



PAPER NO. 207918
**Using Behavior Science
to Maximize Human
Performance**

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LoPeS
Lopez Performance Solutions

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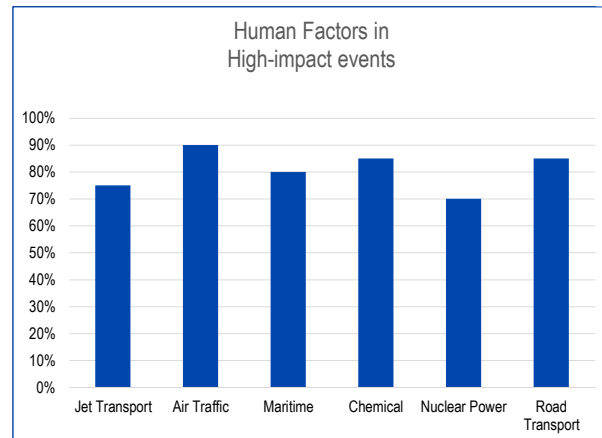


AGENDA

- Human Performance, why?
- Engineering Human Performance
- Case Study

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Human Performance: why?



Taken from: 'Impact of Human Factors in High Risk Industries', European Commission's Joint Research Center. Manna, 2007

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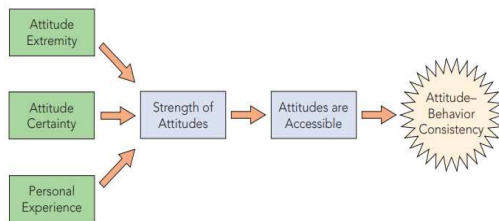
Human Performance: Compliance or Conformance?

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Human Performance: Compliance or Conformance?

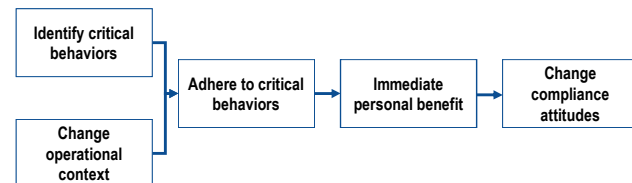


Traditional approach:
Change attitudes to get **compliant** behavior



Taken from: 'Social Psychology',
Branscombe and Baron, 2017

EHP approach:
Influence behavior to achieve **conformance**



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Human Performance: Can it be engineered?



Behavior is lawful



(Herrnstein, 1961, Skinner, 1976)

Behavior is engineerable

Positive, soon and certain feedback is
a powerful CONSEQUENCE



The context (work environment) is a
powerful ANTECEDENT

(Gilbert, 2007, Zimbardo, 2007)

Fixed vs. Flexible Behaviors



(Endsley, 1995, Houmanfar, 2012,
Kahneman, 2011)

Adapted from: SPE 199396, 'Applying Behavior Engineering to Procedural Adherence', Lopez et. al., 2020

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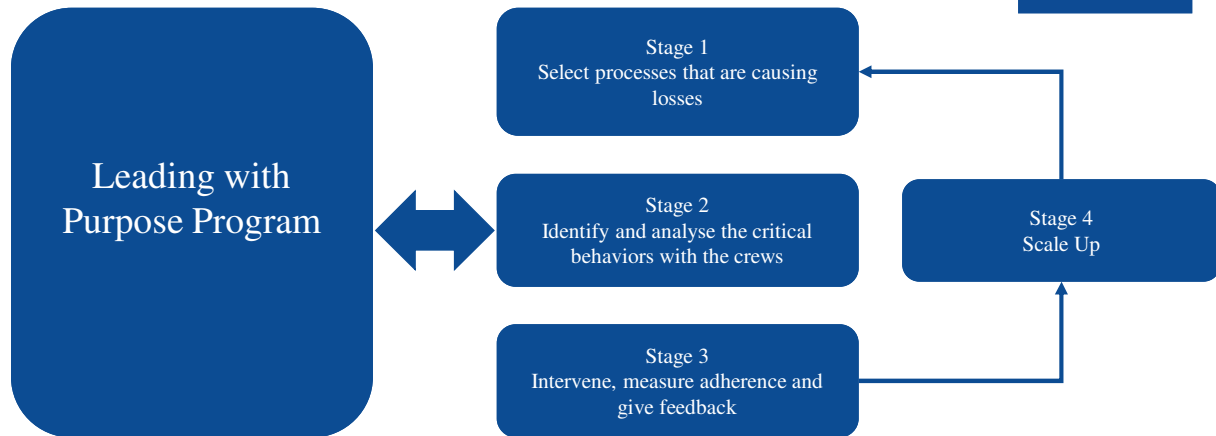
Engineering Human Performance: Best of Lean and BBS



