مهندسی آب و فاضلاب

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جلوتر از دیگران حرکت کنید

اطلاعات آموزشی

اطلاعات فنی و مهندسی

اخبار روز آب و فاضلاب

اخبار استخدامی کارفرمایان

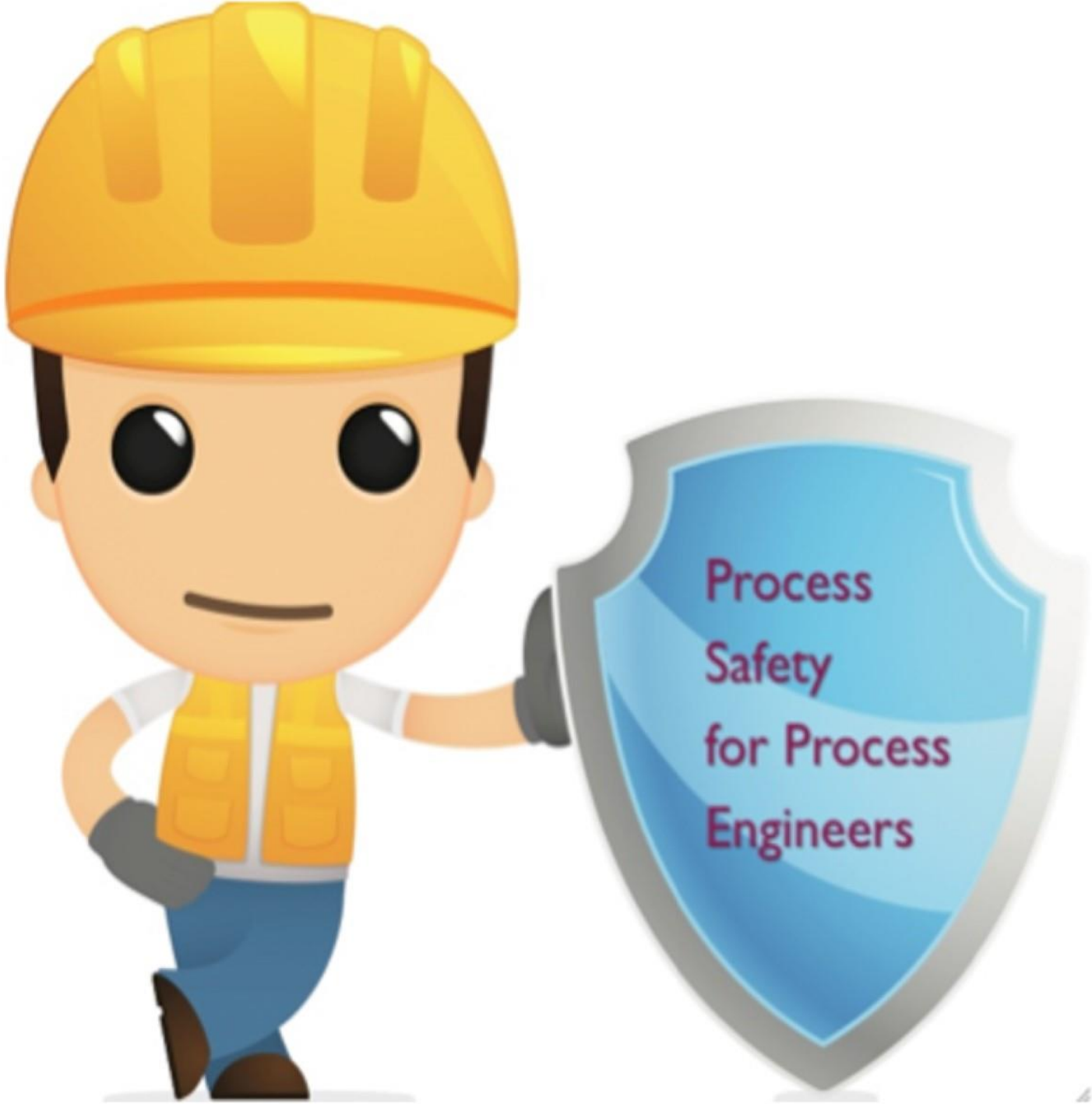
T.me/mohandesifazelab

Instagram.com/abfaeng

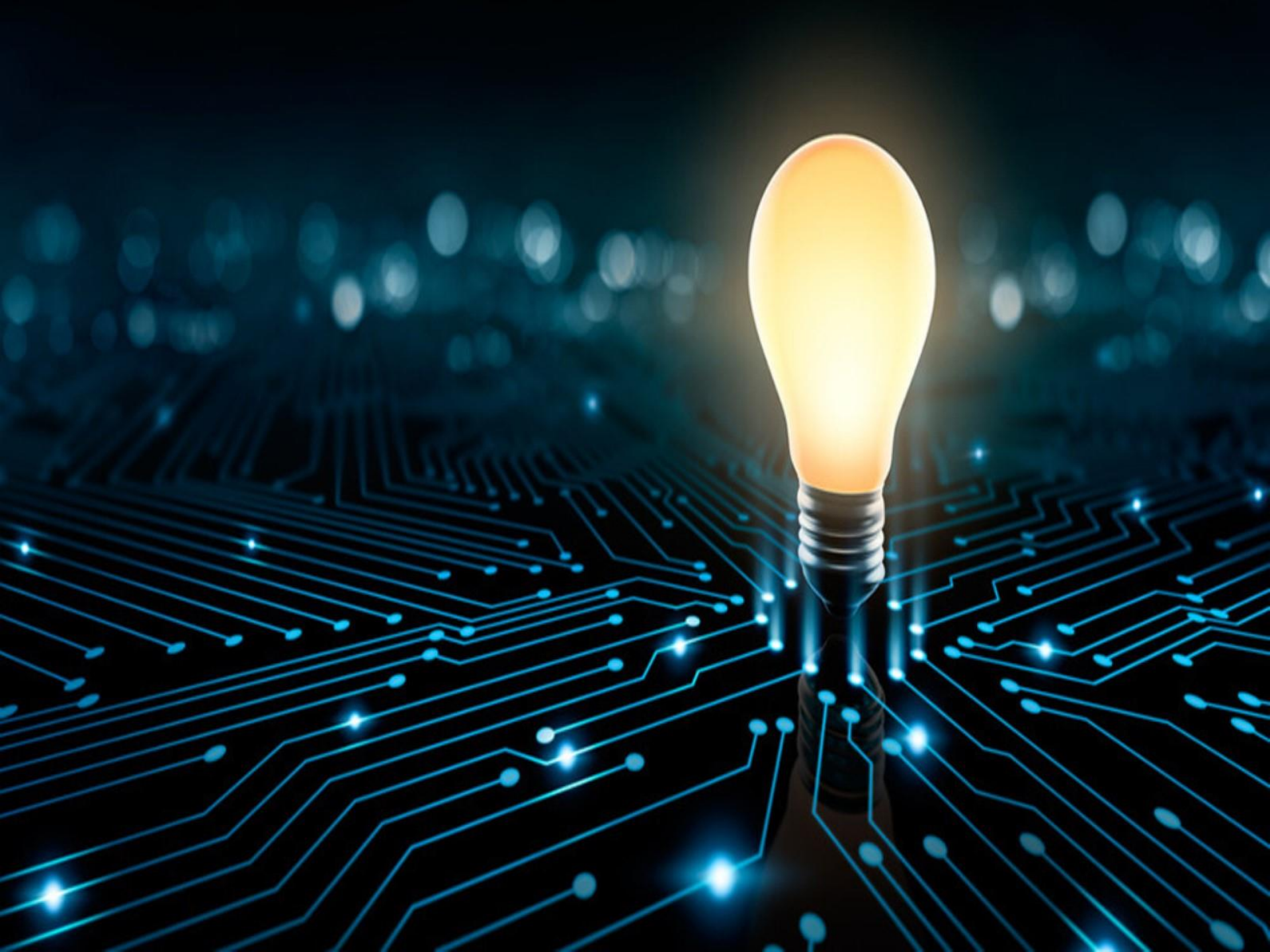
به نام خداوند جان و خرد

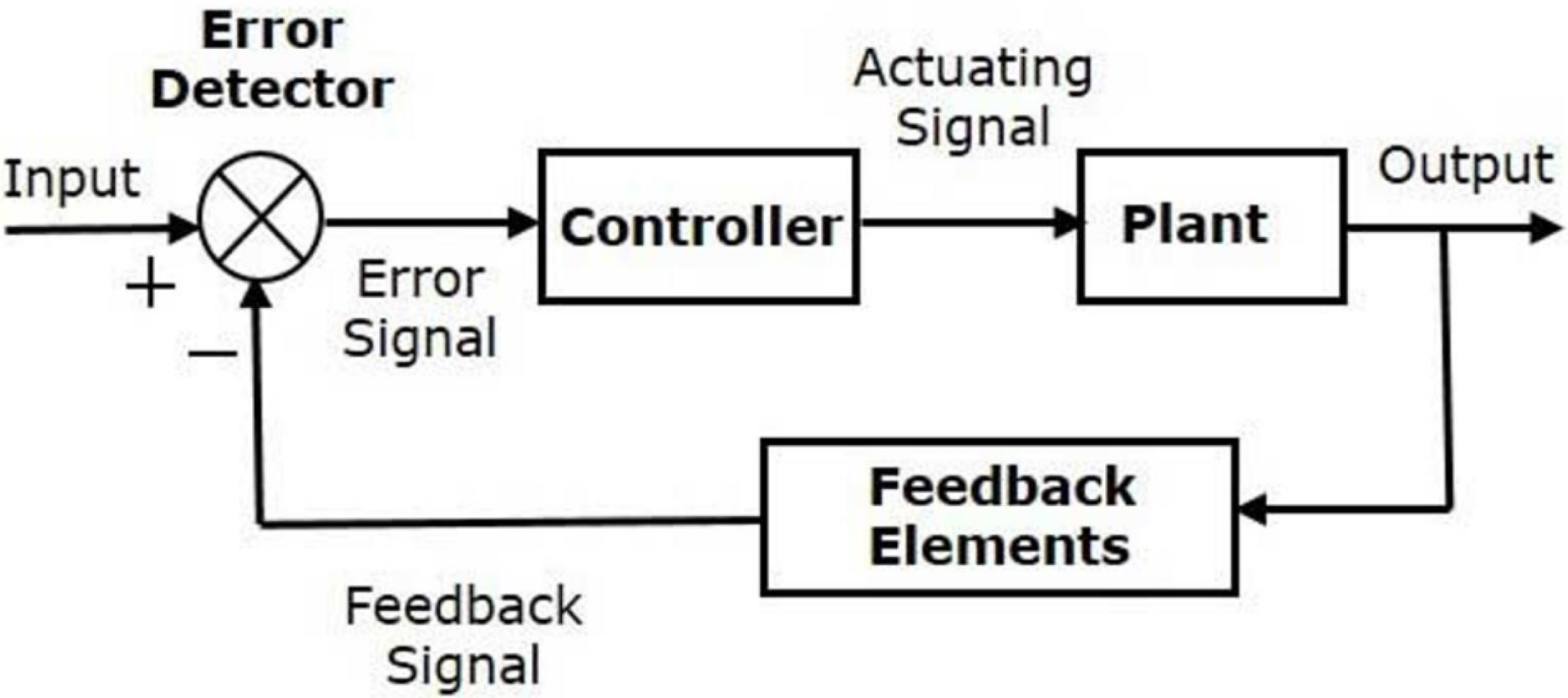
کزاین برتر اندیشه برنگذرد

soltanzadeh.ahmad@gmail.com

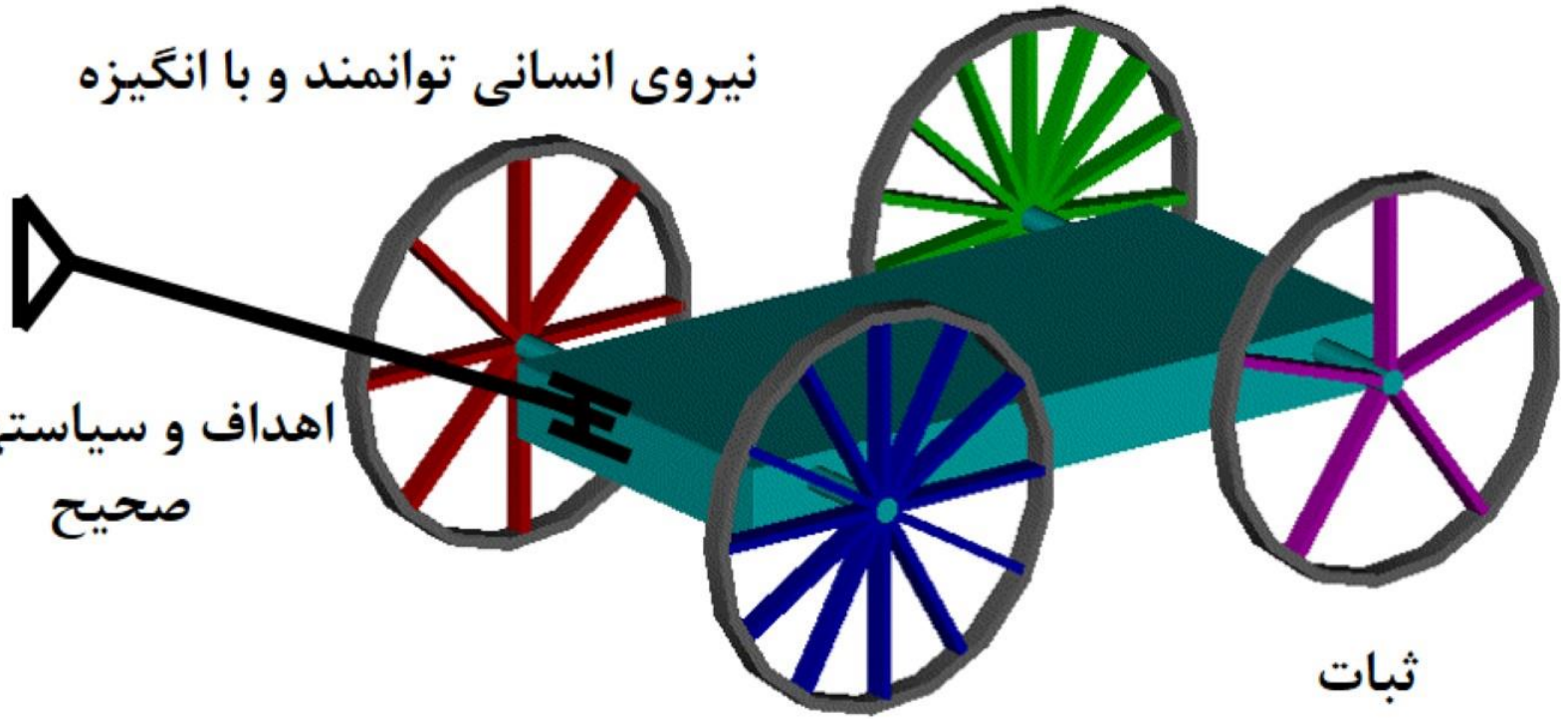

Process
Safety
for Process
Engineers


System

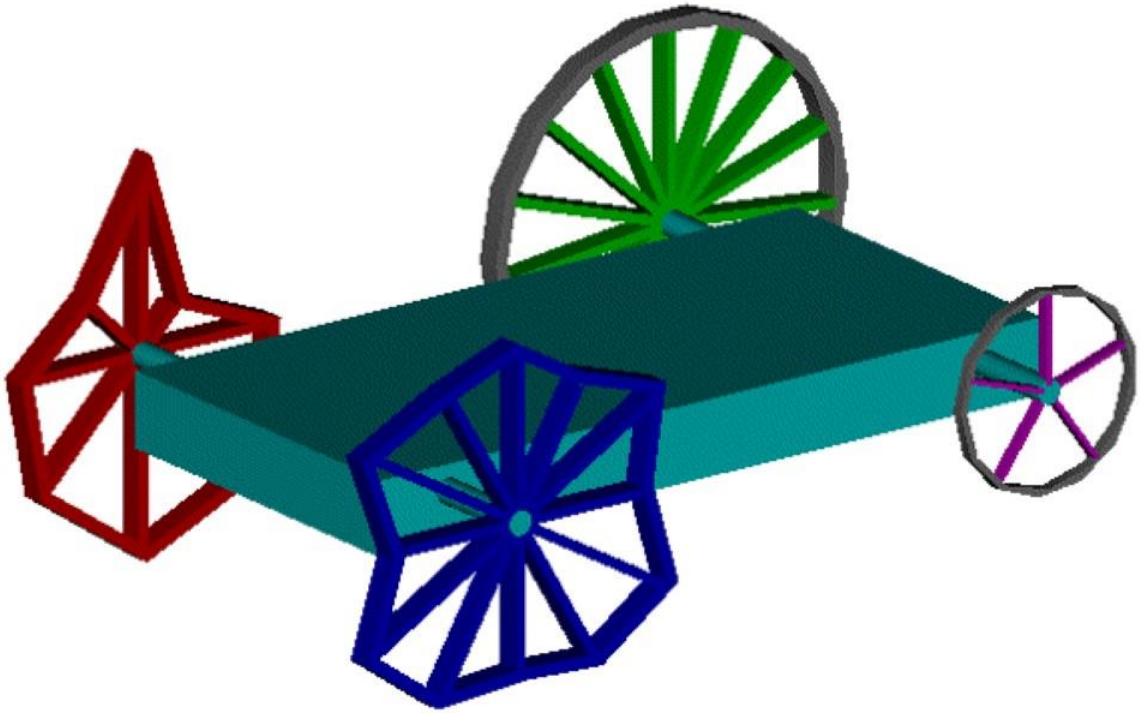



Error
Detector
Actuating
Signal
Input
Output
Controller
Plant
+
−
Error
Signal
Feedback
Elements
Feedback
Signal

