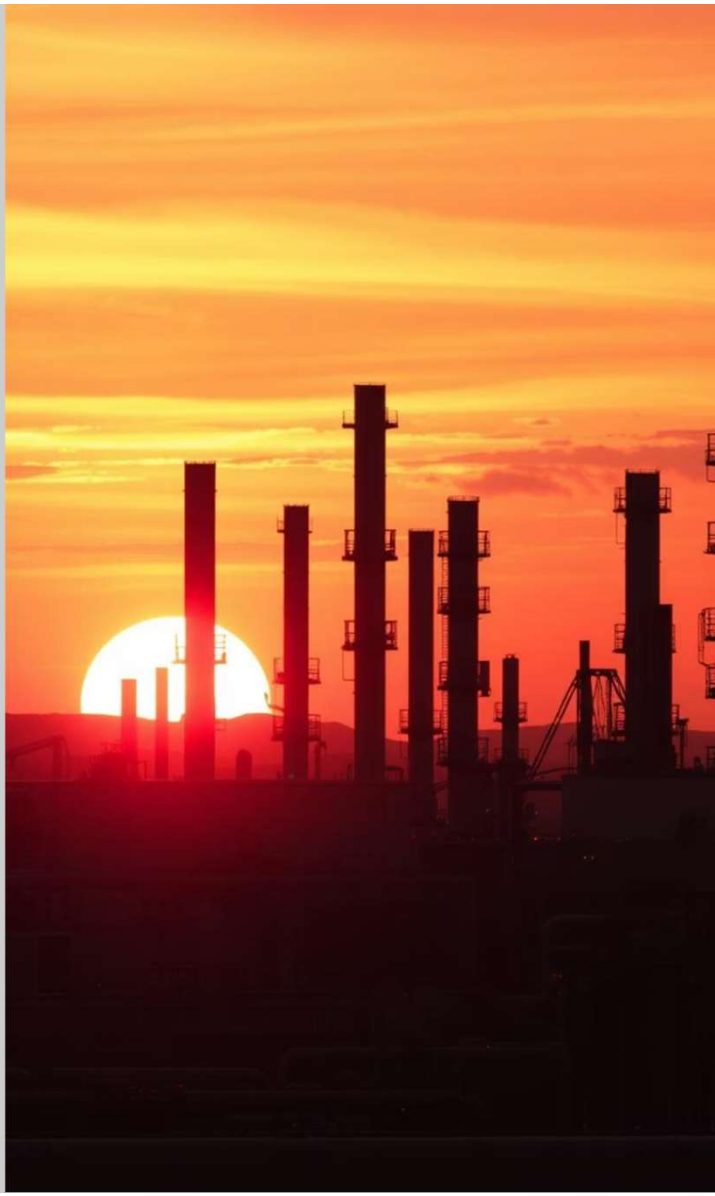
SURAKSHA SAMVAD

An Opportunity to learn from mistakes ...

An OISD initiative to foster a culture of safety by learning from past incidents to prevent future occurrences.

by Ankit Gopal Pandey Joint Director – Process & Engineering OISD



MAJOR FIRE INCIDENT IN COMPRESSOR HOUSE IN GAS PROCESSING PLANT

BRIEF OF GAS PROCESSING PLANT

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01

Receipt of Crude Oil

Crude oil arrives from offshore fields

02

Three-Stage Separation

Crude oil undergoes separation in the CSU

03

Gas Routing

Separated gases are directed to compressors

04

Gas Compression

Gases are compressed by reciprocating compressors

05

Gas Blending

Compressed gas is blended with offshore gas

06

Gas Processing

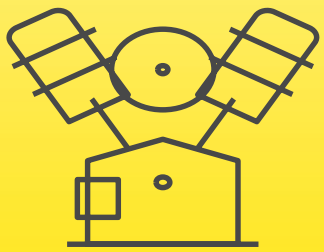
Blended gas is sent for further treatment

BRIEF OFF-GAS PROCESSING COMPRESSOR HOUSE

Reciprocating Compressors

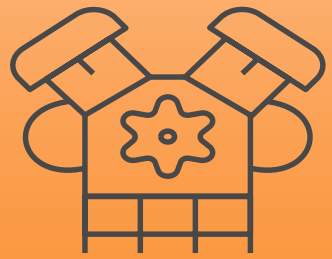
K- A/B/C

IHI-A/B/C compressors manufactured in Japan.



K- A/B

NP-A/B compressors manufactured by Nuovo Pignone.



BRIEF ABOUT OFF-GAS PROCESSING COMPRESSOR

The reciprocating compressor ,where the incident occurred, is a three-stage, five-cylinder , mini-lubricated piston-type.