Topic	Lean / Six Sigma	Behavior Based Safety	Column 3
Scientific foundation			
Statistical rigor			
Process Safety			
Human Factors			
Operational Discipline			
Sustainability and Scalability			
Leadership			
ROI			

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EHP: The Process



Adapted from: SPE 199396, 'Applying Behavior Engineering to Procedural Adherence', Lopez et. al., 2020

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EHP applied to workover operations



- 30+ drilling and workover rigs in Colombia
- 30+ years in the industry
- 2021 pilot test: 4 workover rigs – 2022: scale up
- Good HSE and Quality performance
- Implemented EHP to:
 - Eliminate repetitive accidents
 - Prevent high impact events



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Leading with Purpose

12 mid and high-level leaders

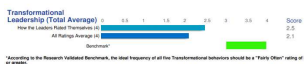


Before

Multifactor Leadership Questionnaire™ Multi-rater Group Report

Bernard M. Bass and Bruce J. Avolio

Transformational Leadership



According to the Research Validated Benchmark, the ideal frequency of all five Transformational behaviors should be a "Fully Often" rating of 5 at all points.

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Sensibilization

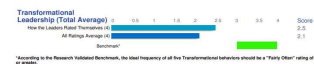
- Kick-off meeting: Reflection in plenary
- Session 1: Why?
- Session 2: Leading with Purpose behaviours
- Session 3: Identify the behaviours I will adapt and adopt to improve my 'Leading with Purpose' skills
- Session 4: Engineer my behaviours
- Session 5: Monitor my adherence until I get the habit
- Monthly follow-up
- Close-out meeting: Reflection in plenary

90 days after

Multifactor Leadership Questionnaire™ Multi-rater Group Report

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Transformational Leadership



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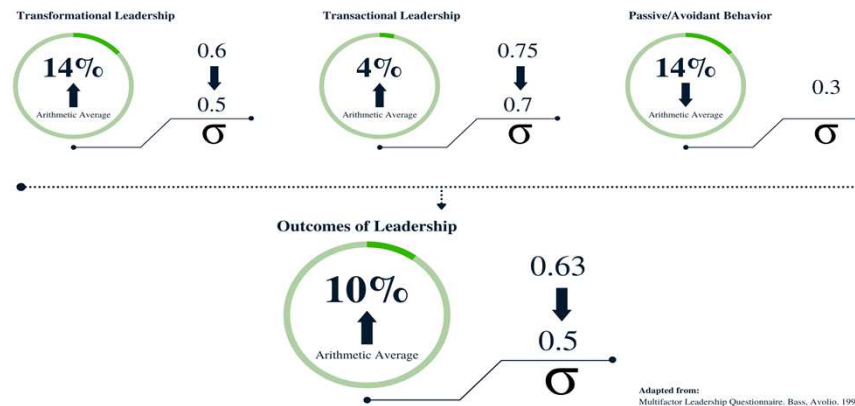
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'Multi-Factor Leadership Questionnaire'. Bass, Avolio, 1995

