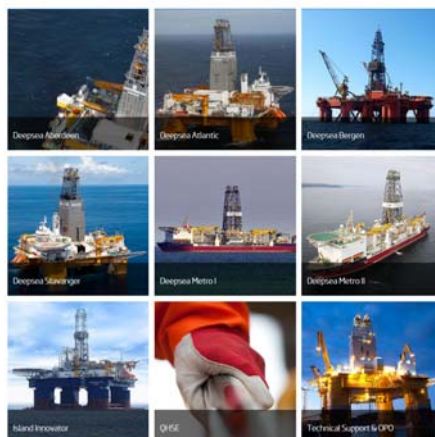


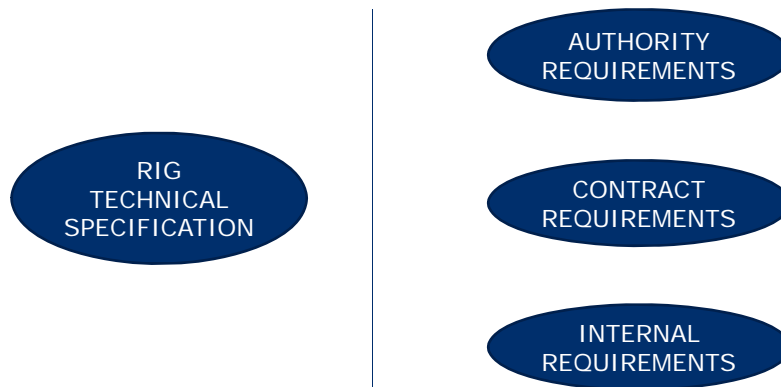


WHAT IS A DRILLING CONTRACTOR DOING?

- ACTIVELY ADVERTISE THE ASSETS IN THE MARKET TO WHOMEVER IS BEING LICENSED FROM AUTHORITIES TO EXPLOIT A WELL OR FIELD AND WILLING TO CONTRACT THESE ASSETS



PREPARATION FOR OPERATION – GAP ANALYSIS



THE CLIENT HAS THE INFORMATION OF THE OIL/GAS WELL/FIELD

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MARKET IMPLICATIONS - CHALLENGES

- THE BUSINESS MODEL CHANGES DUE TO THE MARKET FLOTATIONS
- SAME AMOUNT OF WORK ON PREPARATION FOR OPERATION NO MATTER THE DURATION OF THE CONTRACT
- PUTS EMPHASIS ON THE ORGANIZATIONAL ASPECTS
- ALSO OTHER GEOGRAPHICAL AREAS OF OPERATION WITH DIFFERENT REQUIREMENTS, ARE PART OF THE DAILY CONTRACT/OPERATIONAL SCENARIO
- TYPICALLY NORWAY AND UK ARE LOOKED AS «ONE MARKET»
- DIFFERENT REQUIREMENTS FOR THE SAME NAMING OR VICE VERSA

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Authorities

PETROLEUM SAFETY AUTHORITY NORWAY

REGULATIONS SUPERVISION TOPICS RISK LEVEL ABOUT US NEWS

Barriers

TOPICS

- Priority areas 2015
 - Safe late life
 - The far north
 - Management responsibility
 - > Barriers
- The far north
- Safety Forum
- Risk and risk management
- HSE management

Safety barriers must be maintained in an integrated and consistent manner in order to minimise risk.

16.11.2014 Register for news Tip someone Print

Failure or weakening of barriers is a general cause of incidents. Constant challenges related to well integrity, gas leaks and aging facilities mean that special attention must continue to be paid to these areas. We see a need for better understanding of the interaction between operational, organisational and technical elements in the barriers.

The industry

- The industry must ensure that relationships between risk assessments and barrier management are made clear, and that these have a clear place in managing the enterprise.
- Robust and specific barrier strategies and performance requirements must be developed.
- Operational, organisational and technical barrier elements must be manifested in the risk assessments.

The PSA

- The PSA will develop and implement supervision based on the principles enshrined in the barrier note.

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The Offshore Installations (Offshore Safety Directive) (Safety Case etc.) Regulations 2015

Guidance on Regulation

93 A systematic approach is necessary to identify those systems that constitute such systems many individual components may be SECEs. The term 'contribute substantially to a major accident' is intended to include those parts whose failure would not directly initiate a major accident, but would make a significant contribution to a chain of events that could result in or aggravate a major accident. Typically, these elements will include items of emergency equipment and software that are required to, and must, work only in emergencies and other unplanned abnormal situations.

