

*August 2017, Jakarta*

# GEOHERMAL SAFETY ISSUES

## Course: Operators of Geothermal Power Plant

Hosting by: PPSDM EBTKE, Jakarta

Ardila Johan Erdiansyah



# Ardila Johan Erdiansyah (PT. Pertamina Geothermal Energy)



- Engineer of Operational Excellence
- New Zealand Scholarship Awardee, Master Degree in Electrical and Electronic Engineering, The University of Auckland (January, 2018)
- Studied Bachelor Degree in Electrical Engineering, Sepuluh November Institute of Technology



# Rule #1

Follow the prescribed Safe Journey  
Management Plan

# HAZARD POTENTIAL ON GEOTHERMAL FIELD

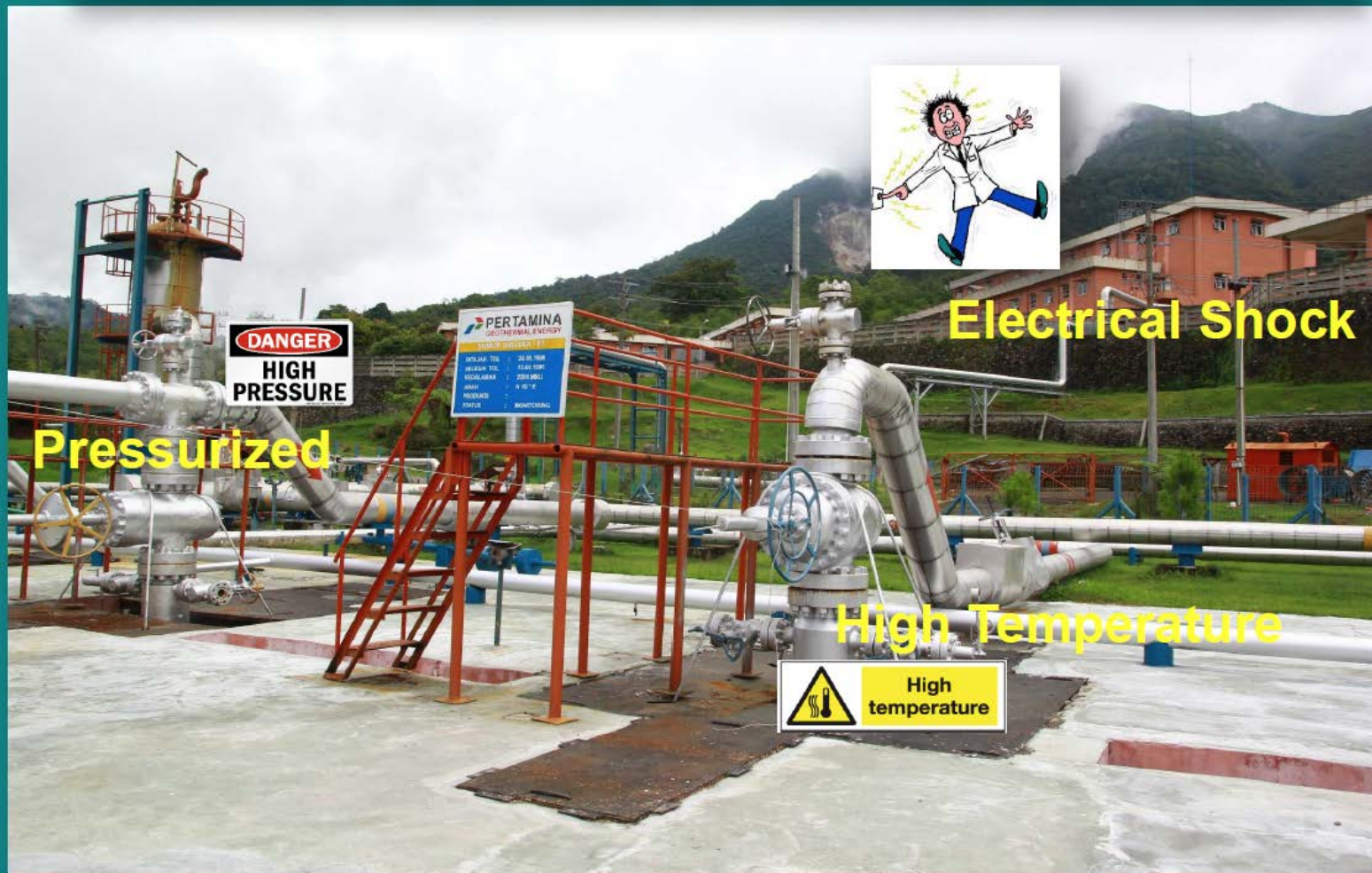
HAZARD POTENTIAL



# HAZARD POTENTIAL ON GEOTHERMAL FIELD



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# HAZARD POTENTIAL ON GEOTHERMAL FIELD



# Pay attention to the signs around you



# SAFETY TARGET ON WORK ACTIVITIES





Substandard Platform & Grating





**Substandard Ladder**



**Standard Ladder**



**Standard Grating**

# Unsafe Action – Work at Height



Without Body harness

# Unsafe Action – Work at Height



Without Body harness

# Unsafe Action – Work at Height



Without Platform

# Safe Action – Work at Height

Wearing Body harness



# Safe Action – Work at Height

## Indonesian Working at Height Regulation

→ Permen No 9 Tahun 2016

### Related Regulation

1. Permenakertrans No Per 01/Men/1980 tentang K3 pada konstruksi bangunan
2. Permenaker No Per 05/Men/1985 Tentang pesawat angkat dan angkut Pasal 35 s/d 48
3. DJPPK Direktur Jendral Pembinaan Pengawasan Ketenagakerjaan No KEP. 45/DJPPK/IX/2008 Pedoman K3 Bekerja di Ketinggian dengan menggunakan akses tali (Rope Access)
4. UU No 1 Tahun 1970 tentang Keselamatan Kerja
5. EN Standard/CEN Standard/CE Standard : EN-12277 : Harnesses, EN-12492 : Helmets, EN-12275 : Connectors, EN-12276 : Frictional Anchors.
6. OSHA PART 1910, BS 1139 Metal Scaffolding, AS/NZS 1576 Scaffolding



# Positive Safety Culture And Safety Performance

The Way We Do Things Around Here (How HSSE Risks Management Practices in E&P)

Thinking and Believing (All Incidents can be prevented. Safety is every body responsibility)

Acting and Doing (Safe behavior On and Off The Jobs)

Unintentional and Deliberate Actions  
(Reduce un-safe acts )