فرایند و سیستم مناسب برنامه ریزی



اطلاعات صحیح ، دقیق و بموقع



Basic Safety philosophy for Success

Basic Safety philosophy for Success

- All accidents are preventable.
- No job is worth getting hurt for.
- Every job will be done safely.
- Incidents can be managed.
- Safety is everyone's responsibility.
- Continuous improvement.
- Safety as a "way of life" for 24 hours/day

❖ HSE Philosophy

ABOCO
Ario Barzan Operation Company

HSE Sustainable Development Process

□. PLAN
1) Policy & Goal 2) HSE Organization 3) Education & Exercise(Training)

□. DO (Establishment)
1) Risk Management(Human Risk, Mechanical Risk)
2) Emergency Response 3) Accident Investigation
4) Management of Change 5) Communication 6) Contractor Management

□. CHECK (Measuring and Monitoring)
1) System, 2) Facility, 3) Personnel

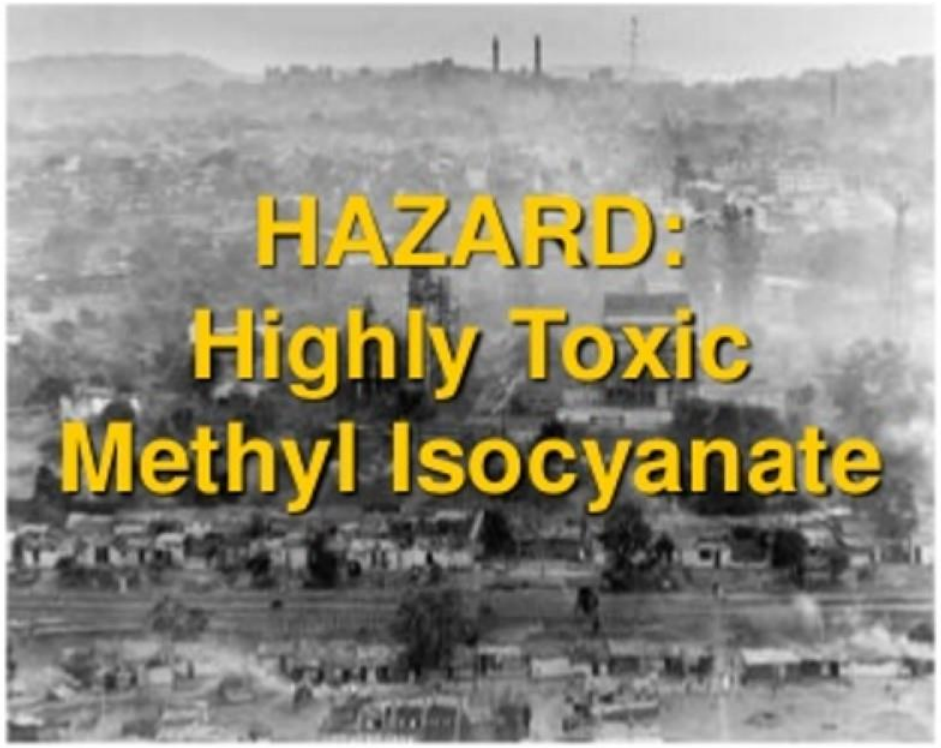
□. ACT
1) Motivation 2) Sustainable Development

Tomorrow Dreams Bigger

3. Case Studies about some of the major chemical accidents

Case study 1: Bhopal Tragedy:

- ✓1984 – Bhopal, India – Toxic Material Released
- ✓2,500 immediate fatalities; 20,000+ total died.
- ✓Many other offsite injuries



❑ **Cause:** Most of the safety systems were not functioning. Many valves and lines were in poor condition

Timeline of Disasters

1988 | 1989 | 2000 | 2005 | 2010

Phillips Disaster of 1989

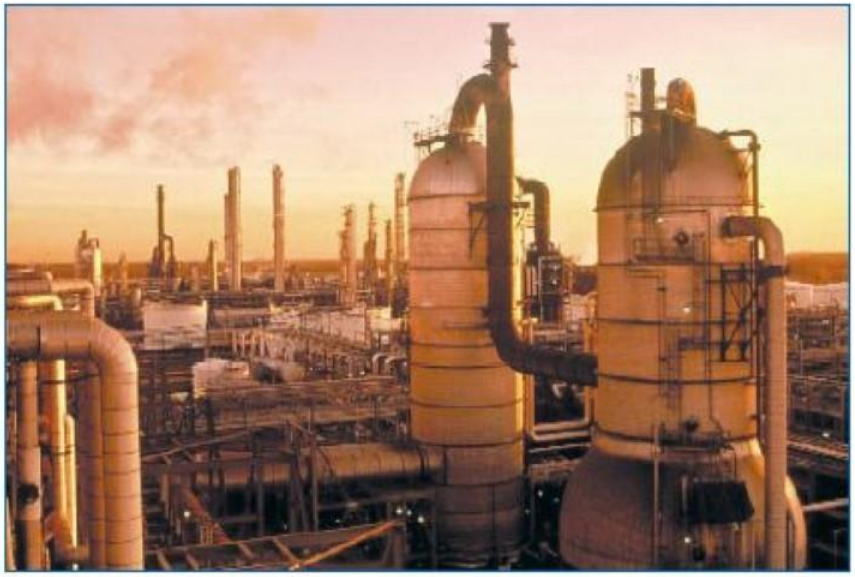
Location: Pasadena, TX
Company: Phillips Petroleum Co.
Damages: $1.4 billion
Deaths: 23
Injuries: 314

BASF incident

- July 1990
- Cincinnati, OH
- Resins Plant
- Killed one person
- Injured 72
- Damaged 17,000 homes and businesses

Arco Chemical

- Channelview, TX
- July 4th 1990
- Waste Chemical Tank
- 17 deaths



Catastrophic Events

		Deaths	Injuries
• 1989	Pasadena, TX	23	130
• 1990	Houston, TX	17	--
• 1990	Cincinnati, OH	2	72
• 1991	Lake Charles, LA	5	--
• 1991	Sterlington, LA	8	120
• 1991	Charleston, SC	6	33
• 1991	Seadrift, TX	1	32

Then what should be done???

PROCESS SAFETY

PROCESS SAFETY MANAGEMENT

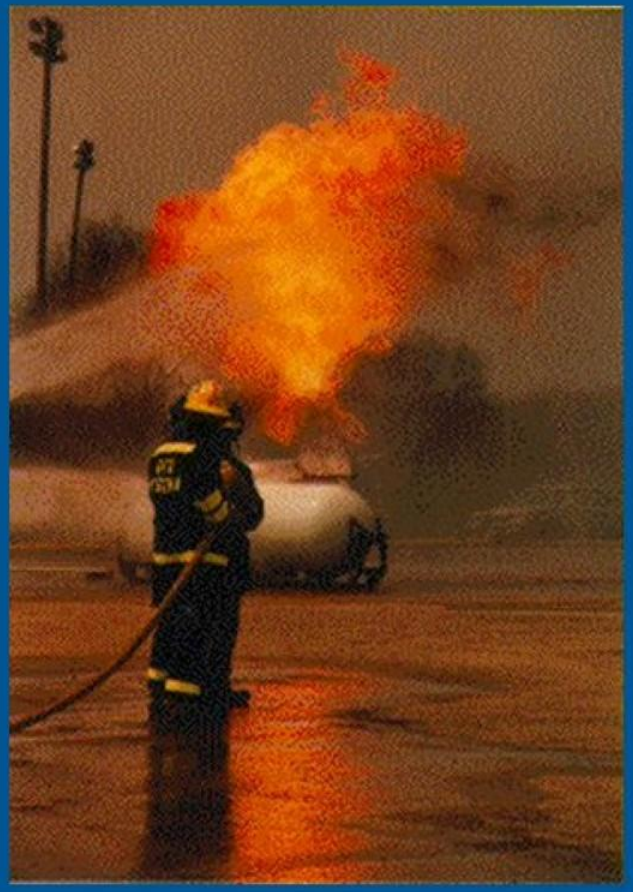
PSM is a Proactive Risk Based Approach

PROACTIVE	REACTIVE
• Implementing countermeasures to prevent an incident	• Implementing countermeasures after an incident has occurred
• Perform hazard analysis and risk assessment	• Perform incident investigation and determine root cause
• Practice inherently safer design	• Design & install additional layers of protection after an incident

History of PSM Catastrophes

A series of catastrophic releases of chemicals leading to fires, explosions and fatalities have occurred in chemical processing plants around the world over the years.

These incidents lead to the passage of the Process Safety Management Rule in 1992.



29 CFR 1910.119

OSHA's Process Safety Management Standard

Managing releases of any substance defined as a **"highly hazardous chemicals"**

History of the PSM standard

- Proposed rule was published – July 17,1990
- Final Rule was published- February 24, 1992.

OSHA
adds value to business, work and life

What Is Process Safety Management?

TOTAL SAFETY®

- PSM:
  - Addresses the management of Highly Hazardous Chemicals (HHC)
- Integrates
  - Technology
  - Operating Procedures
  - Standard management protocols

In a Few Words, What is PSM?

- The ***proactive*** and ***systematic*** identification, evaluation, and mitigation or prevention of chemical releases that could occur as a result of failures in process, procedures, or equipment.

Purpose

- Prevent Catastrophic Releases of Highly Hazardous Chemicals
- Minimize Consequences of Such Releases to Employees and the Community


Process Safety Management
✓ Use
✓ Storage
✓ Handling

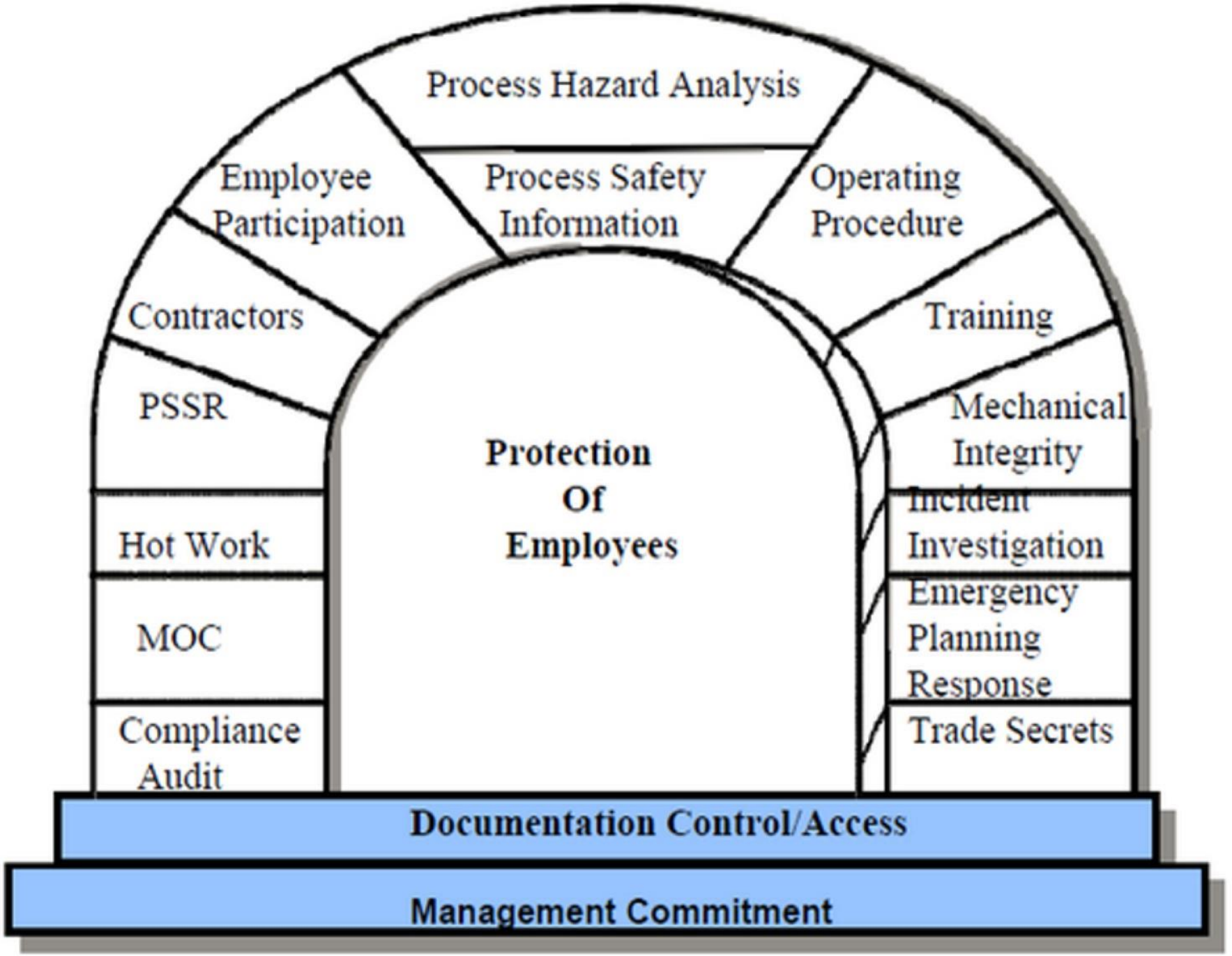
OSHA®
Occupational Safety and Health Administration

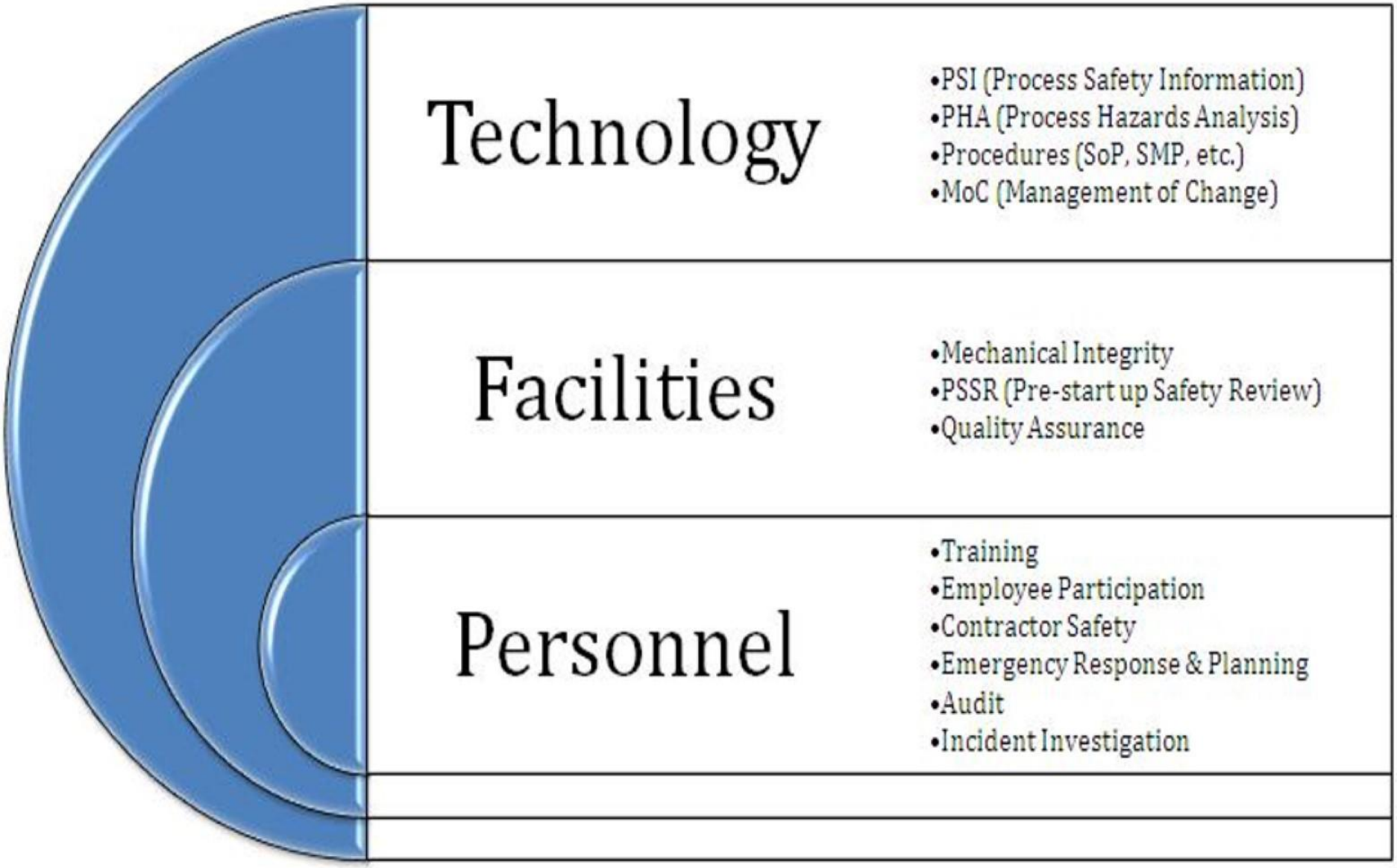
UNITED STATES
DEPARTMENT OF LABOR

OSHA English | Spanish MENU

Regulations (Standards - 29 CFR) - Table of Contents

- **Part Number:** 1910
- **Part Title:** Occupational Safety and Health Standards
- **Subpart:** H
- **Subpart Title:** Hazardous Materials
- **Standard Number:** 1910.119
- **Title:** Process safety management of highly hazardous chemicals.
- **Appendix:** A, B, C, D
- **GPO Source:** e-CFR


Process Hazard Analysis
Employee Participation
Process Safety Information
Operating Procedure
Contractors
Training
PSSR
Mechanical Integrity
Protection Of Employees
Hot Work
Incident Investigation
MOC
Emergency Planning Response
Compliance Audit
Trade Secrets
Documentation Control/Access
Management Commitment


Technology
•PSI (Process Safety Information)
•PHA (Process Hazards Analysis)
•Procedures (SoP, SMP, etc.)
•MoC (Management of Change)
Facilities
•Mechanical Integrity
•PSSR (Pre-start up Safety Review)
•Quality Assurance
Personnel
•Training
•Employee Participation
•Contractor Safety
•Emergency Response & Planning
•Audit
•Incident Investigation

Key Benefits of Process Safety KPIs

- Prevent major incidents
- Improve reliability
- Avoid complacency
- Communicate performance

1

Employee Participation

1. Employee Participation

- All employees must be **involved in every aspect of PSM program**.

