

# Portage County Safety Council Machine Safety Workshop Part 1 of 5 Manufacturing Safety and Productivity

Sept. 1, 2021



## Integrated Mill Systems

**Mark Eitzman**

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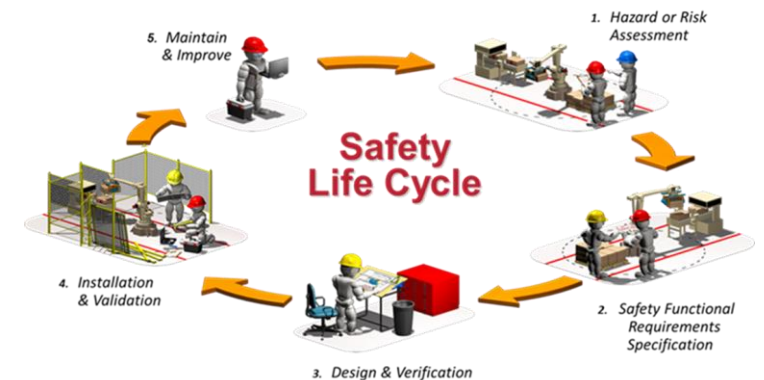


## 5 part series on Manufacturing Safety

## PORTAGE COUNTY SAFETY COUNCIL

A Forum For Workplace Safety

1. **Societal Demands for Safety and Productivity - Sept. 1**
2. **Regulatory Compliance (laws and standards) and Risk Assessments - Sept 8**
3. **Risk Reduction Methods, Technologies and Techniques for Machinery Safety - Sept 15**
4. **Engineered Controls and Safety Circuits – Sept 22**
5. **Installation, Validation and Post Commissioning Management of Change – Sept 29**







# Integrated Mill Systems

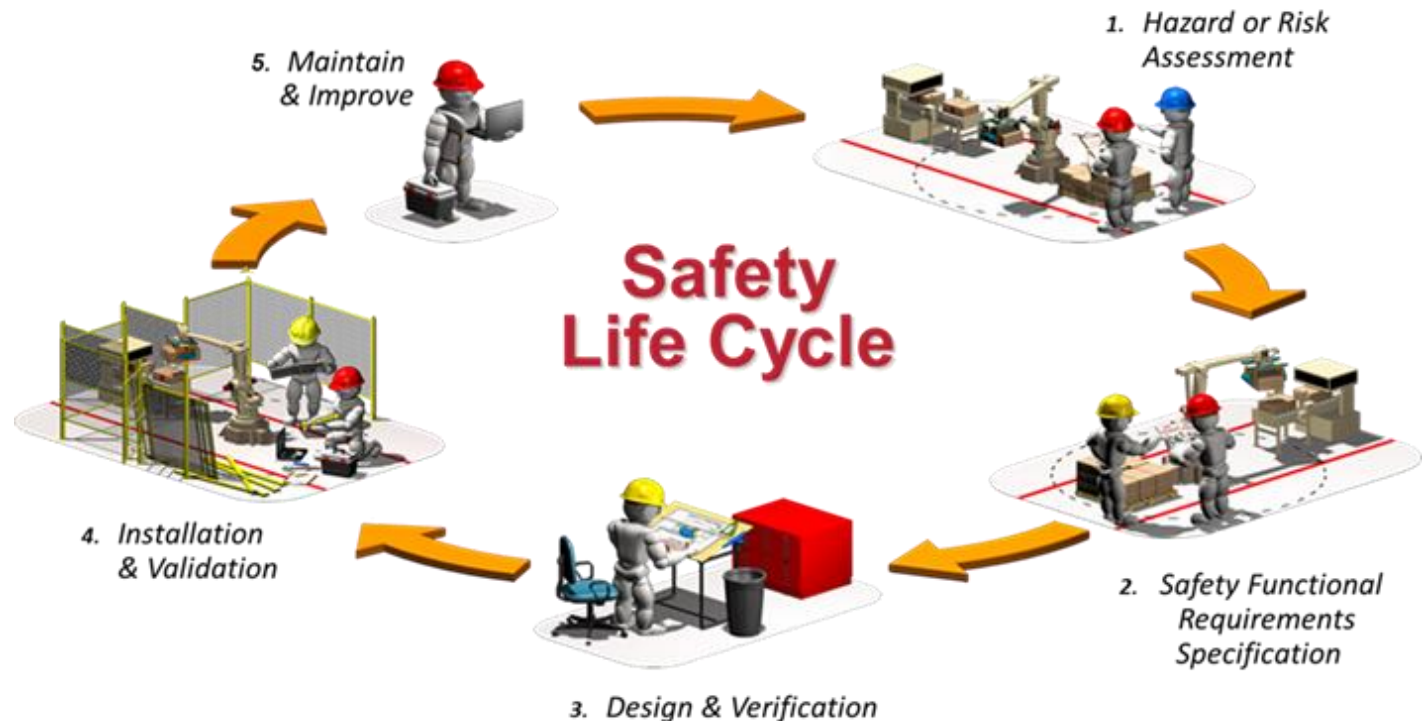
**Integrated Mill Systems (IMS)** is a process automation solutions provider for the metals, mining, utility, petroleum, and process industries.





# Integrated Mill Systems Machine Safety Approach

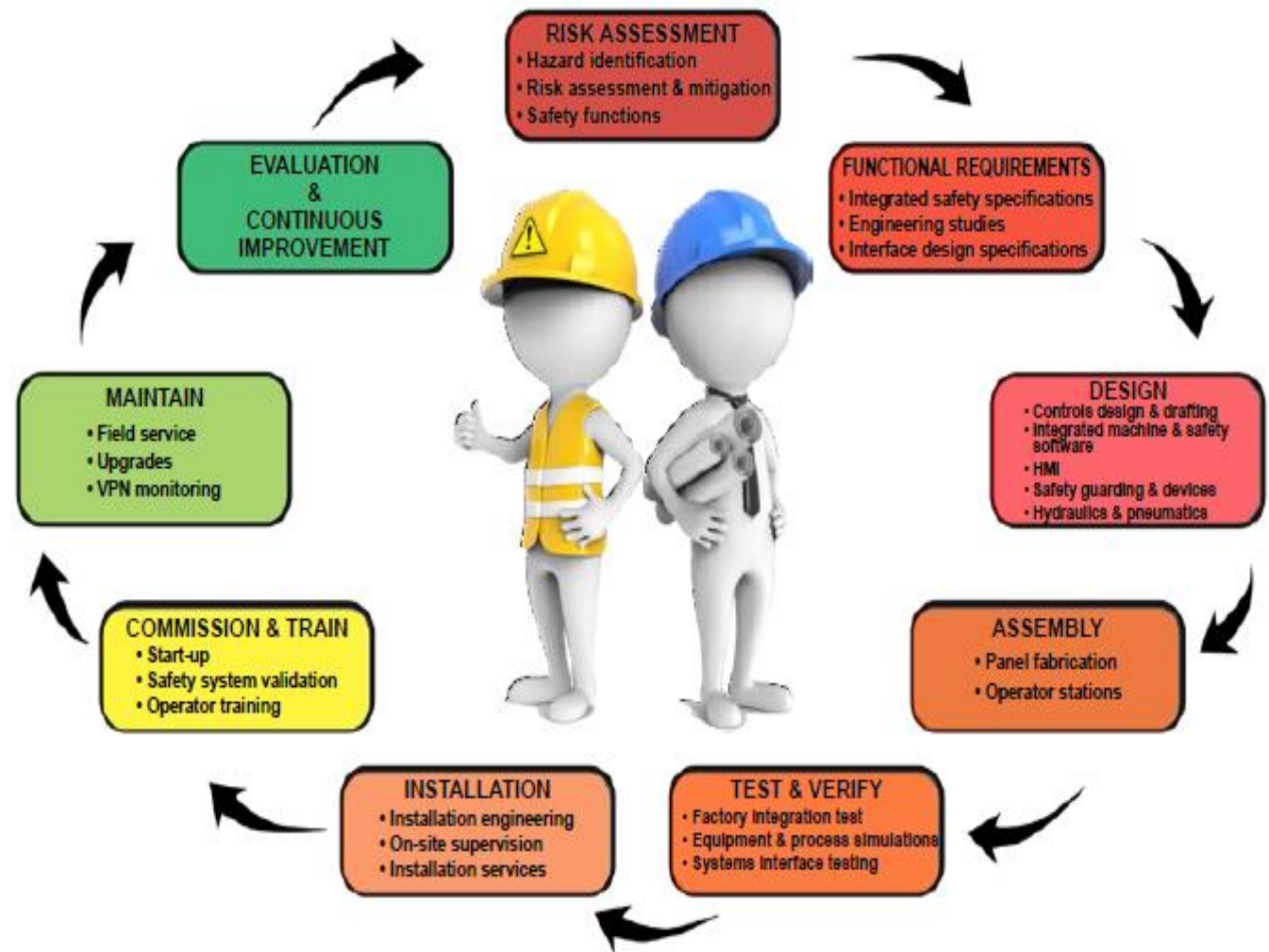
- Risk Assessments
- Safety Functional Specification
- Design and Verification (to standards)
- Safety Hardware Engineering & Supply
- Safety Functions
  - PLCs, Sensors, Actuators (Drives, Contactors, Valves)
  - Machine Guards, Access Control
  - Hydraulic and Pneumatic Engineering
- Safety Programming
- Installation Engineering
- Installation Services
  - Commissioning
  - Validation
  - Training
- Safety Monitoring & Data
  - Machine or safety function used as intended?
  - Potential for improvements in safety and/or OEE?