Improved HSSE Performance and Work Environment



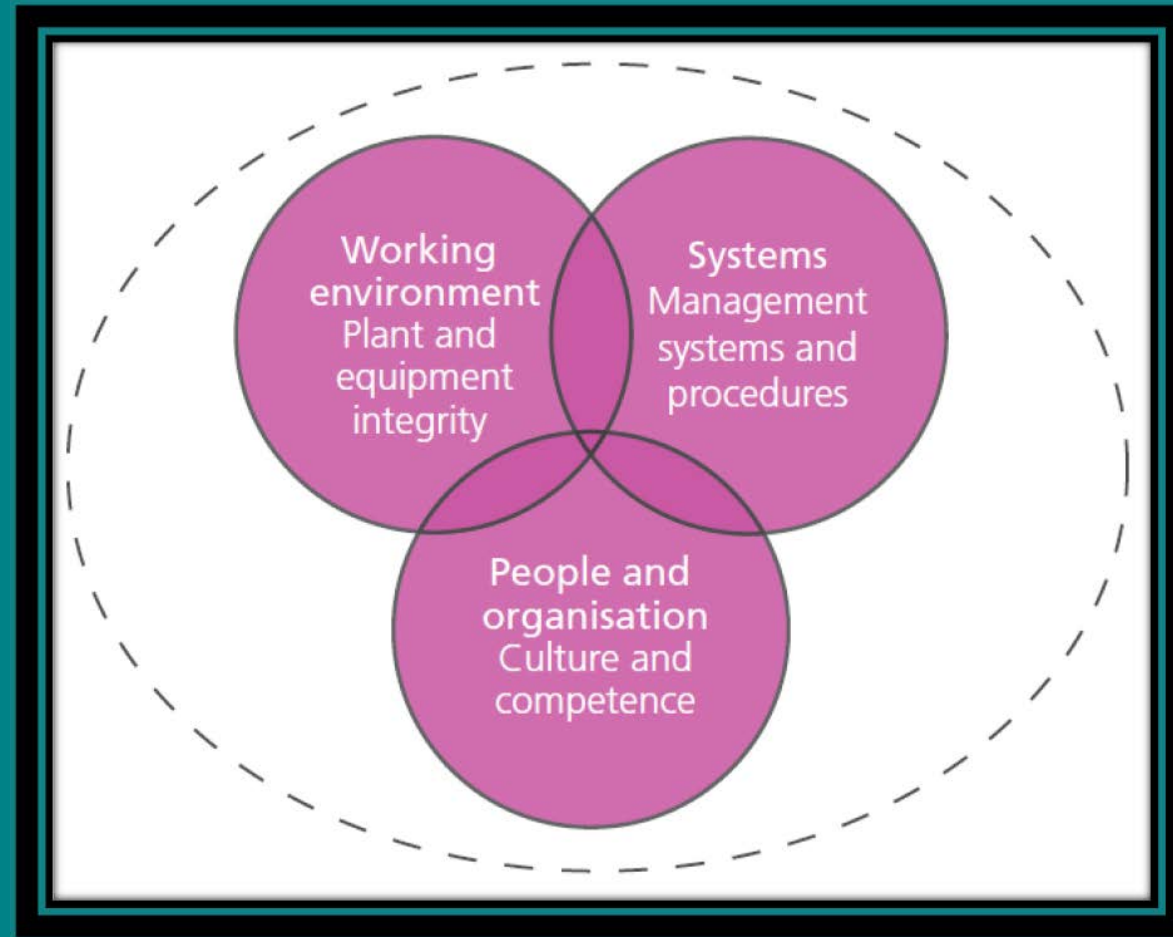
# What Does Positive Safety Culture mean?

- *I know the nature of works and its scope and steps*
- *I understand the hazards & risks may exposed*
- *I can plan and program the risks control and mitigation reasonably*
- *I manage the residual risks within my budget and authority of control*
- *I have the anticipated emergency and crisis situation responses readiness*



***To ignore safety does not indicate bravery;  
only foolishness***

# Positive Safety Culture



# STRONG HSSE CULTURE

Safe Place To Work



## HSSE Leadership:

- Set Policy & Standards Expectation
- Communicate the policy & expectation and motivate to achieve
- Be **ROLE MODEL** and Intervention Feasibility for incompliance & Stop Unsafe Works
- Provide Competence Resources and Infrastructures
- Understand Manageability Measures & promote continues improvement
- Supervise & Coach to link CHALLENGE, PROCESS & RESULT.



People



Plant



Process (Business)



Performance  
(Management &  
Measurement)

# STRONG HSSE CULTURE

## PEOPLE

- *Safe Behavior Observation – 3 HSSE Golden Rules*
- *Competency - Trainings, Assurance, Certification and Authorization*
- *Leadership & Supervisory - MWT, Safe System Of Work Organization & Authorization (SC/ AA/ PA/ AGT/ IA)*
- *Individual HSE Performance Contract*

## PLANT

- *Process Safety – CRR/ HAZID/ HAZOP/ LOPA/ SIL, Proses Setting, Process Control, Shutdown System & Fire Deluge System*
- *Facility Integrity Management System*
- *Inspection, Maintenance and Repair / TA Program*

