

Fire Fighter Survival:

by: Frank Ricci & Jim Duffy

Surviving an Out of Air Emergency with Filter Technology

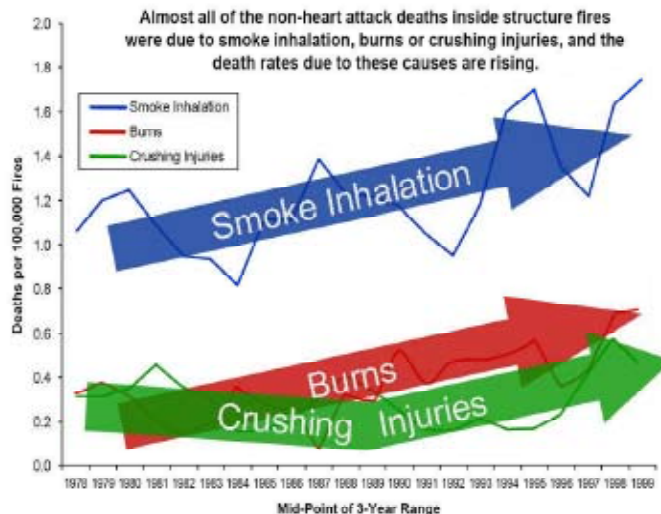
Far too many firefighters each year are dying to take a breath. Smoke inhalation is nothing new to the fire service with implications that range from acute to chronic injuries. The IAFF reported in 2007 that from 2000 to 2005, 170 professional fire fighters have died in the line of duty in Canada. 52 of these deaths were attributed to job-related cancers. As Firefighters we place ourselves in harms way everyday to give the citizens we are charged to protect the best chance of surviving. To facilitate our mission we have adopted high-risk technology without a back-up plan.

With the fire service implementation of SCBA we have saved more lives and property, than any of our forefathers could have ever imagined, while increasing the risk to ourselves. We must do a better job to minimize these risks through training, safer staffing; air management, trained rapid intervention teams, and use of a back up filter respirator.

The Environment

Firefighters face a chemical cocktail of toxic gases. We have examined over 100 autopsies and found that hydrogen cyanide, acrolin, carbon monoxide, hydrogen chloride and soot were all contributing factors to the victims death. The medical diagnosis of asphyxiation is often misleading. The diagnosis of asphyxiation does not indicate that oxygen was missing from the environment, only that the body was not able to

process the available oxygen, because of such gases as carbon monoxide and hydrogen cyanide. NFPA conducted a study of firefighter deaths for a span of twenty-two years per 100,000 fires and found smoke inhalation to be the leading cause of death (non-heart attack) inside structure fires. These studies show why firefighters need a back up respirator as a component to our SCBA. We all acknowledge that supplied breathing apparatus is the best option and that you should be out of the building before you run out of air. We also know that the potential exists at every fire for things



to go wrong. Firefighters commonly become lost, trapped and run out of air. The only option now, for one who has exceeded his air supply, is to breath an IDLH (Immediately Dangerous to Life and Health) atmosphere.

Air Management and the Mayday

Improved filter technology is only needed when everything else fails. Preventing the MAYDAY to begin with, better risk management by the officers in charge and training in air manage-

ment by all firefighters, is where we should begin. The only way this can be done effectively is to conduct hands on training with comparative testing for each firefighter. This should start in the academy and continue through their career. Comparative testing should be conducted by zeroing out SCBA bottles with a digital air gauge. When was the last time your department trained in emergency air management or giving and receiving a mayday call? We have found many departments are not as prepared for this call as they may think. At your next drill have a firefighter get lost and give a mayday, how will your department handle it?

