Report IR-2010-05-31-1

Dive accident involving a Poseidon Discovery Rebreather, in Øygarden, Norway, 2010-05-08.

Product: Poseidon Discovery Rebreather

Manufacturer: Poseidon Diving Systems AB

Manufactured between: 2009-01-01 – 2010-05-30

Number of accident reports: 1

Number of reported injuries: 1 (fatal)

Diver: Male, 33 years old.

Summary

On May 8th, 2010, a fatal diving accident occurred in Øygarden, Norway.

The diver was using a Poseidon Discovery ECCR rebreather and he was found at 4 meters depth, close to the position where he had begun his decent.

After the technical inspection of the unit and reviewing the log files from the unit, representatives of the Norwegian government Diving school in Bergen (HiB) has established that the unit in question has functioned the way it is supposed to do, and that the accident was not caused by equipment error.

The inspection of the unit showed no signs of technical errors or defects.

1. Facts

During the analysis of the log files retrieved, from the day of the accident, the following facts have been established:

- The battery used had insufficient power to pass a pre dive check. There were two pre-dive start up attempts made, that both failed due to insufficient battery power.
- The unit was started using the Emergency start-up procedure, without a successful pre dive check, i.e. the unit has automatically gone in to Dive Mode, as the depth indicated by the on board depth gauge was greater then zero meters.
- At this point, the unit starts all on board alarm systems; HUD light, Buddy light, vibrator and speaker alarm.
- In spite of the alarms, the dive was not aborted.
- During the dive, as long as there was power in the battery, the unit maintained a correct PO2 level in the breathing loop.
- Non essential systems were shut down to preserve battery power, which was used to maintain life support functions for as long as possible.
- Approximately 20 minutes in to the dive, at 4 meters depth, the battery runs out of power, shutting down the unit.
- When shut down, the unit could no longer maintain the PO2 level in the loop, nor could any data be logged.
- The DV switch of the mouthpiece was set in Closed Circuit (CC) mode when the diver was found. No attempts to switch to Open Circuit (OC) were recorded on the log file.
- The unit was equipped with an Octopus connected to the Diluent 1st stage.
- The unit had adequate amounts of Oxygen (69 bar) and Diluent gas (176 bar).

2. Analysis

When the unit was systematically inspected by technicians from HiB, no sign of technical defects on the unit or attached equipment could be found.

As the DV switch mouthpiece was set to CC mode, the loop and canister housing had flooded. No water was found in the inhalation lung of the unit.

After the unit had been disassembled, cleaned and re-assembled, two test dives were made with the unit, by a representative from Poseidon Diving Systems AB, under the supervision of technicians from HiB. The dives were performed in a 3,5 meter deep dive tank at HiB.

In the later of the two test dives, the fully re-charged original battery of the unit was used. This rule out any battery charging problems.

Both test dives were completed without any problems and the log files from these two test dives showed that the unit was working as it should.

3. Recommendations

Based on the findings in the log files and the result of the technical analysis of the unit, Poseidon Diving Systems AB has the following recommendations:

- If the unit doesn't pass the pre dive check, do not dive the unit until the problem has been resolved and the unit has passed the Pre Dive check..
- Take note of the alarms issued by the unit and abort the dive if so instructed by the unit, by performing a bail-out procedure.
- Training organizations should emphasize to students, the importance of paying attention to alarms.
- Students should be instructed NOT to use the built in safety feature of automatic Dive Mode if depth is greater then zero meters, as a way to start up the unit.

4. Conclusion

Based on the analysis of data from the unit involved in the accident, done by the Norwegian government Diving school, assisted by technical staff from Poseidon Diving Systems AB, we find no data that would indicate any technical errors that would prevent the usage of the Discovery Rebreather, in accordance with established training and safety procedures.

In order to avoid accidents like this in the future it is essential that divers are taught to follow alarms and warnings issued by the unit and to regularly practice bail out procedures.

This report has been approved by:

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Poseidon Diving Systems AB	HiB	Norwegian Police