

The background of the slide is a photograph of an industrial refinery or chemical plant. It features numerous tall distillation columns, complex piping networks, and large storage tanks. The scene is bathed in a warm, orange-gold light, suggesting either sunrise or sunset. The overall atmosphere is one of industrial scale and complexity.

# **Sustainable Process Safety Management Requires Cultural Transformation**

**Richard R Emerson  
Bangkok Synthetics Co., Ltd.**

# Presentation Outline

- Background – Cultural Transformation begins
- When Actual ≠ Theory
- Change Behaviors to Transform Culture
  - Whose Behavior?
  - How?

Bangkok Synthetics



# In our last Episode...

## Where There is a Will There is a Way A Story of Organizational Transformation

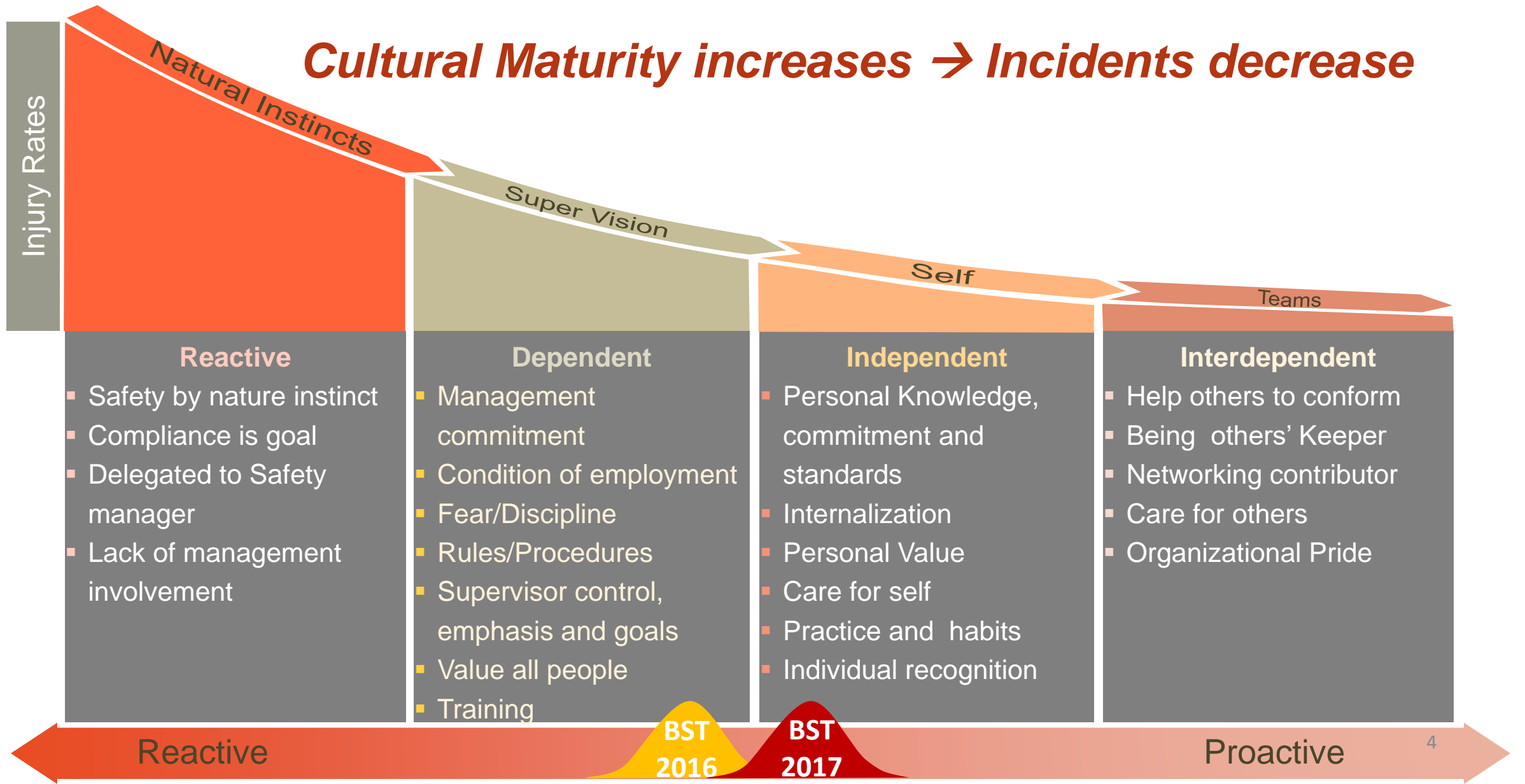
### Key Takeaways

- ✓ Inspiring aspiration – “No Harm to Anyone Anytime”
- ✓ Common understanding of clear requirements;
- ✓ Visible Leadership commitment and actions (time, money, consistency)
- ✓ Learning to communicate differently – Ask first...
- ✓ Making it OK to question, challenge, offer different perspectives
- ✓ Skill building – soft and technical skills
- ✓ Ownership at all levels
- ✓ Ownership of Contractor performance!
- ✓ Recognition that Cultural Transformation is a never ending continuous journey