	1st Stage	2nd Stage	3rd Stage	Discharge
Suction Pressure	1.068 Kg/cm2(a)	4.013 Kg/cm2(a)	15.00 Kg/cm2(a)	51.53 Kg/cm2(a)
Capacity	14905 kg/hr	18722 kg/hr	14934 kg/hr	--

P&ID

INCIDENT TIMELINE

Key Events Leading to Incident

Leakage and Fire

Fire lasts for 55 mins

Repeated Leakage Alarms

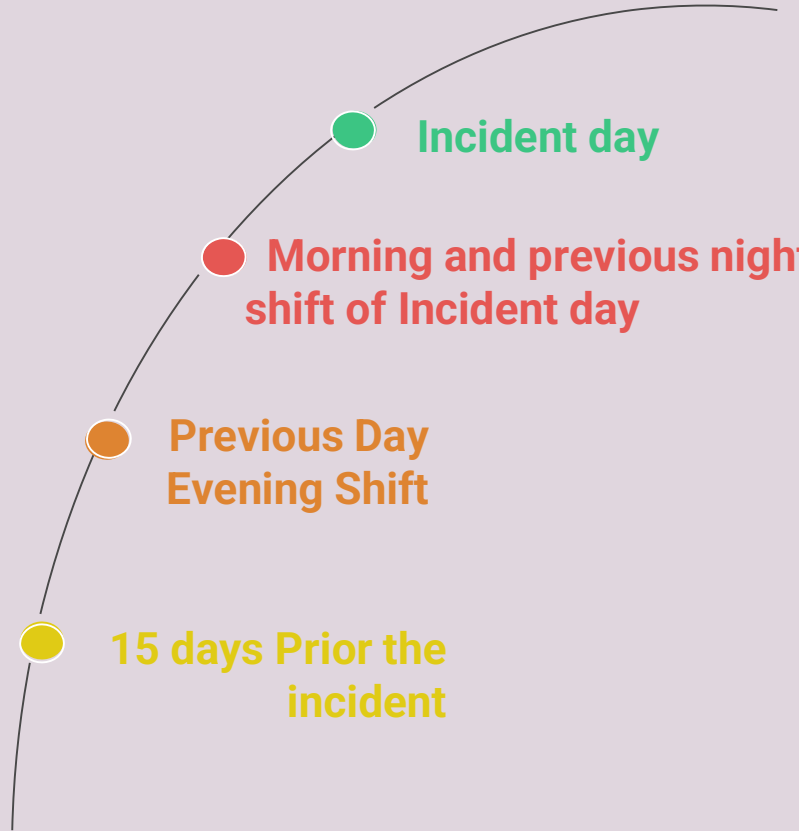
HC detectors trigger 50 & 46 alarms in 9.5 hours, no action taken

Gas Flowrate Drop Ignored

Control room fails to analyze significant gas flowrate decrease

Compressor Abnormalities Logged

Field operators report vibration and knocking in NP-B compressor



Incident day

Morning and previous night shift of Incident day

Previous Day Evening Shift

15 days Prior the incident

Photos

OBSERVATION AND LAPSES

OBSERVATION	DESCRIPTION
Site Condition	Cleared debris, dismantled motor cover, insulation removed
Drain Line	Snapped-off segment, removed spool piece
Sprinkler System	Bent support pole
Hydrocarbon Leakage	Intermittent leaks, repeated alarms, no action
Gas Flowrate	Significant drop, no analysis
Vibration/Knocking	Logged by operators, no escalation
HC Alarms	No alarms stated, alarms triggered during testing
Operator Logbook	Not reviewed/countersigned
P&ID Modification	1” to 2” line change, undocumented
MOC/HIRA	No documentation for modification
Pinhole Leak	Reported in 2019, no pipeline thickness measurement
Structural Support	Installed for vibration, no analysis

Observation and Lapses

OBSERVATION	DESCRIPTION
Piping Support	No support on 2nd stage drain line
Snap-off Joint	30 mm gap, tensile stress
Small-Bore Piping	No inspection practice
Vibration Monitoring	No in-situ probe, no routine monitoring
Volume Bottles	Different weight, no pulsation study
Sprinkler Activation	Did not activate, fused plugs
Fire Suppression	Only foam used, no guidance on medium
Flange Material	Sludge, crevice, reduced thickness, contaminants
Mock Drill	Never conducted in compressor House , not scenario in ERDMP
Safety Meetings	Vibration issue not discussed
Internal Safety Audit	Critical issues not identified

