

Skills Retention – A Must for Today’s Volunteer Fire Service

Leading Community Risk Reduction Programs

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Certification Statement

I hereby certify that this paper constitutes my own product, that where the language of others is set forth, quotation marks so indicated, and appropriate credit is given where I have used the language, ideas, expressions, or writing of other.

Signed: _____

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The problem is there has been a noticeable lack of skill retention from some members of the Brookline Volunteer Fire Company (BVFC). The lack of skill retention has become apparent at actual emergency incidents where the successful performance of a skill was critical to the control of the incident.

The purpose of this Applied Research Paper (ARP) is to investigate the factors that affect the skill retention of the BVFC firefighters and to seek ways to improve skill retention thus improving the operational efficiency at emergency incidents.

This will be an action research project; and will answer the following research questions:

1. What factors have an impact on adult learning and skill retention?
2. What methods or techniques can be used to improve skill retention?
3. In what ways can the decline in emergency incidents impact the skill retention of BVFC firefighters?
4. What steps have other fire companies in the region implemented to improve their member's skill retention?
5. What changes can be made to the training structure to improve skill retention by BVFC firefighters?

The procedures included the distribution of a feedback form to certain Fire Companies in Delaware and Montgomery Counties, located in southeastern Pennsylvania. The fire companies chosen are similar to the BVFC in that they are located in municipalities that operate multiple fire companies.

The results are as follows: Thirteen (72.3%) of the respondents noted that skill retention is sometimes a problem in their fire company. Fourteen (77.8%) of the respondents answered that they did see a relationship between the number of emergency incidents and volunteer team member's ability to retain skills. Twelve (80%) of the respondents replied that their company did

employ steps to measure their members' retention of firefighting/EMS skills. Ten (66.6%) respondents replied that they direct daily observation by officers or training staff to measure their member's skill retention.

The recommendations, based on this ARP, are as follows: the BVFC should change their SOPs to include procedures where members could practice their skill on certain equipment at non-emergency incidents. Officers responsible for training should be given training on adult education methods. Consideration should be given to including all members into facilitating training. Finally, the current frequency of training sessions for all members and additional training provided for probationary members should continue.

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Introduction

The problem is there has been a noticeable lack of skill retention from some members of the Brookline Volunteer Fire Company (BVFC). The lack of skill retention has become apparent at actual emergency incidents where the successful performance of a skill was critical to the control of the incident. The problems include apparatus operators failing to problem solve pump operation problems and members failing to correctly operate equipment such as gas powered saws. The author and Chief John F. Viola, BVFC, discussed this lack of skill retention and its' possible causes at length (J. Viola, personal communication, April 8, 2004). This has also been a frequently discussed problem among all the Line Officers in the BVFC for many years. Inevitably, the interest arises among the officers to wonder if other fire companies have the same concern about their members' skill retention. The purpose of this Applied Research Paper (ARP) is to investigate the factors that affect the skill retention of the BFVC firefighters and to seek ways to improve skill retention thus improving the operational efficiency at emergency incidents. This will be an action research project. The research will examine the factors that affect adult learning and skill retention. In addition, research will be conducted into methods and techniques that can be used to improve skill retention. A survey of other volunteer fire companies in the region will be conducted to determine if they have the similar issues with skill retention among their members and what actions, if any, they have taken to improve skill retention. The survey will attempt to determine if a reduction in the amount of emergency incidents has any effect on the skill retention of their members. I will develop a draft of the steps necessary to improve the skill retention of the members of BVFC. This document will also recommend, if required, changes to the training structure of the Fire Company that will promote the retention of firefighting skills.

The following research questions will be addressed in this applied research paper:

1. What factors have an impact on adult learning and skill retention?
2. What methods or techniques can be used to improve skill retention?
3. In what ways can the decline in emergency incidents impact the skill retention of BVFC firefighters.
4. What steps have other fire companies in the region implemented to improve their member's skill retention?
5. What changes can be made to the training structure to improve skill retention by BVFC firefighters?

