

Diverless Brace Installation Varg A

FFU seminar 26.01.2012

Who am I ?

- Berit Hagland
- Project Manager
- DeepOcean



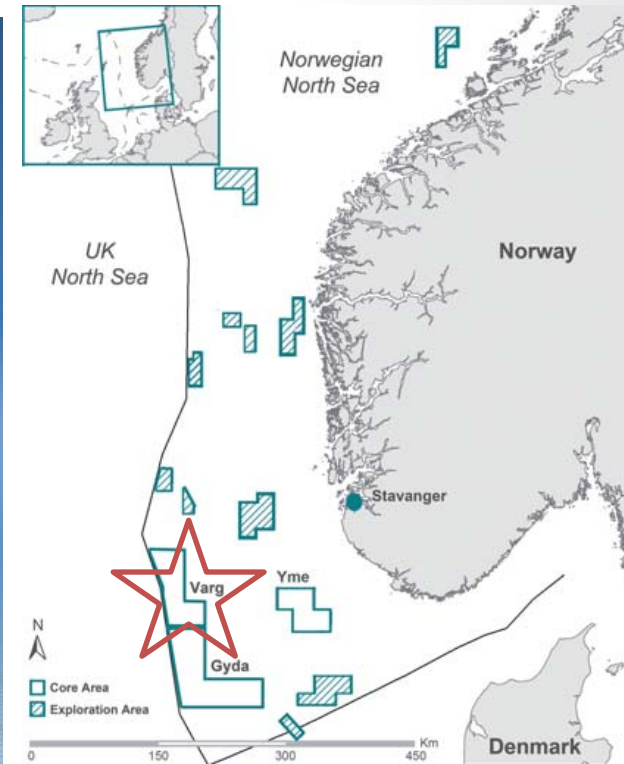
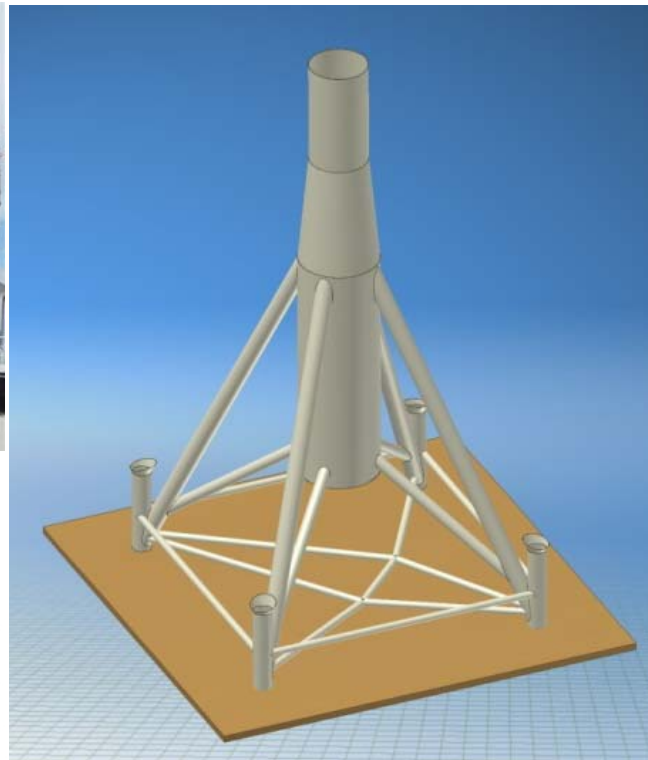
DIVERLESS BRACE INSTALLATION – VARG A

Content:

- Back ground
- Onshore planning
- Offshore operations



Varg A – Monotower wellhead platform
Water depth approx. 84 meters



Background

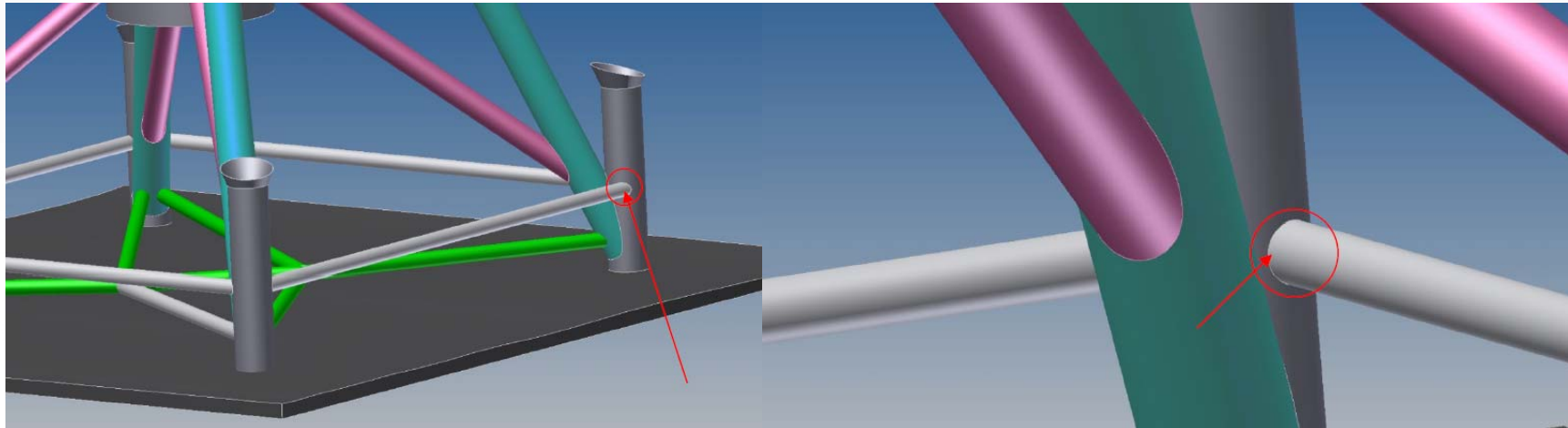
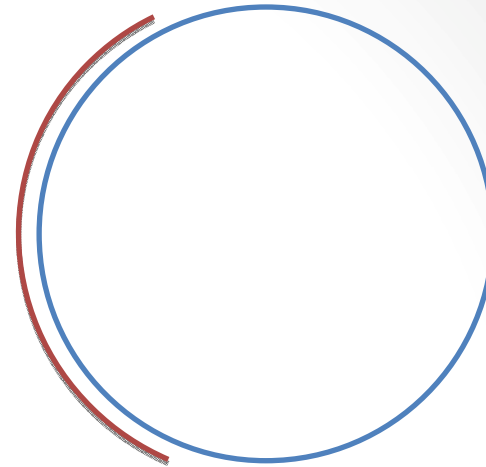
Crack in brace discovered by DeepOcean during the yearly inspection campaign



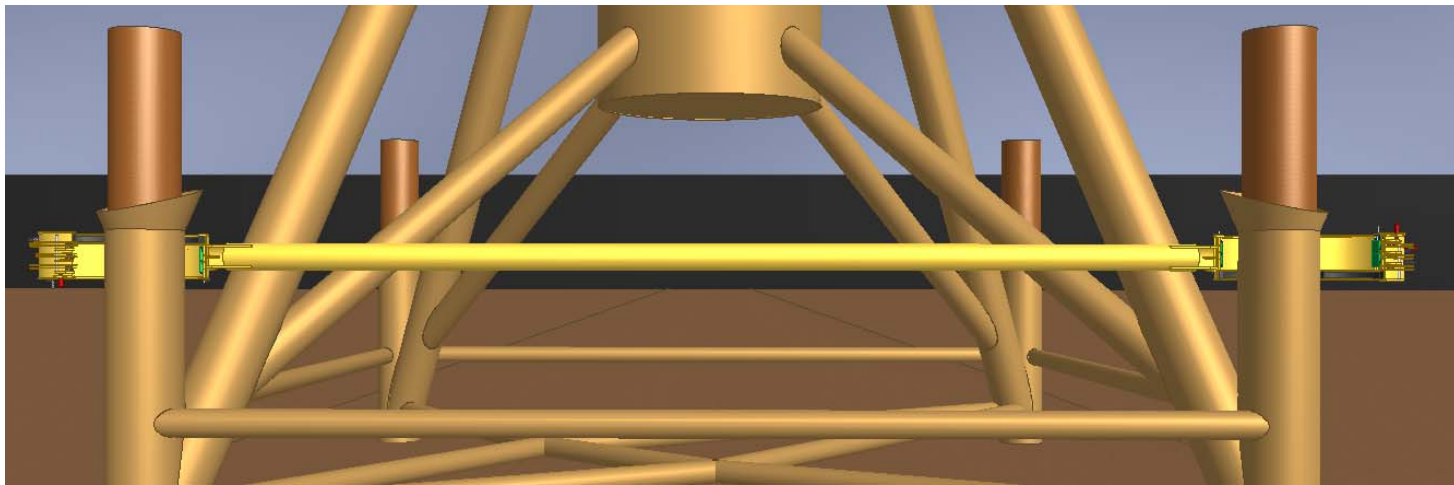
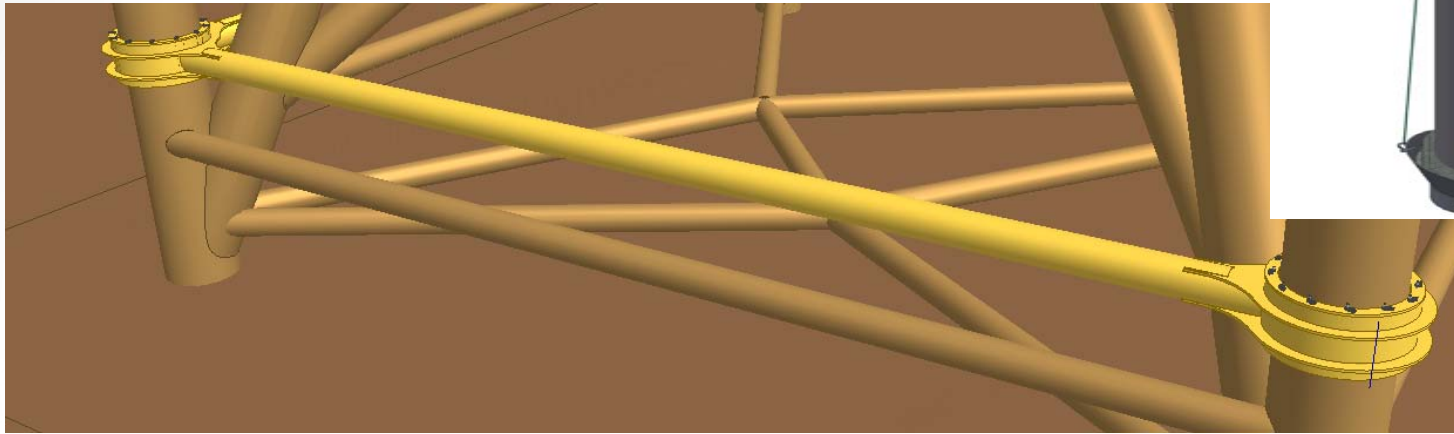
Background