95 Identification of SECEs should include consideration of systems for the detection, control and mitigation of major accidents. Items improving reliability by providing redundancy or diversity should also be considered. Although many items will be safety and environmental critical on every installation, there will be some variation because of the specific circumstances of design and operation of the installation. The list of SECEs on an installation will vary over time. For example, some will be introduced for limited duration activities such as combined operations.

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OFFSHORE DRILLING
- for Decisions

A governing process

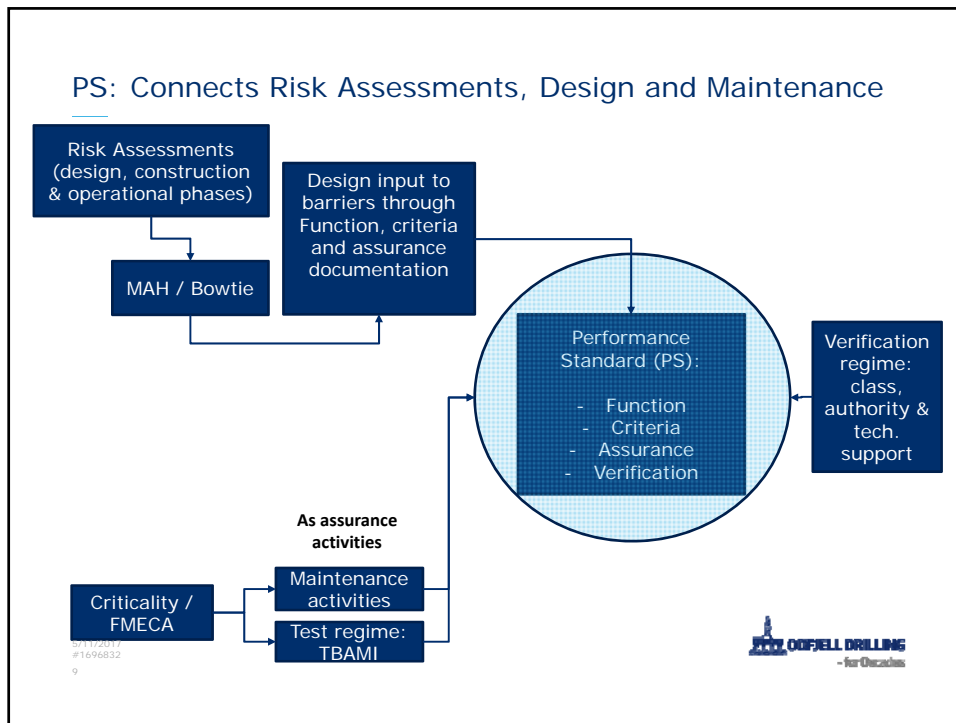
Analysis | Safety Case / AoC | Written Verification Scheme | Test regime and planned maintenance

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A governing process

Actions

Written Verification Scheme | SECE | Performance Standards | Test regime and planned maintenance



PS no.	Safety and environmental critical element (SECE)
Structure systems	
S1	Hull (incl. watertight closures, pontoons and columns)
S2	Derrick (incl. hoisting equipment and compensating equipment)
S3	Helicopter facilities (incl. helideck structure)
S4	Cranes
S5	Topside structure
Marine systems	
M1	DP system
M2	Navigation aids
M3	Ballast and bilge system
M4	Drains
M5	Posmoor ATA
Drilling systems	
D1	Mud system (incl. degasser)
D2	BOP and emergency disconnect system
D3	Choke and kill system (incl. emergency blowdown)
D4	Cement system
D5	Marine riser (incl. diverter)
D6	Drilling instrumentation
D7	Well test system
Fire and gas systems	
FG1	Fire and gas detection
FG2	Active fire-fighting system (incl. fire water main, fire water pumps, drill floor monitors, deluge, foam, fixed fire-fighting systems)
FG3	Emergency shutdown
FG4	Passive fire protection
FG5	Ignition prevention and electrical earthing continuity as means of ignition prevention
FG6	Portable fire-fighting and rescue equipment
Utility systems	
U1	HVAC
U2	Emergency communication
Power systems	
P1	Main/emergency power and UPS (incl. RMS)
Emergency response systems	
ER1	Temporary refuge
ER2	Emergency routes (incl. lighting)
ER3	TEMPSC (totally enclosed motor propelled survival craft)
ER4	Escape chutes and life rafts
ER5	PPE (personal protective equipment)
ER6	Escape to sea
ER7	ERRV (emergency response rescue vessel) and FRC (fast rescue craft)
ER9	Alternative muster areas
Temporary and third party equipment	
TE1	Temporary and third party equipment
Management systems	
SMNG	Software management
VMNG	Vessel management

