

Incidents and Near misses

Aker BP & Equinor – 2023-2024

Eventuelt Pompel og Pilt!



Agenda

1. Linebrudd

- a. Testrekk SC8 – Kjettingbrudd – JJ
- b. Enabler – Kjetting brudd – JP
- c. Kenterlink brudd DSN – JJ

2. Fokus i operasjonene

- a. Svivel som røk under operasjon – JP
- b. Kjetting som ble strammet opp mens den var fast i haikjeft – JJ
- c. Sjakkell benyttet under brekking av ankre – JJ

3. Fiber og fartøyslogistikk

- a. Ødelagt fiber opp av havet – En IMR skute har seilt over – Ingenting ute? – JJ
- b. Manøvrering under oppkobling av rigg – JP

4. Tap av ROV – JJ

5. Ankerlaster - Bruk av Stevmanta soft soil – Delmar/DNV -JP

6. Mob/Demob – JP

7. Personskader JJ/JP

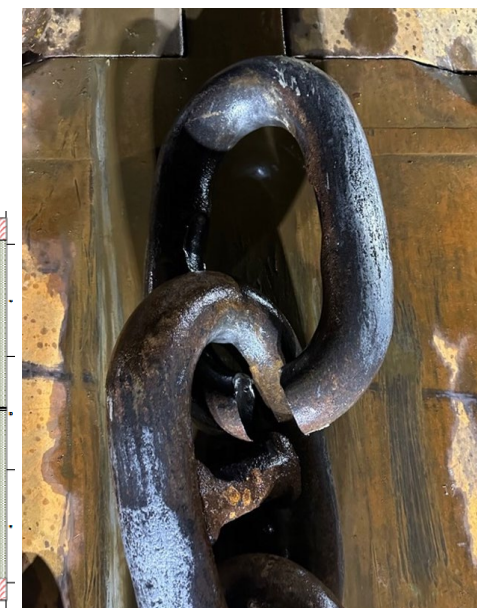
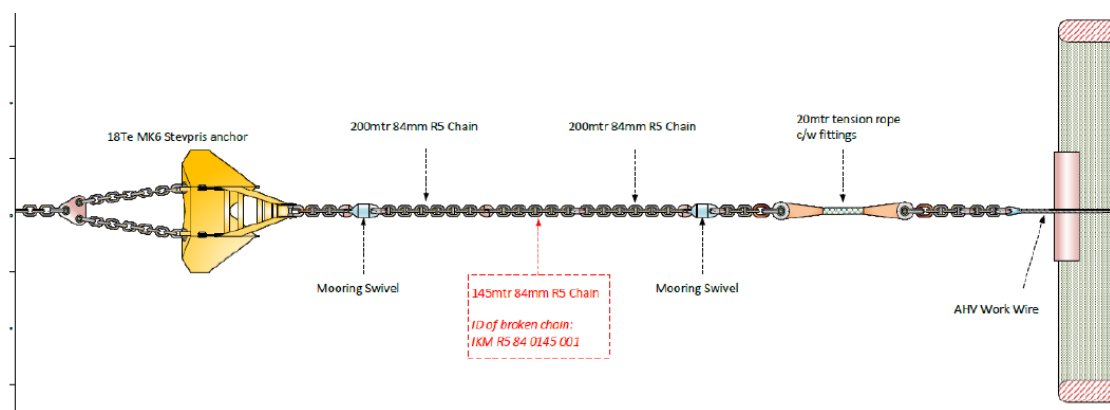
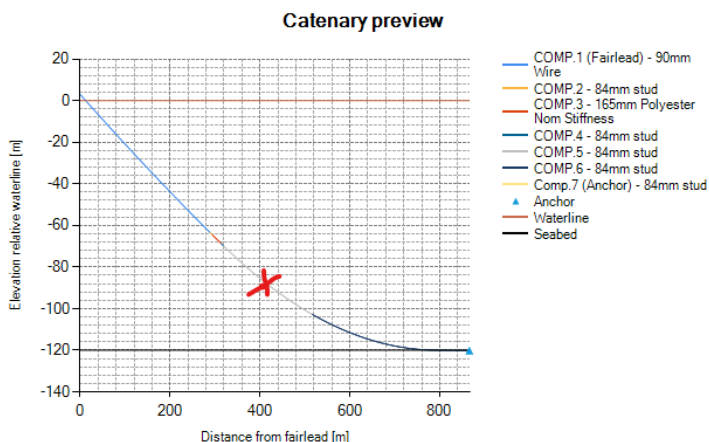
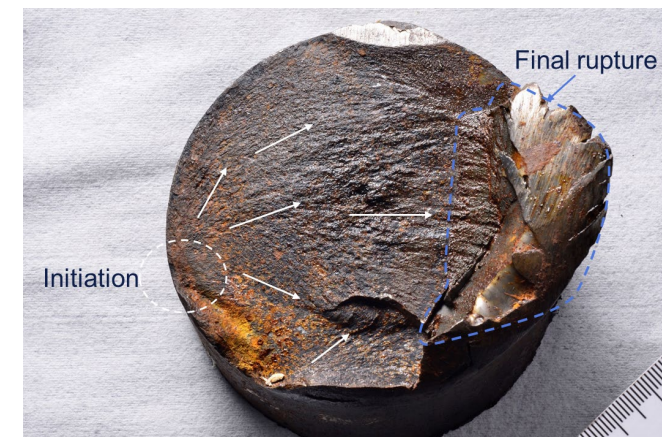
8. Avslutning – Våre drømmer



Chain Breakage during pre lay – SC8 @ FGD

Summary investigation – So far

- During pre lay at FGD an 84mm R5 chain segment broke. Breakage happened in the crown. Chain was from Ramnæs Bruk AB.
- 2,5m Hs and 320Te tension. Water depth 120m. Polyester used between wire and chain. ICCP turned off.
- Link 491 broke. Links 481 to 490 and 490 to 501, in addition to 491 was examined. In addition, several segments of the chain was sent to DNV for high mean load test (40-50% MBL 400Te). JIP.
- Investigation shows tensile strength and hardness within DNV-OS-302 (356 HV and 1113 Mpa).
- Material has failed in a brittle manner, characterized by intergranular cracking. Not possible to establish if a pre-existing crack had been present before the main fracture has started to propagate. Final rupture is a dimpled ductile rupture (overload).
- Based on previous examination of this type of material, the findings support hydrogen induced cracking to be the reason for the failure of the link.



Linebreakage Transocean Enabler

Sum up:

System was pre-laid end march, winch tension around 285 tons.

