

MICEDD

DEEPWATER DEVELOPMENT

28 - 30 March 2023 | Millennium Gloucester Hotel | London, UK

ORGANIZED BY



Quest Offshore

World Oil®

Diverless Repair Technologies Mitigating Safety Risk



Why Diverless?

HITS Hull Inspection Techniques and Strategy JIP

Industry Led

Oil Majors, Lease Operators, Classification Societies, Academic Institutes.

Clear Direction

Reduce risk / improve integrity

No divers, No people in confined spaces, Minimum tank cleaning

Willingness to Change

Off-the-wall ideas are supported and encouraged



Safety

University of Cambridge Study

Independent study of diver fatalities

A high risk occupation with an average of 10 offshore diver deaths per year (another study reports 392 offshore diver fatalities from 2002-2014)

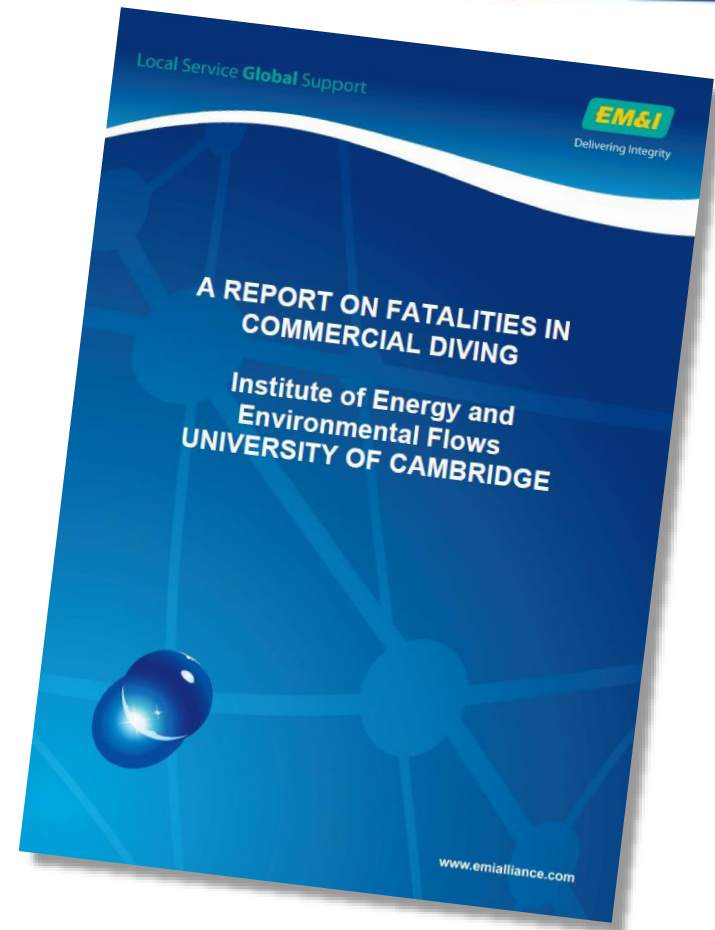
Alternatives

What are the alternatives to the scopes that divers do?

Will these reduce risk?

Are they commercially attractive?

Are they operationally beneficial?



Inspection

Evolution

Inspection came first

Maintenance and Repair followed

What inspections are done by divers?

Sea chests and ship side valves

Visual inspection of hull structures

Ultrasonic thickness measurements

Cathodic Potential surveys

Mooring system inspections



How do we carry out inspections and repairs without divers?