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Version info	Work description	Resources planned	Spare part planned
Ref No: 01		<input type="checkbox"/>	Changed By: 4928
		<input type="checkbox"/>	Changed Date: 24.06.2016
Heading / description L1 (EN) Odjell ref			
M3 TBAMI-PS-SCE-M3 Ballast and Bilge System Equipment: Ballast water pumps			
<p>NOTE: The goal of this test is to reveal hidden and dangerous failures All findings to be recorded in CMMS history.</p> <p>Abbreviations: TBAMI = Technical Barrier Against Major Incidents</p>			
Version info	Work description	Resources planned	Spare part planned
Ref No: 07		<input type="checkbox"/>	Changed By: 4928
		<input type="checkbox"/>	Changed Date: 24.06.2016
Heading / description L1 (EN)			
Function test			
<p>NOTE: No pre testing or maintenance is allowed before TBAMI test is performed.</p> <p>This test requires one man (ERD) in pump room, and one DPO starting the pump from CCR.</p> <ul style="list-style-type: none"> - DPO starts the ballast pump from CCR. - ERD Check in the pump room that the pump is starting, the pressure is coming up to normal, and that the suction and delivery valves open up all the way. - Check that the vacuum ejector starts when pump starts, and stops after 30 seconds, or when the discharge pressure transmitter reaches the pre-set value. - ERD also checks for any abnormal noise or vibration. - DPO Confirms running signal, amperage, and pressures on Kongsberg VMS. Also that there is no alarms on Kongsberg VMS for the relevant ballast pump. <p>NOTE: According to TBAMI, stop test of pump is a separate job. This shall be done after start up test is finished and approved.</p>			

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Verification Scheme – How it works

