तेल उद्योग सुरक्षा निदेशालय
Oil Industry Safety Directorate
ISO 9001:2015 certified

सुरक्षा संवाद
Suraksha Samwad

An opportunity to learn from mistakes....

Disclaimer

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Shri S P Garg,
Advisor (HSE),
GAIL(India) Limited

- Advisor (HSE) and Former **Executive Director**, **GAIL(India)Ltd**
- Fire Protection & Safety Engineer, with **Doctorate in "Safety Management System",** having experience of more than 37 years in Oil & Gas Industry
- **Fellow Member,** Institution of Engineers, Kolkata
- **Board of Governor,** National Safety Council, Mumbai
- President**, Indian Society of HSE Professionals (i-HSE)**
- Recipient of **President's Fire Service Medal** for Meritorious services
- Chaired PNGRB Committee on revision of "**Emergency Response and Disaster Management Plan (ERDMP) Regulations" during 2019-2020 and functional member/leader in many OISD (Oil Industry Safety Directorate) Standards, NFPA (National Fire Protection Association), USA Standard on "Hot Work Operations", NDMA(National Disaster Management Authority) Guidelines on Fire Services etc as tech committee member.**
- Appeared on DD News and Rajyasabha TV as Panelist and Participated in many **National and International Conferences** as Speaker/Co-Chairman/ Chairman/ Moderator and Presented more than 40 Technical Papers
- Co-authored a book **"How to set up Safety Management System in 91 Days"** for MSMEs and CGD companies

For Educational Purpose

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A discussion (SURAKSHA SAMVAD)
on

" SAFETY MANAGEMENT SYSTEM "

04.03.2022

For Educational Purpose

GAIL (India) Limited

Dr S P GARG
Advisor(HSE) & Ex Executive Director
Board of Governor, National Safety Council
Email: sp.garg7826@gmail.com

Overview of Presentation

- *Introduction*
- *Incident/Accident Statistics and analysis*
- *Historical Path to Safety Approach*
- *Concept of Safety Culture*
- *Development of Safety Management System*
- *Role of Leadership in Safety Management*
- *Safety Management System in GAIL*
- *Conclusion*

For Educational Purpose

ILO Statistics on Health & Safety

Every day, 7616 people die as a result of occupational accidents or work-related diseases – more than 2.78 million deaths per year.

There are some 374 million non-fatal work-related injuries and illnesses each year, many of these resulting in extended absences from work.

The human cost of this daily adversity is vast and the economic burden of poor occupational safety and health practices is estimated at 3.94 per cent of global Gross Domestic Product each year

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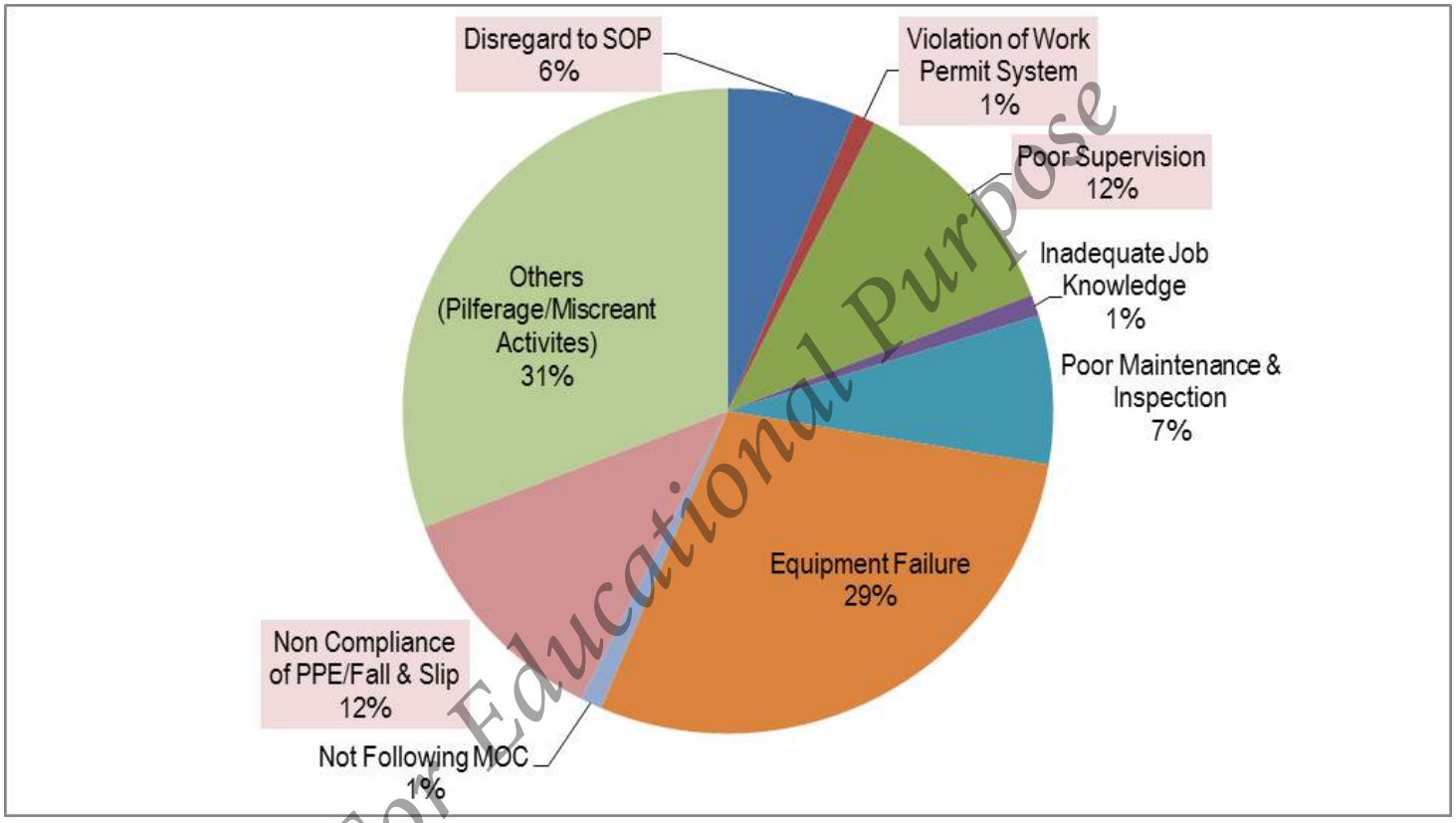
https://www.ilo.org/global/topics/safety-and-health-at-work/lang--en/index.htm