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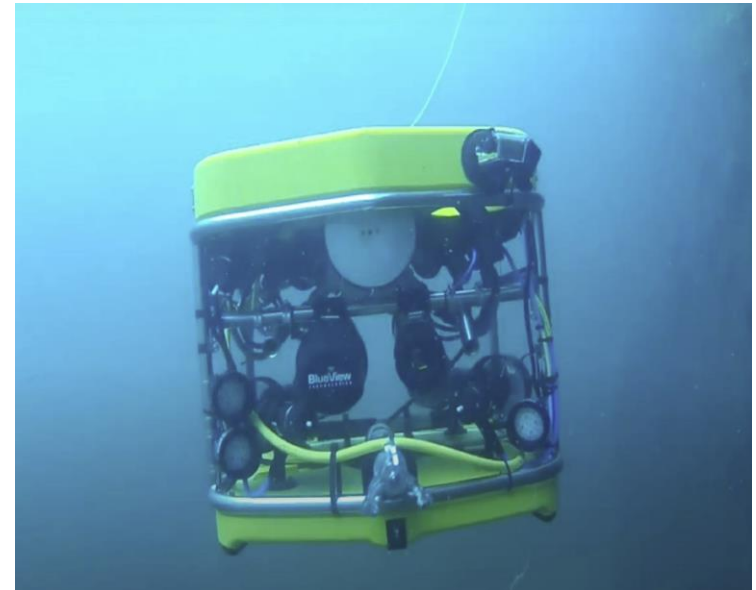
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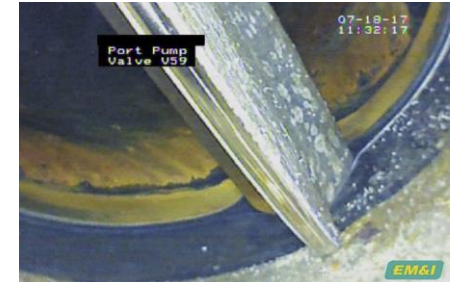


How do we carry out inspections and repairs without divers?

Diverless Inspections

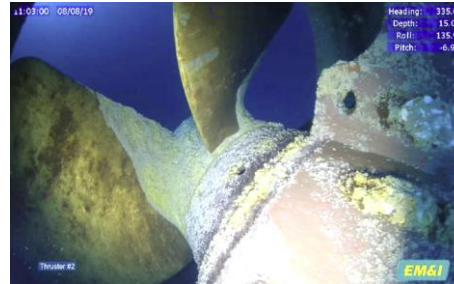
Inspections from inside the hull

Sea chests and ship side valves using ultrasonic and visual inspections, including remote camera inspections



Inspections from outside the hull

Hull plating, bilge keels, propeller/thrusters, rudder, ICCP system/sacrificial anodes, mooring chains, risers, sea chest inlets, discharges etc. using inspection class ROV – visual inspection, ultrasonic gauging, chain measurement and CP surveys using ROV



Cavitation cleaning

Cleaning of selected areas of hull, bilge keel ends, ICCP anodes, mooring chains and sea chest inlets, discharges etc. without damaging coatings using ROV

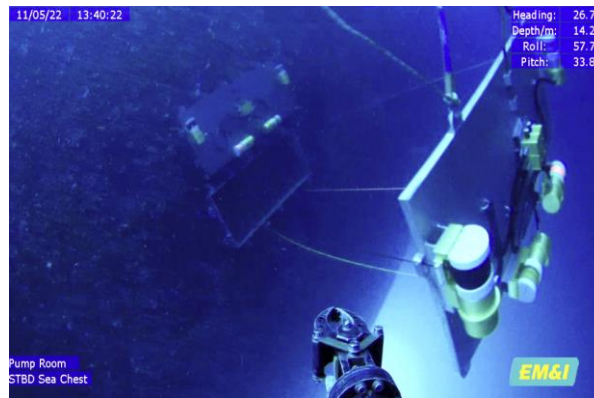
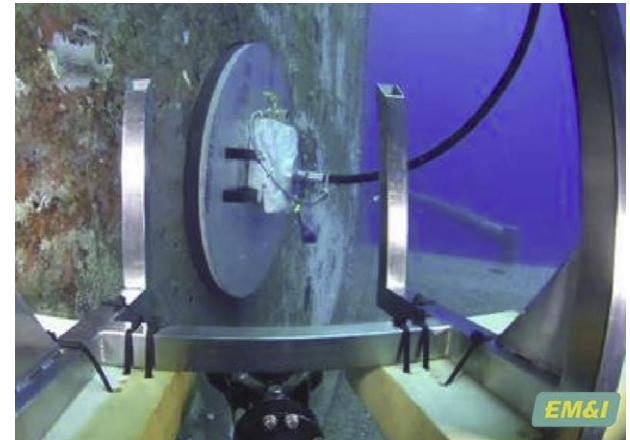


