

PROCESS SAFETY OF KEY INTEREST IN INSURANCE RISK ASSESSMENT SURVEYS

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AGENDA

- Industry Loss Statistics
- Insurance risk assessment survey
- Key items of focus during survey
- Concluding Remarks

Top cause of business interruption losses across all lines of business.

\$ 2m+

Value of the average large BI property insurance claim

2/3rd is due to Fire/Explosion and Machinery Breakdown

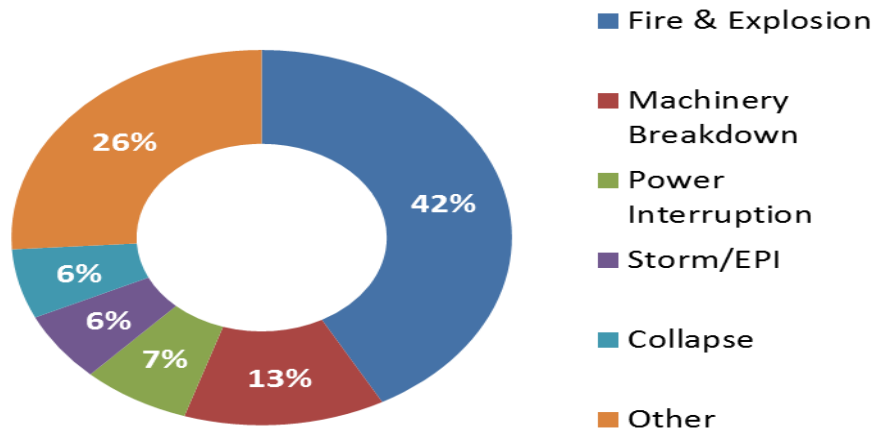


Top cause of business interruption losses in Energy Sector

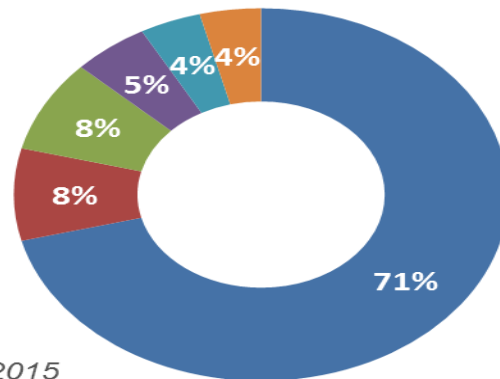
\$ 4m+

Value of the average large BI property insurance claim

Nos of Claims



By Value



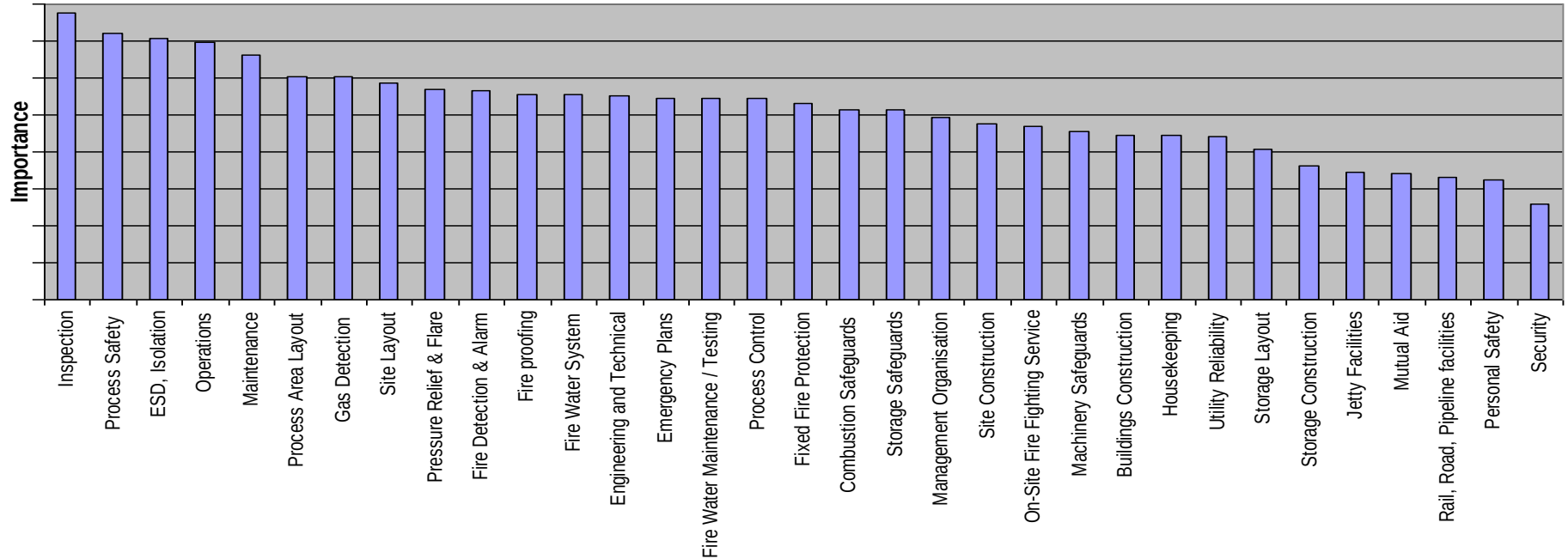
- Energy related Companies (Oil & Gas, Refining, Petrochemical, Power) have complex risk maps and are exposed to a number of Operational risks
- Examples of operational risks relevant to the Energy Industry are
 - Fire / Explosion / Toxic release from a hydrocarbon loss of containment incident
 - Breakdown of a process equipment, e.g. Centrifugal Compressor
- These risks could result in an insurance claim from:
 - Property Damage – Physical Damage and Business Interruption.
 - Third Party Liability claims

- Given the size and complexity of the program, typically, Energy Industry Insurance covers are placed through International Reinsurers
- Also, most insurance placements are done through a major international reinsurance broker
- The Risk Assessment survey is carried out (typically once every two years) by the Company's appointed broker and representatives from the lead reinsurers