Since OSHA requires **written employee participation**, it is best to create a **formal plan for safety meetings**.

1. Employee Participation

- مهندسان فرایند
- اپراتورها
- ایمنی
- تعمیرات
- مدیران
- پیمانکاران
- طراحان
- مشاوران

1. Employee Participation

مراحل تشکیل یک تیم

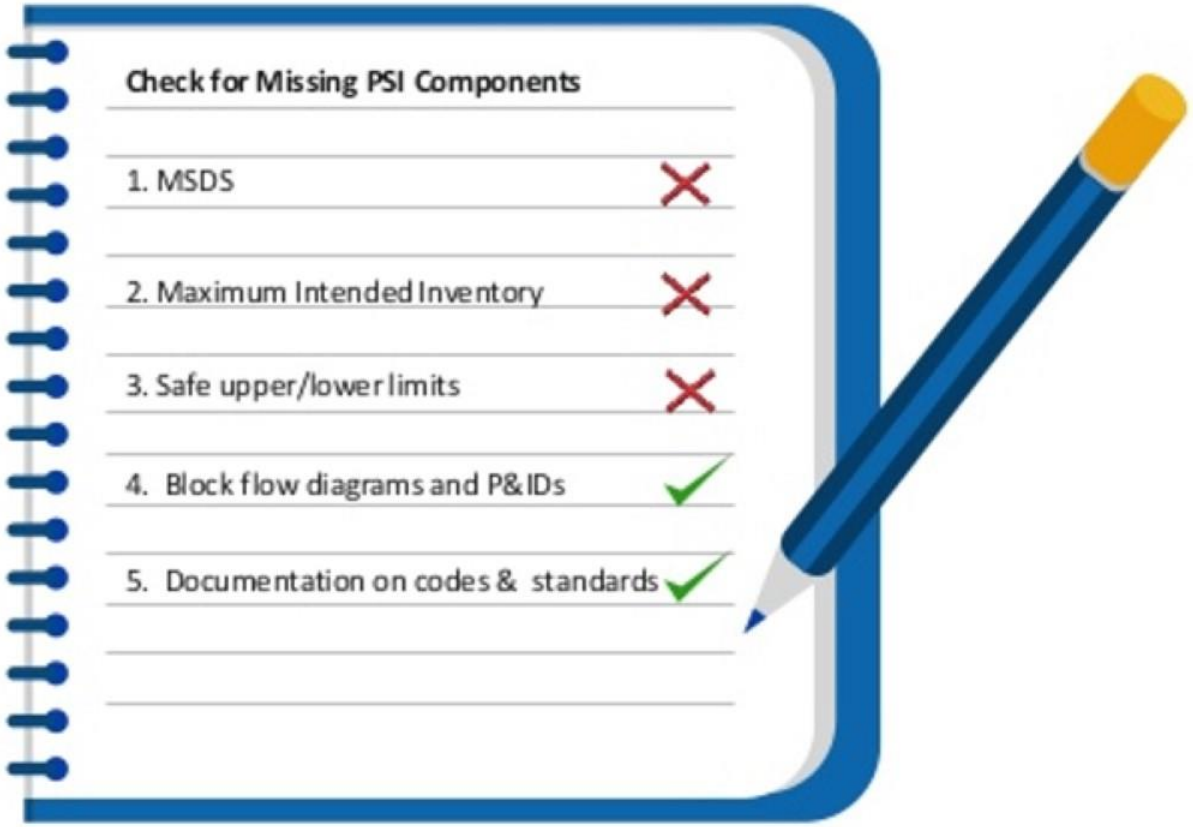
- تعیین اعضا
- تعیین اصول و هسته وظایف و صلاحیت‌ها
- تعیین وظایف و مسئولیت‌ها
- تعیین نوع ارتباطات
- تعیین رهبر گروه

Intrinsic Motivation

Engage in a behavior because it is personally rewarding, not for an external reward

Process Safety Information

2



2. Process Safety Information

Employees should be **able** to **access** and **understand** the technical information related to any **highly hazardous chemicals (HHC)** they work with on the job.

Process Safety Information: Chemicals

- Toxicity
- PEL
- Physical Data
- Reactivity and Corrosivity
- Thermal and Chemical Stability
- Effects of Mixing Chemicals

CAMEO

Process Safety Information: Process

- Block flow or process flow diagram
- Process chemistry
- Maximum intended inventory
- Safe upper/lower limits for such items as temperatures, pressures, flows or compositions
- Consequences of deviations, e.g. runaway reaction potential

Process Safety Information: Equipment

- Materials of construction
- P&IDs
- Electrical Classification
- Relief system design & design basis
- Ventilation system design
- Design codes and standards
- Material & energy balances
- Safety systems

Explosive

Flammable

Oxidizing

Compressed Gas

Harmful/Irritant

Dangerous for the Environment

Health Hazard

Corrosive

Toxic

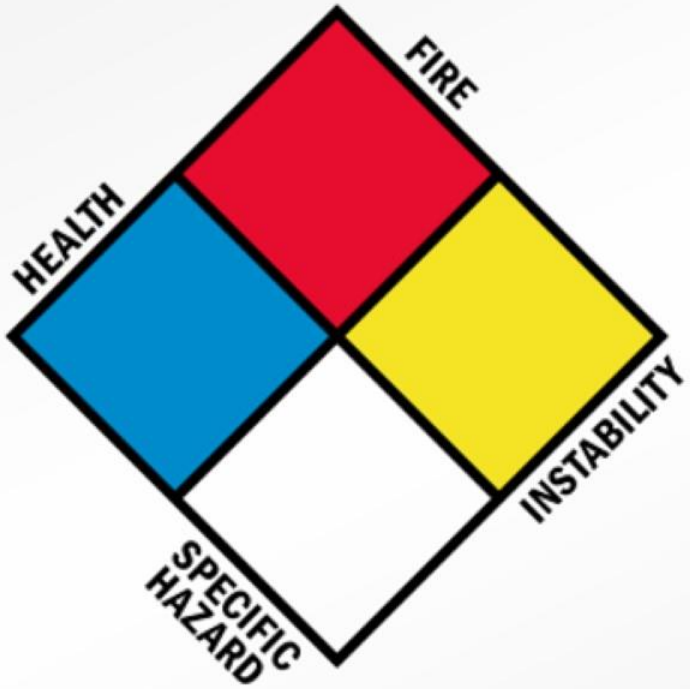
Product ID:

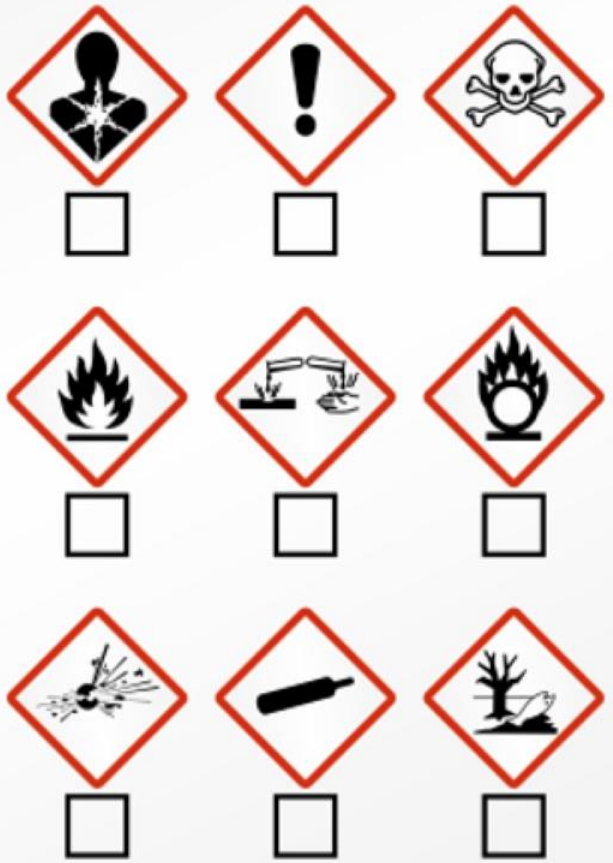
Signal Word:

☐ **DANGER**

☐ **WARNING**

☐ **N/A**





Precautionary and Other Information:

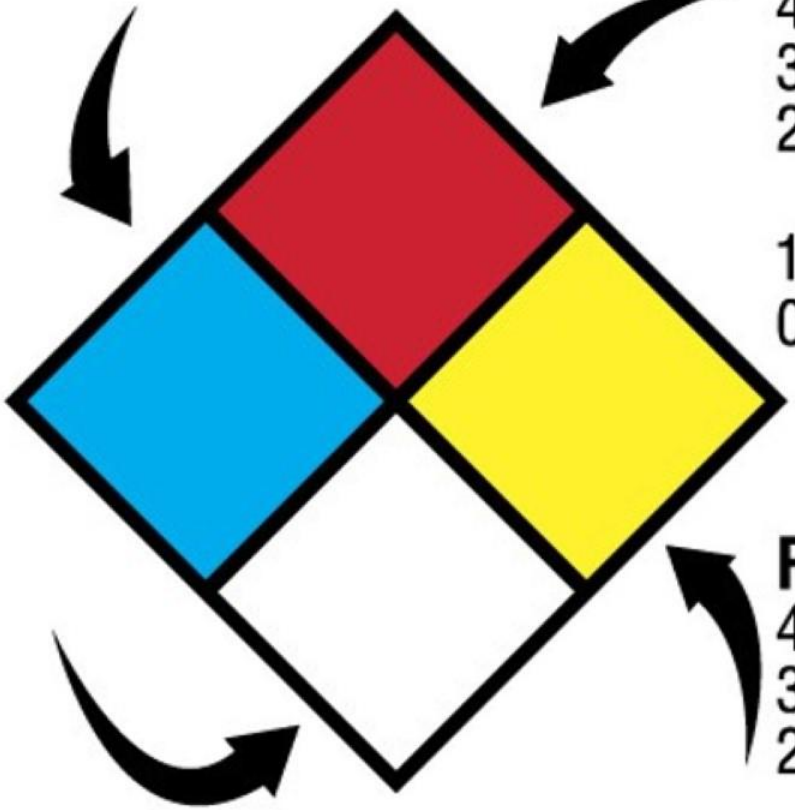
PPE Code:

HEALTH HAZARD

4 Deadly
3 Extreme danger
2 Hazardous
1 Slightly hazardous
0 Normal material

SPECIFIC HAZARD

ACID-Acid
ALK-Alkali
COR-Corrosive
OXY-Oxidizer
P-Polymerization
☢-Radioactive
₩-Use No Water



FIRE HAZARD

Flash Points
4 Below 73° F
3 Below 100° F
2 Above 100° F not exceeding 200° F
1 Above 200° F
0 Will not burn

Reactivity

4 May detonate
3 Shock & heat
2 Violent chemical change
1 Unstable if heated
0 Stable

CHEMICAL NAME _____

MSDS # _____

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM

HAZARD INDEX

4	Severe Hazard
3	Serious Hazard
2	Moderate Hazard
1	Slight Hazard
0	Minimal Hazard

* An asterik or other designation corresponds to additional information on a data sheet or separate chronic effects notification

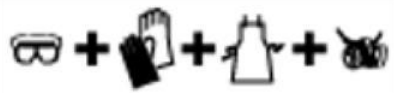
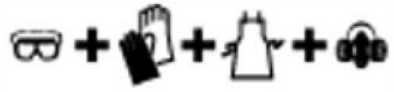
HEALTH

FLAMMABILITY

PHYSICAL HAZARD

Personal Protection

PERSONAL PROTECTION INDEX

A		G	
B		H	
C		I	
D		J	
E		K	
F		X	Consult your supervisor or S.O.P. for "Special" handling directions

A Safety Glasses	n Splash Goggles	o Face Shield & Eye Protection	p Gloves	q Boots	r Synthetics Aprons
s Full Suit	t Dust Respirator	u Vapor Respirator	w Dust & Vapor Respirator	y Full Face Respirator	z Airline Hood or Mask

Process Hazard Analysis

Prepared by
Reese Engineering, Inc.

November 12, 2013

3. Process Hazard Analysis

- Based on organization complexity & nature
- Based on Risk Management Plan

3

Process Hazard Analysis

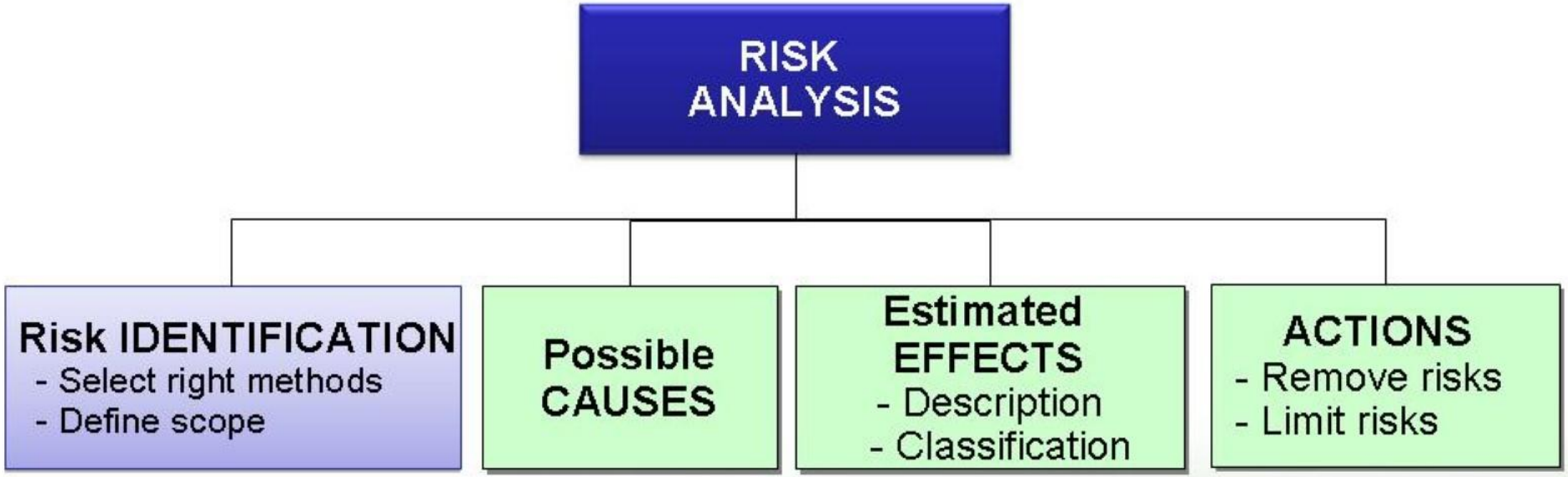
identifying, evaluating, and controlling the hazards of processes involving highly hazardous chemicals.