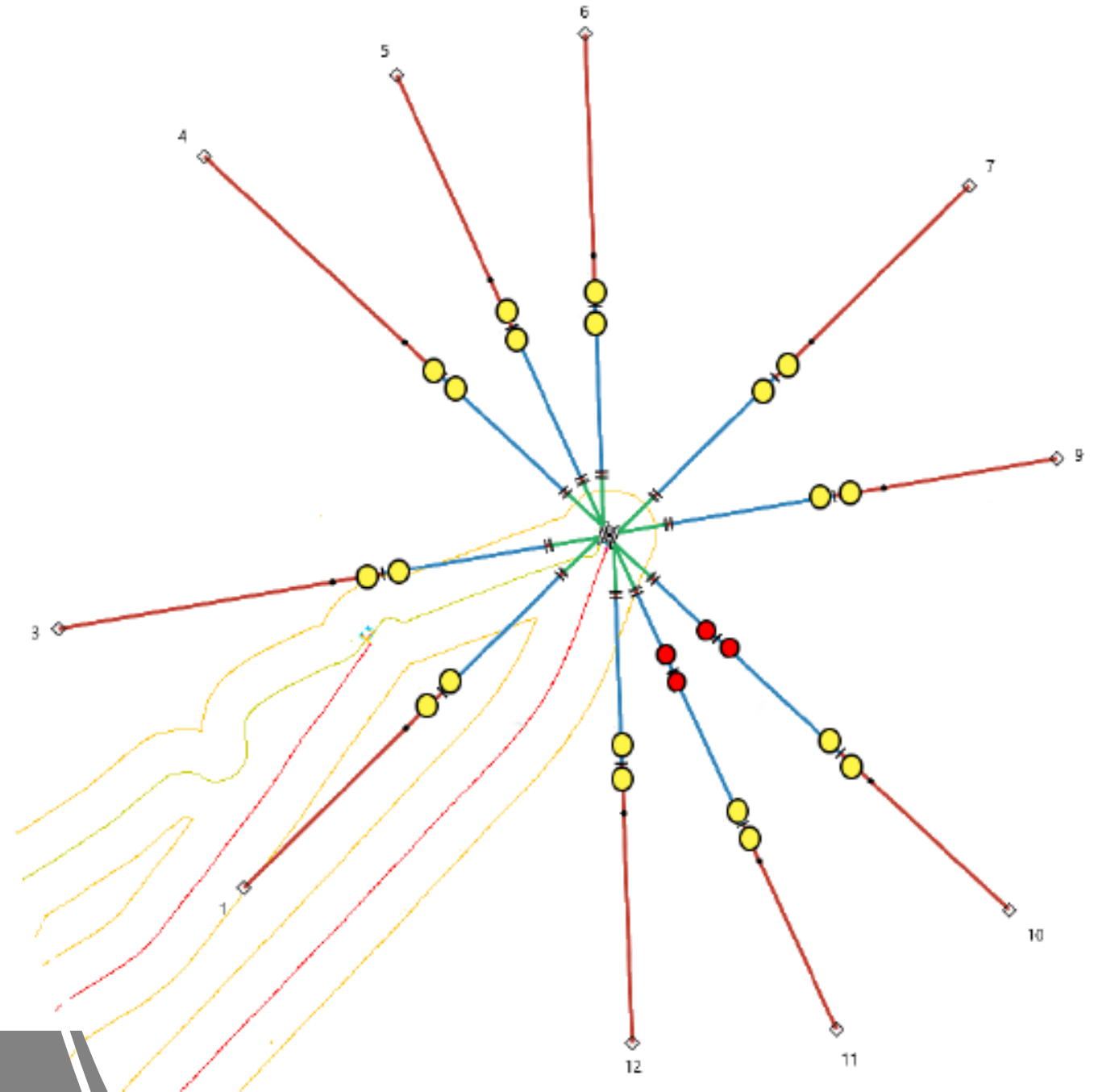
Rig hooked up after easter

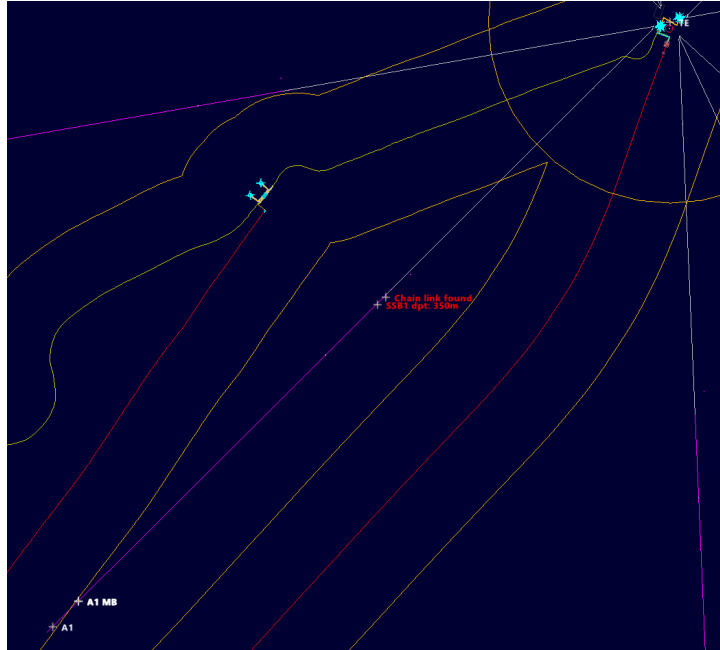
Big system, that allows the rig to skid between 2 wells. Rig moored in center between the wells.

Evening 8th of August, reported line breakage

Mobilized Skandi Vega the day after, as the behaviour of the line indicated that it was broken on the bottomchain side of the fiber rope.

Completed operation at the 10th in the afternoon.

