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Competent in the Use of SCBA

Sean Duffy informs on numerous breathing techniques in his article that warns of the peril that can result from SCBA complacency.

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The rules of air management dictate that 25 percent of the cylinder can be used to get to the fire, 25 percent can be used to work once you are there, 25 percent is for getting out and the remaining 25 percent is reserved for the unexpected.

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Firefighters are responsible for ensuring that they are competent in the use of SCBA. It's the most important piece of PPE that we have, yet, way too often, it's taken for granted. Many might feel that they are "comfortable" with their abilities and that they know their equipment because they perform a "routine" check.

However, there should be nothing routine about checking your SCBA. "Routine" usually is accompanied by complacency. Inspection alone isn't enough when it comes to saving yourself or another member.

There's a lot more to using SCBA than just turning a valve, plugging in the regulator and taking a breath. You must know how it functions as well as how to properly breathe to extend your abilities while conserving air.

Repetition: The mother of skill

Many firefighters lack true familiarity regarding the use of their SCBA. This poses a great risk to everyone who operates on the fireground.

In recruit training, one of the first skills that's taught is the proper use of breathing apparatus. Recruits continuously drill on it until they can demonstrate a level of competency with its basic functions.

So, what happens after graduation? Do you continue to work on your proficiency? The reality is that you likely overrate your abilities, call them "good enough" and do very little more in this area as your skills begin to deteriorate almost instantly.

Proper training

Constant training and thorough understanding of how SCBA functions and of its capabilities are vital. The objective is to train not only to live but also to perform. When you train, you program your mind, and the worst thing that you can do is program it the wrong way.

The importance of knowing what your low air alarm actually means must be stressed. Most alarms sound when roughly 33 percent of the air supply has been used. The rules of air management dictate that 25 percent of the cylinder can be used to get to the fire, 25 percent can be used to work once you are there, 25 percent is for getting out and the remaining 25 percent is reserved for the unexpected.

When in trouble, firefighters must navigate through the situation while conserving air. Your low air alarm will stop ringing when bottle pressure is below 100–150 psi. During this time, each breath that's taken becomes more difficult.

Have you ever had to breathe that very last breath from your bottle? If not, you need to, because once your mask starts sucking to your face, the situation has a huge effect on you mentally and on the decisions that follow. SCBA from each manufacturer will have a different feel when this occurs, and there will be a distinct sound that's associated with it. Be sure to take time to really learn your equipment.

Air conservation requires continual training, discipline and the ability to remain oriented to the usage of your air supply. One of the best ways to conserve air is to plug in right before entering an immediately dangerous to life and health atmosphere. Don't get sucked into hanging out unnecessarily while using your air. Simply put, complete your assignment and get out. Upon exiting the environment, immediately unplug and turn off your air supply. This ensures that, should you be needed for immediate reassignment, you have the most air available to you in the event that you were unable to change cylinders between assignments.

Training to live

Be mindful not to create "training scars," which can be fatal. For example, how many times have you been told "Don't worry about the alarm, this is training" or "If you run out of air, just unplug." Although the premise itself is meant to complete the training evolution, each time that these comments are made, a total disregard for your safety and for available air supply versus consumption rates is reinforced. The fact is, waiting for the alarm to sound isn't an effective way to manage air supply, and it's the result of a training scar that was developed by lack of enforcement when enforcement was needed the most.

Confidence should be built while reinforcing the importance of performance under pressure, particularly when heart rate is elevated and all rationale is lost. This is what's referred to as "condition black." This is pure survival instinct, and it occurs when the heart rate generally exceeds 175 bpm.

Training to operate as well as control breathing during condition black is a must. During an evolution, if the participant runs out of air, this should signal the end of the evolution, and improvement should be sought from that point forward. Although advanced methods on what to do when you run out of air are being taught, training officers don't want to instill a false sense of security that the consequences of poor air management aren't severe.



Temptation to linger inside of a fire building while using your SCBA is predictable, but you must resist it: Complete your assignment and get out.

Fireground effectiveness/safety

The size of the firefighter, stress levels, physical fitness and how intensely the individual is working all play a role in how long that it takes to exhaust a cylinder. Assuming that a

30- or 45-minute bottle rating equates to the same amount of working time on air is not only ignorant but extremely dangerous. While working on air there's about a 33 percent increase in energy expenditure, and the additional weight that's carried on the back increases cardiorespiratory function. So, the user's physical condition coupled with the individual's level of training and amount of experience ultimately enhances the duration of one's air supply.