Background and Significance

The Brookline Volunteer Fire Company serves various communities within Haverford Township. Haverford Township is a suburban community of 9.9 square miles and 48,489 residents located in southeastern Pennsylvania (D. LaSora, personal communication, June 1, 2004). BVFC is one of five volunteer fire companies that comprise the Haverford Township Bureau of Fire. The Bureau of Fire is governing body for the fire companies within Haverford Township and its representatives include a career Fire Marshal/ Emergency Management Coordinator, the Fire Chief from each of the five Fire Companies, the Police Chief, the Paramedic Chief, and a Township Commissioner. The BVFC operates four pieces of apparatus including: an aerial ladder truck, two engines and a spill control unit. One of the engines has foam capabilities. In addition to its' normal fire suppression duties, the BVFC is charged with the responsibility of suppressing flammable liquid fires and spills of various liquids that may occur within the Township. There are currently forty-four members of the BVFC. This Applied Research Paper relates to one of the United States Fire Administration's (USFA) four operational objectives: "Reduce the loss of life from fire of firefighters" (NFA, 2002, p. II-2).

This ARP also relates to the *Leading Community Risk Reduction* course of the National Fire Academy's Executive Fire Officer Program. Developing and implementing improvements in the skill retention of members of the BVFC would meet one of the Terminal Objectives of Unit 1 of the *Leading Community Risk Reduction Student's Manual*. The Terminal Objective states "The student will be able to take responsibility for fire prevention and community risk reduction programs by mitigating risks in the following areas: economic, social, political, life and property, and environmental" (NFA, 2003, p. S M 1-5). These objectives would be achieved by a successful research project that could provide information on improving the skill retention of the members of the BVFC. The efficient operation of apparatus, tools, and equipment would prevent firefighter injuries and deaths by providing members with the necessary and uninterrupted protection of operating hoselines, proper and adequate ventilation, egress by properly placed ladders, and other tactical necessities. These objectives would also be met by a Fire Company that can efficiently and effectively use its' firefighting and rescue skills to reduce or control the communities' risk to fires, accidents, hazardous material incidents, or other incidents within the community. The efficient and effective use of skills to reduce or control these risks would have a positive effect on the economic, social, political, life and property, and environmental aspects of the community.

Literature Review

A literature review was conducted as the foundation for this ARP. Literary sources were obtained for review from academic and fire service oriented publications. These sources included books and magazine articles on adult education, conditioning and learning, training in private sector organizations and within the fire service, and evaluation of job related training.

Five research questions will be addressed within this literature review. First, what factors have an impact on adult learning and skill retention? “When it comes to adult learning in organizations, there is plenty of evidence for discarding the machine and military metaphor. Perhaps a better metaphor for learning is that of sowing seeds. Successful, growing, living learning about complexity depends on the quality of the seed (the information itself), the skill of the farmer (the one guiding the learning process), the condition of the soil (the openness of the learner), and a little bit of luck in the weather (the events in the organizational context). Importantly, most farmers will admit that the seed, soil, and weather have more to do than with success than the farmer” (Plsek & Associates, 2001, p. 1). Additionally, “Research on adult learning suggests that retention of learning is a key challenge. Adults remember only about 10% of what they read and 50% of what they see and hear. But they retain 70% of what they say themselves and about 90% of what they do” (Plsek & Associates, 2001). It is recognized that children and adults learn differently. Lev Vygotsky suggested a phenomenon of adult education called “Zone of Proximal Development”. It is described as “the distance between the actual development level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers”(Riddle, 1999, p.1). Riddle also points out that “individuals participating in peer collaboration or guided teacher instruction must share the same focus in order to access the proximal development” (Riddle, 1999).

“The term “andragogy” refers to the concept that teaching adults is different from teaching children, in part because of contrasting learning goals and expectations between the two” (Jones-Hall, 1989, p.66). Within the concept of andragogy, there are four basic assumptions made regarding adults:

1. “Adults both desire and enact a tendency toward self-direction as they mature, though they may be dependent in certain situations.
2. Adults’ experiences are a rich resource for learning. Adults learn more effectively through experiential techniques of education such as problem solving.
3. Adults are aware of specific learning needs generated by real-life tasks or problems. Adult education programs, therefore, should be organized around ‘life applications’ categories and sequenced according to the learner’s readiness to learn.
4. Adults are competency-based learners (as opposed to students) in that they wish to apply newly acquired skills or knowledge to their immediate circumstances. Adults are therefore ‘performance centered’ in their orientation to learning” (Jones- Hall, 1989, p.66).