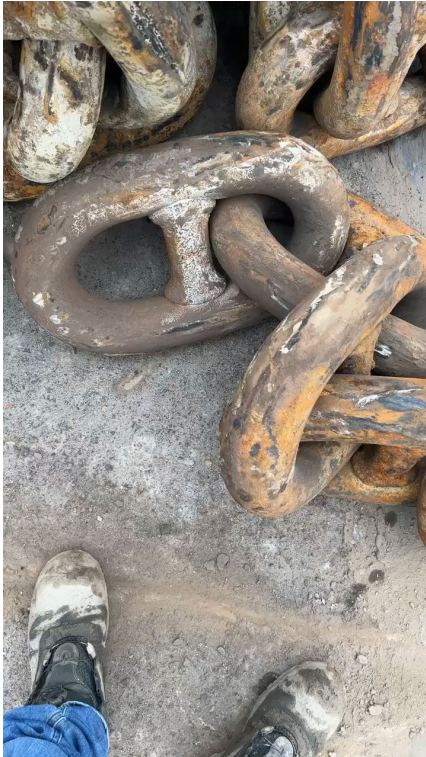




Offshore Operation



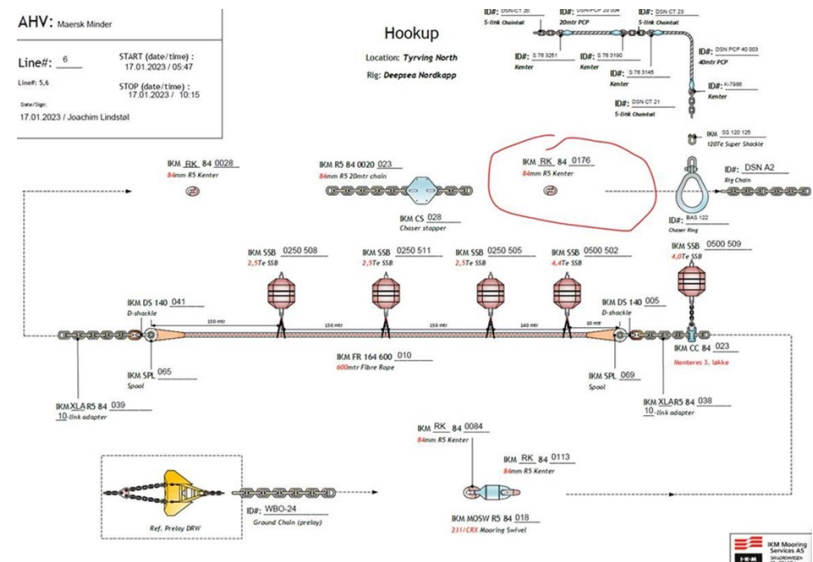
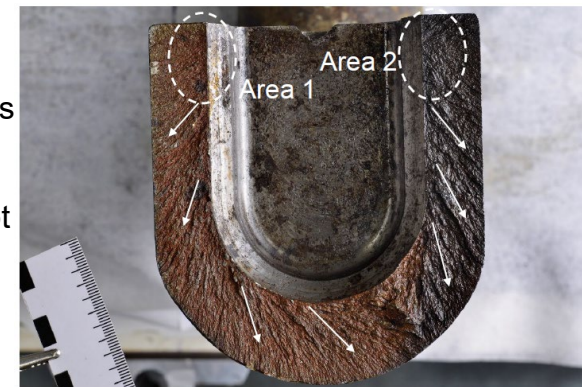
Damaged link – recovered and sent to Høvik



Kenter Link Breakage – DSN @ Trell

Summary investigation – So far

- During operation at Trell a 84mm R5 kenter type Feuerstein Raptor broke. From 2014 and re certified in 2020. Usage: 360 days
- 220Te tension in the mooring line. Position is shown in drawing. Rig movement after failure as expected.
- Good preservation was done, and the link was sent to DNV for investigation. Fracture initiated in two locations. Both fatigue hot spots for kenter links. Initial fracture is fatigue fracture mode (0,5mm depth) → Propagated in a brittle manner
- Hardness testing (HV) shows very high values (397 HV10 and 1250Mpa). DNV-OS-302 (356 HV and 1113 Mpa).
- Charpy testing at -20 deg shows values below req. Average 17 J. DNV-OS-302 (44 J)
- Certificate states that all values should be within DNV req.
- Microstructure examination shows that material have been tempered.



Marking: IKM RK 840176 47



Forbedringer - ICCP

- With the latest challenges around R5 chain, we need to try and isolate the chain as much as we can during operations.
- One solution was to turn off the ICCP system on the vessel.
- Not a good solution for our firm vessels as they are running AH operation continuously.
- Inserting the fibersabb – 20-30 meter long fiberrope that allows us to isolate fiber during prelay tension tests.
- New one from OTS made and tested during this spring on Skandi Iceman, good tests and good feedback from the crew onboard.
- Improved handling for the vessel and crew.
- The only time we now need to shut down ICCP is during recovery of anchors, and that has been agreed on from Shipowners and DNV

The «manta»

Did a test with Delmar/Vryhof i May last year.

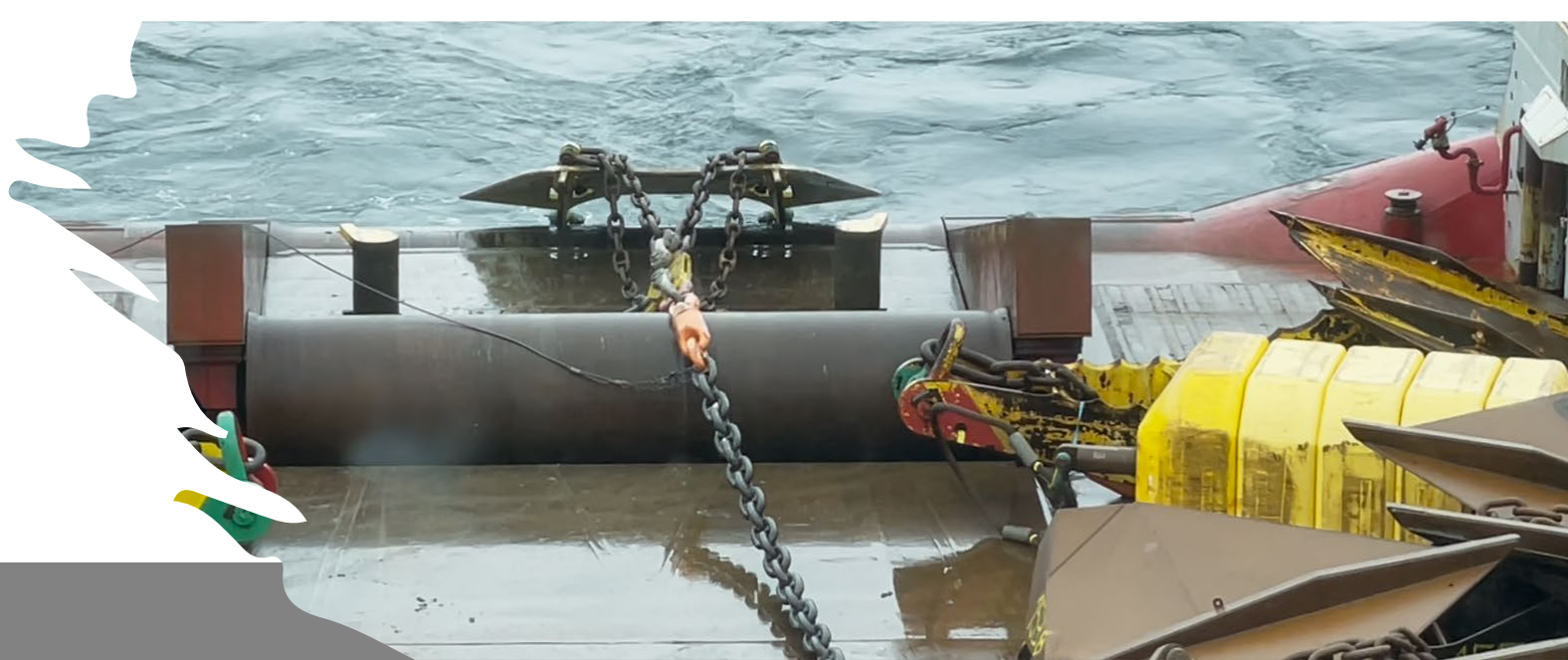
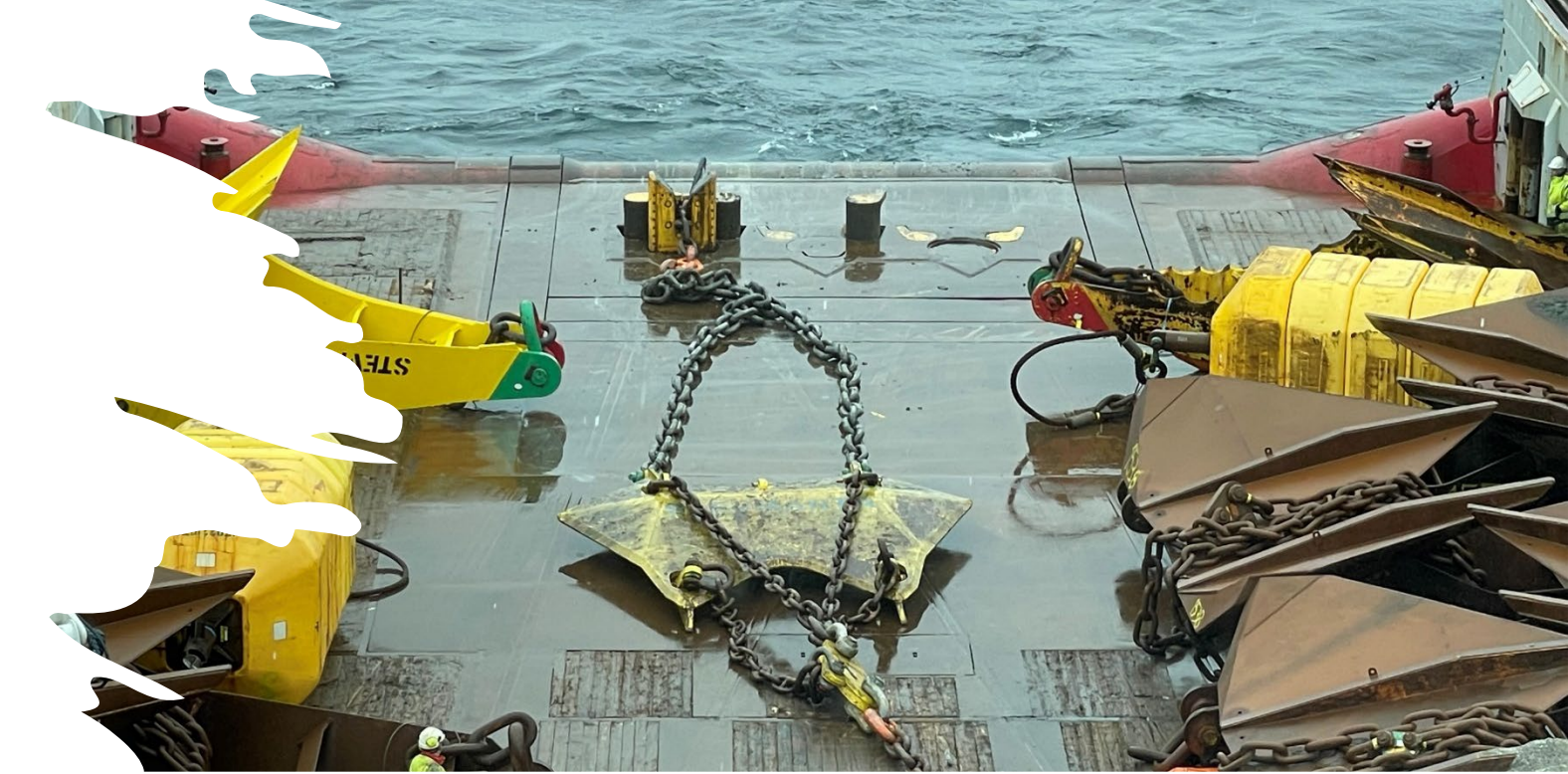
Purpose:

Demonstrate that STEVMANTA can be used as a «normal» anchor

Demonstrate STEVMANTA low retrieval force using by recovering it with pennant behind the anchor

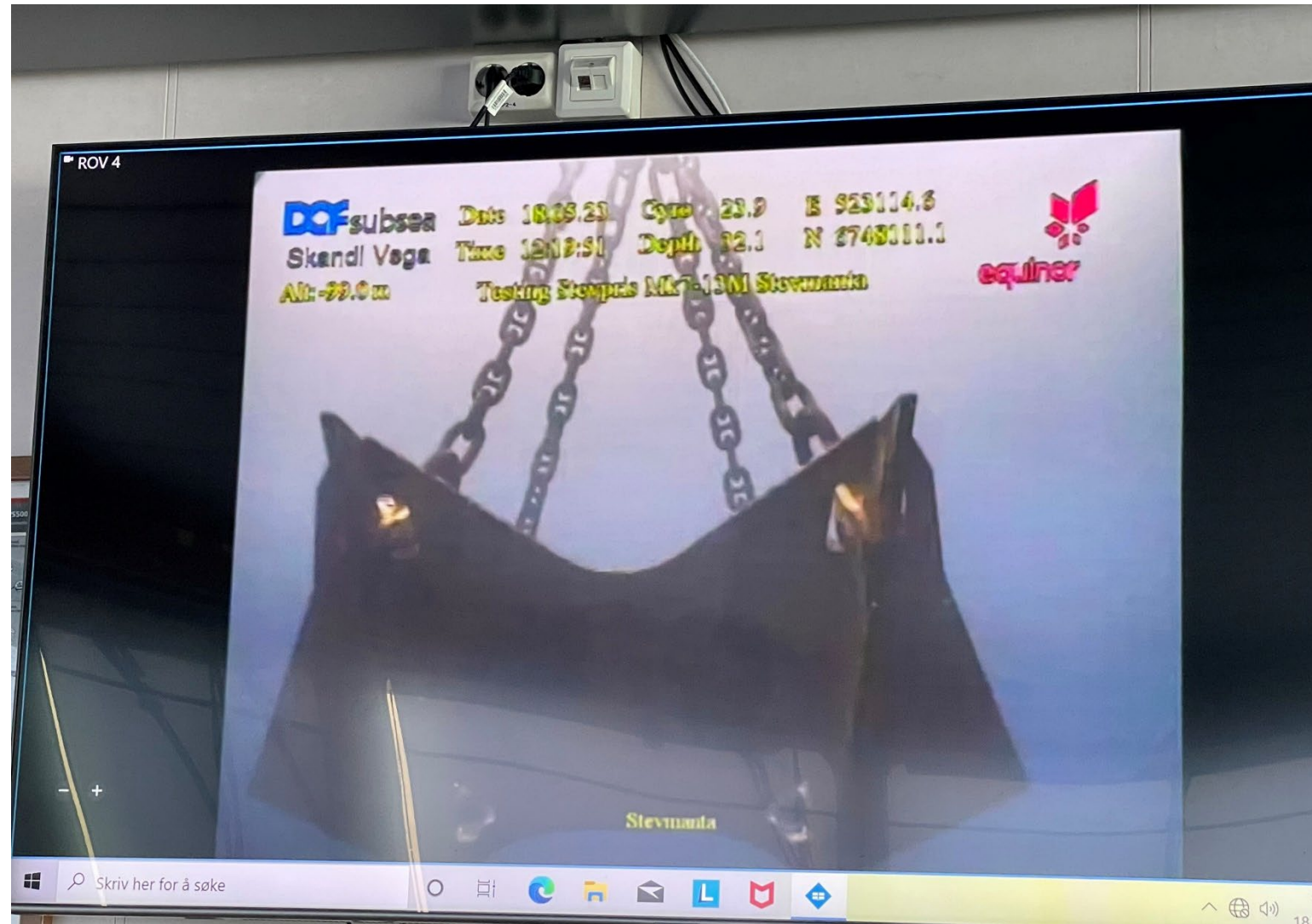
We used fixed breaking pin, so the anchor will not go into “vertical mode” but just behave as a normal fluke anchor.

