FIND OUT WHERE AND HOW YOUR NEXT ACCIDENT MAY HAPPEN

WITH **LEARNING FROM NORMAL WORK**

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Psychology Applied

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PSYCHOLOGY APPLIED

STEP CHANGE IN SAFETY

International Association of Oil & Gas Producers

SPE International
Human Factors Technical Section

WHAT IF YOU COULD:

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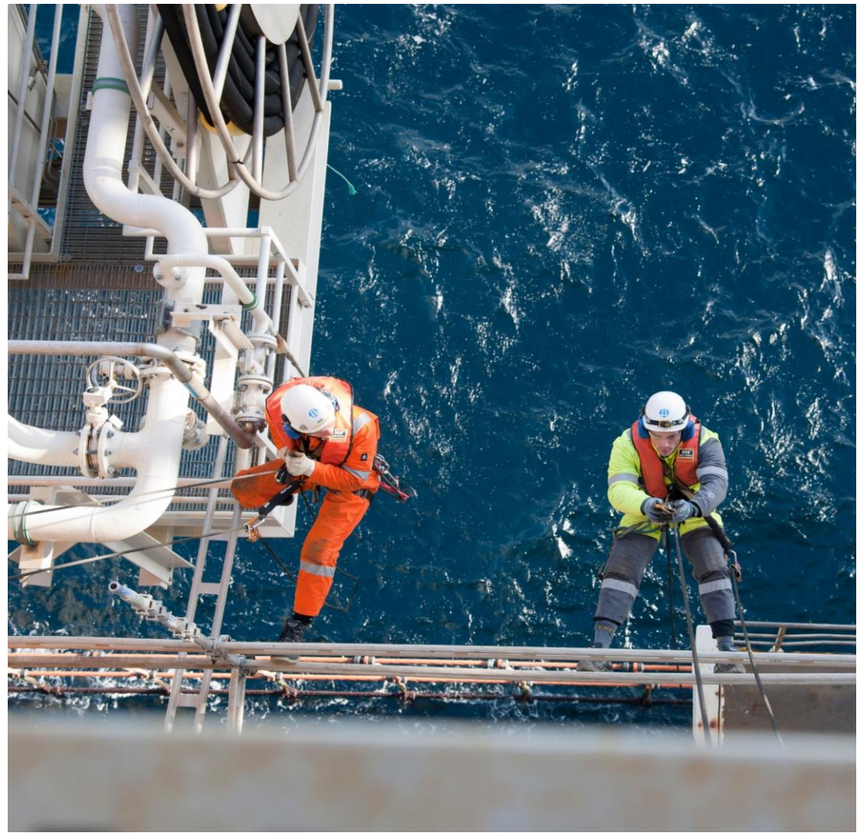
- Find out which activities are likely to result in an accident.
- Get your workers to tell you what is REALLY going on.
- Find and address the causes of accidents before they happen.
- Make pro-active learning part of your culture.



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MEET MARCIN

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Alcoa

Baker Hughes

SPE International
Society of Petroleum Engineers

International Association of Oil & Gas Producers

hpog

STEP CHANGE IN SAFETY

Awards for PRACTICAL implementation of HF / HP:

