High potential near-miss: Poor O_2 content in supplied air – diver temporarily lost consciousness

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A member has reported an incident in which a diver lost consciousness temporarily while getting ready to dive, due to the intake of low oxygen content in the Breathing Air Quad supply.

What happened?

The incident occurred during air diving work from a diving support vessel while the diver was still on board the vessel, beside the dive stage. It happened when the diver had his dive helmet locked on and the initial breathing air supply from the compressor was switched over to air quad supply to the diver. Prior to that, air from the diving compressor supply was run to perform the system check and testing for pre-dive checks.

After about 40 seconds of breathing from the Breathing Air Quad, while the diver was waiting for the clump weight to be lowered and was standing on deck beside the diving basket, he was observed to be disoriented and his body started to lose control. The tenders noticed the divers awkward position as he was about to collapse and responded swiftly to hold him and immediately assist to open the diving helmet and undress him.

The diver immediately regained consciousness and was given oxygen from the stand-by medical Oâ„ cylinder as a precautionary measure. He was then assisted and walked to the vessel clinic for a check-up. The medic examined and observed him for about half an hour and he was found to be in good condition, discharged and advised to rest. The diver returned to normal diving ‘routine’ on his next shift and resumed his diving rotation until completion of the project.

The Breathing Air Quads were immediately isolated after the incident. An investigation was conducted to determine the causes of the event.

The following points were noted:

- The Breathing Air Quads had been procured from a 3rd party licensed and approved vendor which had been used in the past.
- The gas content was tested for any contamination and the result was negative.
- The oxygen level in the Breathing Air Quads was tested on three occasions internally and by a 3rd party and it was confirmed that it was below the standard Breathing Air requirement (testing results showed around 3% Oxygen content).
- The quad had arrived with a certificate stating ‘Breathing Air Quality’, but it was noted that the quad had Nâ„ (Nitrogen) stamped on its bottles which had recently been painted over.

- The oxygen analyser on the control panel did not alarm during the switch over from compressor supply to quads supply, most likely due to the long piping to the analyser and low flow rate.
- The immediate response by the diver's tender to remove the diver's helmet was noted as positive and correct.
- An immediate circular was sent to all diving worksites to conduct tests on all Breathing Air Quads confirming their oxygen levels. No oxygen deficiency level was reported from other sites.

The following lessons were learnt:

- Procedures for Quality Assurance Check on 3rd party supplied breathing air quads should be revised and improved.
- Air Diving Manual to be revised to include revision of the pre-dive checklist to cater for the complete draining of all remaining gas in piping leading to the analyser before a new supply is introduced.