# STRONG HSSE CULTURE

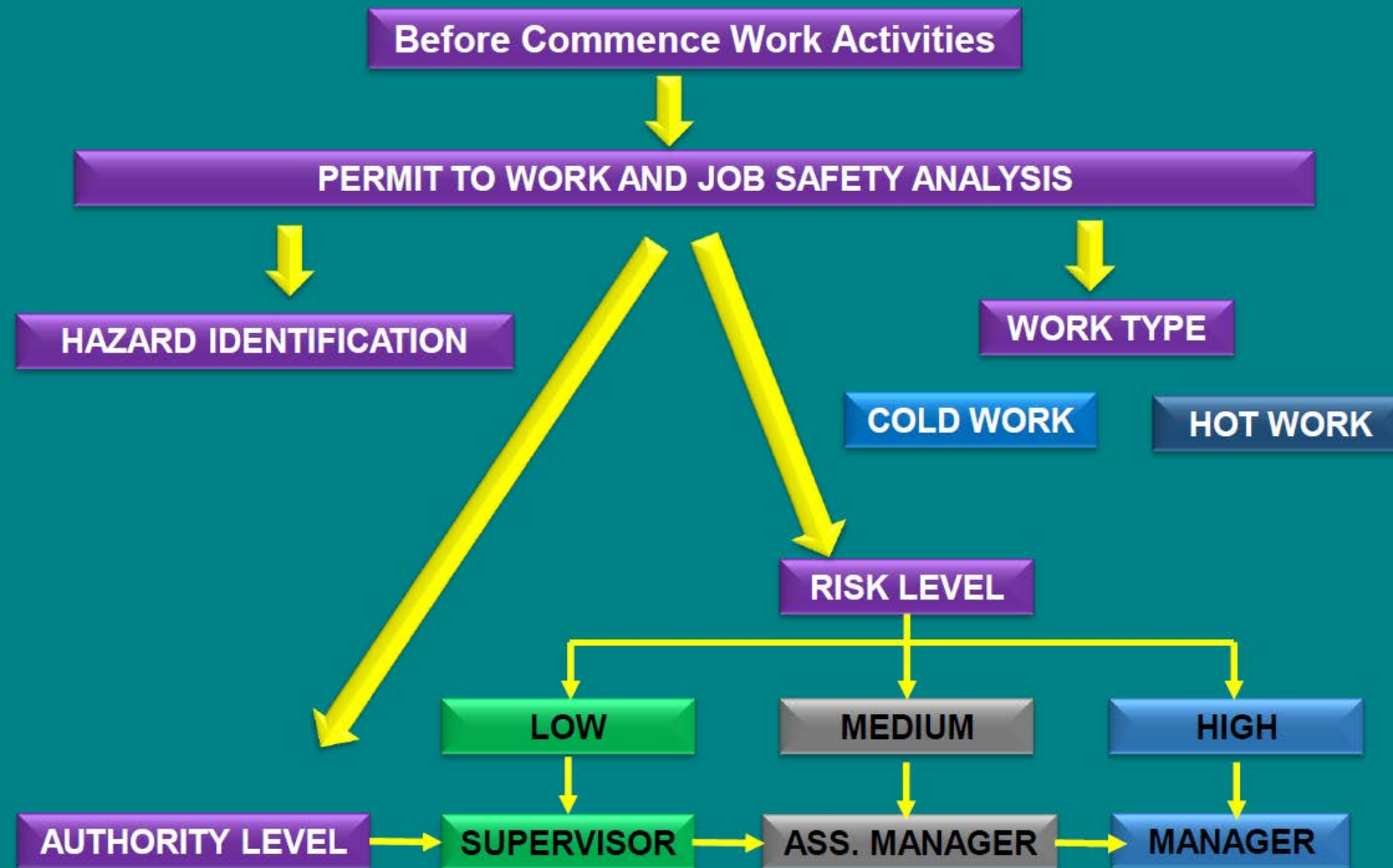
## PROCESS (Business)

- *Contractor Safety (CSMS) for contracted services works*
- *Project/ Non-Routine HSE - Risk Register/ PHSER/ PSSR/ Handover Certification in PUDW Cycle*
- *Control of Work (CoW) for safe work execution/ 9 Aspect Fundamental Safety/ Basic Safety Rules*
- *Site Pre-Mobilization Readiness: HSE Passport, SBTC, Crew Induction, Go/No-Go readiness check list.*
- *Investigation, Emergency Response and Crisis Mgmt..*