Methods

- What-if
- Checklist
- What-if/checklist
- Hazard and operability study (HAZOP)
- Failure mode and effects analysis (FMEA)
- Fault tree analysis
- An appropriate equivalent methodology

Risk Analysis

'Risk Identification Methods'



4 Steps of Process Hazard Analysis

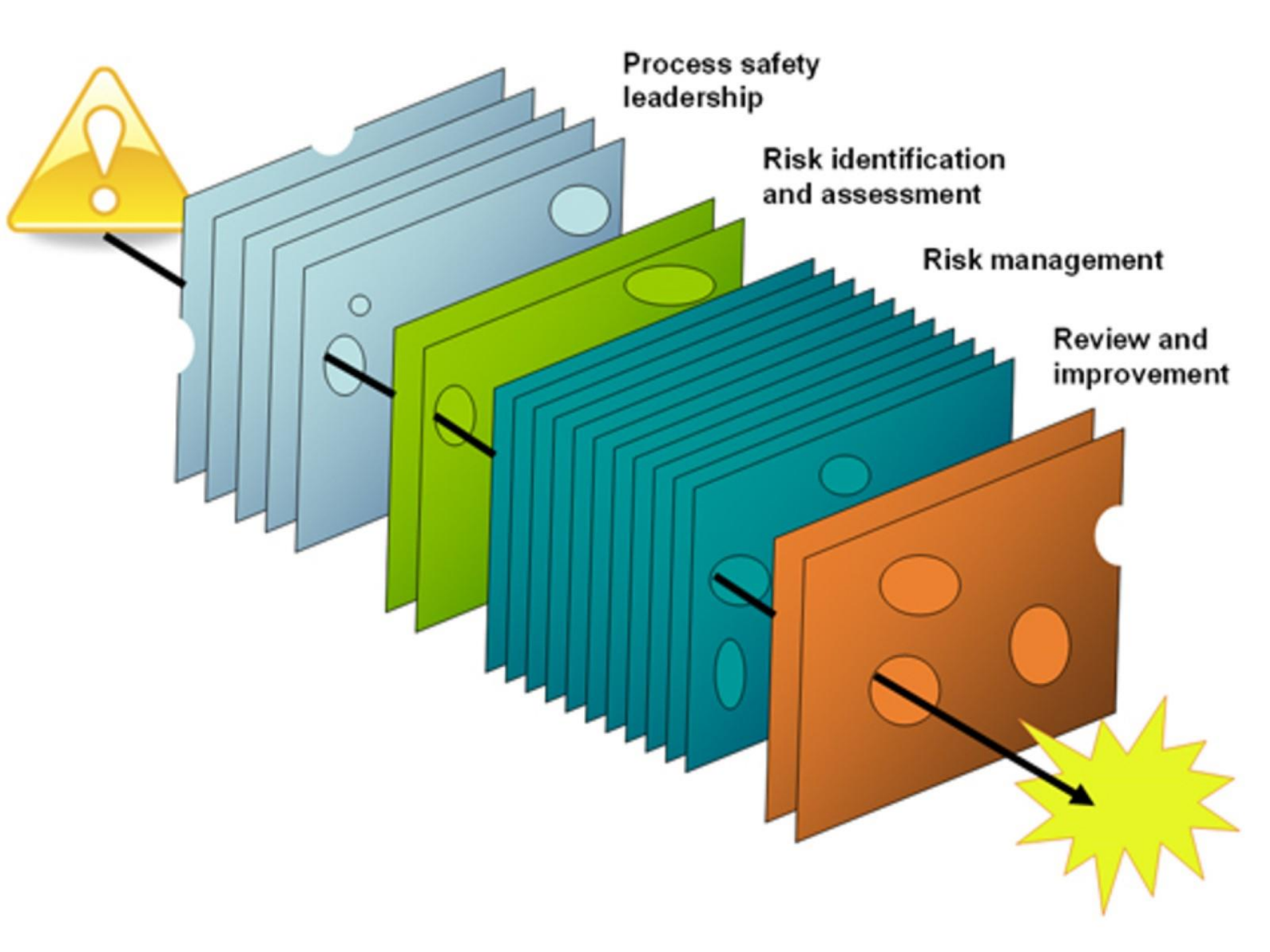
DEKRA

1 **Accumulation of process safety information**
(materials, processes, equipment etc.)

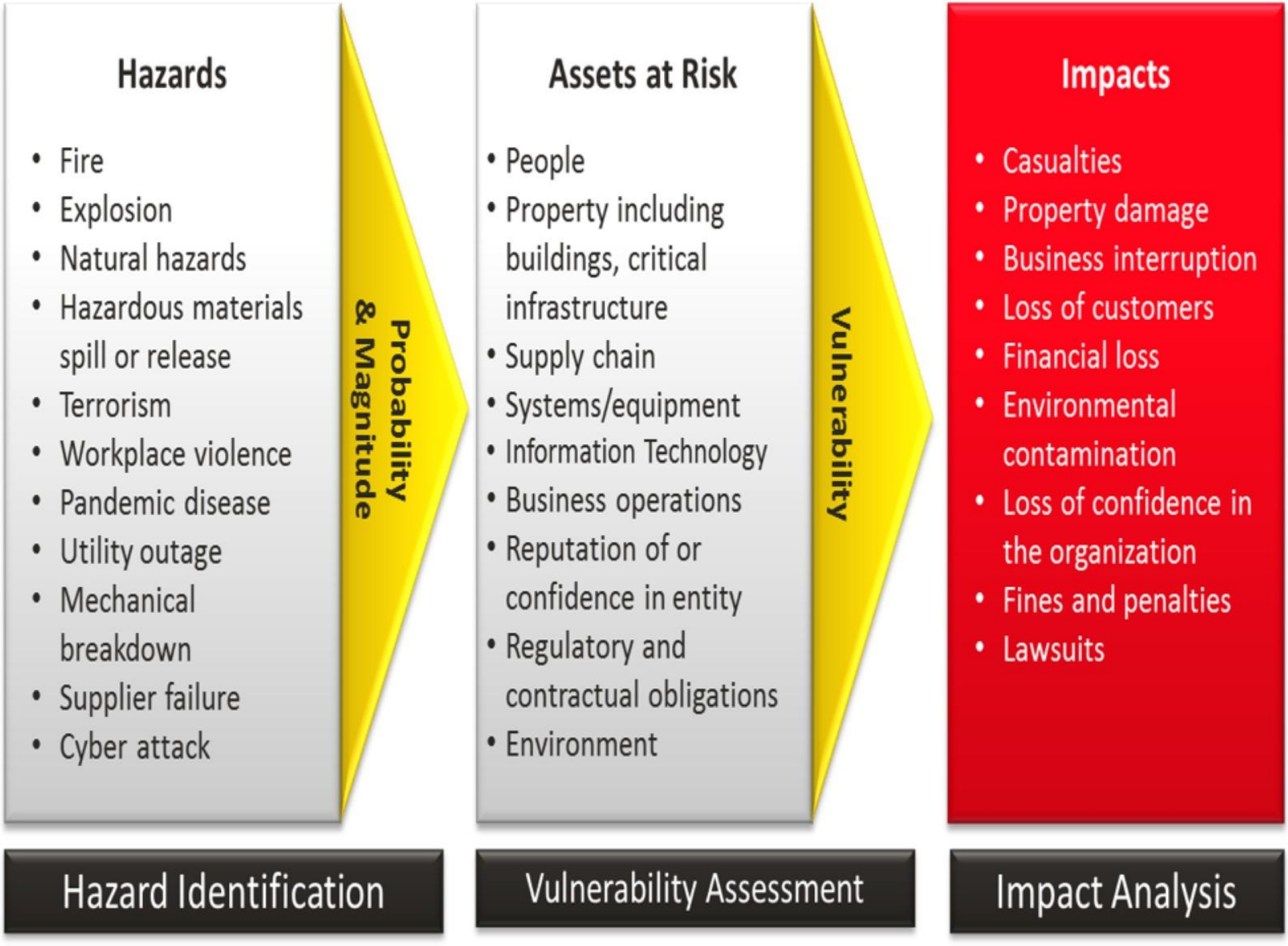
2 **Assembly of PHA team**
(diverse experience and expertise)

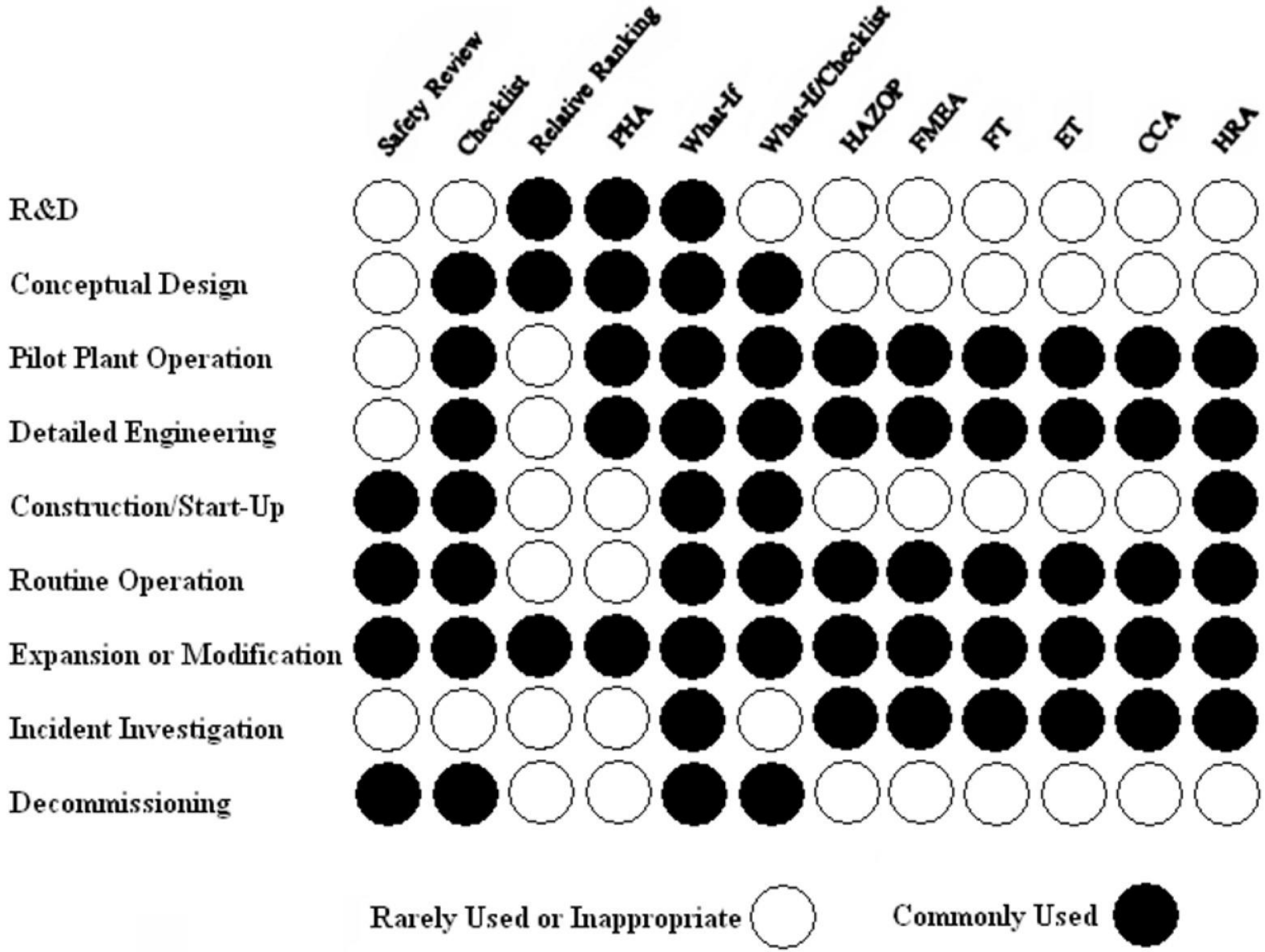
3 **PHA exercise**
(identify hazards, examine safeguards)

4 **Documentation**
(of the PHA, its findings and recommendations)

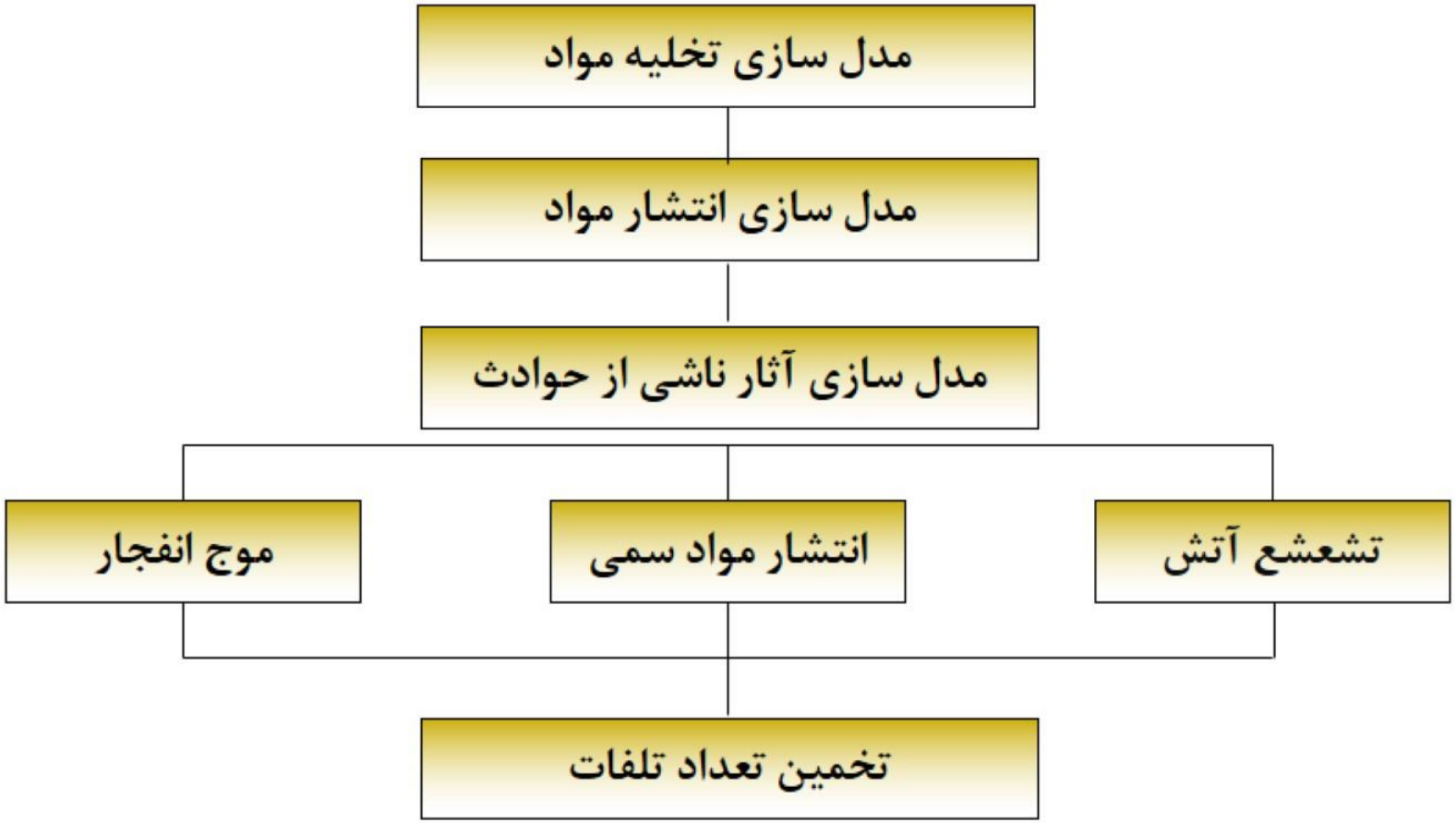

Process safety leadership
Risk identification and assessment
Risk management
Review and improvement


Identify Hazards
Evaluate Hazards
Recommend Actions
Act to Address Hazards
Revalidate Process


Hazards
Fire
Explosion
Natural hazards
Hazardous materials spill or release
Terrorism
Workplace violence
Pandemic disease
Utility outage
Mechanical breakdown
Supplier failure
Cyber attack
Probability & Magnitude
Assets at Risk
People
Property including buildings, critical infrastructure
Supply chain
Systems/equipment
Information Technology
Business operations
Reputation of or confidence in entity
Regulatory and contractual obligations
Environment
Vulnerability
Impacts
Casualties
Property damage
Business interruption
Loss of customers
Financial loss
Environmental contamination
Loss of confidence in the organization
Fines and penalties
Lawsuits
Hazard Identification
Vulnerability Assessment
Impact Analysis


Safety Review
Checklist
Relative Ranking
PHA
What-If
What-If/Checklist
HAZOP
FMEA
FT
ET
CCA
HRA
R&D
Conceptual Design
Pilot Plant Operation
Detailed Engineering
Construction/Start-Up
Routine Operation
Expansion or Modification
Incident Investigation
Decommissioning
Rarely Used or Inappropriate
Commonly Used