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# Portage County Safety Council

## Machine Safety Workshop Part 1

### Manufacturing Safety and Productivity

- Societal and economic forces driving safety demands on industry
  - Safety and Productivity (OEE)
- The 3 elements of Safety Maturity
  - Culture
  - Policies and Procedures
  - Technologies and Techniques
- Justifying and proving the *Return on Investment* (ROI) of safety and productivity
  - A calculator to generate real numbers for safety and OEE
  - How EHS can contribute to fiscal performance


**PORTAGE COUNTY SAFETY COUNCIL**

A Forum For Workplace Safety



# Integrated Mill Systems Machine Safety Workshop handouts

- D+V+S>R notes
- *Goals and business outcomes of an investment in machine safety solutions*



**Integrated Mill Systems  
Machine Safety Workshop**

Leadership Driven Change - Gleicher-Dannemiller Change Equation

D

+

V

+

S

>

R

Disatisfaction
Vision
Next Steps
Resistance

Disatisfaction	Vision	Next Steps	Resistance to Change

**INTEGRATED MILL SYSTEMS - MACHINE SAFETY SOLUTIONS**

**Goals and business outcomes of an investment in machine safety solutions**

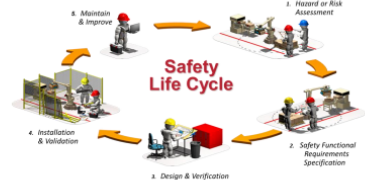
- comply with regulatory requirements of OSHA's General Duty Clause by adhering to consensus machine safety standards.

*OSH Act of 1970 SEC.5. Duties: (a) Each employer (1) shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees;*

- improve the safety of their facility to an acceptable level of risk as defined by the owner
- take into consideration productivity (OEE - overall equipment effectiveness) when embarking on a machine safety project.
- refine risk reduction solutions and implementation to meet actual risk reduction as required by a systematic approach rather than assumed requirements or a universal or minimal level (i.e. a specification such as, all safety circuits shall be PLd/cat3 or higher).
- document the thought process and justify the decisions made about their risk reduction efforts in the event this information will be useful later.
- protect/improve the company image or brand equity by including and promoting employee safety in corporate social responsibility efforts.
- enhance the ability to attract and retain a quality workforce by demonstrating a commitment to worker safety.

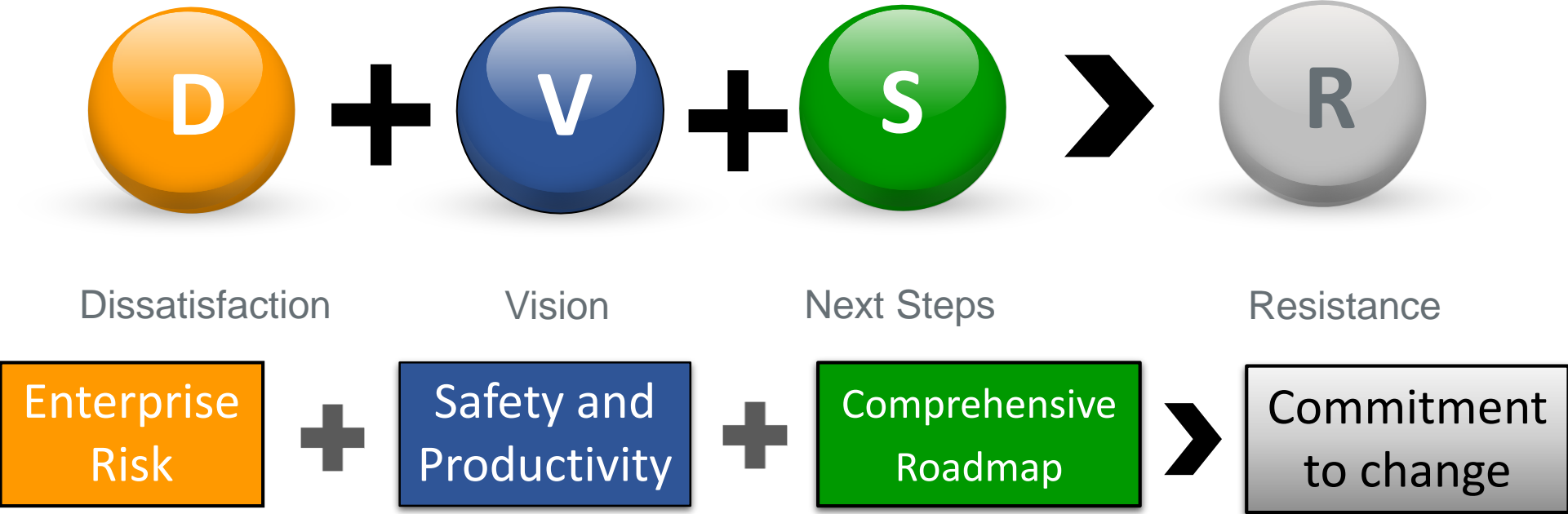
**The elements the Machine Safety Life Cycle**

1. Risk Assessment
2. SFRS - Safety Functional Requirements Specification
3. Risk Reduction Design and Verification
4. Installation and Validation
5. Maintenance, Monitor, Re-evaluating and Continuous Improvement (intention is to regularly repeat the process or life cycle)



Safety Life Cycle

# Leadership Driven Change - *Gleicher-Dannemiller Change Equation*



Injury/Fatality, Incident/Rate  
Corp. or Regulatory Compliance  
Company/Brand Image/Equity  
Employee Morale  
Union Relations

