

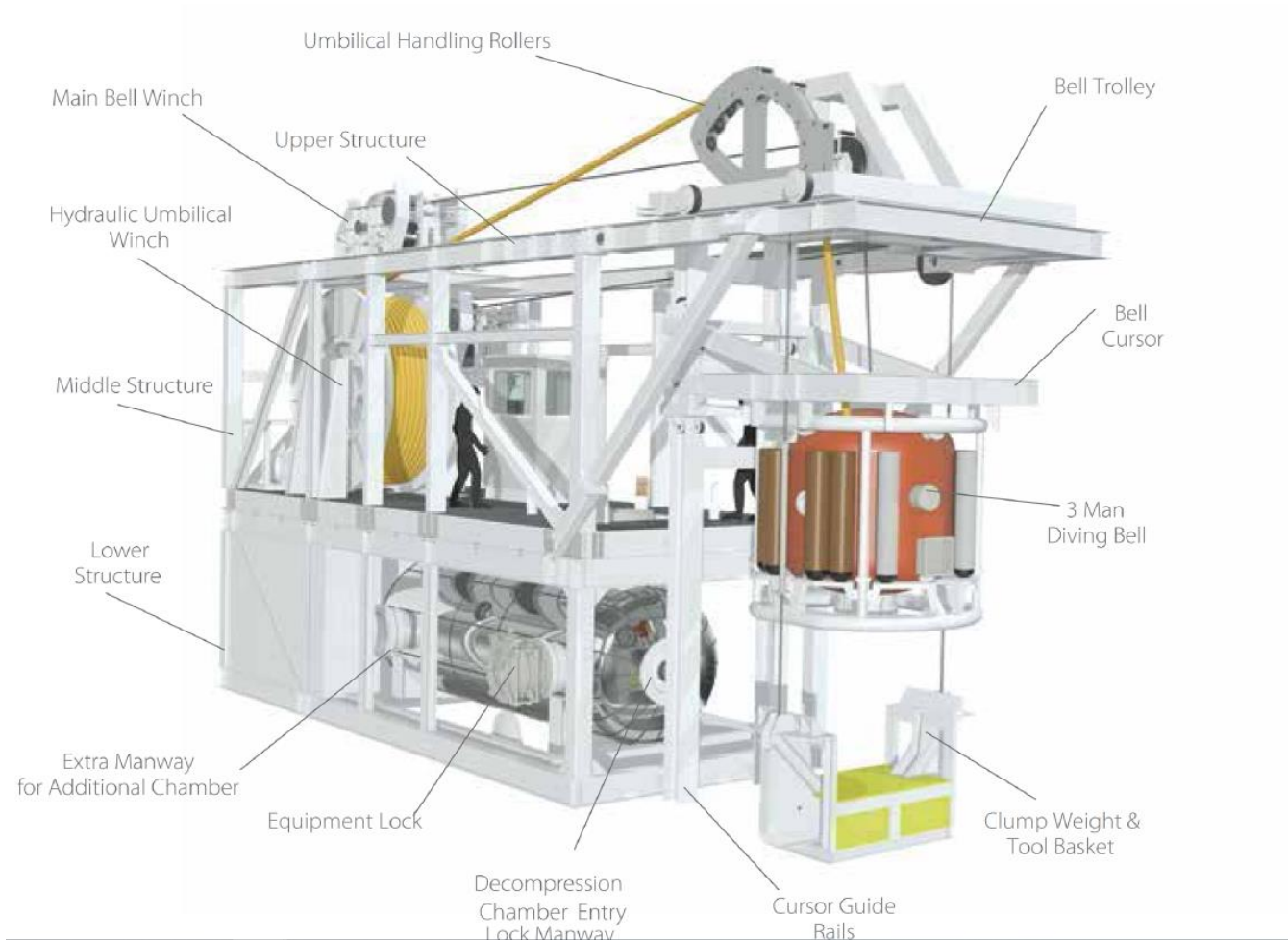


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Bergen International Diving Seminar 2019
TUP with SPHL CONCEPT

David Champion
Diving Manager

TYPICAL TUP SYSTEM



INDUSTRY GUIDANCE and STANDARDS

- Who Involved /Regulates

- Health and Safety Executive, PFEER, SCR
- Petroleum Safety Authority
- IMO, SOLAS
- IMCA D 052 & D 053 provides guidance on equipment specifications
- OGP Report 478 describes Hyperbaric evacuation planning requirements
- DNV GL RP E403 provides SPHL Technical Specifications



ALL REFERENCE TO SATURATION DIVING OPERATIONS ONLY



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INDUSTRY GUIDANCE and STANDARDS

HOWEVER –

April 2017 – UK HSE Diving Inspectorate

Advice on the Emergency Evacuation of Divers, including Divers Involved in TUP Diving Operations

DSV Based TUP Diving

The introduction of TUP systems, and their use in deeper and longer duration dives means that there is the potential for divers to require longer duration decompression requirements.