مدل سازی پیامد حوادث



تعیین آثار ناشی از حوادث

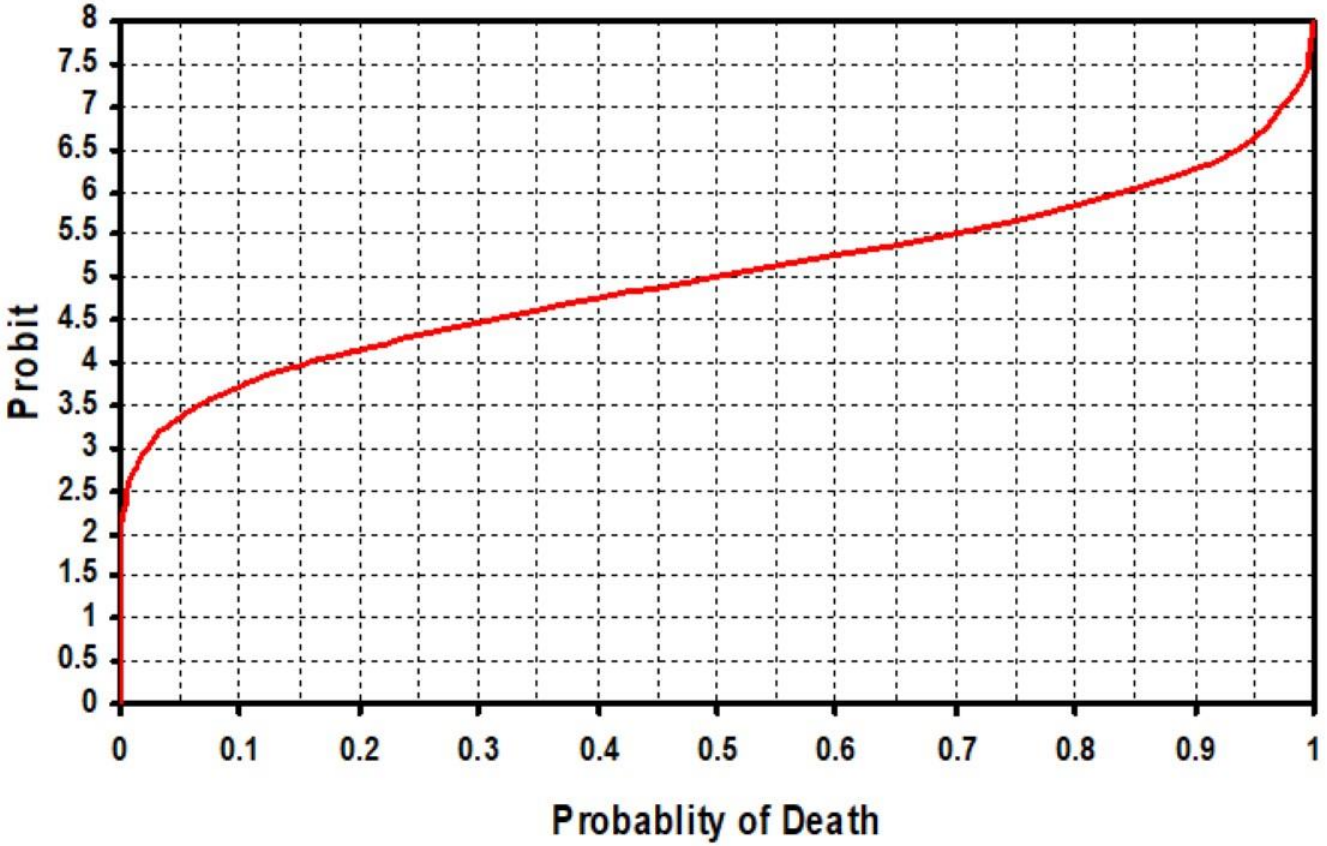
معادلات Probit:

روشهای متداولی که به منظور بدست آوردن درصد افرادی که تحت تاثـــیر یک حادثه خاص قرار می‌گیرند استفاده از متغیری به نام Probit می‌باشد!!!

$$Y = k_1 + k_2.Ln(V)$$

تعیین آثار ناشی از حوادث

منحنی مورد استفاده در تبدیل Probit به درصد تلفات



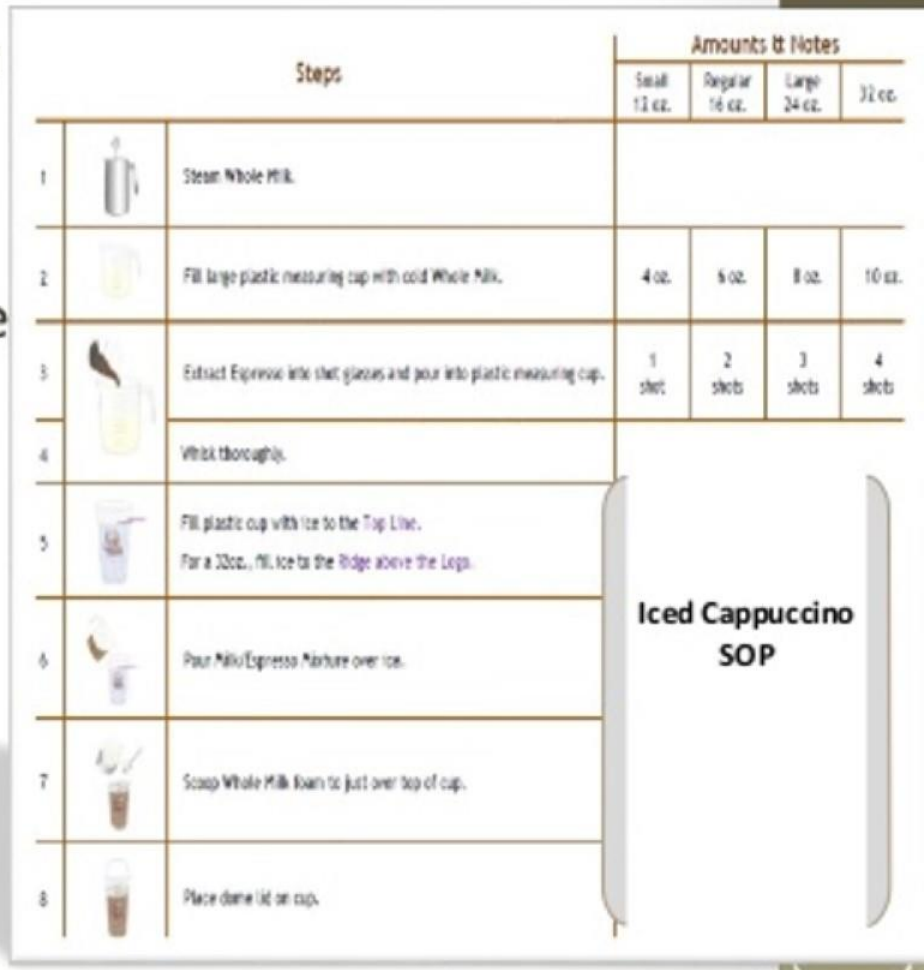

4
STANDARD
OPERATING
PROCEDURE
SOP
STANDARD
PERATING
ROCEDURE

4. standard operating procedure

چارچوب مشخص و شفاف برای هدایت ایمن فعالیت‌های موجود!

A "GOOD" Standard Operating Procedure

- Should provide all the information necessary to perform a task
- Is usually specific to the equipment used for the procedure
- Should be detailed
- Should "stand alone"
- Should provide quality control information
- Should provide references



		Steps	Amounts & Notes			
			Small 12 oz.	Regular 16 oz.	Large 24 oz.	32 oz.
1		Steam Whole Milk.				
2		Fill large plastic measuring cup with cold Whole Milk.	4 oz.	6 oz.	8 oz.	10 oz.
3		Extract Espresso into shot glasses and pour into plastic measuring cup.	1 shot	2 shots	3 shots	4 shots
4		Whisk thoroughly.				
5		Fill plastic cup with Ice to the Top Line. For a 32oz., fill Ice to the Ridge above the Logo.				
6		Pour Milk/Espresso Mixture over ice.				
7		Scoop Whole Milk foam to just over top of cup.				
8		Place dome lid on cup.				

Iced Cappuccino SOP

Source: adapted from the International Coffee Bean & Tea Leaf standard operating procedure manual

4. standard operating procedure

- Initial start-up
- Normal operations
- Temporary operations
- Emergency shutdown
- Emergency operations
- Normal shutdown
- Consequences of deviation
- Steps to correct or avoid deviation

Five Steps to an SOP Template

1. Create an SOP Template File
2. Define the SOP Format
3. Add Common SOP Elements
4. Finalize The SOP Styles
5. Tell Everyone About Your New SOP Template

STANDARD OPERATING PROCEDURES (SOPS)

Name of Facility:	Page ..... of .....
SOP Number _____ Revision _____	Title:
Author:	Quality Assurance Authorization Signature
Effective date _____	Replaces Revision Number _____

Standard Operating Procedure Template

1) **Purpose:**

2) **Scope:**

3) **Responsibility:**

4) **Materials and Equipment**

5) **Safety Issues:**

6) **Procedure:**

7) **Reporting:**

8) **Reference documents:**

9) **Change History:**


5
plan
TRAINING
knowledge
learn
development

5. Training

Provide training courses for all hazardous activities.

PSM Training Summary

- PSM Training Programs Must be Developed for All Necessary Workers and Contractors
- Verification of Understanding is Required
- Training Must Be Performed as Follows:
- Initial training
  - Prior to work assignment
  - Waved for those already in a process
- Refresher training
  - Every three years
- All Training Must be Documented


Workshop
Development
Skills
Learn
TRAINING
Coaching
Teaching
Knowledge

5. Training

- Safe working conditions
- Emergency Response Planning
- Procedures for the implementation of activities
- Routine and non-routine activities
- Hot work
- LOTO

5. Training

- Incident/accident investigation
- MOC
- PSSR
- Risk Assessment/Management
- ERP
- SOP
- …

NJD PEOPLE CONSULTING

6 Benefits of training to your organisation

Increased communication skills

Development of new ideas

Professional Qualifications

Positive impact on individual performance

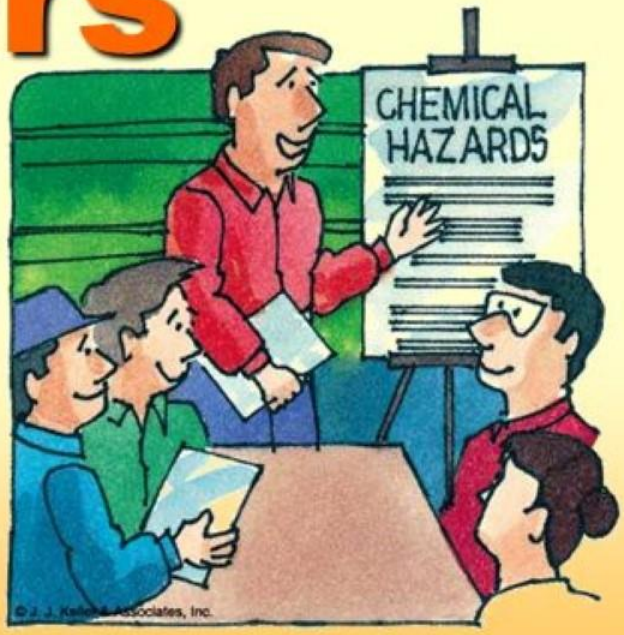
Driving business performance

Increased profits

Process Safety Management

Contractors

6



PSM Contractors

- The employer, when selecting a contractor, shall obtain and evaluate information regarding the contract employer's safety performance and programs.
- The employer shall inform contract employers of the known potential fire, explosion, or toxic release hazards related to the contractor's work and the process

OSHA PSM Standard

6. Contractors
   - Inform contractors of potential fire/explosion hazards
   - Maintain employee injury/illness log & evaluate safety performance
   - Contractors shall ensure employees are trained in fire/explosion hazards
   - Document they have received and understood training & document as in item 5.

CONTRACTORS

- **Establish a screening process in the selection of contractors**
- **Contractors Evaluation**
- **Safety of all process personnel**

همه پیمانکاران در نصب و راه‌اندازی فرایند، نگهداری و تعمیرات تجهیزات و سیستم‌ها مشمول این نظام مدیریتی می‌باشند.

Pre-Startup Safety Review (PSSR).

Pre-startup Safety Review

- **Done when:**
  - New processes
  - Modified process
- **Pre-startup Review Verifies**
  - Construction: conforms to design
  - Procedures: adequate, in place
  - PHA recommendations resolved or implemented
  - Management of change requirements met
  - All affected workers trained

Pre-Startup Safety Review (PSSR) for New Projects

Conducted by:

- Business group team supported by SHE specialists

Typical Timing:

- Two to six weeks prior to unit commissioning.

Description:

- Assesses readiness of organization for safe startup of facilities, including status of previously identified SHE issues, SHE training of personnel, etc.
- Key checks made on the implementation of approved SHE practices, project specifications and field verification of constructed facilities.

- ارزیابی ایمنی پیش راه‌اندازی میزان ایمنی تاسیسات جدید را مشخص می‌کند.

… Pre-Startup Safety Review (PSSR)

- **Real World Advice**
  - Involve the right people – experience counts
  - Don’t rely on memory - use checklists
  - Develop a system for managing post-startup actions from PSSR
  - Use the PSSR as opportunity to prove that process is safe to start – Document everything!

PSSR

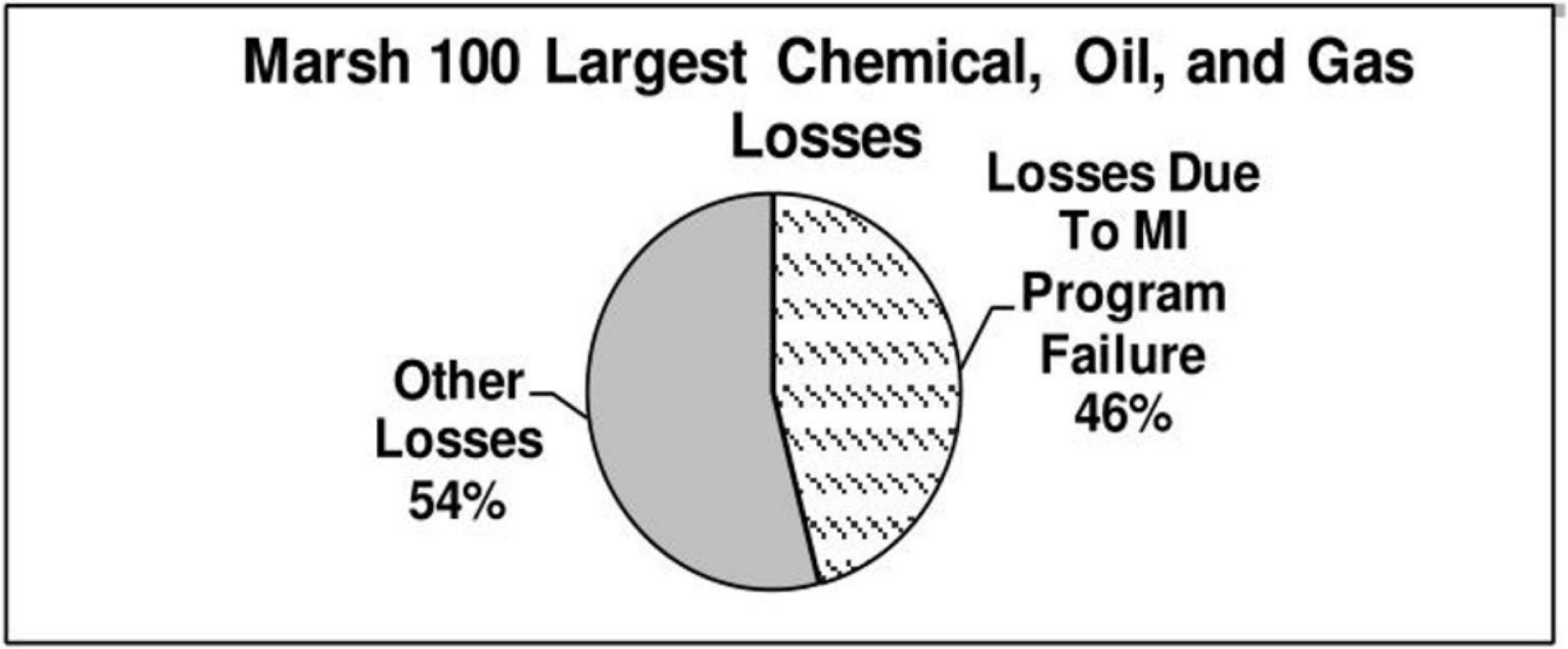
برای تاسیسات جدید، می‌توان از **Preliminary Hazard Analysis** و دیگر روشها در قالب MOD و MOC، در بهبود طراحی و ساخت فرایند از نقطه نظر ایمنی، کیفیت و قابلیت اطمینان استفاده نمود.

PSSR

بایستی از کلیه پیشنهادها و راهکارهای اصلاحی حاصل از مطالعه PHA و مطالعات بررسی حوادث و ...، عدم انطباق های حاصل از ممیزی برای اجرای عملیات ایمن در فرایندهای جدید، پیش از نصب نهایی تاسیسات بهره برد.

PSM: Mechanical Integrity

Mechanical Integrity



Mechanical Integrity

OSHA 1910.119(j)

"The employer shall establish and implement written procedures to maintain the on-going integrity of process equipment."