The concept of andragogy presented by Malcom Knowles and related in Jan Jones-Hall’s JEMS article “Skill Retention – Adults Learn Differently” can be further expanded upon to explain some of the factors that impact adult learning and skill retention. Knowles’ first assumption regarding the desire of adults to be self-directed can be explained as “adults are autonomous and self-directed. They need to be free to direct themselves. Their teachers must actively involve adult participants in the learning process and serve as facilitators for them” (Lieb, 1991, p.1). However, under certain circumstances, they may be dependant on the teacher. “People like to know where they stand and if they are making progress in your eyes. You, as their leader, must praise them if they are performing correctly, remind them if they forget and help them solve new problems or difficulties that arise” (Cox, May 1990, p.23). Knowles’ second assumption speaks to using the adult’s life experiences as a resource for learning. “Adults have accumulated a foundation of life experiences and knowledge that may include work-related activities, family responsibilities, and previous education. They need to connect learning to this

knowledge/experience base” (Lieb, 1991). As this concept relates to the fire service, it is important to remember that “today’s fire service is not comprised of a single, die-cut type individual. It is made up of unique adults, each bringing years of life experiences to the table” (Wendt, 1999, p.30). “Prior experience may make the educator’s role easier compared to someone who has never witnessed the value of what you have to offer” (Cox, 1990).

Donald Cox also offers the example of the challenge involved in implementing a seat belt policy for riding on fire apparatus. Firefighters who have never heard of or seen someone hurt as the result of not being properly belted in an apparatus may have a harder time learning and relating to this new policy. The third assumption addresses the adult’s need for specific learning that is caused by experienced problems or required life tasks. “If there is not a specified or valid need, why bother. Possibly they could have an ‘it could never happen to me attitude’ “(Cox, 1990). Knowles’ fourth assumption holds that adults are competency based learners. Adults want to use new skills and knowledge. “Adults are practical, focusing on the aspects of a lesson most useful to them in their work” (Lieb, 1991).

In addition to Malcom Knowles’ concept of “andragogy”, there are several other factors that affect adult education and learning. “Training in the fire service has traditionally catered to the left-brain functions, neglecting many of the critical, creative right-brain functions. Even hands-on training predominately uses left-brain functions such as sequence, linearity, logic, and analysis. In most cases, we’re missing opportunity to integrate right-brain functions into training programs. These are powerful tools that have powerful influences, such as the visualization techniques that professional sports teams and Olympic athletes have used very successfully”(Bridges, March 1994, p. 70). In addition to sequence, linearity, logic, and analysis, Ms. Bridges also includes language and numbers as (academic) left-brain functions. Right-brain (creative) functions include rhythm, color, daydreaming, dimension, space, music,

and images. “One common, effective example of the fire service using rhythm, imagination, language, and dimension is when children are trained to “Stop, drop and roll”. It really works, for children and adults, because it uses capabilities from both sides of the brain” (Bridges, 1994).

Motivation plays a part in adult education. Stephen Lieb in his article “Adults as Learners” cites six factors that motivate the adult learner. First, adult learning can form social relationships. Social relationships fulfill people's need to form new associations and friendships. Second, the adult learner's compliance with external expectations. This compliance is to fulfill the educational recommendations or expectations of an authority figure. Third, is personal advancement. The adult learner is motivated to seek education for the pursuit of personal advancement in employment or to stay ahead of the competition. Fourth, is social welfare. This motivates the adult learner to prepare for service work within a community. The fifth factor of the adult learner's motivation is known as escape stimulation. Escape stimulation is the adult learner trying to relieve boredom by breaking the daily routine of life. The sixth motivation is cognitive interest. Cognitive interest is seeking knowledge to satisfy an interest. However, Lieb also cites motivation as a barrier to adult learning. Many times adults are motivated to learn to meet a certification requirement, a need to learn new skill or maintain previously learned skills, or the need to adapt to a job change.

Lieb also points out some barriers to adult learning. “Unlike children and teenagers, adults have many responsibilities that they must balance against the demands of learning. Because of these responsibilities, adults have barriers against participating in learning” (Lieb, 1991). These responsibilities that Lieb refers to include: family responsibilities and child care, a lack of money, time or interest.