The use of accelerated emergency decompression may not be appropriate as the primary means of evacuation due to the increased risk of decompression illness, and

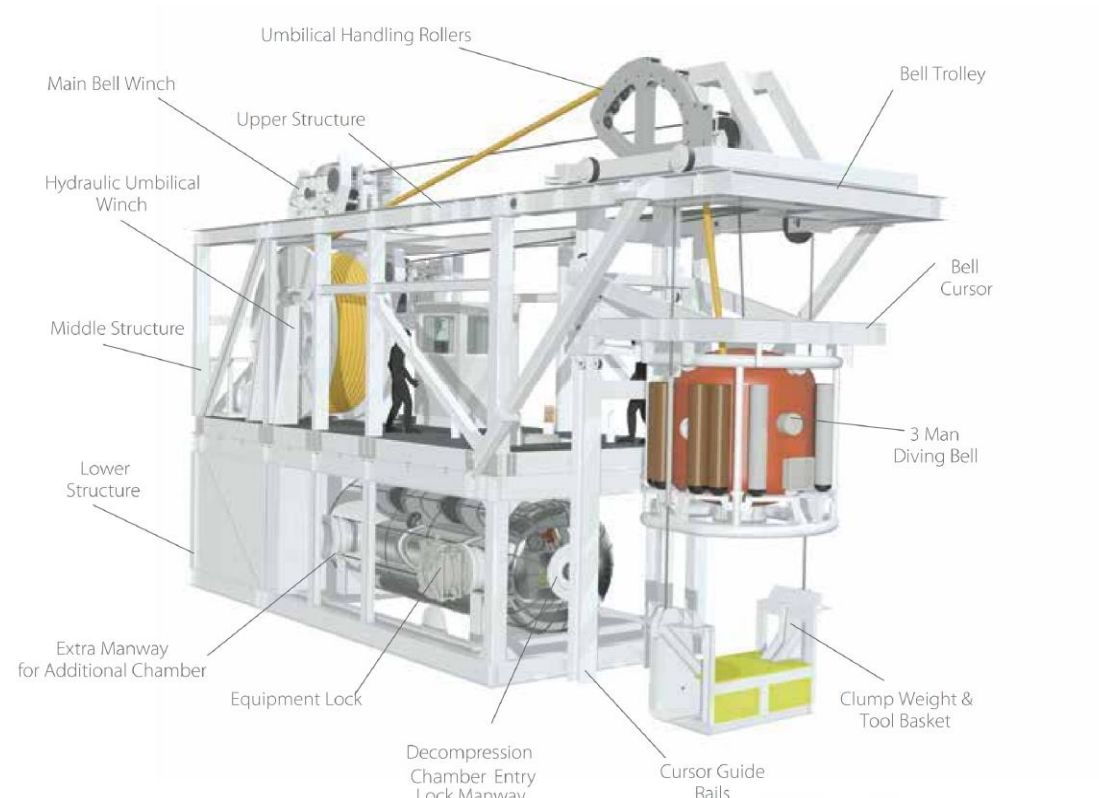
the use of an SPHL may be considered to be more appropriate.

This decision will be based on a suitable and sufficient risk assessment.

It is best to hold detailed discussions with HSE in relation to specific diving projects and systems.



TYPICAL TUP SYSTEM WITH SPHL



MINI SAT SYSTEM ?