Analysis of major Pipeline Incidents: OISD (2004-2015)



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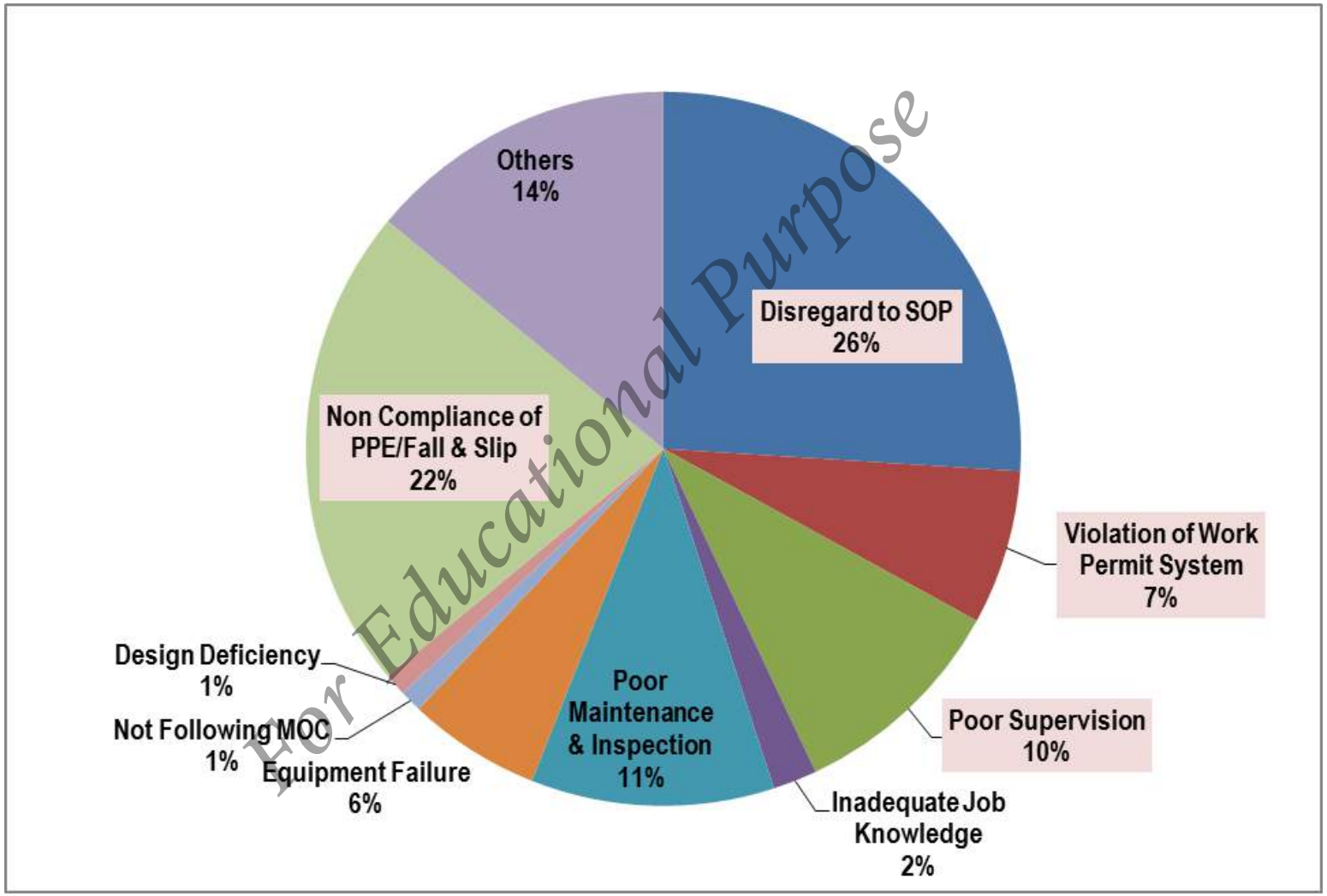
31% of Pipeline Incidents attributed to Pilferage/Third Party Interference Activities. 29% of Incidents attributed to Equipment Failure and balance all about 40% could be linked to human failure/negligence/unsafe act etc

