

EXPERTISE OF INDUSTRIAL HYGIENISTS KEEPS NAVY FIREFIGHTERS SAFE

The U. S. Navy's civilian firefighters serve as first responders during many emergencies, to fight fires, rescue trapped and injured persons, and to provide emergency services during hazardous materials spills, civil unrest, and terrorist attacks. Like their counterparts in community fire services, the Navy's firefighters follow strict safety procedures to protect themselves while they are protecting the lives and property of others.

As dictated by their command's respiratory protection program, Navy firefighters are required to use *respiratory protection* to prevent them from



Navy firefighters wearing SCBAs extinguish a warehouse fire

inhaling toxic or deadly gases, vapors, mists, and fumes. Respiratory protection must also be worn to prevent suffocation when firefighters go into locations where there may not be enough oxygen to keep them alive. One type of respiratory protection equipment used for protecting Navy firefighters is a *full facepiece, pressure-demand self-contained breathing apparatus*

(SCBA) that has been approved by the National Institute of Occupational Safety and Health (NIOSH) and meets National Fire Protection Association (NFPA) requirements. A self contained breathing apparatus supplies breathable air from a cylinder, usually carried on the wearer's back, to a face mask with a hose leading to the cylinder. The SCBA has the ability to carry 30 minutes of air and provides the highest level of respirator protection.

Navy respiratory protection programs require daily, weekly, and monthly service checks and testing the fit of each respiratory protection device to its user. Such testing is extremely important to ensure that an SCBA will protect the firefighter who uses it from inhalation hazards and suffocation. Since SCBAs are worn in situations that are immediately hazardous to life and health, a defective SCBA could cause serious harm to, or the death of a firefighter.

The National Naval Medical Center (NNMC) Industrial Hygiene Service North provides industrial hygiene expertise for many Navy commands in the Northeastern United States. Jeff McClafin, an industrial hygienist with NNMC North, is assigned to evaluate respiratory protection programs and personal protective equipment used by Navy firefighters. Mr. McClafin routinely tests respirator facepieces used by firefighters to be sure that each firefighter is adequately protected against possible toxic or deadly atmospheres while fighting a fire or working in the vicinity of a hazardous materials release.

While testing the fit of respiratory protection devices at the fire department for the Naval Surface Warfare Command (NSWC) Philadelphia Naval Business Center, Mr. McClafin found three of their SCBA facemasks failed the fit test procedures. Upon close inspection, he noted pinhole leaks in the facemasks, a dangerous, even

fatal, condition that could have led to inhalation of deadly gases, mists, fumes, or vapors if they leaked into the respirator facepieces while the firefighters wore their SCBAs to protect them in a hazardous environment. Mr. McClafin quickly informed NSWC's Assistant Fire Chief, Ken Bennett of the leaking facepieces.



Navy firefighters wear SCBAs to prevent them from inhaling toxic or deadly gases, vapors, mists, and fumes

Assistant Fire Chief Bennett contacted the fire department's respirator program manager, Karl Mack, who immediately removed the defective facemasks from service and replaced them with facemasks that passed the fit test.

McClafin and Martin Dubin, the Industrial Hygiene Supervisor for NNMC's Northern Division, also immediately contacted the Navy Environmental Health Center to expedite their notification of all Navy ships and shore facilities of the leaking SCBA facepieces. It was essential to find out whether a similar situation existed elsewhere in the Navy and to remove from service any other leaking SCBA facepieces. Fortunately, no other leakages were found.

The NSWC Fire Department had planned to replace their SCBAs in the near future with a newer model. With the finding of leaking facepieces, Fire Chief, Ken Barber, received approval to purchase new SCBAs. The NNMC industrial

hygiene office researched various SCBAs and recommended the SCBAs used by the city of Philadelphia as top-quality respiratory protective equipment. An advantage to using the same SCBAs as the City Fire Department is that when



New SCBAs are more comfortable to wear and enhance safety of Navy firefighters

responding to the same emergency, Navy and city firefighters can share equipment. In the autumn of 2001, the NSW Fire Department received their new SCBAs. The new SCBAs have several advantages over the previous model that improve the safety and endurance of the Navy firefighters. The SCBAs have an alarm that warns the user by vibrating that the breathing air in the SCBA cylinder is getting low so that the user knows when to replace his air cylinder with a full one. Another alarm signals when a firefighter may be in trouble. The *firefighter in trouble* alarm activates whenever its wearer fails to move for more than thirty seconds.

The new SCBA has padded straps that distribute its weight more evenly and comfortably on the wearer. The facepiece on the new SCBA gives the user a wider field of view. A firefighter can also disconnect the facemask from the breathing device without removing the mask from his face, allowing him to share another firefighter's air in case his air supply runs out before he can get to safety. In addition, facemasks can be removed from the breathing air cylinder and fitted with an adapter for a breathing-air cartridge designed for use where there may be hazardous materials such as in hazardous waste sites and around biological hazards. Using the same facemask negates the need for a second respirator and time spent on additional fit testing. The firefighters are trained on wearing and operating the new SCBAs and



Veteran Navy firefighter, George Wallace, models new SCBA

used them successfully for the first time to fight a fire in December 2001. The firefighters are very pleased with their new SCBAs. Said firefighter George Wallace, who has been fighting fires for the Navy for over 20 years, "These new units are 100% better than the old ones. I'm more comfortable, have greater mobility, and feel safer."



Firefighters are trained on using and wearing new SCBAs

Joe O'Connell performs SCBA training for his platoon. He said the new units are far superior to the old SCBAs. "It is like comparing an old fashioned 35mm camera to a digital. The new units have many more features. They are padded and contoured making them much more comfortable. There is not one firefighter who would switch back to the old SCBAs. They are also easier to manipulate and are very user friendly."

Identification of defects in SCBA equipment by NNMC North's industrial hygiene service averted a potential tragedy for NSW fire fighters. NNMC North also assisted the NSW Fire Department

in identifying and obtaining up-to-date SCBAs that make their dangerous work safer.

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