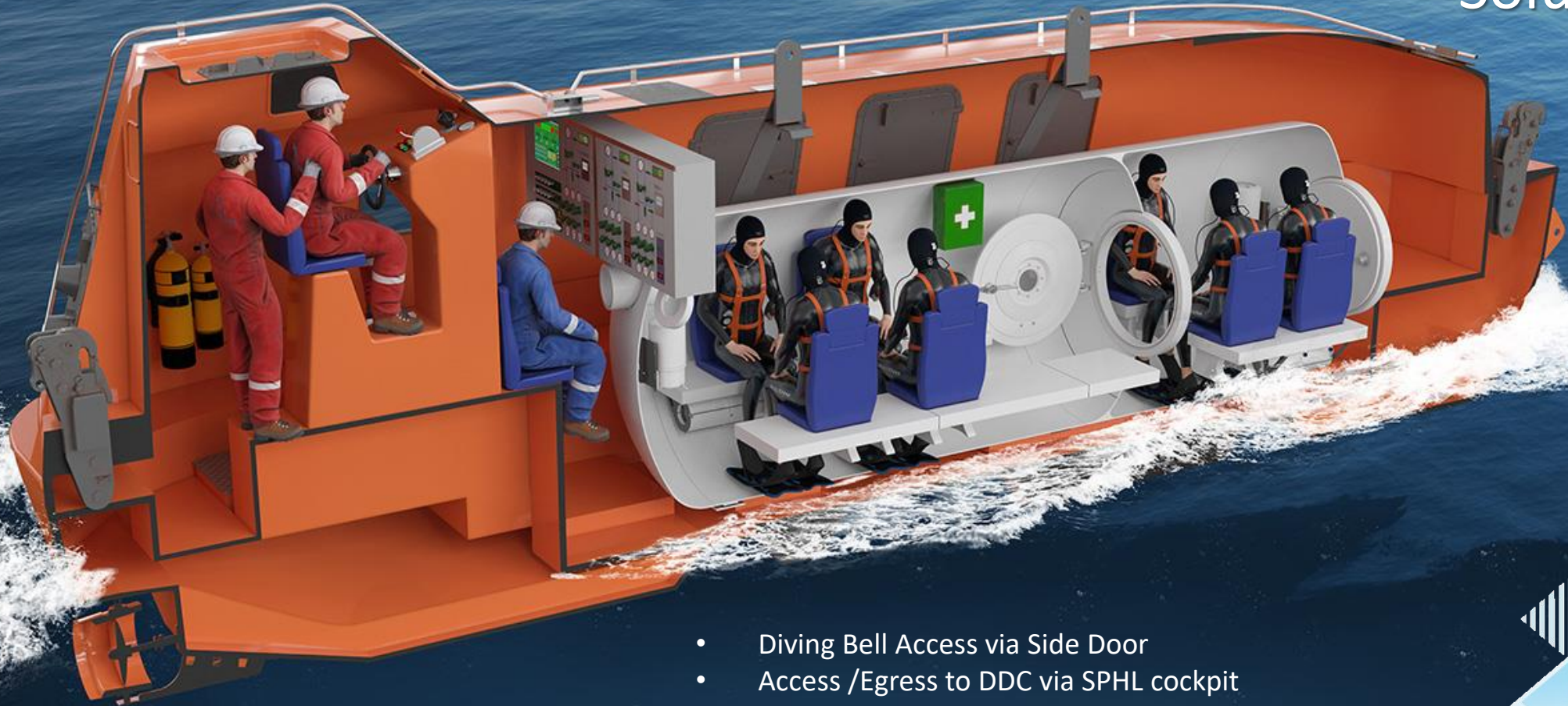
TUP DIVING – NEW CONCEPT – WHY?

DSV ADAPTABILITY

- Single Door
- Sealed using internal pressure
- Unable to decompress Divers to surface
- Requires Hyperbaric Evacuation Plan and Reception Facility



SubseaPartner Solution



- Diving Bell Access via Side Door
- Access /Egress to DDC via SPHL cockpit
- SOLAS Compliant
- DNV Certified
- Life Support Applicable to Diving Method