Fiscal Performance  
Compliance  
Brand Image & Awards  
Executive Recognition  
Best Place to Work

Trusted Resources  
10 Step Program  
SMI Assessment  
Pilot Project  
Executive Leadership

No injuries/deaths...lately  
Fines are minimal (lax OSHA)  
No corporate mandates  
Fear costs or decreased OEE  
BTTWWADI





# Integrated Mill Systems Machine Safety Workshop

- *Economic and Societal Forces*
- *Safety and Productivity*

Definition of Maturity Class	Mean Class Performance
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# Manufacturing Enterprise Risk Management

**Business Goal: *Attain production goals at an acceptable level of risk***

**Business  
Performance**



**Employee  
Health & Safety**

*“What is your company’s appetite for risk?”*  
Cal Beyer – Vice President, Zurich NA



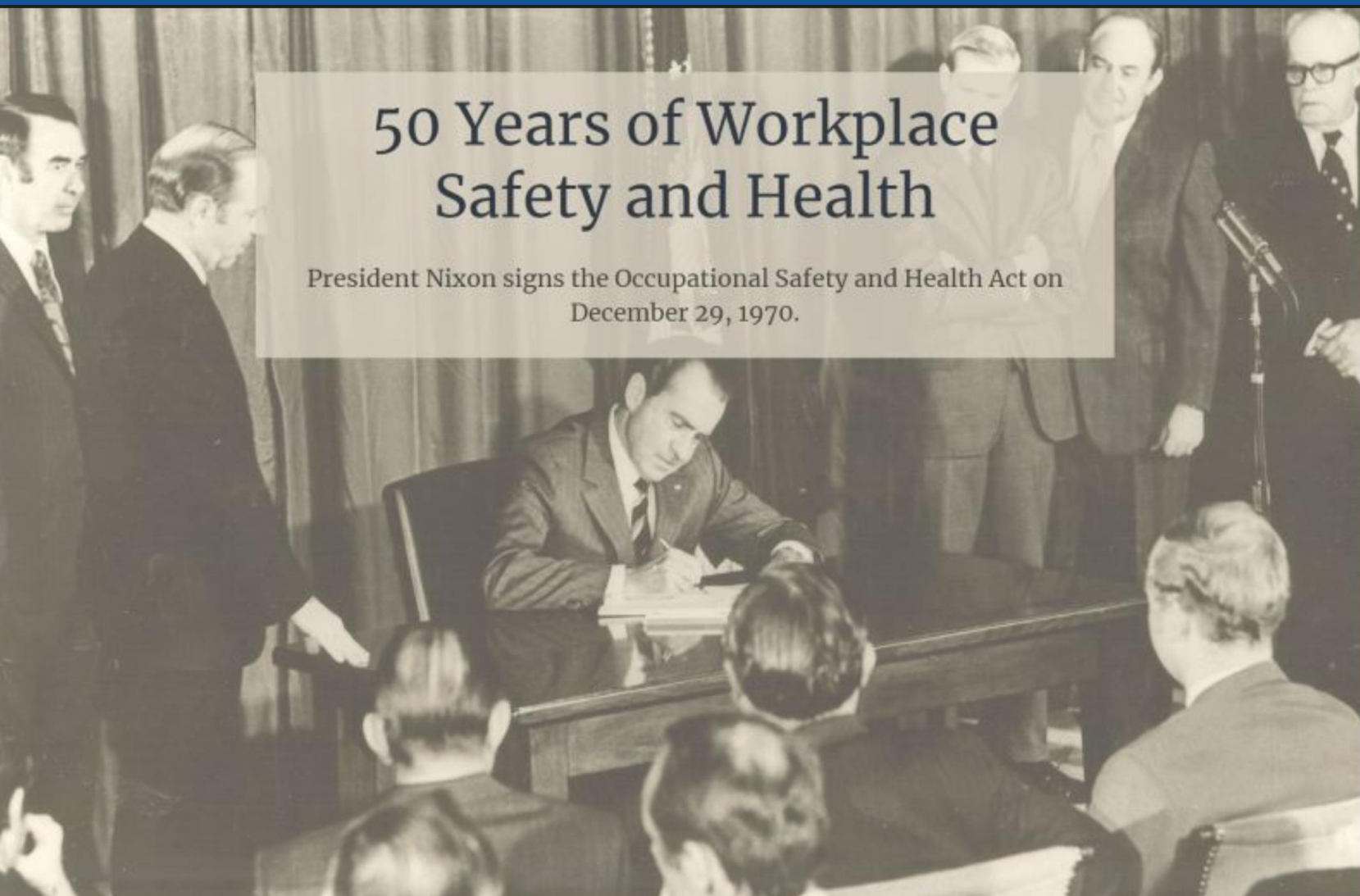
# United States Legislative Standard *Accountability for safety in the in USA*



UNITED STATES  
DEPARTMENT OF LABOR

## 50 Years of Workplace Safety and Health

President Nixon signs the Occupational Safety and Health Act on  
December 29, 1970.



# Obsolete and Less Mature Perspective of Safety



Reduced Healthcare costs  
Reduced Litigation costs  
Reduced Labor grievances



Reduced Machine Utilization  
Reduced Operational Efficiency  
Increased Labor Costs  
Increased Mean Time To Repair  
Increased Nuisance Shutdowns



*Safety and Productivity are Mutually Exclusive*



Workers' continuous dilemma  
*safety* vs *productivity*



SAFETY  
FIRST







# Lucky or Safe?

Is the work environment free of risk or just appears so due to acceptable lagging indicators?

Is there “normalization of deviance”?



# Normalization of Deviance





# Transparency – *Sunlight is a great disinfectant on the affairs of people*

- U.S. Supreme Court Justice Louis Brandeis

- Financial Risk
- Reputational Risk
- Sustainability
- Supply Chain Risk
- Legal Risk

## Accident at Coca-Cola Bottle Plant Kills Mission Viejo Man

Alberto Gonzalez, 58, died Friday after an industrial accident at a bottle plant in Anaheim.

Posted by [Contact: SanJuanCapistrano@Patch.com](#) , April 13, 2013 at 10:10 PM

## Goodyear to pay \$1.75 million to settle workplace violations in Virginia tire plant where four workers died



News

## Suicide at Apple supplier in China by mistreatment, says victim's family

A worker fell to his death after trying to request a leave of absence from an electronics manufacturer Foxlink, says his family

## U.S., Toyota reach \$1.2 billion settlement over sudden acceleration problems

The penalty is the largest fine of its kind ever imposed on an automotive company.