Diverless Repairs

Ship side valves

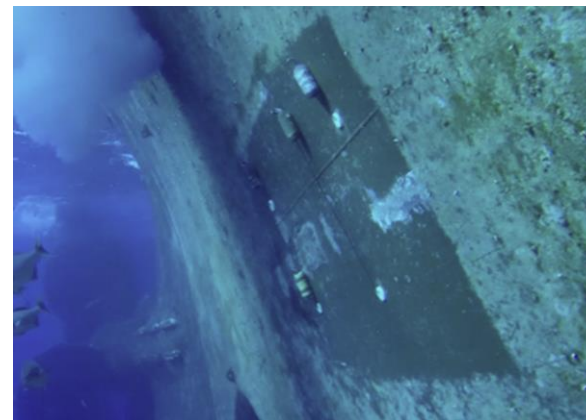
Discharge line plugging

Sea chest blanking



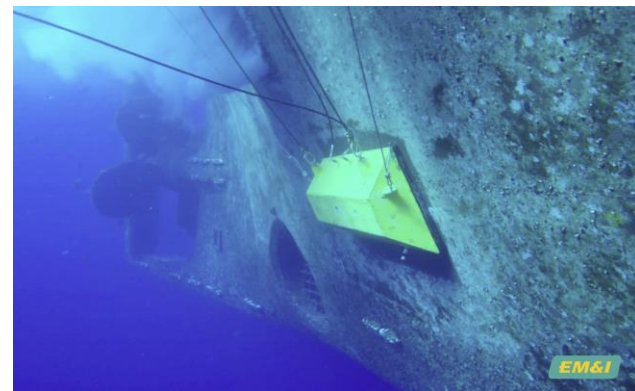
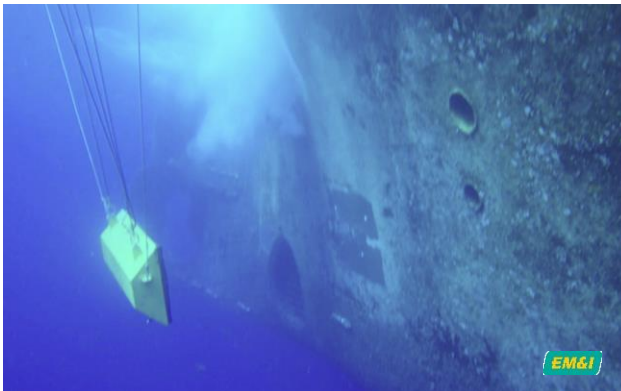
Diverless Repairs