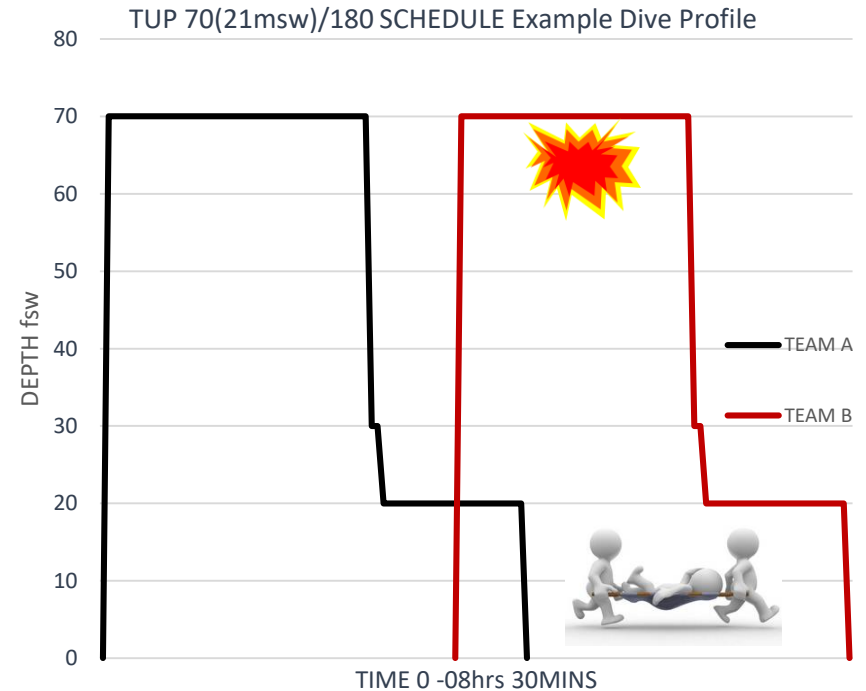
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ABANDONMENT - WHAT IF SCENARIO'S

Member of Team A experiences DCS after Surfacing and Team B has past No Decom Dive Profile and an Abandonment is required



Team B immediately recovered to SPHL and transferred to EL and decompression Initiated.
Team A blown down in Transfer Lock, Transferred to SPHL ML with DMT and Therapeutic Initiated SPHL deployed