LEARNING FROM INCIDENTS:
IMPORTANT BUT LIMITING

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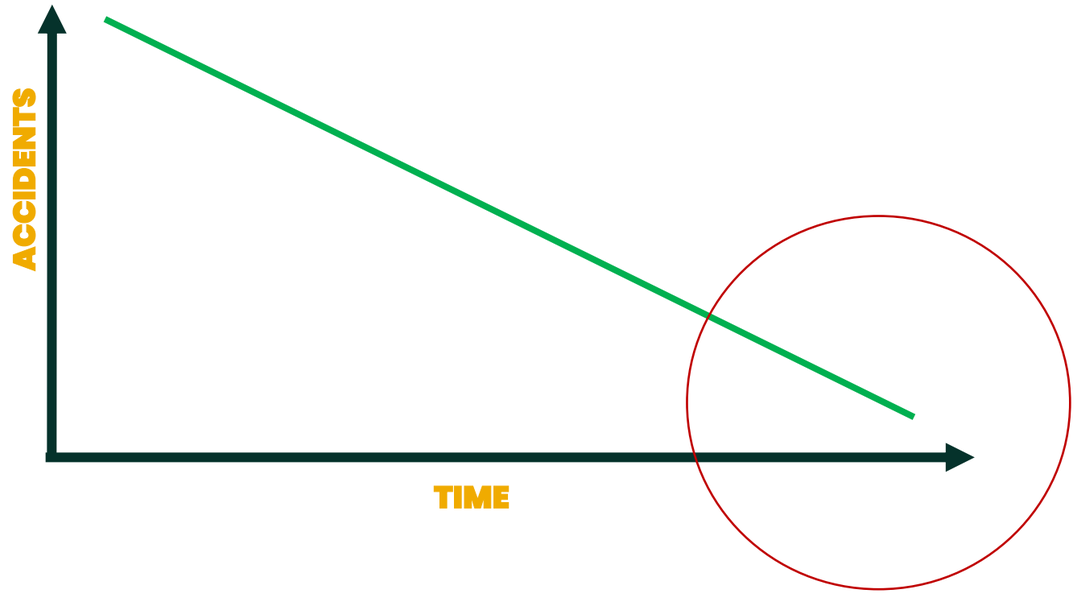

- Few learning opportunities
- Lagging indicators are not helpful
- Focusing on unsafe behaviors is no longer sufficient to further reduce risk
- Frustrating repeat accidents

LEARNING FROM NORMAL WORK

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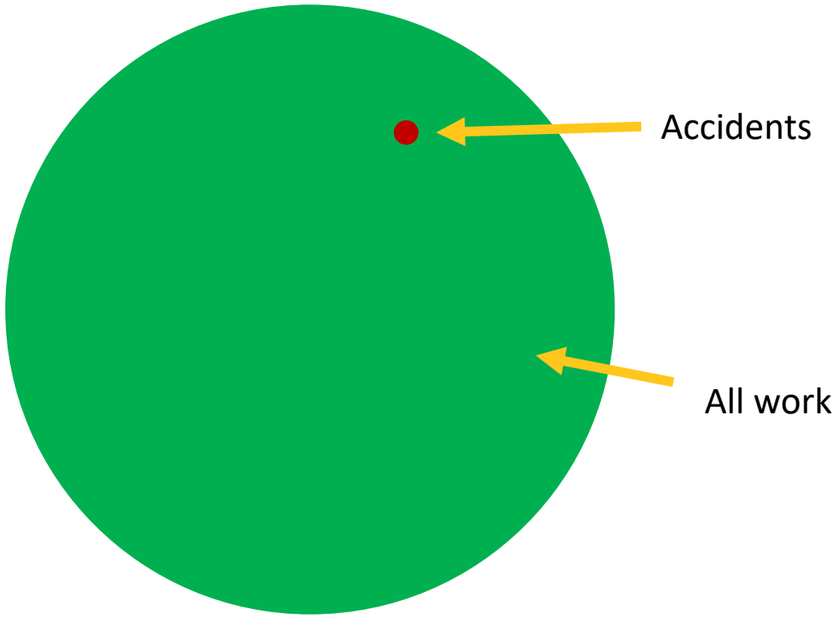

- Only a very small percentage of all activities result in an undesired event.
- Does it mean that all other work was executed flawlessly?
- If not, could we learn about the issues and challenges that could, but did not, result in an accident?

THINGS GO WRONG FOR THE VERY SAME REASONS THAT THINGS GO RIGHT

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SOMETHING WENT WRONG

Incident

Surprise
Production pressure
Production pressure
Adaptation
System Strengths
Tradeoffs
Latent Conditions
System Weaknesses
Resource Constraints
Normal Variability

Hazards & Risks
Weak Signals
Local Factors
Fear of Reporting
Personal Factors
Incomplete Procedures

Errors
Change in Plans
Near Misses
Design Shortcomings
Past Success

Poor Communication
Flawed Processes

Goal Conflict

Success looks a lot like failure

Success

&

Failure

NOTHING WENT WRONG

No Incident

EuroControl, "Systems Thinking for Safety: Ten Principles A White Paper. Moving towards Safety-II," 2014.