- The survey report is very comprehensive and provides details of the risk exposures and loss control features of a particular site, which enables an underwriter to arrive at informed decisions about the 'transfer of risk'

- The survey normally include site visits and meetings with all operational areas
- The surveyors also come up with “recommendations” for risk improvement for the Company to consider and implement. The response to the recommendations are closely monitored by the underwriters
- The team carrying out the survey are mostly from the Engineering community, who typically bring in their knowledge and experience (e.g. benchmark, best practice etc.) through their work on a number of surveys

- Insurance Risk Surveys in Energy Industry lays a lot of emphasis on process safety, which is a significant aspect in most operational incidents
- By engaging with the Insurance community, the Energy Industry can add value to their risk management process, which can improve their risk profile and eventually improve their safety / loss record

Insurance Market Order of Priority



- **From an Operational Risk perspective, following are the areas of focus by the insurance survey community**
 - Mechanical integrity failure due to corrosion
 - Operating practices and procedures
 - Hazard identification studies
 - Permit to Work and Equipment isolation
 - Management of Change
 - Remote Operated Isolation valves
 - Recent Incidents
 - New Projects

- **Also on the radar are**
 - Safe venting of bonnets of bellows type relief valves
 - Use of long bolt flanges
 - Fire and gas detectors
 - Fire water pumps and annual testing to NFPA requirements
 - P&IDs/ Control of changes
 - Fire proofing of structures

