

Session #1

Surface Blowout Preventors and High Pressure Drilling Risers

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Session #1

SBOPs and High Pressure Risers

▶ White Paper

- Provides some background history and motivation for the trend back to the use of surface BOP hardware in floating drilling operations
- Evolution from SX drilling from MODUs to more modern purpose built vessels like spars and TLPs
- Trends in hardware development and operations to address vexing technical and economic issues

▶ There are still a lot of gaps

- Little uniform guidance on how to design and operate safely from different vessel types – what constitutes safely?
- Misinterpretation or ambiguity between different operators and operating theaters – not for everywhere



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SBOPs and High Pressure Risers

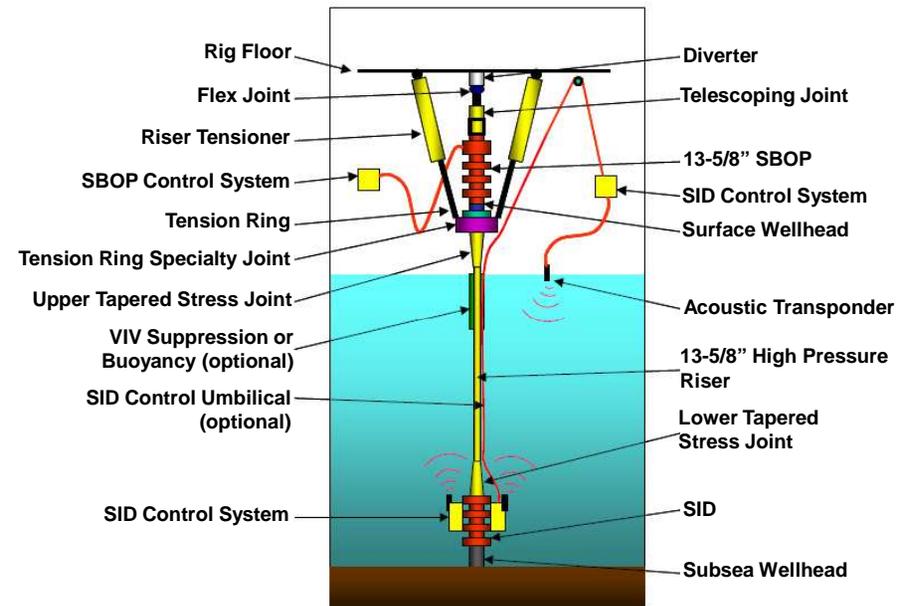
- ▶ This Session #1 breakout workshop
 - Achieve tangible results through open dialog
 - Everyone points to the other guy and says they're ignorant, reckless or insensitive to the issues
 - Here's your chance to set the record straight.
 - Don't be afraid to ask (*there are no stupid questions*)
 - Seek CLARITY – OWN IT
 - Be open minded, positive, and proactive,
 - Agree to closeout issues and move on (submit notes)
 - Respect others:
 - No sidebars, cell phones – silent/off,
 - Be prompt for start-ups and breaks



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- ▶ White Paper #1 is still incomplete:
 - The workshop's breakout sessions are intended to get delegate's points included in the white papers; answering or addressing three issues prior to paper publication.