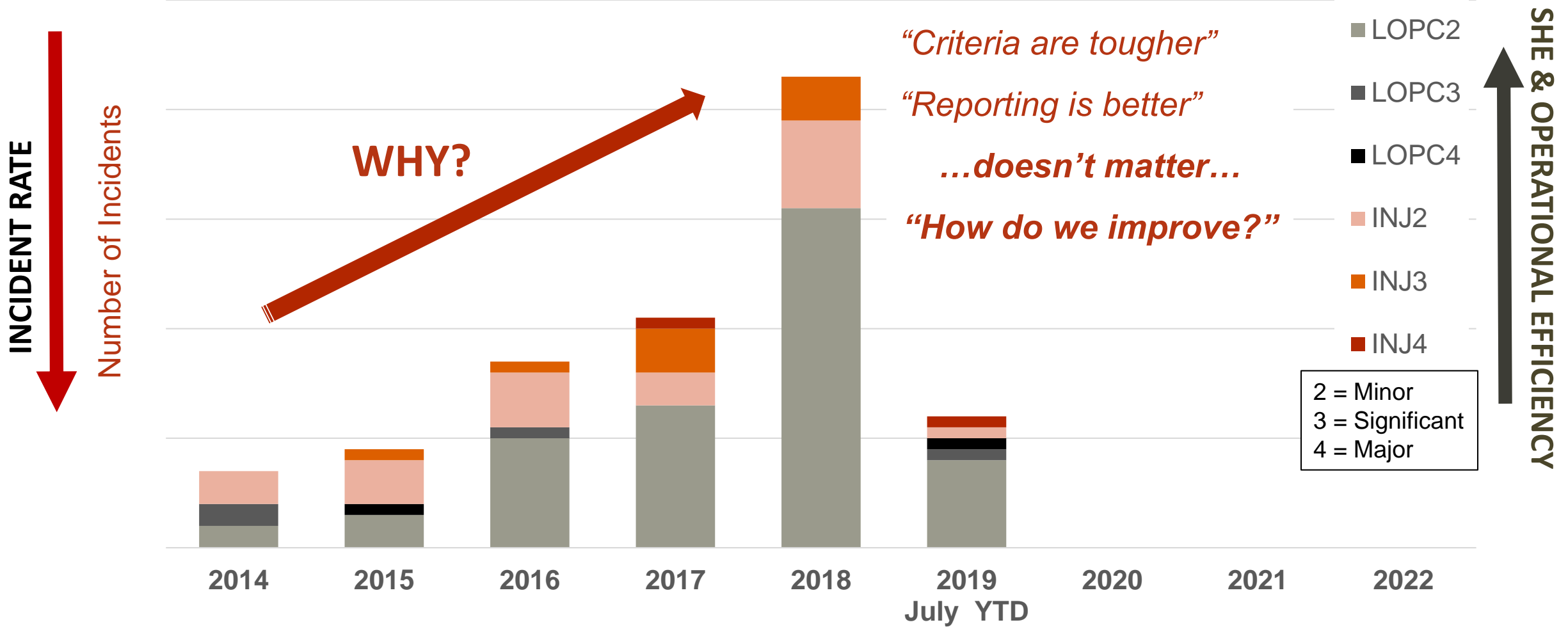
- Vision
- Leadership
- Engagement
- Ownership

# DuPont Bradley Curve<sup>©</sup> - Culture Maturity Concept



# Actual vs Theory – Moment of Truth

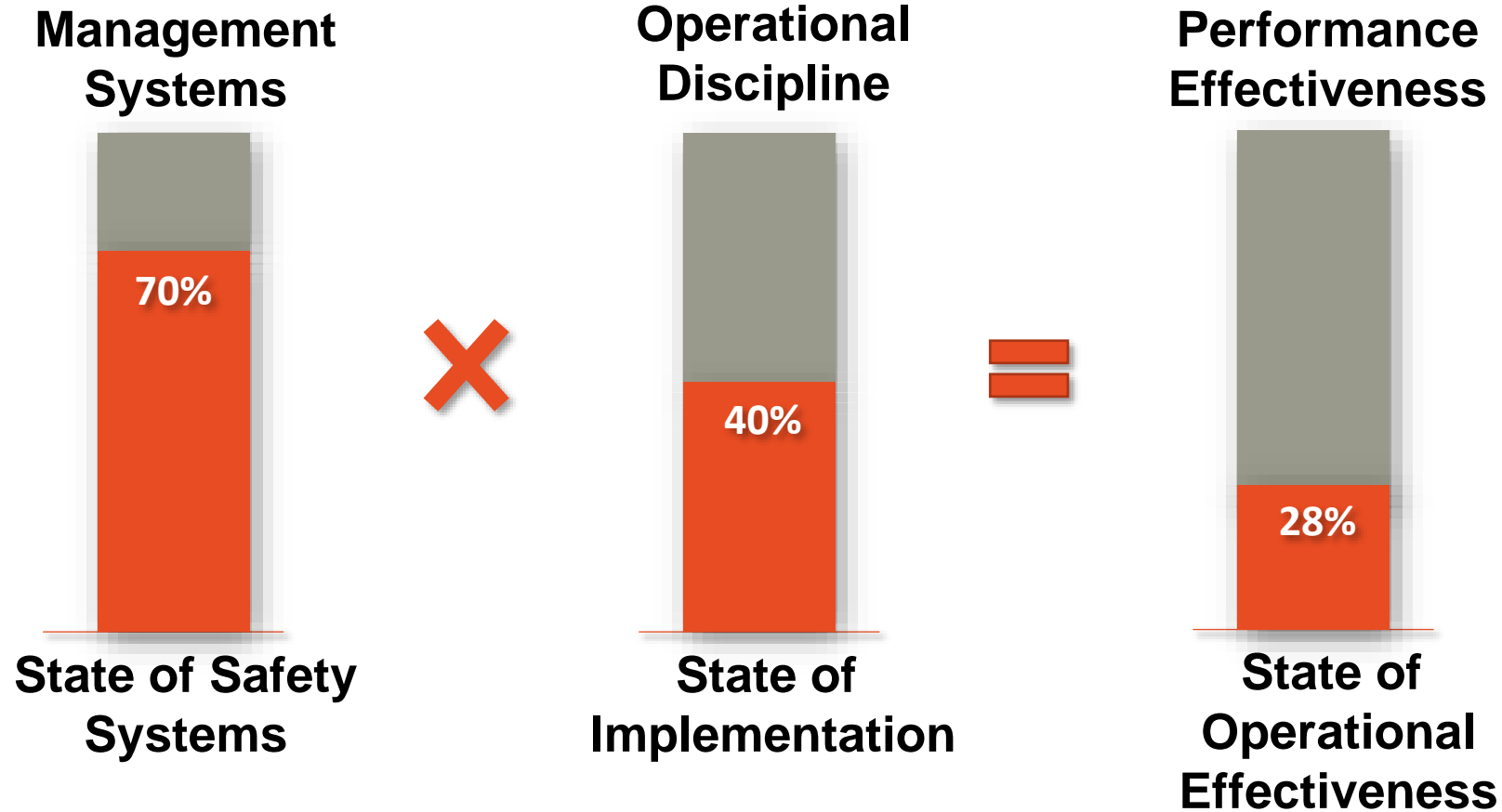
## BST INCIDENT LEVEL 2 UP (INJURY & LOPC) HISTORY



