

## **Schwerer Zwischenfall mit RB80 Rebreather in einer Schwedischen Silbermine / Untersuchungsbericht durch die Schwedische Marine**

[ article originally in Swedish and translated by via language bot and posted on the link. full report by the Swedish Navy in the files section, includes graphs, pictures and analytical methods]

A quick translation with Google. It's not 100%, but I'll think that you'll be able to use it together with the original document.

<http://www.rebreatherworld.com/rebreather-accidents-incidents/21515-report-halcyon-rb80-involved-serious-accident.html>

\*Edit

It was quite a few words that were not translated. A quick speed-lesson in Swedish follows:

dykare	diver
dyket	dive
dykapparat	diving apparatus
djup/djupet	depth
lunga	lung
andning	breathing
tryck	pressure
inandning	inhalation
utandning	exhalation
syrgasfraktion	oxygen fraction
andningskrets	breathing loop
återandningsapparat	rebreather

DEFENCE MARINBASEN 2008-08-25

Annex 1

02 760:71224 Page 1 (29)

Examination of Halcyon RB80

semi-dykapparat in connection with dykeriolycksfall

Mikael Ericsson

Defence dykeri and navalmedicinska centre

Oskar Frånberg

Research Agency

Peter Lindholm

Department of Physiology and Pharmacology

Karolinska Institutet

June 2008

DEFENCE MARINBASEN 2008-08-25

Annex 1

02 760:71224 Page 2 (29)

## **Abstract**

This report describes the examination of a halcyon RB80 semi-closed underwater breathing apparatus involved in a diving accident in **Sala silver mine** in January 2007. The tests were performed at the Swedish Armed Forces Diving and Naval Medicine Centre (DNC) in collaboration with the Swedish Defence Research Agency (FOI). The aim was to develop and evaluate methods to conduct accident investigations related to this type of advanced diving.

The apparatus was, at the time of the accident, supplied with a trimix containing 31% oxygen. The duration of the dive was 105 minutes at 30 meters depth, after which the diver surfaced with severe neurological symptoms. The apparatus was tested with regard to the carbon dioxide absorbents ability to remove carbon dioxide from the breathing loop, breathing performance and the drop in oxygen fraction between the supply of gas and the breathing loop, i.e. the gas that is actually inhaled by the diver.

The tests shows that the gas mixture in the breathing loop deviate considerably from the supply of gas. The **oxygen fraction in the gas mixture that has been inhaled by the diver** during the dive has most likely been **much lower than the oxygen fraction that was stated in the information materials available from the manufacturer at the time of the accident.**

The divers decompression calculations were based on the performance stated by the manufacturer. Simulations show that the oxygen fraction could have been as low as 21.3%, but should have been around 24% for the majority of the dive. For the decompression calculations was, however, 30% as average inspired oxygen fraction used.

**This has most likely resulted in to short and / or to few decompression stops during the ascent.**

**Our conclusion is that the inadequate information about the performance of the RB80 was the cause of this accident.**

### **Keywords:**

Accident investigation, diving accident, diving, rebreather, Halcyon, RB80, trimix, gas injection, the Work of breathing, wob, hydrostatic imbalance.