WHAT IS (LEARNING FROM) NORMAL WORK?

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‘Normal work’ is about how people adapt to changing conditions and challenges as part of their job.

For example, using a crane to lift a load. Every time an operator does it, there may be something different about the situation, for example:

- Less time available than planned
- Additional people in the area
- One person being off work
- Correct tools not available, e.g. lifting slings

Adapting to overcome the various challenges is part of what needs to be done. It’s ‘normal work’.

PHYSICAL SOURCES OF HARM SUCH AS:

- Ignition sources
- Confined space
- Electricity
- Lifting
- Chemical Exposure
- Hot Surfaces
- Noise
- Hazardous Atmosphere

LOCAL CONSTRAINTS, E.G.

- Incorrect procedure
- Insufficient time available
- Incorrect tools for the job
- Confusing design
- Insufficient spacing
- Unfamiliar situations

ADAPTATIONS AND WORK AROUNDS TO THE CONSTRANTS, E.G.

- Developed unique procedure because the official one was incorrect
- Fabricated own tools in the workshop as the provided tools were not adequate

CONTROLS

- Eliminate the hazard
- Substitute for less hazardous
- Engineering controls, e.g. guards, automated cut-offs
- Administrative, e.g. procedures, training, signs
- Personal Protective Equipment (PPE)

Context and dynamically changing operational situations that include people, teams and organizations cannot be fully controlled in the engineering sese) therefore corrective actions are optimizations, e.g.

Procedure is aligned with how the task is really done

Correct tools provided

More time provided

Training redesigned to meet the needs

Equipment re-designed to reduce errors

INDUSTRY EFFORTS

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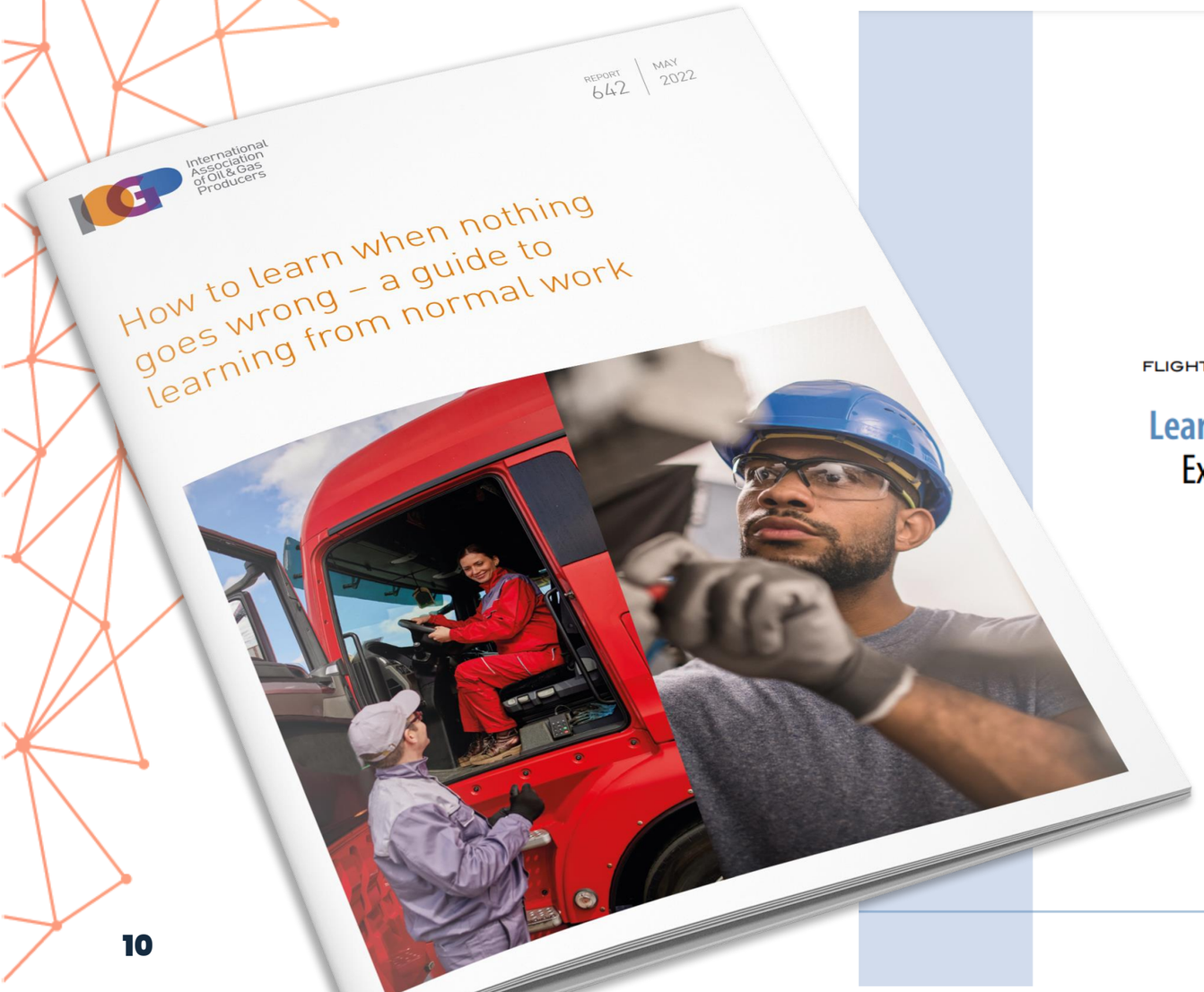