# Key Organizational Learning

Operational effectiveness - “**everyone...do it right...every time**”

*(Behaviors)*



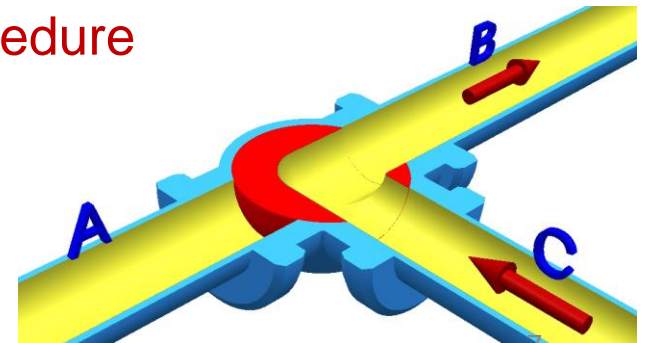
# Two Unplanned Plant Shutdowns lead to Epiphany

Separate Shutdown incidents from valves left in wrong position

*“Operator forgot to open/close XYZ valve...”*

*(Implied Conclusion: Operator was at fault)*

- ✓ Learning to communicate differently – Ask first...
- ✓ Making it OK to question, challenge, offer different perspectives
  - “Why did the Operator forget?”
  - Missing/incomplete startup preparation checklist or procedure
  - Relying on “Operator memory”



# “Management is Accountable for Preventing Harm”

(All) Employee Expectations ← “Enablers” ← Manager and Supervisor Expectations

1. All Work Related S.H.E. incidents shall be reported immediately to an employee’s immediate supervisor, or higher.
2. Personal Protective Equipment (PPE) must be worn, and must be in good working condition.
3. Procedures and Work instructions shall be followed.
4. All employees shall complete the S.H.E. training required for their jobs.
5. All employees shall take action to report and/or stop work when an unsafe condition or an unsafe act is observed.

1. All Work Related S.H.E. incidents shall be investigated for cause and corrective actions.
2. PPE, Tools, and Equipment that are required and appropriate for specific jobs or working in specific areas shall be provided in good, working order.
3. Procedures and Work Instructions, or Job Hazard Analyses shall be written and implemented for all jobs that have the potential to cause “Harm”.
4. Supervisors and Managers shall ensure that employees are trained to do their jobs safely.
5. Supervisors and Managers shall take corrective actions to address unsafe conditions and unsafe acts in a timely manner.
6. Supervisors and Managers shall communicate these S.H.E. Minimum Expectations to all employees and manage non-conformance to S.H.E. requirements.

***Management was not meeting its own expectations!***



# Changing Behaviors to meet Expectations

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*What are the behaviors that need changing?*

*Who owns them?*

*How do you change them?*

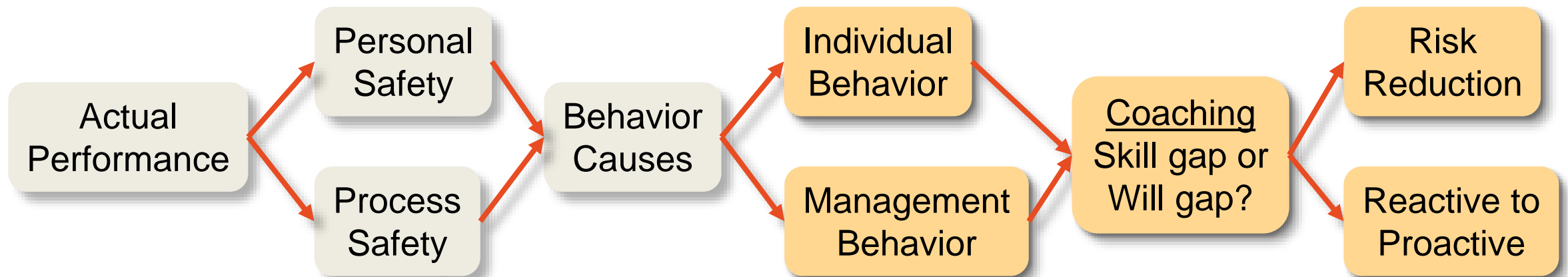
# Coaching to Change Behaviors – Approach and Context

*What are the behaviors that need changing?*

*Who owns them?*

*How do you change them?*

- Differentiate between individual and management behaviors
- Differentiate behaviors between Skill gaps and Will gaps
- Risk reduction framework to focus behavioral improvements
- Transition from reactive to proactive behaviors



