HMEL®

Energising a Brighter Tomorrow

DRIVING PROCESS SAFETY PERFORMANCE THROUGH INTELLIGENT DASHBOARD

By VijayaKrishna Malluri & Anshul Tiwari

HMEL.....

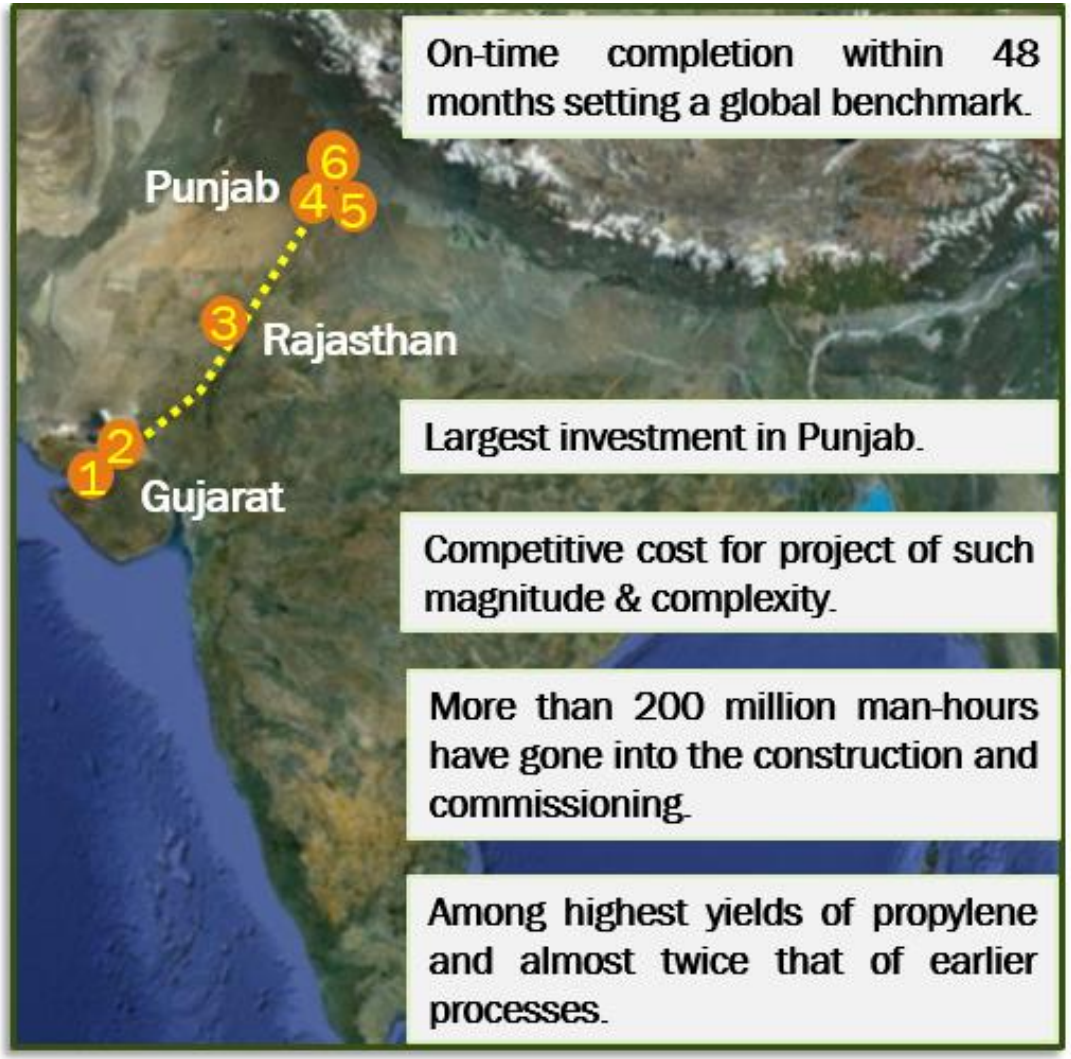
HPCL

- A 'Navratna' Public Sector Undertaking and a 'Fortune 500' company
- HPCL is one of the largest oil refining and marketing companies in India owned by Gov. of India

MEIL

- MEIL is a 100% subsidiary of Mittal Investments Sàrl, beneficially owned by Mr. Lakshmi N. Mittal and family.
- Mittal Investments Sàrl is engaged in building a portfolio of oil-and-gas assets

HMEL.....



On-time completion within 48 months setting a global benchmark.

Largest investment in Punjab.

Competitive cost for project of such magnitude & complexity.

More than 200 million man-hours have gone into the construction and commissioning.

Among highest yields of propylene and almost twice that of earlier processes.

1. **Single Point Mooring (SPM)**: For handling VLCCs 7 km in the sea.