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LEADERSHIP ENGAGEMENT FOR LEARNING

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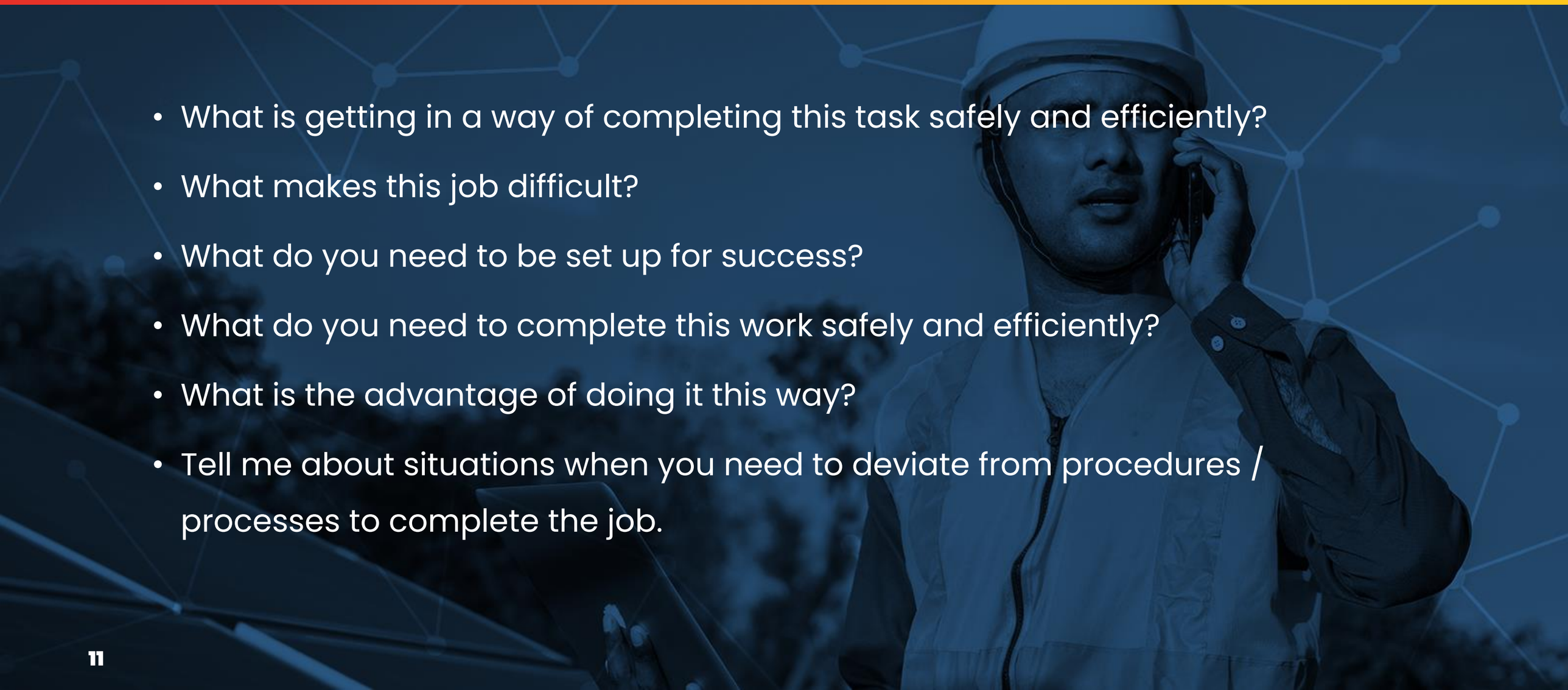
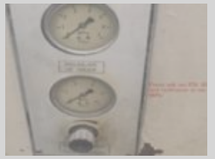