# Understanding the Causes

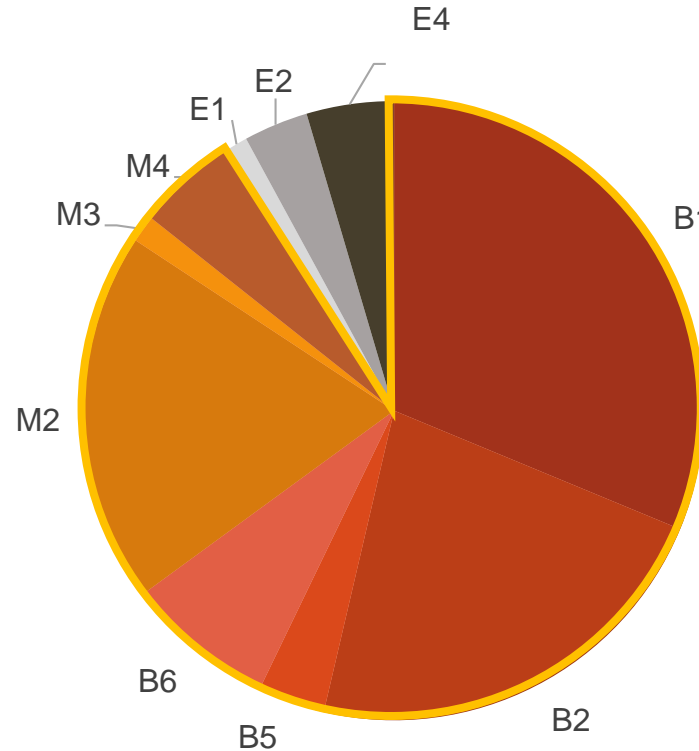
## Root Cause Type and Sub-Type

<b>Individual Behavior (B)</b>	B1 Unidentified Risks or Hazards
	B2 Not Follow Work Procedures Correctly
	B3 Not Wearing Proper PPE
	B4 Use Incorrect Tools/Equipment
	B5 Work Area Untidy
	B6 Unsafe Actions (Method, Ergonomics)
<b>Management Behavior (M)</b>	M1 Risk Assessment for Job/Task Not Done
	M2 Procedure/WI Incomplete or Incorrect
	M3 Required Procedure/WI/Permit/JHA Not Provided
	M4 Insufficient Training Provided
	M5 Insufficient Inspection, Monitoring, Enforcement of Requirements
	M6 Inadequate Resources Provided (People, Tools, PPE)
<b>Equipment/Material (E)</b>	E1 Equipment or Tool Failure
	E2 Error or Inadequate Design
	E3 Control of Hardware/Software System Error or Failure
	E4 Deficiency, Incorrect Type, Invalid Material

## Personal Safety

### Injury Root Cause Analysis

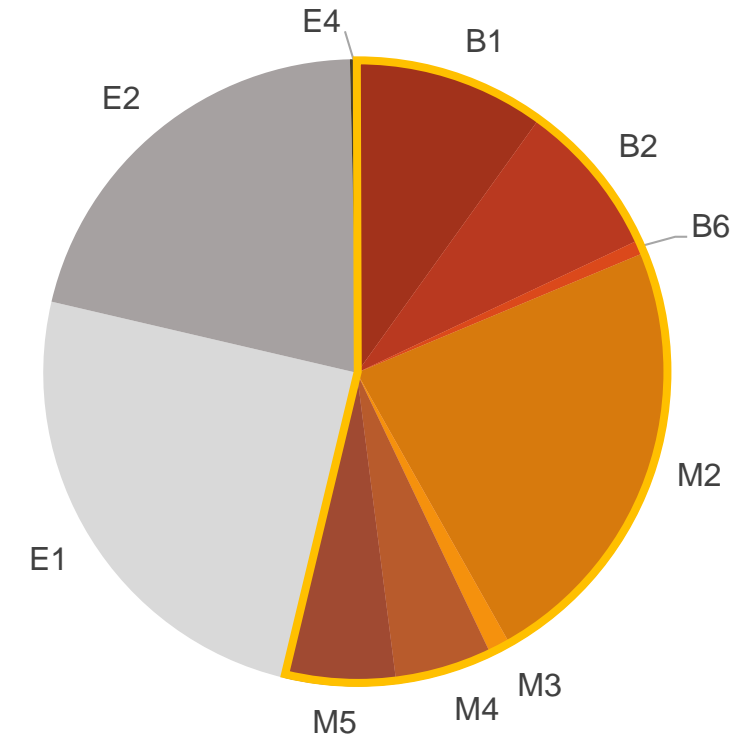
	2018	2019
Individual Behavior	61%	86%
Management Behavior	31%	0%
<b>Total Behavior</b>	<b>92%</b>	<b>86%</b>
Equipment/Material	8%	14%



## Process Safety

### LOPC Root Cause Analysis

	2018	2019
Individual Behavior	25%	8%
Management Behavior	25%	52%
<b>Total Behavior</b>	<b>50%</b>	<b>60%</b>
Equipment/Material	50%	40%



# ✓ Common understanding of clear requirements

Differentiate between Skill gaps  
and Will gaps

## If proper Behavior not demonstrated

- Does Person have the required Skills?

If NO → **“Skill Gap”**

If YES → **“Will Gap”**

Person **CHOSE** not to do it  
correctly for some reason

- Coaching messages and actions are different  
for different gaps

➤ Closing BOTH types of gaps is essential,  
and is management’s job



The poster features a header image of two workers in safety gear at an industrial site. Below the image is a blue banner with the text 'BST Life Saving Rules'. The rules are listed in two columns. The first column is on a green background and is labeled 'DO' in a green box. The second column is on a red background and is labeled 'DON'T' in a red box. At the bottom right, there is a logo with the Thai text 'ไม่มีอันตรายจากไหนๆ' and the English text 'No Harm to Anyone Anytime'.

**BST Life Saving Rules**

1. Work with a valid Work Permit when required.
2. Conduct Gas Tests when required.
3. Verify isolation before work begins and use the specified life protecting equipment.
4. Obtain authorization before entering a confined space.
5. Obtain authorization before overriding or disabling safety critical equipment.
6. Protect Yourself against a fall when working at height.
7. Wear your seat belt/helmet.
8. No smoking or use of prohibited ignition sources outside of designated areas.
9. No alcohol or drugs influence while working or driving.
10. No mobile phone usage without a hands-free mobile phone device while driving.

ไม่มีอันตรายจากไหนๆ  
No Harm to Anyone Anytime

# Risk Reduction Framework for Behavioral Improvements

**No Harm to Anyone Anytime**  
*(Incident Free)*

## Risk Elimination

### Improve **Systems**

- Engineering Controls
- Administrative Controls
- PPE

### Improve **Behaviors**

- Ask and Listen
- Teach and Train
- Observe and Feedback
- Intervene and Correct
- Learn and Improve

**“ENABLERS”**  
Management  
Behavior

**ENGAGEMENT &  
COACHING**  
Management and  
Individual Behavior

***Risk Reduction  
Framework for  
Behavioral  
Improvements***

## Risk Identification (BEHAVIORS)

- “See the Risk”
- “Imagine the Risk”
- Evaluate/Calculate the Risk

## Values, Attitudes, Beliefs

- SUCCESS Together
- Vision
- SHE Principles, Requirements

Cascades  
2017-18

**Foundation**

# Transition from Reactive to Proactive Behaviors

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*“All incidents can be prevented.”*

(Agree?)