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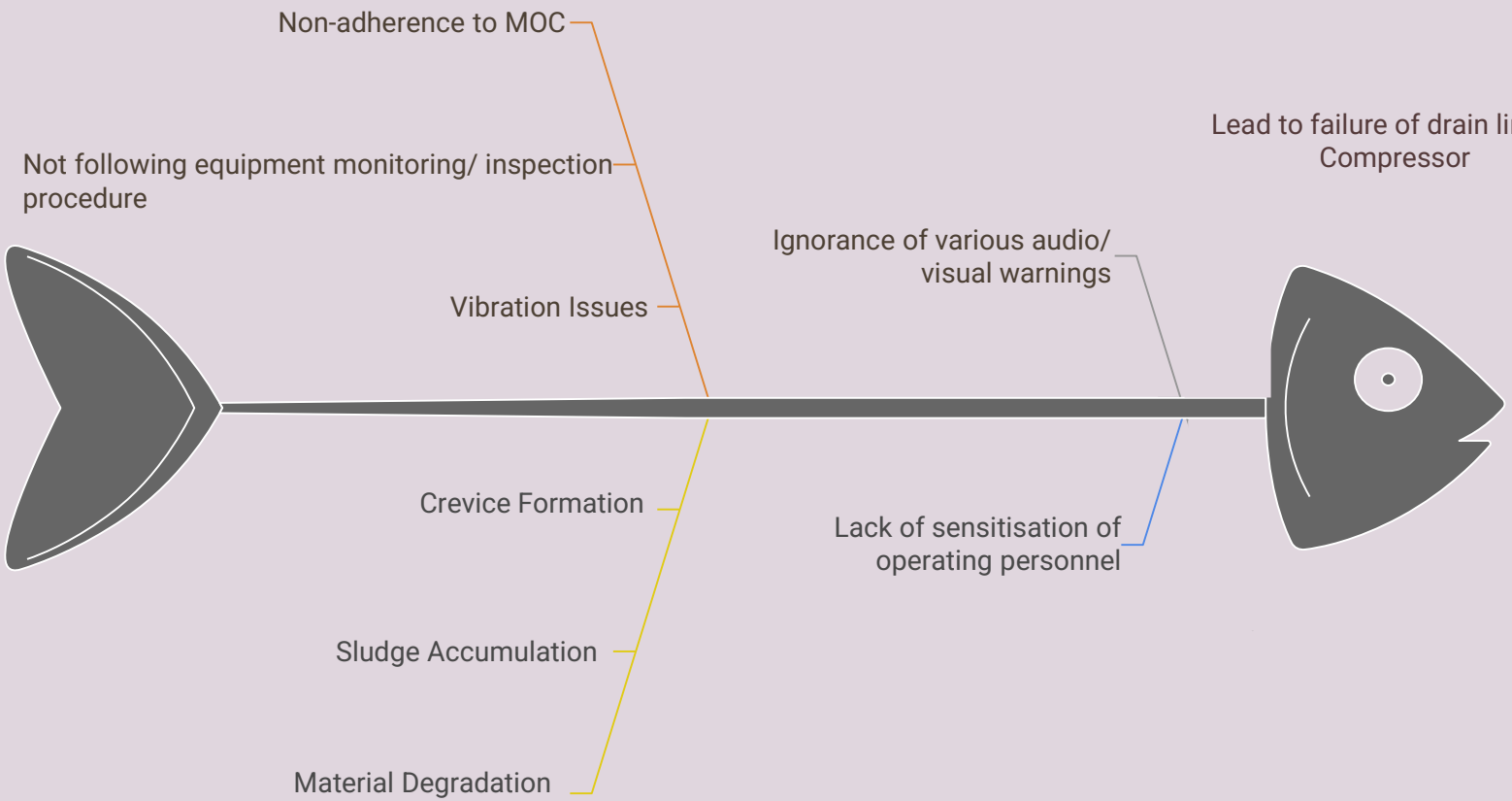
Root Cause of the Incident



Recommendation

Process Safety Management

MOC must be done for any temporary or permanent change.

Robust and Effective internal safety audit.

Asset Integrity Management

Comprehensive inspection plan for small bore piping and dead legs at periodic intervals.

Asset Integrity Management

Regular Monitoring of casing vibration and bearing temperature.