2. **Crude Oil Terminal**: 14 crude tanks of 60,000KL each & 4 blending headers.

3. **Crude Pipeline**: 1017 km underground pipeline sized to carry 18 MMT of crude.

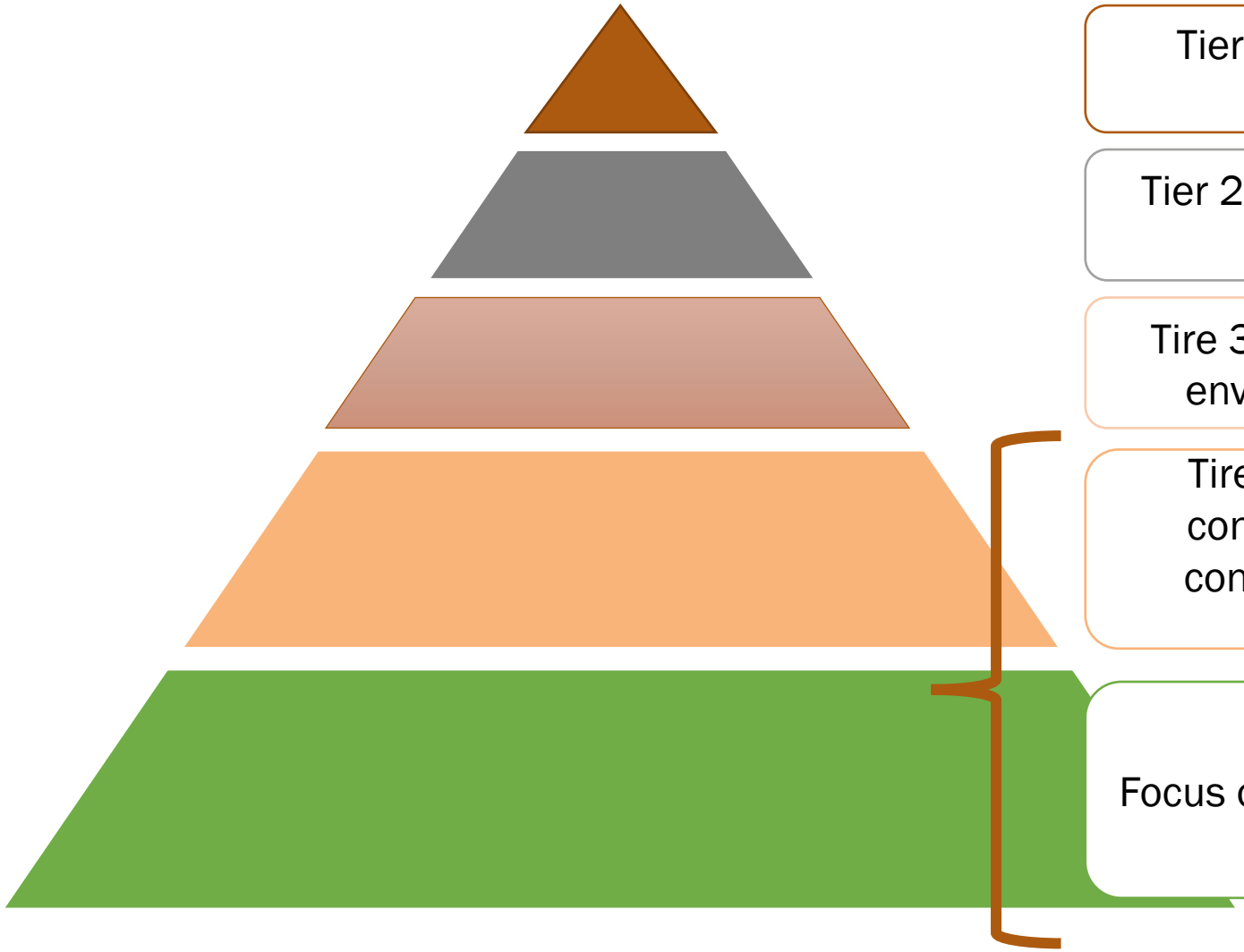
4. **Complex Refinery**: Best in class refinery recently expanded to 11.3 MMTPA.

5. **Captive Power Plant**: Power plant with gross capacity of 165 MW.

6. **Polymer Unit**: PP unit with design capacity of 467 KTPA (multiple grades).