March 19, 2014 | Tribune Newspapers and wire reports

## West, Texas, fertilizer plant blast that killed 15 'preventable,' safety board says

By [Elliott C. McLaughlin](#), CNN  
updated 9:58 PM EDT, Tue April 22, 2014

IN DEPTH

## Gulf Coast Oil Disaster

Complete coverage of the massive oil spill on the U.S. Gulf Coast

Share: [f](#) [t](#) [+](#)

CNN U.S.

cs Justice Entertainment Tech Health Living Travel Opinion iReport Money >

FAIR TRADE

## Report alleges Victoria's Secret linked to child labor

December 15, 2011 | By Josh Levs, CNN


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## Bangladesh prime minister alleges arson in deadly factory fire

From [Farid Ahmed](#), CNN  
updated 11:42 AM EST, Tue November 27, 2012



Click to play

garment factories under scrutiny

[Visit the Gulf](#) We're Still Making Progress in the Gulf. Follow [ing Oil Spill \\$175/nt](#) All meals, Laundry, Packed Lunch Maid

## Legacy of the BP spill: What's a reputation worth?

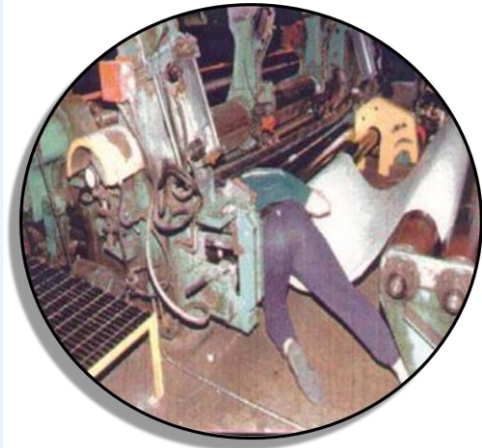
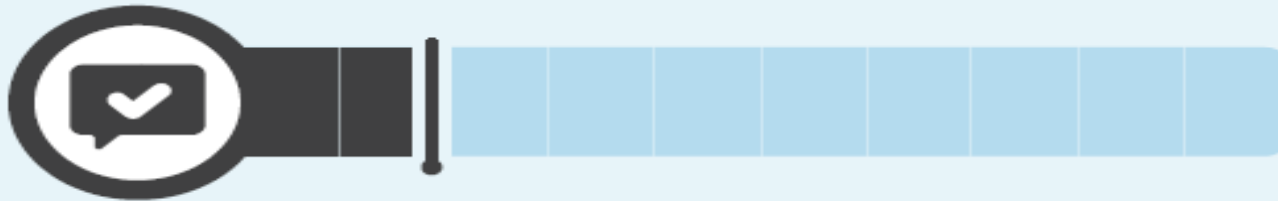
The BP spill in the Gulf of Mexico caused a public outcry and savaged BP's share price. Image repair won't be easy.

# The Gap Between Good Safety Intentions and Execution

**49% OF COMPANIES**  
claim safety as a core value...



Yet only **19% HAVE EXECUTIVE COMMITMENT**  
to make necessary investments.





# Proven Business Value of Safety

Turn to Aberdeen for Research with Results™

Aberdeen Group  
A Harte-Hanks Company

## Defining Best-In-Class Performance

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• ½ the injury rate

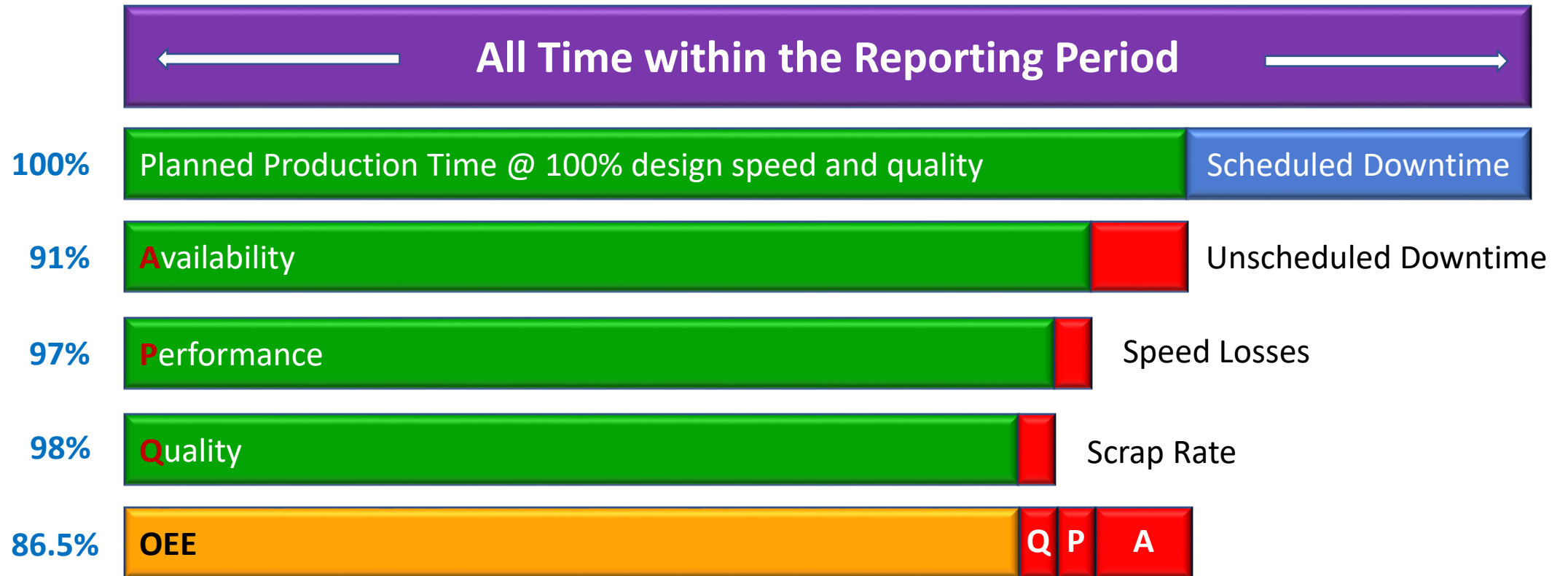
Average

• 9% Lower OEE  
• 3X higher injury rate

*Safety is the Barometer of Manufacturing Excellence*



# OEE – Overall Equipment Effectiveness



$$1 \times .91 \times .97 \times .98 = 86.5\%$$

**A                  P                  Q                  OEE**





# Definition

**SAFETY** is.... Freedom from unacceptable **RISK**

**RISK** is... a combination of **SEVERITY** and **PROBABILITY**

**ACCEPTABLE RISK** is... **UP TO YOU!**



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# Contemporary - Maturing Perspective of Safety



- Improved Machine Speed & Utilization
- Improved Operational Efficiency / Labor Costs
- Improved Maintenance Downtime / Efficiency
- Reduced Nuisance Shutdowns
- Regulatory Compliance
- Reduced Healthcare costs
- Reduced Litigation costs
- Reduced Labor grievances



- More sophisticated controls
- More educated staff
- May require a culture shift
- New policies/procedures/standards



*Safety and Productivity are Complementary*





# Machine Safety Evolution



LOTO



Preventing Access



Detecting & Controlling Access



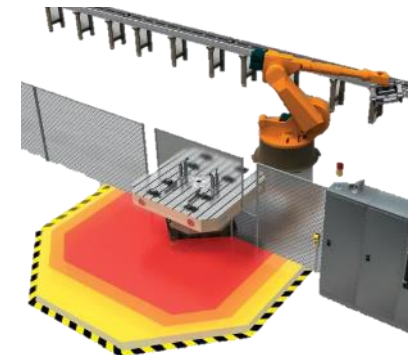
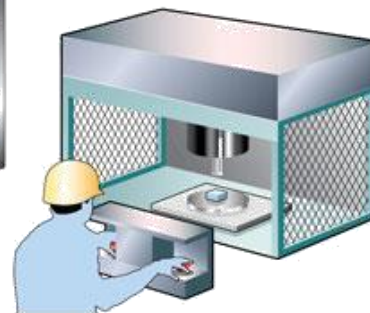
Collaborative Access



Guards



Safeguards



Integrated Safety

# Integrated Mill Systems Machine Safety Workshop

## Manufacturing Safety Maturity

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# Proven Business Value of Safety

*What differentiated Best-in-class Manufacturers from their Peers?*

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# “3Cs” – Culture, Compliance, Capital



- **Culture: attitudes, accountability, and compliance**

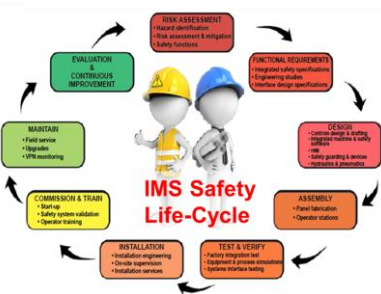
- An enterprise value (more than a priority) emanating from leadership throughout the organization. It is observable and uncompromised.