Hull Plating



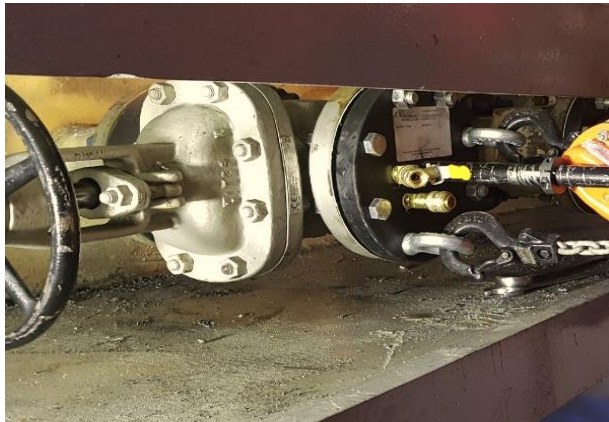
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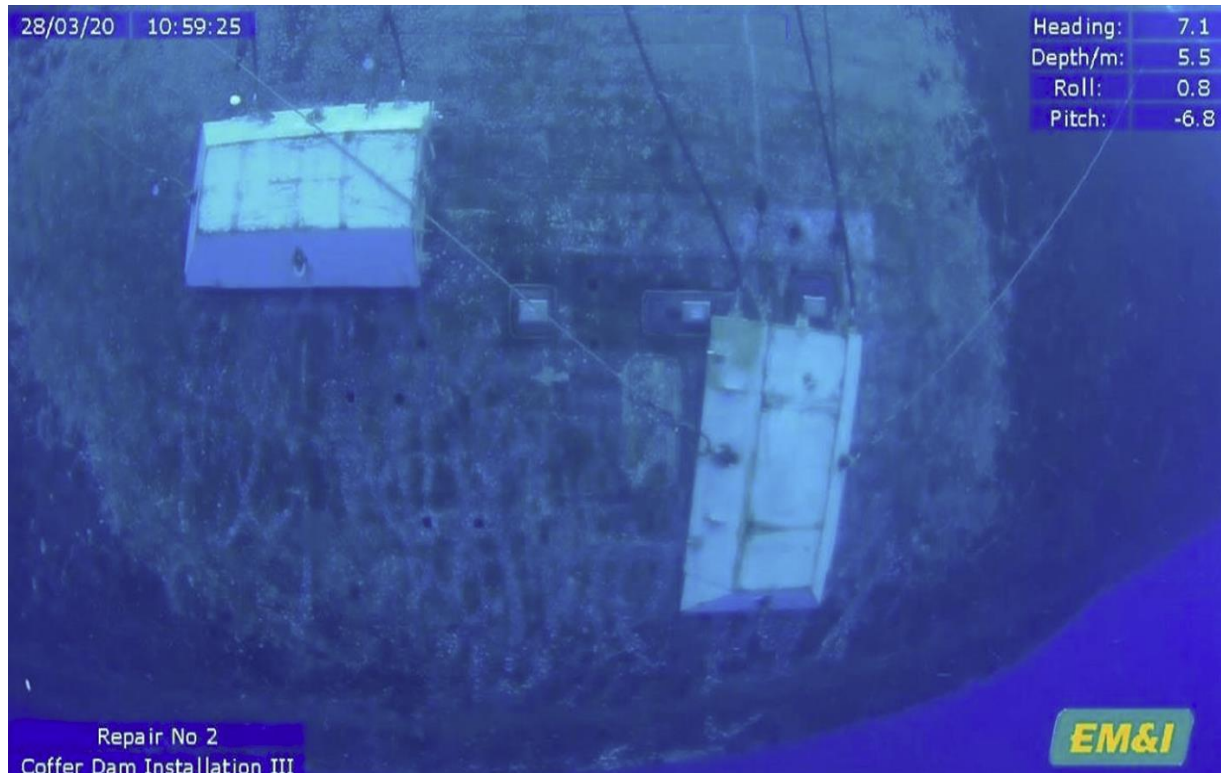
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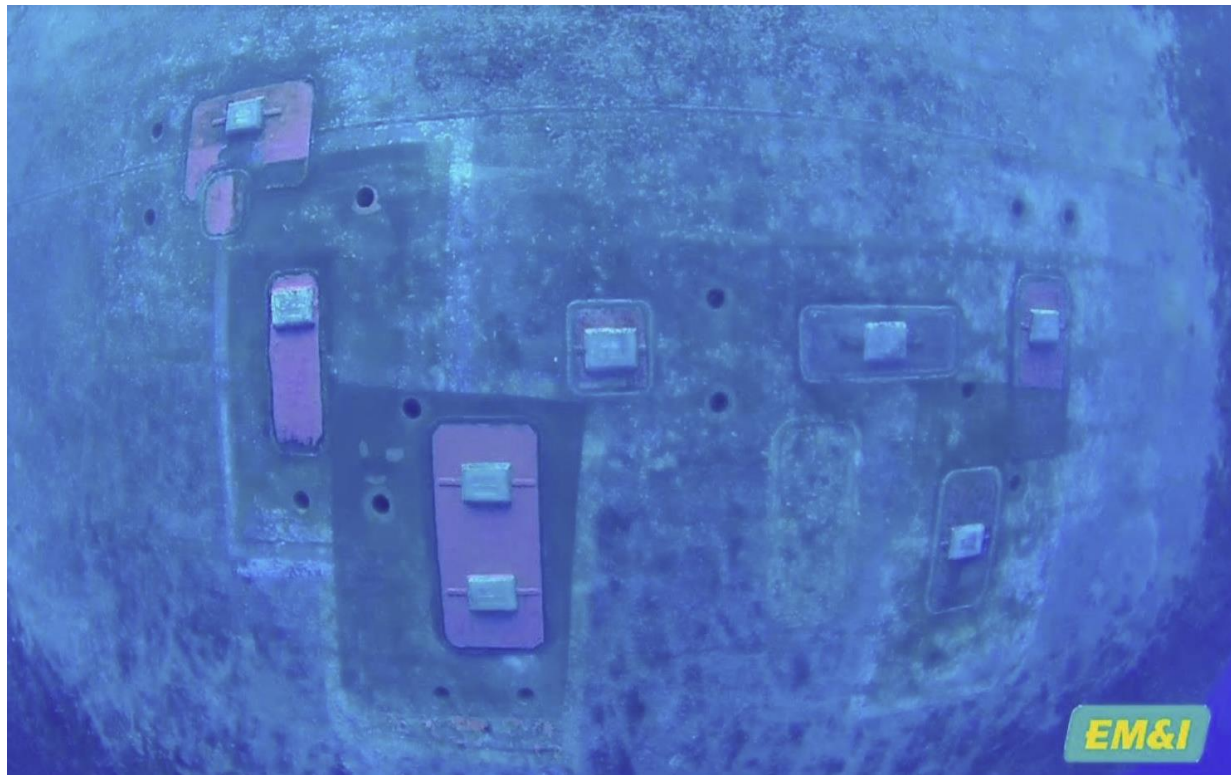
Diverless Repairs