Call for help as soon as you think you are in trouble because if you think you are in trouble you probably are. It is far better to get teased at the kitchen table than have the brothers talk about what a good guy you were after you've become a LODD statistic. A firefighter must call a mayday under the following conditions:

- Tangled, pinned or stuck with a low air alarm activation
- Fall through roof or floor
- Tangled, Pinned, or Stuck and cannot extricate self in 60 seconds
- Caught in flashover; zero visibility and no contact with hose or lifeline
- Do not know direction to exit
- Exit blocked by fire or collapse and not at secondary exit in 30 seconds
- Low air alarm activation and not at exit (door or window) in 30 seconds
- Cannot find exit (door or window) in 60 seconds
- Can Not Locate All Of Your Crew (Not At PAR)

Do not hesitate to call MAYDAY when you need help!

Your departments Mayday policy should include the Personal Sequence of Survival:



photo credit Nancy Ricci

- Call The MAYDAY
- Stay Calm Conserve Air
- Activate PASS
- LUNAR Report, discussed later in article
- If Lost or Disoriented as a Crew, you stay as a Crew
- Search for exit Look for light
- Follow a hose line or life line to safety
- Find an area of refuge CLOSE THE DOOR
- Shine and wave flashlight towards ceiling

The firefighter should call mayday, mayday, mayday; this will distinguish between the firefighter who is calling for help and someone else talking about the mayday. There are times where you will have to take protective action, such as closing a door or seeking an area of refuge, before you radio. Radio as soon as possible. It is important to maintain crew integrity. Update or give your mayday followed by company, name, last known location, air supply, conditions, Personal Accountability Report (PAR) of the company and if stationary or moving. Or use the acronym "LUNAR" (Location, Unit, Name, Assignment & Air Supply, Resources needed). Conserve air by remaining calm, use the Reilly Emergency Breathing Technique (R-EBT) or other proven emergency breathing method. Results of (R-EBT) testing are posted on line at www.firefightersafety.net. Activate your PASS device intermittently after you are finished with your message. Try to exit the structure. By staying calm and radioing for help

early we increase the chance of getting out or the rapid intervention team reaching you before you run out of air. All fire departments must train for rapid intervention and calling the MAYDAY. Sending your people into structure fires without this training and using rapid intervention teams that have not been trained is paramount to gross negligence.

Command

When a mayday call is received, be prepared to act. Never lose contact with the firefighter calling for help and realize that they might need reassurance. Ask direct questions about any information that was left out of the mayday and give appropriate direction. You may have to think for that firefighter. A common command mistake is trying to manage both the fire and the mayday. This cannot be done. Other companies should switch to an alternate channel, managed by a different officer. The RIT officer should coordinate the rescue. Once the RIT team is deployed it must be replaced immediately! A second common mistake is caused when the mayday involves a separated or lost firefighter. Commanders will often order the evacuation of the

building. This action of pulling everyone out may seal the firefighter's fate. This action usually occurs because of a failure to track crew's location inside the fire. Accountability should not only answer who is there but where they are. Diagramming the fire with proper radio communications will aid in this endeavor. And as the old saying goes, if we put out the fire everything else will get better.

Last Chance SCBA Backup Filter

Past line of duty deaths have shown that rapid intervention is not reliable and we continue to die waiting for RIT. This is where filter technology could make an impact on injuries and deaths from smoke inhalation. The Last Chance back up filter is your last option when faced with an out of air emergency. The Last Chance is rated for up to 15 minutes, to the European EN403 standard for smoke hoods. The

manufacture is adamant on the subject of use. Only when everything else has failed should a firefighter lock in this device to get out or buy time for RIT to find them. The Last Chance protects the firefighter from hydrogen cyanide, acroliein, carbon monoxide, hydrogen chloride and soot. The unit will not protect you from a high heat environment. This is why it is critical to take protective measures during the course of your mayday. This filter has been independently tested by fire departments across the U.S. in a study conducted by the Yale School of Medicine in conjunction with



A firefighter donning a Last Chance Backup Filter
photo credit Nancy Ricci

the Hamden Fire Department and the Connecticut Council on Occupational Safety and Health. I had the opportunity to participate in the study. In an IDLH atmosphere I switched over to the filter and I know that I would not want to go

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to work without one. Every firefighter deserves to have one last chance to see their kids at the end of their shift.