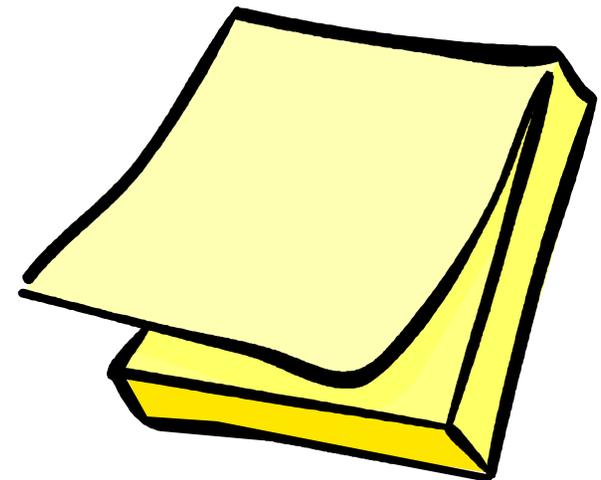
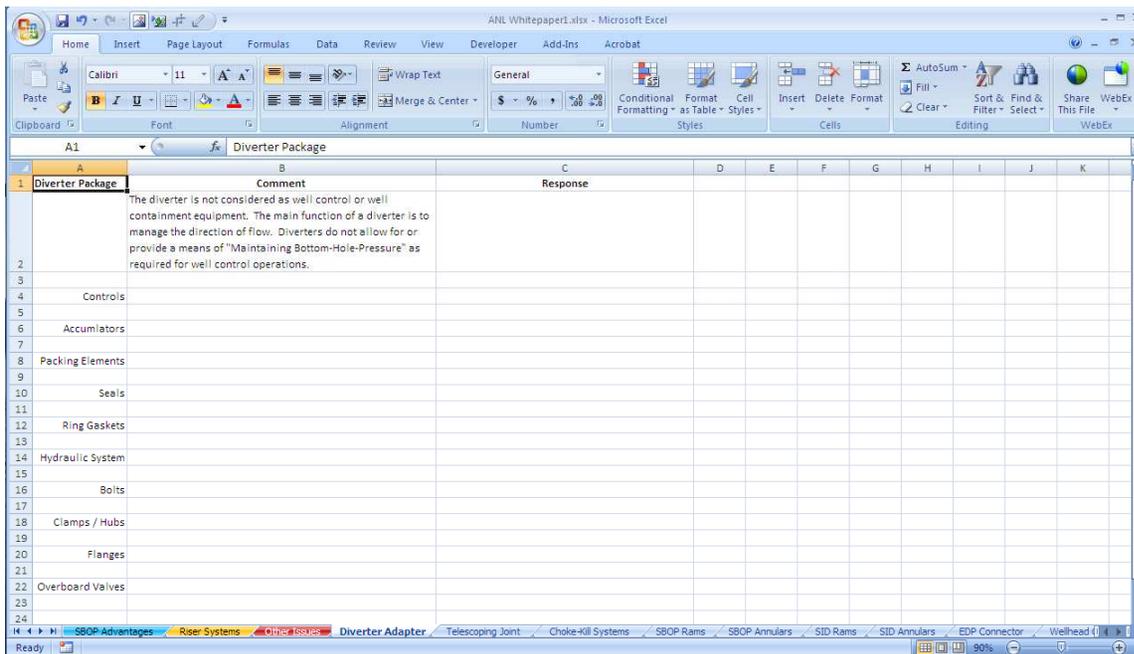


- ▶ Is it still worth it (pros and cons)
- ▶ It's all about the riser
- ▶ Potpourri (other issues)

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SBOPs and High Pressure Risers

- ▶ To help us capture your comments:



For larger thoughts or capturing thoughts after the allotted time, please put them down on paper and hand them in during breaks.

Spreadsheet with tabs for each group and hardware class to capture dialog

- ▶ We have to report back to the main body at the close of the workshop.

Session #1 – SBOPs and High Pressure Risers

Issue #1 – Is it still worth it?

Pros

- ▶ Larger drilling watch circle
- ▶ Use of slimbore well
 - Less mud and chemicals
 - Less pipe weight and tensioning requirements
 - Less waste
 - Better hole cleaning
 - Smaller riser pipe – less prone to VIV or DIV
- ▶ Less risk of gas expansion and better containment under BOP
- ▶ Reduced risk of hydrates
- ▶ Less need for booster line
- ▶ Smaller rig – more availability

Cons

- ▶ Smaller shut down and disconnect watch circle
- ▶ Riser pipe now integral part of well containment
- ▶ Anchoring MODUs against 10 year storm vs. TLP/Spars against 100 year storm
- ▶ Is SID a BOP? If so, doesn't subsea BOP makes better sense than SBOP-SID?