Analysis of Major Incidents in Refining & GPUs (2004-2015)



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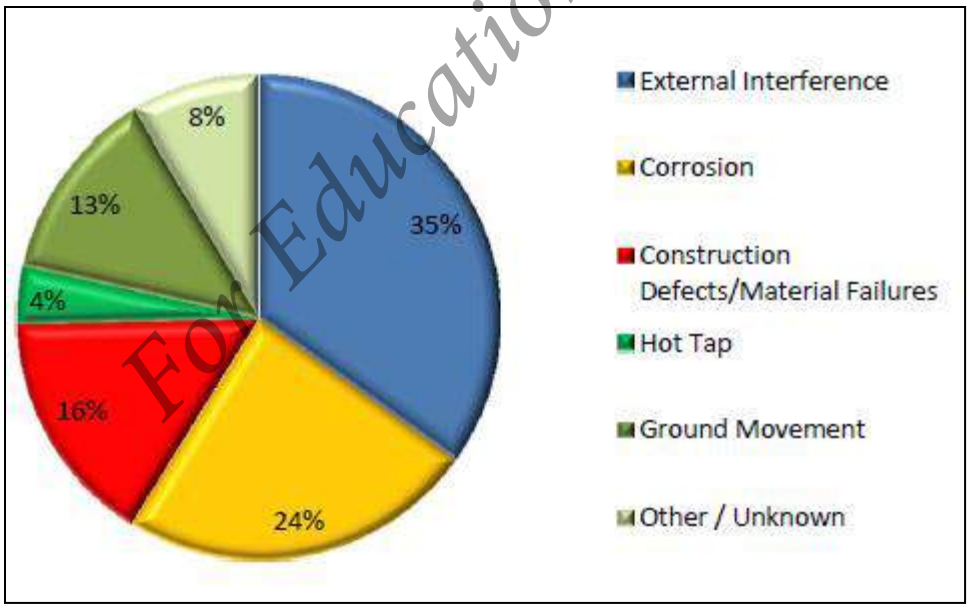
In 1982 six European gas transmission system operators took the initiative to gather the data on the unintentional release of gas in their transmission pipeline system known as EGIG (European Gas Pipeline Incident Data Group).

EGIG has maintained the European Gas Pipeline Incident Database of fifteen European Countries on more than 143000 KM of pipelines every year.



Source: 9th EGIG Report 2004-2013

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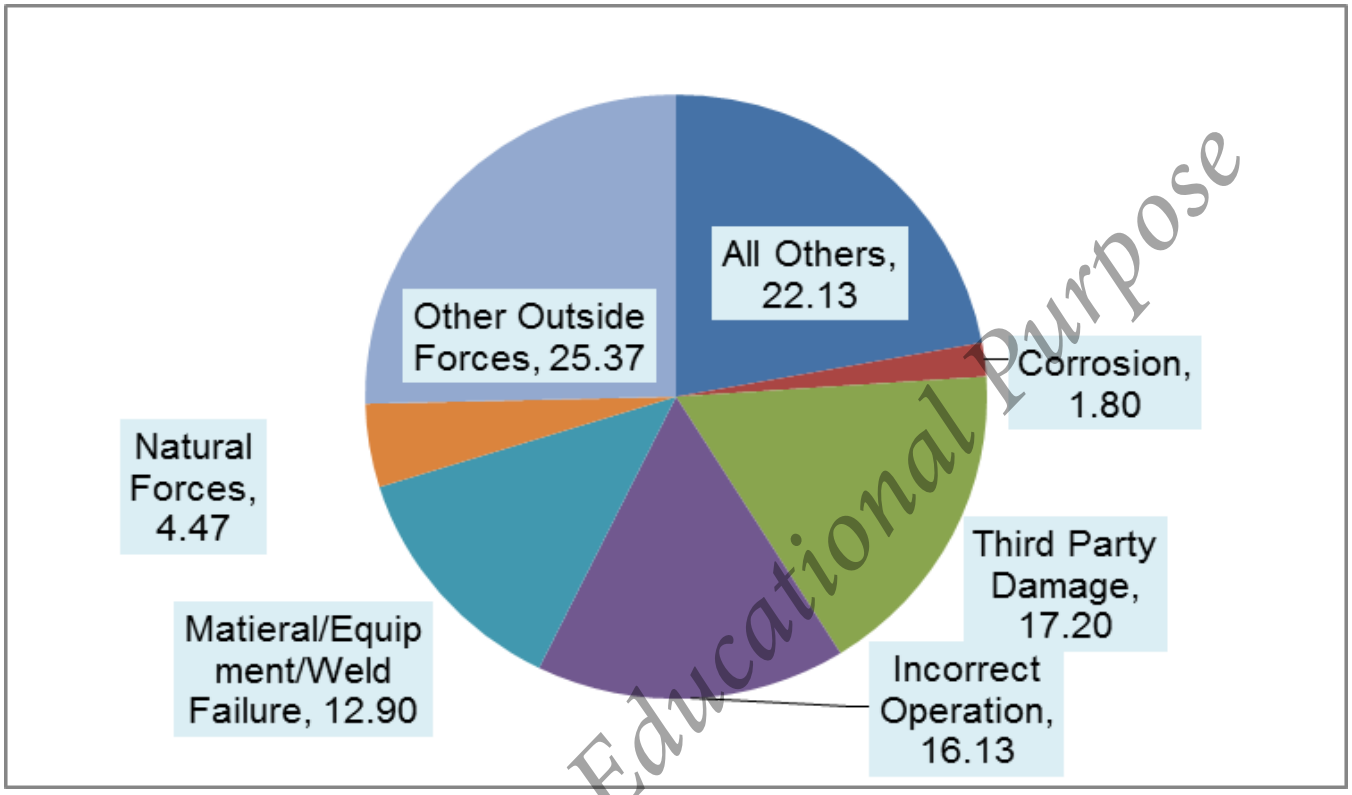

