



# A Model for Winning Hearts and Minds to Enhance Process Safety

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# Er. Chan, Keng Yong

## Manager, Asia-Pacific Business Unit

Er. Chan Keng Yong possesses about 25 years of local and international experiences comprising of process safety, process, commercial, business development and project management experience in the oil and gas industries, including gas and chemicals. He is a commercially astute and technically competent manager who have successfully grown business and developed technical teams.

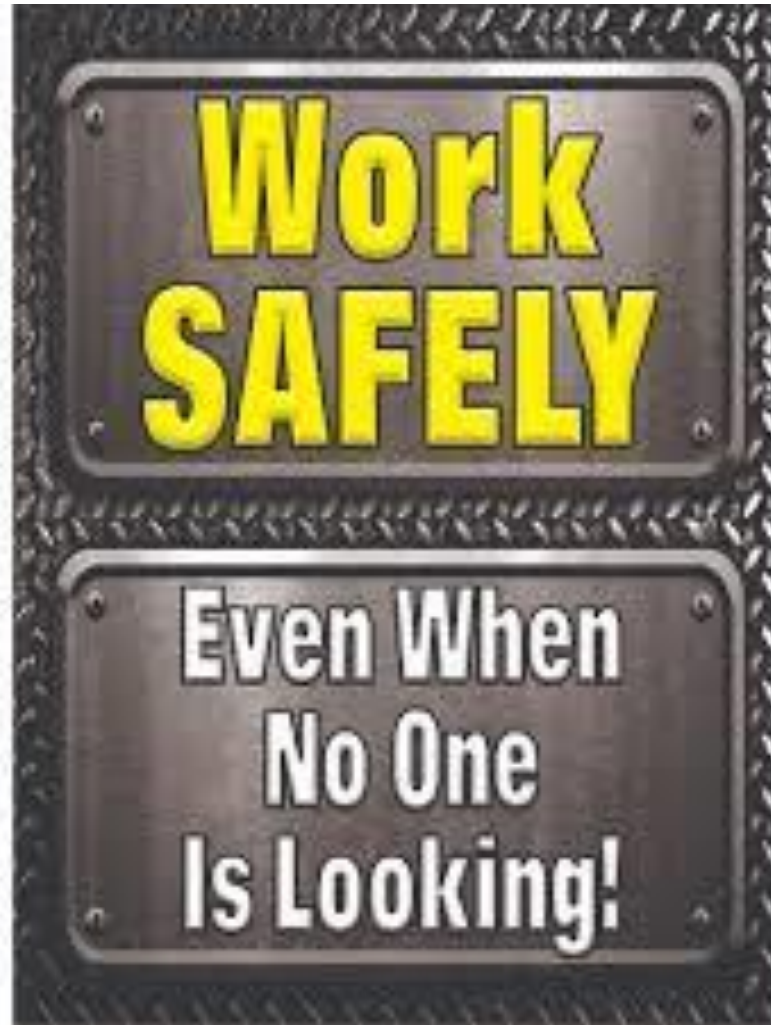
His experiences include process safety management (PSM) consulting, Safety Case, qualitative and quantitative process safety studies, EH&S consulting, commercial/business management, and business development in safety consulting. He is a registered Professional Engineer (Chemical) by the PE Board Singapore since May 2017.



# Agenda

- Background & Introduction
- Common Safety Culture Models
- CCPS Process Safety Culture Concepts
- Sample of PSM Culture Survey/Assessment
- Strengthening & Sustaining PSM Culture





**Not just at/during work  
inside facility.....**

**But when you are at  
home / outside work  
too**

# Background - PSM Management Systems in Accidents Prevention

Traditional approach in managing and preventing accidents in the oil & gas and chemical process industries: Act/Regulations and Management System programs

- Regulatory
  - US: OSHA PSM CFR, EPA RMP
  - UK: COMAH Regulations, Safety Case
- Organizational Guidelines / Recommended Practices
  - API RP 75
  - AIChE/CCPS Risk Based Process Safety
  - EI, IOGP, ILO

