

# Trends in rig inspection findings

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# Scope

- Intro to ModuSpec
- Rig Inspections
- Rig Inspection Findings
- Examples of issues in CSG
- Challenges in importing equipment
- Conclusion

# ModuSpec Snapshot

- 25 years of providing drilling asset reliability
- 8 offices worldwide
- Perform more than 500 rig inspections per year
- High-quality and innovative services
- ISO 9001:2008 certified management system
- 24/7 Technical support
- Part of the Lloyd's Register Group since 2008



- Rig Inspection
- Rig Commissioning & Acceptance
- Maintenance Management
- Rig HSSEQ Services
- Training Services

# Rig Inspections

- Over 400 Land Rig inspections conducted in Australia, New Zealand & Papua New Guinea.
  - Broadly broken into three categories
    - CSG/Mining
    - Conventional
    - Geothermal
  - The following slides focus in on the findings from Queensland.

# Rig Inspection cont

- Compliance and Condition rig inspection consists of:
  - Electrical Surveyor (10+ Years of Oil and Gas Experience)
  - Mechanical Surveyor (10+ Years of Oil and Gas Experience)
  - 6 – 8 man days on-site
  - Inspecting to State/Federal Legislation, ASNZ Standards, API and Client Standards
    - Drilling equipment
    - Mud systems
    - BOP and well control equipment
    - Electrical equipment and systems
    - Power plant
    - Safety equipment
    - Maintenance system
    - Spare parts

# Rig Inspection cont

- Focussed Inspection in the following areas:
  - DROPS
  - Safety Management Systems Auditing
  - Camp Inspections
  - Electrical conformance
  - Lighting and Noise
  - Maintenance Management System Auditing
  - Commissioning and Acceptance

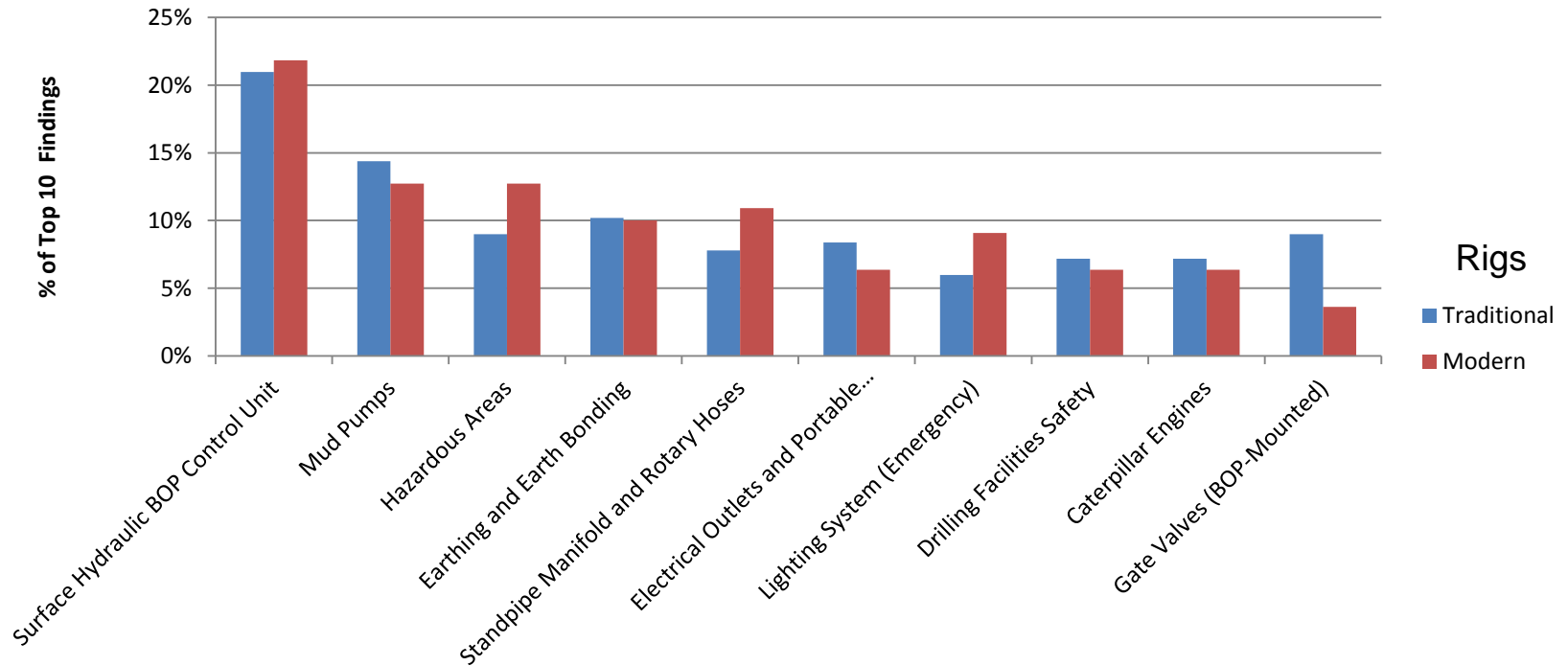
# Rig inspection standards – onshore Queensland