Brace outer diameter – Approx. 1 m

Crack located in weld seam from 7 to 11 o'clock in complex location for ROV and ROV tooling access



Study: Closed and Hinged Clamp Evaluated



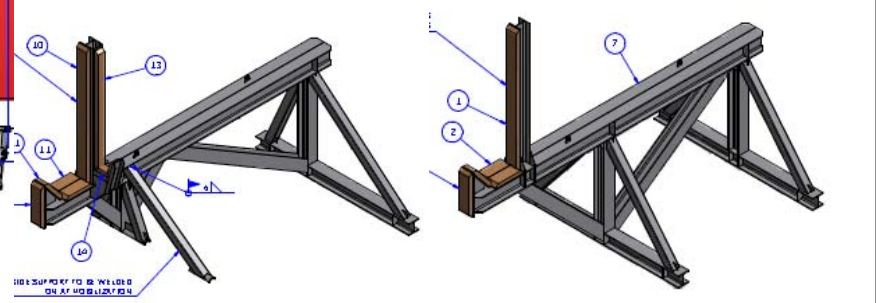
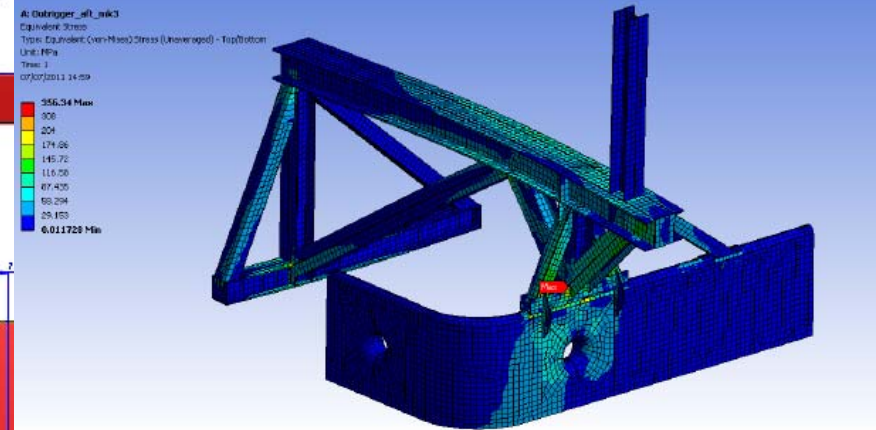
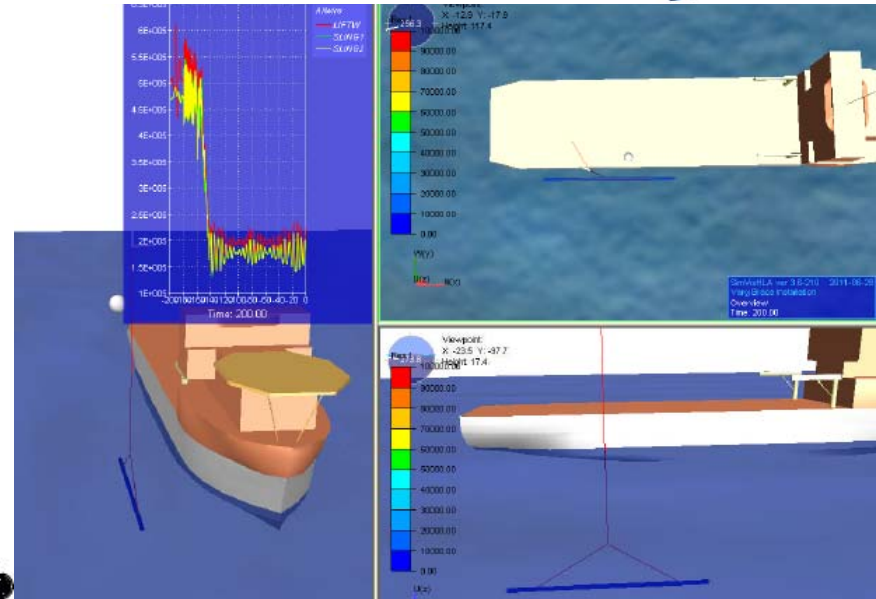
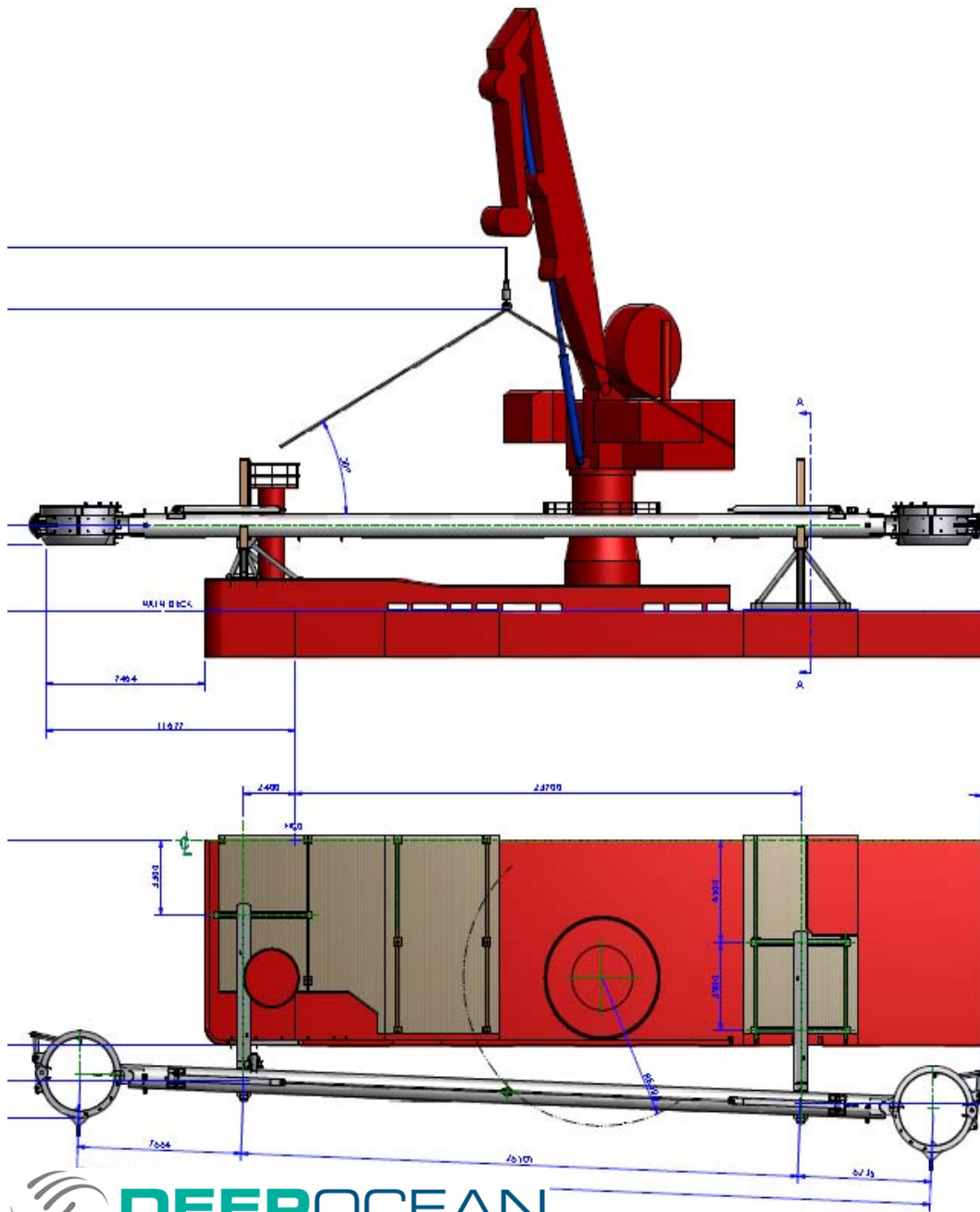