# Background - PSM Management Systems in Accidents Prevention

- Operating & Consulting companies
  - ExxonMobil OIMS / BP OMS
  - DuPont ORM / DNV ISRS

Management Systems traditionally focus on technical aspects and work processes; however, these have evolved to incorporate **human factors and culture aspects** based on learnings from past catastrophic accidents in the O&G and chemicals industries

# Incidents Learnings with reference to Process Safety Culture

Longford Australia: *“Investigators found that audits conducted of the facility shortly before the incident revealed no deficiencies in the management system. These audits gave management **false confidence** in their process safety performance and culture”*

Texas City refinery explosion: Baker Panel investigation report: *“We are under no illusion that **deficiencies in process safety culture, management, or corporate oversight** are limited to the company”.*

# Process Safety Culture

1. What is “Process Safety Culture” in the context of oil and gas, and chemical processing industries ?
2. Can we measure and assess “Process Safety Culture” of a company ?
3. Culture evolvment and sustainment



# Definition of Process Safety Culture

*The **pattern** of shared written and unwritten attitudes and behavior norms that positively influence how a facility or company collectively supports the successful execution and improvement of its Process Safety Management Systems (PSMs), resulting in preventing process safety incidents*

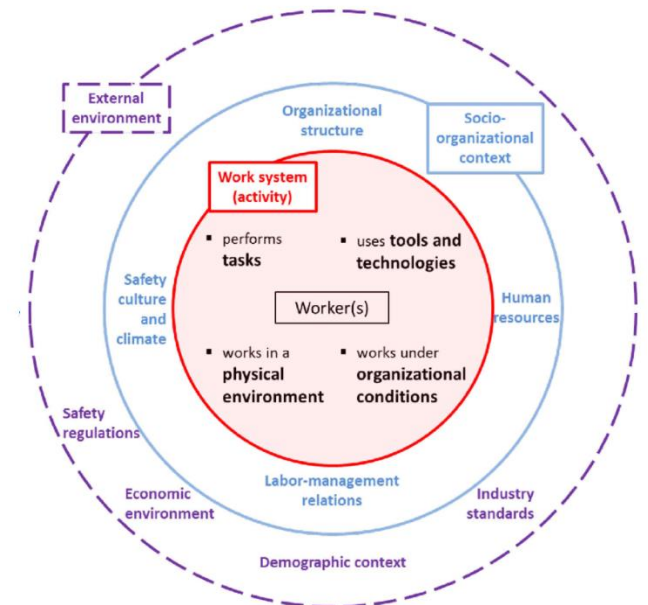
Ref: CCPS “Essential Practices for Creating, Strengthening and Sustaining Process Safety Culture

# Safety Culture Models / Concepts

- Henrich's Law or Safety Triangle (1930s)



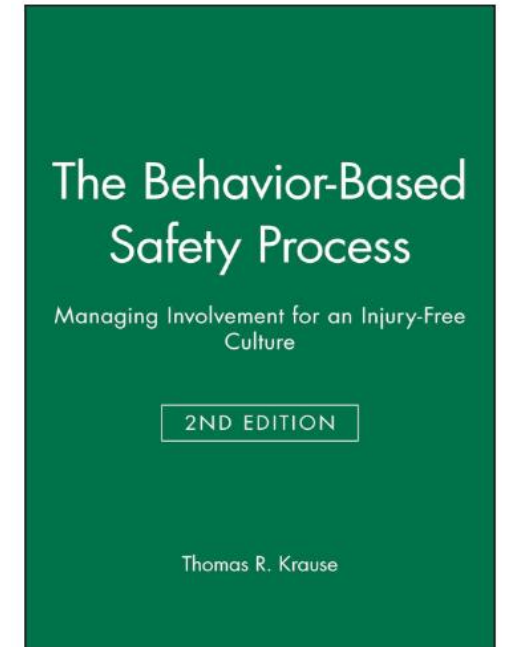
- Sociotechnical Systems (STS) or model (1950)