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Source: US Department of Transportation Pipeline and Hazardous Materials Safety Administration (2015-2017)

US Department of Transportation Pipeline and Hazardous Materials Safety Administration maintained Incident Data of more than 500000 KMs of Cross Country Pipelines.

Safety Culture

The Product of Individual and Group Values, Attitude, Competencies and Pattern of Behaviour that determine the commitment to and the Style and Proficiency of Organization's Health and Safety Program.

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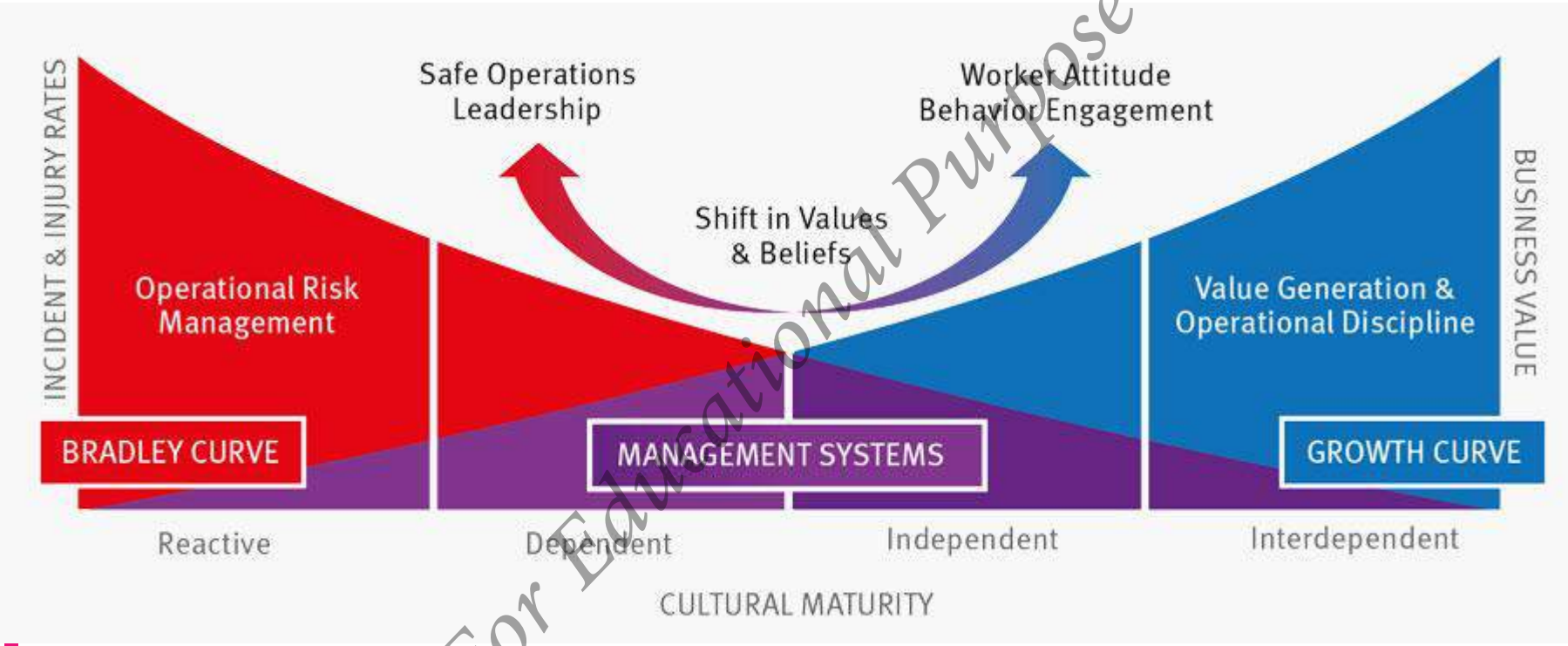
Safety culture continuum….



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Every Organization striving to build a Safety Culture for Business Value

OISD–Safety Management System

Safety Management System:

1. Safety Organisation
2. Employees Participation
3. Process Safety Information
4. Process Hazard Analysis
5. Operating Procedures
6. Training
7. Contractors
8. Pre-startup Safety Review
9. Mechanical Integrity
10. Work Permit
11. Management of Change
12. Incident Investigation and Analysis
13. Emergency Planning and Response
14. Compliance Audit
15. Occupational Health
16. Off-the job Safety
17. Customers and Products
18. Road Transportation
19. Trade Secrets

(OISD Standard 206, Published by Oil Industry Safety Directorate, Ministry of Petroleum & Natural Gas, Government of India)

Published in Year 2001

- **Specific to Oil & Gas Installations**
- **Mainly adopted by Public Sector Units under MoPNG**
- **Also include Process Safety Factors/Aspects**
- **Failure impact of element is very difficult to ascertain.**