	Length	Weight in Air	Weight in Water
New Brace	45 m	51 e	19 Te



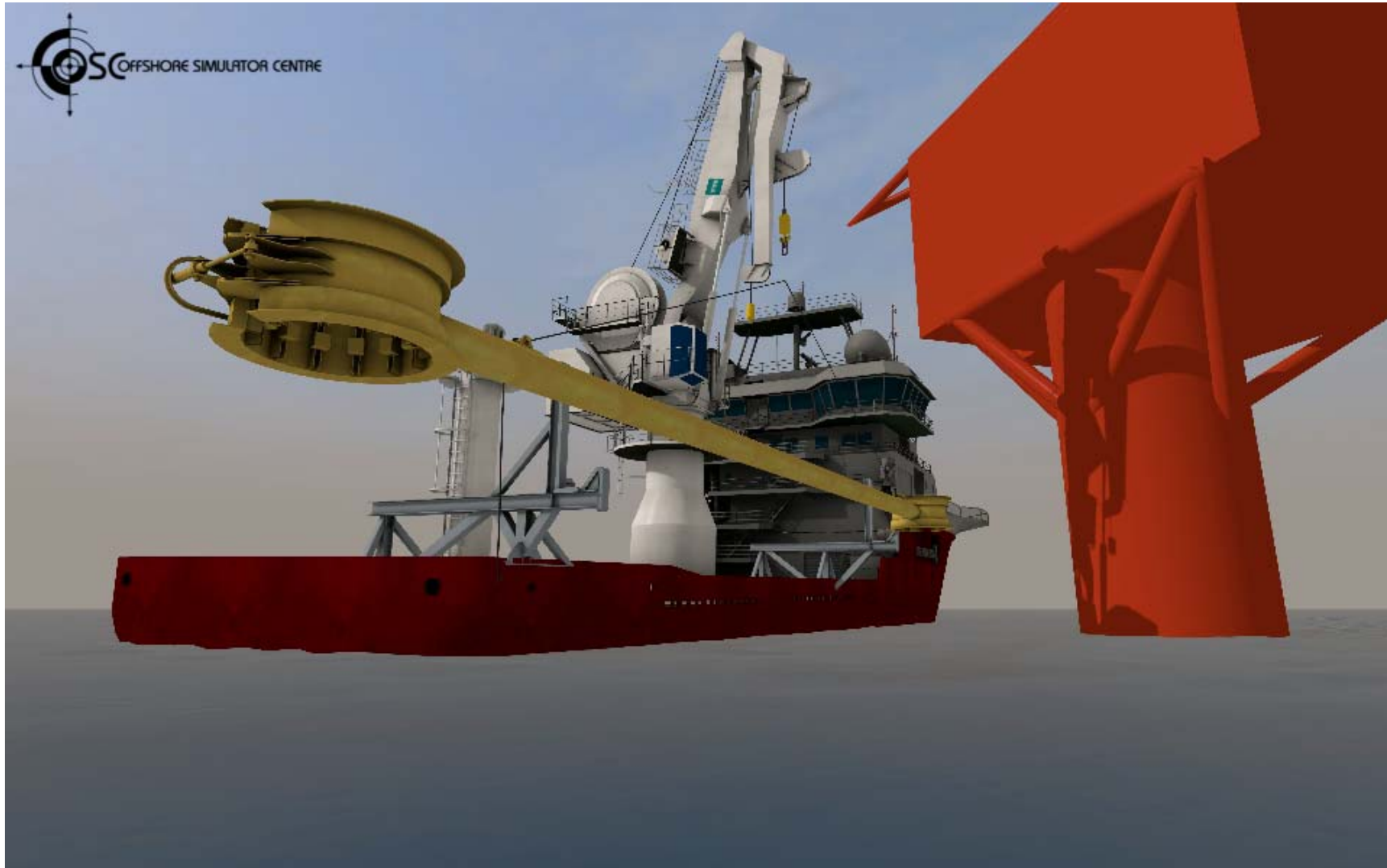
	Length	Weight in Air	Weight in Water
Old Brace	36 m	42 Te	13 Te

Campaign 2 - Preparations : Design of outriggers and SIMO analyses



Campaign 2 Preparations

Simulator training offshore lifts



MEMBERS OF DEEPOCEAN GROUP

Campaign 1 – Northern Canyon



Campaign 1 – Cleaning / removal of marine growth

Depth 84.11 m Pitch 1.03

Task: 1140 cleaning and inspection

ROV: Supporter4

TALISMAN
ENERGY

 **DEEPOCEAN**
SUBSEA SERVICES



Campaign 1 – Removal of 12 anodes and other obstructions

Depth 75.79 Roll 0.29



TALISMAN
ENERGY

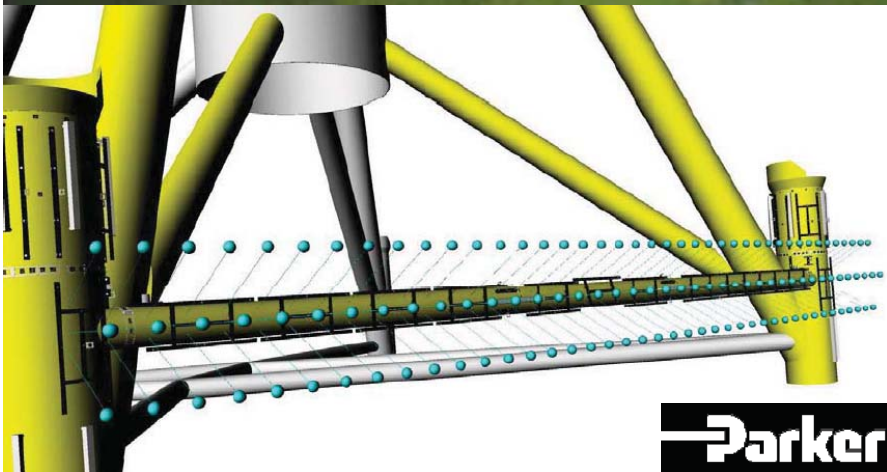
Task: Anode removal, north west cor

ROV: HIROV 5

DEEPOCEAN
SUBSEA SERVICES

Campaign 1 – Photogrammetry

6438086.92 N Depth 80.57 Pitch -7.44



grammetry ops.

ROV: Supporter4



Campaign 1 – Drilling of 4 off 90 degree holes to accommodate for lifting aids



Campaign 1 – Drilling of 3 holes to prevent further crack development



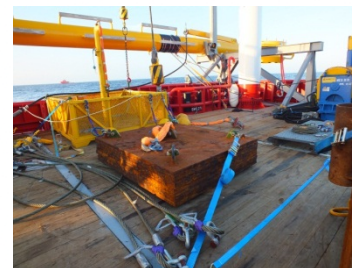
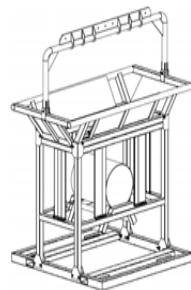
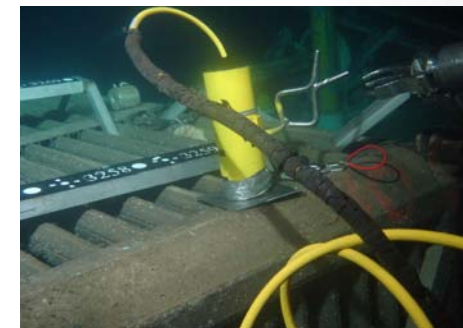
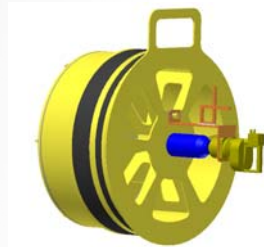
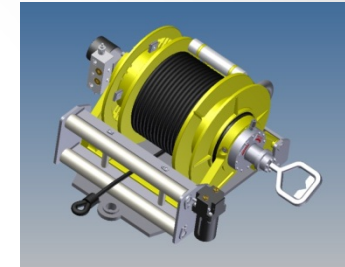
Test Phase