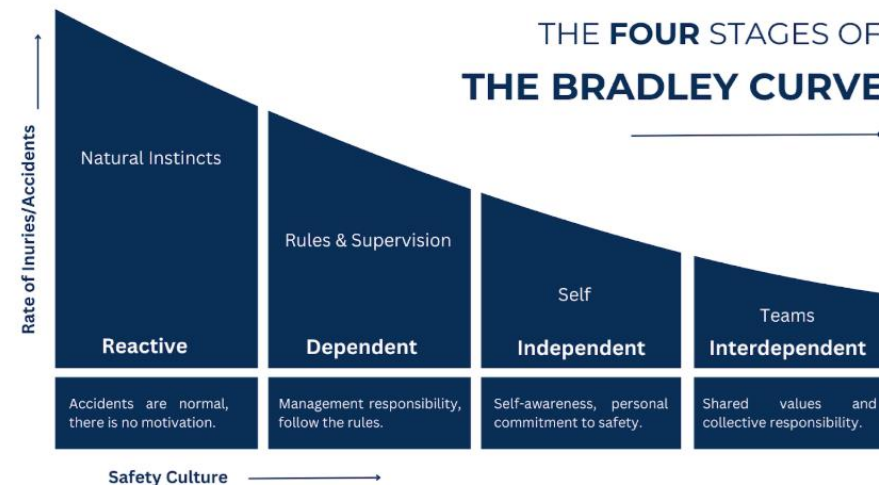
The model of sociotechnical system for workplace safety (Carayon et al. 2015).

# Safety Culture Models / Concepts

- Behavior Based Safety (BBS) (from 1980s)



- Bradley's Curve (1995)



# Safety Culture Models / Concepts

- Those safety culture models have evolved and refined/innovated over time. They have generally proven or were observed to yield improvements in **(occupational) safety**
- PSM culture models
  - Model is “evolving”, still not “fully matured” yet
  - Correlation between PSM leading or lagging indicators with PSM culture

# CCPS Process Safety Culture Core Principles

## 2004

1. Maintain Sense of Vulnerability
2. Combat Normalization of Deviation
3. Establish an Imperative for Safety
4. Perform Valid/Timely Hazard/Risk Assessment
5. Ensure Open/Frank Communication
6. Learn & Advocate the Culture