Learning and retaining skills can be affected by the type of skills that need to be learned. “For learners of both high and low aptitude, there are two good principles to keep in mind about

these tasks. We remember skills we *do* better than those we are simply told how to do, such as the well known riding a bicycle example” (Wall, Haught, Dowler, 1982). Motor skills are usually retained easier and for a longer period of time. In addition, it is suggested that for someone to retain a skill it should be performed as soon as possible and as frequently as possible. The steps of the operation should be presented in a “meaningful way” to the learner and in an organized fashion with sequential steps that allow the learner to see the relationship between the steps.

The second research question to be answered is what methods or techniques can be used to improve skill retention? “Learning is critical to our survival in this fast-paced, high technology, competitive world. We need to ignite people’s capabilities for: thinking skills, learning skills, creativity skills, problem solving skills” (Bridges, 1994). Alice Bridges also compares learning to taking a trip. The instructor or facilitator of learning must make maps to make the trip effective and successful for the facilitator and the student. Both should expect “curves in the road” that will require changes to improve the learning process. Bridges suggests the learning facilitators should implement five learning strategies that create a collaborative and caring learning environment. First, provide a positive and open learning experience. Facilitators should minimize the fears and barriers to learning. The learning process should change from the established practice of passive lectures where the student sits and is subjected to “how great I am and “I’ll tell you everything you need to know” (Bridges, 1994) to formats where the student is totally involved. This type of setting allows students to learn from not only the facilitator but from other students in the class. Within this positive and open learning experience the facilitator should also provide the goals and objective to the students. In addition, the facilitator should also obtain the students’ goals and objectives. This exchange helps to eliminate any false expectations for the class and gives the sense of a collaborative environment. Facilitators should also provide immediate and frequent positive feedback to give the students early and frequent feeling of

success. Facilitators should also provide an environment that is discrimination-free. The use of masculine pronouns can disrupt the learning process. Facilitators should also be aware of a growing diversity in today's fire service and show the appropriate respect during the learning sessions. Finally, provide learning that is immediate and personally meaningful, "then those firefighters will be able to say IGM ("I got mine!")" (Bridges, 1994). Bridges' second learning strategy is to move from a training centered to a learning centered approach. In the training centered method, the instructor delivers the contents of the program. In a learning centered approach, the content of the lesson is delivered in various ways by student involvement. Training centered learning as related by Martin M. Broadwell causes students to forget 75% of what was learned as quickly as two days after it is heard. Paralleling Ms. Bridges' thoughts, Robert Bingham suggests "instructors should use less lecture and more class participation" (Bingham, 1997). Instructors/facilitators who bring out the students' experiences will help to stir their minds. Bingham reinforces the position that "real learning takes place when they actually do it. Firefighters learn by doing" (Bingham, 1997).

The third strategy is to design a creative environment that stimulates all the senses. One of the suggested methods is to do away with the auditorium style seating arrangement whenever possible. This is the least effective seating arrangement to facilitate learning. Ms. Bridges recommends using an interactive seating arrangement. This type of arrangement uses a cluster type of seating where the tables and chairs are put in a wide V arrangement. The other suggested room arrangement is a circle style. Students are placed at a circular or square table but they are seated facing each other. These style settings breakdown the traditional classroom setting and allow eye contact and interaction between the students. In addition, it encourages the students to question and interact with the facilitator. Once establishing a seating method, the facilitator should use a variety of audio and visual devices. These devices could include: transparencies,

videos, music videos, and slides. These audio and visual devices should use various colors and graphs to support the learning process. A creative environment can be established by getting the students physically active and engaged in the class and using personal experiences when appropriate. “We have a new generation of firefighters to train. The MTV generation doesn’t want Lawrence Welk instruction” (Bingham, 1997).

The fourth strategy is to find an application for the learning. Bridges suggests having periodic group discussions or de-briefings to pull out key thoughts and feelings. This will allow the students to connect the training to the real world. These de-briefings are compared to post-incident debriefings or critiques used commonly in the fire service. The author recommends not calling these de-briefings “critiques” because of the negative connotations often associated with the critique process. De-briefings should be a normal and natural end to providing closure to an incident or to the learning process. The de-briefing should provide positive communication to support existing behaviors and to help build new behaviors acquired during the learning process.