- AS/NZS standards, including AS/NZS 1020, 1418, 1470, 1768, 2319, 3000 etc
- API standards
- IEC/IEE/IEEE standards
- NDT inspections and various certifications
- Maintenance practices and records
- Any internal standards possessed by the client relevant to drilling
- If authorized for release to ModuSpec, the technical terms of the contract between the drilling contractor and operator.
- Equipment manufacturer's specifications and recommendations
- ModuSpec catalogue of industry best practice, which includes alerts and information from Cameron, Hydril, IADC, NOV etc.
- Queensland Petroleum Acts (Queensland Petroleum Act 1923, Production and Safety Act 2004 etc.)
- Queensland Operating Plant Code of Practice 2008
- Availability of risk assessments for the rig's safety management plan
- Queensland Workplace Health and Safety Regulation 1997
- Any Queensland mining regulations deemed relevant to coal bed methane drilling (i.e. Coal Mining Safety & Health Act 1999, Mining and Quarrying Safety and Health Act 1999)
- Queensland Transport Operations (Road Use Management) Act 1995



# Rig inspection findings - statistics

## Top 10 Findings



\* Criticality: (Critical, Major, Minor)



# Critical recommendations (top 4 areas)

## **BOP**

- ✓ Discuss the suitability of the existing power system, where a breaker switch has to be operated to allow the second generator to supply power to the BOP HPU pumps, taking into consideration that a back up nitrogen system was plumbed into the BOP HPU manifold. Refer to API Spec16D Section 5.1.2.1
- ✓ Engineer the accumulator manifold so that no more than 25% of the accumulator capacity can be lost at any one time. Refer to API Spec16D Section 5.1.3.2
- ✓ Confirm that the accumulators are pre-charged to the correct pressure, prior to installing the BOP stack. Refer to API RP53 Section 12.3.5

## **Mud Pump**

- ✓ Check that the mud pump relief valve vent line is self-draining. This is to prevent gelled or solidified mud from causing a blockage. Refer to API RP54 Section 9.13.7
- ✓ Verify that mud pumps are fitted with a pop off pressure relief valve. This is to safeguard the equipment and personnel from an overpressure hazard should a blockage or restriction occurs. Refer to API RP54 Section 9.13.8

# Critical recommendations (top 4 areas)

## Hazardous Areas

- ✓ Verify that personnel working on hazardous area electrical equipment are qualified to do so. Refer to AS/NZS 60079.17 Section 4.2
- ✓ Verify that the hazardous areas were agreed to by the operator, and the appropriate hazardous area drawing produced. AS/NZS 60079.10.1 Section 7.1 & 7.2

## Standpipe

- ✓ Confirm that all the high-pressure lines on the standpipe manifold and rotary hoses have safety clamps at each end on the rig-up. This is to prevent a hose or line failure from becoming a hazard to personnel. Refer to API RP54 Section 9.13.3

# Critical safety recommendations

## General Safety Items

✓ Commission and test the ESD systems on the rig. Refer to API RP54 Section 9.15.2

Formulate a process to develop and produce a workable SOP that covers all aspects of rig operations. Refer to Queensland, *Petroleum and Gas (Production and Safety) Regulation 2004*

## Lifting and Handling

✓ Provide certification for all the lifting and handling equipment. Refer to AS 1418 Section 14 & 16