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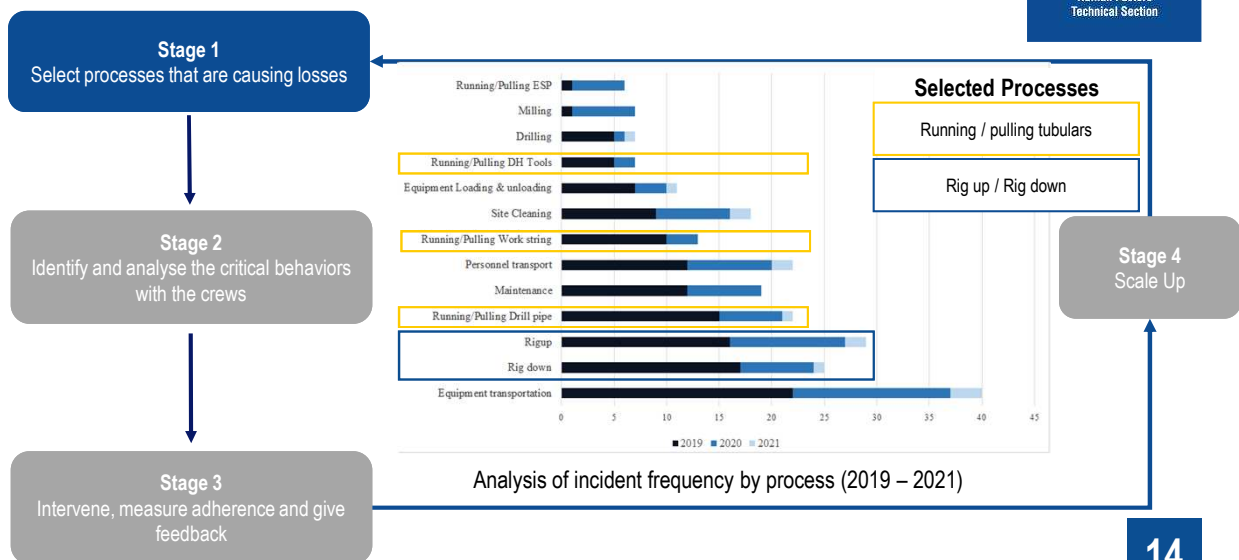
Leading with Purpose: Results