Campaign 2 – Volstad Surveyor



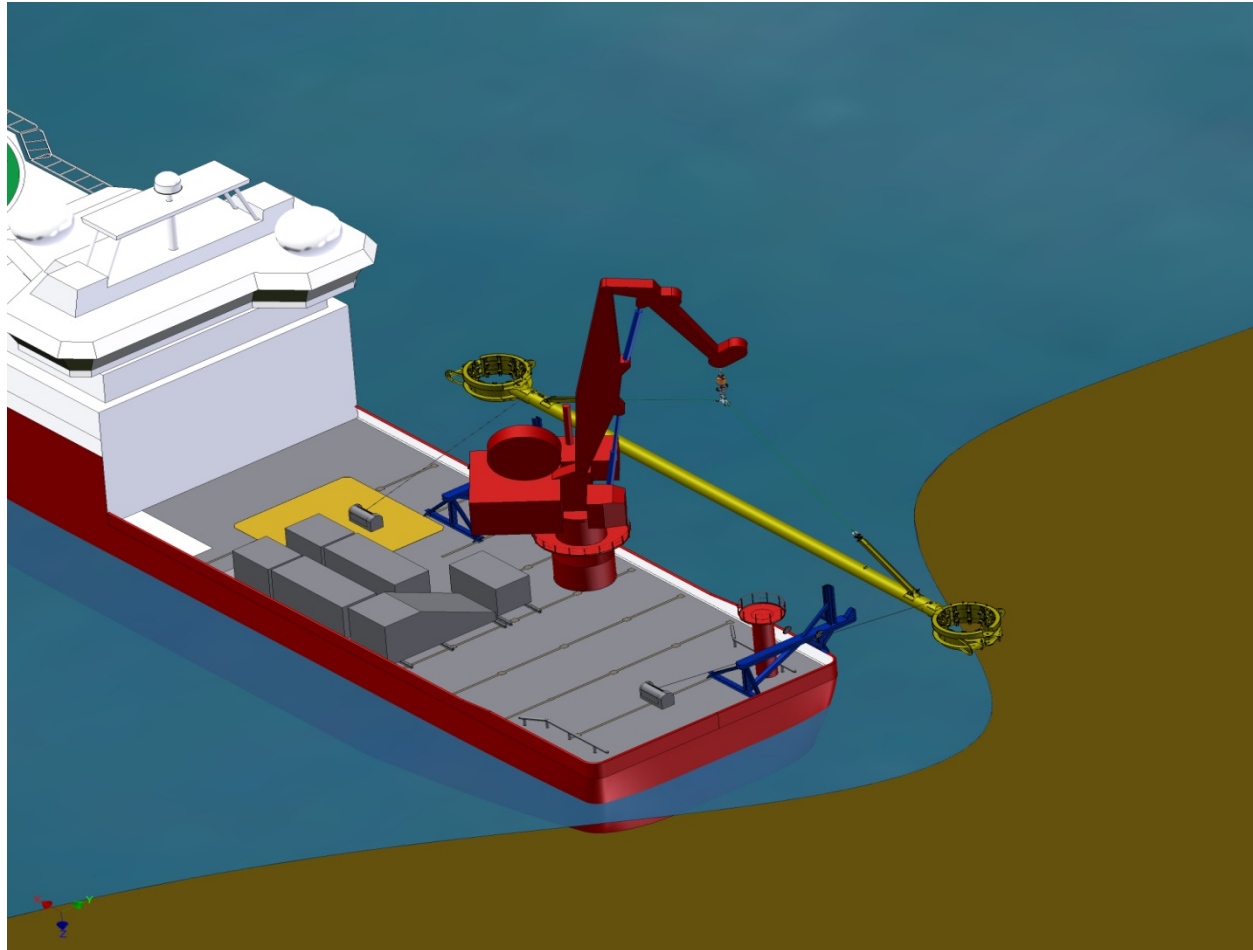
Additional project equipment



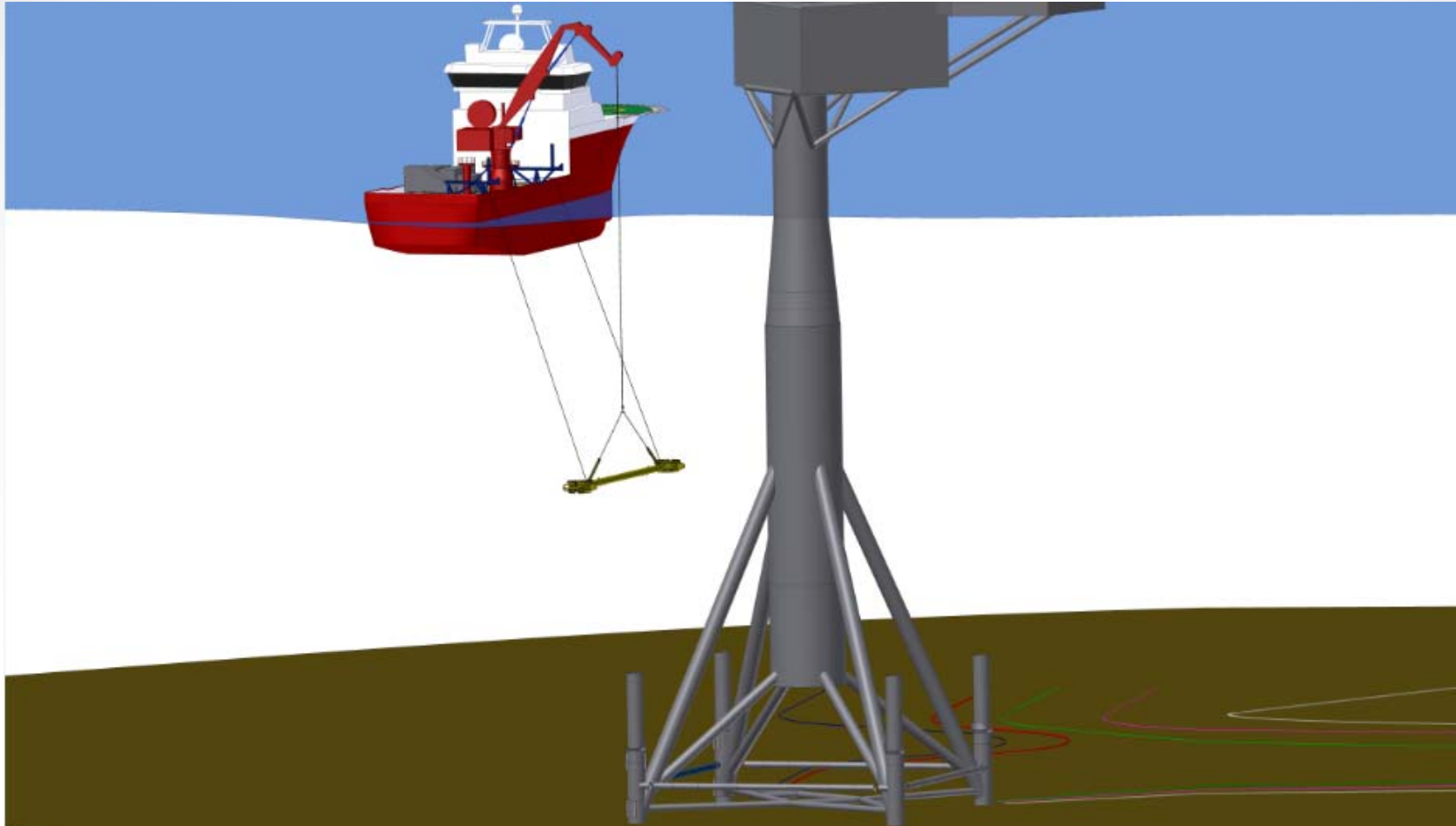
Campaign 2 – Volstad Surveyor



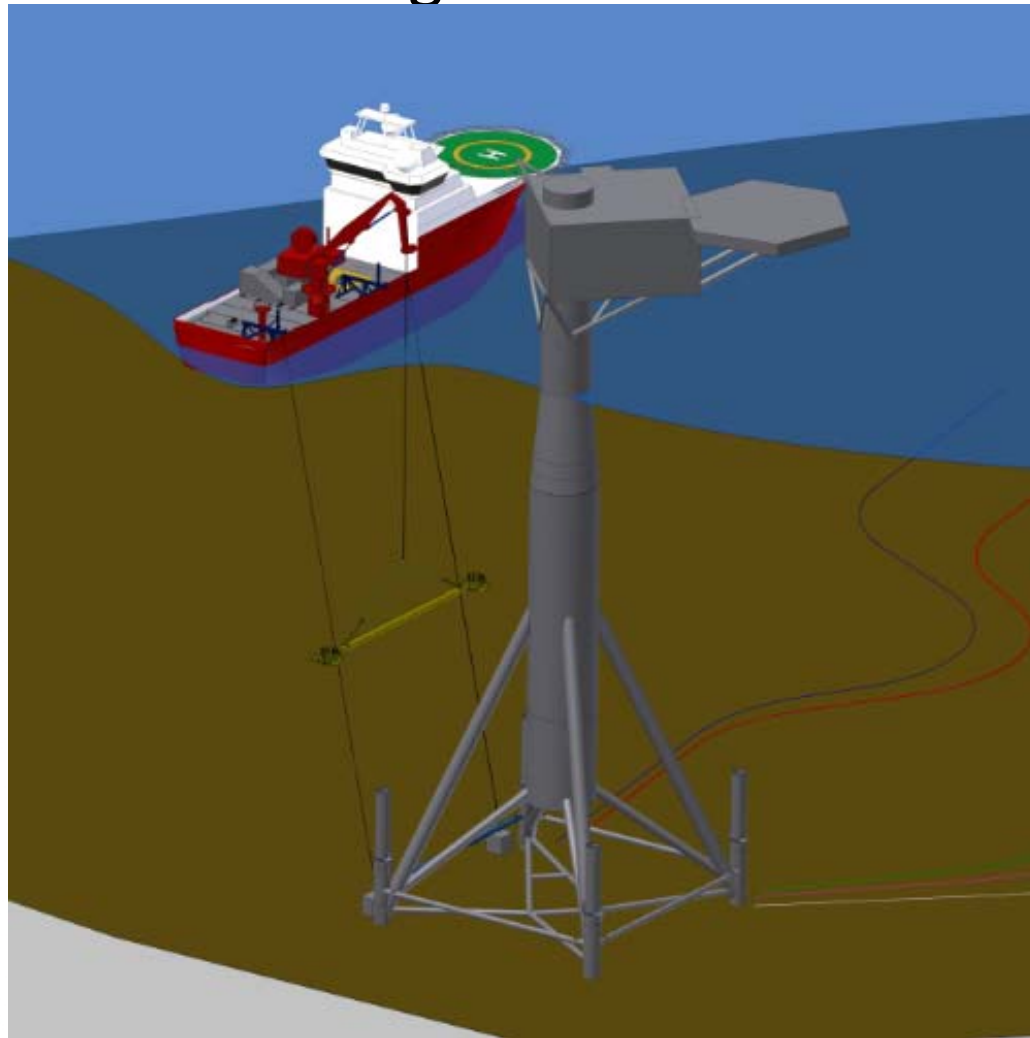
Lower through splash zone with holdback tugger lines to control brace



