

# This Month's "Working Fire"...

**Volume 95-4: April 1995**  
**Approx. Program Length 58:43**

## **FIRELINE**

**Ice Rescue**  
**Sewell, NJ**

**Approx. length: 10:38**

The Washington Township charter calls for all rescues to be handled by the Ambulance/Rescue Association. But, when this call came in, it required all agencies to work together. Three victims fell through the ice but dive rescue teams were 20 minutes away. Volunteers used any available resources and got out to the victims as they were going under. They retrieved two girls but the third victim, a man who had been trying to help, had been under for 10 minutes before they found his body. They revived him on-scene. This segment stresses the importance of remaining safe, working together when you don't have specialized equipment and the need for cross training with other agencies. Graphic videotape. Discussion topic: List the resources within your own department and those of neighboring departments that could be used at an ice rescue. For more information on this incident, contact: Chief A.J. Morgan, Hurffville Vol. Fire Co., 213 E. Holly Ave., Sewell, NJ 08080. Or call: (609) 589-1247.

**Natural Gas Explosion**  
**Westminster, MD**

**Approx. length: 5:13**

The explosion rocked a neighborhood after a private contractor using an auger struck a four-inch, 100 psi gas main. It destroyed five homes and severely damaged 70 others. With so many homes damaged, search and rescue were the main issues. This was a massive multi-agency, multi-jurisdictional response with over 100 fire service personnel on-scene. This segment stresses placement of apparatus at a natural gas incident and appropriate placement of a designated command post and staging location. Discussion topic: Describe the ideal location for first responding units to a natural gas incident and why. For more information on this incident, contact: Lt. Michael Rehfeld, Westminster Fire Dept., 66 E. Main St., Westminster, MD 21157. Or call: (410) 848-1800.

## **HANDS-ON**

**SCBA Basics:**  
**Components and Donning Methods**

**Approx. length: 10:11**

Assistant Chief Ken Hines describes the basic components of an MSA SCBA. He also demonstrates the "Over the Head" and "Over the Shoulder" methods. It's extremely important to note that you should follow the manufacturer's instructions based on your particular SCBA. You can also find Enhanced Training on SCBA in this month's Training material.



# Enhanced Training

## Basics of SCBA (Self-Contained Breathing Apparatus)

### Objectives

After watching this program the student shall:

1. Explain why the use of SCBA reduces firefighter risk of injury and the situations in which SCBA are utilized
2. SCBA Limitations
3. Understand the basic components of the Self-Contained Breathing Apparatus.
4. Explain the steps in the "Over the head"- and "Seat mount"-type donning methods for SCBA.

### Standards and Regulations

This training is compatible with NFPA 1001 Standard for Firefighter Professional Qualifications (1992 Edition) and NFPA 1981 Standard on Open-Circuit Self-Contained Breathing Apparatus for Fire Fighters (1992 Edition).

**Training Note to Instructor:** This lesson plan deals with two particular methods of donning SCBA. In addition, the non-facepiece regulator SCBA is only discussed. For other types of SCBA, viewers should consult manufacturer recommendations for wearing and use. No information is provided on SCBA maintenance, refilling bottles or particular emergency situations.

### Training Outline

Definition:

Self-contained breathing apparatus (SCBA) is a piece of the firefighter's protective clothing used in conjunction with helmet and turnout coat and pants, boots and gloves.

#### A. SCBA and Firefighter Safety.

1. Firefighting is an inherently dangerous operation. One of the most significant hazards or risks facing the firefighter is the inhalation of dangerous products of combustion; smoke and fire gases, oxygen deficient atmospheres, and exposure to hazardous chemicals.
2. Smoke and fire gases are produced in every fire to varying degrees. No human can sustain prolonged exposure to these products. Exposure to fire products can produce acute and chronic health effects such as hypoxia, carbon monoxide poisoning and cancer.
3. Regular and routine use of SCBA in toxic atmospheres or reduced oxygen situations allows the firefighting crew to safely perform their emergency tasks with reduced risk of injury or even death.