'Multi-Factor Leadership Questionnaire'. Bass, Avolio, 1995

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EHP Process

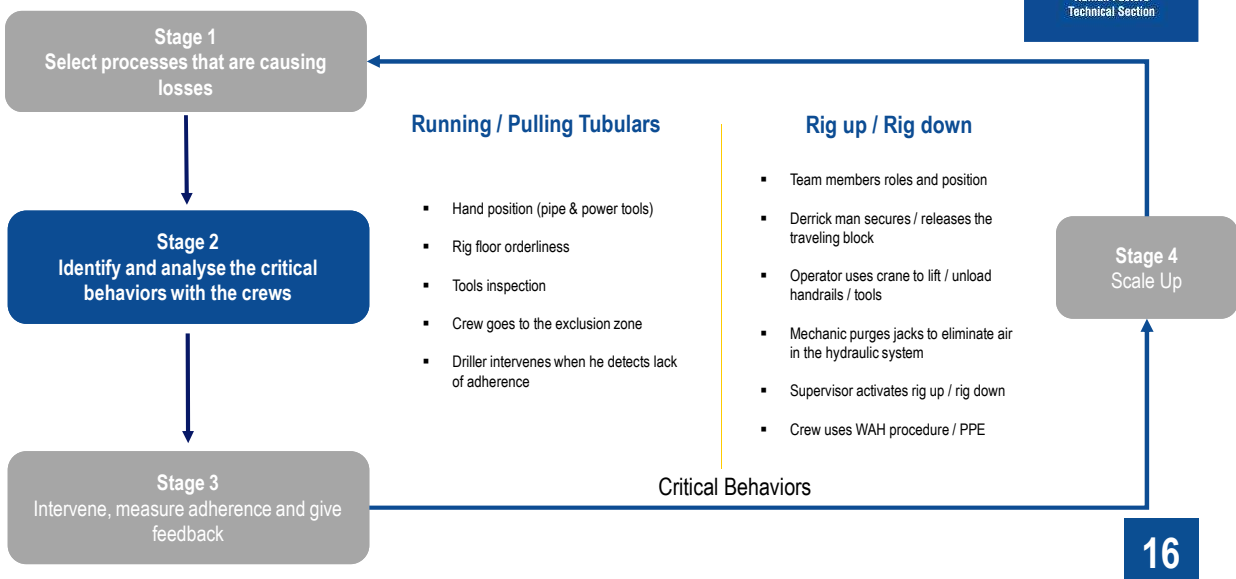


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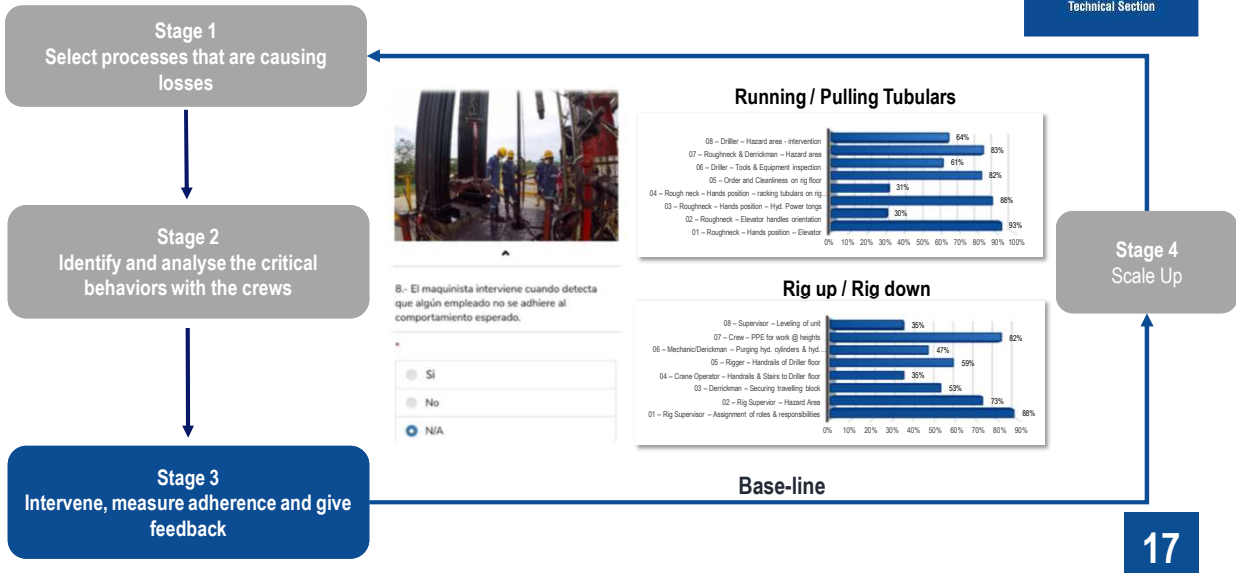
EHP Process