A governing process

Test regime and planned maintenance on the rig

KPIs follow up onshore

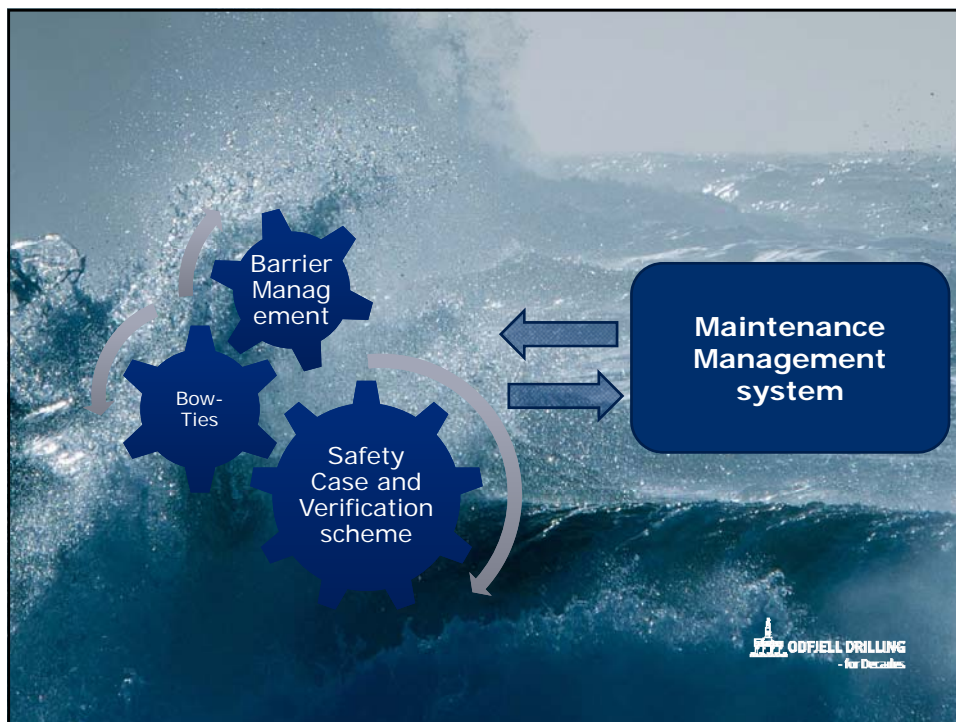
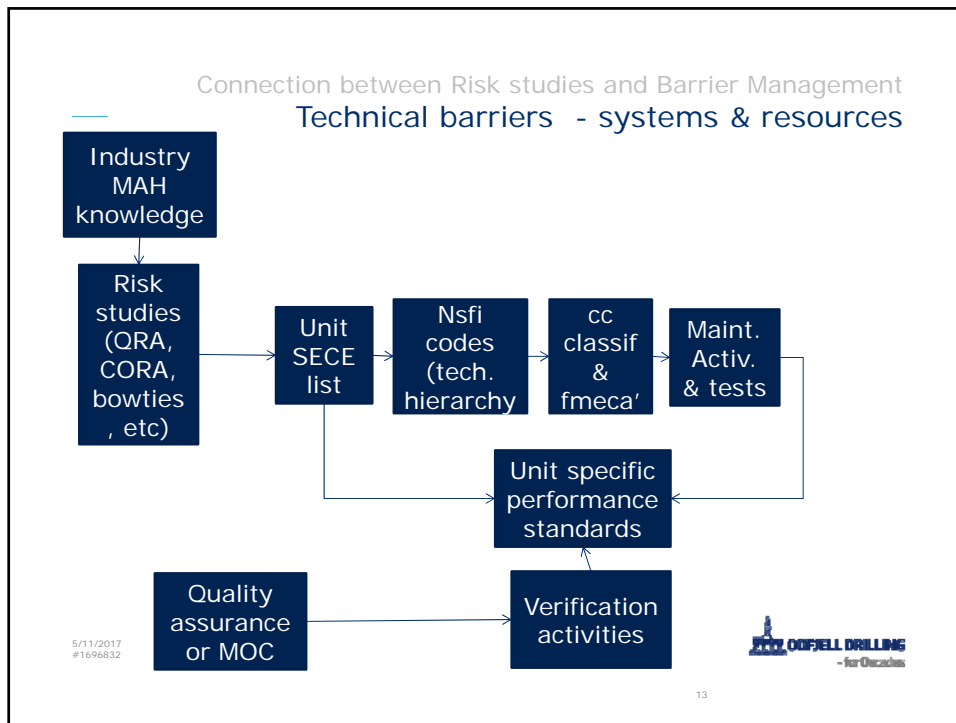
Verifier audit on the rig

Verifier issues potential actions

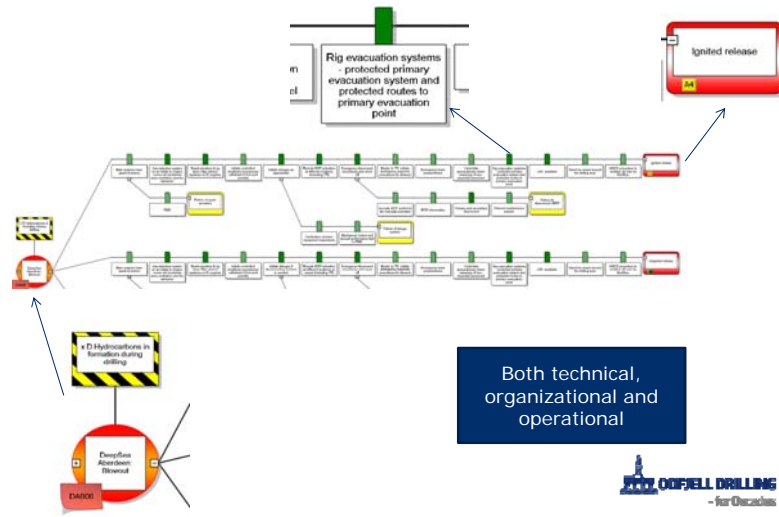
Synergy case for recommendations

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ODFJELL DRILLING
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BOW-TIE: Identification of barriers & Performance shaping factors