## PERFORMANCE (Management & Measurement)

- *Introduce Management System & Measurement (ISRS)*
- *Set Up Relevant KPI & Genuine Excellent People/ Plant/ Process leading and Lagging metrics*
- *Performance data Analysis & Synthesis to intervene*

# SAFETY AT WORK



# EMERGENCY PROCEDURES

## Fire Emergency Checklist

1. Raise the alarm
2. Evacuate people from the area
3. Activate any emergency shutdown systems
4. Call emergency services
5. Call your manager

## Precautions

- Do not endanger yourself
- Make sure you have an escape route
- Do not use water on petroleum or electrical fires
- Do not leave the site unattended if there is a risk of further outbreak
- Advise your manager of the incident

# EMERGENCY PROCEDURES

## DISASTER STRIKES - EARTHQUAKE

### During the earthquake

1. Keep calm
2. Stay indoors where practical
3. Keep away from windows and heavy furniture
4. Take cover – use a doorway or get under a strong table or other sturdy structure

### After the earthquake, if the building is damaged

- -Turn off water, electricity, and gas at mains (Operator)
- -Follow the instruction from safety officer
- -Go to muster points
- -Treat injuries
- -Get in touch with neighbors – they may need help
- -When help is needed go to your nearest civil defense post
- -Advise manager of damaged sustained



THANK YOU

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# Risk Assessment, mitigation, and control

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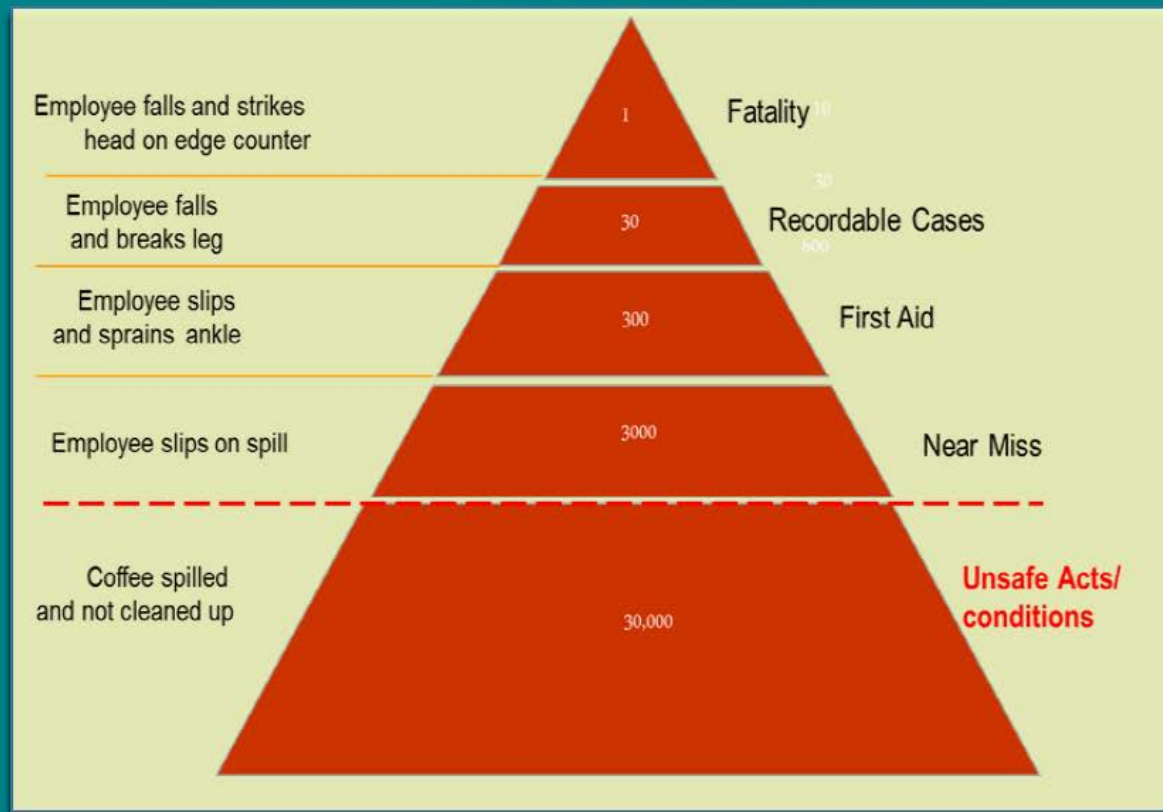
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# Hazard Management