8. Mechanical Integrity

Mechanical Integrity

- Design - appropriate for the intended use
- Inspection - visually check condition
- Maintenance - preventative or as needed

Mechanical Integrity

Critical equipment is identified, designed, installed, and properly maintained

Employees maintaining equipment are trained to do so

Defects are resolved before continued use of equipment

The first step of an effective MI program is to **compile and categorize a list of process equipment and instrumentation.**

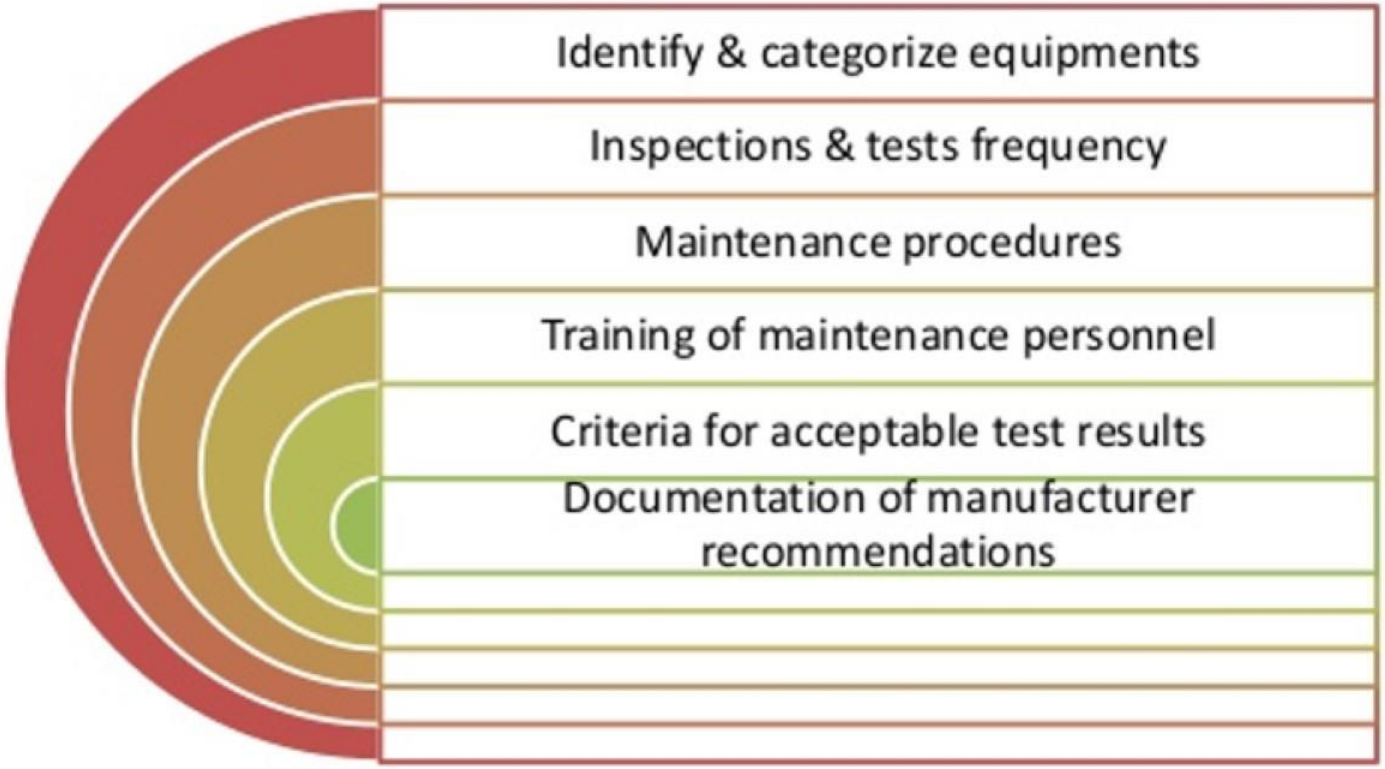
PSM Mechanical Integrity

- Pressure vessels, storage tanks
- Piping systems, components
- Relief & vent systems, devices
- Emergency shutdown systems
- Controls: monitoring devices, sensors, alarms, interlocks
- Pumps

Components of Process Safety

Mechanical Integrity

Elements of a mechanical integrity program



- **National Board Inspection Code,**
- **American Society for Testing and Material,**
- **American Petroleum Institute,**
- **National Fire Protection Association,**
- **American National Standards Institute,**
- **American Society of Mechanical Engineers,**
- **and other groups.**

provide information to help establish an effective testing and inspection frequency, as well as appropriate methodologies.

- **ASME**

(American Society of Mechanical Engineers)

- **ANSI**

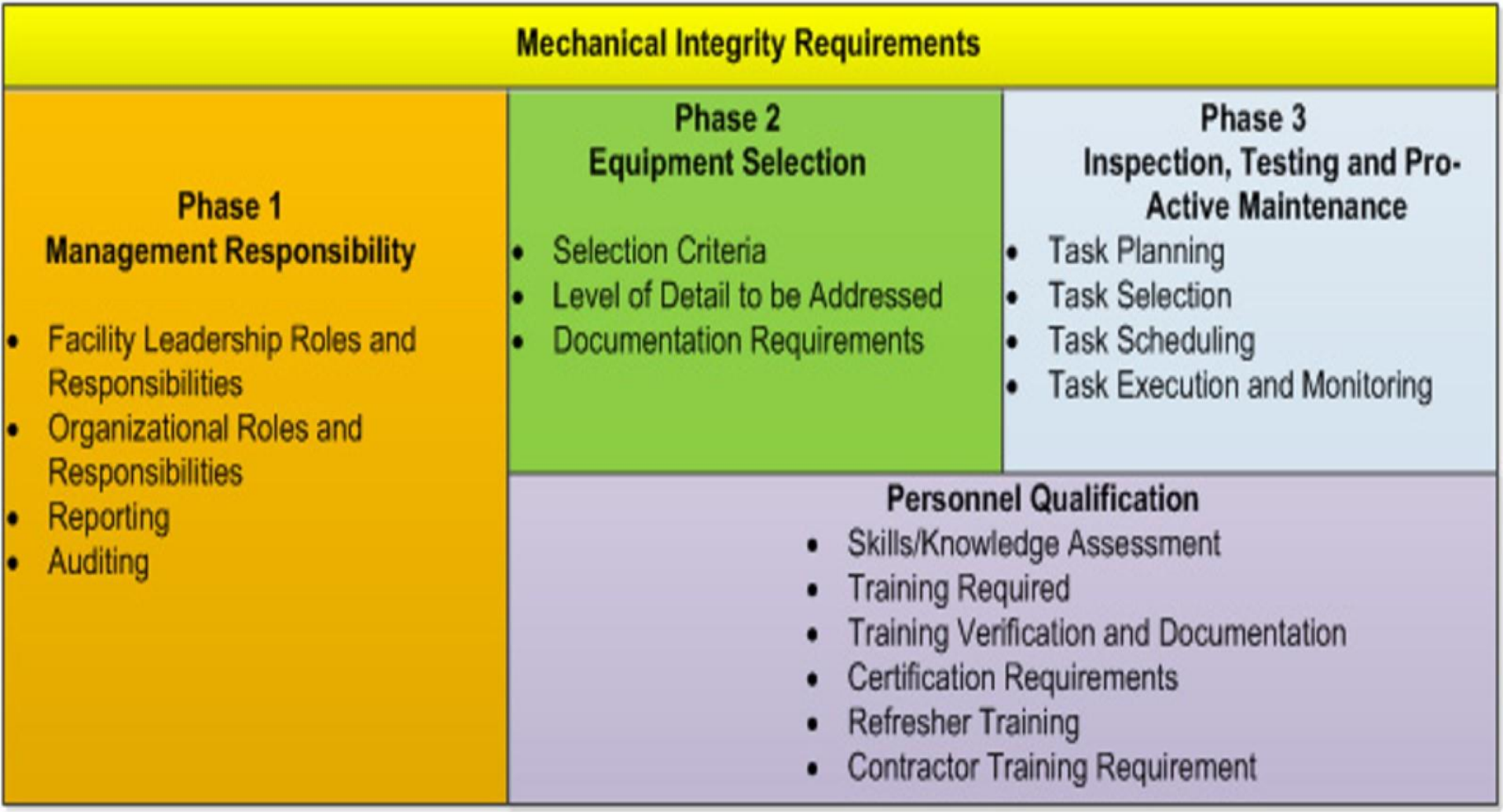
(American National Standard Institute)

- **ASTM**

(American Society for Testing Material)

- **NFPA**

(National Fire Protection Association)


Mechanical Integrity Requirements
Phase 1
Management Responsibility
Facility Leadership Roles and Responsibilities
Organizational Roles and Responsibilities
Reporting
Auditing
Phase 2
Equipment Selection
Selection Criteria
Level of Detail to be Addressed
Documentation Requirements
Phase 3
Inspection, Testing and Pro-Active Maintenance
Task Planning
Task Selection
Task Scheduling
Task Execution and Monitoring
Personnel Qualification
Skills/Knowledge Assessment
Training Required
Training Verification and Documentation
Certification Requirements
Refresher Training
Contractor Training Requirement

BEFORE

AFTER

BEFORE

AFTER

BEFORE

AFTER

BEFORE

AFTER

BEFORE

AFTER

Hot Work


DANGER
HOT WORK
BY PERMIT ONLY
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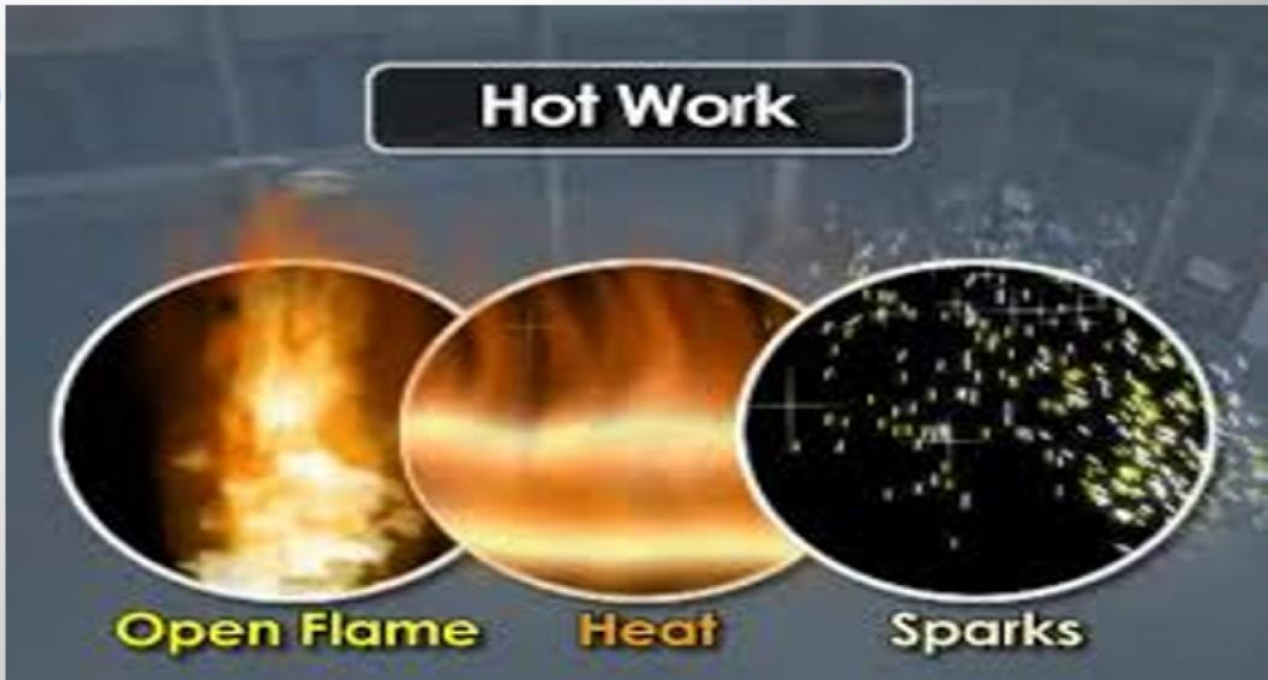
Permits

9. Hot Work

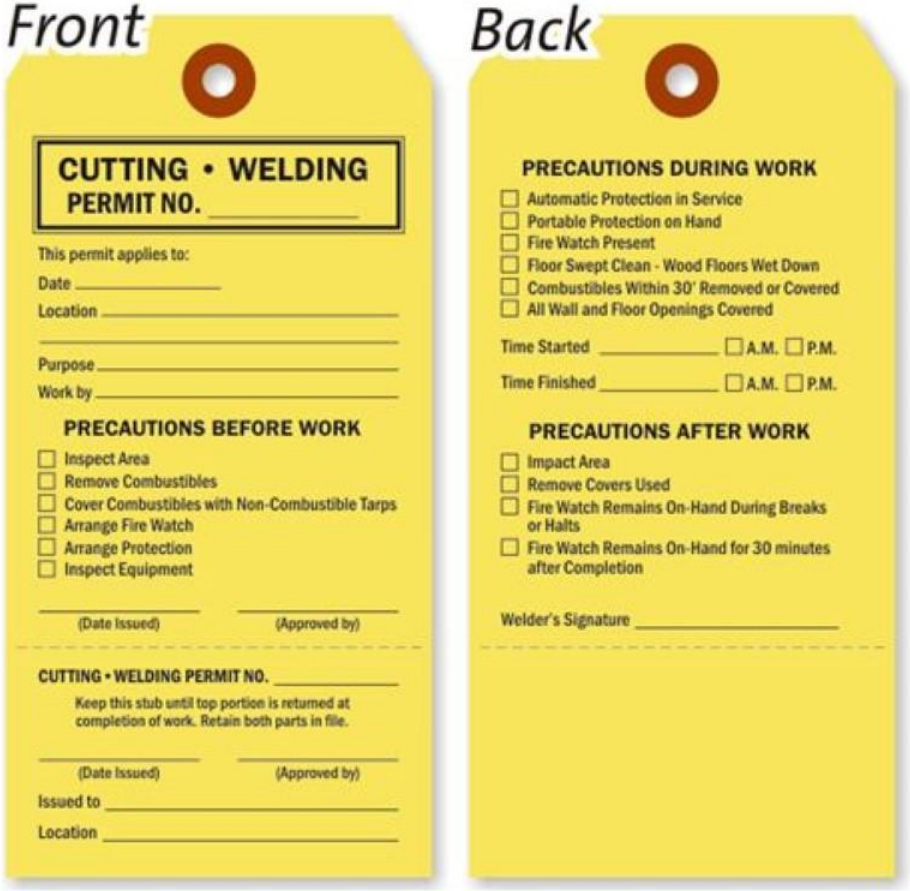
Any employee or contractor that performs welding or other high temperature work near covered processes must hold the proper hot work permits.



Hot Work Permit

pennsylvania
DEPARTMENT OF LABOR & INDUSTRY

- For hot work conducted on or near a covered process
- Document fire prevention & protection requirements implemented (per 29 CFR 1910.252(a))
- Permit kept on file until work operations are completed



Hot Work Permit

- ایمنی افرادی که کار را انجام می‌دهند
- ایمنی افرادی حاضر در تأسیسات
- ایمنی تأسیسات و محیط زیست
- رعایت استانداردها

HOT WORK
DESIGNATED (FIXED) AREA PERMIT

1 SI Tracking #

The Following Section to be Completed by the General Contractor or Requestor

2 NAME OF BUILDING AND CONTACT NUMBER EMERGENCY PHONE #

Parent Building

Permit Issued To Phone

Requested by Phone

The Following Section to be Completed by the General Contractor or Requestor

3 EXACT LOCATION OF WORK AREA (Specific Area Name & Room # and/or Exterior Location)

The Following Section to be Completed by the General Contractor or Requestor

4 TYPE OF HOT WORK CONTRACTOR AND/OR SI WORK GROUP & TYPE OF GENERAL WORK

Select Type of Work from Drop Downs. Select "blank" to write additional comments.

HOT WORK PERMIT DURATION CANNOT EXCEED 6 MONTHS FROM ISSUE DATE.

PERMIT START DATE

PERMIT EXPIRATION DATE

This fixed shop hot work area complies with all applicable fire protection regulations. Changes in the configuration and/or occupancy of the fixed hot work area SHALL void this permit. The supervisor is responsible for the fixed hot work location. He/she is responsible for requesting a valid permit before the currently issued permit expires or if the designated hot work location is modified. In the event of a fire system impairment, the hotwork must be discontinued for the duration of the impairment.

The Following Section to be Completed by the Permit Authorizing Individual or Requester

5 Additional Comments

The Following Section to be Completed by PAI and Supervisor.

6	Required Precautions Checklist - The Following Precautions have been Taken Check (X)	PAI YES	PAI NO	PAI N/A	Supervisor YES	Supervisor NO	Supervisor N/A
a	Portable fire fighting equipment readily available and nearest phone and fire alarm box identified	☐	☐	☐	☐	☐	☐
b	Hot work equipment is in good repair and personnel protective equipment will be used during hot work	☐	☐	☐	☐	☐	☐
c	Flammable liquids, dust, lint, and oil deposits are removed within 35 ft of operation (not specified).	☐	☐	☐	☐	☐	☐
d	Combustibles have been removed where possible and/or items are protected with fire resistant tarps and/or shields	☐	☐	☐	☐	☐	☐
e	All wall and floor openings are covered within 35 ft of operation (not specified) and and fire resistant tarps will be used beneath work area	☐	☐	☐	☐	☐	☐
f	Construction is noncombustible or protected.	☐	☐	☐	☐	☐	☐
g	Ample ventilation is available to remove smoke / vapor from the work area and will be discharged to a safe location.	☐	☐	☐	☐	☐	☐
h	All compressed gas cylinders have been moved to a safe location	☐	☐	☐	☐	☐	☐
i	Chemical hazards have been evaluated (coating, paint, cleaners, fumes, etc.) and removed	☐	☐	☐	☐	☐	☐

The Following Section to be Completed by the General Contractor or Requestor and the Permit Authorizing Individual.

7 * I verify the above location has been examined, the precautions checked on the required precautions checklist have been taken to prevent fire and permit hot work in the above designated area.

PRINT NAME (Hot Work Supervisor) PRINT NAME (Permit Authorizing Individual, PAI)

SIGNATURE Inspection Date / Time SIGNATURE Inspection Date / Time

HOT WORK MAY BEGIN AFTER IT HAS BEEN VERIFIED THAT ABOVE CONDITIONS HAVE BEEN MET, PERMIT SIGNED FOR APPROVAL AND POSTED AT HOT WORK SITE. COPIES OF THIS PERMIT HAVE BEEN DISTRIBUTED TO OFFICE OF PROTECTION SERVICES (SECURITY MANAGER AND SECURITY CONTROL ROOM OPERATOR), BUILDING MANAGER, AND SAFETY COORDINATOR.

Yes or N/A box must be checked for every item in section 6 before signing this permit.