Continue lowering & monitoring with ROV's

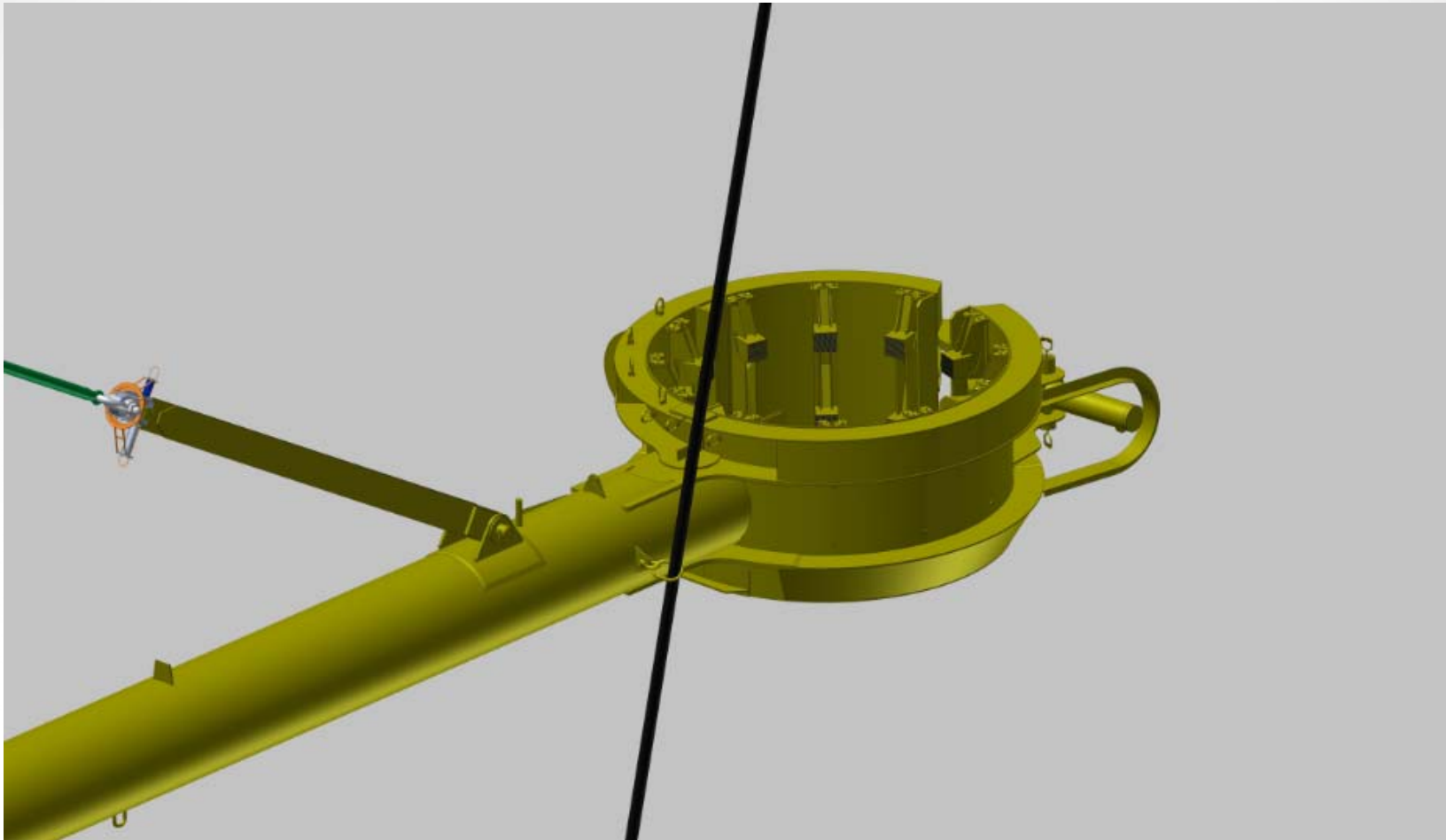


Disconnect tugger winch lines Reconnect as guide wires via DMA's

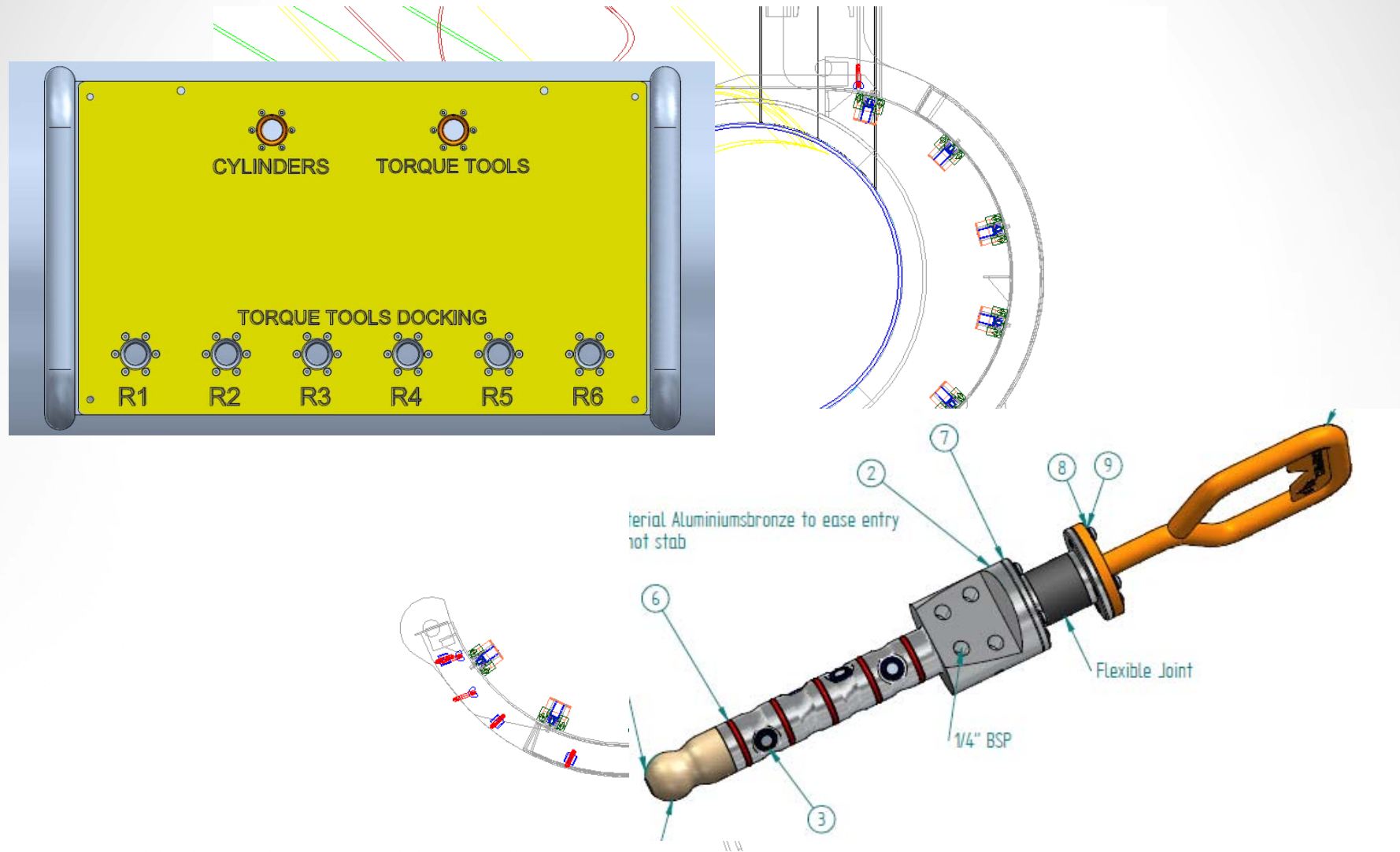


Change from holdback wire to guide wire mode

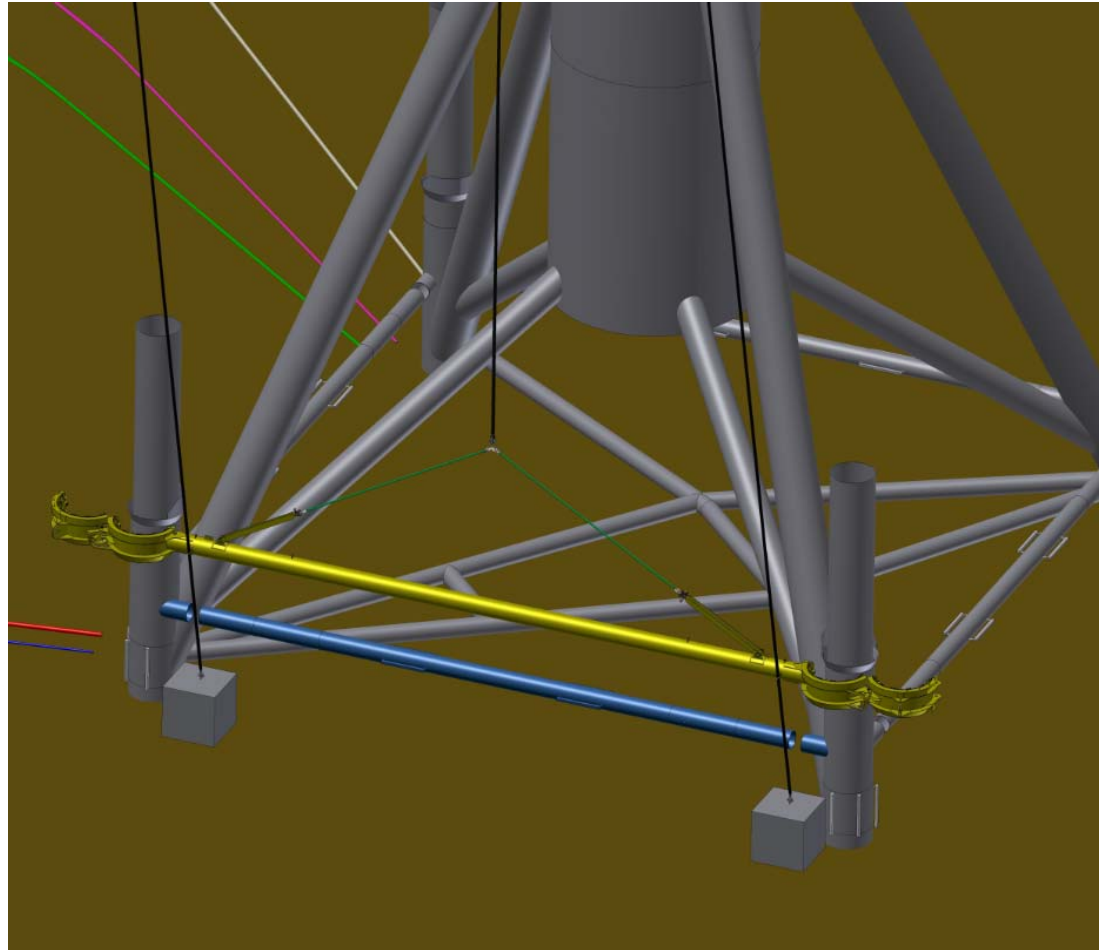
(ROV disconnects wire, passes through masterlink & connects to DMA on seabed)