In emergency situations, each additional breath that a person who is on SCBA takes can cost that person greatly when it comes to time for escape or rescue.

Under normal working conditions, the average time that it takes to deplete a 30-minute, 4,500-psi bottle is 12–16 minutes. Every 100 psi in that same bottle equates to approximately 8–10 breaths. This is why it's critical to have a plan in place to conserve air that's in the bottle and to give you the greatest chance of surviving the fireground. The aim should be to reduce the difference between air that's required and air that's consumed. The amount of time that the air supply will last is unique to each firefighter, so be sure to thoroughly evaluate different breathing techniques.

One thing that's certain: The better shape that you are in, the more efficient that you will be while using SCBA.

Methods of breathing

Firefighters who serve across the United States and elsewhere commonly are taught to under-ventilate. This is done in an effort to promote air conservation, but when was the last time that you truly tested the effectiveness of your breathing technique(s)?

When your survival is at stake, there must be a proven and reliable way to conserve your extremely limited air supply. In intense moments, nasal breathing is the ideal way to oxygenate your bodily systems. Even if the body is stressed by high-intensity exercise, nasal breathing provides a sense of calmness, and the calmness allows you to function better.

The martial arts teach a breathing technique that's called autogenic breathing. The technique is to breathe in through your nose for a count of three, hold that breath for a two count and then exhale through your mouth for a three count. Research shows that when people perform this technique for a three-cycle count, they decrease their heart rate as much as 30 percent for possibly 40 seconds. If your heart rate was around 175 bpm, autogenic breathing would bring it down into a target range of 145 bpm. Between 115–145 bpm is where your firefighting skills and reaction times truly are maximized.

Reilly Emergency Breathing

The **Reilly Emergency Breathing Technique** (R-EBT) is performed by a slow inhalation followed by an exhalation that's controlled by the firefighter by making a humming sound as the breath is released. During studies of this technique, it was found that the R-EBT showed an increase in consumption time by as much as 36 percent compared with other methods. In other words, the more that you use it, the more that you will increase survival time. Your SCBA low air alarm activates between 1,000–1,250 psi. This means that the user has approximately 50–80 breaths remaining when using a 30-minute bottle. Having an additional six seconds of time with each breath will compound to more air remaining in the bottle.

With only 600 psi in the SCBA bottle, the average firefighter can extend air supply by approximately two minutes, which equates to more than 26 percent compared with other breathing techniques. Minutes quite literally can be the difference between rescue or recovery.

Operational readiness

You are responsible for checking the readiness and operation of your SCBA. This should be the very first priority when you arrive for duty. Your life will depend on how well you and your SCBA perform. Emphasis should be placed on the importance of committing yourself to improvement if you truly desire to become skilled in the use of your SCBA.

Comfort vs. Reality

It's very easy to become so comfortable with your air consumption rate that you wind up ignoring your low air alarm and continue to operate, believing that you have a sufficient supply to finish the task. What happens when your level of comfort is confronted with reality? That was the harsh lesson that I learned when I let myself become so consumed in my assignment on the fireground that I didn't acknowledge the warning from my SCBA, indicating that it was time to exit the structure.

We just completed the primary search and were reassigned to help the fire attack to pull ceiling and to open walls to search for any remaining fire. Comfortable with my distance to the door, I chose to continue working and ignored my low air alarm. It wasn't until it became increasingly more difficult to draw a breath that I realized that I had exhausted nearly all of my air. As my partner and I prepared to exit the structure, my mask began sucking to my face; before I could get to the front door, I was completely out of air. The only thing that kept me calm and prevented me from ripping off my facepiece: During my daily SCBA checks, I breathed down the remaining air in the lines until empty and would see how many additional breaths I could take until I had to pull off my mask. Every shift, I made it a goal to get just one more breath than the previous shift.

Constant repetition shift after shift and knowing my SCBA gave me the reassurance that I could make it out that day before I took off my mask.

I share this incident because it's important to learn from mistakes as well as to understand that there never are any certainties on the fireground. The only thing that we can do is prepare for situations that we might face and take every opportunity to improve, so when faced with a situation, we can handle it properly and remain calm.

About the Author

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Sean Duffy is a 16-year member of the fire service. He currently is a firefighter for the city of Ann Arbor,, MI, Fire Department. Duffy co-founded Build Your Culture LLC. He has an Associate of Applied Science in fire science and numerous professional certifications. Duffy is a member of the Marion County FOOLS of OZ.

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