- **Compliance: use of effective processes and procedures**

- Establish a formalized risk management strategy, standards and procedures to identify, prioritize and mitigate risks.

- **Capital: investments in technologies**

- Contemporary safety solutions and technologies that improve both safety and productivity and are seen as a viable investment with an ROI.



***What differentiated Best-in-class Manufacturers from their Peers?***





# Safety Maturity Index™

## for Machinery

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# Characterization of SMI levels

- **SMI 4** – *Demands both safety and productivity*
- **SMI 3** – *Safety above all*
- **SMI 2** – *Interest is primarily “compliance”*
- **SMI 1** – *No current interest in safety*

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# Safety Maturity Index – Cultural Attributes

## Attitude:

- Safety is considered vital to the health of the business and its employees – a key indicator of business optimization.
- Safety is a value. No exceptions to safety are acceptable in pursuit of other goals
- Employees would rank priorities as: Safety, Quality, Production, Cost Reduction
- Safety is a prominent part of the business and strategic plans, including being considered a key element of brand image.

## Accountability:

- Upper management is held accountable, including compensation, for safety metrics.
- All safety incidents are reported appropriately with total transparency.
- Leaders/managers are constantly on the floor asking about, coaching about or observing opportunities for improving safety.
- Employees view leader/manager adherence to safety as 100% on board, caring about worker safety.

## Commitment:

- Anticipatory, pre/during/post-incident accountability exhibited by employees for their safety and the safety of others, aligned with systemic process or procedure.
- >90% of employees are committed to actively managing their own safety behavior, and coaching others regarding workplace safety, to specified behavior standards and expectations.
- >90% of employees are involved and participating in safety improvement initiatives.

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# Safety Maturity Index – Policy/Procedural Attributes

## EH&S:

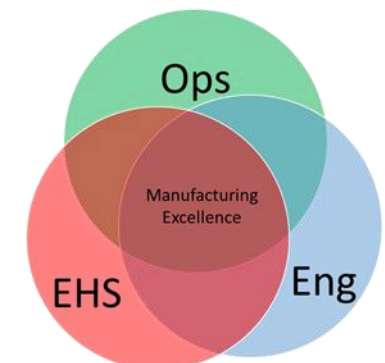
- Entire supply chain required to meet safety standards.
- Clearly defined appropriate roles and activities for all levels of employees.
- Rigorous Management of Change process in place, and functioning.
- Accountability through performance management process established.
- Formalized risk assessment process for EHS impacts in place, based on established standards.

## Engineering:

- Documented safety assessments performed throughout the machinery life cycle steps including
  - concept/design, fabrication, installation, validation, operation/maintenance, decommissioning.
- Functional safety specifications developed to improve safety *and* productivity.
- Design considerations for safety *and* productivity.
- Safety system design using safety rated products.
- Design and verification of safety system to ensure risks are mitigated.
- Safety system validation and documentation to ensure functional safety by a qualified safety engineer.
- Perform regular maintenance and modification assessments of safety systems.
- Requires machinery suppliers to provide proof/documentation of risk assessment, design verification, and system validation to ensure that all machines meet requirements.
- Provides standardized global specification of safety performance or integrity level.

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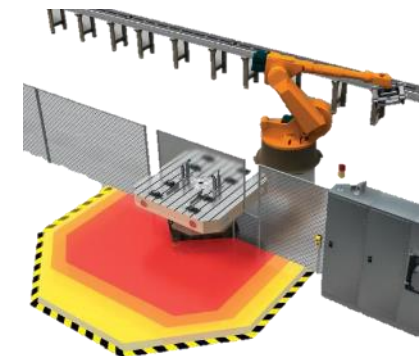
# Safety Maturity Index – Technology Attributes

## Effective use of contemporary safety techniques and technologies

- Optimize safety and productivity
- Reduce unscheduled downtime
- Investments in safety technology is perceived as an investment with an ROI
- Machines are *Inherently Safe by Design*
- Use of *alternative measures* to lock-out/tag-out for tasks deemed to be routine, repetitive, and integral to the process (*OSHA's minor servicing exception*) to optimize productivity.
- Integration of safety, discrete and motion control systems diagnostics to reduce unscheduled downtime (MTBF, MTTR).
- Use of advanced safety technologies and techniques (safe speed, safe direction, safe torque off, safe position, zone control, presence sensing, etc.) to optimize productivity.
- Use of manufacturing intelligence to monitor safety system performance (MTTFd), diagnostics, and ensure proper safety system use, maintenance and validation.

## Defining Best-In-Class Performance

Definition of Maturity Class	Mean Class Performance
<b>Best-in-Class:</b> Top 20% of aggregate performance scorers	<ul style="list-style-type: none"><li>• 90% OEE</li><li>• 0.2% Repeat Accident Rate</li><li>• 0.05 Injury Frequency Rate</li><li>• 2% Unscheduled Asset Downtime</li></ul>
<b>Industry Average:</b> Middle 50% of aggregate performance scorers	<ul style="list-style-type: none"><li>• 85% OEE</li><li>• 2.4% Repeat Accident Rate</li><li>• 0.9 Injury Frequency Rate</li><li>• 6% Unscheduled Asset Downtime</li></ul>
<b>Laggard:</b> Bottom 30% of aggregate performance scorers	<ul style="list-style-type: none"><li>• 76% OEE</li><li>• 10% Repeat Accident Rate</li><li>• 3.0 Injury Frequency Rate</li><li>• 14% Unscheduled Asset Downtime</li></ul>