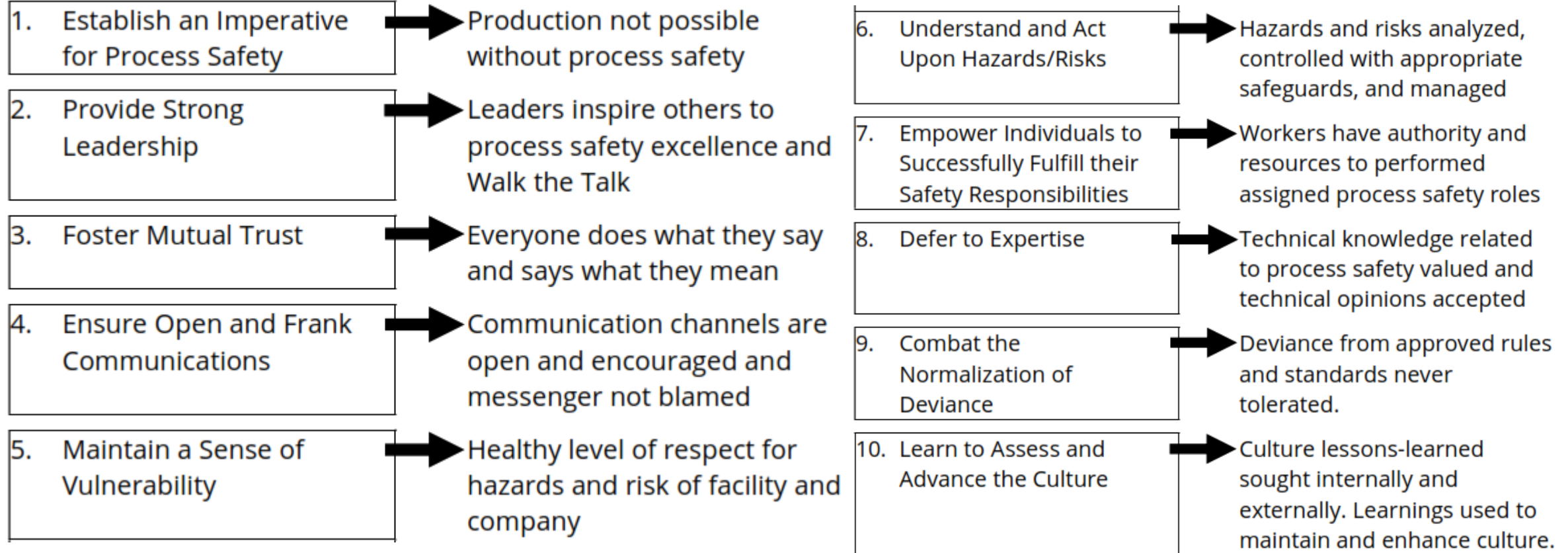


## 2018

1. Establish an Imperative for Safety
2. Provide Strong Leadership
3. Maintain Sense of Vulnerability
4. Understand and Act upon Hazards/Risks
5. Empower Individuals to Successfully Fulfill their Safety Responsibilities
6. Defer to Expertise
7. Ensure Open/Frank Communication
8. Foster Mutual Trust
9. Combat Normalization of Deviation
10. Learn & Advocate the Culture



# CCPS Process Safety Culture Core Principles



# Strong v Weak Process Safety Culture

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## A strong or positive culture:

- Always doing the right thing even when nobody was watching or listening.
- No tolerance for deviations from approved policies, procedures, or practices.
- Maintaining a healthy respect for the inherent risks associated with the processes, even when the likelihood of serious consequences is very low.
- Actions are always performed safely, or not performed at all.

## A weak or negative culture:

- Would tolerate deviating from approved policies, procedures, or practices.
- Would allow such deviations to become regular occurrences
- Would exhibit complacency regarding the risks associated with their processes.
- Would allow short-cuts to occur to get something done more quickly or more cheaply.

# Winning Hearts & Mind

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## Strong Leadership in Process Safety

- Senior management executives and line organization play a vital role in shaping the PSM culture
- **Visible felt leadership**; earn respect and inspire people
  - Setting mission, goals and priorities / Providing resources
  - Personally involve in process safety activities – not just visible on site but ensure their presence is felt through **meaningful actions and engagements** (actions, behaviors and beliefs can influence the followers)

# Process Safety Culture Assessment

AcuTech has deep experiences and expertise through many PSM Culture Assessment projects for refineries and specialty chemicals in US, Turkey and Finland.

Element Score	Description of Element Implementation and Functionality	Maturity Level
Above 90%	The element demonstrates best practice performance	Leading
80% to 90%	The element is implemented and functional	Integrated
60% to 80%	The element is implemented and partly functional	Functional
Below 60%	The element is not implemented and not functional	Informal