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Steps involved in setting up HSE Management System from scratch

(Extract from Book)

"How to set up Safety Management System in 91 Days"

(Dr S P Garg, K K Gupta & Rajat Tewari)

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- 1. Writing Safety Policy (7 Days)
- 2. Writing SMS Elements(7 Days)
- 3. SOP for SMS & awareness (21Days + 8 Days)
- 4. Safety Governance Mechanism(7 Days)
- 5. BBS Integration into organization (7 Days)
- 6. Digitalization of Safety Processes (7 Days)
- 7. Safety Culture and Leadership (15 Days)
- 8. Safety as a core value (5 Days)
- 9. Communication to drive Safety Culture(7 Days)

HOW TO SET UP

SAFETY

MANAGEMENT SYSTEM
IN 91 DAYS

Most MSME do not have the knowledge or resources to build sufficient safety at work, and jeopardize the health and life of their workers, and potentially their future profits.

Today India has crores of MSME who are totally blind to the fact that a simple Safety Management system, implemented with minimal resources, can have a huge impact on their workplace.

The book directly addresses this issue. It shows how an effective and inexpensive Safety Management System can be implemented by an MSME or CGD in 91 days (about 3 months). Thus it is aptly named as 'How to Setup Safety Management System in 91 days'.

"This book would be a valuable referral document on Safety for policy makers, administrators, academicians and people working or associated with MSMEs and CGDs"
Manoj Jain
Chairman and Managing Director
GAIL

INVINCIBLE
Publishers and Marketeers

MRP: ₹ 399/-
ISBN 978-93-90542-06-2
9 789390 542062

Invincible Publishers

HOW TO SET UP SAFETY MANAGEMENT SYSTEM IN 91 DAYS

DR. S.P. GARG
K K GUPTA
RAJAT TEWARI

HOW TO SET UP

SAFETY

MANAGEMENT SYSTEM
IN 91 DAYS

A Safety Management Handbook
for MSMEs and CGDs

DR. S P GARG
K K GUPTA
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9 789390 542062
Safety Management

GAIL's Corporate HSE Policy' and 'HSE Management System' (18 Elements) provide the sound foundation by integrating safe work practices in every activity of the organization.

HSE Management System of GAIL was prepared in line with OISD-GDN-206 "Safety Management System in Petroleum Industry". Initially, the HSE management system and guidelines were introduced in GAIL in the year 2002. Subsequently, revised in the years 2008 and 2015.

- **The HSE Management System covers following key elements:**

  - ✓ **HSE Policy Statement**
  - ✓ **Organizational Objectives**
  - ✓ **Set of detailed processes supporting HSEMS**
  - ✓ **Periodic, monitoring, review and reporting of performance**
  - ✓ **Audit of Internal & External Activities**

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GAIL (India) Limited

CORPORATE

HEALTH, SAFETY & ENVIRONMENT POLICY

GAIL (India) Limited endeavors to generate value through Sustainable Development by placing commitment to Occupational Health, Safety and Environment of Plants, Pipelines including CGDs and Personnel, and these beliefs are embedded within our core Organizational Values.

GAIL is committed to

- Be a leader in Safety, Occupational Health and Environment protection by adopting latest Technology and Digitization.
- Design, construct, operate and maintain its facilities as per National / International standards to ensure adequate safety of all Stakeholders, Plants, Pipelines, Projects and Surroundings.
- Comply with applicable Statutory Rules and Regulations of the countries where we operate.
- Optimize the HSE resources and provide structured trainings on HSE Management System including Behavior Based Safety (BBS), and ensure effective Emergency preparedness at all installations.
- Implement Occupational Hygiene measures & regular Medical Surveillance and Risk based monitoring to ensure good health & wellbeing of its Employees.
- Make use of effective Waste Management System including E-Waste and Bio-Medical Waste as applicable for a Clean & Green Environment.
- Share HSE Policy and HSE performance with all interested Stakeholders.

We encourage all employees including Contract Workmen to adopt safe working habits and behavior to create positive HSE culture within organization. They have responsibility and authority to notify and stop any unsafe work /act, as deemed fit.