Proper material of construction of Piping

Training

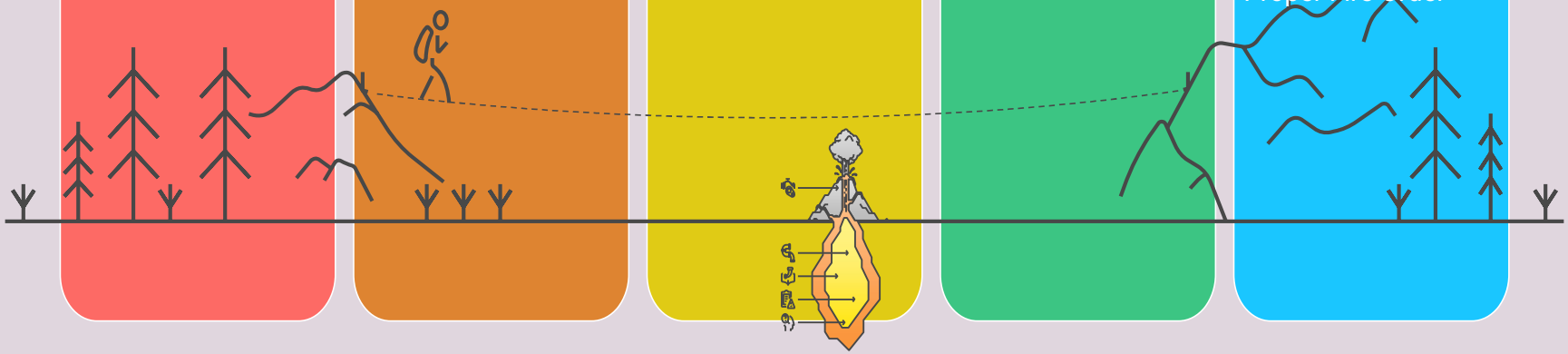
Training of panel officer and operator.

Fire Protection System

Regular Inspection of fire suppression system

Deficiencies in firefighting methodology

Proper Fire Order



Key Takeaways & Next Steps

Embrace Learning

Every incident is a valuable lesson.

Follow Process Safety Management

Implement process safety management system

Sustain Culture

Prioritize safety in all operations.

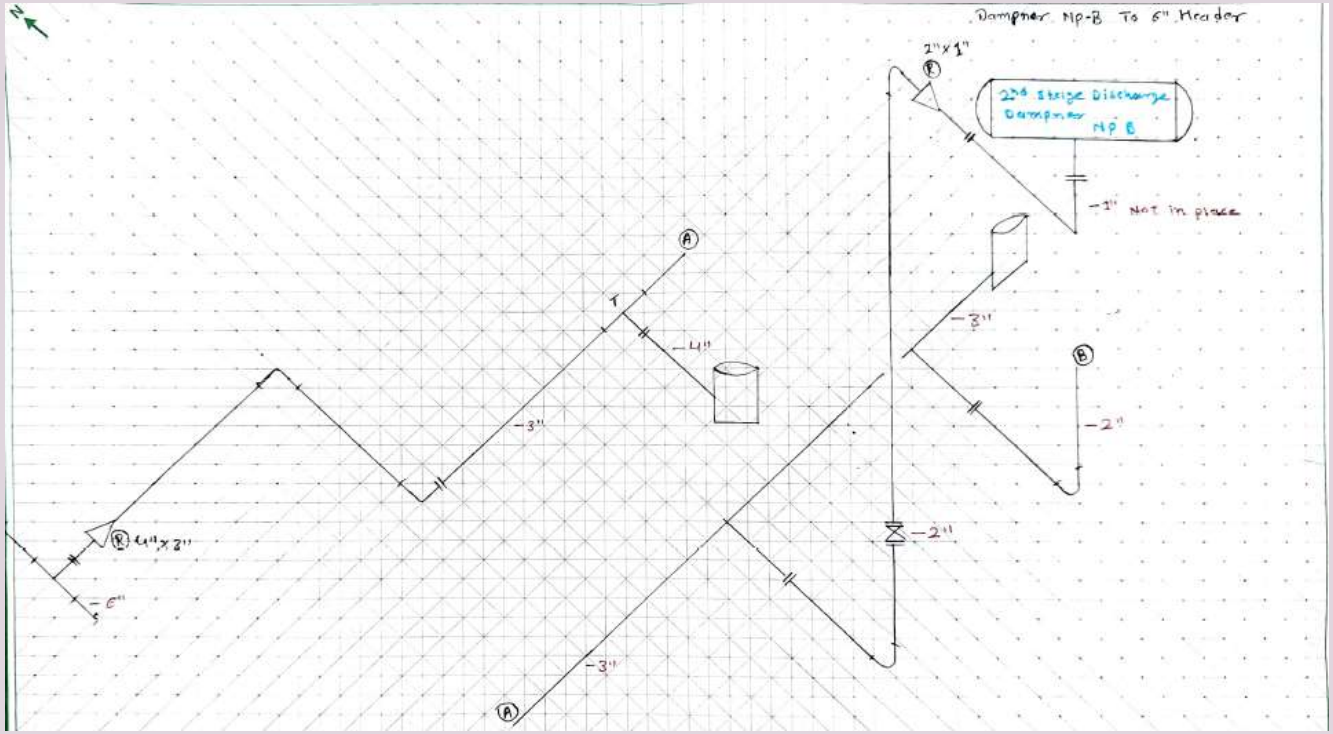
BEND POLE OF SPRINKLER SUPPORT STRUCTURE