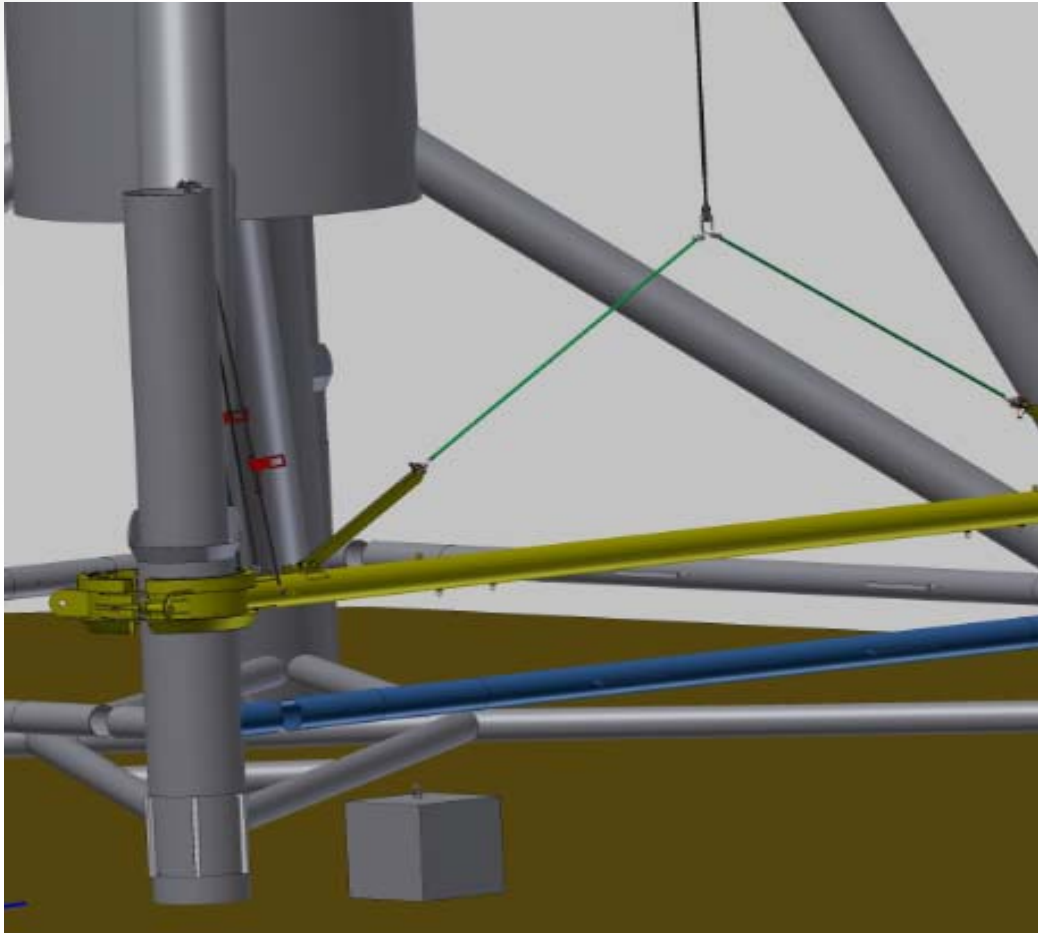
ROV opens clamp to position using hot stab



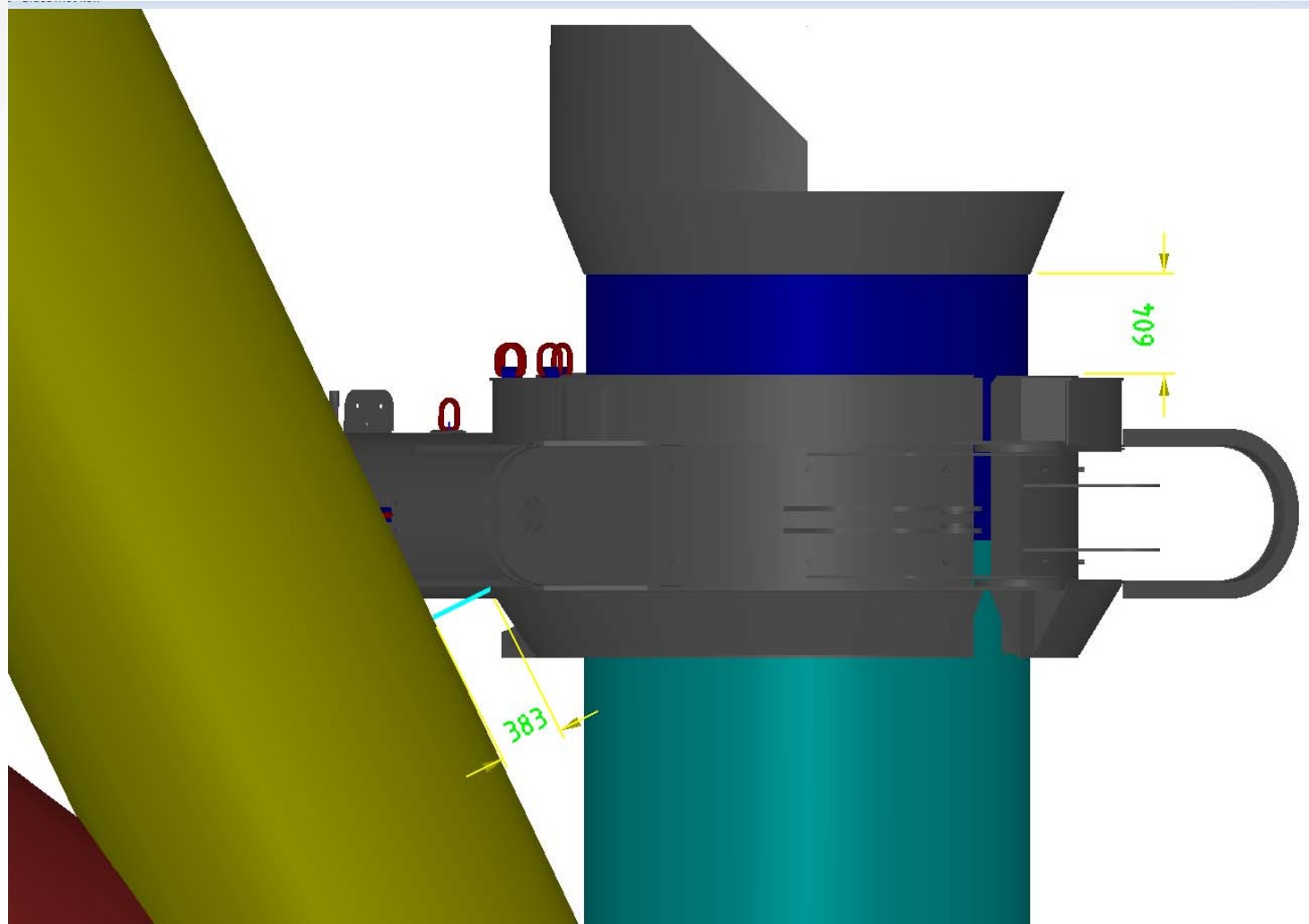
Lower brace into position close to pile sleeve guides



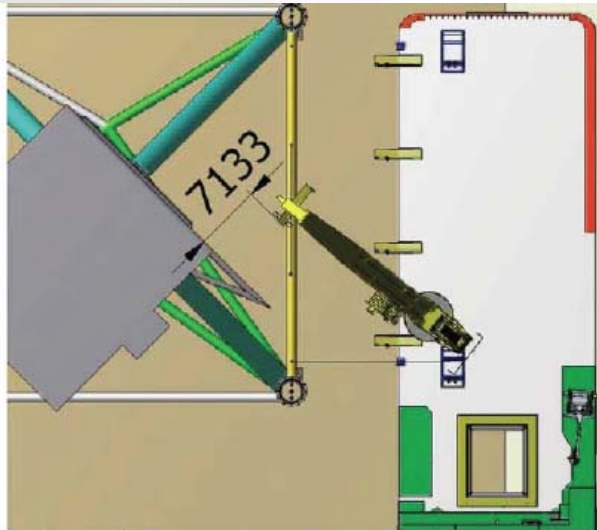
Install hang-off rigging w/ ROV operated hydraulic chain blocks