Date of Review: 10.07.2020
Revision No.:07

Manoj jain
Chairman & Managing Director

For Educational Purpose

Elements of HSE Management System

Compliance Audit

Leadership & Commitment

Employee Participation

Emergency Planning & Response

Facility, Design Construction & Prestartup Review

Environment Management

Occupational Health

Process Safety Information

Accident Investigation & Analysis

Risk Analysis & Management

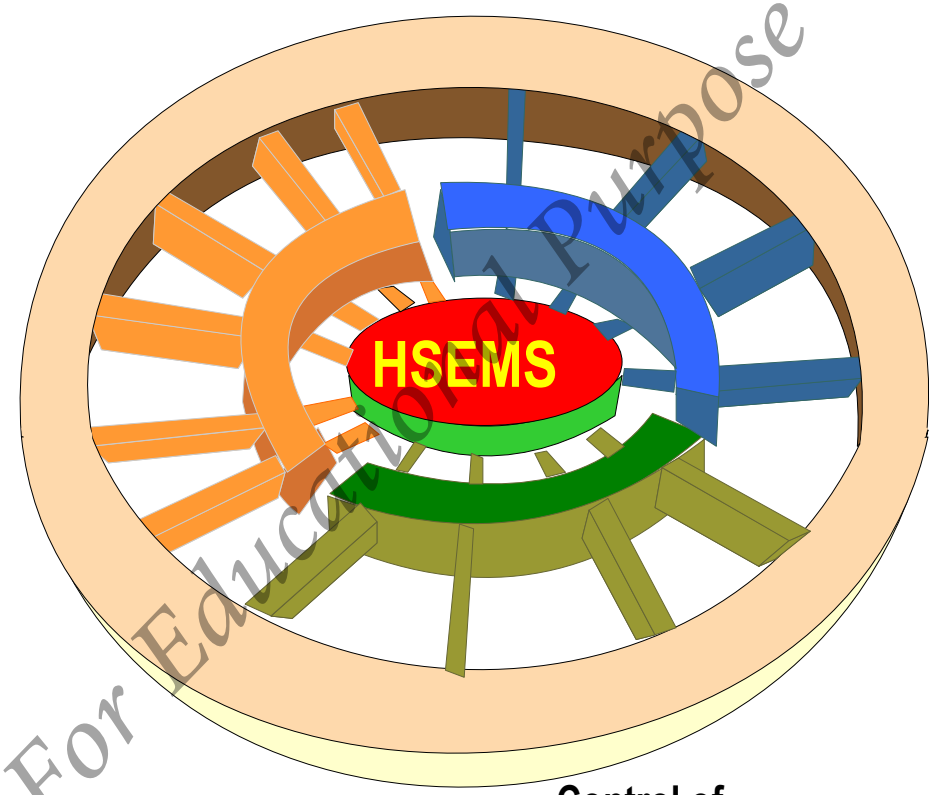
Training

3rd Party Services

MOC

Personnel Safety

Inspection & Maintenance



Operation & Maintenance

Work Permit System

Control of Defeat & Reliability of critical devices

For Educational Purpose

- **The HSE Management System Elements and Guidelines provide minimum requirements to all GAIL Installations on Health, Safety and Environment functions and focus on uniform implementation.**

- **The HSE Management System does not cover any statutory or legal compliances pertaining to installations.**

- **The HSE Management System is not intended to override the compliances of various Central and State Government Rules and Regulations. GAIL Installations are abiding/bound with applicable legal compliances pertaining to site specific and it shall be prime responsibility of sites to comply with.**

- **The HSE Management System was duly approved by Director (BD) & Director (Projects) in April 2015.**

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HSE Leadership and Commitment

- Site specific Health, Safety and Environment Policy
- Delegation of HSE responsibilities
- HOD (F&S) reports to OIC/WIC
- Preparation of 'Annual HSE Plan' along with the quantifiable and measurable goals by individual work centres on yearly basis (April – March) duly approval of the same by OIC/WIC
- Review of HSE Performance through 'HSE Score' System.
- Conduct Safety Tour to Sites
- Statutory Compliances
- Observance of Monthly Safety Day

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Achieving Visible Safety Leadership: ERM Global **Safety Survey**

SAFETY: A source of increasing risk and opportunity for business – What is the global perspective?

For Educational Purpose

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ERM

We spoke to 144 senior safety functional leaders

22	120	$4.3T	6.8M
Countries	Companies	Annual Revenues (USD)	Employees

72% Global Directors/VPs

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They told us…

leadership engagement is key, but leaders need to step up and gain new skills

Only 29%

felt leaders at all levels were effective at hazard recognition/engaging effectively as coaches on the frontline

For Educational Purposes

Leadership & Commitment

- Cultural change has to be driven from the top not by specialist at any intermediate/middle management level.
- Top Management should have die heart desire
- Overcome from “touch me not” or “stay out” approach

For Educational Purpose

For Educational Purpose

What are your thoughts? Are you doing this as a leader?

Felt Leadership

1. Be visible to the organization.
2. Be relentless about time with your people.
3. Recognize your role as a teacher/trainer.
4. Lead by example.
5. Hold people accountable
6. You are authentic in all aspects of communication
7. Celebrate and recognize successes.

For Educational Purpose

Employees Participation

- Encourage employee participation in HSE matters
- Observance of Monthly Safety Day, Campaign on Life Savers etc.
- Encourage to report incidents/near misses
- Formation of Safety Committee
- Dissemination of HSE through display of safety posters, information, SOPs etc. and imparting training to employees including contract workers
- Formulation and implementation of appropriate Award/Reward Scheme for motivation of employees in HSE matter for their contribution
- Structured HSE Trainings

For Educational Purpose

Process Safety Information

- Field verification of P&ID once in a two year by nominated group of people to ensure the incorporation of all modification with the actual process philosophy.

- The Standard Operating Procedures should be available and displayed. And the personnel deployed for the process operation need to be trained on SOPs. Kindly refer the requirement of SOPs in element Operation & Maintenance.

Third Party Services

- Meeting with Contractor Site In-Charge by Engineer In-Charge of Works or Services on quarterly basis along with Operation and Fire & Safety representative on HSE requirements and implementation.

- Monitoring and Evaluation of Contractors and suppliers' performance by the group deploying the agency through surprise checks as required.