# Safety Maturity Index™

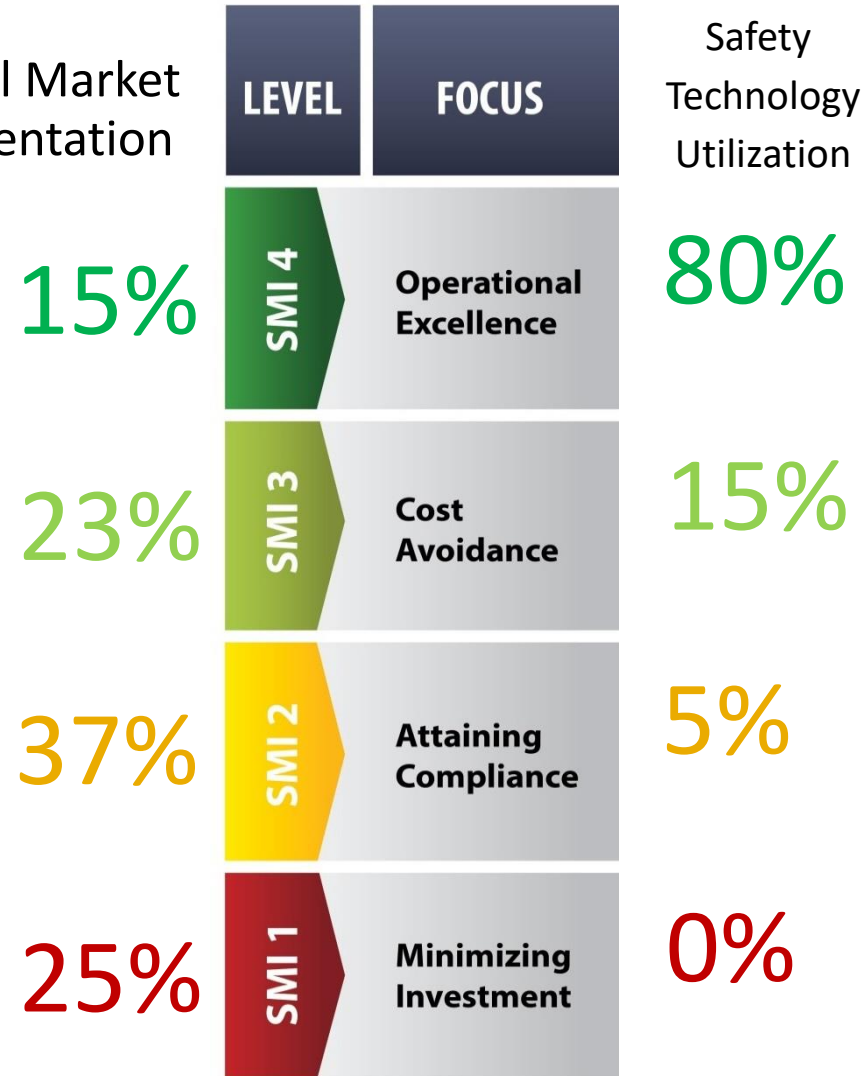
## for Machinery

LEVEL	FOCUS	CULTURE	COMPLIANCE	CAPITAL
		BEHAVIORAL	PROCEDURAL	TECHNICAL
<b>SMI 4</b>	<b>Operational Excellence</b>	Safety is a <b>value</b> – essential to the health of the business.	Standard processes established to design <b>safety and productivity</b> into machinery throughout the supply chain.	Use of <b>contemporary</b> safety technologies & techniques to optimize <b>safety and productivity</b> .
<b>SMI 3</b>	<b>Cost Avoidance</b>	Safety is a <b>priority</b> – important to the health of the business.	Standard processes established to design <b>safe machinery</b> throughout the company.	Use of safety technologies & techniques to <b>optimize safety</b> .
<b>SMI 2</b>	<b>Attaining Compliance</b>	Safety is a <b>necessity</b> – to meet compliance requirements.	Standard processes established to <b>meet minimum requirements</b> .	Use of <b>basic safety</b> technologies & techniques.
<b>SMI 1</b>	<b>Minimizing Investment</b>	Safety is <b>minimized</b> – it could interfere with other prerogatives.	Minimal processes established to avoid fines and complaints.	Incomplete or improper use of safety technologies.

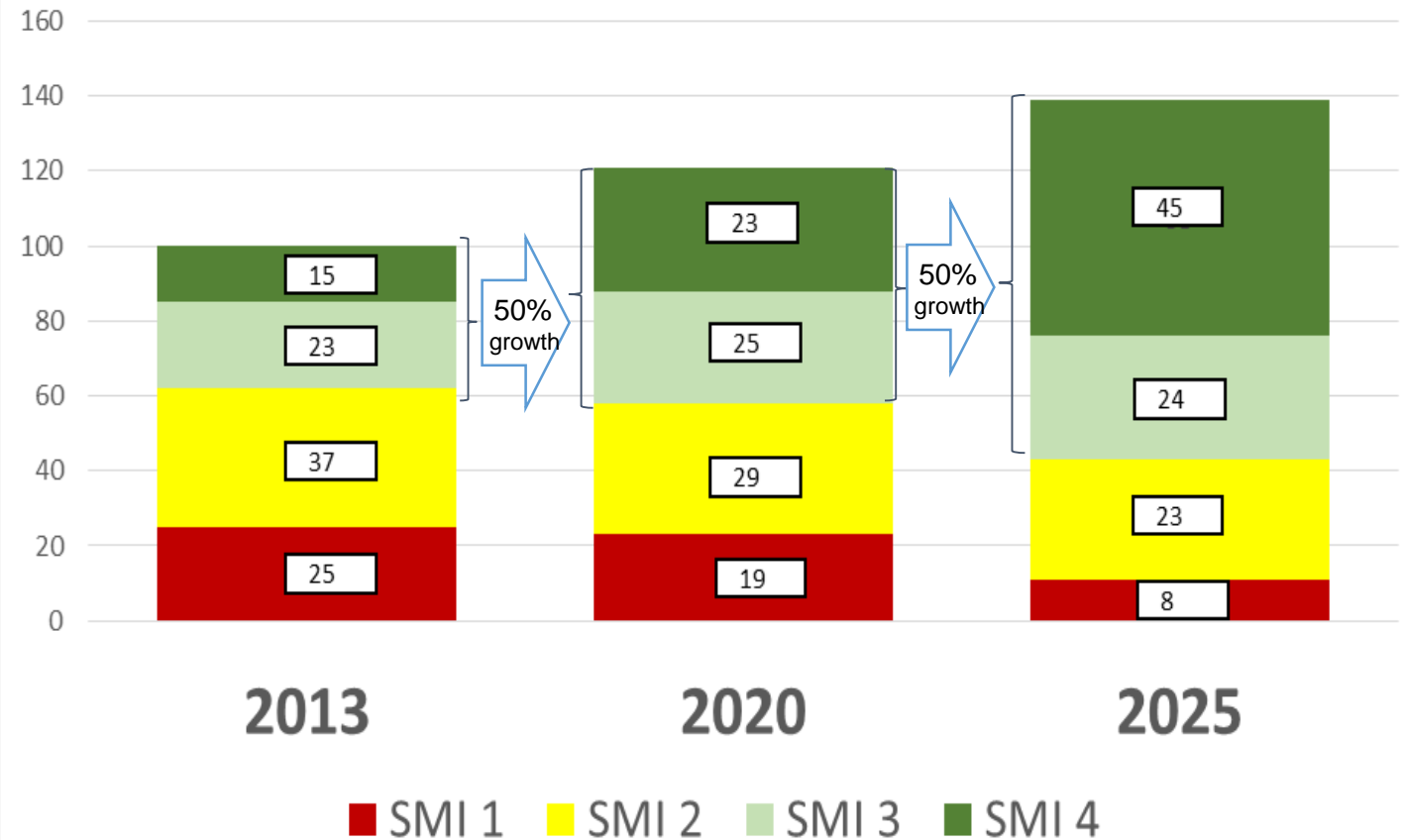


# Safety Maturity Index™ for Machinery

Global Market  
Segmentation



## Manufacturing Market Safety Maturity Segmentation Outlook



Source – Rockwell Automation, 2013 Manufacturing Safety Effectiveness Study by The Aberdeen Group



# Safety Maturity Index™ for Machinery

[link to Safety Maturity Index page, white paper and tool](#)

## 1. Assess your Manufacturing Safety Maturity

- Culture (behavioral)
- Compliance (procedural)
- Capital (technical)

## 2. Determine where to invest

- Develop the Roadmap by collaborating with expert resources

## 3. Benchmark your organization

- Track your progress on the journey to safer more productive manufacturing
- Compare yours to similar organizations

LEVEL	FOCUS	CULTURE	COMPLIANCE	CAPITAL
		BEHAVIORAL	PROCEDURAL	TECHNICAL
SMI 4	Operational Excellence	Safety is a value – essential to the success of the business.	Standard processes established to ensure safety and productivity throughout the supply chain.	Use of contemporary safety technologies and techniques to optimize safety and productivity.
SMI 3	Cost Avoidance	Safety is a priority – important to the health of the business.	Standard processes established to meet minimum requirements.	Use of safety technologies & techniques to optimize safety.
SMI 2	Attaining Compliance	Safety is a necessity – to meet compliance requirements.	Standard processes established to meet minimum requirements.	Use of basic safety technologies & techniques.
SMI 1	Minimizing Investment	Safety is minimized – it could interfere with other priorities.	Minimal processes established to avoid fines and citations.	Incomplete or inappropriate use of safety technologies.