Clamp fully closed in final position 383mm clearance



Campaign 2 – Working close to platform



Typical vessel/crane arrangement during brace deployment



Campaign 2 – Deployment



Campaign 2 – Preparations

TALISMAN ENERGY

E10443 Lower brace into position

DEEPOCEAN

TALISMAN ENERGY

E10443 Lower brace into position

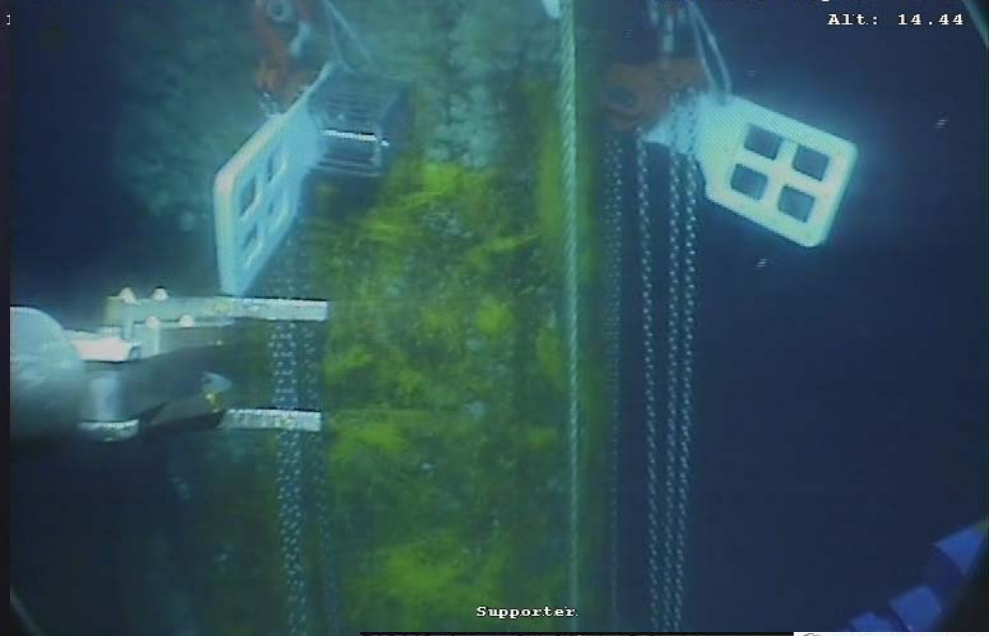
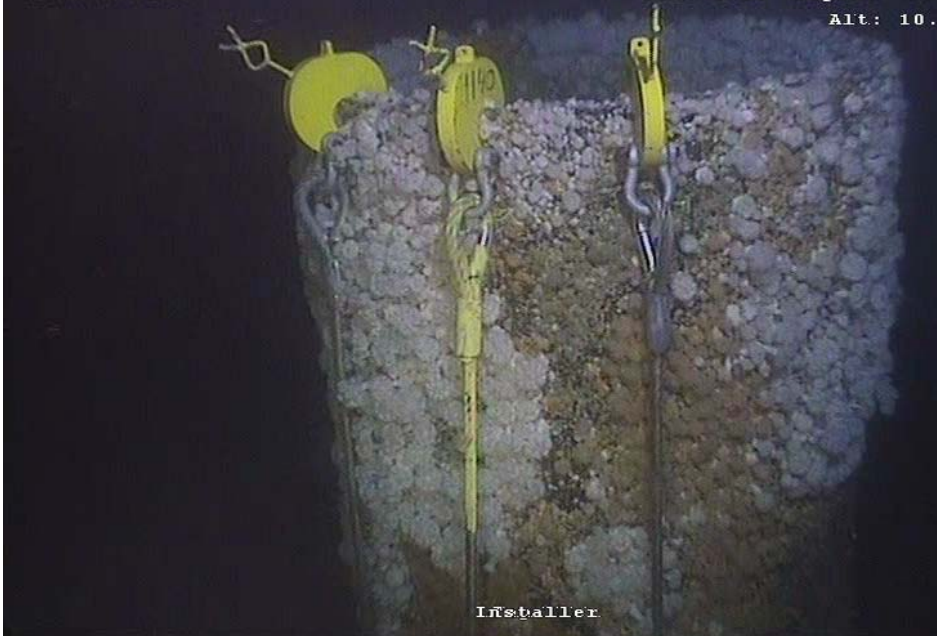
DEEPOCEAN

21/08/2011 E: 434550.16 N: 6438091.12
UTC 21:13:47

KP: 0.000 HDG: 256.22/08/2011
DCC: 0.00 Depth: 73.00 UTC 01:27:43
Alt: 10.1

E: 434549.89 N: 6438091.89

KP: 0.000 HDG: 247.47
DCC: 0.00 Depth: 68.17
Alt: 14.44



TALISMAN ENERGY

E10443 As Found & Deploy Installation

DEEPOCEAN

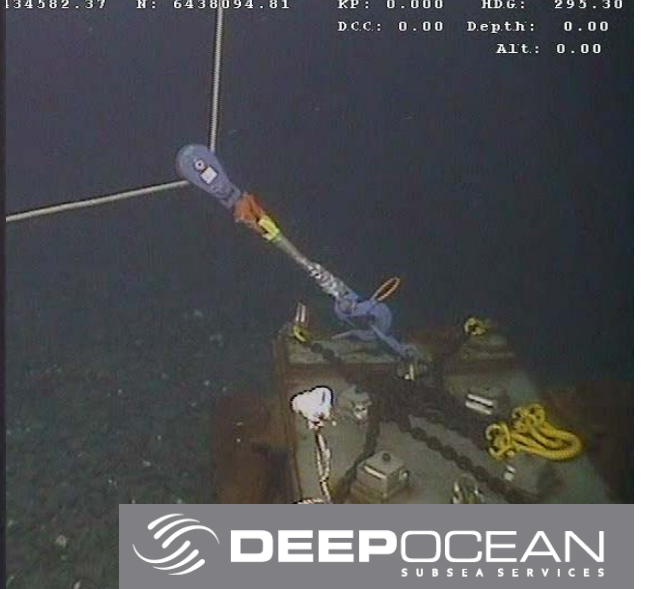
DEEPOCEAN

21/08/2011 E: 434557.81 N: 6438090.39
UTC 00:04:06

KP: 0.000 HDG: 277.69
DCC: 0.00 Depth: 59.62
Alt: 22.68

E10443 Cross hauling of brace

E: 434582.37 N: 6438094.81
KP: 0.000 HDG: 295.30
DCC: 0.00 Depth: 0.00
Alt: 0.00



Campaign 2 – Deployment

TALISMAN
ENERGY

E10443 Clamp-on brace installation

 **DEEPOCEAN**
SUBSEA SERVICES

21/08/2011 E: 434543.62 N: 6438098.64 KP: 0.000 HDG: 113.21
UTC 15:20:44 D.CC: 0.00 Depth: 53.90
Alt: 29.76



Installer

 **DEEPOCEAN**
SUBSEA SERVICES

Campaign 2 – Opening clamps

TALISMAN
ENERGY

E10443 Opening Clamps

DEEPOCEAN
SUBSEA SERVICES

21/08/2011 E: 434584.96 N: 6438091.34 KP: 0.000 HDG: 202.59
UTC 17:42:48 D.C.C.: 0.00 Depth: 53.08
Alt: 29.77



TALISMAN E10443 Lower brace auto position **DEEPOCEAN**

22/08/2011 E: 434537.85 N: 6438087.46 KP: 0.000 HDG: 58.66
UTC 01:47:46 D.C.C.: 0.00 Depth: 73.63
Alt: 9.10



Supporter

DEEPOCEAN
SUBSEA SERVICES

Campaign 2 – Hang-off and aligning

TALISMAN ENERGY

E10443 Lower brace into position

DEEPOCEAN

TALISMAN ENERGY

E10443 Lower brace into position

DEEPOCEAN

22/08/2011 E: 434540.61 N: 6438096.00 KP: 0.000 HDG: 147.52
UTC 00:06:49 DCC: 0.00 Depth: 68.84
Alt: 14.02

22/08/2011 E: 434541.97 N: 6438096.32 KP: 0.000 HDG: 154.54
UTC 00:06:28 DCC: 0.00 Depth: 68.82
Alt: 13.69



Installer



Supporter



Supporter

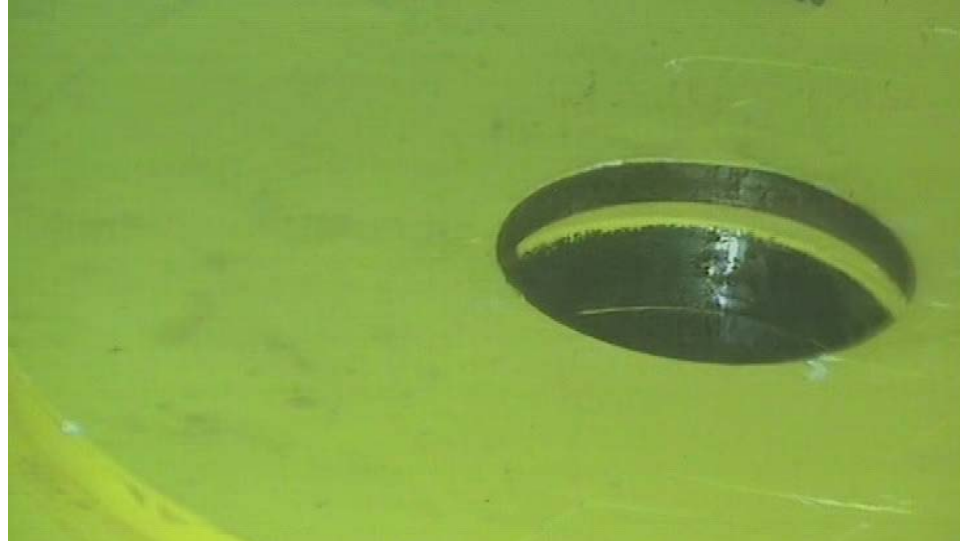


Campaign 2 – Closing clamps



Campaign 2 – Locking clamps, aligning & levelling

TALISMAN ENERGY
 08/2011 E: 434549.27 N: 6438095.05 KP: 0.000 HDG: 355.81
 TC 15:31:43 DCC: 0.00 Depth: 55.28
 Alt: 29.93



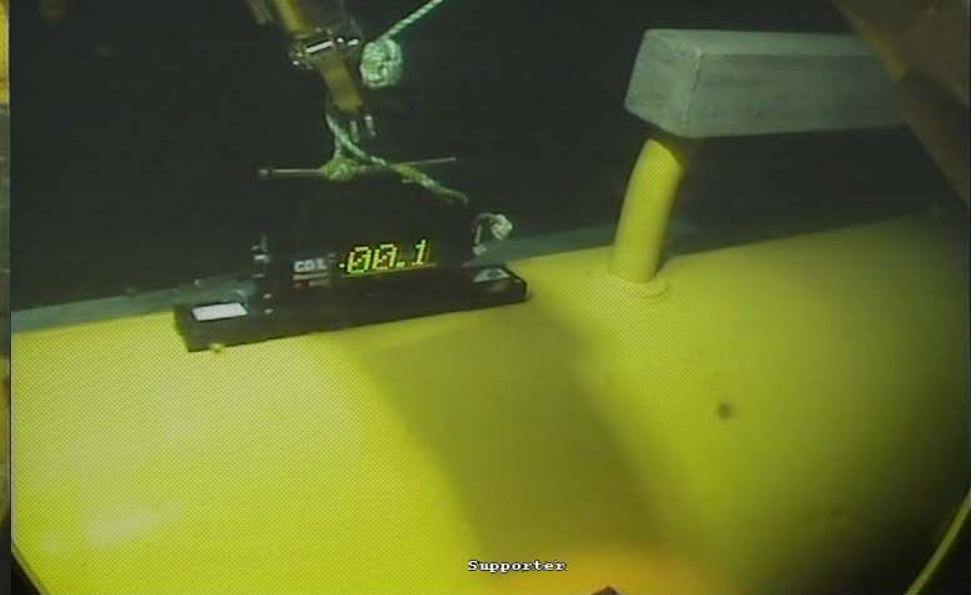
UTC 02:01:14 DCC: 0.00 Depth: 73.65
 Alt: 9.10