HMEL
GURU GOBIND SINGH REFINERY
HPCL-MITTAL ENERGY LIMITED
DESIGN INTEGRITY
OPERATING INTEGRITY
TECHNICAL INTEGRITY
PEOPLE AND SYSTEM
HMEL
Process Safety Management
COMMITTED TO PROCESS SAFETY
UNDERSTAND THE HAZARD & RISK
MANAGE RISK
LEARNING FROM EXPERIENCE
PROCESS SAFETY CULTURE
EMPLOYEE PARTICIPATION
PROCESS SAFETY INFORMATION
PROCESS HAZARD ANALYSIS
OPERATING PROCEDURE
MANAGEMENT OF CHANGE
PRE STARTUP SAFETY REVIEW
CONTRACTOR MANAGEMENT
MECHANICAL INTEGRITY
TRAINING & PERFORMANCE ASSURANCE
SAFE WORK PRACTICE
EMERGENCY RESPONSE
INCIDENT INVESTIGATION
COMPLIANCE AUDIT
PERFORMANCE MEASUREMENT
MANAGEMENT REVIEW
Vision – Incident & Injury Free Workplace

Process Safety Incident Reporting Pyramid



Tier -01 PSE : Event significantly impacting people, environment & asset.

Tier 2 PSE : Event with no significant impact to people, environment & asset

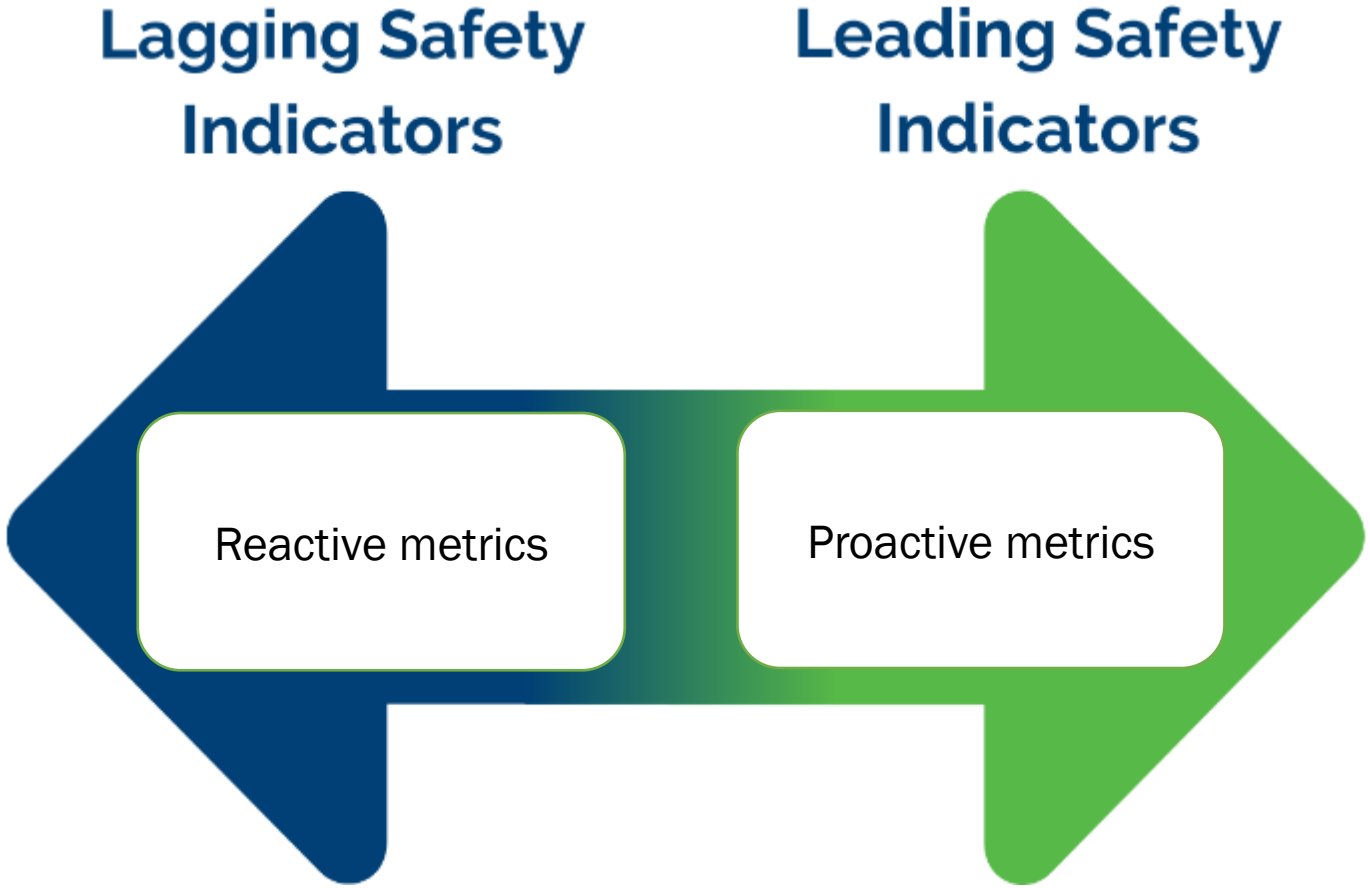
Tire 3 : High potential event with no impact to people, environment & asset but had a potential to do so.