• Mechanical integrity failure due to corrosion

- Most common cause of losses in the energy sector

54%

Of major losses were due to mechanical integrity failure due to corrosion

65%

Internal corrosion of process piping

13%

Corrosion of static equipment

22%

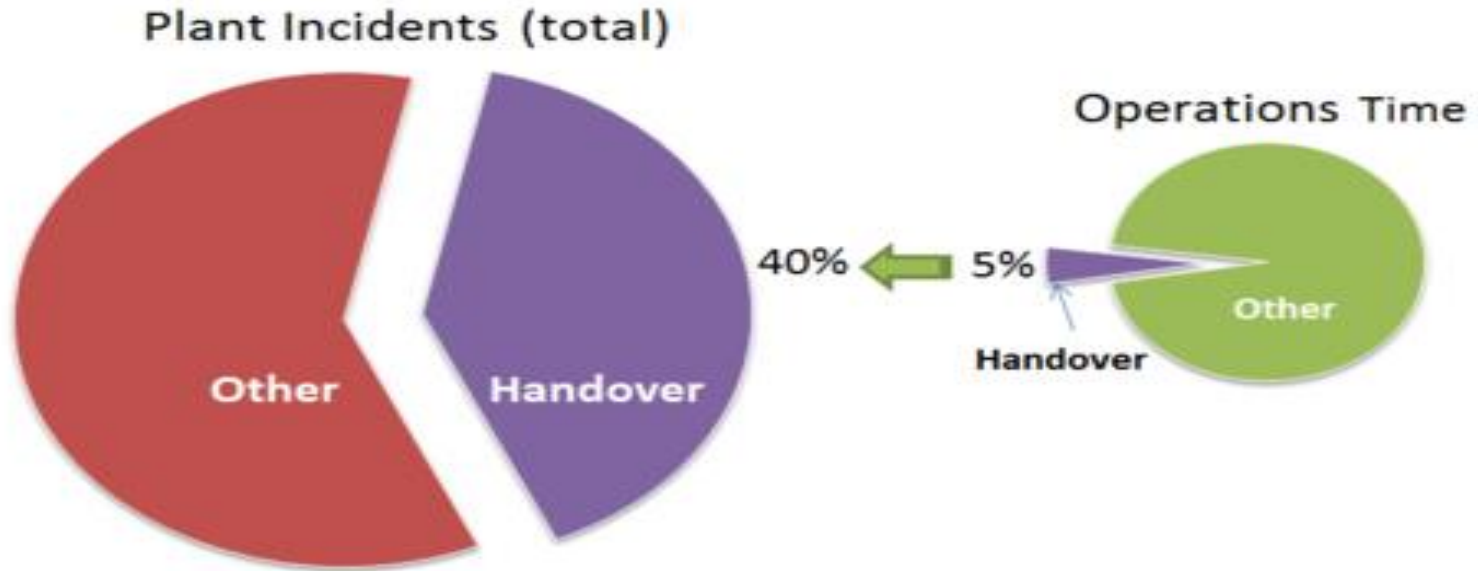
Incorrect or defective materials



- **Mechanical integrity failure due to corrosion; focus on**
 - Inspection program for internal corrosion of piping
 - Positive material identification during construction and maintenance
 - Inspection of locations that are hard to access
 - Inspection deferments
 - External corrosion under insulation
 - Adequacy of resources to meet the inspection program requirements
 - Qualification of Inspectors
 - Organizational hierarchy

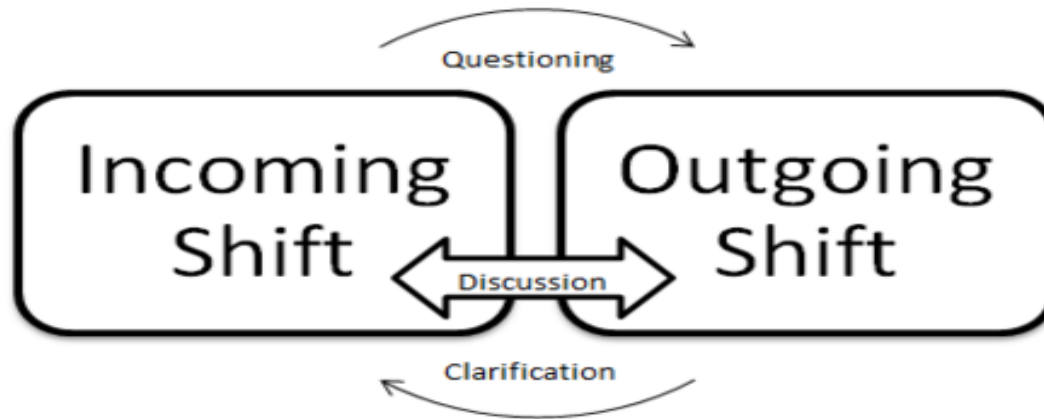
- **Operating practices and procedures;** focus on
 - Management of bypassing and disabling of safety critical instruments (trips and interlocks)
 - Emergency operating procedures (presence, availability, effectiveness, readiness)
 - Staffing levels
 - Shift handover