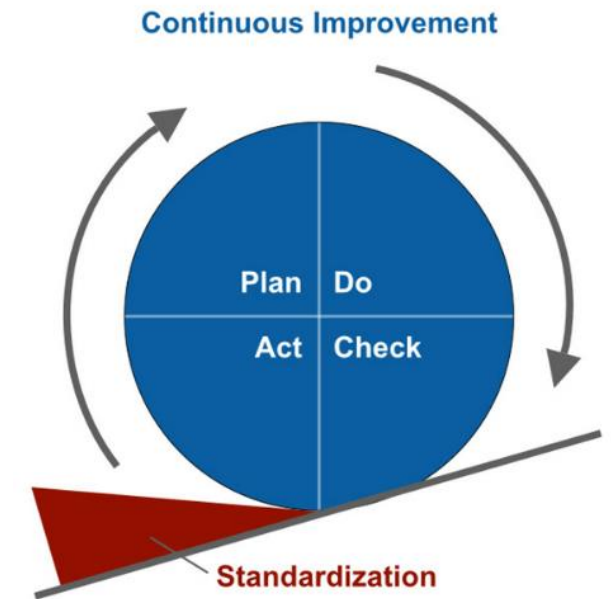
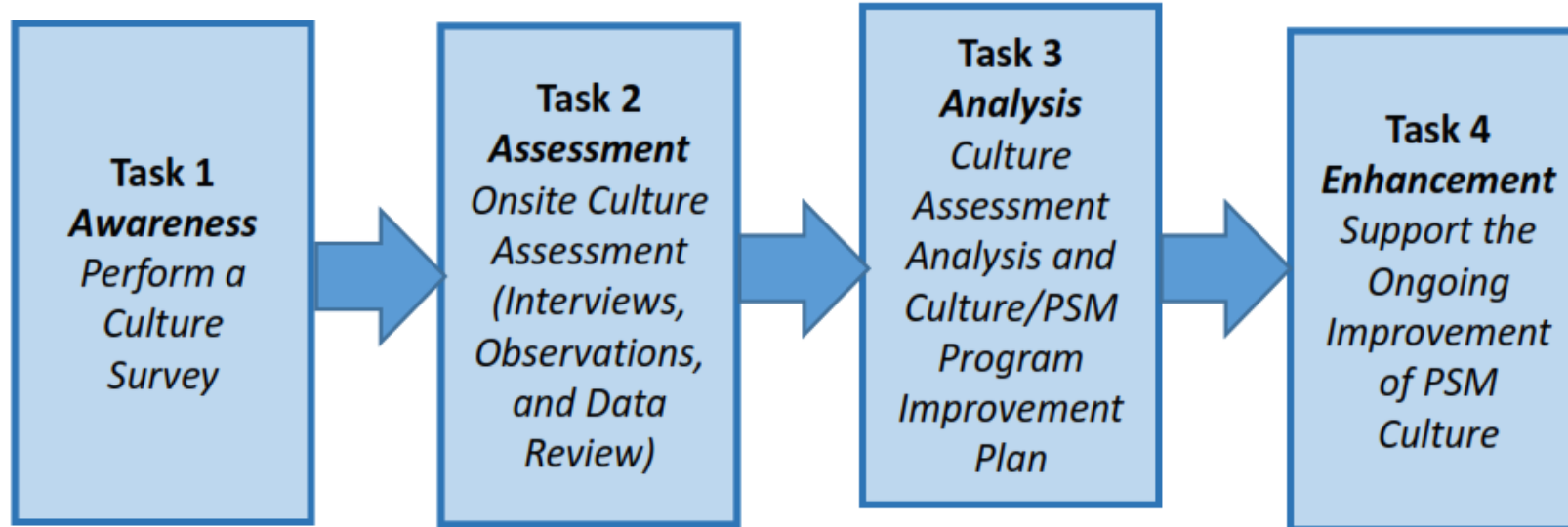
## Benchmarking and Goal Setting for Successful Performance

- PSM culture should be analyzed (baseline) and then monitored for status/improvement.
- AcuTech uses a maturity scale as a way to define relative performance of the entire system and to set goals for improvement, including for PSM Culture.
- Periodic audits and employee surveys are useful tools to monitor progress.





# Typical Approach to PSM Culture Assessment



# Team Level Subculture Behavioral Questions

**34.** My team and I are encouraged to ask challenging questions about process safety concerns without fear of reprisal? *(That is, we trust the motivations and behaviors of each other; and have confidence that a just system exists where honest errors can be reported without fear of reprisal.)*

Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)	N/A
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