TALISMAN ENERGY E10443 Final contl mesurm of Brace
 DEEPOCEAN
 22/08/2011 E: 434579.49 N: 6438091.50 KP: 0.000 HDG: 181.21
 UTC 08:24:46 DCC: 0.00 Depth: 73.21
 Alt: 10.12



TALISMAN ENERGY E10443 Final contl mesurm of Brace
 DEEPOCEAN
 22/08/2011 E: 434585.12 N: 6438093.23 KP: 0.000 HDG: 188.25
 UTC 10:02:39 DCC: 0.00 Depth: 73.05
 Alt: 9.48



Campaign 2 – Torquing operations



Campaign 2 – Dogs engaged

1150 Survey wedges.

0.60 N: 6438077.07 KP: 0.000 HDG: 34.70
DCC: 0.00 Depth: 0.00
Alt: 0.00

34578.94 N: 6438072.12 KP:
DCC:

1-2-3-4-5-6-7-8-9-10-11-12-13-14-15-16-17-18-19-20-21-22-23-24-25-26-27-28-29-30-31-32-33-34-35-36-37-38-39-40-41-42-43-44-45-46-47-48-49-50-51-52-53-54-55-56-57-58-59-60-61-62-63-64-65-66-67-68-69-70-71-72-73-74-75-76-77-78-79-80-81-82-83-84-85-86-87-88-89-90-91-92-93-94-95-96-97-98-99-100

1 2 3 4 5

Installer

Campaign 2 – Hanging off old brace in new brace

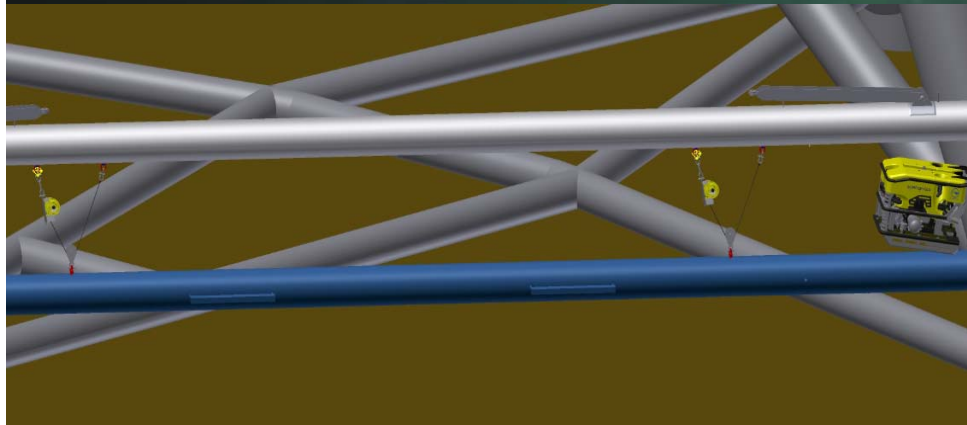
25/08/2011
UTC 01:28:55

E: 434624.68

N: 6438133.75

KP: 0.000

DCC: 0.00



pporter

Campaign 2 – Cutting old brace

26/08/2011

E: 434578.03

N: 6438084.97

KP: 0.000

HDG: 166.33

UTC 00:46:26

DCC: 0.00

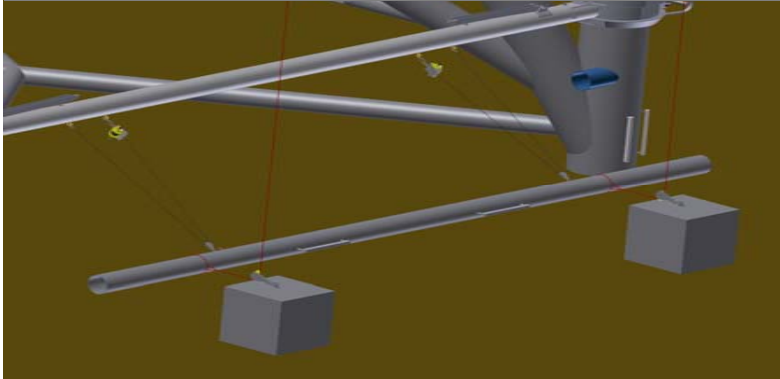
Depth: 0.00

Alt: 0.00



Installer

Campaign 2 – Lowering old brace to seabed



N: 6438094.03

KP: 0.000

HDG: 165.81

DCC: 0.00

Depth: 0.00

Alt: 0.00



Installer

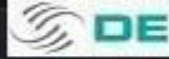
Campaign 2 – Installing plugs to keep water in brace during recovery

26/08/2011 E: 434577.24 N: 643808
UTC 12:22:39



Campaign 2 – Lifting aids for old brace

Rigging Old Brace



87 N: 6438195.04 KP: 0.000 HD.G
D.C.C: 0.00 Dept.
A1



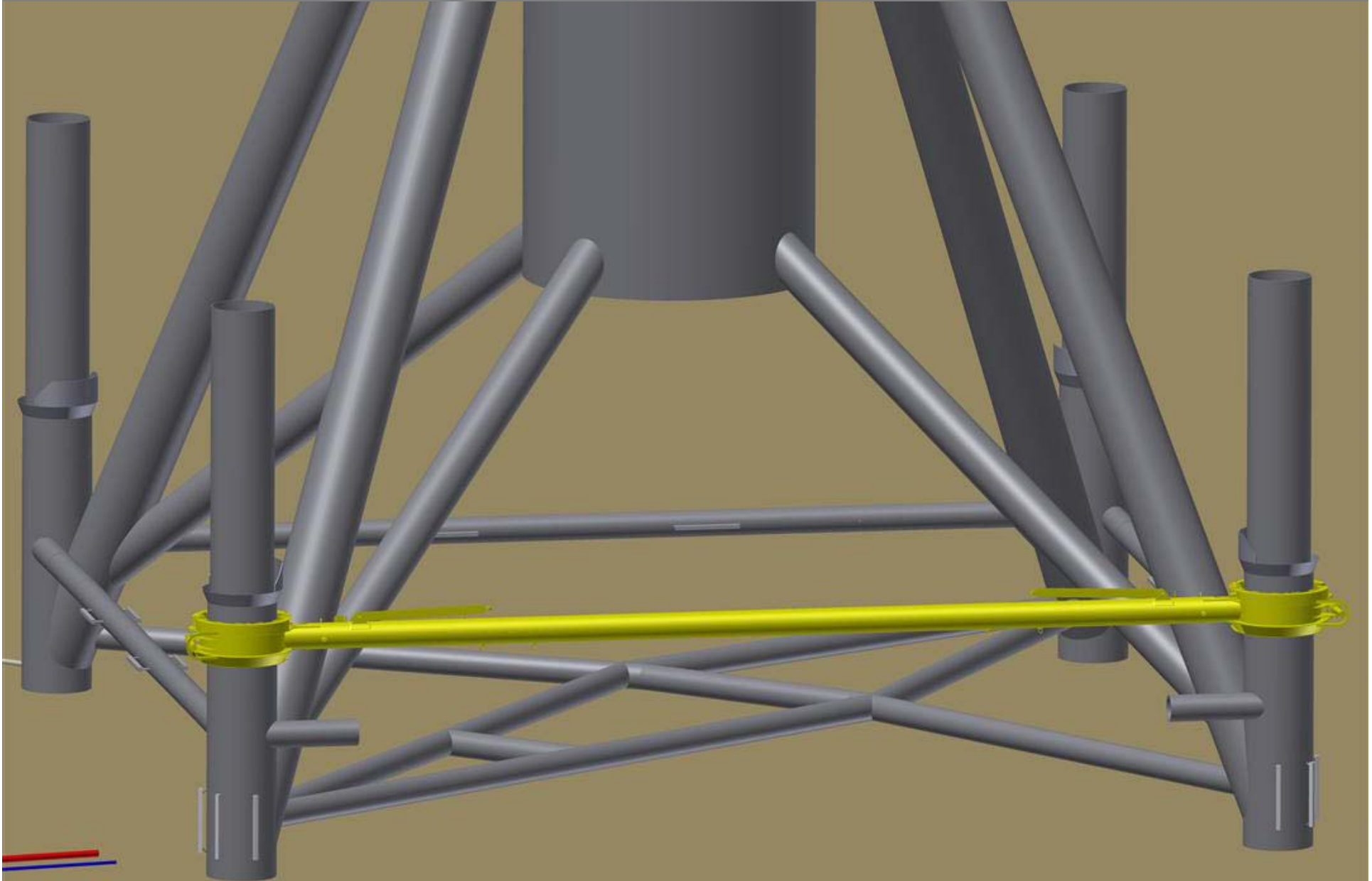
Campaign 2 – Recovery of old brace



Campaign 2 – Installation of earthing clamps



As-installed



Experience

- ❖ Technical solutions worked planned
- ❖ No injuries
- ❖ Project performed within schedule

- ❖ Key factors for success:
 - DeepOcean and IK was involved early in the process
 - Simulation of lifting operations
 - Offshore personnel involved in planning
 - Engineers involved in planning went offshore
 - Good communication between all Parties



Timeline

December 2010

August 2011



Companies involved

TALISMAN ENERGY



nexum engineering as