- What is getting in a way of completing this task safely and efficiently?
- What makes this job difficult?
- What do you need to be set up for success?
- What do you need to complete this work safely and efficiently?
- What is the advantage of doing it this way?
- Tell me about situations when you need to deviate from procedures / processes to complete the job.

WALK THROUGH TALK THROUGH – EXAMPLE

Preventive Maintenance Lathe Machine	Preventive maintenance to lathe machines has to be performed monthly using the protocol and checklist created for this process.		
Steps (According to the person doing the job)	**What might go wrong? (According to the What error traps increase the likelihood of error? What person doing the job) Does this step match reality? Are there steps, which are done that are not included in the procedure?**	**What error traps increase the likelihood of error? What makes a mistake more likely? What makes the step more difficult to perform? (According to the person doing the job)**	**Photo**
1. "Review Oil, Grease and Refrigerant Liquid Levels, in Hydraulic and Lubrication Unit of Spindle and Magazine, Benches and Table."	The operator may misread the levels, leading to the equipment overheating.	The display does not clearly show what the correct level of oil is. Procedure does not explain what the minimum oil level is.	
2. "Change the Air Filter of the Electrical Cabinet"	The Air Filter may not need to be changed. Potential waste of time as the life time for air filters is longer than one month. Increased cost due to higher number of filters used.	The procedure requires to change the filter. The real instruction should be "Change the filter if you find X, Y, Z characteristics."	
3. "Check machine air pressure is 85 PSI"	Too much pressure may lead to equipment damage.	The pressure units on the machine (MP) are different to pressure units used in the procedure (PSI). This may confuse the operators.	
4. "Level oil lubrication guides. Use DTE24 oil or equivalent."	Equipment damage due to incorrect lubrication	The instruction is not clear. Specifically, what to check and how much lubricant is correct for the equipment. The container for the lubricant has white marks. However, it's not clear if these indicate the maximum or minimum level of lubricant required.	
5. "Check load of Waste of time if the operator tries to find this Instruction includes steps for old equipment. This component is hydraulic accumulator"	Waste of time if the operator tries to find this accumulator. If something is not obvious next time while performing another task, operator may presume that procedure is incorrect, and skip the step.	linstruction includes steps for old equipment. This component is no longer part of the equipment, and need to be updated.	
Opportunities to improve?			
• Update the procedure based on the specification for the new equipment • Upgrade the oil and lubricant containers to indicate minimum / maximum levels • The maintenance personnel to conduct a WTTT with the equipment operators and the maintenance supervisor to ensure that he instructions are clear and up to date • Standardize measurements system and displays to they can indicate the correct level of liquid and pressure.			