Tire 4 : Physical substandard & human producing conditions that has the potential to cause loss of containment event or impact functioning of safety system.

Tire 5 Indicators :
Focus on Conduct of operation and Operation discipline :
Design & Management system issues

Process Safety Performance Indicators

1. No. of Tier-1 PSEs
2. No. of Tier-2 PSEs
3. No. of Tier-3 PSEs
4. No. of OLS clamps
5. Safety System Bypasses.



1. Employee participation in proactive safety initiative.
2. Leadership PSM tour.
3. Line supervisor tour.
4. Operator focus safety rounds
5. Near miss reporting & closure
6. Permits Compliance.
7. SOP Verification survey.
8. Refresher training compliance.
9. PSM IDP Training Compliance
10. PM compliance of SCE's
11. SOP revision compliance
12. SMP revision compliance
13. MOC life-cyle deviations
14. Audit rec. compliance
15. PHA rec. compliance
16. PSSR rec. compliance
17. Investigation rec. Compliance
18. Emergency preparedness.

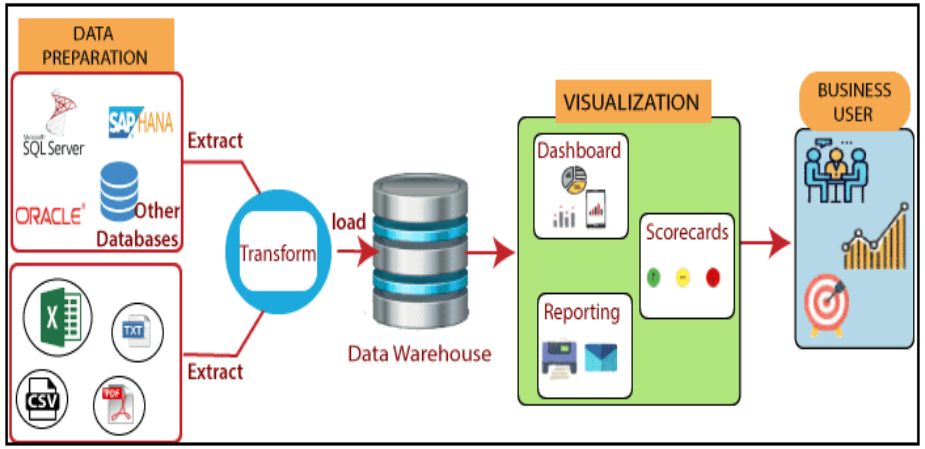
Steps in Development of Digitalized Dashboard

1. Selection of Process Safety Leading and Lagging Indicator
2. Identification of Source Systems for Work Processes & Procedures
3. Utilization of Data Analytics Tool for Mapping and Importing Data
4. Data Transformation and Process Safety Key Performance Indicator (KPI) Generation
5. Data Visualization for Monitoring and Performance Evaluation

Lagging indicators	Leading indicators
• No. of Tier-1 process safety incidents	• No. of PHA recommendations pending/ overdue for closure

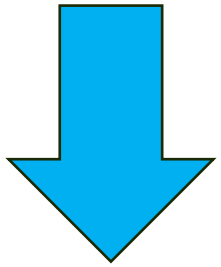
Plant data	Business software tools
• Near miss & incident data	SAP BI
• Work permit audit	SSIS/SQL

POWER BI ARCHITECTURE

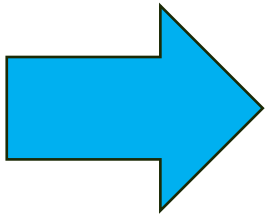


Dashboard to Intelligent Dashboard

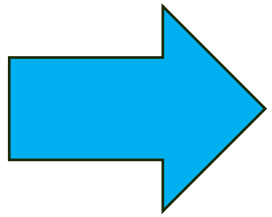
Raw Data



Clean Data
(Performance dashboard)



Algorithm



Valuable Insights
Areas of concern.
(Intelligent dashboard)

Dashboard Intelligence Capability Areas

- Process safety near miss analysis.
- Online leak sealing (OLS) data analysis.
- Operator safety round data analysis.
- Permit audit & Suraksha Samwad (PASS) data analysis.
- Process safety incident data analysis.
- Management of change (MOC) data analysis