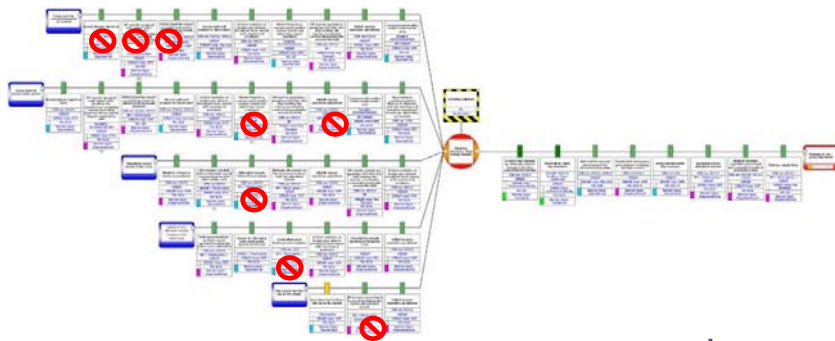


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Overview – Common barrier impact

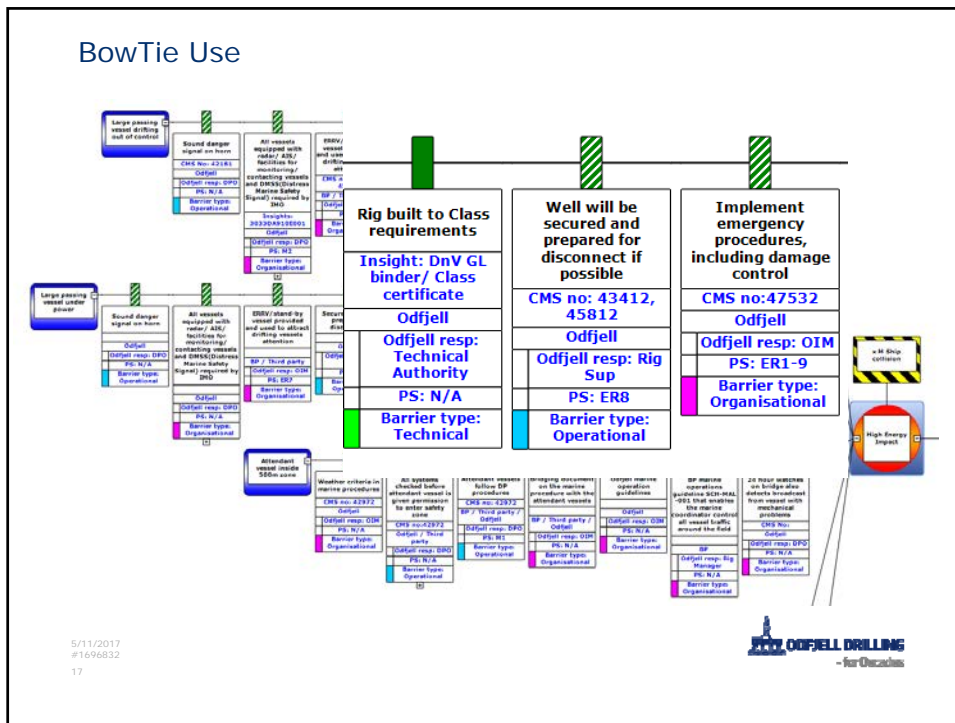
How:

Drill on the risk leading to an Top Event such a blowout, collision, etc. (Left hand side of the BowTie's)