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LEARNING TEAM - SIMPLE EXAMPLE

Work-as-Imagined	Works-as-Done	Organizational Factors	Corrective Action
Lifting a 7-ton spool with a standard 10-ton overhead crane	Wired crane control restricting operator visibility and requiring a spotter directing movement	Design of crane, crane controls and the lifting process	Installed a remote control, directional indicators and removed spotter from lift zone
Potential severity of the undesired outcome BEFORE learning team	Likelihood of the undesired outcome BEFORE learning team	Potential severity of the undesired outcome AFTER learning team	Likelihood of the undesired outcome AFTER learning team
Life changing injury	Medium	Potential for injury eliminated	

37% reduction in injuries

THE PROBLEM

Risk related to complex lifting

INTERDEPENDENT TEAMS

Operators, Supervisors, Engineers, Operations, Logistics

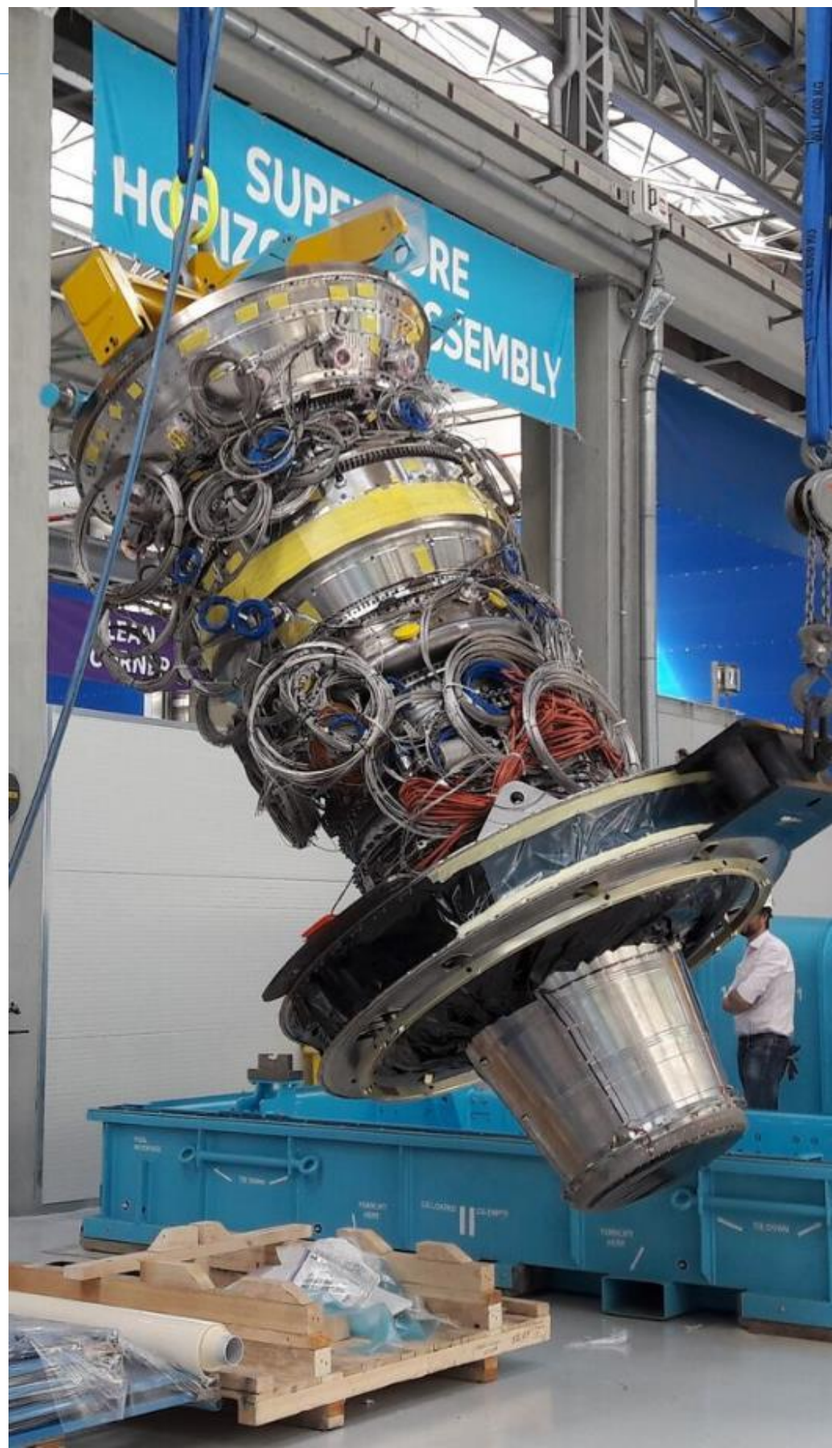
OVER 30 ERROR TRAPS IN 5 CATEGORIES

- **Process and Communication,** e.g. Moving requests plans not available
- **Information availability and accessibility**, e.g. Missing information about load
- **Tools & housekeeping,** e.g. The bay access are often blocked by equipment
- **Information/ training,** e.g. Limited training after introducing a new tool
- **Technical and procedures,** e.g. Discrepancy between new drawing/ project and old work instruction