## Individual Behaviors

- Close the Skill Gaps → Teaching, Training, Practice
- Close the Will Gaps → Expectations, Interventions, Lower Tolerance

## Management Behaviors

- Raised Expectations to proactively Identify and Improve the Enablers
- Raised Expectations for proactive Management of Others' Behaviors

# Example 1 - Risk Awareness Training Workshop Team

## ✓ Skill building – soft and technical skills

“Unrecognized risk” – common cause of personal injuries

- People were not seeing/aware of risks
  - Wet and Slippery stairs (slip and fall injury)
  - Gap in grating (bicycle accident injury)
  - Unsupported piping (piping fell and pinched/cut finger)



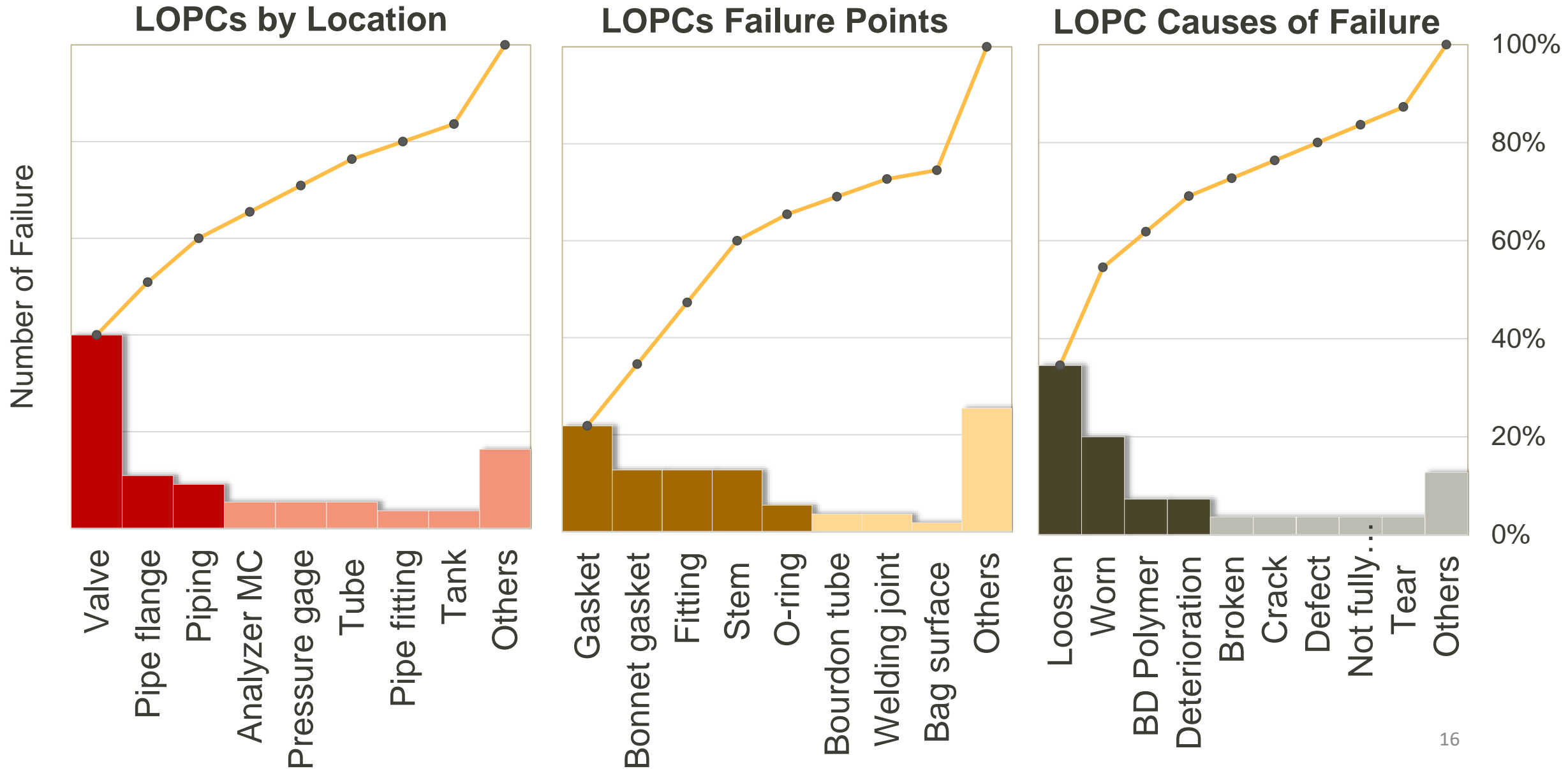
## • Risk Awareness Training and Workshops

- Framework for recognizing risks that could injure (Skill gap)
- Specific body parts at risk (Skill gap)
- Personal responsibility to see and avoid risks (Will gap)
- Delivered to all Employees and Contractors



# Example 2

# – Loss of Primary Containment Reduction Team





## Example 2 – Loss of Primary Containment Reduction Team

*“LOPCs caused primarily by system component failures”*

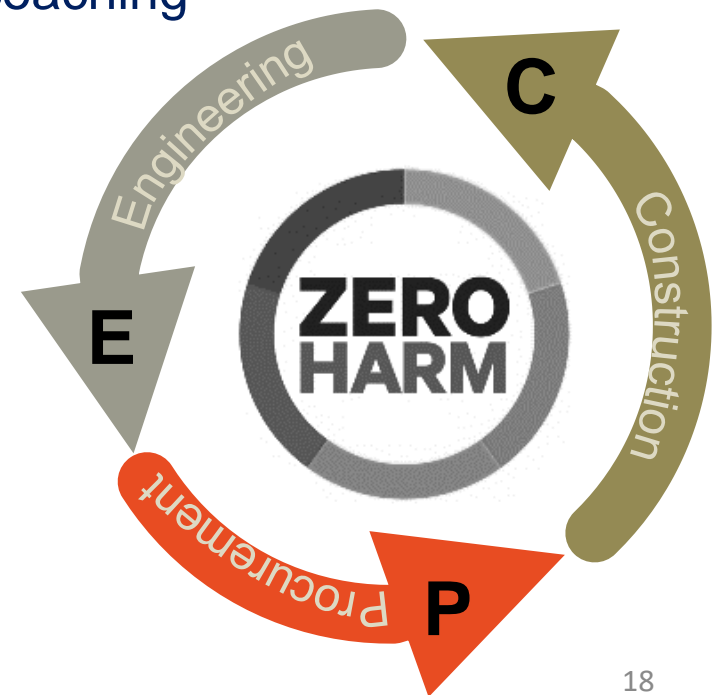
- Quick Fix – Improved Monitoring Plan
  - Fugitive Monitoring for early detection; Frequency higher than legal requirements
  - Flange and Joint Management process (vibration, corrosion, gasketing)
  - Inspections managed by Operations personnel
- Aging Plant component replacements
  - BST Plants 6 – 25+ years old
  - Proactive Component replacements based on risk and age
  - Management committing Capex
  - Managed by Maintenance and Engineering personnel