Case 1 : Process safety near miss Data Analysis

Figure-1: Year Wise Near miss Count

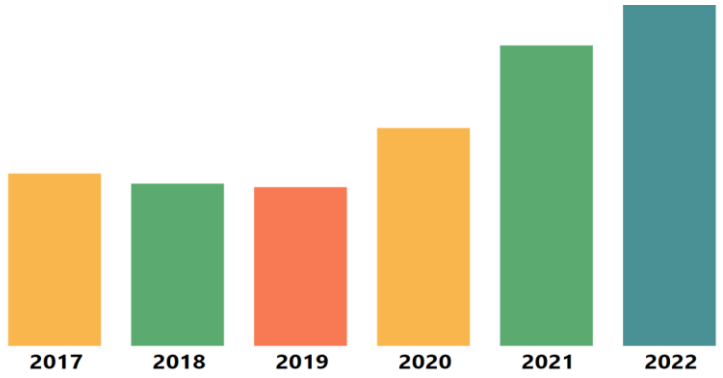


Figure-2: Near miss primary classification

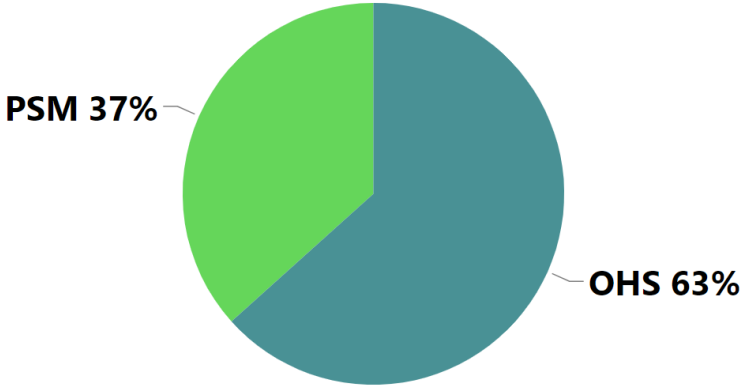


Figure-3: Category Wise classification