Donning the Last Chance Backup Filter

If RIT and self-rescue have failed and you are almost out of air, take the filter out of the package and tear it open. Line up the locking dogs and prepare to change over. Once you are completely out of air don the unit, and breathe out.

This will push the products of combustion back through the filter. Stay low and breathe off the floor where the air will be cooler and oxygen will be most abundant. It is important to remember the basics. Move away from any heat source and get out. This can all be accomplished when you are wearing gloves. If the RIT team finds a pinned firefighter they can easily remove the filter and switch the firefighter back to supplied air. The filter comes with an extensive training program that can be incorpo-

rated into your department's safety and survival training. The Last Chance Filter is not NIOSH certified. This is also the case with buddy breathing. The manufacture Essex PB&R is working to establish an NFPA standard for this improved technology. For more information, go to: www.firefightersafety.net

The number one job of all fire chiefs and company officers is to make sure that all of their people return home in the same condition they started the day in. Proper Training, good risk benefit analysis, using an incident command system and utilizing proven technology, like the last chance rescue filter (as it becomes available), will help achieve that objective. Remember; always have a plan B and C and D for that matter. If we apply these principles on a routine basis, we can reduce the number of firefighters that die annually in structure fires and it is absolutely our responsibility to do just that.

Live to Fight Another Day.

Survive an SCBA Emergency.

Only the Last Chance Rescue Filter™ provides the 15 minutes of breathable air you need to escape.

- Converts CO to CO₂
- Filters out HCN, HCl and other toxic gases
- Snaps on most SCBAs in seconds
- Weighs less than 1 pound; compact (3" x 5")

Lifesaving backup filter protection from Essex P.B. & R. Corp., a trusted name in protective breathing equipment.

Visit www.lastchancefilter.com for more information or call 314.351.6116.

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Frank Ricci: Currently he serves as the Director of Fire Services for ConnecticutCOSH (Connecticut Council on Occupational Safety & Health) He is an adjunct instructor for the New Haven Fire Department, Top Rung and Middlesex County Fire School. Frank has been a subject matter consultant for Yale, FDNY, Essex PB&R, Williams Direct Dryers and the DuPont Corporation. Frank has been nationally published in Fire Engineering magazine and is one of the contributing authors of a book entitled Carbon Monoxide Poisoning CRC Press 2008. Frank has worked on a heavy rescue unit covering Bethesda and Chevy Chase MD and was a "student live in" at station 31 in Rockville MD. He was one of the co-authors of CT whistle blower law. He is in his 11th year with the City of New Haven Fire and most recently developed the Fire Engineering film "Smoke Showing." Frank is the task force chair of New Havens Injury Rehabilitation Initiative that has been endorsed by the IAFF. He is currently working on a training DVD on Firefighter Survival Techniques. Frank will be teaching at FDIC in April. He can be reached at firefightersafety.net

Jim Duffy: has been a career firefighter for sixteen years and is a Shift Commander in the Wallingford Fire Department for the last seven. He started and is an ex-captain with the Mineola FD on Long Island NY. He is nationally certified as a Fire Instructor. Jim Has been an Adjunct instructor Middlesex regional Fire School and the developer of FF safety Program PREVENTION NOT INTERVENTION Jim is a member of Ricci Associates and is on the peer review board for firefightersafety.net He was the Division Chief for the Yale Survivability study on the Last Chance SCBA Back Up Filter. Jim has worked on several DVD projects for Fire Engineering and is currently working on a DVD for Firefighter Survival Techniques. Chart from NFPA Rita F. Fahy, Ph.D U.S. Fire Service Fatalities in Structure Fires, 1977-2000 (emphasis add by Bobby Halton)