The fifth strategy is for the facilitator preparing themselves and the necessary materials for the training. The facilitator prepares mentally by believing in the student’s ability and by dispensing with any bias or attitudes. Materials for the training should be prepared before the class. Handouts and visual materials should be colorful with pictures and graphs whenever possible. The use of these types of aids will stimulate the learning process. The use of training materials that look “excessively photocopied” should be revised or re-formatted to give a better appearance. Finally, Ms. Bridges advises that those conducting training sessions should be “facilitators of learning, not pushers of information” (Bridges, 1994). In some cases, the need for the facilitator to control the entire learning process must be set aside, especially if it interferes with the ability of the group to interact.

Another suggestion for improving skill retention and the ability of a person to remember what they have learned is to incorporate meaningfulness, overlearning, and distributed practice. “The trainer should make the material as *meaningful* as possible”. “Use easy words and simple descriptions” (Wall, Haught, Dowler, 1982). “Overlearning means practicing more than necessary to master the task” (Wall, Haught, Dowler, 1982, p.77). It is suggested that a task is practiced 50 % more than what is normally required to master the task. Distributed practice improves skill retention by breaking skill practice into several smaller duration segments, rather than larger blocks of time with fewer segments.

Mentoring is a growing trend in the corporate world not only to provide training and skill development through instructors or facilitators, but to also use mentors. “Mentoring is a means of supporting and developing the staff” (Holmes, 2002, p. 83). Holmes suggests that mentoring take place “outside of the line relationship”, but within a professional relationship. A professional relationship will allow the mentor to work with the employee to develop objectives and provide the necessary feedback. Holmes lists four styles of mentors:

1. A directive and challenging coach who directs the learner throughout the learning process;
2. a directive and nurturing guardian who acts as a role model and provider of advice;
3. the nurturing and non-directive counselor who provides support during the learning process; and
4. the challenging and non-directive network/facilitator who helps the individual take charge of their own learning.

We are reminded, “The real challenge, therefore, is upgrading and transformation of our skills to maintain our employability well into the future” (Holmes, 2002). This theory on employability may be paralleled to the volunteer fire service. Acceptance and value as a skilled

member of a volunteer fire company could be seen as volunteer employability. Holmes also relates that “it is clear that new jobs demanding old skills will not materialize; new jobs will require new skills. With governments and organizations generally slow to respond to these issues, it is up to the individual to ensure they are appropriately skilled throughout their careers” (Holmes, 2002). Holmes sees “lifelong learning as the key to longevity within the workplace” (Holmes, 2002).

The third research question to be answered is in what ways can the decline in emergency incidents impact the skill retention of BVFC firefighters? One of the impacts on skill retention caused by the decline in emergency incidents is the onset of complacency by the responding firefighters. Many fire departments are seeing a decline in the number of fire responses referred to as “the big one”. This type of incident allowed firefighters to use the skills that they have practiced repeatedly. Instead, “the big one” or actual fire responses have been replaced with responses to automatic fire alarm and carbon monoxide detector activations, people stuck in defective elevators, or burned food on the stove. “When you are repeatedly getting dispatched to these minor nuisance calls, all with similar results, it is not that difficult to let your guard down and think the next one will be more of the same” (Carlin, June 2003, p.83). Carlin relates that when this complacency sets in, firefighters may not use their assessment skills when arriving at an incident. They may not wear the necessary personal protective equipment when feeling “why bother putting on all my gear just to reset an alarm panel?” (Carlin, 2003). Carlin suggests combating complacency by the various department leaders identifying problem areas that support the development of complacency and implementing programs to combat this problem.

Training Officers can provide training to simulate actual firefighting conditions that could be encountered by the department. During this training, the safety aspects needed to complete a successful operation should be stressed constantly. Carlin also relates that company

officers should set a good example by closely following company SOPs during all routine or nuisances responses. They should also seize the opportunity to use these responses to review preplan procedures, point out hazards, and discuss tactics that could be used during an actual incident.