For Educational Purpose

- Review of JSA and HIRA once in a year to add the new activities if any and incorporate of addition control and lower the risk respectively.
- Nomination or constitution of multi-disciplinary group to conduct Hazard Identification and Risk Assessment in respective work centres by OIC/WIC.
- Conduct Quantitative Risk Analysis through reputed third party with latest tools available in National/International market.
- Conduct Quantitative Risk Analysis & Hazop Study for all installations once in five year and after any change and modification. Hazop Study shall be the part of all Change of Management Process across the organization.
- Implementation of recommendations of Hazard Identification and Risk Assessment implemented in time bound manner.

For Educational Purpose

Personnel Safety

- Monitoring of personal behaviour of employees and workers at site. Generation of monthly report and its analysis to improve the safety behavior of personnel at site.
- Standardization of Specification of Personal Protective Equipment.
- PPE Matrix
- Review of Safety and Pocket Safety Manual for updating at least once a year

Critical System & Devices

- Preparation of up to date list of critical systems and devices and duly approved by OIC. Updating the same in once in year or inclusion of new system or devices.
- Maintenance of records for bypassed or inactive critical systems and devices at control room for ready reference

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Work Permit System

- **Work Permit System must be established online through SAP at all Petrochemical Plant, Gas Processing Plants, Compressor Stations, LPG Pumping Station and Pipeline Installations. No permit can be issued offline expect in pipeline installations and project site.**

- **Permit Authorization -Process Plant:**
  - Employees at level of Manager (E-4) and above shall be authorized by name to issue of work permits.
  - Employees at level of Sr. Engineer (E-2) and above shall be authorized by name to receive the work permits.
  - Employees at level of Sr. Officer (E-2) and above shall be authorized by name to counter signed the permit as Fire & Safety representative.
  - In no case Employees at level of Engineer (E-1) and below is authorized by name for issuing or receiving of permit. Employees at level below Engineer (E-1) only can be authorized to receive the permit with approval of OIC based on his competency.
  - For any exception mentioned above, necessary approval shall be accorded by OIC only.
- **Other Installations**:
  - Employees at level of Sr. Engineer (E-2) and above shall be authorized by name to issue of work permits.
  - Employees at level of Engineer (E-1) and above shall be authorized by name to receive the work permits.
  - Employees at level of Officer (E-1) and above shall be authorized by name to counter signed the permit as Fire & Safety representative.
  - In no case Employees at level of Engineer (E-1) and below is authorized by name for issuing or receiving of permit. Employees at level below Engineer (E-1) only can be authorized to receive the permit with approval of OIC based on his competency.
  - For exception mentioned above, necessary approval shall be accorded by OIC only.
- `

For Educational Purpose

- Imparting one day training on Work Permit System to personnel, who authorized for issuing of permit, receiving of permit and countersigning of permit, followed with refresher training at least once in two years.

- Inspection of Work Permit System by nominated employees (Representative from Operation, Maintenance and F&S for Process Plant and representative from Operation and F&S for Other Installations) once in a quarter for checking the same for its adequacy and also for further improvements.

- For effective supervision under work permit system, not more than two critical jobs should be supervised by one official from maintenance at a time except in case of urgency.

- The procedures as followed in Operation and Maintenance, same will be applicable for annual turnaround of Process Plants/Pipelines.

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- Review of SOPs by multi-disciplinary group of employees, nominated by OIC/WIC in once in a year.
- Structured training to involved personnel on Standard Operating Procedures once in a year.
- Necessary undertaking that the concerned has on read and understood (familiarization) SOP on once in six months.
- Tool box/pep talk/safety briefing for all involved employees including contract workers for non-routine work before initiation of job by Executing Department to familiarize them on hazards associated with work, mitigation methods in place and also use of appropriate PPEs. Special mention of the same at work permit for necessary record.
- Review of Operation and Maintenance procedures once in a two years by nominated group of members for its relevancy and effective usage.

For Educational Purpose

Major Reportable Incidents:

1. Any incidents of fire not extinguished in 15 minutes.
2. Any incident causing shutdown of operations on account of fire/explosion/leakage
3. Any incident causing financial loss above Rs. 20 lakhs (financial loss above Rs.10 lakhs for the purpose of reporting to PNGRB).
4. Any incident leading to fatality (s) within plant/location premises.
5. Any incident causing major loss of containment and having adverse impact outside the plant/location premises including disasters defined under Section 2(d) of DM Act, 2005.
6. Any incident of road accidents (during transportation of petroleum products) resulting in fire/explosions which in turn leads to fatality(s).
7. Any incident not covered above in S No. 1 and 6 but which gets reported in the national media within 24 hours of the occurrence.

Additional Reportable Events:

1. Any specific Disaster arising out of terrorists attack, fire and natural calamities.
2. The disruption on big scale in the supply of Petroleum Products (NG, LPG etc.) due to terrorists attack, natural calamities and law and order problems.
3. Strike by the Employees of Oil Industry
4. Cyber Attack and Cyber Terrorism

All other incidents not mentioned above shall be treated as Non-Major (Minor) incident

For Educational Purpose

Investigation Committee Constitution:

a. Respective OIC will constitute a multi-disciplinary committee within 48 hours to investigate the incident.

b. The Investigation Committee should be constituted as follows:

i. Level –I incident:

- Minimum 3 member multi-disciplinary committee including F&S representative
- Pipeline Installations - headed by minimum Manager Level.

ii. Level –II, III & Major incident:

- Minimum 4 member multi-disciplinary committee including F&S HOD.
- GPUs / Pipeline Installations - headed by minimum DGM Level.