# Enhanced Training

## Basics of Self-Contained Breathing Apparatus

4. SCBA should be considered a mandatory item on any working fire, including dumpsters and vehicles. SCBA should be used on all hazardous materials emergencies, reduced oxygen atmospheres such as confined space and trench rescues, and any and all other emergency events where the firefighter's respiratory system may be in danger.

### B. SCBA Limitations: Firefighters ability to efficiently and effectively use SCBA.

#### 1. Physical condition of firefighter.

- a. Firefighters should be in good physical condition to ensure that tactics can be completed with the available air supply contained in the SCBA. With a three-person crew, if one member uses more air in a given period of time, the tactic may not be completed and the crew may have to exit because of the one member. Physical condition of the firefighter should include good aerobic capacity and flexibility in order to function in the best possible fashion when performing tasks while wearing bulky turnout gear and SCBA.

#### 2. Mental condition.

- a. Fire attack training and the use of personal protective equipment (PPE) will provide the firefighter knowledge and experience. Practicing with an SCBA typical of the kind a firefighter would use gives the wearer knowledge and conditioning as to apparatus components and emergency procedures.
- b. Training provides the wearer the ability to work through the possible claustrophobic effects that the SCBA facepiece might generate in certain members. Training should develop self-confidence with the SCBA as well as the personal ability to deal with dangerous situations and the understanding that the wearer must rely on PPE.
- c. Mental preparation may be the most important element of SCBA training.

### C. SCBA Components.

1. There are various manufacturers. Consult your department operating procedures for component identification and methods of donning and use.
2. Two basic types of SCBA: open-circuit and closed-circuit.

# Enhanced Training

## Basics of Self-Contained Breathing Apparatus

- a. Open-circuit is the most common in the fire service and is best described as an air-cylinder containing compressed air used to provide an air supply to the user with a limited amount of usable air in that cylinder.
  - b. Closed-circuit is best described as the rebreather type and is uncommon in most fire departments.
  - c. For the purposes of this lesson, we will examine only open-circuit SCBA and their common components.
3. Four basic components (*may vary slightly depending upon manufacturer*):
- a. Backpack and harness assembly to hold the SCBA bottle to the firefighter. Includes shoulder and waist belt straps and a method to attach SCBA bottle to the harness. A Personal Alert Safety System (PASS) device may be attached to the harness straps.
  - b. Air cylinder with bottle pressure gauge, opening and closing air valve, and low air warning bell or alarm.
  - c. Air regulator with pressure hose which connects to the SCBA bottle, mainline on/off valve, emergency bypass valve, air discharge to connect facepiece hose, and bottle air pressure gauge to indicate remaining bottle air.
  - d. Facepiece with breathing tube which hooks to regulator, inhalation valve, exhalation valve, and head webbing to attach facepiece to head. (On some SCBA facepieces the regulator attaches directly to the facepiece inhalation port. Once again, check pack specifics about donning and use.) Some facepieces utilize a strap webbing arrangement to secure the facepiece. Other models use a one-piece cloth web with face straps to anchor to head. In addition, some facepieces may have a nose cup to prevent fogging of the facepiece.
4. Donning SCBA “Over-the-Head” or “From a Seat Mount” methods. (Demonstrated using a type of SCBA with a non-facepiece mounted regulator. Check manufacturers' recommendations for donning facepiece-mounted regulator.)
- a. Put on full protective clothing including turnout pants and Nomex hood.
  - b. Locate SCBA and check unit to ensure full air supply is available (depending upon department SOP's and daily operational checks, as applicable).
  - j. Start with the cheek straps and tighten them securely and evenly, pulling straight back

