

Oxygen awareness

By Shannon Smith

Oxygen is a minor but important percentage of the air we breathe and getting it in the right amount is critical to health.

Too much oxygen (hyperoxia) slows heart rate and makes it more difficult to breathe. Other symptoms include confusion, changes in vision or hearing, dizziness, cramps, nausea, confusion, convulsions and irritability.

Too little oxygen (hypoxia) increases heart rate and speeds up breathing. It can also result in changes in skin color ranging from blue to cherry red, coughing, sweating, wheezing and restlessness. Other symptoms are similar to hyperoxia and include confusion, anxiety, dizziness.

The point is this: Your body is designed to operate in a **very specific oxygen level**— between **19.5 and 21.5%** of the air you breathe. Get out of that range and your body will start experiencing stress, discomfort, disorientation, cell damage and ultimately death.

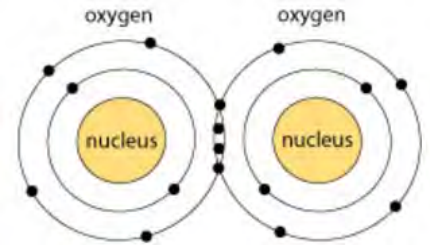
By now you have received the oxygen testers that are required for confined space entry into Category 2 spaces. In the updated confined space permit, one of the final checks before entering is testing the oxygen content of the space to ensure it is within the proper range.

We take for granted that air is safe everywhere we go because 99.9% of the time, it is! But in small spaces or those with inadequate ventilation, that can change without your knowing. Never assume it is safe to go in this time just because it was last time. In the following investigation a very experienced inspector paid the price for that assumption.

Use the oxygen testers in your drills and practice with them to get comfortable using them. They are simple to operate and meant to keep you safe.

Oxygen Content Casualty

On 20 December 1974, an experienced U.S. Coast Guard Marine Inspector assigned to the Coast Guard Marine Inspection Office at New Orleans was detailed to inspect two barges located on the canal at Harvey, Louisiana.



**Oxygen gas
molecule**

“Without oxygen, irreversible brain damage starts to occur within 3 to 5 minutes.”

Brain Injury Foundation
www.braininjuryfoundation.org

The Dobkin Technique

This procedure, in conjunction with CPR, can significantly delay brain injury resulting from lack of oxygen.

In emergency apply ice cold water or very cold compress (58 degrees F or cooler) to the face and eyes of the victim.

This triggers the Mammalian Diving Response, which slows the heart rate and concentrates blood flow to the lungs, brain and heart.

TOP 3 Safety Card Hits (Fleetwide last month)

Maintenance Inspections 10

Housekeeping 8

Safety Attitude 7

Oxygen Content Casualty (continued)

This inspector, a Coast Guard Chief Warrant Officer, had served in Merchant Marine Safety Assignments for approximately four years, having served previously in the Norfolk, VA office. He has served over 26 years in the Coast Guard.

The barges which he was detailed to inspect, EXXON 158 and EXXON 171, are known as tank battery barges. Each is compartmented into six internal spaces and is fitted with two oil field storage tanks and four separator tanks with associated piping topside. Entry below decks is through a single manhole opening into each compartment. The gooseneck vent opening into the forward and after pairs of compartments are generally kept plugged because of local operating requirements.

Upon arrival at the barge site, the inspector met with the owners representative and discussed inspection procedures. The inspector was interested in examining below-deck barge structure. Gas Free Certificates for the barges were not available, but the inspector did have a copy of a certificate issued some eight months previous for the EXXON 153. **Since below deck spaces were piped to contain only water ballast, and since these tanks has not been opened since issuance of the Gas free certificate, it was decided to go ahead with the inspection.** The barge EXXON 171 was inspected first, followed by the EXXON 158.

Inspection of the first vessel proceeded without incident. Each space was opened for the inspector, he entered, made his inspection, then proceeded to the next tank. At all times a company representative was with him or nearby. As the aftermost starboard compartment of the EXXON 158 was opened, air was heard rushing into the space, indicating that the compartment was under partial vacuum. The compartment immediately forward was then inspected, after which the two men discussed whether to continue the inspection or break for lunch; they decided to continue.

The inspector entered the after starboard compartment, apparently unseen by the company representative who had gone forward to check on work in progress by two of his employees. Not seeing the inspector a few minutes later, he proceeded aft and found him lying unconscious in the bottom of the compartment. In an attempt to assist, he also entered and became unconscious but fortunately came to quickly and was able to get out of the space. After he was removed from the compartment attempts were made to revive the inspector, but with no success. He was later pronounced dead on arrival at the local hospital.

What went wrong?

*Review of the casualty revealed **none of the tanks were examined for oxygen content prior to entry. Further, no mechanical ventilation was used to "air out" the tanks prior to entry. Examination of the tank sometime later showed that it contained 17 percent oxygen, and the adjacent port side compartment was found to contain only 12.3 percent oxygen. The cause of this casualty can be attributed to inattention to detail. specifically, failure to test the below-deck compartments for oxygen content.***