Finally, Carlin suggests that firefighters themselves can maintain their skill levels despite the lack of emergency incidents and when responding to routine or nuisance calls. Firefighters can respond in full protective clothing, carrying the appropriate tools, and acting in compliance with the established company SOPs. These actions will help to reinforce previously learned skills and provide a mental focus in the event the incident should escalate into something more serious. In addition to this response level, Carlin emphasizes the need for firefighters to read as many post-incident reviews as possible. This allows firefighters to learn from the experiences of others so they can avoid the similar mistakes. “We don’t know when that small routine call will become “the big one”. We don’t know when bad habits and complacency will catch us off guard. We don’t know when things will go wrong, and when a building and its’ contents will sustain heavy damage, or when a firefighter or civilian will get hurt or killed” (Carlin, 2003).

In addition to complacency affecting skill retention due to a decline in emergency incidents, the concept of forgetting and the extinction of skills may also impact retention. “You forget things over longer periods of time because you encounter other things, in the meantime, that interferes with your remembering of what you learned” (Wall, Haught, Dowler, 1982, p.77). In this case, what you learned is not available to you at the time it is needed. Extinction is described by the authors as a person having the required skills and training but the person chooses not to respond with these skills because they don’t “pay off”. The “pay off” is a favorable response in the use of the skill to complete a task or satisfy a supervisor’s direction.

The experience level of firefighters may decrease with the decline in emergency incidents. “As sprinklers, smoke detectors and other prevention/automatic suppression advances collectively reduce the number of fires, the experience level of personnel has correspondingly gone down” (Mittendorf, March 1997, p. 38). Mittendorf cites an NFPA statistic that 60 to 70 % of today’s fires in single family dwelling involve only one room. Mittendorf also theorizes this reduction in emergency incidents can cause the excitement level of the responding firefighters to rise. The rise in the excitement level may cause firefighters to forget basic fireground procedures. This lapse in following safety procedure could result in the injury or death of a firefighter. Some counter, that additional training could help overcome this lack of fireground experience. Mittendorf acknowledges this response but asks the question “How many fire departments have increased the amount of training in fireground operations they administer?” (Mittendorf, 1997).

The fourth research question to be answered is what steps have other fire companies in the region implemented to improve their members’ skill retention? This question will be answered completely in the Results and Discussion sections of this ARP.

The fifth research question is what changes can be made to the training structure to improve skill retention by BVFC firefighters? This question will also be answered in the Results and Discussion sections of this ARP.

Procedures

The topic of skill retention was chosen for this ARP because of a noticeable lack of skill retention from some members of the Brookline Volunteer Fire Company (BVFC). The lack of skill retention has become apparent at actual emergency incidents where the successful performance of a skill was critical to the control of the incident. The problems include apparatus operators failing to problem solve pump operation problems and members failing to correctly operate equipment such as gas powered saws. The author and Chief John F. Viola, BVFC,

discussed this lack of skill retention and its' possible causes at length. In addition, this has been a frequently discussed problem among all the Officers in the BVFC for many years. The author and Chief Viola were interested in determining the following information: First, what factors have an impact on adult learning and skill retention? Second, what methods or techniques can be used to improve skill retention? Third, in what ways can the decline in emergency incidents impact the skill retention of BVFC firefighters? Fourth, what steps have other fire companies in the region implemented to improve their member's skill retention? Fifth, what changes can be made to the training structure to improve skill retention by BVFC firefighters? (J. Viola, personal communication, April 8, 2004)

Research for this ARP was begun by conducting a literature review on the topics of skill retention, adult education, and vocational training. This information was gathered by electronic reviews of several library card catalogues located in the northeast region of the United States. These libraries included the following: the National Fire Academy's Learning Resource Center, Haverford College, Bryn Mawr College, Drexel University, Villanova University, West Chester University, the Pennsylvania State University (Penn State), The University of Maryland Library System, and the Five Colleges System (Amherst, Hampshire, Mount Holyoke, Smith, and U Mass at Amherst). In addition, a search of the World Wide Web was conducted using the search titles of skill retention, adult education, and vocational training. An electronic search of the Fire Engineering and Firehouse Magazine websites was conducted. The research materials for this ARP were obtained through the Haverford College Magill Library inter-library loan service.