## Example 3 – Safe Project Executions

### BST Implementing 2 large Capex Expansions *within Operating Plants*

- Engaged DuPont Sustainable Solutions to develop Safe Execution Plan
  - Proactive implementation of SHE requirements in EPC contract
  - Applied throughout Engineering, Procurement, and Construction phases
  - Collaboratively managed by BST and EPC with DSS coaching
- Key Work Streams defined (examples)
  - Process Hazard Analysis
  - Quality Assurance
  - Construction and Contractor Safety
  - Readiness to Operate



# Example 3 – Safe Project Executions

KPI Status As of Jul'19

KPI No.	Status	PHA KPI Monitoring Status	Status	Quality Assurance KPI Monitoring Status	Status	Construction and Contractor Safety KPI Monitoring Status	Status	Readiness to Operate (RTO) KPI Monitoring Status
		KPI Title		KPI Title		KPI Title		KPI Title
1	●	Incorporate HAZID recommendations into Design	●	Number of days delay in plant commissioning due to QA deficiency.	●	Zero fatality	●	% of Emergency drills conducted per plan for commissioning before S/U
2	●	Incorporate HAZOP-LOPA recommendations (Risk Level 1,2) into Design	●	Cost overrun resulting from severity of defects due to QA deficiency.	●	Accident Frequency Rate	●	No. of PSM internal audit findings.
3	●	Incorporate Human Factor recommendations into Design	●	Number of EHS incidents caused from QA deficiency.	●	Zero Major Environmental Incident	●	PSM Certification by External Audit
4	●	Review HAZOP-LOPA for Design Changes post EPC HAZOP	●	Quality meeting - Plan Vs Actual	●	No Property Damage (Fire Case)	●	No. of work instruction and form completed on time as plan
5			●	Number of Field Design Changes	●	Safety Observation Tours (SOT) Completed per plan.	●	% of Organization hired as plan
6			●	Quality Audit Plan completion per plan (Construction Site)	●	Safety Audits Completed per plan	●	% of All staff pass training program
7			●	Number of overdue recommendations and action items from Quality Audits	●	Safety Meetings Conducted per plan	●	% of PM plan completed for all critical equipment
8			●	Number of NCR and punch list items incurred in EPC.	●	100 % annual compliance of emergency mock drills	●	No. of delay day from RFSU.
9			●	NCR (Major Case) Closed before shipment.	●	Closure of all internal audit and incident investigation actions	●	No. of incident ( Level 3&4) during pre- commissioning /start up/PA
10					●	Drug Testing Completed per Plan		
11					●	Alcohol Testing Completed per Plan		