## Fuel Oil System

✓ Install a grounding wire connected between the fuel tank and the re-fuelling tanker when transferring fuel. To dissipate static electricity to prevent accidental ignition. Refer to AS 1940 Section 8.2.9

# Common issues with modern rigs



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# Common issues with CSG rigs

- Certification and test evidence for well control equipment, particularly with regard to API RP16D, API RP53 etc.
- The mast, tracks, sheave inspection regime, will it concur with API RP8B?
- Solenoid placement with regard to hazardous area zoning
- Ensuring emergency shutdown devices are placed on appropriate equipment
- Care in choosing if a radio controlled rig shutdown system will be used – if radio silence is require during certain times ensure there is a suitable alternative
- Spark arrestors fitted to mitigate potential ignition sources

# Common issues with CSG rigs

- Ensuring the extra raising the sub base (not applicable on all rigs) to fit a BOP doesn't compromise the rig's general stability
- General hazardous area zone measurements are at least compliant to API RP 500/505 and the physical rig actually conforms to the hazardous area paper drawing provided
- Compliance to ASNZS 3000 wiring requirements has been an issue for rigs coming in from overseas





# Common issues with CSG rigs

- Excessive wear on the drilling lines
- Certification of the sub base height modification
- Illegal welding practices
- Need for robust maintenance management system
- Calibration of critical instrumentation
- Safe means of access to the mast (Lad-Safe)
- Management of pressure relief valves
- Issues with API compliant well control equipment
- The use of rig savers and their correct application
- Exhaust insulation on diesel engines as per API RP 07C-11F



# Hazardous area zoning

- In general, classifications in accordance with the following codes are also acceptable, where their application to the particular situation can be clearly demonstrated:
  - i. IP 15
  - ii. API RP 505
  - iii. API RP 500
  - iv. BS 5908

# Common issues with CSG rigs



Insulation material will protect the personnel against the heat and will retard the start of a fire.

When a leak of lubricating oil or fuel occurs there will be a rapid development of smoke warning the crew or to be picked up by smoke sensors.

# Common issues with CSG rigs



Terminate all the plugs in the correct manner.

# Considerations for importing equipment

Supply certification for the air pressure vessel check valves.	AS NZS 3788 – 2006
Wires must conform to the Australian/New Zealand color coding system. In certain circumstances European colours have been known to be used, depending on the situation (at the contractors own risk). A warning to the unwary should be posted, where there may be a cross connection of the colour code systems.	AS/NZS 3000 – 2007 Section 3.8.3.2 (known as the Australian New Zealand Wiring Rules)
Ensure colour coding on main transformer terminals is correct	AS/NZS 3000 – 2007 Section 3.8.3.2
Main supply cable must be in accordance with an Australian approved cable, which has appropriately sized and colour coded conductors for the application.	API RP 14FZ Section 4.4.1, AS/NZ 3000 3.8.1. AS/NZS 3000-2007 3.8.3.2.
Verify that the bulk fuel tank is compliance with Australian standards. Check the requirements for secondary containment.	AS 1692 AS 1940

# Considerations for importing equipment

Ensure the rig stairs and walkways had been installed in accordance with the requirements in the relevant Australian safety codes	AS 1657-1922
Install an EEHA emergency stop button with integral lock out facility for the HPU AC Motor, to provide a quick safe method of shutting down the motor in an emergency.	AS/NZS 3000 4.13.1.
Ensure the nameplate for the hydraulic drive motor is clearly written in English, to assist with the clear identification of the motor ratings and to provide proof of EEHA compliance.	AS/NZS 60079.17: 4.1
Check that the wiring systems installed in the hazardous areas meet the requirements of Australia.	AS/NZ 2381.1:2005 table 3.1 AS/NZS 2381.1:2005 table 3.1. IEC 61892 - 7 Section 10.3.1.
Install earth/bonding between the hazardous devices and the container main frame.	API RP 54 Section 9.14.11, API RP 14FZ 6.10.3.4; AS/NZS 3000 - 2007 Section 5.4.6.3. Aus: AS 1940-1993 Section 8.2.10, AS/NZS 1020 Section 6.2,

# General Impressions not covered in the analysis

- Desire to improve
  - Design of “smart” rigs
  - Construction standards
  - Knowledge of ASNZS, Regulations, API and Client requirements
- Drive to hold contractors to the standard

# Concluding remarks





# Questions?

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