HOT WORK PERMIT

The supervisor, in issuing this permit, certifies that all safety factors have been considered and cared for satisfactorily.

Return this permit upon completion of the job which it is to cover to the authorizing supervisor. The supervisor will write "complete", date and initial across the face of the permit.

AREA OF HOT WORK: _____

WORK TO BE DONE: _____

		YES	NO	N/A
1	Read the Hot Work Permit Procedure			
2	Work area and equipment has been made free of flammable, combustible, and hazardous materials.			
3	Gas Test taken.			
4	Is a fire extinguisher on the job?			
5	Smoke alarms covered?			
6	Lines disconnected and/or blanked?			
7	Is a fire watch provided?			
8	Adjoining equipment and operations considered ok from standpoint of possible effect on the job.			
9	Other necessary precautions SPECIFY			

APPROVAL

I have personally checked the conditions necessary and as specified I authorize this "Hot" work to begin.

APPROVED BY_____DATE_____TIME_____

HOT WORK PERMIT IS GOOD FOR_____HOURS ONLY

THIS PERMIT CAN BE ISSUED FOR ONLY ONE SHIFT. IT BECOMES VOID AT THE END OF WORK SHIFT DAY.

Hot Work Permit

Number: _____

Location: _____

_____

_____

Date: _____

Nature of Job: _____

_____

_____

Name of Person Performing Hot Work: _____

_____

The above location has been examined and required fire safety precautions (as shown in the attached Cutting and Welding Safety Guidelines) have been taken. Permission is granted for this work.

Individual Responsible for Authorizing Operation: _____

Title of Individual Responsible for Authorizing Operation: _____

Permit Expires Date: _____ Time: _____

Attachment: Cutting and Welding Safety Guidelines


10
Management
of Change
MoC

10. MOC

- فرایندها
- تکنولوژی
- تجهیزات
- تاسیسات و ابزار
- روش‌های اجرایی
- مواد و محصولات

10. MOC

- شرح و هدف از تغییر
- اساس مورد نظر در تغییر مربوطه
- ملاحظات ایمنی و بهداشتی
- مستندسازی تغییرات برای روش اجرایی عملیاتی
- روش تعمیرات و نگهداری
- نظارت و بازرسی
- طول دوره تغییر (در صورت موقتی بودن تغییر)
- تاییدیه ها و مجوزها

MOC Application

- Management of Change should be Completed on BOTH:
- Temporary
- Permanent Changes

10. MOC

Changes to the existing process procedures regarding chemicals, technology, and equipment must be well-documented and shared with all employees.

- MOC is different from the other elements
  - MOC is never complete - must be performed on a continual basis throughout the life of the plant.

3 Levels of Change Management

Smart

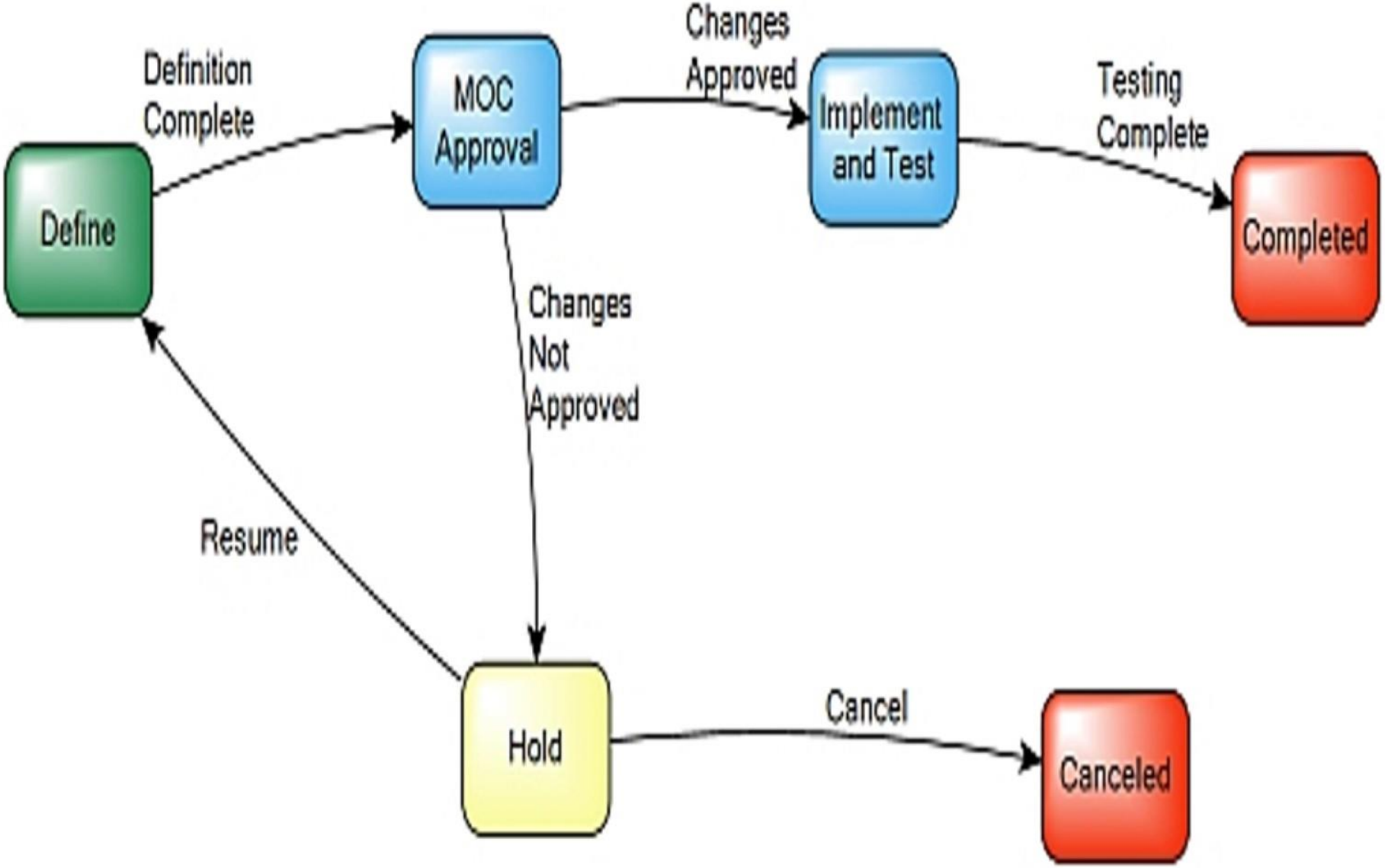
Recognize change

Smarter

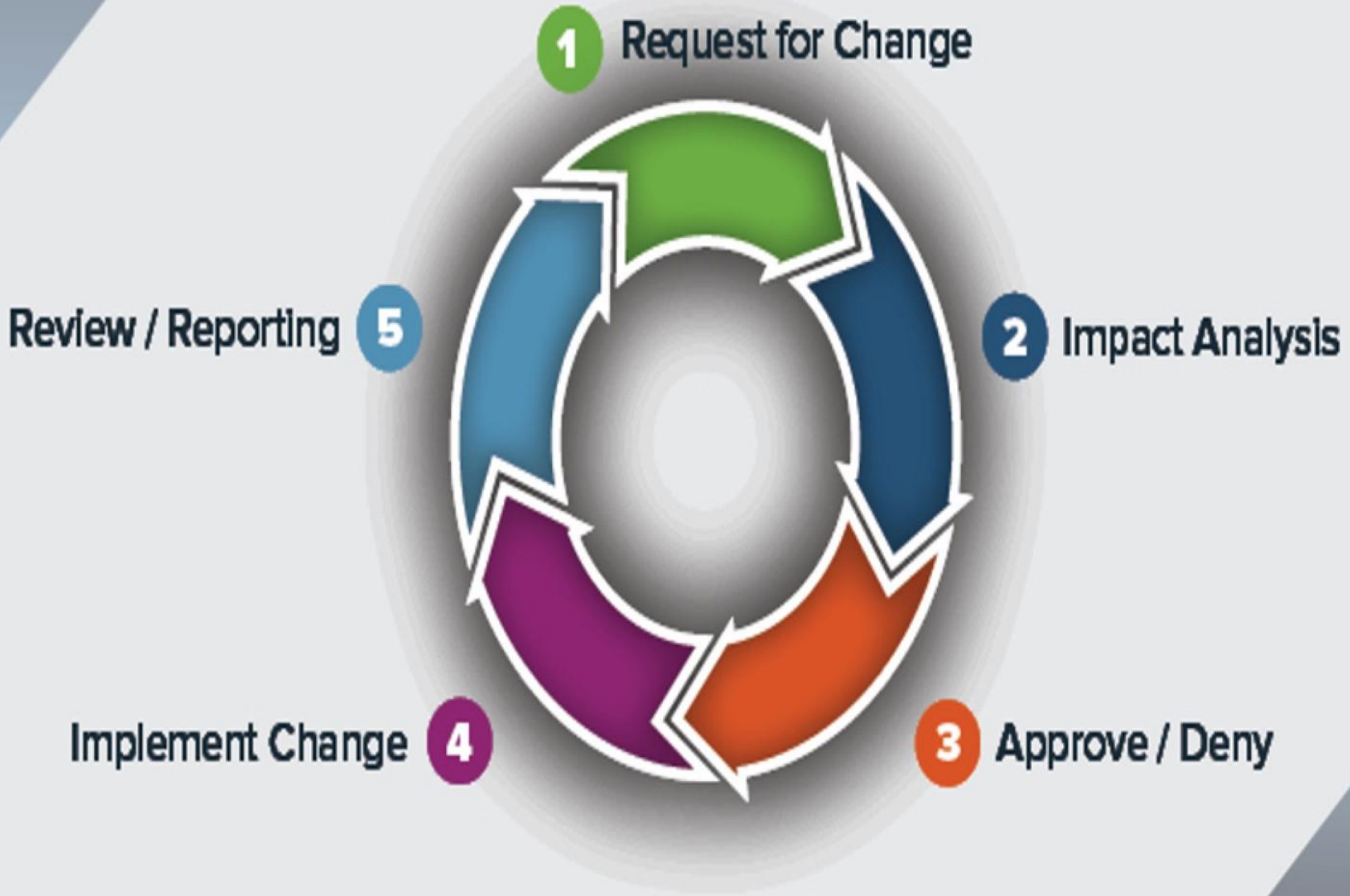
Anticipate change

Smartest

Create change


Define
Definition Complete
MOC Approval
Changes Approved
Implement and Test
Testing Complete
Completed
Changes Not Approved
Resume
Hold
Cancel
Canceled

Change Management Process




INCIDENT INVESTIGATION

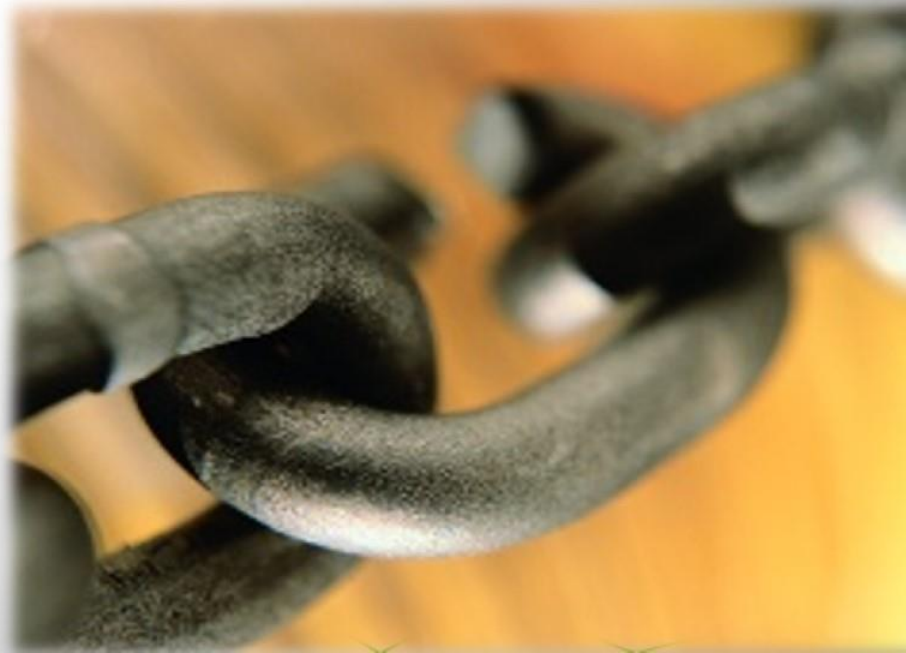

what?
where?
how?
who?
find the answer
why?
when?
where?
how?
what?
Safer Process


ACCIDENT INVESTIGATION


11

Incident Investigation

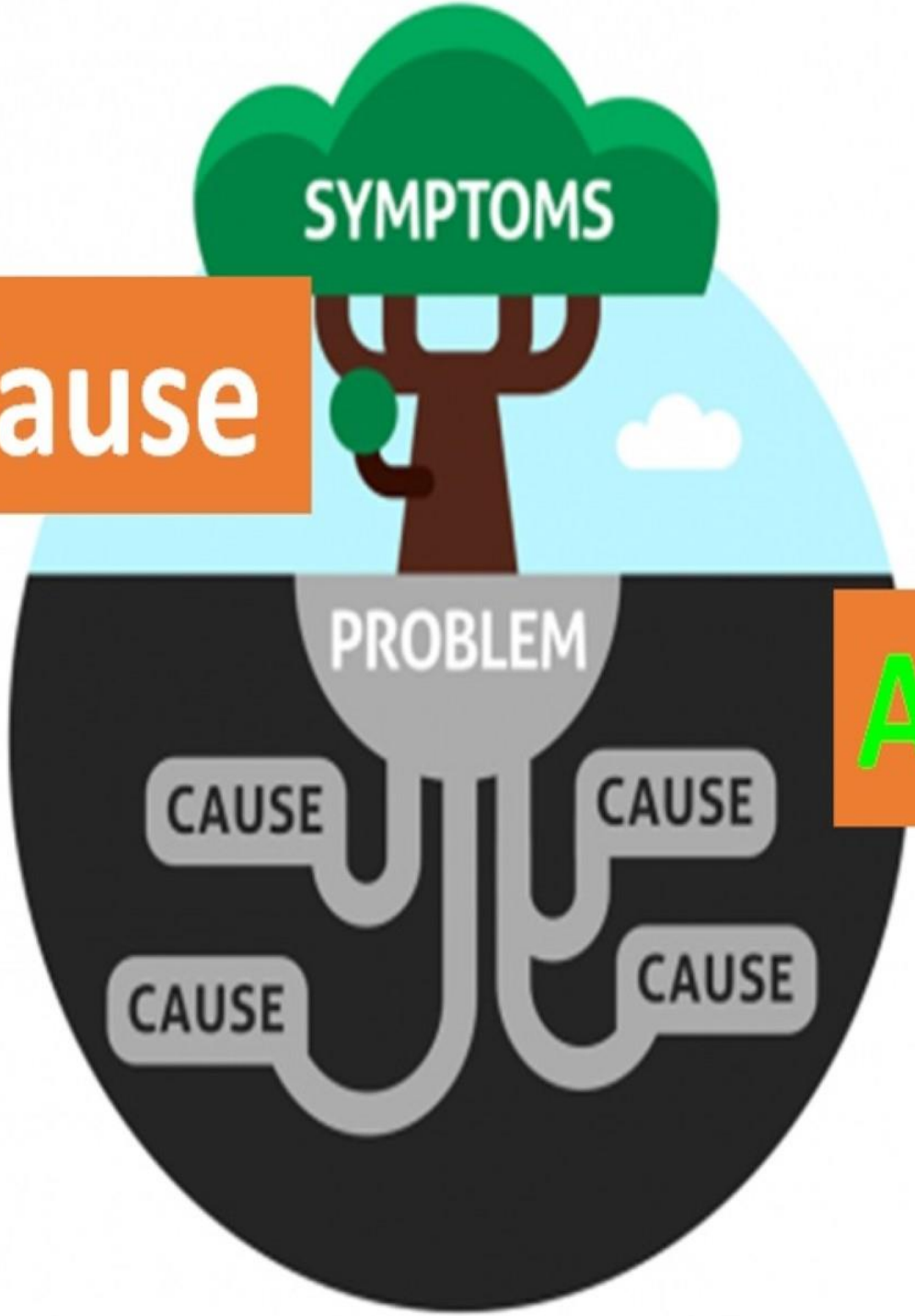
The organization must have instructions in place for investigations that occur after any situation that resulted in incidents.



