The Last Tra

By Cdr. Rick Erickson, MSC

The flight started out simply enough: Ferry an FA-18 from point A north to point B south, to support a squadron detachment.

The launch routine was normal. Cruise altitude was FL430 to avoid the numerous seasonal thunderstorms. Around 1+15 into the flight, a series of cascading events caused the aircraft to rapidly descend. The pilot didn't try to eject prior to hitting the ground.

Although most of the aircraft wreckage was recovered at the crash site, the aircraft-mishap board (AMB) had little to go on. The aircraft had hit the ground at high speed, at a steep angle, with the nose down. Extreme collision forces destroyed the aircraft. The AMB pieced together the limited available evidence and determined hypoxia most likely was the culprit.

Radio transmissions from the mishap pilot to ATC initially had been routine. However, seven minutes after check-in with the last sector ATC, a mostly unintelligible radio call was made to a center controller. The aircraft continued at altitude for two minutes and then descended rapidly. The crash occurred about one minute after initial descent.

The AMB focused on the radio transmissions between the pilot and ATC. Of particular interest to the board was the last transmission before the crash.

Key points became evident as the AMB scrutinized communications:

- The response time for the pilot to acknowledge ATC was significantly longer than previous responses.
- The pilot's voice sounded sluggish and labored, and it had a more urgent quality, including an uncharacteristic silent period. The extended interval between the time he keyed the microphone button and started talking indicated

Scenes of the crash site where excavation of the aircraft reached depths of 25 to 30 feet.

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a lack of coordination. When the controller again queried the pilot, the pilot did not respond.

You probably have surmised that hypoxia didn't occur spontaneously. Two scenarios were possible. A mechanical problem developed in the oxygen system of the aircraft and exposed the pilot to rarefied atmosphere, or his oxygen mask failed to function as advertised. Whatever the cause, the end result was a physiological event that incapacitated the pilot.

If you recall your initial or quadrennial update in the low-pressure chamber at the Aviation Survival Training Center, you probably recognize some of the symptoms discussed in the previous scenario. Classic hypoxia symptoms include a slow response to a question, labored breathing, and lack of coordination. This experienced pilot, who undoubtedly went through the low-pressure chamber more than once, was overcome by the insidious onset of hypoxia.

Let's review the different types of hypoxia. In general, hypoxia is the lack of oxygen to the brain. Hypoxia exists in four different types: hypoxic, anemic, stagnant, and histotoxic. No matter which one occurs, the outcome always is the same: reduced oxygen to the brain.

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Hypoxic hypoxia is the most common type found in aviation. It is the reduced ability of red blood cells to carry oxygen. The most familiar cause of hypoxic hypoxia is the low oxygen

Debris is placed in a sifter to separate and identify parts.

content of air at high altitude. Symptoms appear when you are exposed to an altitude that requires oxygen, but you are not wearing an oxygen mask, or your oxygen mask or oxygen system isn't working.

Anemic hypoxia involves a reduction of functioning, circulating hemoglobin. This type of hypoxia appears in persons suffering from anemia or blood loss. Anemic hypoxia also can be caused by carbon monoxide, which configures the hemoglobin so it carries less oxygen. The body is effectively put at altitude before leaving the ground. Combining the effects of smoking with cockpit altitude puts your body at a higher altitude than the pressurized cockpit.

Stagnant hypoxia is the result of a reduction in the total volume of circulating blood because of shock, or the pooling of blood in the extremities during rapid acceleration. This blood pooling can cause visual problems, including loss of peripheral vision and the ability to focus. Blood pooling can lead to blackout or loss of vision and unconsciousness.

The fourth type of hypoxia is histotoxic hypoxia. It results from the poisoning of the tissue enzymes that render tissue cells unable to use oxygen. For example, taking two aspirins six hours before flying can destroy 30 to 60 percent of one's tolerance to hypoxia.

Lower altitudes produce hypoxia symptoms more slowly, while higher altitudes expedite the process. The sure cure for alleviating hypoxia symptoms is to breathe 100 percent oxygen and to descend below 10,000 feet.

How big a problem is hypoxia? A data-run from the Naval Safety Center for FY91 through FY01 found 28 cases. The most recent Class A hypoxia mishap, discussed earlier, is the only one in which hypoxia was determined to be the cause. Twenty of these events involved material-equipment failures that included explosive decompression, pressurization-system malfunctions, OBOGS malfunctions, and damaged or failed personal-protective equipment (oxygen mask, hoses, regulators).

In FY02, several hypoxia hazreps identified concerns about the OBOGS systems.

As long as airplanes continue to fly at altitude, the potential for hypoxia exists. No new lessons have been learned, just old ones rehashed. Be familiar with your aviation-life-support equipment, and conduct proper preflight checks. Know the symptoms of hypoxia and what precautions to take.

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