**Rockwell Automation** | Safety Maturity Assessment Tool for Machinery

Welcome back! mpetzma@ra.com

### Safety Maturity Assessment Tool for Machinery

Assessment

#### Facility Profile

- How many years has your facility been in operation?
  - ☐ Less than 5 years
  - ☐ 5-10 years
  - ☐ 11-25 years
  - ☐ 26-50 years
  - ☐ More than 50 years
- Which of the following best describes your facility?
  - ☒ Automotive
  - ☐ Beverage
  - ☐ Fibers and textiles
  - ☐ Food
  - ☐ Entertainment
  - ☐ Household and personal care
  - ☐ Infrastructure
  - ☐ Life Sciences
  - ☐ Marine
  - ☐ Metals

#### Culture

- How is safety described in your facility?
  - ☐ A core value (uncompromising)
  - ☐ A high priority (among other priorities)
  - ☐ Necessary to be compliant with regulations
  - ☐ Minimized and ignored
- What is the role of facility senior management?
  - ☐ Completely accountable, supportive
  - ☐ Accountable, supportive, promotes safety
  - ☐ Aware and monitoring safety performance
  - ☐ No personal role in safety performance
- How are safety incidents handled?
  - ☐ All incidents, including minor near misses
  - ☐ All incidents, especially near misses
  - ☐ Most incidents reported and tracked
  - ☐ Tendency to hide or cover up incidents
- What percentage of facility employees are safety conscious?
  - ☐ Greater than 90%
  - ☐ 76-90%
  - ☐ 50-75%
  - ☐ Less than 50%
- What percentage of facility employees are safety conscious?
  - ☐ Greater than 90%
  - ☐ 76-90%
  - ☐ 50-75%
  - ☐ Less than 50%

#### Compliance

- What best describes your facility's approach to machine safety compliance?
  - ☐ Standardized processes established
  - ☐ Standardized processes established
  - ☐ Standardized processes established
  - ☐ Standardized processes established
- Describe safety roles for facility
  - ☐ Clearly defined safety responsibilities
  - ☐ Defined safety responsibilities
  - ☐ Safety responsibilities defined
  - ☐ Few or no safety responsibilities
- Describe the thoroughness of safety training
  - ☐ Comprehensive safety training
  - ☐ Comprehensive safety training
  - ☐ Comprehensive safety training
  - ☐ Comprehensive safety training
- What practices are used to verify safety
  - ☐ Machinery suppliers provide
  - ☐ Machinery specifications are
  - ☐ Specific machinery specifications
  - ☐ Low or no machinery specifications
- What type of safety metrics are used?
  - ☐ Standardized metrics tracked
  - ☐ Standardized metrics tracked
  - ☐ Standardized metrics tracked
  - ☐ Standardized metrics tracked

#### Capital

- How is safety integrated into machine procurement?
  - ☐ Comprehensive safety technologies and techniques optimize machinery safety and productivity
  - ☐ Safety technologies and techniques optimize machinery safety
  - ☐ Basic safety technologies and techniques
  - ☐ Basic safety technologies and techniques
- How is safety integrated into machine procurement?
  - ☐ Comprehensive safety technologies and techniques optimize machinery safety and productivity
  - ☐ Safety technologies and techniques optimize machinery safety
  - ☐ Basic safety technologies and techniques
  - ☐ Basic safety technologies and techniques
- Describe safety equipment measures used throughout your facility or machinery
  - ☐ Comprehensive safety technologies and techniques optimize machinery safety and productivity
  - ☐ Safety technologies and techniques optimize machinery safety
  - ☐ Basic safety technologies and techniques
  - ☐ Basic safety technologies and techniques
- How is machinery safety system performance monitored and maintained?
  - ☐ Comprehensive safety technologies and techniques optimize machinery safety and productivity
  - ☐ Safety technologies and techniques optimize machinery safety
  - ☐ Basic safety technologies and techniques
  - ☐ Basic safety technologies and techniques
- Agree what is the performance of your safety technology evaluation?
  - ☐ Comprehensive safety technologies and techniques optimize machinery safety and productivity
  - ☐ Safety technologies and techniques optimize machinery safety
  - ☐ Basic safety technologies and techniques
  - ☐ Basic safety technologies and techniques

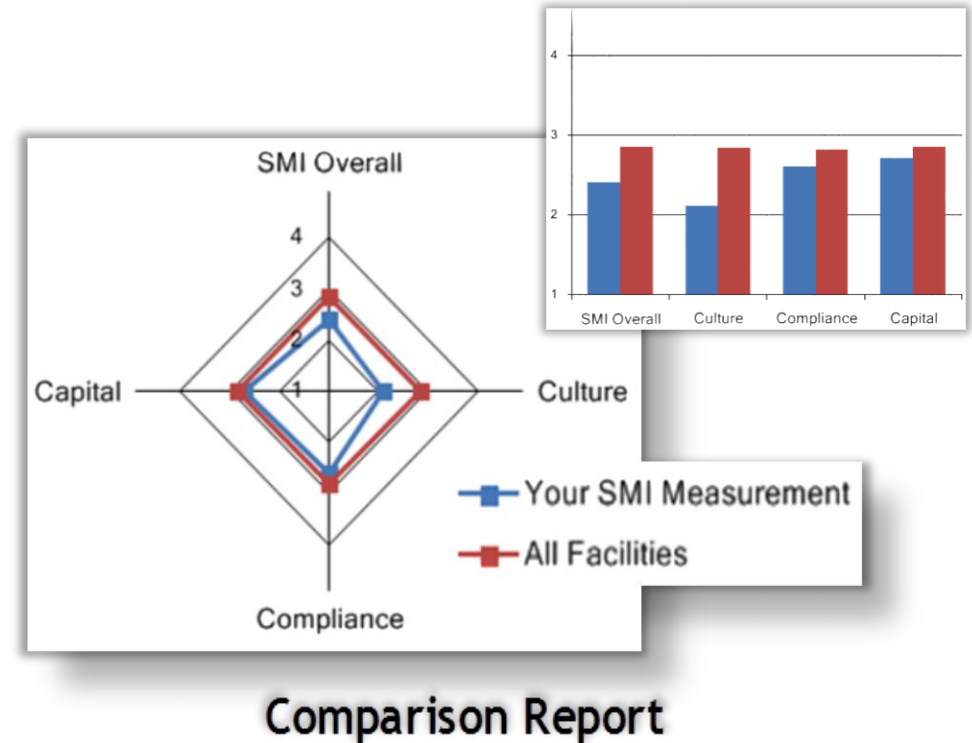
Go





## ***Safety Maturity Index™*** for Machinery

- **SMI assessment database**
  - Completely anonymous
  - Will compile industry and market data
  - Generate a report (.xls or pdf)
- **Allows users to compare results by;**
  - Product/Industry
  - Geo. Region
  - Size (emp. & revenue)
  - Years in operation