- **Operating practices and procedures; focus on Shift handover**



(Source: NPRA 2009 National Safety Conference)

- **Operating practices and procedures;** focus on Shift handover

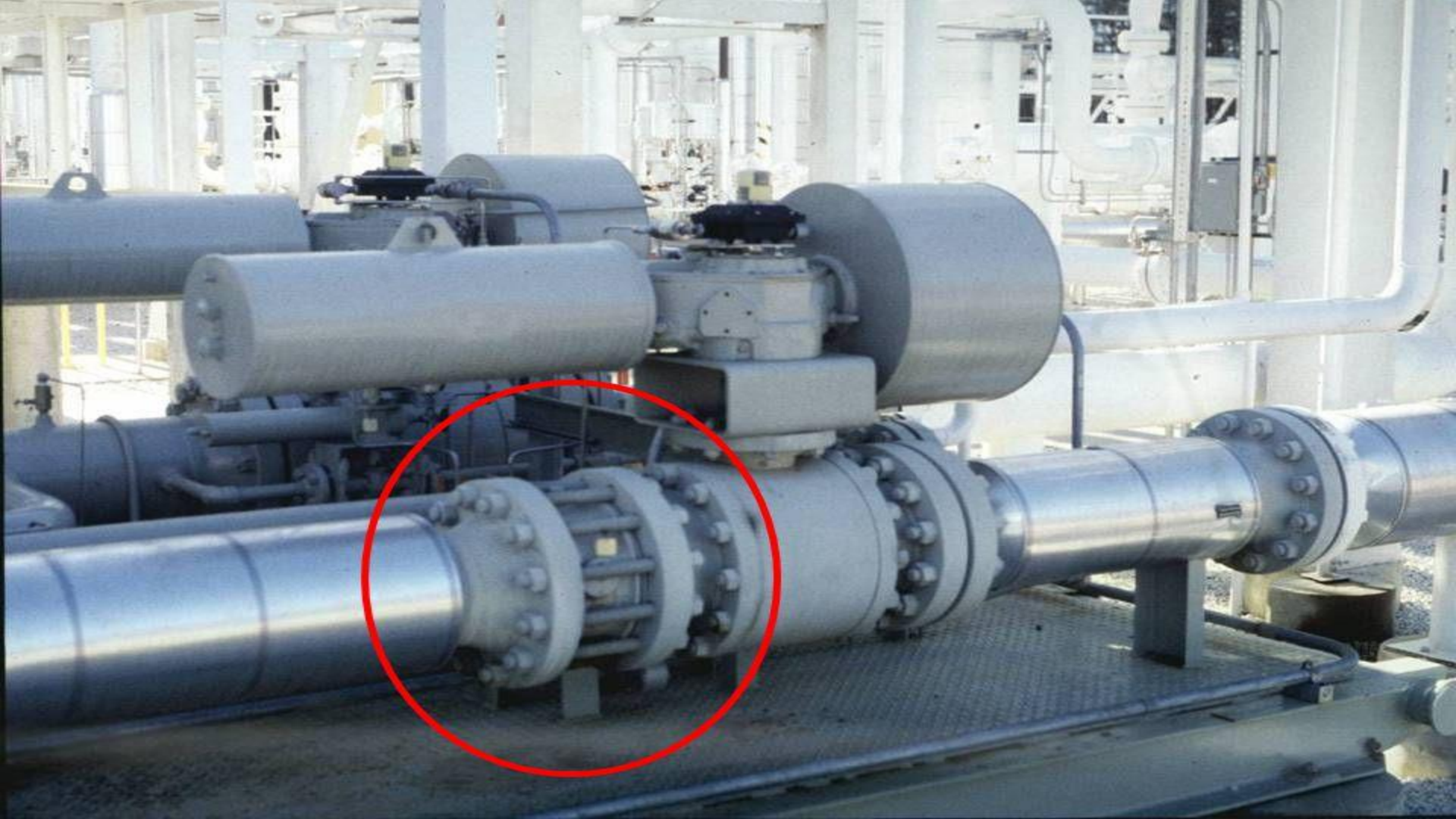


- Two way channels for discussion
- One on One interactions; Question: Clarify
- Physical logs -avoiding technical misunderstanding.

