



## East Fork Fire and Paramedic Districts Training and Safety Division

<b>TOPIC:</b>	AIR SUPPLY LIMITATIONS
<b>TIME FRAME:</b>	2hrs
<b>METHOD:</b>	Lecture/Practical
<b>OBJECTIVES:</b>	<p>Each participant will understand the limitations of the 1200 liter SCBA</p> <p>Each participant will participate in a practical exercise using a 1200 liter SCBA bottle filled to a minimum of 2100psi.</p> <p>The practical exercise shall be done in teams of 2. One shall be the timer the other shall perform simulated fireground tasks. The timekeeper shall track the following start to 50% air, 50% to the 25% (emergency firefighter reserve air) then the time from 25% to depletion of air supply. At the completion of the first exercise the team will switch and the exercise shall be repeated.</p> <p>Each participant will performing simulated fireground tasks until the participant reaches 50% of their air at this time the participant will reverse direction of travel and complete the same simulated tasks until they reach their <b>emergency air reserve</b> of 25%. This will determine individual participant actual working times. No low air alarms shall sound during this time.</p> <p>The participant will stop all tasks and sit down where they are when they reach 25%(emergency air reserve) and will practice emergency air conservation techniques to see how long a participant can stretch their remaining air during an actual emergency. When all air is depleted the participant shall have completed the drill</p>
<b>MATERIALS NEEDED:</b>	SCBA, extra SCBA bottles 2 per participant
<b>REFERENCES:</b>	IFSTA Essentials, Air Management
<b>ASSIGNMENT:</b>	Practice drill prior to timing
<b>PREPARATION:</b>	If you need extra air bottles please contact Dave Hays to arrange
<b>SUNPRO CODE:</b>	STR04 (str04.04,str04.05,str04.06)



## East Fork Fire and Paramedic Districts Training and Safety Division

### AIR SUPPLY LIMITATIONS:

Air supply limitations are based on following:

1. Physical condition of the user – A firefighter in poor physical condition will undoubtedly expend his/her air supply at a faster rate compared to a firefighter in peak physical condition. Additionally, firefighters who are larger in physical stature have a tendency to consume air at a higher rate than firefighters with a lesser build.
2. Physical exertion levels - The aforementioned endurance course is considered a moderate workload for the average firefighter. Physical exertion levels directly relate to the consumption rate of the working member, higher exertion levels will cause the firefighter to expend his/her air supply at a faster rate.
3. Emotional reactions - Firefighters will react to situations in a variety of ways emotionally and physically. Firefighters who become exited or anxious while wearing an SCBA will experience an increase in their respiratory rate causing an increased consumption rate.
4. Condition of the SCBA - SCBA's in poor repair or improperly fitted will leak and allow air to flow freely thereby reducing the members overall working time.
5. Starting pressure - SCBA cylinders should be filled to their capacity before use to ensure adequate results.
6. Training and Experience Levels- Members who are well trained and comfortable in the use of an SCBA have a tendency to control there breathing rates and overall consumption rate more appropriately. Prior to performing any type of endurance training, members should be provided with a detailed SCBA training course including confidence training to ensure optimal performance.



## East Fork Fire and Paramedic Districts Training and Safety Division

### EXPANDING YOUR WORKING TIME:

During any type of endurance training, members should be encouraged to concentrate on their breathing techniques. Controlled breathing techniques will ensure optimum performance and prolonged operating times. Suggested breathing techniques include

1. **Nose Breathing:** Breathing in through your nose results in shorter breaths. Inhalation through your nose will usually fill the lungs to less than their capacity enabling the inhaled air to be utilized entirely.
2. **Mouth Breathing:** Breathing in through your mouth results in a more rapid respiratory rate in which your body cannot take full advantage of oxygen before exhalation

In order to control your consumption rate, members should attempt to breathe in through their nose and exhale through their mouth. Members should be instructed to take in slow deep breaths to allow the air to be held in the lungs for maximum oxygen/carbon dioxide exchange. Exhalation should be out through the mouth in a controlled manner. **DO NOT ATTEMPT TO HOLD YOUR BREATH.**

As the member becomes more fatigued he/she will begin to breathe through his/her mouth in an effort to take in more air. Members should be instructed to inhale through their mouth, breathe in slow and deep, attempt to hold the air in their lungs for 3-4 seconds for maximum oxygen/carbon dioxide exchange. In order for optimal air exchange without holding their breath the process of breathing in through their mouth and out through their nose should be continued.

Breathing must be kept on a conscious level. Subconscious patterns result in breathing only through the mouth or nose

1. Nose breathing results in
  - a. Short breaths
  - b. Lungs not filled to capacity
2. Mouth breathing results in
  - a. Rapid breathing
  - b. Body cannot take full advantage of oxygen before exhalation
3. Suggested Patterns
  - a. In through nose - out through mouth
  - b. Easy to learn and remember
  - c. Close to normal pattern when speaking

The best method for strenuous work is the five-second-count method: Inhale for 5 seconds using either of the first two methods - slowly and fully, hold for 5 seconds, exhale for 5 seconds, hold for 5 seconds, repeat cycle.



## East Fork Fire and Paramedic Districts Training and Safety Division

### **EMERGENCY AIR SUPPLY ENHANCEMENT TECHNIQUE**

#### SKIP BREATHING - Emergency Use Only

In an emergency situation, the use of a skip-breathing can enable a firefighter to prolong his/her air supply in excess of two hours when using a traditional 1200 liter air supply. This technique should NOT be attempted during highly strenuous endurance training rather for emergency situations when a firefighter must prolong his/her air supply when trapped or disoriented in a hazardous environment.

#### Recommended tasks:

Crawling, using an axe and chopping, climbing stairs, dragging a weight (100#) for 10-15 yards, walking with tools, advancing a charged line while crawling.

Be creative if you can think of a few other ideas that are safe then please us them.

Remember the goal is air management not the performing of the task itself.