While conducting the literature review, it was decided to distribute a feedback form to certain Fire Companies in Delaware and Montgomery Counties, located in southeastern Pennsylvania. The fire companies chosen are similar to the BVFC in that they are located in

municipalities that operate multiple fire companies. The fire companies and municipalities are identified and listed in Appendix (A). The decision to distribute feedback forms was reached when it was determined that the following research questions required a survey to gather some of the necessary information: a) what factors have an impact on adult learning and skill retention, b) what methods or techniques can be used to improve skill retention, c) in what ways can the decline in emergency incidents impact the skill retention of BVFC firefighters, d) what steps have other fire companies in the region implemented to improve their member's skill retention, and e) what changes can be made to the training structure to improve skill retention by BVFC firefighters?

Feedback Form

The feedback form was developed by the author to obtain data from the fire companies listed in Appendix (B) on the subject of skill retention within the volunteer fire service. The following questions were asked: a) skill retention in my company has been or is currently a problem, b) do you see a relationship between the number of emergency incidents and a volunteer team member's ability to retain skills, c) does your company employ steps to measure a member's retention of firefighting/EMS skill, d) what methods does your company employ to measure a member's skill retention? The feedback form also requested the respondent to list other methods of measuring skill retention not listed in the multiple choices in question d. Respondents were also asked to list additional comments related to skill retention and adult education which they thought were not covered by this survey. A cover letter accompanied each feedback form explaining the purpose of the ARP (Appendix C). The respondents were asked to provide their contact information and were also given the option of receiving a copy of this ARP when completed and graded. Each of the feedback forms included a postage paid return envelope.

Population

The population for this feedback sampling were the fire companies in Delaware and Montgomery counties that are located in municipalities that operate multiple fire companies. The total population for this sampling was 37. The Chief of the BVFC was not included in this sampling, since the information is being gathered for his use.

Statistical Analysis

The results received from this feedback form were evaluated and presented using action research methods. The raw feedback data is located in Appendix (D). The data was then compiled on an individual bar chart as it compares to each question on the feedback form. Question 1 (skill retention in my company has been or is currently a problem), question 2 (do you see a relationship between the number of emergency incidents and a volunteer team member's ability to retain skills?), question 3 (does your company employ steps to measure a member's retention of firefighting/EMS skill required the respondents to answer yes or no. Question 4 (what methods does your company employ to measure a member's skill retention?) provided the respondents five choices of individual observation, testing, or self reporting as measurements of skill retention within their Companies. Information for this question was gathered from the book titled: *Evaluating Job-Related Training* (Deming, 1982, p.65). Number 5 on the feedback form allows the respondent to list other methods of measuring skill retention used by their Company that were not listed in question 4. Additionally, number 6 on the feedback form asks respondents to list comments related to skill retention and adult education that were not covered by the survey. Where appropriate, this information will be used in the Results and Discussion sections of this ARP.

Limitations and Assumptions

There were several limitations in this ARP and associated feedback form. During the electronic searches, it was difficult to locate information related directly to the topic of skill retention. The majority of the information related to skill retention was discovered in the other topics of adult education and vocational training. This problem was also discovered while searching fire service related resources. Regarding the limitations and assumptions as they apply to the feedback forms, there are a few that must be mentioned. The author had some difficulty finding the addresses of some of the fire companies that were targeted for participation in this survey. Many of the fire companies had web sites but did not list their mailing addresses on the homepages. Additionally, requests for this information from county governments were met with some resistance. Some of the information was obtained through personal and informal contact with county employees. However, to be fair in the reporting of this limitation, it must be acknowledged that these employees were extremely cooperative and helpful. The response to the feedback forms was less than favorable. There are different reasons that could be the cause of this low response. Several of the feedback forms were sent to fire companies that use Post Office Boxes to receive their mail. Serving as volunteer members of the fire company, the mail pick up may not be as frequent and the volume of mail may have caused this feedback form to become lost in the administrative process of mail distribution. The potential respondents may have opened the feedback forms after the requested return date and decided it was too late to participate. In addition to the less than favorable response, one of the questions was not answered by all of the respondents. Due to the shortage of time while writing this ARP, the author did not contact the non-respondents in attempts to increase the percentage of responses. It is assumed that the respondents did answer the questions honestly and without reservation. The final limitation is the Executive Fire Officer Program's requirement for completing the ARP in six

months. This requirement restricts the amount of research that can be completed on a chosen subject.

Definition of Terms

Skill - Proficiency, facility, or dexterity that is acquired or developed through training or experience

Skill Retention – The extent to which a skill that was previously learned can be recalled by the learner.

