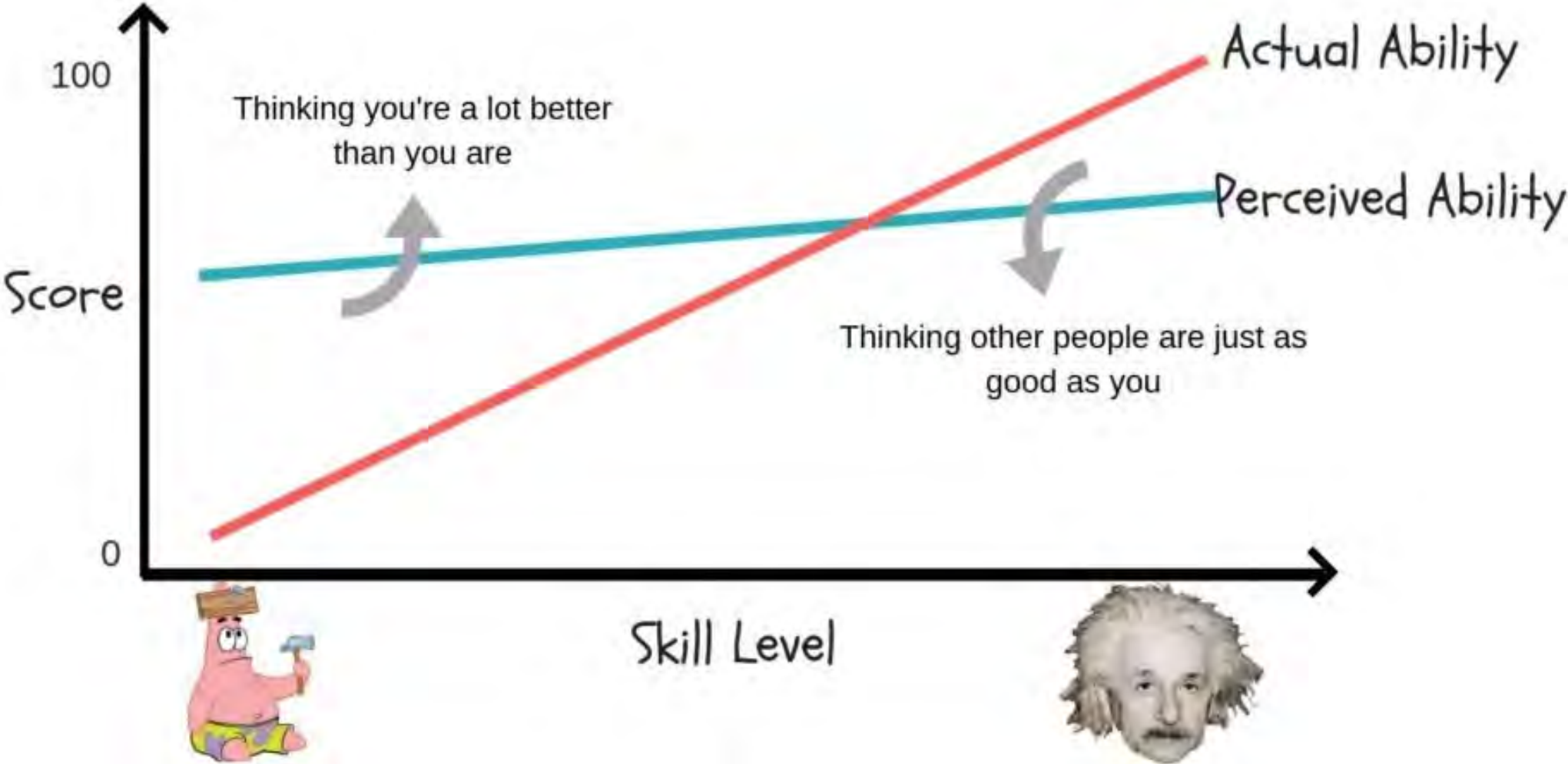


# Who is the expert?

PHMSA defines a Subject Matter Expert (SME) as:

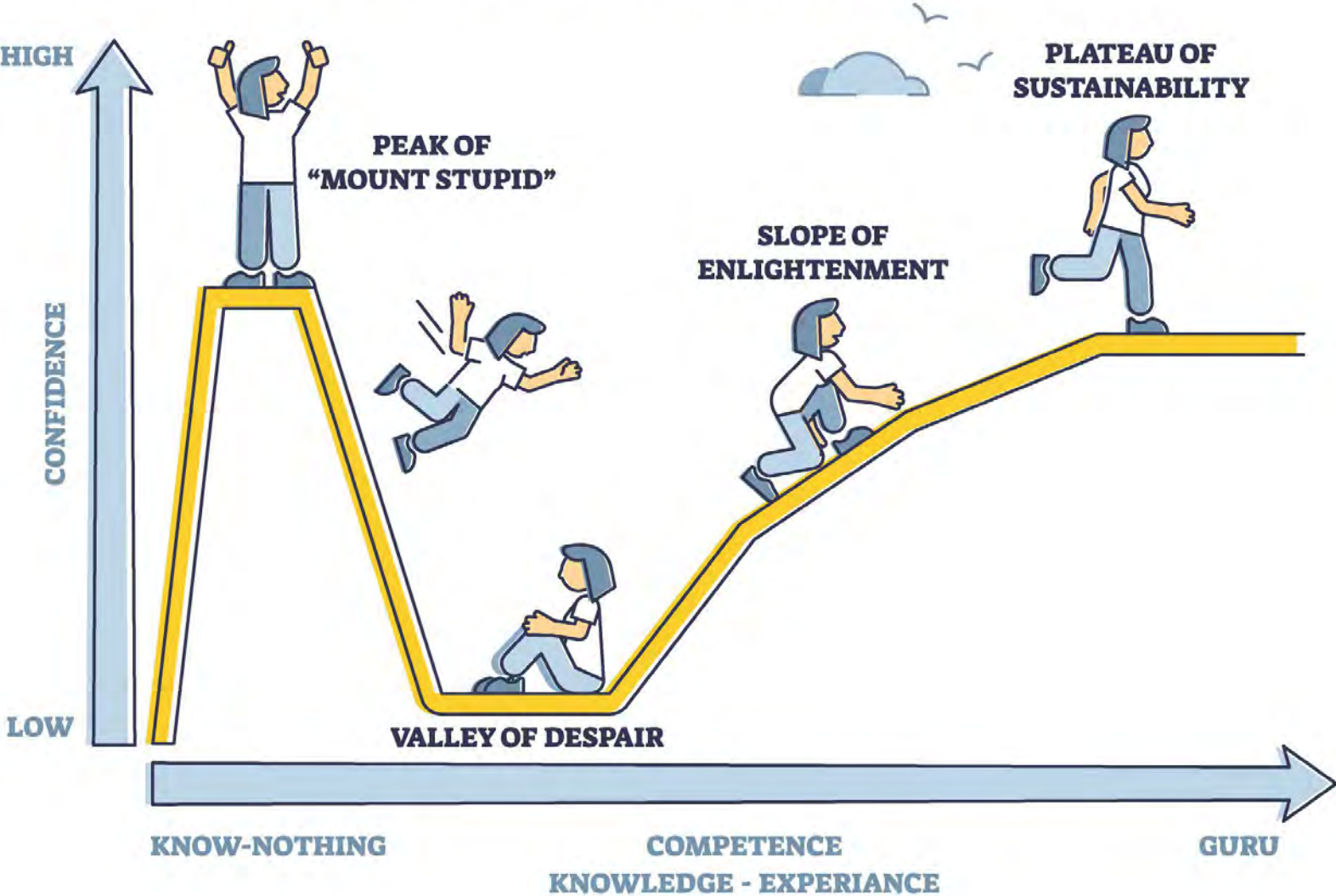
*“An individual recognized as having a special skill or specialized knowledge of a process in a particular field, or piece of equipment.”*

# Competence vs Confidence



# Competence vs Confidence

## DUNNING KRUGER EFFECT



# Competency Standards

Who has a competency standard?

Some form of process to cover

- Training
- Mentoring
- Experience



# Competency Frameworks



Compares the competency requirement of a job with the competencies of the job holder



Fills any gaps between the requirements and the holder by structured and assessed education, training, mentoring, or experience

# Skills and Knowledge Requirements

- They are minimum requirements
- They are not intended to be prescriptive
- More detail can be included in the learning program

Awareness  
Foundation  
Practitioner  
Expert

# Skills and Knowledge Requirements

## Awareness

Is aware of pipeline design (front end engineering and detailed design) principles, standards, and regulations and **understands** the bases of the key contents of design standards, including design for strength and fatigue.

## Practitioner

Can perform pipeline design (front end engineering and detailed design) and **use** differing standards, and can **apply** and **employ** the key contents of design standards including valves, crossings, bends, temperature effects, geotechnics, environmental impact, and fracture control.



# Skills and Knowledge Requirements

## Table Exercise

Choose a job function

Write the skills and knowledge requirements for one level:

- Awareness
- Foundation
- Practitioner
- Expert

# Management Systems

An organization should control, assure, and develop, competent performance.

- Individuals are clear about the performance that is expected of them
- They have received appropriate training, development, and assessment
- They maintain or develop their competence over time

The system must include verification, audit, and review.

# Training, Mentoring, and Experience



■ Training (10%)

■ Mentoring (20%)

■ Experience (70%)

Competence:



Skills



Knowledge



Experience

Does holding a certification like API 1169 make a person competent?

Yes

No

It  
Depends

# Acknowledgements

ROSEN - "Competency Standards Manual for Pipeline Integrity Management"

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APGA - "Pipeline Engineering Competency System"

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# Closing Remarks

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