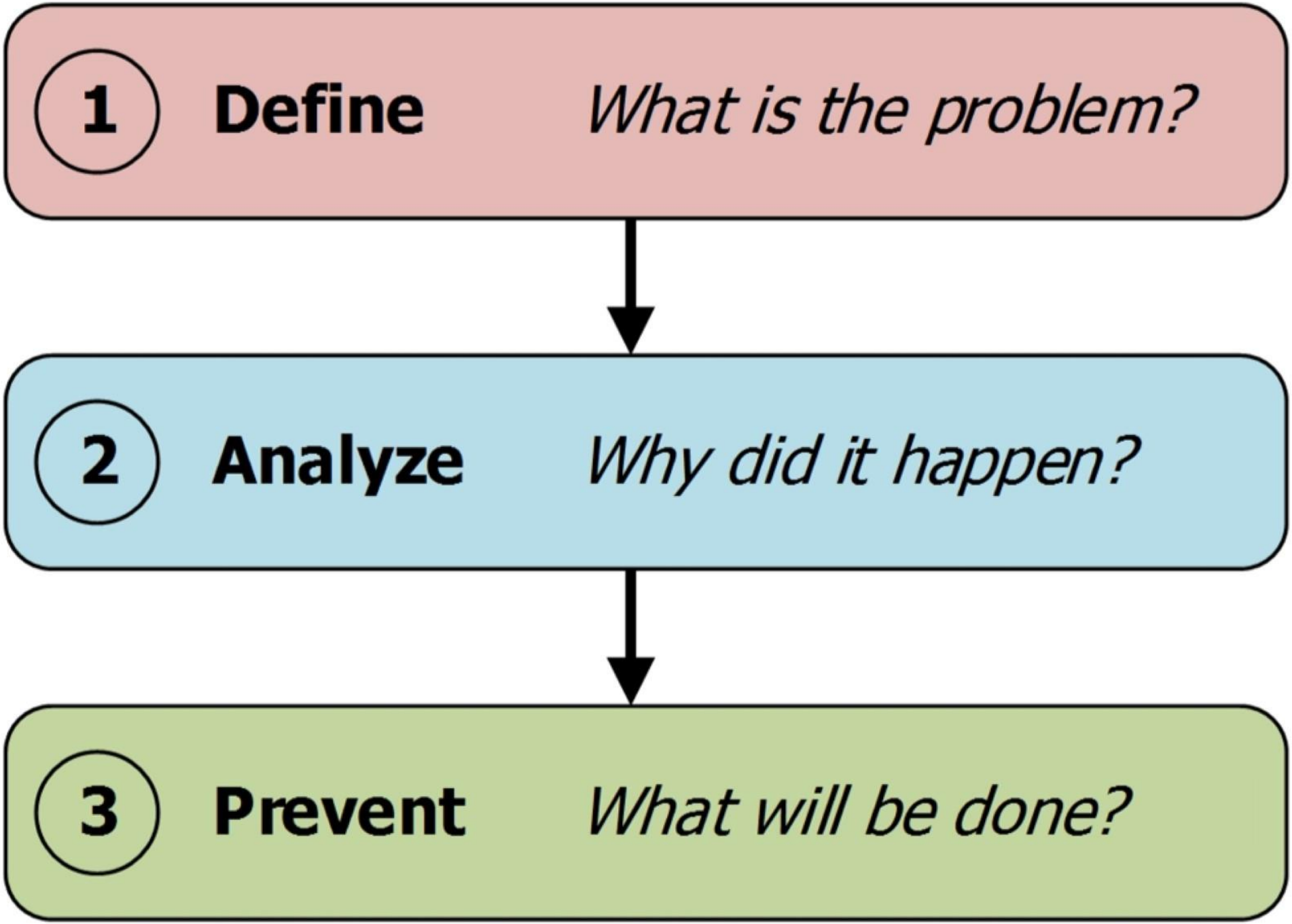
Incident Investigation

- The goal of an accident investigation is to learn from past experiences to avoid repeating mistakes.
- Incident investigation is not a blaming approach!!!

Root Cause Analysis



ROOT CAUSE & FAILURE ANALYSIS TECHNIQUES


1
Define
What is the problem?
2
Analyze
Why did it happen?
3
Prevent
What will be done?

PSM: Emergency Planning & Response

12. Emergency Response Planning

- Emergency plans, even for the smallest accidents, must be in place.
- all employees should know their role when it comes to emergency procedures.

12. Emergency Response Planning

- روش و راه‌های فرار
- سرشماری پس از تخلیه
- وجود ابزارهای ارتباطی و گزارش‌دهی
- آموزش‌ها و مانورهای مورد نیاز
- سیستم‌های هشدار

29 CFR 1910.120 (q) EMERGENCY PLANNING

- Emergency Action Plan -
  - 29 CFR 1910.38
- Emergency Response Plan -
  - 29 CFR 1910.120 (q)

Compliance audit

13


REQUIREMENTS
REGULATIONS
POLICIES
COMPLIANCE
RULES
LAW
STANDARDS
TRANSPARENCY

Compliance Auditing

DEKRA

1

Information collection

2

On-site visite

3

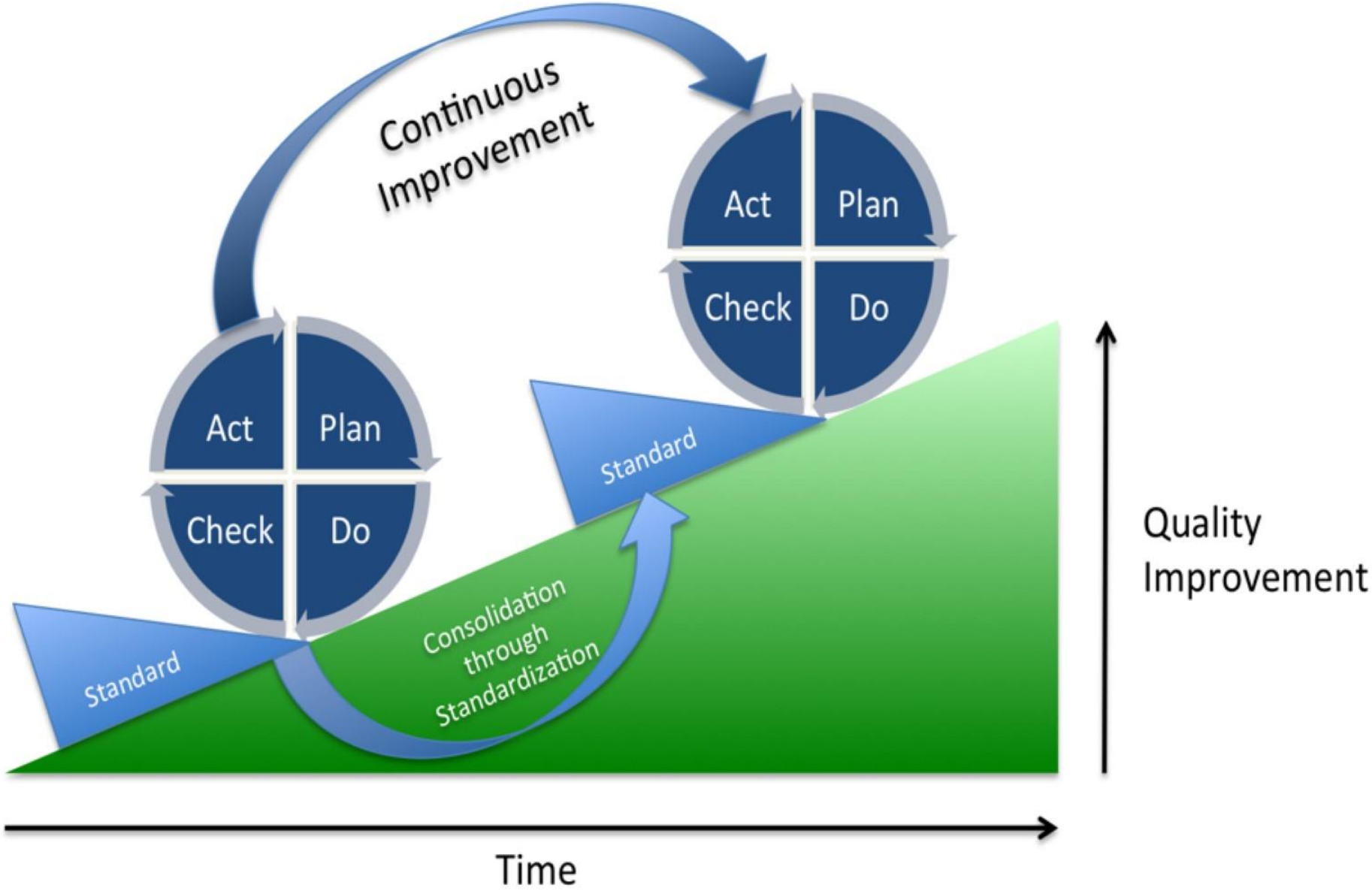
Report and documentation

ممیزی انطباق ابزاری است برای کمک به سازمان تا ضعف‌های سیستم HSE را شناسایی و اقدامات اصلاحی را تدوین و توسعه دهند.


Trade Secret
14

Trade Secrets

- Employers must make all necessary information required to comply with PSM, regardless of trade secrets, available to persons involved in developing or creating:
  - Compiling process safety information
  - PHAs
  - SOPs
  - Incident investigations
  - Emergency planning and response
  - Compliance audits
- Confidentiality agreements are allowed


Continuous Improvement
Act
Plan
Check
Do
Act
Plan
Check
Do
Standard
Standard
Consolidation through Standardization
Quality Improvement
Time

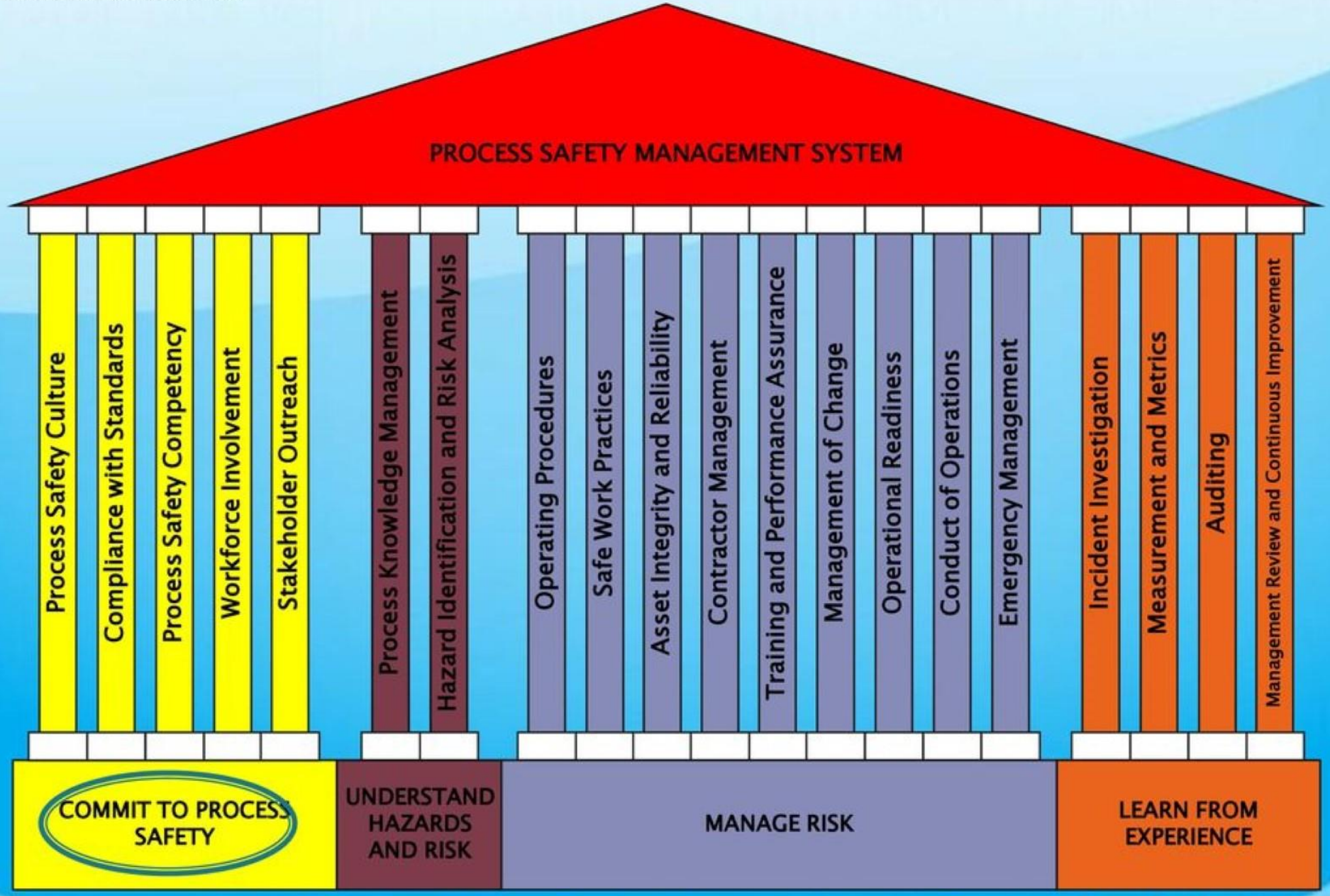

Contractors Training
Mechanical integrity
Compliance audits
Operating Procedures
Trade Secrets
Employee Participation
Incident investigation
Process Hazard analysis
Hot work permit
Process Safety information
Management of change
Pre startup Safety review
Emergency planning and response

An AIChE Technology Alliance

CPS

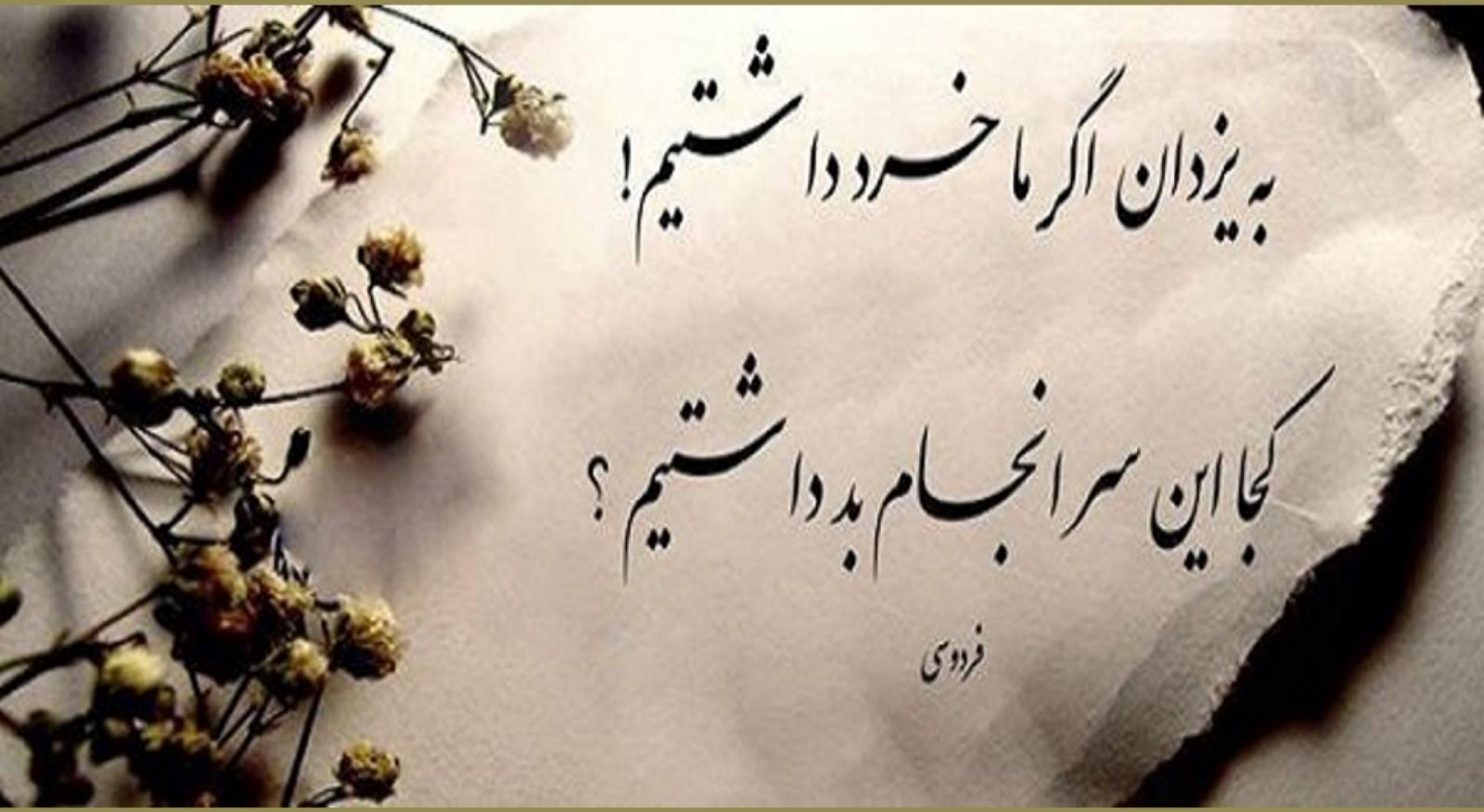
Center for Chemical Process Safety

Risk Based Process Safety



RBPS Elements – Relationship to PSM

RBPS Element	New Element	Expanded Scope	Improved Practices
Process Safety Culture	✓		
Compliance to Standards	✓		
Process Safety Competency	✓		
Workforce Involvement		✓	✓
Stakeholder Outreach	✓		
Process Knowledge Management		✓	✓
Hazard Identification and Risk Analysis		✓	✓
Operating Procedures			✓
Safe Work Practices			✓
Asset Integrity and Reliability		✓	✓
Contractor Management			✓
Training and Performance			✓
Management of Change		✓	✓
Operational Readiness		✓	✓
Conduct of Operations	✓		
Emergency Management			✓
Incident Investigation			✓
Measurement and Metrics	✓		
Auditing			✓
Management Review and Continuous Improvement	✓		


به یزدان اگر ما خرد داشتیم!
کجا این سرانجام بد داشتیم؟
فردوسی

THANK YOU FOR YOUR ATTENTION!

ANY QUESTIONS ?

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