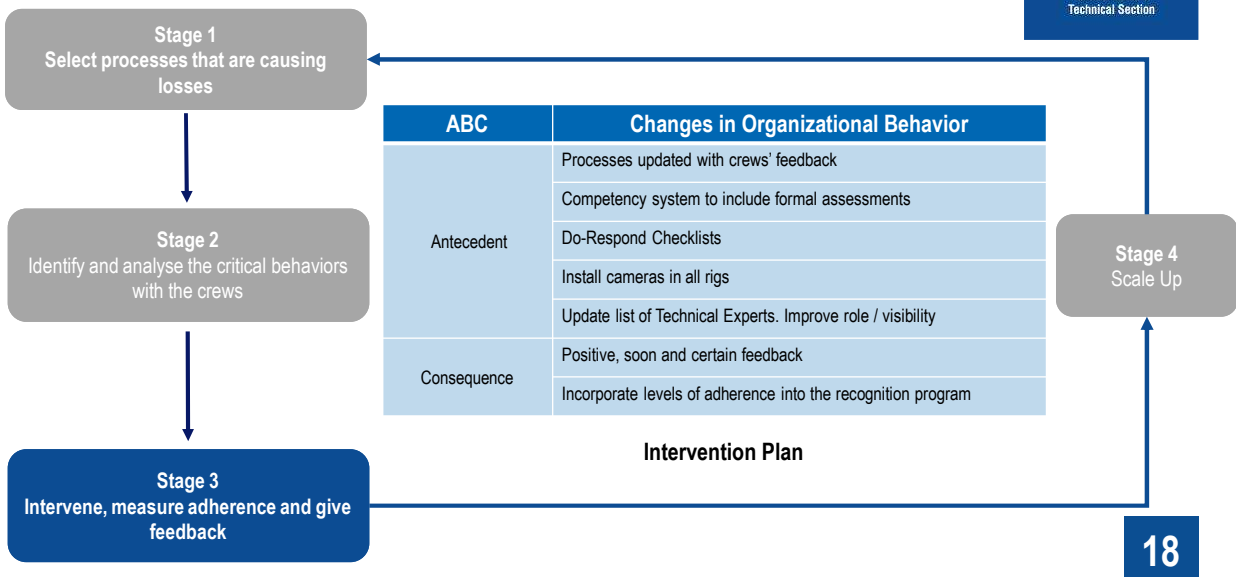
EHP Process



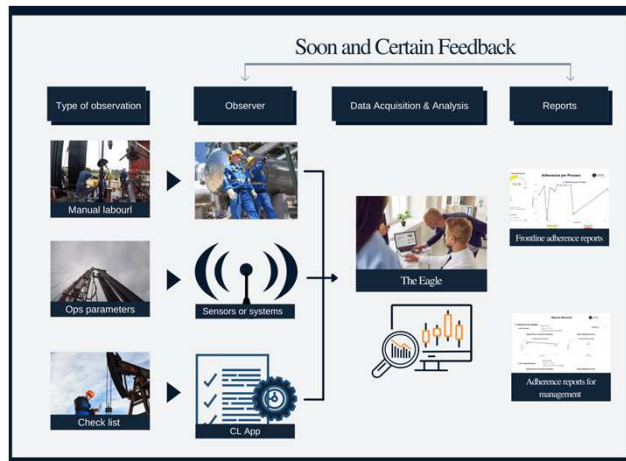
EHP Process



EHP Process



Behavior Empowerment Center



Statistical Significance

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Weekly Behavioral Adherence Report

Week of November 22 - 28

Positive, soon and certain feedback

Weekly feedback to the crews

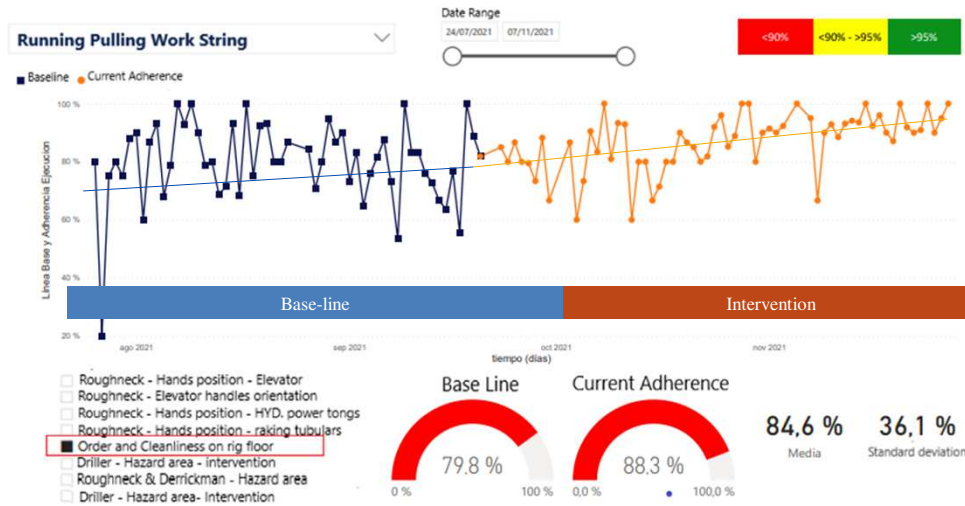
- 16 out of 16 behaviors with cumulative adherence > 90%
- 15 out of 16 behaviors with cumulative adherence above the base line



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Positive, soon and certain feedback