- StevManta – the answer on soft soil ???



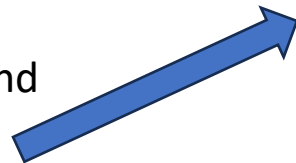
I think so!!

- Test went smooth.
- Anchor held 350 tons without problem for 15 min.
- Recovery load was significant lower then the Mk6.
- During recovery of MK 6 anchors on soft soil locations, we can have significant peak loads, the Manta came out at 150 tonnes after short time. No chain on roller that can take damage.
- However;
- The STEVMANTA recovery needs some additional handling time (disconnecting& picking up pennant wire & reconnect) but recovery speeds will more than compensate for the additional handling.
- •Recovery is also more vertical, requiring less free seabed space, important on areas with a lot of infrastructure
- •Potentially take more anchors on one vessel ?



Whats next

- Can we solve a lot of the R5 problems?
- What is the way forward from here
- We are working on it together with the Industry
- Currently with small anchors and very low bollard pull ;)



Important Learnings

Damage to 84mm R5 chain and shark yaw insert

- During mobilization the chain was secured in the vessels shark yaw
- Winch operator got distracted by personnel on the bridge. 2nd officer was occupied with paperwork.
- Lead to the chain getting tightened up in the shark yaw.
- Consequence: Damaged insert and chain.
- This is a low-tension operation, but winch operator registered a spike of 350t on the winch monitoring system.
- Large potential.

Focus needs to in place in every step of the operation

Be aware – even during «simple» or «routine» operations

All involved should keep track of operation sequences.



Important Learnings

120t shackle used instead of kenterlink

- During recovery operation, a 120t shackle was used between vessels work wire and bottom chain.
- Neither deck crew, ID-rep, bridge crew or marine reps caught this wrongdoing during connection.
- Damaged shackle
- Large potential

Focus needs to in place in every step of the operation

Be aware – even during «simple» or «routine» operations

All involved should keep track of operation sequences



Are we focused?



Fingers

Two fingers crushed during greasing of winch



Maintenance work

Routine greasing of mooring winch



Position of hand during injury.
Removing old grease using short length hacksaw blade



Finger

Partial amputation

glove pulled into AC



Skade på personell –
Klarer vi å være
«DØNN TILSTEDE»?

Simulating the position of hand during injury when manually moving the belt to hear the noise

Partial amputation of one finger



Important Learnings

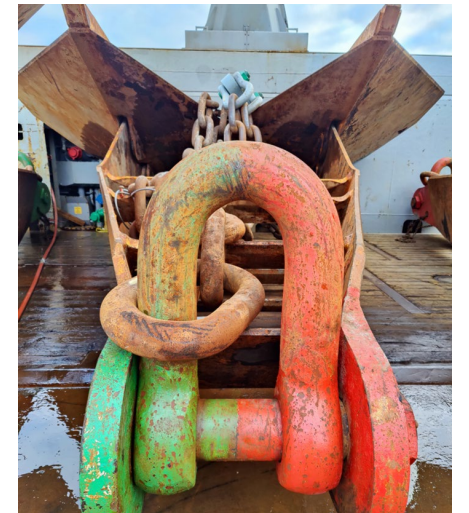
Other incidents we NEED to mention

- Grating – Personal injury – PSV
- Sprained fingers – Special end link
- Twisting of ankles – Two cases last year
- Knee Injury

Focus in everything you do!

Risk picture and stop the job attitude!

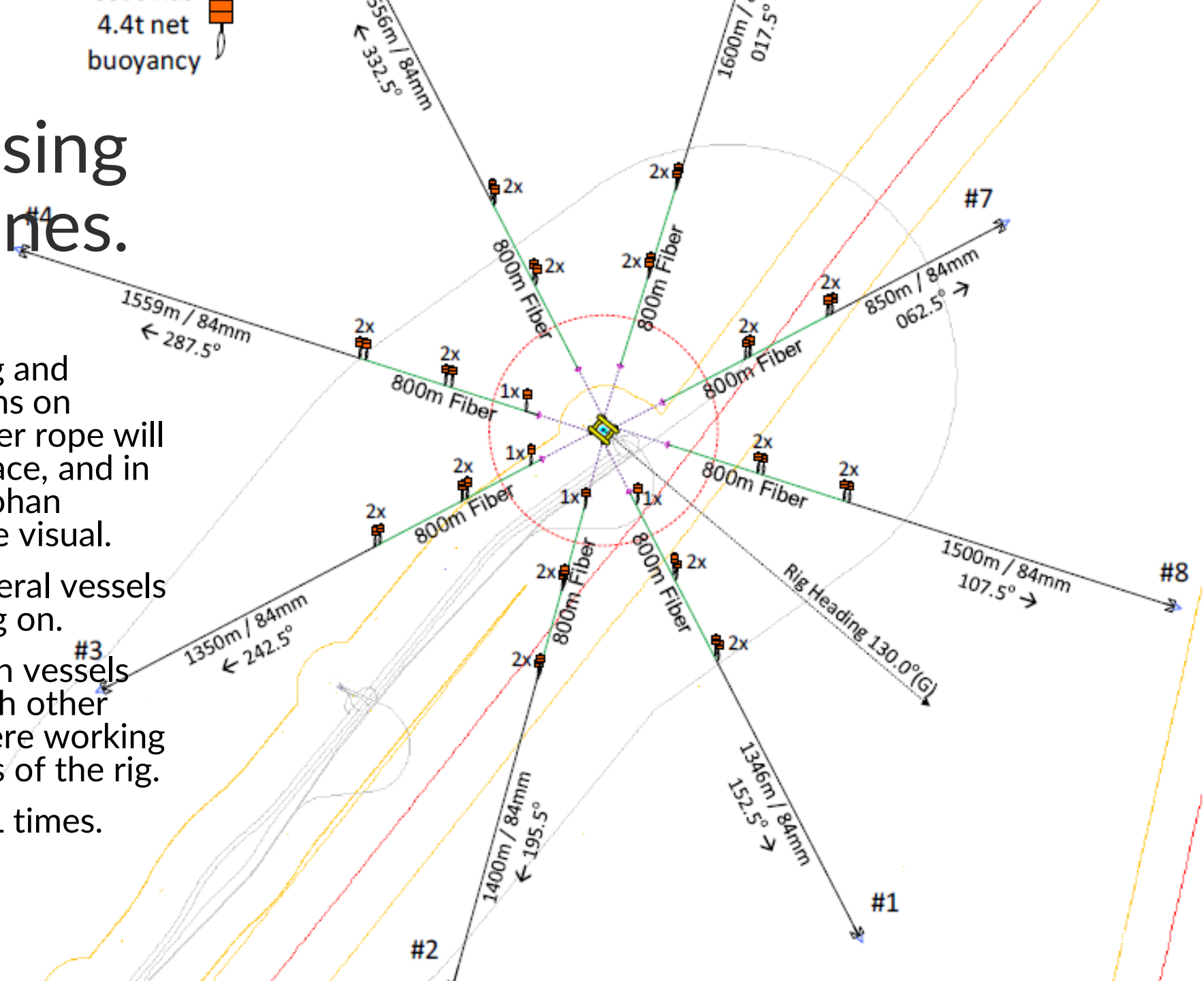
How can WE eliminate all these incidents? Together?