Session #1 – SBOPs and High Pressure Risers

Issue #2 – It's all about the riser

Working Stress Design (WSD)

- ▶ 67% yield – operating
- ▶ 83% yield – test or extreme load

- ▶ 12-1/2% reduction
- ▶ 5% ovality

Load Limit State

- ▶ 67% normal, 80% test/extreme, 90-100% survival

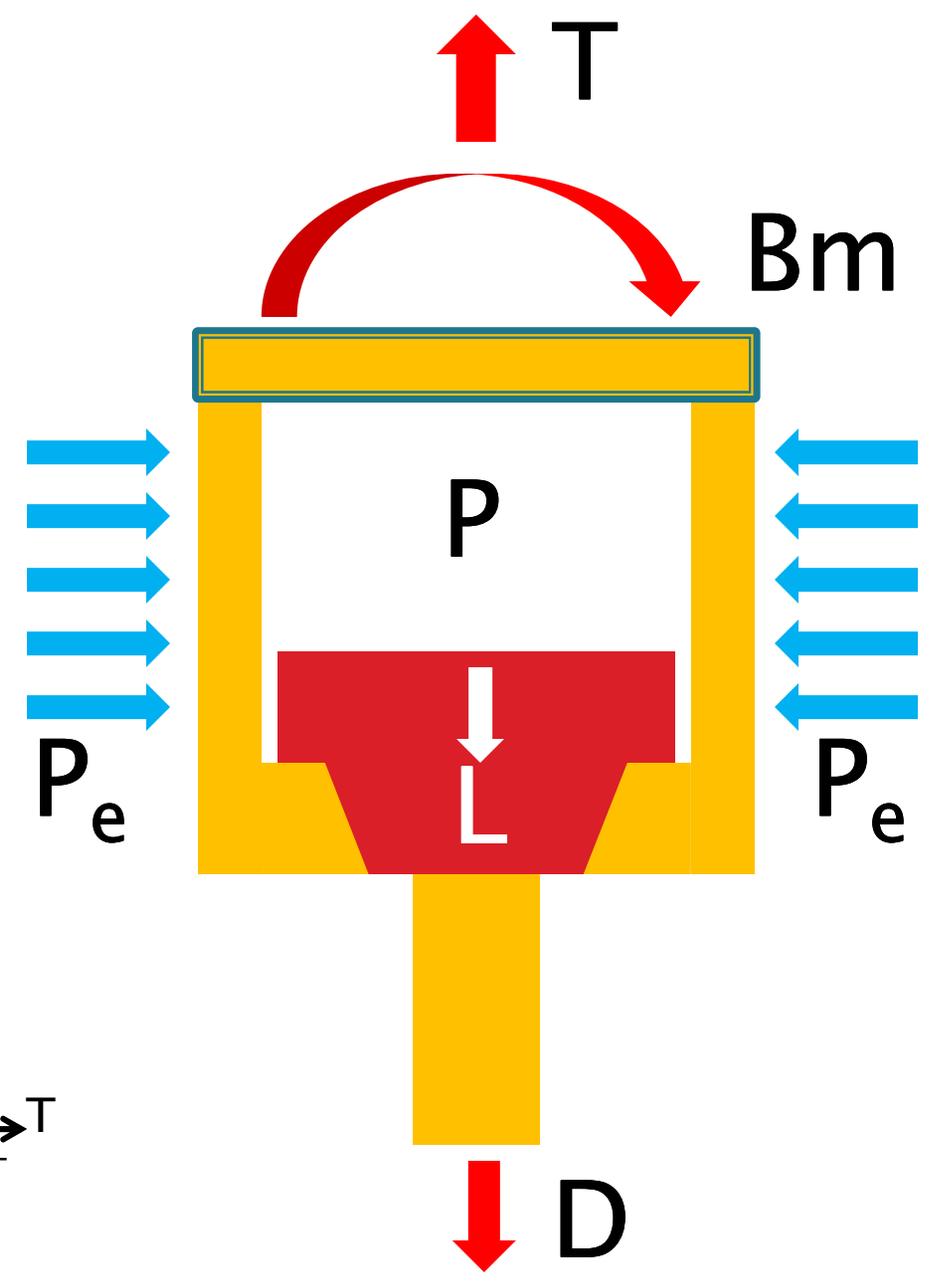
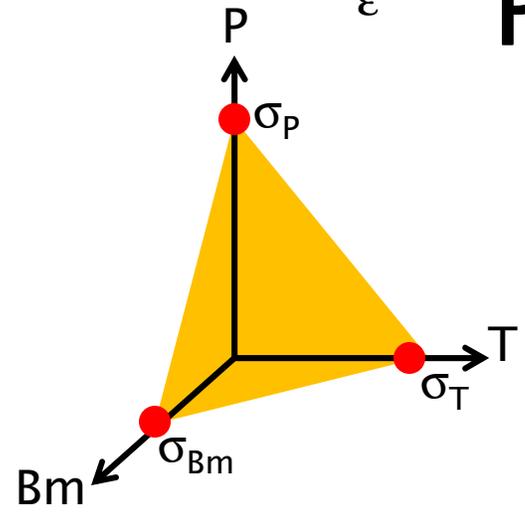
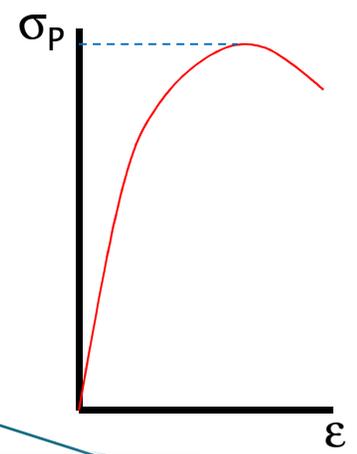
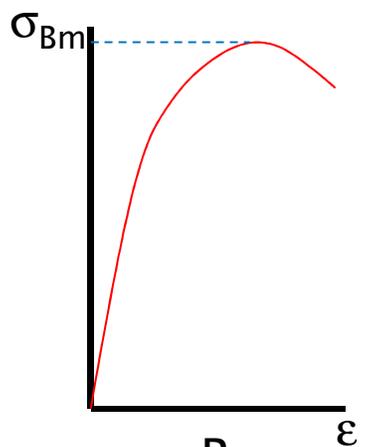
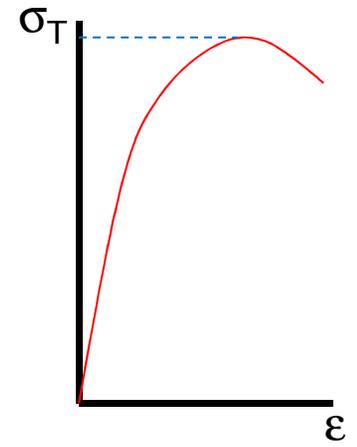
- ▶ 5% reduction
- ▶ 1% ovality