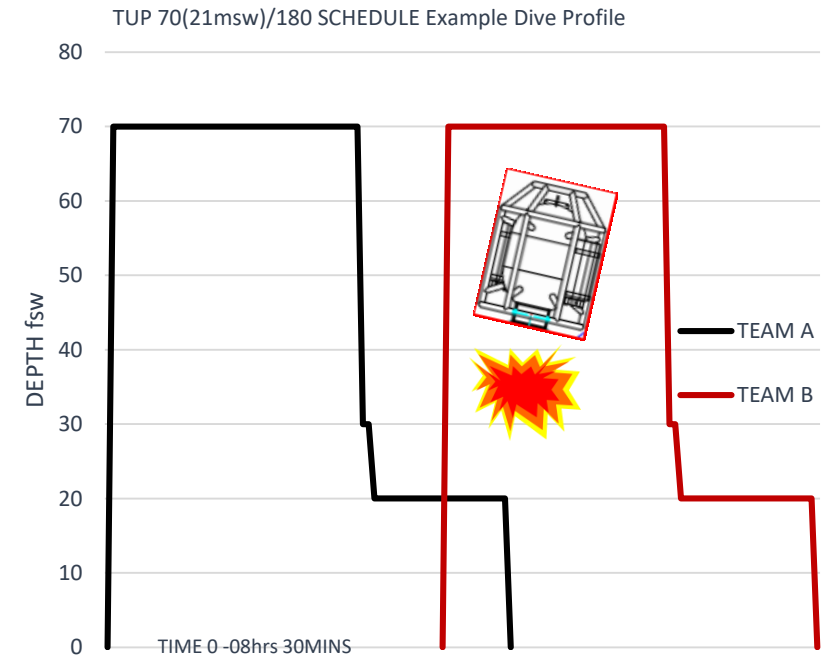


ABANDONMENT - WHAT IF SCENARIO'S

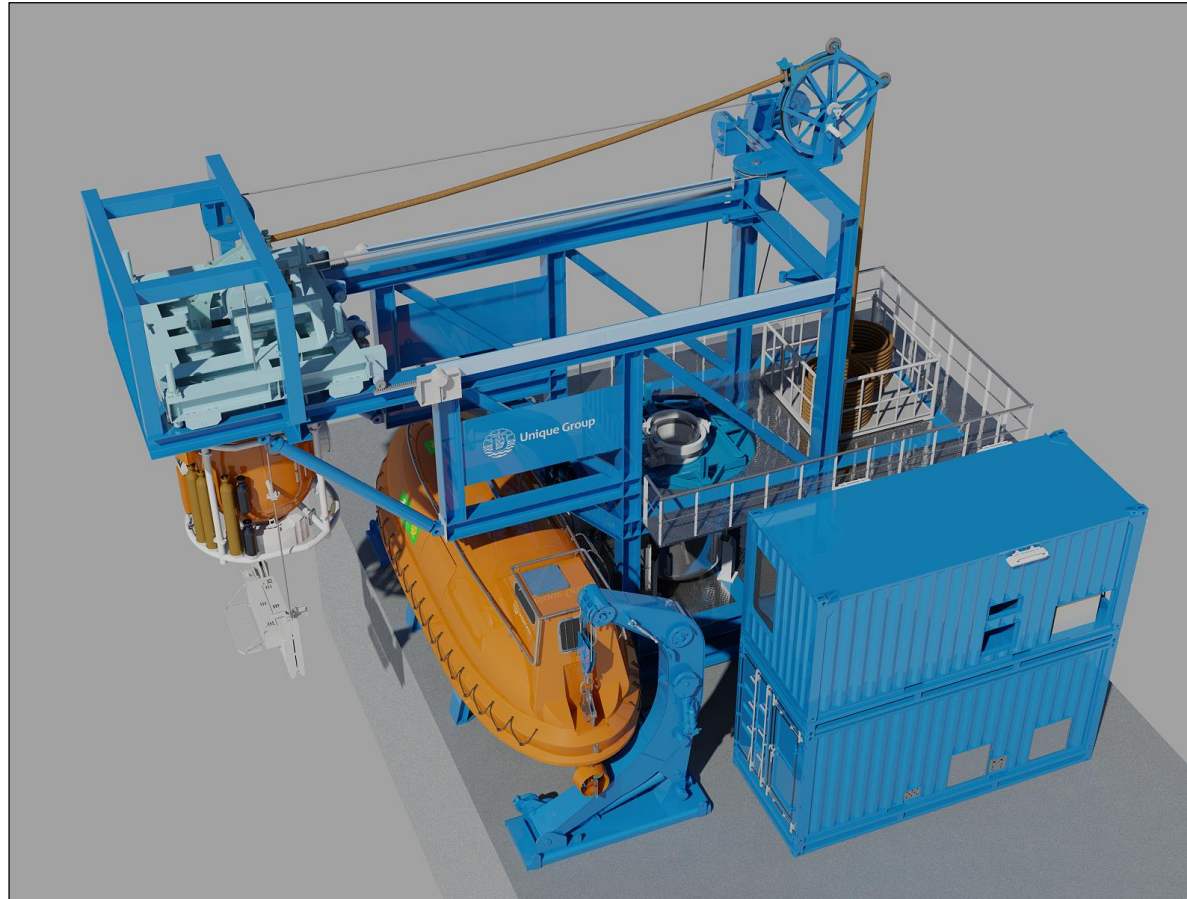
Detached / Trapped Diving Bell requiring Stand-By Diver Intervention and external factor requiring vessel abandonment



Stand-By Diver recovered with Dive Team B
Team A (DMT) Blowdown in Transfer Lock
Deploy SPHL
All 7x Divers decompressed in ML & EL