Avoid crossing of anchorlines.

- During unmooring and mooring operations on shallow water, fiber rope will almost reach surface, and in many cases like Johan Sverdrup, it will be visual.
- Rigmoves with several vessels there is a lot going on.
- Had incident when vessels were crossing each other lines, since they were working on several corners of the rig.
- Keep focus at ALL times.

4.4t net buoyancy



Avoid crossing of anchorlines

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- Keep focus at ALL times.



Fiber protection

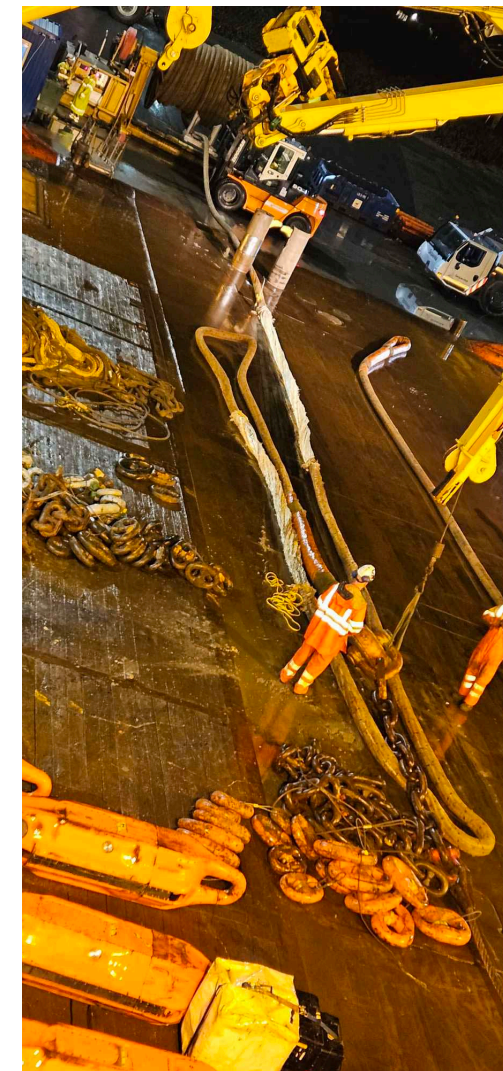
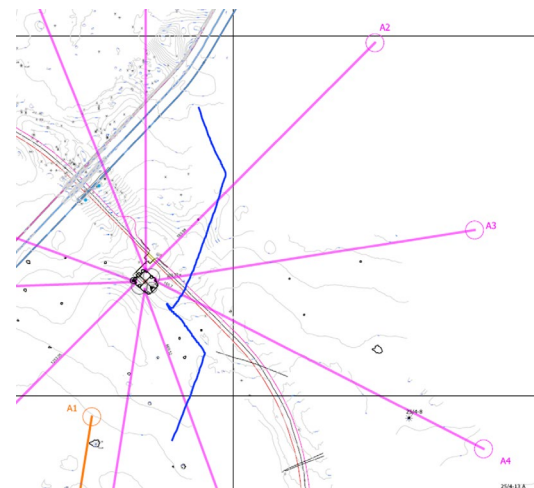
- Before we had mats around the timble when running it on the winch.
- Could not verify that no sharp edges breach through the fibermats – Also time consuming
- New Poly protection cups is used.
- Quick to install, takes one man and if/when they fall off, we get a visual of this and can stop the operation and hinder fiber damage



Important Learnings

Fiber rope damage

- Fiber rope protection missing – discovered during recovery. On mooring line #3
- No one admits to have done something wrong
- But investigation shows that a vessel has crossed the polyester during its time in the sea.
- Could easily have led to a line breakage.



Focus on in-field traffic and movement

Always report incidents to AkerBP as soon as possible

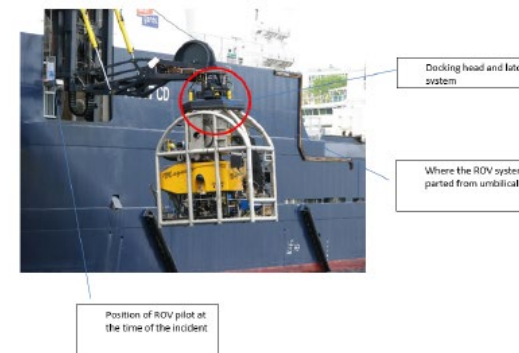
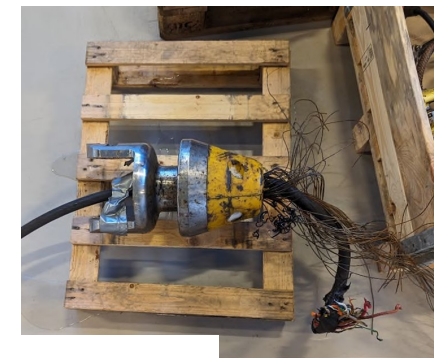
Increased information to parties on mooring spreads



Important Learnings

Loss of ROV

- During recovery of an ROV January 2024 the TMS umbilical broke. Weather was ok.
- Investigation shows that the umbilical was cut by the latching system. Instead of locking the ROV in position the system cut the umbilical.
- Four main factors leading to the incident to occur.
 - Procedures for operation not followed. Operator did not see the indication flag for the latching system.
 - Not enough mechanical barriers to prevent the possibility of cutting the umbilical.



Close up picture of latch system when it was new in 2007.

Procedures is to be followed.

Stop the job is important.