(Source: NPRA 2009 National Safety Conference)

- **Long bolt flanges**

- Also called long bolt valves, sandwich, or wafer valves. Devices such as control valves, butterfly valves and check valves with no integral flanges for bolting to the pipe or vessel flanges, and thus having exposed bolts of >3-inches
- The long bolts will likely receive direct flame contact (Impingement) if there is a fire in the area
- Direct flame contact causes the bolts to expand rapidly and lengthen, allowing both gaskets to leak product in <<20minutes. The leaking material then adds fuel to the fire and if under pressure it causes a large spraying fire that results in much more damage



Bolted Flange Fires

**Note the larger fire at the
Long Bolt flange joint**



- **Long bolt flanges;** Action following insurance recommendations
- Identify Long Bolt Flanges
- Assess fire hazard from the contained material and location hazards
- Where possible, replace with normal flange valves
- Reduce risk by wrapping the long bolts with a fire resistant material and/or enclosing the entire assembly with a stainless steel covering

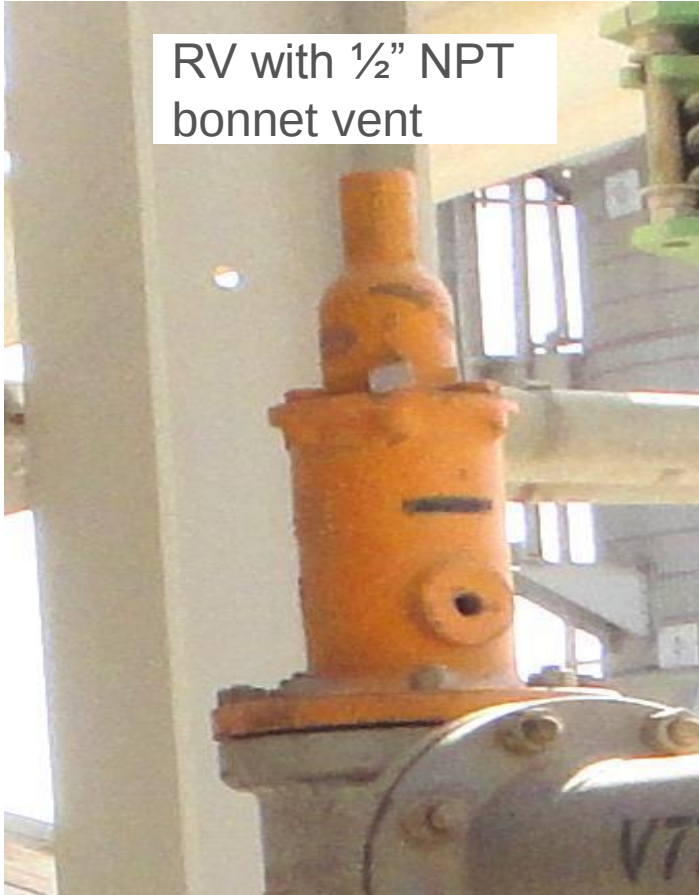
Long Bolt Flanges with stainless steel covering