SOLUTION

- Over 30 error traps and process gaps addressed

REDUCED RISK



	Incident Investigations	Learning From Normal Work
Training Time	8-40h	2-8h
Investigation time	20-100s hours	4-20 hours
How the conversations feel	Tense. People may be afraid of being honest	Relaxed. People are keen to discuss how to improve things
Typical findings	Failure of something, e.g., failed to follow procedure, etc.	Things that make the execution of work difficult, e.g., the procedure is out of date and not available
Planning	Unplanned	Planned
Costs	Very expensive with many indirect and hidden costs. All combined costs of a life-changing injury in the O&G may reach 100s of thousands into millions of dollars.	Ultra cheap compared to the costs of accidents and investigation. No hidden, indirect costs. The cost of reviewing an activity that includes people's time may reach hundreds/thousands of dollars. This is c. 0.002% of the cost of an accident!

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WHERE TO FOCUS?

1. Existing trends
2. Risk matrix
3. Project plan data
4. Critical Task Screening
5. Talk to people

WHAT DO YOU NEED?

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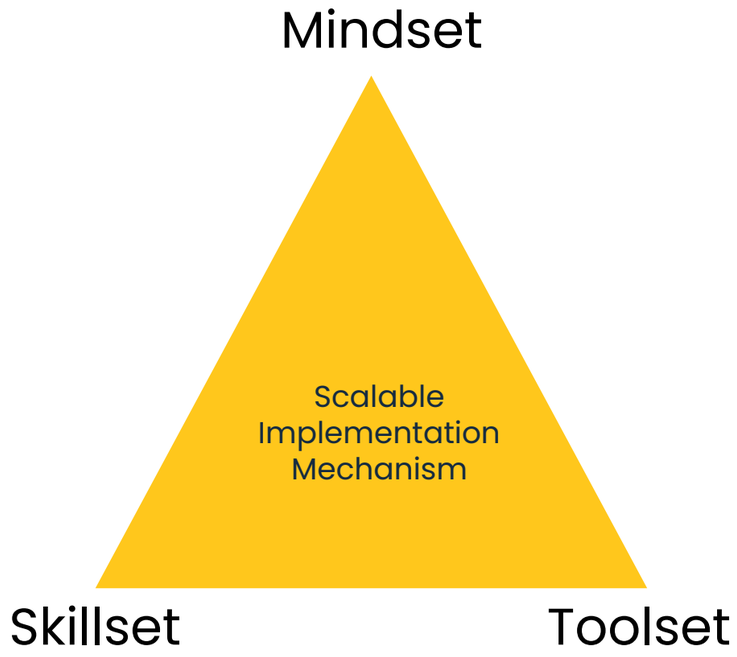

HOW TO IMPLEMENT IT?

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Leadership Buy-In

- Presentation to the LT
- Training for the LT
- New tone and expectations

Pilot at a site

- Site leadership training
- Facilitator training and coaching
- Show value and business case

Integrate and scale up

- Leadership visits
- Risk assessment
- BBS
- Procedure Reviews

WHAT'S INSIDE THE TRAINING?

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1. Chapter 1 - Performance Variability
2. Chapter 2 - Why People Don't Follow the Rules and Use Workarounds
3. Chapter 3 - The Gap Between Plans and Reality and How Teams Depend on Each Other
4. Chapter 4 - Your Beliefs Determine What You See
5. Chapter 5 - Does Holding People Accountable Lead to More Incidents?
6. Chapter 6 - Do Your Questions Shut People Down?
7. Chapter 7 - Practical Tools
8. Chapter 8 - How to Apply and Scale it Up?

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