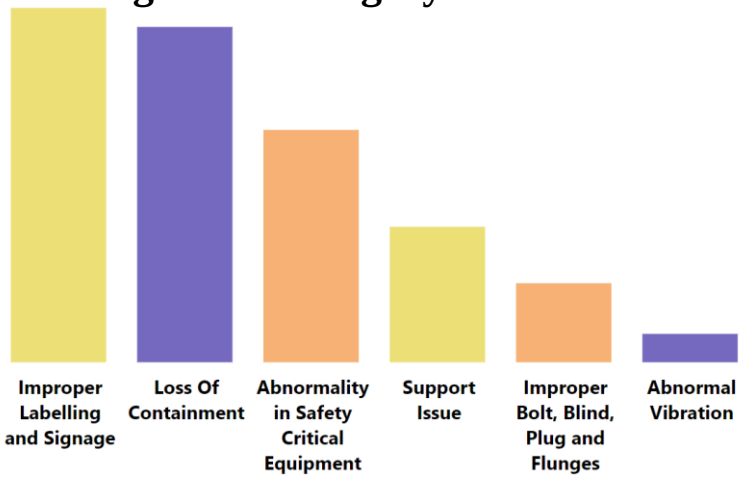


Figure-4: Type of chemical released

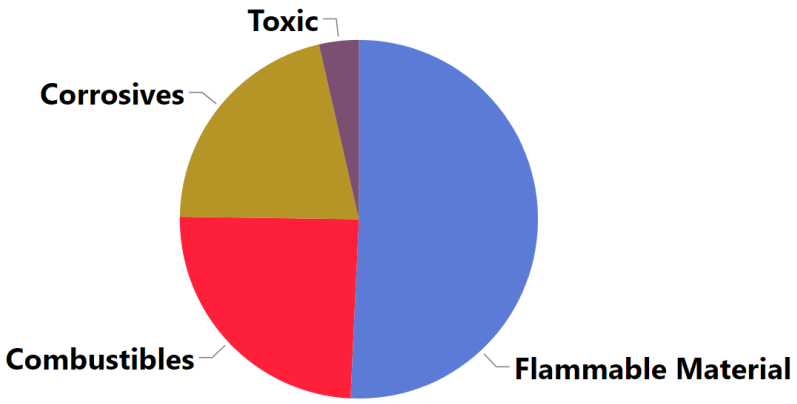


Figure-5: Point of Release

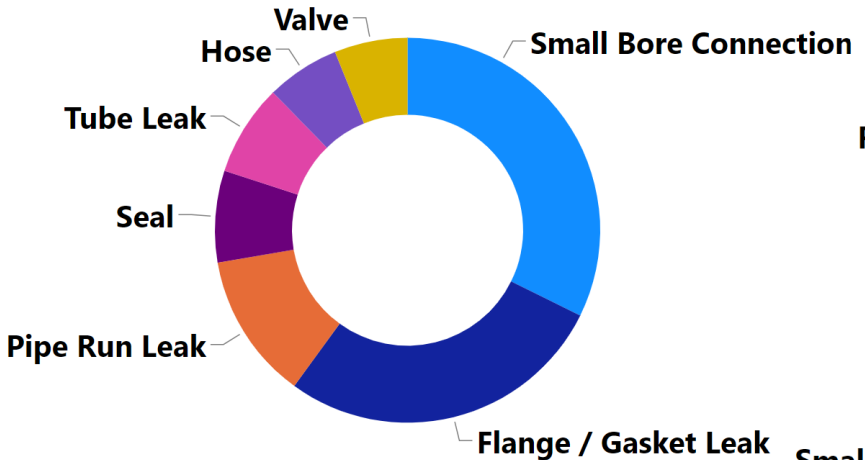
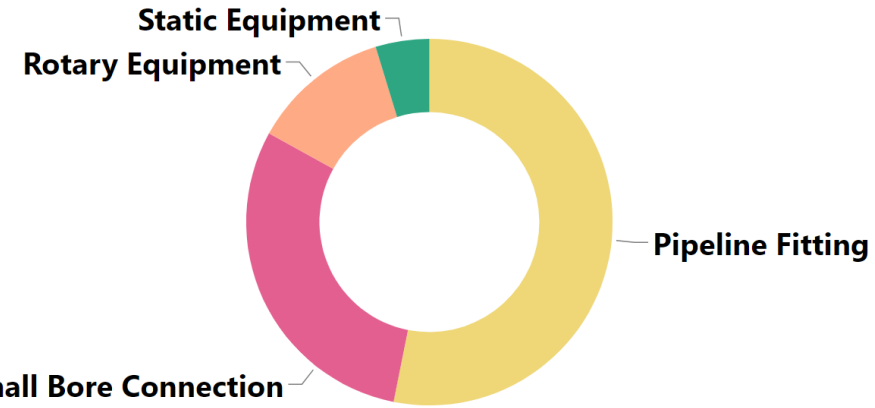
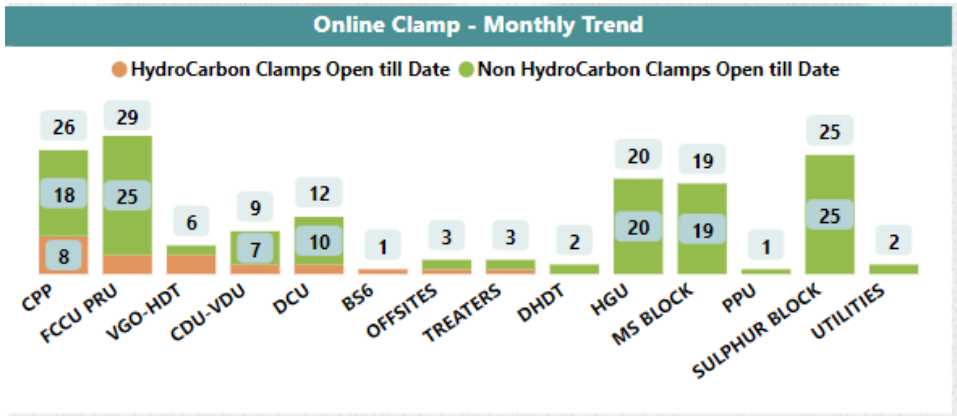