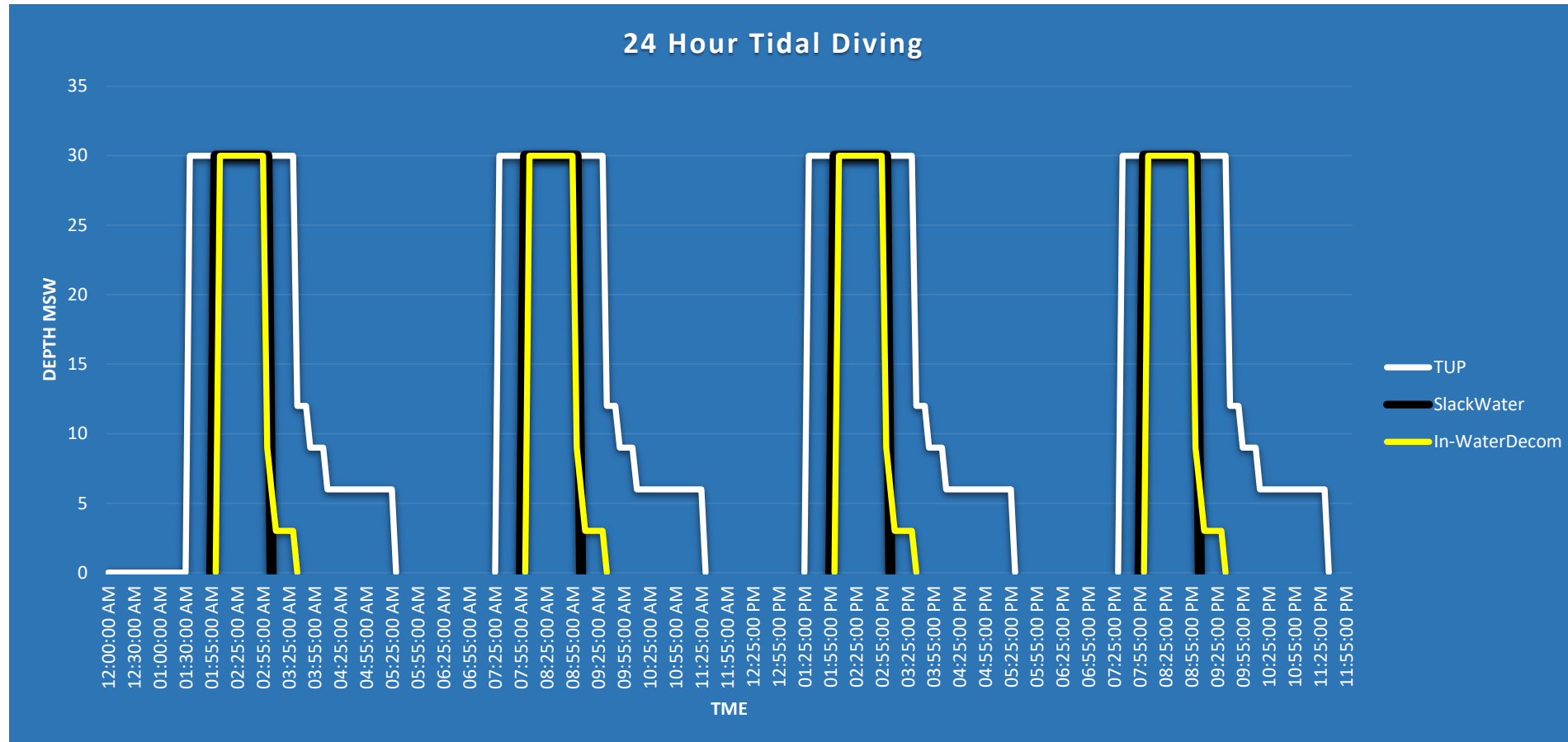
TUP DIVING – NEW CONCEPT - WHERE & WHEN



TUP DIVING – NEW CONCEPT - WHERE & WHEN



TUP DIVING v SURFACE DIVING COMPARISON



TUP Diving 30msw/ 110mins = 440 mins Bottom Time (Shallow Saturation)

In-Water Decom 30msw /50mins schedule = 200 mins Bottom Time



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TUP DIVING – NEW CONCEPT – COST ANALYSIS

TYPICAL MANPOWER REQUIREMENTS

Position	Saturation Diving	Conventional Surface Diving	TUP Diving
Offshore Manager	1	1	1
Dive Supervisors	4	4	4
Saturation Divers	15 (3 in decom)	0	0
Divers	2	10	14
Life Support Personnel	6	0	0
Dive Technicians	2	2	2
TOTAL	28	17	18
£	£31,981.59	£ 10,282.94	£ 12,861.72

OR in Water Productive Times Cost Per Minute

Sat Diving = £72.68

Surface Diving = £ 51.41

TUP Diving = £ 29.23

CONCLUSIONS

- TUP Diving is an Accepted method of Diver Intervention.
- Need to consider Hyperbaric Evacuation due to longer decompression times compared to conventional surface Diving Techniques, IE- SUR D02 and In-Water.
- TUP Diving with Hyperbaric Evacuation offers significant cost savings (estimate 50% dependent on project requirements) in comparison to shallow Saturation Diving in the range up to 40msw – 50msw.
- At present there is no industry guidance for TUP Hyperbaric Evacuation.
- In an abandonment situation it is safer to Decompress Divers in the SPHL and on reaching ambient pressure the SPHL is considered a Lifeboat
- TUP Hyperbaric Evacuation does not require any Hyperbaric Reception Facility.
- Not practical to adapt existing DSV,s for TUP Diving – unable to Decompress Divers.

SUBSEAPARTNER SOLUTION TO OFFER THE FIRST

- DNV certified, Lightweight System with a Bespoke DDC installed in a SOLAS compliant SPHL.
- Capable of Mobilising within 24 hours.
- Potential to re-commence Diving Operations from Installations.
- Available for 2020 Season or earlier if required.
- Have already developed TUP Decompression Tables and Procedures.

QUESTIONS?



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