Hull Plating



Diverless Repairs

Hull Plating



Diverless Benefits

Safer – there is no need to put human lives at what is a significant risk

POB – typically 3 POB for inspection tasks and 5–7 POB for repair tasks, compared to double or treble these numbers for divers

Weather Dependency

Far less dependant on weather and sea state

Carbon Footprint

Lower carbon footprint – fewer helicopter and/or support vessel operations

Cost and Budget Risk

Lower costs and lower budget risks

Current (knots)	0.0	0.8	1.0	1.2	1.5	1.8	2.0 & Beyond
Surf supply in mid water	Normal work		Observation	* NB 1	** NB 2		
EM&I ROV	Normal Work (Cleaning, CVI & Measurement)					Observation	NB1
Surf supply on bottom	Normal work	Light work	Observation	* NB 1	** NB 2		
Bell or wet bell in mid water	Normal work		Light work	Observation	* NB 1	** NB 2	
Bell or wet bell on bottom	Normal work			Light work	Observation	* NB 1	** NB 2

NB 1 – Diving by means of this method in these currents should not be a routine operation. The Diving Supervisor should consult with the divers involved and any other person he judges necessary about the best way to conduct such an operation.

NB 2 – Diving by means of this method in these currents should not be considered unless the operation has been pre-planned taking account of the presence of high current from the early stages of the project. Special solutions involving equipment techniques and procedures should have been evolved to overcome – or protect the diver from – the effects of currents and to provide contingencies for foreseeable emergencies.

Conclusions

Drivers

Safety – HITS and University of Cambridge study indicate high risks that can be avoided by using diverless methods

Technology

Alternatives to conventional diver based methods are proven and Class approved
The scope of alternatives is increasing rapidly

Operationally

Diverless methods offer major operational benefits – reduced downtime and budget risk
Fewer POB – allowing priority activities to progress

Financially

Diverless methods are less costly

Environment

Fewer POB means less transport and lower emissions

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