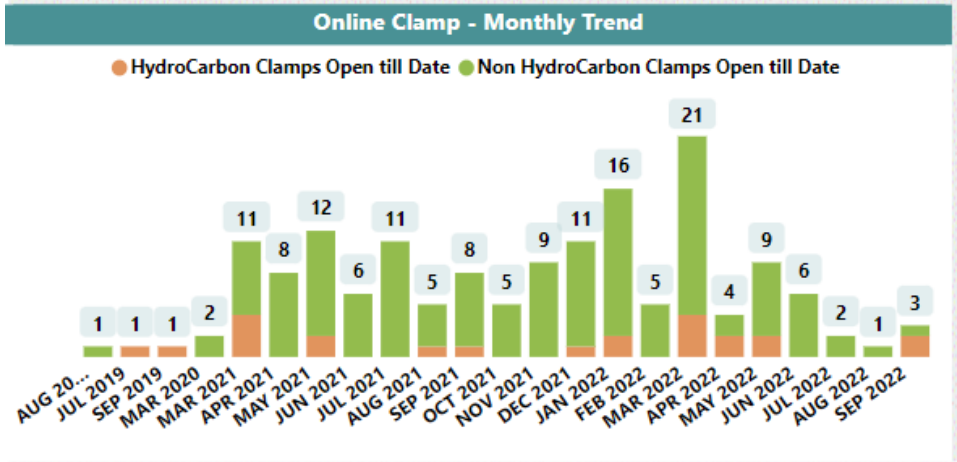
Figure-6: Type of Equipment Involved

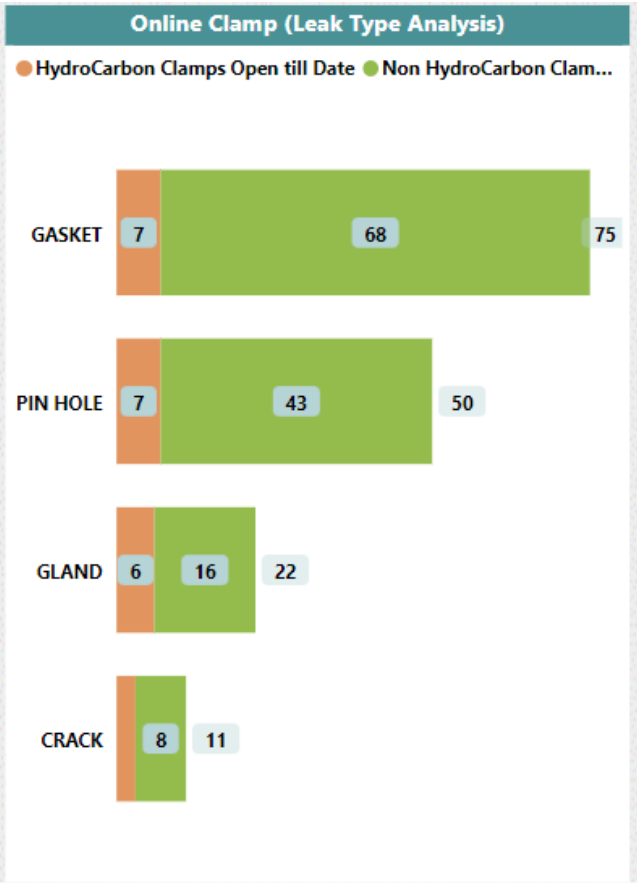


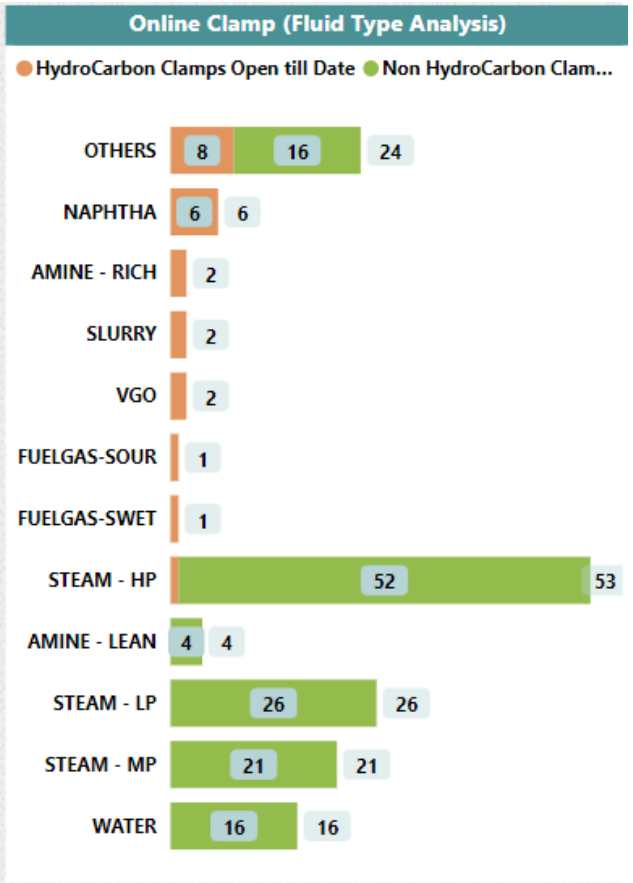
Case 2 : Data analysis of OLS

- Data is recorded in OLS management system in SAP



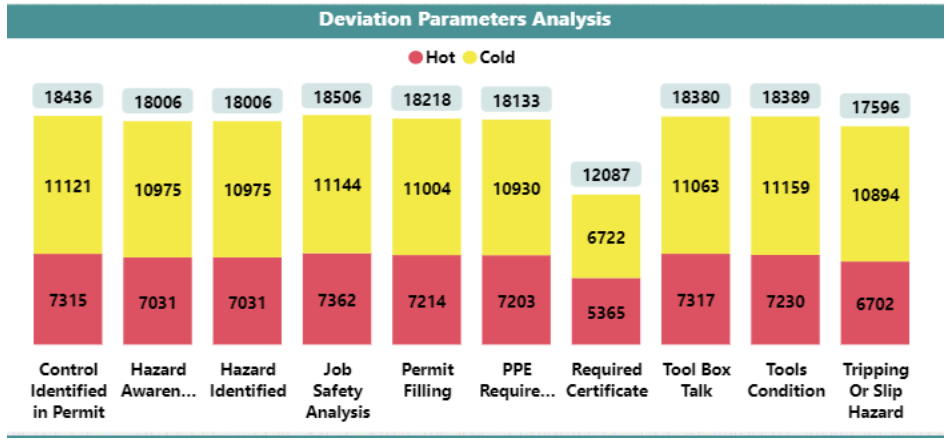


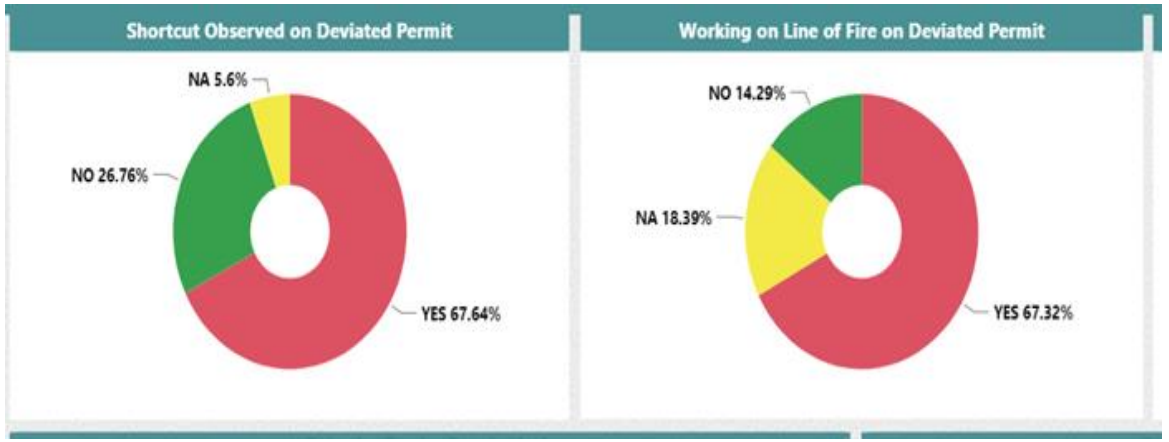