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Investigation Report Submission:

a. Non-Major (Minor) Incident:

1. Duly constituted committee will submit the report to respective OIC within three weeks.
2. OIC will forward a copy of the accident investigation report to respective ED / GM (O&M) with a copy to HOD (HSE) within three weeks.

b. Major Incident:

1. Respective ED / GM (O&M) will forward investigation report of all major incidents as defined in PNGRB ERDMP regulation to GM (RA) with a copy to HOD (HSE), within 25 days of occurring of incident.

2. GM (RA) will forward the investigation report to PNGRB within 30 days of incident with a copy to NGMC, HOD (HSE) and ED (O&M) CO.

For Educational Purpose

Our focus areas in HSE Management System

For Educational Purpose

Board Level HSE Subcommittee to Review

- Exclusive SD Sub Committee of Board to oversee HSE Matters.
- HSE Exceptions review by the Sub-Committee of Board headed by Independent Director

For Educational Purpose

Observance of Monthly Safety Day

- Dedicated half day on 10th of every month by site OICs for HSE review
- Review of Exception Report by Directors
- Action taken report for further improvements

Safe Behaviours at Work

- BBS journey as part of initiating Safety Cultural Change.
- Rolled out across Organization
- Constitution of Corporate and Site Steering Committee & Functional Committees at Local level to drive BBS
- Development of BBS Lead Trainers and Observers
- BBS Promotional Events at sites
- Third Party Agency is engaged for further penetrating the BBS & Soft Leadership Concept through 'BBS Advance'.

For Educational Purpose

Standardization of Processes & Procedures

Standard Operating Procedures

- Reviewed by International Reputed Agency M/s. British Safety Council, UK for Process Plants and M/s. DNV GL for pipelines
- Standardization of SOPs across organizations
- Preparation of films on Critical SOPs for better understanding

HSE Procedures/Guidelines: Beyond Statutes

- Operation and Maintenance Guidelines
- Fire & Safety Policy: Scaling of Fire & Safety System and Equipment, Spare/Stock Philosophy and Life Cycle
- Standardization of Fire & Safety Equipment Specifications
- Occupational Health and Environment Management Guidelines

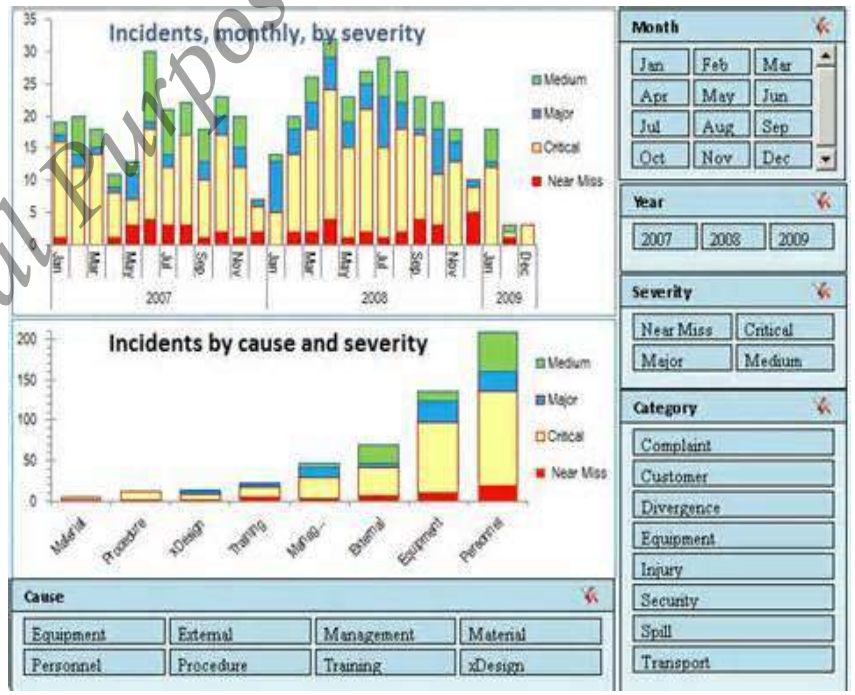
For Educational Purpose

Leveraging IT in Safety Management – EHSM SAP

- ✓ EHS Management System with new functionalities having key advantage of portal based, guided steps, work flow and analytical dashboard.

- ✓ The key new functionalities in enhancement are:

  - Incident/Accident Management (Safety Observation, Near miss Reporting & Incident/Accident Reporting
  - Risk Assessment (Job Safety Analysis & Equipment Risk Assessment)
  - Worker Safety Management
  - Safety Audit/Activity Monitoring System
  - Plant Maintenance Module
  - Work Permit System



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External Safety Audits

- Once in a year by Third Party Inspection Agency
- Once in three years by approved Third Party Inspection Agency of Petroleum and Natural Gas Regulatory Board
- Once in five years by Oil Industry Safety Directorate (OISD), a Technical Wing of Ministry of Petroleum and Natural Gas

Internal Safety Audits

- Proactive Safety Audit once in a year by Respective Region
- Internal Audit by Corporate O&M Team once in a year

For Educational Purpose

Good Safety Management System lays foundation for developing good Organizational Safety Culture, necessary for long term organizational sustenance

As no change can be introduced overnight, it is important to build a conducive environment for adopting change and making it sustainable

For Educational Purpose

THANKS