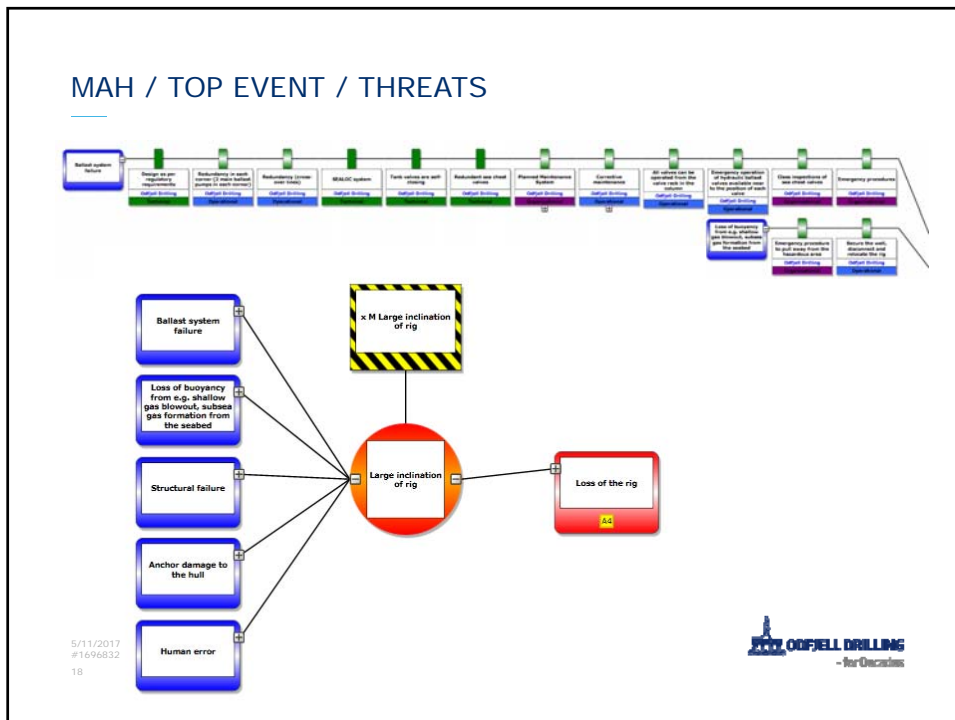
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BowTIE Use