1. No intervention or in-effective investigation/ symptomatic only or recommendations are not follow up effectively
2. Less Pay attention or No intervention, No HSSE 3 Golden Rules commitment



# Risk Assessment

## Purposes :

- Identify the hazards created at work and evaluate the risks associated with these hazards,
- Determine what measures they should take to protect the health and safety of their employees and other workers
- Evaluate the risks in order to make the best informed selection of work equipment, chemical substances or preparations used, the fitting out of the workplace, and the organization of work
- Check whether the measures in place are adequate

# Risk Assessment

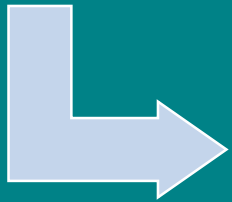


## Purposes :

- Prioritise action if further measures are found to be necessary as a result of the assessment
- Demonstrate to themselves, the competent authorities, workers and their representatives that :
  1. All factors pertinent to the work have been considered,
  2. An informed valid judgment has been made about the risks
  3. The measures necessary to safeguard health and safety
- Ensure that the preventive measures and the working and production methods, which are considered to be necessary and implemented following a risk assessment
- Provide an improvement in the level of worker's protection.

# Risk Mitigation

**Risk mitigation planning** is the process of developing options and actions to enhance opportunities and reduce threats to project objectives