SMI MEASUREMENTS	Your Facility	Comparison
SMI Overall	2.4	2.8
Culture	2.1	2.8
Compliance	2.6	2.8
Capital	2.7	2.8

# Integrated Mill Systems Machine Safety Workshop



## *The ROI of Investments in Safety*



Definition of Maturity Class	Mean Class Performance
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# Machine Safety Evolution



1970

1980

1990

2000

2010

2020

LOTO

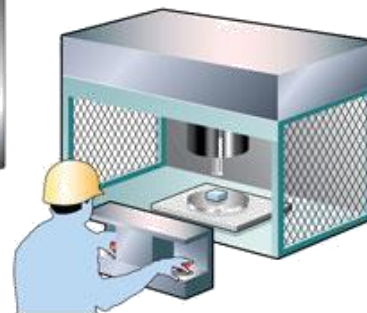
Preventing Access

Detecting & Controlling Access

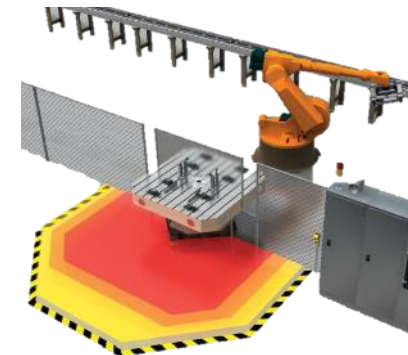
Collaborative Access



Guards



Safeguards



Integrated Safety

# Contemporary - Maturing Perspective of Safety



- Improved Machine Speed & Utilization
- Improved Operational Efficiency / Labor Costs
- Improved Maintenance Downtime / Efficiency
- Reduced Nuisance Shutdowns
- Regulatory Compliance
- Reduced Healthcare costs
- Reduced Litigation costs
- Reduced Labor grievances



and expensive

- More sophisticated controls
- More educated staff
- May require a culture shift
- New policies/procedures/standards



*Safety and Productivity are Complementary*





# Do we have an “opportunities”?

- Are poor safety system designs inducing people to bypass them just to do their jobs?
  - Are safety procedures being followed?
  - Are “short cuts” taken to expedite maintenance?
  - Is LOTO (lock out/tag out) always followed?
  - Are safety systems or technologies ever bypassed?
  - Are people using a “cheater key”?



*“A historical lack of accidents does not imply a current presence of safety. It simply means you’ve been faster than the machine.”*

Bill Hilton, Director of Health and Safety



# Safety ROI Tool to justify safety solution investments

- Calculate safety project ROI based on related **productivity enhancements** and **injury cost avoidance**
- Allows a manufacturer to create a business case for safety investments
- Use defaults or populate with own data regarding specific projects
- Available on;
  - rockwellautomation.com > capabilities > safety solutions
  - [Link to Safety ROI tool on rockwellautomation.com](#)



$$\frac{\text{Cost Avoidance}}{\text{\$\$}} + \frac{\text{OEE Improvements}}{\text{\$\$}} = \text{Fiscal and Social Responsibility ROI}$$




# Safety ROI Tool

*Is safety only a cost, or can a safety project show a return?*

**Rockwell Automation** | Safety Resource Center

Safety ROI Tool



### Safety Is Good Business

The evidence is clear: safety is good business. Find out how to quantify the savings and productivity gains from safety investments. The Rockwell Automation Safety Return-On-Investment Tool accounts for improved safety, reduced claims, improved productivity, and other issues unique to safety applications.

To use the Rockwell Automation ROI Tool you will need to register or provide a registration code. The information given to determine your Safety ROI will not be saved or used for any other purpose by Rockwell Automation.

Register Now!

Are you a returning user?

Enter your code to load the ROI Tool

Go!

**A Cost Estimate**  
Total project cost estimate (controls, software, installations, training, etc.)

1 Total Project Cost

Dollars

75000

**B OEE (Overall Equipment Effectiveness)**  
Availability, Performance, Quality

Availability Increase  
Reduces The Cost of Unscheduled Downtime

2 Unscheduled Downtime

Minutes Per Week

3 Operations Cost of Downtime

Dollars Per Minute

4 Weeks of Unscheduled Downtime

Per Year

5 Reduction Factor

Percent

6 Unscheduled Downtime Savings (First Year)

45000

Performance Increase  
Generates More Uptime and Increases Production Volume

7 Increased Units Produced

Per Week

8 Scheduled Production

Weeks Per Year

9 Profit Contribution

Dollars Per Unit

10 Increased Profit (First Year)

172800

Quality Improvement  
Difficult to measure financial value attributable to safety controls retrofit




# Safety ROI Tool

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**Go!**

**C Increased Capital Asset Depreciation**  
Depreciation of the new integrated safety system

11 Total Project Cost

Dollars

12 Residual Value

Dollars

13 Depreciation Term

Years

14 Depreciation (First Year)

**7500**

**D Direct injury cost (12 Months)**

15 Direct Injury Cost

Dollars

15000

**E Indirect Injury Cost (12 Months)**  
Cost avoidance

16 Direct Injury Cost

Dollars

17 Ratio

to 1

18 Indirect Injury Cost

**75000**





# Safety ROI Tool

*Is safety only a cost, or can a safety project show a return?*

**Total First Year Benefits**

294300

7500

**Return on Investment**

Percentage of first year return on investment

3.924

15000

75000





# *Why Safety...?*

## *Corporate Social Responsibility AND Good Business*

- **Contemporary approach improves the bottom line**
  - Best in class – 5-7% higher OEE and half the injury rate
  - Reduced financial risk – direct costs, civil/criminal liability, fines, supply chain disruptions
- **Safety improves your business**
  - “Best place to work”
  - Attraction/retention of high quality employees
  - Improves overall competitiveness
- **Worker safety is a corporate social responsibility**
  - Contributes to corporate image
  - Protects share holder value
  - Enhances of trust in company leadership



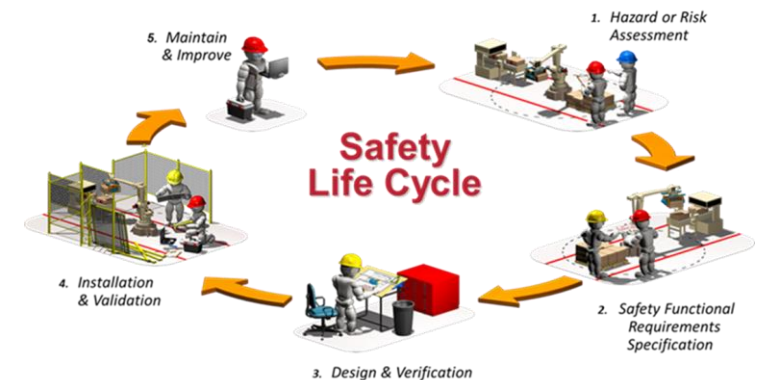


## 5 part series on Manufacturing Safety

## PORTAGE COUNTY SAFETY COUNCIL

A Forum For Workplace Safety

1. **Societal Demands for Safety and Productivity - Sept. 1**
2. **Regulatory Compliance (laws and standards) and Risk Assessments - Sept 8**
3. **Risk Reduction Methods, Technologies and Techniques for Machinery Safety - Sept 15**
4. **Engineered Controls and Safety Circuits – Sept 22**
5. **Installation, Validation and Post Commissioning Management of Change – Sept 29**





# Portage County Safety Council Machine Safety Workshop Part 1 of 5 Manufacturing Safety and Productivity

Sept. 1, 2021



## Integrated Mill Systems

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