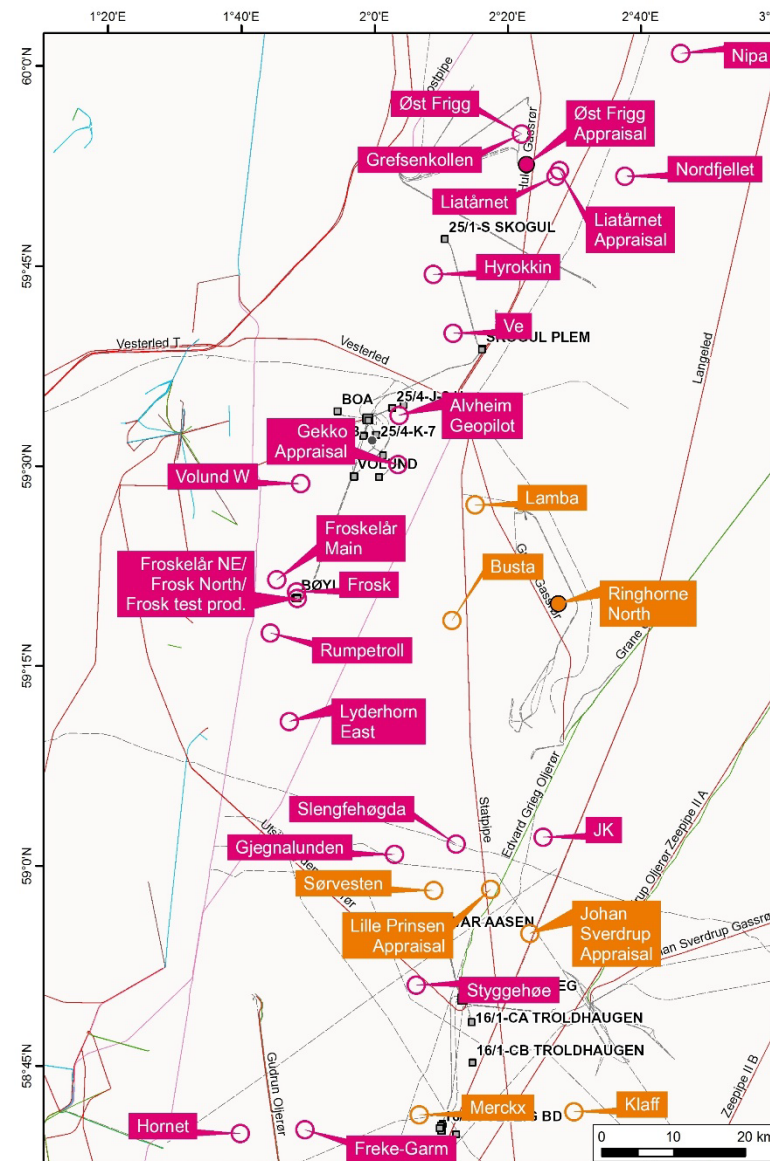
System to be improved.



Erfaringsdata og geografi

Rig	Location	Operator	Område	DIGIN / ULS	Water depth	Numl of lin
DSS	Volund ST	AkerBP	Nordsjøen Midt (Ivå	ULS	124m	8
DSN	Jette	AkerBP	Nordsjøen Midt (Ivå	ULS	126m	8
DSS	Freke-Garm	AkerBP	Nordsjøen Midt (Ivå	ULS	121m	8
DSS	Hornet	AkerBP	Nordsjøen Midt (Ivå	ULS	121m	8
DSS	Liatårnet	AkerBP	Nordsjøen Midt (Ivå	ULS	110m	8
DSN	Skogul	AkerBP	Nordsjøen Midt (Ivå	ULS	126m	10
DSN	KIM	AkerBP	Nordsjøen Midt (Ivå	ULS	118m	10
DSN	BOA	AkerBP	Nordsjøen Midt (Ivå	ULS	121m	10
DSN	Liatårnet	AkerBP	Nordsjøen Midt (Ivå	ULS	110	10
DSS	Lyderhorn	AkerBP	Nordsjøen Midt (Ivå	ULS	118m	8
DSN	Grefsenkollen	AkerBP	Nordsjøen Midt (Ivå	ULS	105m	10
Scarabeo 8	Rumpetroll	AkerBP	Nordsjøen Midt (Ivå	ULS	115m	8
Scarabeo 8	Froskelår	AkerBP	Nordsjøen Midt (Ivå	ULS	120m	8
Scarabeo 8	Frosk Test Produce	AkerBP	Nordsjøen Midt (Ivå	ULS	119m	8
DSN	Rumpetroll	AkerBP	Nordsjøen Midt (Ivå	ULS	115m	8
DSS	Gekko	AkerBP	Nordsjøen Midt (Ivå	ULS	124m	8
DSS	Cameleon Infill Sout	AkerBP	Nordsjøen Midt (Ivå	ULS	124m	9
DSN	Volund	AkerBP	Nordsjøen Midt (Ivå	ULS	124m	10
DSN	Frosk	AkerBP	Nordsjøen Midt (Ivå	ULS	120m	10
DSN	Gekko South	AkerBP	Nordsjøen Midt (Ivå	ULS	125	10
Scarabeo 8	Gjegnalunden	AkerBP	Nordsjøen Midt (Ivå	ULS	116m	8
Scarabeo 8	Styggehøe	AkerBP	Nordsjøen Midt (Ivå	ULS	108m	8
Scarabeo 8	Ve	AkerBP	Nordsjøen Midt (Ivå	ULS	120m	8
Scarabeo 8	Øst-Frigg	AkerBP	Nordsjøen Midt (Ivå	ULS	108m	8
DSS	Lille Prinsen	Lundin	Nordsjøen Midt (Ivå	ULS	112m	8
DSS	Merckx	Lundin	Nordsjøen Midt (Ivå	ULS	100m	8
DSS	Dovregubben	Lundin	Nordsjøen Midt (Ivå	ULS	119m	8
West Bollsta	D-Segment	Lundin	Nordsjøen Midt (Ivå	ULS		8
West Bollsta	Solveig	Lundin	Nordsjøen Midt (Ivå	ULS		32
West Bollsta	Rolvsnæs EWT	Lundin	Nordsjøen Midt (Ivå	ULS		8
COSL Innovatc	Luno II	Lundin	Nordsjøen Midt (Ivå	ULS	100m	8
COSL Innovatc	Rolvsnæs	Lundin	Nordsjøen Midt (Ivå	ULS	107m	8
Leiv Eiriksson	Jorvik	Lundin	Nordsjøen Midt (Ivå	ULS	111m	8

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Ankertyper

Field	Fluke angle	Piggy-back anchors	Failed attempts
Hornet	32	3	4
Rumpetroll	32/41	5	18
Frosk Test Producer	41	5	11
Gekko	32	2	5

Stevpris Mk6 15Te



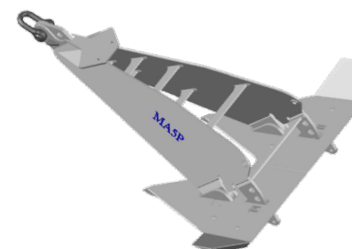
Field	Fluke angle	Piggy-back anchors	Failed attempts
Volund ST	32/41	0	4
Jette	41	2	5
Freke-Garm	32	0	0
Liatårnet	32	0	0
Skogul	32	0	0
Grefsenkollen	32	0	0
Laushomet	50	0	0
Froskelår	32/41	5	7
KIS	32	0	0
Volund	32/41	2	8
Gekko South	41/32	0	4
Styggehøe	32	0	1
Øst Frigg	32	0	0