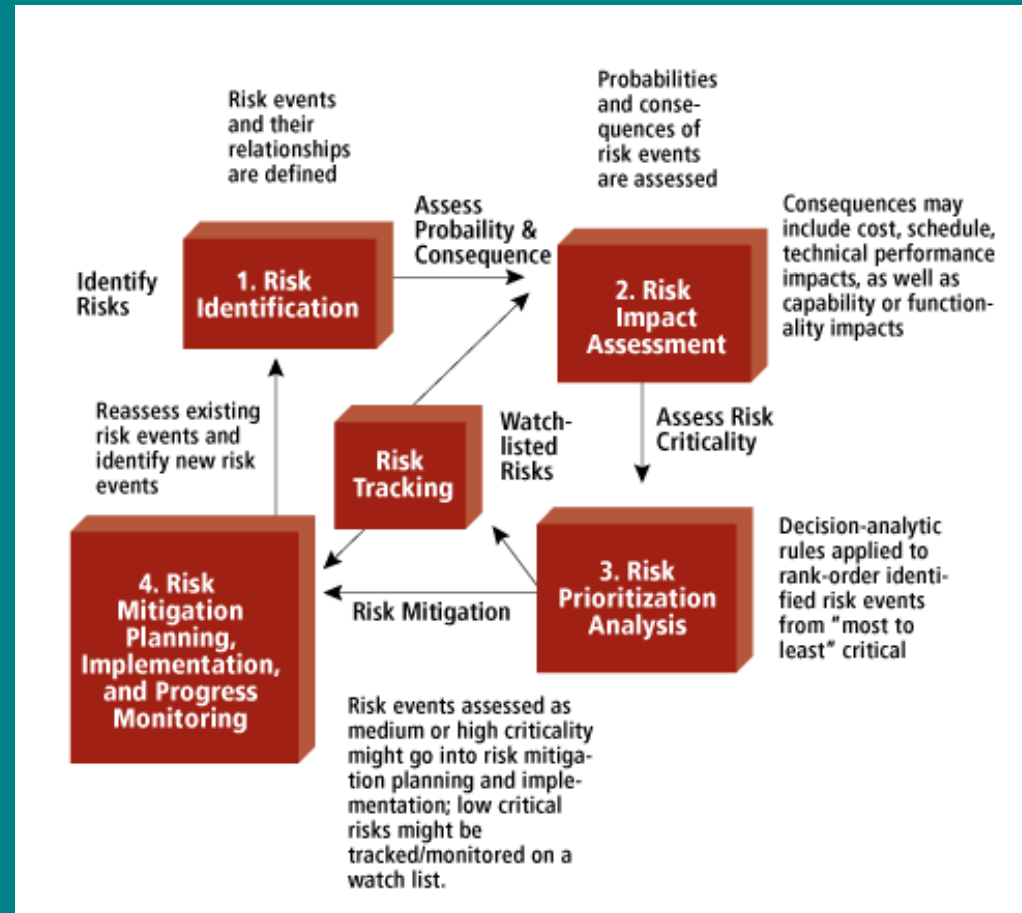


**Risk mitigation implementation** is the process of executing risk mitigation actions



**Risk mitigation progress monitoring** includes tracking identified risks, identifying new risks, and evaluating risk process effectiveness throughout the project

# Risk Mitigation



# Risk Register - Practical



# Safety Observation & Intervention Cycle

*To make **SAFETY** is Your Value/ Mind Set. All incident can be prevented. Safety is everybody responsibility*

**DECIDE**



**STOP**

*Pay attention to surrounding work environment*



**OBSERVE**

*For Unsafe Acts & Unsafe Conditions*