Which Design Code? Is there anything specific we can use?

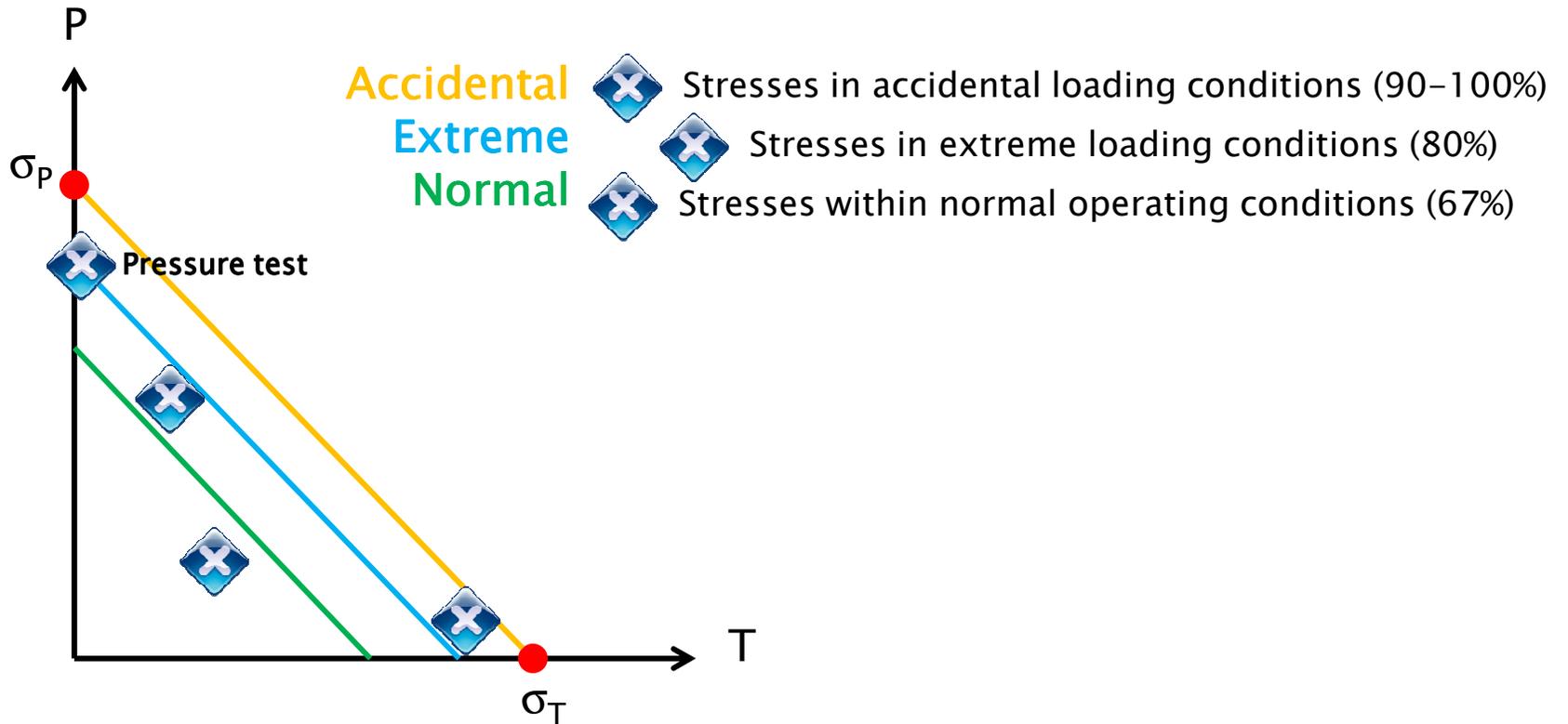
- Load Limit State – DnV OS-F201, OS-F101, API RP 17G, RP 1111
- WSD – API 2RD, 16Q, ASME B31.3/B31.4/B31.8



Load Limit State Design



Load Limit Evaluation (Definitions)



 Represents a combined load of pressure and tension

Session #1 – SBOPs and High Pressure Risers

Issue #3 – Other issues

- ▶ Single Riser and SID vs. Dual Riser
- ▶ Number of rams on SBOP, Number of rams on SID
- ▶ Blind/shear on SID?
- ▶ What is MASP for SBOP? For SID?
- ▶ How to regain circulation control with gas cap under SID?
- ▶ What is best control and communication systems for SID?
- ▶ Fatigue Instrumentation; what would it look like
- ▶ Personnel:
 - Riser operation
 - Riser maintenance
 - Fatigue and load monitoring
 - Reliability and redundancy design
- ▶ Fatigue of high pressure wellhead and riser models – rigid lockdown required?
- ▶ Well survivability screening
- ▶ IADC guidelines only “standard” → API (53,59,64,96)
- ▶ Any other gaps?