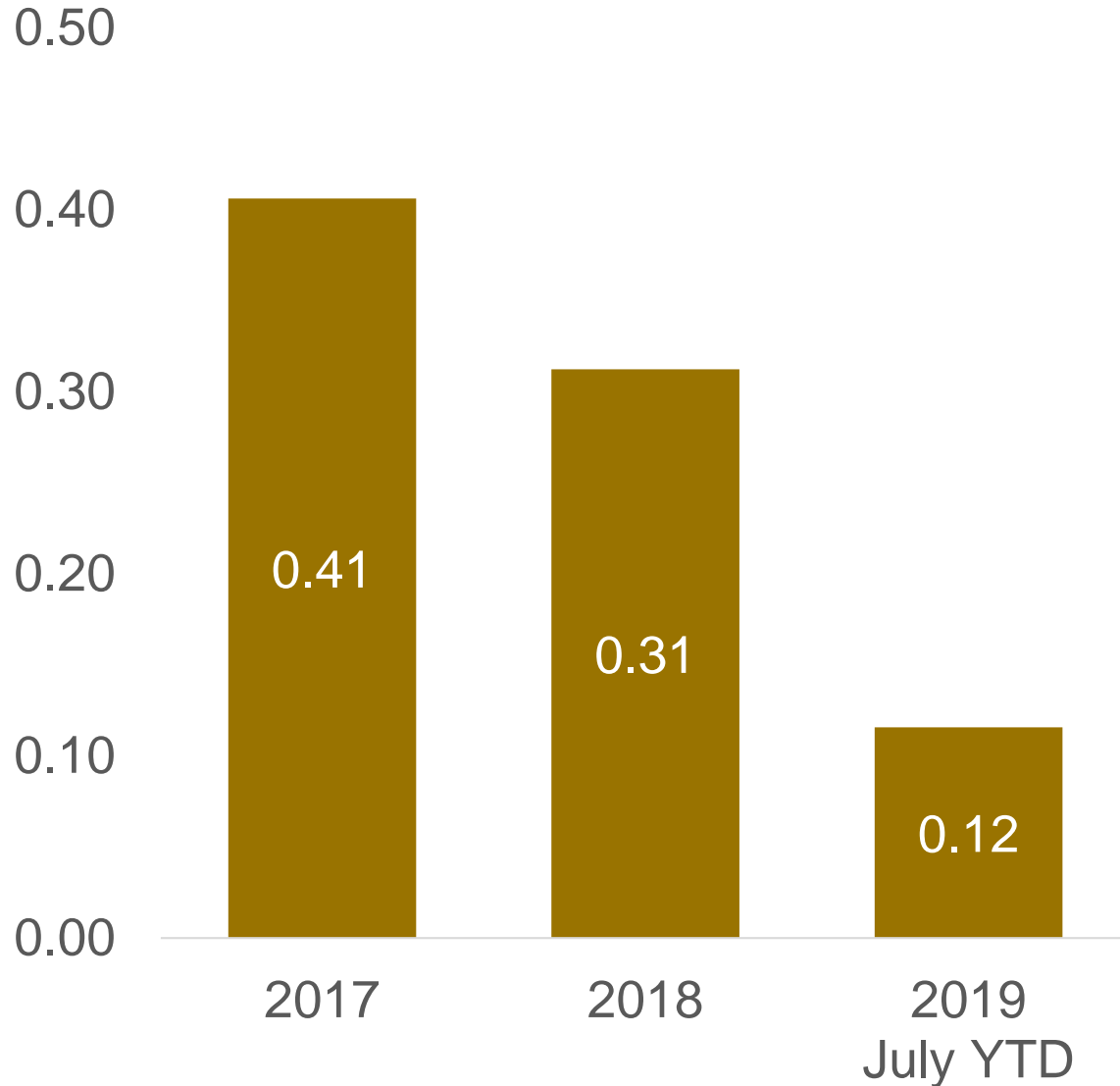
**LAGGING INDICATOR**

**LEADING INDICATOR**

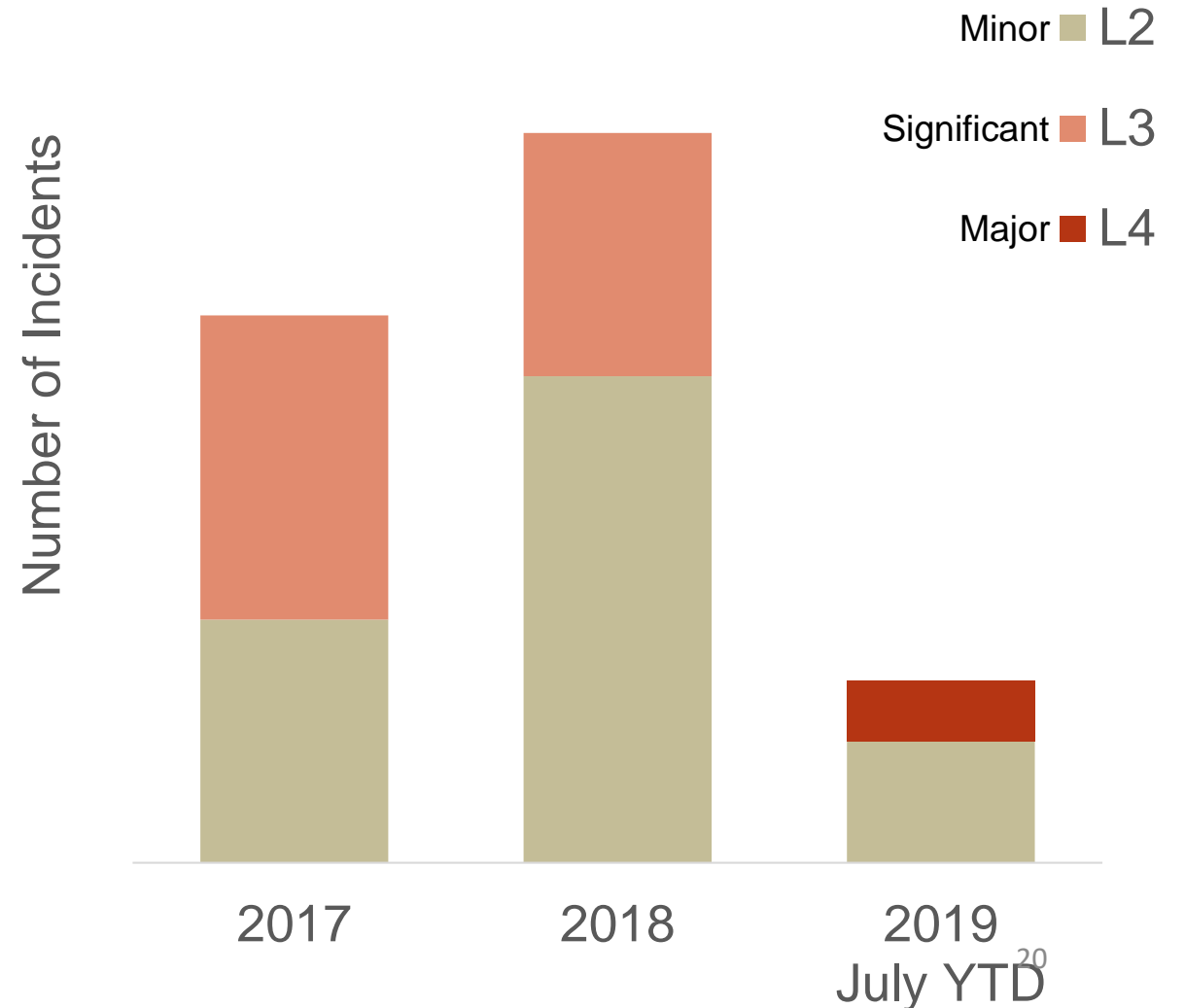
- On Target
- <5% Delay
- >5% Delay

# Results - Personal Injury Performance Improvement

## BST Accident Frequency Rate

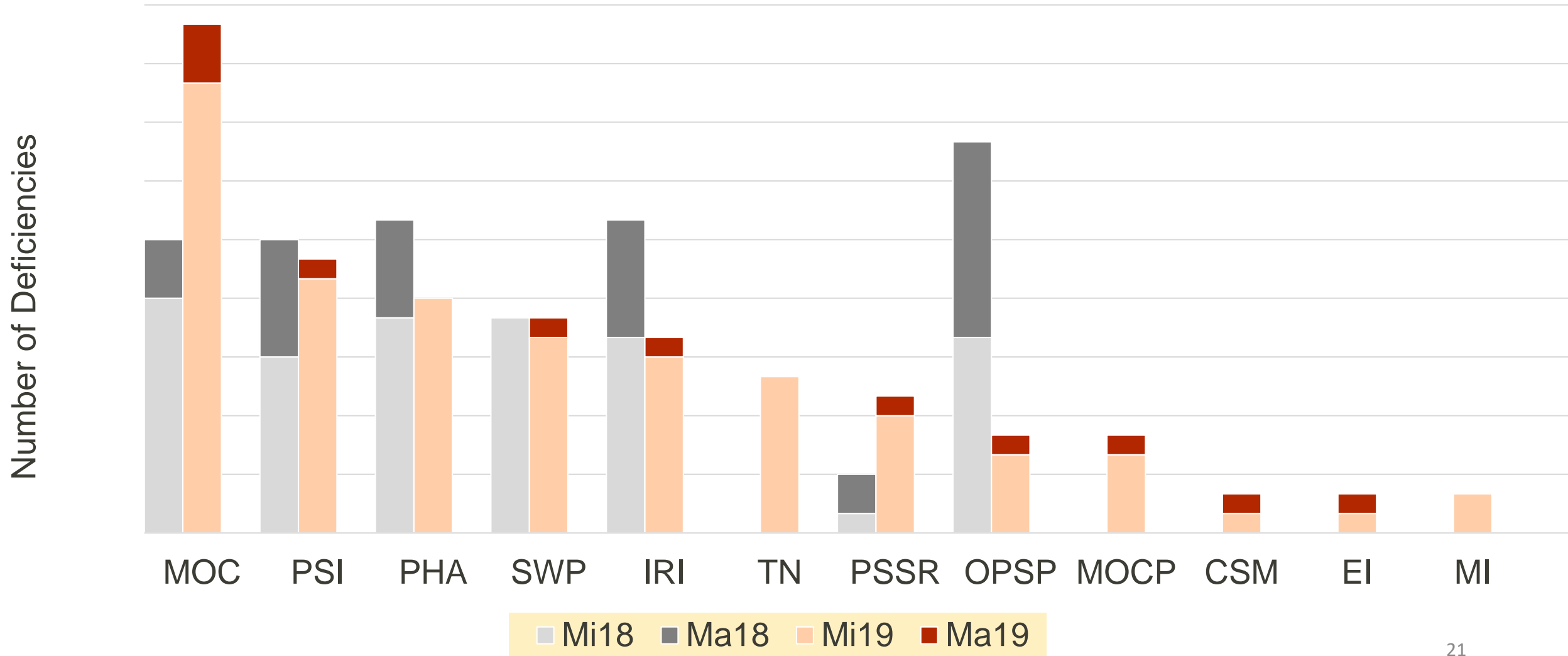


## BST Personal Injury History

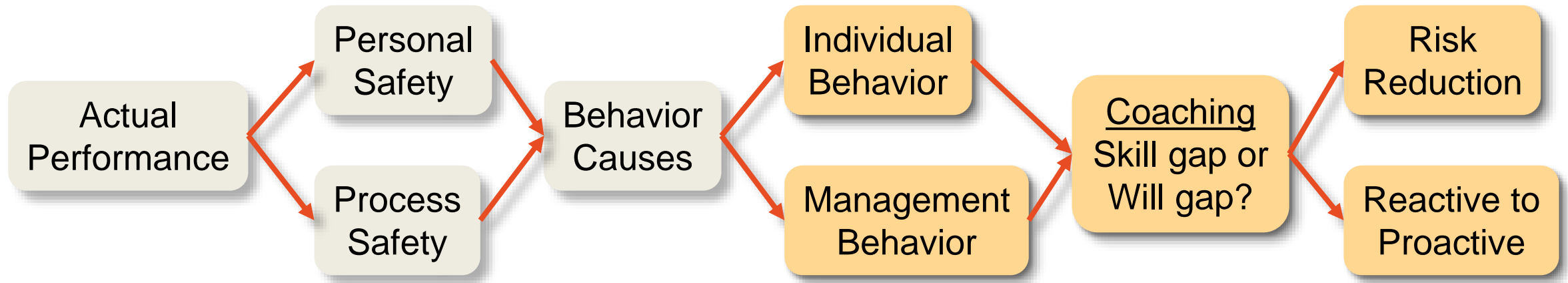
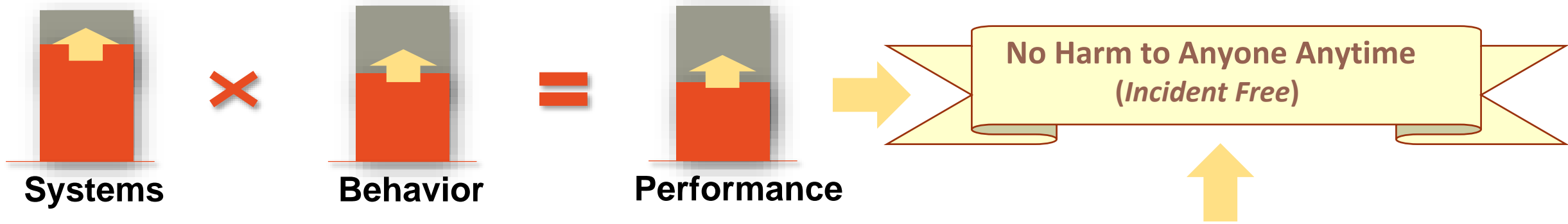


# Results - PSM Audit Findings

## PSM Audit Deficiencies by Element



# Summary of BST Cultural Transformation



Management



- Commitment, Persistence
- Engaging
- Learning and Adapting

# Personal Reflections on the Journey

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- Cultural Transformation takes Time, Persistence, Patience; Never ends
- It is a *Non-Linear* Learning Journey requiring Adaptation and Change
- Behaviors underpin both Personal and Process Safety Performance
- Changing Behaviors can be Emotional (People, not “Things”)
- Management Behaviors are hardest to change

***How many Psychologists are required to change a Light Bulb?***

***Only One, but the Light Bulb has to WANT to Change!***

**✓ Inspiring aspiration – “No Harm to Anyone Anytime”**