*Remove the unsafe acts/ unsafe conditions in situ and report (for data base & analysis)*

**ACT & REPORT**



**DISCUSS**

*How the job or conditions may be done **MORE SAFELY***



# Safety Observation & Intervention Cycle



# RISK CONTROL IS ABOUT PEOPLE

Heinrich's Domino Theory says that Incident:

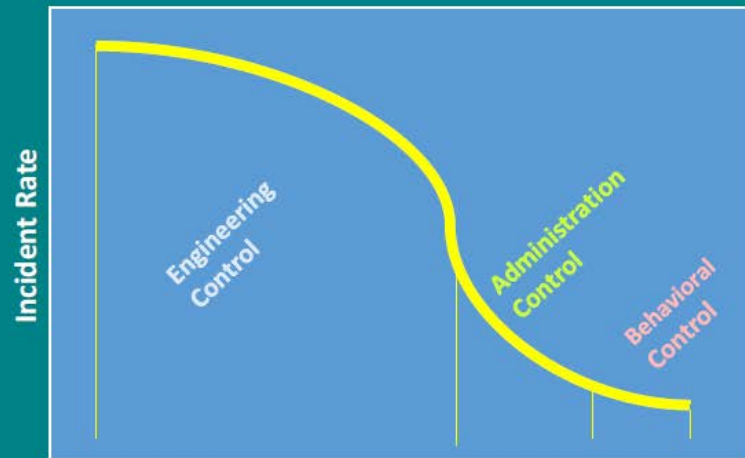


**02% Are Unavoidable**

**10 % Caused by Unsafe Conditions**

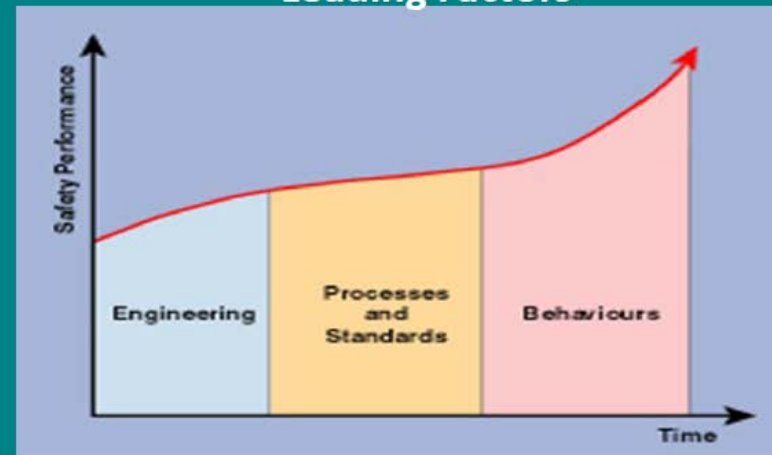
**88 % Caused by Unsafe Acts !!!!! (it is about people)**

Cost Of Risk Control



Cost Proportional

Sustainability Of Risk Control  
Leading Factors





THANK YOU