

Old Habits, New

By AME1(AW) Kurt Ervin

After a tour at NAMTRAU Lemoore, I joined VFA-113 as a quality assurance representative and was relieved I didn't have to deal with LOX converters. The reliability of the on-board, oxygen-generating system (OBOGS) in our lot XIV Hornets was a welcome sight. My relief quickly turned to concern when pilots began to experience high-altitude hypoxia, and OBOGS was the suspect.

I consulted the manuals, researched message traffic from similar incidents, and debriefed the affected pilots. We then investigated the problem.

One of the shop's

petty officers had inspected the suspect OBOGS system and found it was working "as advertised." Knowing the system worked fine on deck but not at altitude, we decided to turn in the OBOGS concentrator, to get AIMD to inspect it, and to determine if it degraded at high altitude. They found no defect.

After removing the concentrator, an AME2 showed me an OBOGS line he had removed. We could see it almost completely was closed off, blocking the flow of oxygen. We quickly recognized this crimp could be the source of the problem. A closer look revealed the hose's exterior metal braiding had separated from the plastic tube inside, and this defect had hidden the true condition of the hose.

I then went to maintenance control, told them about the problem, and asked to inspect the other aircraft. We wanted to determine if this was an isolated case or a fleetwide problem. After inspecting 12 aircraft, I found nine lines bent or crimped in some way, possibly causing low flow at high altitude. I then went to our sister squadron's AME shop and asked to look

at an OBOGS line. The very first aircraft had the same problem. After inspecting their aircraft,

To remove the OBOGS concentrator, Sailors often bend the OBOGS line (left of the ruler) out of the way.

The bent line can restrict oxygen flow.



Equipment

we found eight of 12 had bad oxygen-supply lines.

We now researched the cause of the crimp. I followed our AMEs out to an aircraft and watched them remove an OBOGS concentrator. I quickly discovered their technique didn't appear correct. The publication said to move the product line to the side, which allowed space to remove the concentrator. However, this technique resulted in AMEs treating the OBOGS lines like old LOX lines: They just bent them up and out of the way. The difference is the LOX lines, which we harmlessly could move aside, were not made of the same rigid, inner plastic as the OBOGS lines. When a maintainer moved the OBOGS line, it got crimped on the positioning clamp, crushing the inner plastic sleeve. This damage is hidden during a casual examination because of the protective metal shroud, which makes a maintainer think the line is durable and can't be damaged.

We turned in the damaged lines for an EI. That investigation revealed the crimped hose did cause a little backpressure within the OBOGS concentrator. As a result, a significant amount of oxygen was ported out the concentrator's nitrogen check valves, instead of going to the pilot. This reduced amount of oxygen did not impair a pilot's performance,

until the aircraft reached very high altitudes. A final piece of this puzzle could have turned the situation lethal: The OBOGS oxygen monitor detects only the oxygen concentration within the concentrator, which means an "OBOGS DEGD" caution would not light up because the level in the concentrator was unaffected. An oxygen monitor does not exist downstream, so the pilot never will get a warning of this lethal defect.

We learned to stop treating OBOGS lines like LOX lines. Remove the positioning clamp and move the product line to the side, taking care not to damage it. Hypoxia has killed before; this find may keep it from killing again. 🦋

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This discovery may help to solve a previously unknown condition. NavAir responded to VFA-113's hazrep in 300634Z SEP 02. They disagreed with the squadron's suggestion to redesign the current oxygen line and to change the MIMs to require removal of the line before removing the concentrator. This step would avoid the problem of bending the line to get it out of the way. A maintenance engineering advisory was issued in 031135Z JUL 02 to warn maintainers about the danger of bending this line. NavAir also agreed to change the publications to warn of this problem, issuing IRAC No. 2 to A1-FA18C-410-310 in 181400Z JUL 02.—Ed.



A rigid, plastic, inner sleeve is inside this braided line and does not regain its shape when bent.