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MAH / TOP EVENT / THREATS

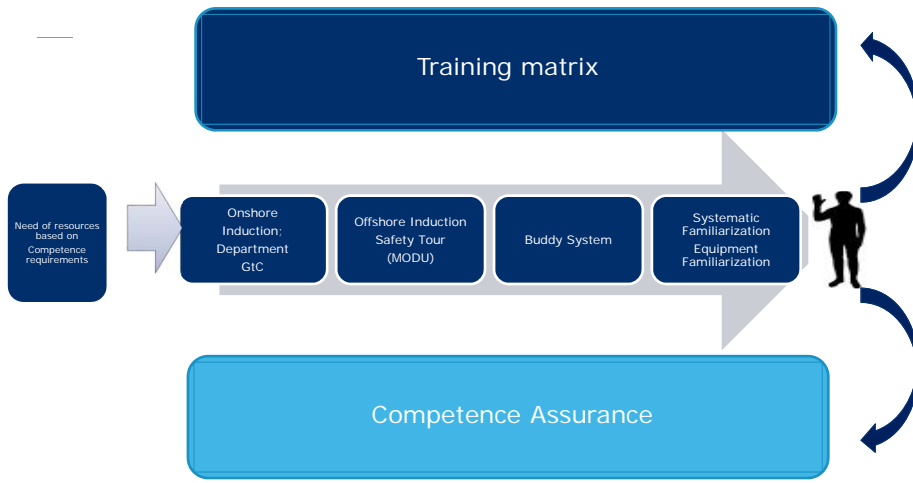


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SAFETY CRITICAL TASKS

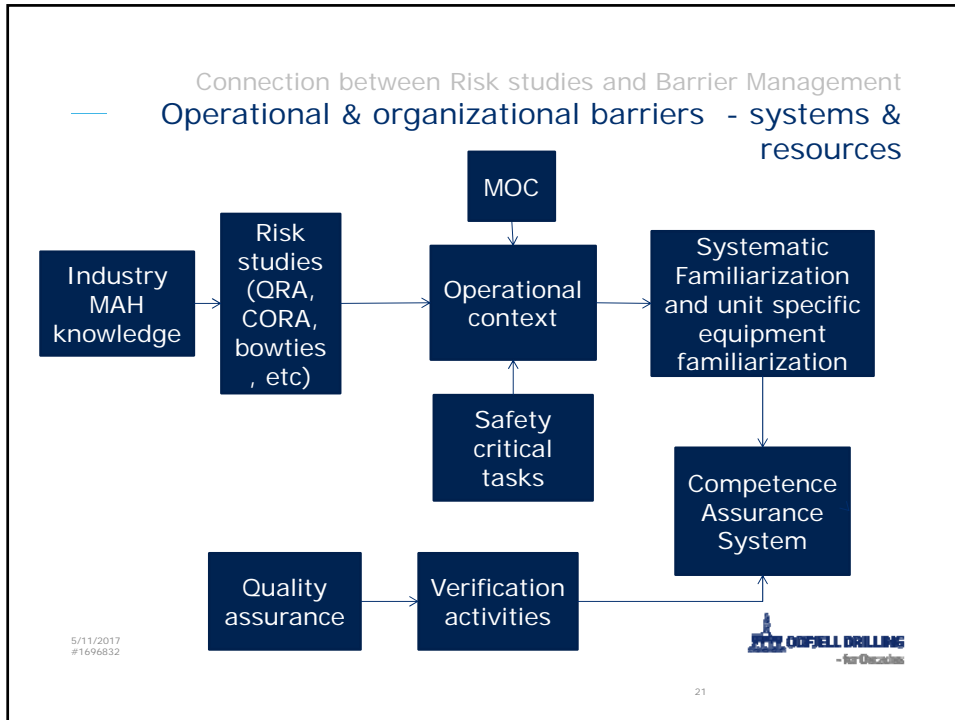
MAINT	Risk	Barrier/Influencing factor	Task	Responsible	Type	CT	SCT	Position req.
Loss of stability	Ballast system failure	Planned maintenance system	testing	TSL CRO	preventive	Verify condition & testing		Education Training matrix Systematic Fam. CAS element Drills & Exer.
			testing	ERO	performance	perform test		
		Emergency operation of valves	perform Start/stop pump	ARL team	performance	execution		
			Detect and instruct	ARL team	performance	execution		
		Design	Act according to procedures	CRO	performance	execution		
		Emergency procedures		OIM	operational	execution		
Loss of buoyancy		Emergency procedures	Activate emergency release	OIM	operational	execution		
			Testing emergency release incl all functions	CRO ERO Mecanic	performance	perform test		
		Secure the well	testing	TSL	preventive	Verify condition & testing		
			Secure the well	Rig super	operational	execution		
			Disconnect Relocate	Rig super OIM	operational	execution		

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ID	Defined situations of hazard and accidents (DSHA)	Major accident hazard (MAH)
1	Loss of well control	<ul style="list-style-type: none"> Hydrocarbons in formation during drilling Hydrocarbons in formation during subsea completion and workover operations Shallow gas Toxic gas
2	Blowout on the rig	<ul style="list-style-type: none"> Hydrocarbons in formation during drilling Hydrocarbons in formation during subsea completion and workover operations Shallow gas
3	Subsea blowout	<ul style="list-style-type: none"> Hydrocarbons under pressure on the seabed
4	Acute oil spill/chemical spill	<ul style="list-style-type: none"> Hydrocarbons in formation during drilling Hydrocarbons in formation during coiled tubing work Well testing
5	Falling loads	<ul style="list-style-type: none"> Dropped objects - crane operations Dropped objects - derrick operations Dropped objects - pipe-handling
6	Radioactive radiation	Not considered as a MAH
7	Incomplete detonation of explosives	Perforating gun charges
8	Fire/explosion in test area/ drilling fluid system	<ul style="list-style-type: none"> Well testing Entrained gas within the mud system
9	Fire in engine room/emergency generator	Generator room fire
10	Fire in living quarters	Accommodation fire
11	Ship collision/drifted object	Ship collision
12	Structural failure	Loss of integrity
13	Failure in ballast system/displacement of loads	Loss of stability

ID	Defined situations of hazard and accidents (DSHA)	Major accident hazard (MAH)
14	Poor/severe weather in drilling position (drift) - Extreme weather	Loss of integrity
15	Poor/severe weather during rig move (control system failure during rig move)	Loss of power or control in transit
16	Helicopter accident on the rig	Helicopter transport
17	Helicopter accident close to rig	Helicopter transport
18	Man overboard	Not considered as a MAH
19	Medical emergency/work accident	Not considered as a MAH
20	Acts of crime (incl. terrorism)	Not considered as a MAH
21	Loss of position (DP)	Station holding failure
	Other	Mechanical failure

Some DSHAs are not regarded as MAHs, but are treated in different documentation such as:

ID	DSHA	Risk analysis
6	Radioactive radiation	Emergency response plan (ERP)
18	Man overboard	Emergency preparedness analysis (EPA)
19	Medical emergency	Emergency preparedness analysis (EPA)
20	Acts of crime	Ship security plan (SSP)

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- for Decades

