

Emergency Breathing Safety System

NIOSH Public Meeting

December 9, 2010

EBSS Task Group

**NFPA Technical Committee on Respiratory
Protection Equipment**



National Fire Protection Association

Emergency Breathing Safety System

NFPA Technical Committee on Respiratory Protection Equipment

- Ascertain why NIOSH issued the 1984 letter prohibiting buddy-breathing.
 - Technological issue and the possibility of exposure to IDLH.
 - Task Group formed
1. Investigate changes in technology
 2. History of Buddy Breathing use
 3. Work with NIOSH
 4. Develop verbiage for NFPA 1981 Standard



National Fire Protection Association

Types of EBSS in 1984

- **Sharing of Facepiece** - Victim shares rescuer's air by passing facepiece back and forth and taking turns breathing. Exposure by both firefighters to IDLH environment when not in possession of facepiece. Variation: Passing mask-mounted second stage regulator back and forth.
- **Breathing Tube** - Victim connects low pressure, corrugated breathing hose to outlet on rescuer's facepiece, inhaling the rescuer's exhalation (approximately 16% oxygen content).
- **Buddy Breather Pigtail** - Victim connects buddy breather pigtail hose to rescuer's buddy breather connection, holding breath during the process until connected. Exposure to IDLH environment while holding breath.
- **Exposure to IDLH always a risk.**



Typical Current Technology of EBSS

- Rescuer's male/female quick connect (EBSS) is attached to the SCBA's intermediate pressure line with a 36-inch hose.
- Victim's male/female quick-connect (EBSS) is attached to rescuer's quick-connect. IDLH atmosphere cannot enter the breathing air supply. Victim does not have to remove facepiece or hold breath. 72 inches of travel available between rescuer and victim.
- No hose connection to facepiece to create possible loss of positive pressure to either firefighter during movement.



SPERIAN



INTERSPIRO



Dräger

The difference between EBSS & UAC

There is a fundamental difference in the use of an EBSS (sharing of air at an intermediate pressure connection) and a Universal Air Connection (UAC) (rapid transfer of air at a high pressure connection).

- Once the connection between a rescuer and victim is made with a UAC, the air pressure is equalized between the two air cylinders. Only one manufacturer offers this system for transfer of air from SCBA to SCBA. A more probable scenario is that the victim would need to have a sufficient air supply to allow the Rapid Intervention Crew/Team to respond and locate him. A UAC connection provides no assistance in the case of a first stage regulator failure or air cylinder leak.
- Once an EBSS connection is made, breathing air is shared between the rescuer and victim. The breathing air is available almost immediately without the delay of waiting for the RIC/RIT. No equalization of breathing air occurs. Air is shared downstream of the air cylinder and first stage regulator at an intermediate pressure. If the situation changes, the EBSS connection can be terminated.

Possible EBSS Use Scenarios

- ***Large warehouse or storage buildings where a firefighter has simply lost his orientation.*** He is not trapped or injured; he is simply exhausting his air supply in a cold smoke environment. If located by another firefighter, he could simply be connected via an EBSS and walk out of the structure.
- ***Situations where a firefighter has become entangled due to a material or structure collapse and is exhausting his air supply.*** A crew working in the same division of the fire could rotate turns using an EBSS to allow ample time for a Rapid Intervention Crew/Team to reach the downed firefighter with a fresh air supply (utilizing a RIT Bag or spare SCBA).
- ***Incidents where travel time is extensive, as in tunnel or high rise fires.*** A RIT Bag with an EBSS connection could be used to allow firefighters to replace a low air cylinder with a fully charged air cylinder while maintaining positive pressure in the facepiece in an IDLH environment. No exchange or transfer of air would occur between firefighters. A RIT Bag with a 2400 liter air cylinder could facilitate a safe air cylinder exchange for 20 to 30 firefighters.

Rapid Intervention

Phoenix Fire Department obtained three vacant commercial buildings: a warehouse, a movie theatre and a country-western bar. The RIT drill was for the first alarm companies to respond to a report of two firefighters in trouble. One is disoriented and the other one is unconscious. The buildings were sealed from outside light and the facemasks were obscured to simulate heavy smoke conditions. The RIT teams were equipped and deployed as if this is was a working fire. The department ran through about **200 RIT drills** with **1144 PFD firefighters** participating. Their activities were monitored and timed. An Arizona State University statistician analyzed the data.