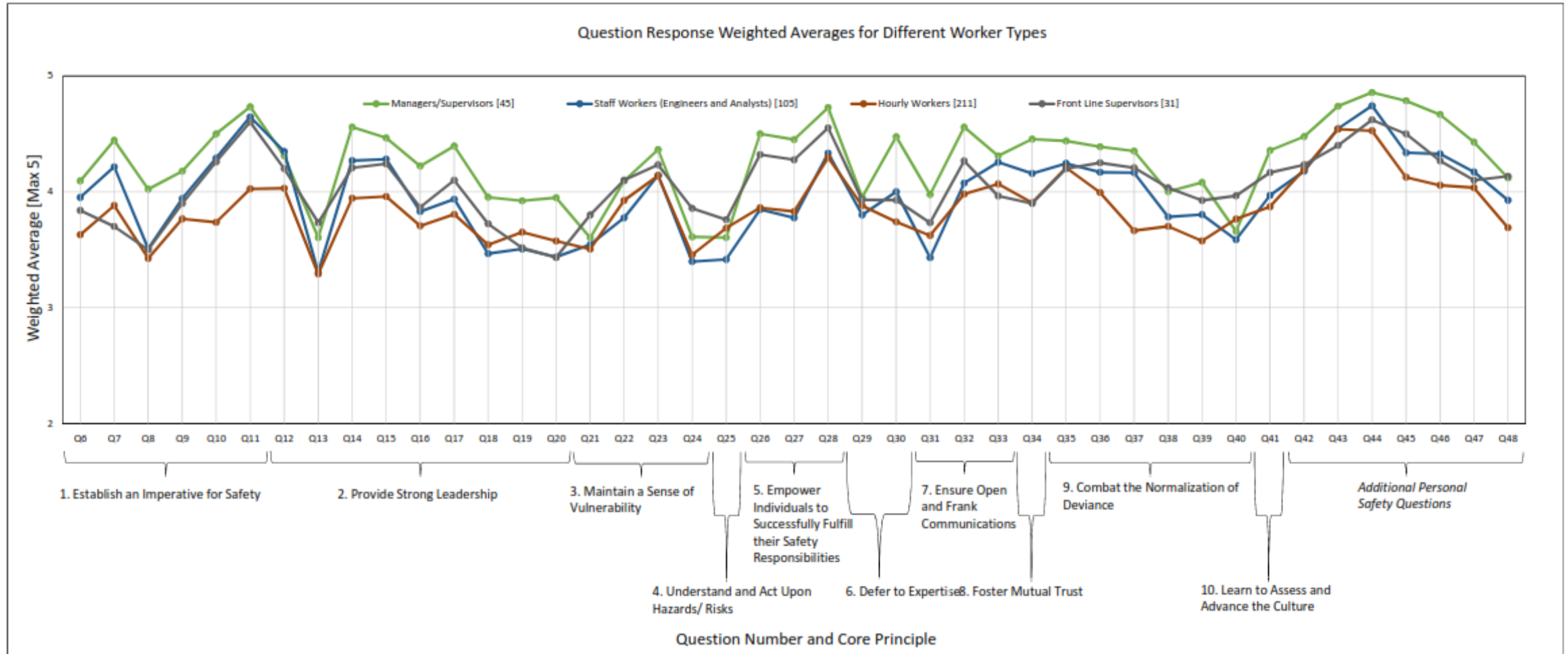
**35.** My team and I follow our procedures and treat them as mandatory requirements? *(For example, procedures needed to do my job well, like SOPs, Permit to Work, LOTO, and other Safe Work Practices are understood and consistently followed)*

Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)	N/A
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**36.** We do not allow exceedance of established safe operating limits?

Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)	N/A
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

# Sample of PSM Culture Survey Results



# Challenges to Strengthening and Sustaining PSM Culture

- Aging workforce affecting knowledge transfer. Staff (or role) retention (Gen Zs)
- Speed (Faster) & Cost which may compromise Quality
- Technology (AI) & Tools – affects communication and how “knowledge” is gained

# Conclusions

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- Process safety efforts will not be successful if the culture of the organization is not conducive to implementation.
- Process safety management also has its own culture.
- Process safety culture is developed and maintained at all levels of the organization.
- Leadership needs to be continually committed in all respects.
- There are means to measure the “temperature” and “maturity” of the process safety culture.
- Establishing and nurturing a sound process safety culture is a journey with no definitive end, i.e., it is not a “project” or a “program.”





CONTACT US

# Questions?

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