# Enhanced Training

## Basics of Self-Contained Breathing Apparatus

- c. Open bottle valve slowly and listen for low air alarm to sound as the air system pressurizes.
- d. On some units, the main air regulator may also indicate cylinder air pressure. A good rule of thumb is that bottle air gauge pressure and the main regulator pressure should be within 100 lbs. of each other.
- e. Spread out harness straps, ensuring that the straps are fully extended for ease of donning. In the "Seat-Mount" method, straps are often laid open to the side of the harness to allow ease of donning.
- f. In the "Over the Head" method, the bottle air pressure gauge and valve will be facing away from the firefighter, strap-side up. The firefighter should grasp the cylinder on both sides and raise the assembly over the head. No straps should be between the hands. In the "Seat-Mount" method, the arms are simply slipped through the harness straps while seated enroute to the emergency.
- g. In the "Over the Head" method, the main air regulator and shoulder straps should hang down towards the wearer's elbows. The arms should slip up between the shoulder strap openings.
  - i. The wearer should allow the assembly to slowly slide down over their head and onto their back.
  - ii. While leaning forward, the wearer should tighten the shoulder straps, trying to get the SCBA assembly high up on their back. Next, fasten the waist strap followed by the chest strap (once again, follow manufacturer and department SOP's about strap tightening steps).
- h. The Nomex hood should be pulled down prior to donning the facepiece so that the facepiece will seat to the face properly with no hood obstructions.
- i. Grasp the rear of the facepiece with both hands, spreading the webbing straps. Working down over the top of your head, place firmly against the face, seating the chin in the chin cup securely. (NOTE: Firefighters should have annual "fit-testing" to ensure that the proper-sized facepiece is being used for their facial structure. A loose fitting facepiece will allow air to escape reducing interior time. A tight-fitting facepiece will be uncomfortable and difficult to wear.)

**Answers to Enhanced Training Quiz on following page:**

1. True 2. True 3. False 4. a. 5. e.

## **Basics of Self-Contained Breathing Apparatus**

- j. Start with the cheek straps and tighten them securely and evenly, pulling straight back towards the ears, not out to the side. Next, tighten the temple straps in the same manner. Finally, tighten the top strap in the same manner.
- k. To check the facepiece seal, cover the end of the low-pressure air hose tube with a hand and inhale easily. If the facepiece leaks, reseal, redon, or replace.
- l. Inhale again, seal the low-pressure hose end again with a hand and then exhale to check proper function of the exhalation valve.
- m. Once the facepiece is seated properly, pull up the nomex hood and completely cover the head and facepiece straps.
- n. The low-pressure air hose can be placed between the helmet chin strap and the helmet can be seated on the head. Tight the helmet chin strap.
- o. Connect the low-pressure air hose to the main air regulator. In most instances, a mainline air valve may have to be turned on to provide an air supply. When this is done, break the seal of the facepiece to hear a rush of air as the mask provides positive pressure air displacement. (Only positive-pressure SCBA are in compliance with OSHA requirements and NFPA standards require only positive-pressure SCBA be used in the fire service.)
- p. Don firefighting gloves.
- q. Turn on PASS device before entering hostile environments.

# Enhanced Training

## Self-contained Breathing Apparatus: Quiz

Select the best answer:

1. True or False Positive-pressure type SCBA are the only type of SCBA currently in compliance with OSHA requirements and required by NFP standards.
2. True or False Fit testing ensures the wearer will have a comfortable and proper fitting mask.
3. True or False Physical conditions of the firefighter are the only limiting factor in SCBA use.
4. The Nomex-style protective hood should be worn:
  - a. on the outside of the facepiece straps
  - b. on the inside of the facepiece straps
  - c. it doesn't matter
  - d. I don't know.
5. SCBA should be worn as a matter of routine on which of the following incidents?
  - a. on any working fire, including dumpsters and vehicles
  - b. hazardous materials emergencies
  - c. reduced oxygen atmospheres such as confined space and trench rescues
  - d. any and all other emergency events where the firefighter's respiratory system may be in danger.
  - e. all of the above
  - f. none of the above.

### Bibliography

International Fire Service Training Association; *Essentials of Fire Fighting*; Oklahoma State University; Stillwater, OK; Third Edition, 1992.

National Fire Protection Association; *Standard for Firefighter Professional Qualification 1001*; 1992 edition.

National Fire Protection Association; *Fire Department Occupational Safety and Health Program 1500*; 1992 edition.

National Fire Protection Association: *Standard on Open-Circuit Self-Contained Breathing Apparatus for Fire Fighters 1981*; 1992 edition.