The results show that rapid intervention is not rapid:

Rescue crew ready state	2.50 minutes
Mayday to RIC entry	3.03 minutes
RIC contact with downed firefighter	5.82 minutes
Total time inside building for each RIC team	12.33 minutes
Total time for rescue	21 minutes

150 foot hose line with Firefighter 40 foot off nozzle.

Record/History of EBSS Use

- There is minimal documentation regarding the use of EBSS.
- Users are reluctant to document use of a prohibited system.
- Reviewing NIOSH and NFPA investigations, the Task Group could not find a fatality incident where EBSS had been deployed.
- The Task Group survey regarding EBSS did not reveal a single incident where EBSS use created a situation that compounded or increased a fire fighter injury.
- The Task Group survey did receive comments of a few positive outcomes when EBSS was deployed. Even with the promise of confidentiality, firefighters were unwilling to give specifics.

EBSS Use

Battalion Chief Deborah Crisher
Virginia Beach Fire Department
Chesapeake Virginia



March 10, 2008 – 4820 Columbus Street - 139,396 s.f. Warehouse Fire

- E19 – 3 man crew assigned to relieve E16 on interior hose line in Division C
- Captain E19 gets off hose line – low on air – becomes disoriented
- Two E19 Fire Fighters locate Captain – Captain has exhausted air supply
FF 2 calls Mayday – FF 1 initiates EBSS with Captain E19
- All three exit area with assistance of Interior Battalion Chief

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EBSS Survey

Deputy Fire Chief William Flint

District of Columbia Fire & EMS

Washington D.C.



EBSS in Service

- Manufacturers surveyed—Dräger, Interspiro, ISI, MSA, Scott, Sperian
- Of the SCBAs sold in the U.S. the percentage that includes a Supplied Air Line connection (EBSS) ranges from 50 to 80 percent among manufacturers.
- 87 percent of responses to survey indicate that they feel EBSS is an important component of the SCBA.
- 81 percent of responses to survey indicate they would specify or recommend EBSS on their next SCBA purchase.
- Although EBSS has been an unregulated and undocumented component of SCBAs for some time, it is obvious that firefighters overwhelmingly feel it provides an additional degree of safety when operating in IDLH.
- An EBSS system is intended for a last option incident where a firefighter has exhausted his air supply to the point that a RIT operation does not have sufficient time to effect a positive outcome rescue.

Other EBSS Regulations

OSHA

- 1910.156(f)(1)(iii) Approved self-contained breathing apparatus may be equipped with either a "buddy-breathing" device or a quick disconnect valve, even if these devices are not certified by NIOSH. If these accessories are used, they shall not cause damage to the apparatus, or restrict the air flow of the apparatus, or obstruct the normal operation of the apparatus.



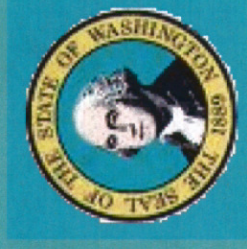
- Subchapter 7. General Industry Safety Orders
 - Group 2. Safe Practices and Personal Protection
 - Article 10.1. Personal Protective Clothing and Equipment for Fire Fighters
 - (2) Permissible Devices. (5) Buddy-Breathing. Approved self-contained breathing apparatus may be equipped with either a "buddy-breathing" device or a quick disconnect valve, even if these devices are not certified by NIOSH. If these accessories are used, they shall not cause damage to the apparatus, or obstruct the normal operation of the apparatus.

Other EBSS Regulations

Washington State Department of Labor & Industries

• An SCBA can have a quick-disconnect valve or “buddy breathing” accessory only if the valve or accessory doesn’t do any of the following:

- Damage the SCBA
- Restrict the SCBA’s air flow
- Interfere with the SCBA’s normal operation
- The “buddy breathing” accessory or quick disconnect valve need not be certified by NIOSH



SCUBA Equipment & Safety

• Alternate second stage—A complete second stage regulator required for emergency situation to provide an easy way to share air in case you need to help another diver.

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EBSS in NFPA

NFPA 1981—*Standard on Open-Circuit Self-Contained Breathing Apparatus (SCBA) for Emergency Services*

- Completed draft language for performance and test requirements.
- EBSS would be an option not a requirement.
- Cannot move forward without change in NIOSH position.

NFPA 1404—*Standard for Fire Service Respiratory Protection Training*

- Has been briefed on Task Group's intentions and progress.
- If included in 1981, 1404 will write training standard.

NFPA 1500—*Standard on Fire Department Occupational Safety and Health Program*

- Has discussed changes in language should NIOSH withdraw its 1984 letter.

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