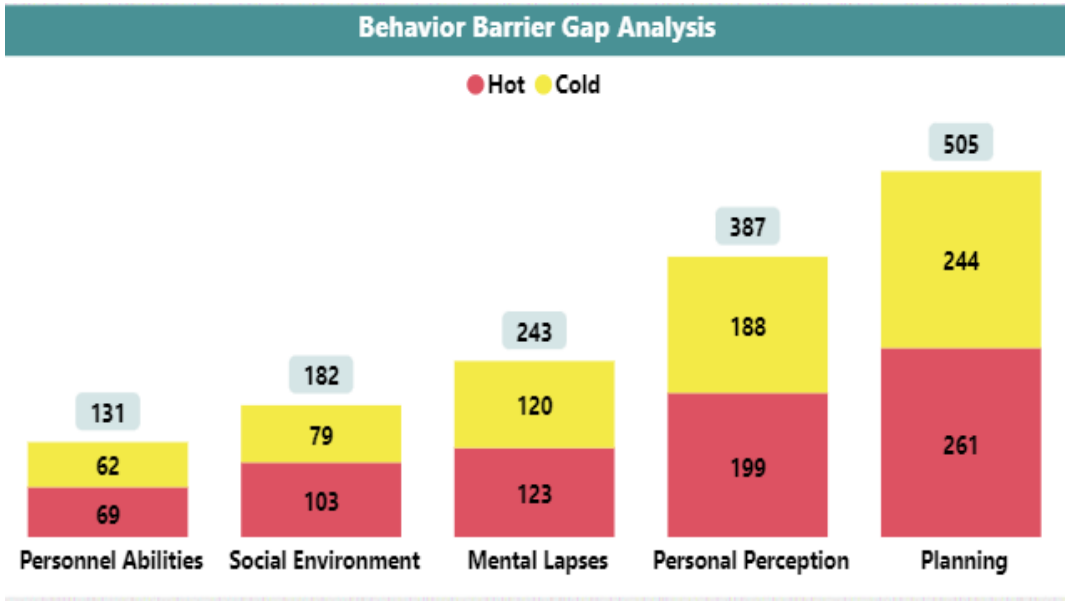


Case 3 : Operator safety round data analysis

Case 4 : PASS data analysis







Conclusion

- Harnessing the power of data analytics in process safety
- Embrace the shift towards proactive safety management

Thank you

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