

## **Carbon Monoxide Exposure in Norwegian Rescue Helicopters.**

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**OBJECTIVE:** Exposure to exhaust fumes from combustion engines can lead to carbon monoxide (CO) poisoning. Sea King Rescue helicopter crews are frequently subjected to engine exhaust. This study investigates the extent of CO exposure and potential for intoxication for flight crews during standard operational training procedures.

**METHODS:** Over a 2-week period, rescue helicopter flight crews were monitored for exposure to exhaust fumes and clinical symptoms of CO intoxication by means of a written survey and measurements of carboxyhemoglobin saturation (SpCO) with a handheld pulse CO oximeter (RAD-57; Masimo, Irvine, CA). Normal ranges for SpCO were defined as  $\leq 4\%$ .

**RESULTS:** Sixty-nine completed surveys and 138 SpCO measurements of 37 crewmembers were included in the study. Sixty-four percent ( $n = 44$ ) experienced subjective exposure to engine exhaust during training. Clinical symptoms were reported in 8.6% ( $n = 6$ ) and included exhaustion ( $n = 4$ ), headache ( $n = 1$ ), and nausea ( $n = 1$ ). Twenty-nine percent ( $n = 20$ ) showed postflight SpCO levels outside the normal range ( $\geq 4\%$ ). The maximum postflight SpCO level among all measurements was 7%.

**CONCLUSION:** Exposure to engine fumes is common, even more so during open cargo door operations. However, clinical symptoms are infrequent and mild. Toxic SpCO levels were not reached in this study, but approximately one third of postflight SpCO levels were outside the normal range.