



"Market volume and technology for New DSVs and transferrable diving systems"

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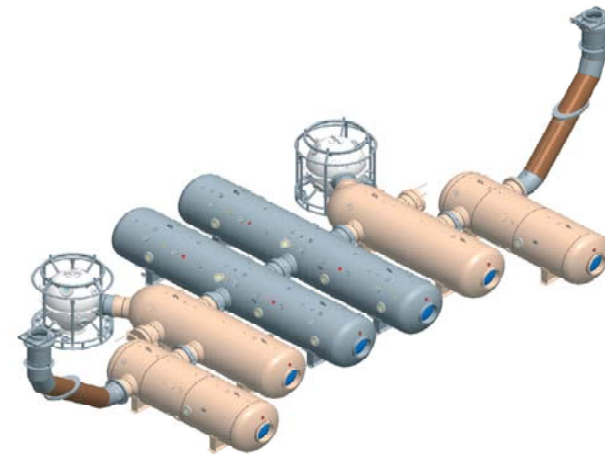
Market volume – present and future

- Presently 30 fixed diving systems are in operation Classed with DNV and we estimate 10 to 15 systems are in class with others.
- 20 to 25 transferable diving systems are classed by others and in operation on DNV Classed vessels. Additionally, 2 transferable systems are certified by DNV.
- During the start-up of the latest boom, around 2006, we were informed of 25 diving support vessels with fixed and large transferable systems on order.
- The number of independent transferable diving systems on order at the time was not known to us, but we estimated there were 4 capable of saturation diving.
- With the benefit of hindsight, we can probably double the estimate on transferable systems and stay with the estimate of the number of fixed systems.



Market trends

- The trend is moving in two directions from a core 12/15/18 man fixed system:
 - 1. Large modular diving systems (some contained completely in one integrated container weighing from 250 to 350 tons!)
 - 2. Large fixed systems with a capacity of 24 divers.
- A further trend is moving in the direction of two bell systems and towards Self Propelled Hyperbaric Evacuation Units. (We understand about 40 SPHLs are on order, meaning older Hyperbaric Evacuation Chambers are being replaced.)
- New systems are being Classed, as older non-classed systems are being replaced.



New technologies in diving support

- New technologies during the last ten years are mostly tied to advances in electronics. Hence, development do parallel our daily lives.
- The risk run by introducing new systems is mostly tied to fire/explosion (batteries in particular) and to possible off-gassing from materials. Most components are never adequately tested,
- Computer assisted control systems are proposed & present a challenge in terms of defining safety integrity levels acceptable to the diving industry.
- However, these systems used in process industry for a number of years.



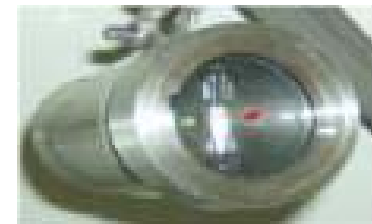
New technologies in diving support – cont.

- Fire safety improves where fixed extinguishers replaces portable extinguishers in chambers.
- Fire/smoke detection improves with type approved detectors on the market.
- Some cleaning procedures for piping utilise more effective cleaning agents. However, much more work should be done here by the industry.



Experience from past activities prompting improvement in equipment and/or systems

- Most risks posed by the equipment and systems in the diving industry are tied to four functions:
 - Pressure retaining locking arrangements
 - Gas composition and pressure control
 - Lifting & handling of bells
 - Fire safety
- DNV doesn't allow purely electronic locking devices replacing directly controlled pneumatic/ mechanical locking arrangements, but recognise the benefit of protecting locking arrangements by electronics.
- Gas composition and pressure control is generally well handled when personnel are well trained. Computer assisted systems may reduce risk of human error.
- Risk on handling systems, includes the placement of the bell on the TUP.
- Fire safety;
risk is a product of probability and consequence.
 - increased probability due to introduction of risky materials
 - fatal consequence due to a lack of detection.



Similarities/differences between various designs applying the new technologies

- Designs vary according to manufacturers whims and fancies.
- Personnel learn how to handle differences if the basics are the same.
For emergency operations the risk increases with lack of familiarity.
- Panels vary in terms of lay-out and logic.
- There is a Babel of terms used for various functions;
Is the variety repeated in new computer based systems?
- IMCA members could contribute to a degree of commonality.



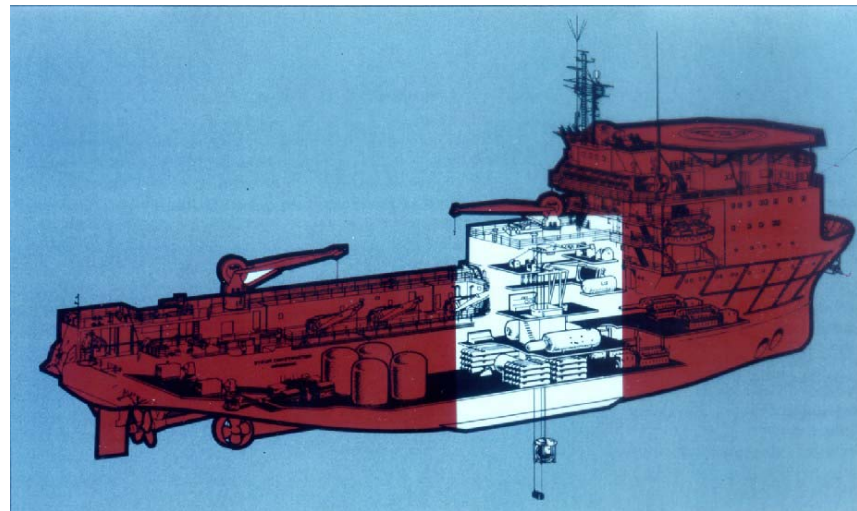
New technology and free movement of persons and services

- Can free movement of personnel contribute to normative effects across borders?
- Or, is the culture in each geographic region, company or vessel so strong that it forcibly socialises newcomers rather than adapts to new impulses.
- Do new technologies act as instruments of alienation?
- IMCA meetings have '*lack of competence in the industry*' as a point on most agendas. Ad strain posed by competence required for new complex systems, and you may have reached a critical mass.



Geographic/demographic tendencies

- Demographic policies may be found overly conservative or, minimal safety policies may be accepted as a way of life.
- Is there a correlation between conservative policies on technology and lax policies on safety?
- Corporate social responsibility, expressed by the principles in the UN Global Compact, applies to companies operating in all regions. So the industry safety policies should not reflect policy on safety in the geographic region in general.



New technology and resourcing personnel – Boon or bane?

- The older generation may find it difficult to adapt to a new technology, whereas the new generation may find it to be a necessity.
- This may cause a trend where older personnel stay with older vessels, whereas the new generation seeks work on newer vessels.
- Alternatively, will new technology attract resourceful persons who would otherwise shun an ageing industry?
Session 2 speakers should be able to answer this.
- Can we establish an online “Open College” for the industry where we can all contribute and learn from each other?
- Who would grasp the challenge of doing so?



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