- **Bellows Type Relief Valve-safe venting of bonnets**

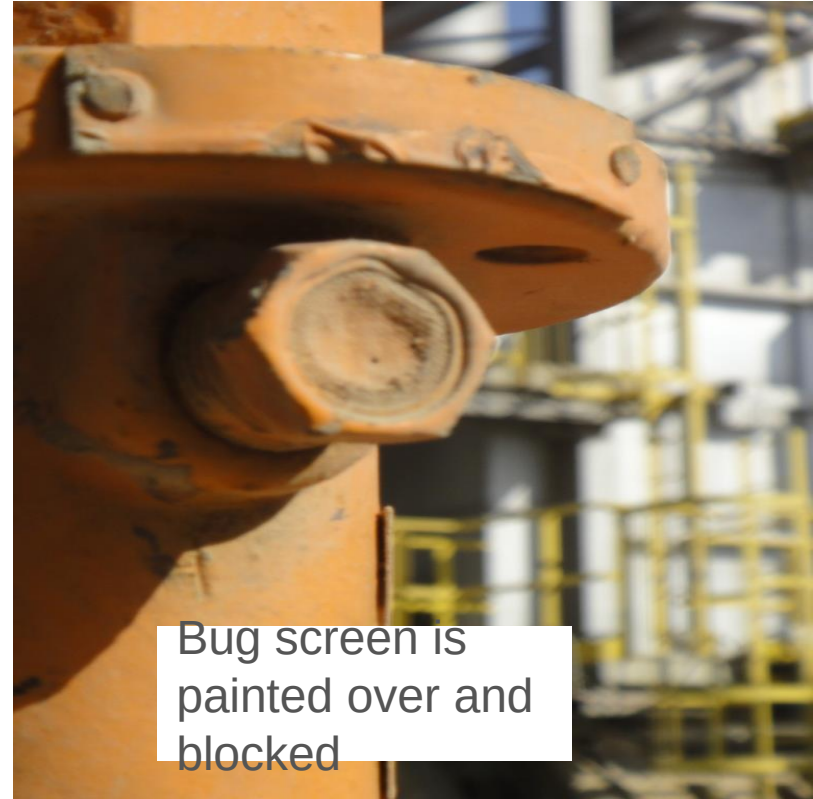
- Functionality of a bellows type Relief Valve (RV) requires that the RV bonnet operates at atmospheric pressure at all times; hence bonnet is provide with a vent hole
- A failure of the bellows often results in leakage of fluid from the downstream side of the RV into the bonnet and out of the bonnet vent. Therefore API RP520 requires that the bonnet is vented to a safe location
- Plastic caps are provided on the bonnet vent hole during transportation
- Bug screen may be provided for the vent hole

RV with ½" NPT
bonnet vent



RV with plastic cap
in vent





- **Remote Operated Isolation valves**

- ROIV or EIBV (Emergency Isolation Block Valve) is dedicated to the purpose of isolating large inventories of flammable or toxic material from sources or equipment whose relative likelihood of significant leakage is high
 - Prevent escalating of a LOC event
- Insurance Focus
 - Site has appropriate standards and requirement for installing in new units and retrospectively in existing units
 - ROIVs are maintained to the prescribed standards

- **ROIV/EIBV Bapco experience**

- Standard specifies requirement basis products characteristics and inventory
 - Light / Heavy components present
 - Operating temperature above/below Flash Point
- Use of Manual or Remote Operated valves
- Mandatory for new units
- Existing units-evaluated during the Hazop process ; investment decisions based on risk analysis/remanant life and feasibility

- **ROIV/EIBV Bapco experience**
 - Fireproofing/Fire-resistant specifications for Valve, Actuator and cabling
 - Fire resistance time duration of 30 minutes
 - Remote actuation switch at a safe location in the field
 - Issues
 - Actuator damage from process temperature
 - Inadequacy of fireproofing after maintenance

Concluding Remarks

- The energy industry has become safer over the past several years, as companies have come to realize the high costs associated with accidents.
- However, when accidents occur, insurance claims are generally higher than in the past, as a result of the utilization of more complex technology.
- It is our experience that process safety on site has benefitted from the recommendations that come out of the Insurance Risk surveys. The insurance 'buying' process should consider the services provided by the brokers and underwriters to help in improving the risk profile.

Concluding Remarks

- Survey findings and the follow up on recommendations have enabled us to have a relook and close gaps in our systems and also is a reassurance, that we are treading the right path on our PSM journey.
- We believe the insurance survey is a beneficial process - sites benefit from improved process safety which can contribute to improved risk profile and lower premium spend.
- The Energy Industry should positively engage with their insurance partners in order to achieve the benefits out of the survey.

THANK YOU