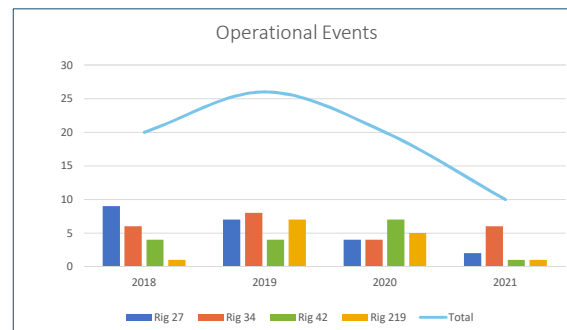
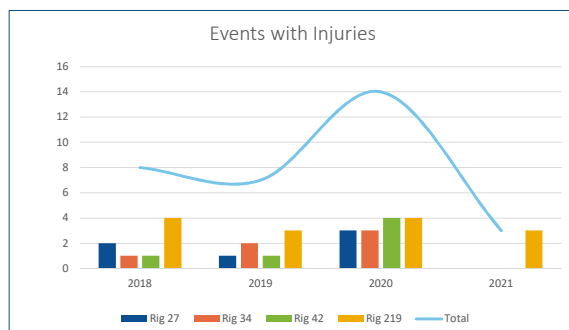
Weekly feedback to the leaders



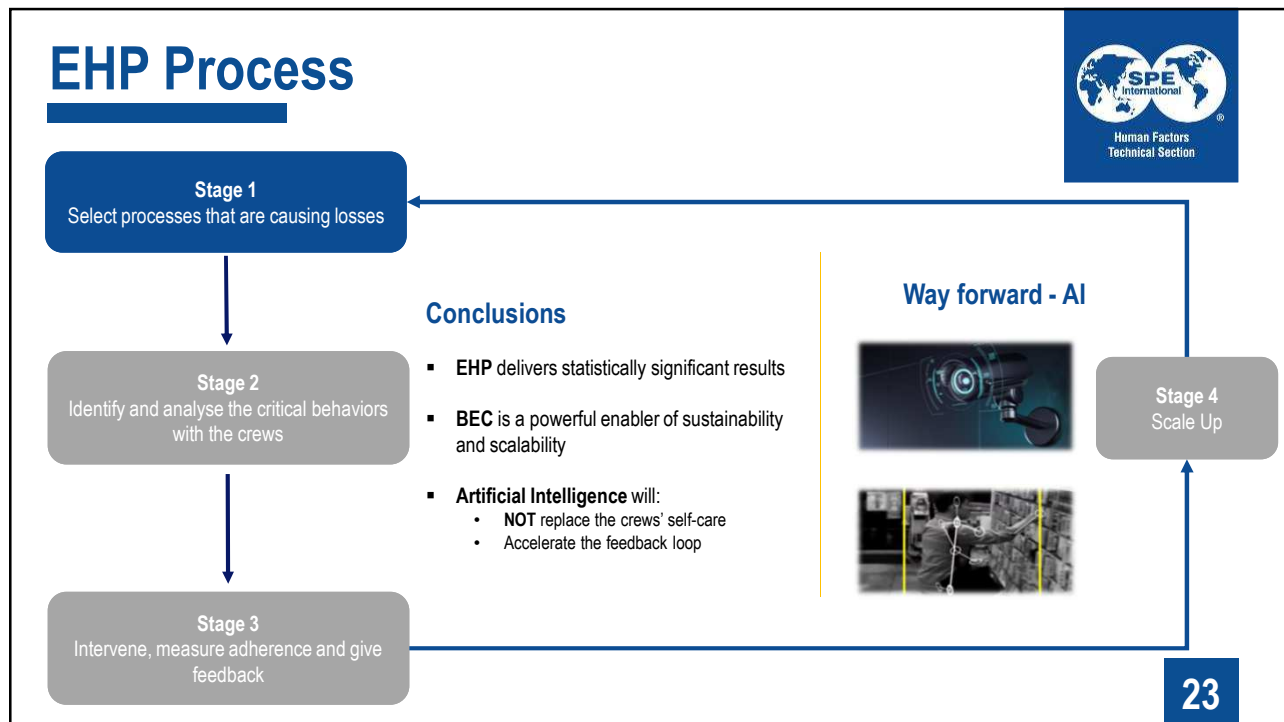
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Impact

Pilot Rigs' Performance



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ACKNOWLEDGEMENTS

Logos for Independence and Colmena Seguros are displayed.

QUESTIONS

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Logos: SPE International Human Factors Technical Section (top left) and LoPeS Lopez Performance Solutions (bottom left).

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Human Factors
Technical Section

THANK YOU