Stevpris Mk6 18Te



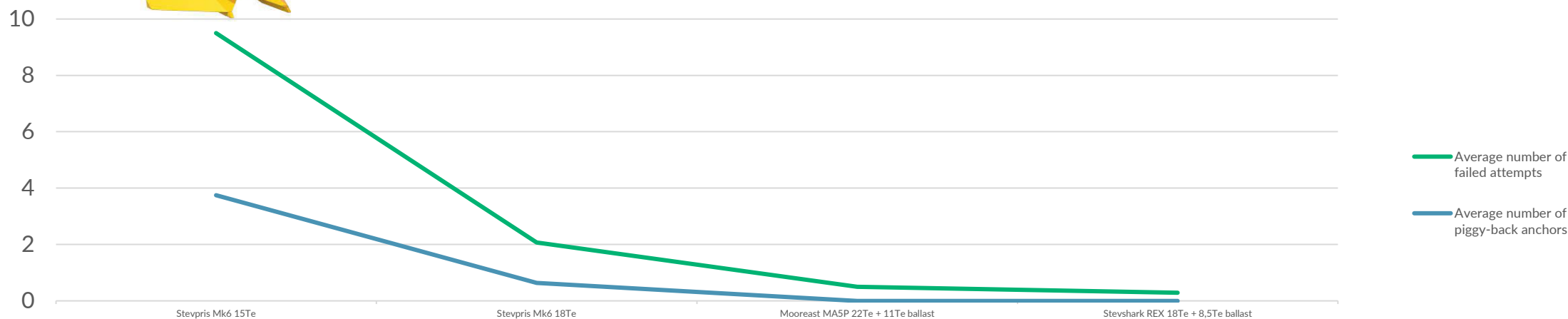
Field	Fluke angle	Piggy-back anchors	Failed attempts
KIM	32	0	0
BOA	32	0	0
Liatårnet	32	0	0
Frosk	41	0	2
Rumpetroll	32/41	0	0

Mooreast MA5P 22Te + 11Te ballast



Field	Fluke angle	Piggy-back anchors	Failed attempts
Gjegalunden	32	0	1
Ve	32	0	0
Lille Prinsen	32	0	0
Merckx	32	0	0
D-Segment	32	0	0
Goddo	32	0	0
Jorvik	32	0	1

Stevshark REX 18Te + 8,5Te ballast



Mobilization and demobilization - Equinor

- Can we make it more efficient and still keep it safe?
- Shorter turn around time on the base.
- Fewer vessels for the same amount of operation.
- Complexity of the mooring spread
- Pcps no longer in one length, often 20+40 og 20+20+20. leads to alot of time for connection and disconnection.



Mobilization and demobilization - Equinor

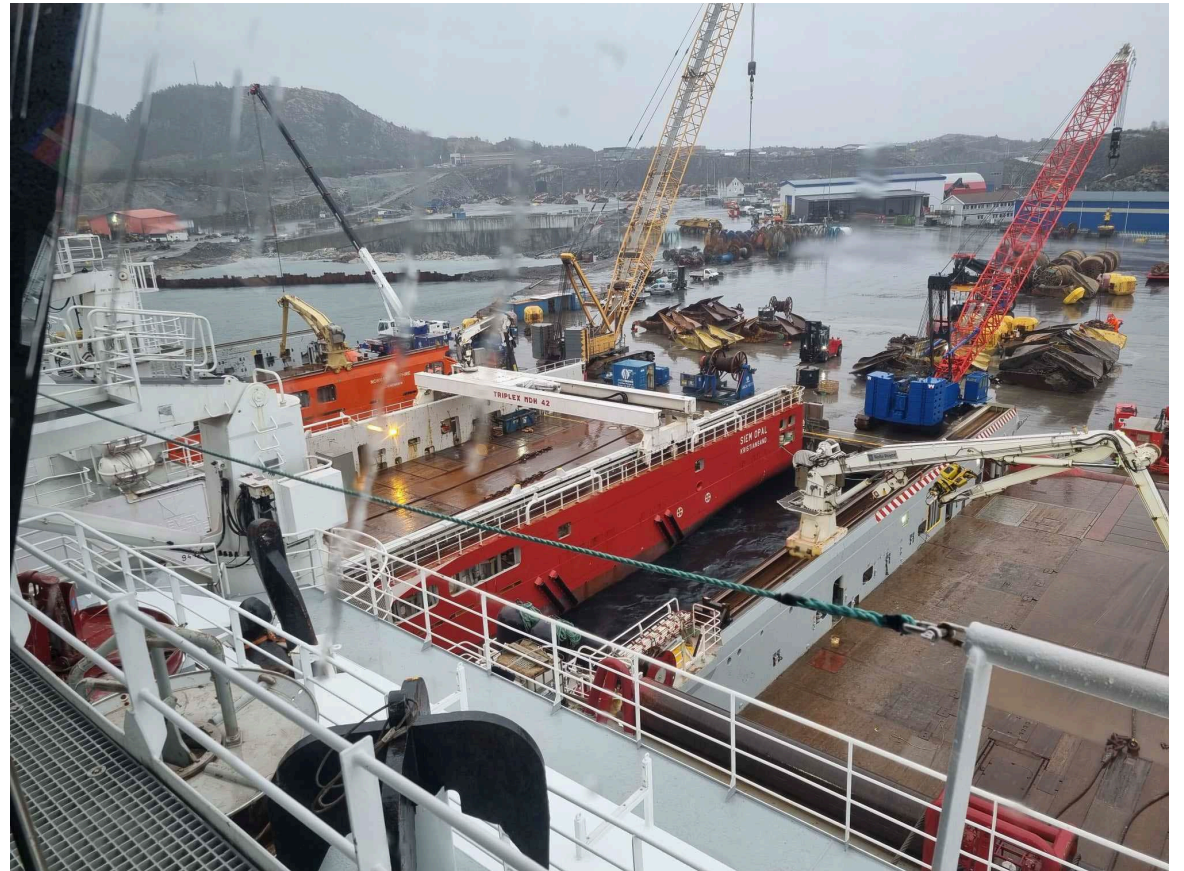
Can we have larger drums? That require fewer reel-changes?

Could fiber and wires be pre-rigged at the warehouse prior to vessel arrival, in order to minimize the time alongside the base.

Will lead to less time alongside, lower emissions from the vessels and cost for the operator.

Reels can be «re-organized» and checked properly when the vessels are away. In safe manners inside warehouses.

Give it a thought, maybe something that can be implemented.



Work going head - Dreams of our own

- JP wants to fly
- Losen wants to walk on the water
- ***Together increase focus on everyday operations and HSE thinking!
We have to stop the number of incidents we see.***
- The high grade JIP → Lets contribute together in order to get to the bottom of all our challenges.
- Reduce the test tensions loads!!!
 - Better for the chain
 - Better for safety
 - Better for environment
 - SO go on Jan Holme
 - Start using experience is my plan
- Thanks!