Back

FAILED JOINT OF 1” DRAIN LINE

Back

ISOMETRIC OF FAILED PIPING



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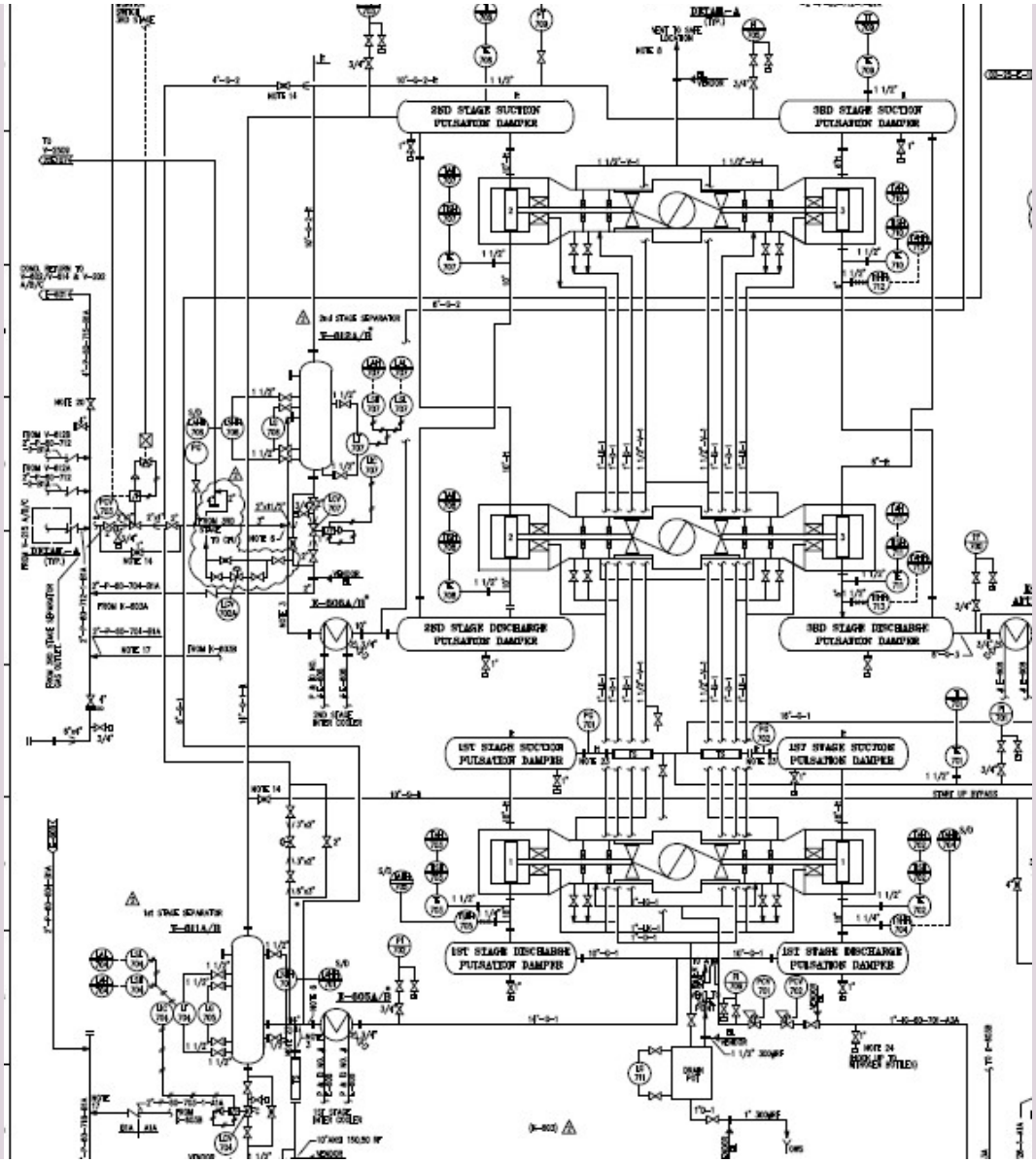

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