MTV generation – A group of individuals born during recent years that were influenced by the culture of MTV (Music Television Network).

Lawrence Welk – An orchestra leader that hosted a variety television show that aired from 1955 to 1982 which featured “champagne music”. The music was highlighted by the use of accordions and organs.

SOP – Standard Operating Procedure

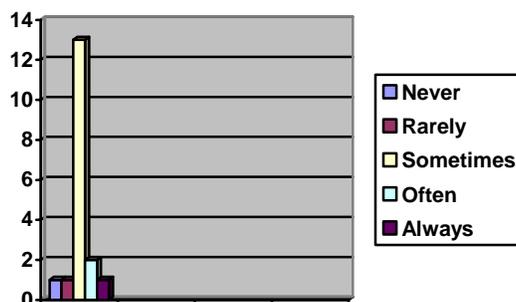
NFPA – National Fire Protection Association

Results

A total of 18 of the 37 fire chiefs surveyed from Delaware and Montgomery Counties completed and returned the feedback forms. This translated in to a 48% response rate. Although question 1 (skill retention in my company has been or is currently a problem) on the feedback form was not a research question, it was asked as a general information question to determine if skill retention problems are unique to the BVFC. A total of 18 of the respondents answered this statement. Thirteen (72.3%) of the respondents noted that skill retention is sometimes a problem in their fire company. Two (11.1%) of the respondents reported that often skill retention was a problem in their company. One (5.5%) of the respondents stated that skill retention never has been or is currently a problem in their company. One (5.5%) of the respondents stated that rarely

is skill retention a problem in their company. One (5.5%) reported that skill retention was always a problem in their fire company (Figure 1).

Figure #1: Is, or has, skill retention been a problem in my company?



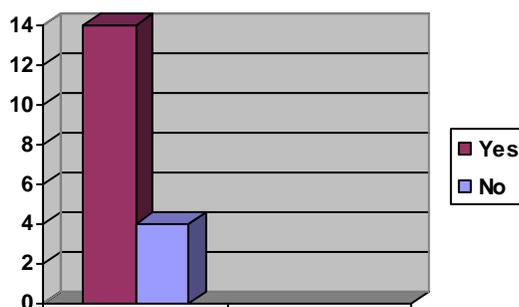
The question was also asked to attempt to learn the frequency that skill retention problems occur in neighboring fire companies. The use of the responses; (never, rarely, sometimes, often, always) helped to determine the frequency that the respondent felt skill retention was a problem within their organization. The commonality of the problem may allow a more objective look at one's fire company when trying to determine how to overcome the problem. The majority of the feedback responses to this question clearly show that skill retention is or has been a common problem among the volunteer fire companies. Only one of the respondents reported that skill retention has never been or is currently a problem in its company.

This feedback question relates to research question 1 (What factors have an impact on adult learning and skill retention?) and research question 2 (What methods or techniques can be used to improve skill retention?). By fire companies self assessing their skill retention levels, they can then try and learn what factors impact adult learning, and skill retention, and what methods can be used to improve their company's skill retention.

Research question 3 asked "In what ways can the decline in emergency incidents impact the skill retention of BVFC firefighters?" In attempts to gather information for this question, the

author asked the survey respondents “Do you see a relationship between the number of emergency incidents and a volunteer team member’s ability to retain skills?” Fourteen (77.8%) of the respondents answered that they did see a relationship between the number of emergency incidents and volunteer team member’s ability to retain skills. Four (22.2%) of the respondents disagreed and did not see a relationship between the number of emergency incidents and the ability of a volunteer team member to retain skills (Figure 2). This question was asked to determine if the number of emergency response could be one of the impacts on skill retention. The respondents’ answers affirmed this theory.

Figure #2: Do you see a relationship between the number of emergency incidents and a volunteer team-member’s ability to retain skills?



Research question 4 asks “What steps have other fire companies in the region implemented to improve their members’ skill retention?” The feedback form provided a section to list additional comments related to skill retention or adult education not covered by the survey. Several of the respondents listed comments explaining existing programs currently in use to promote skill retention. The respondents reported conducting frequent training on essential skills. One fire company requires all active members to participate in training, not just new members. Another company conducts an annual review of essential skills and requires participation from

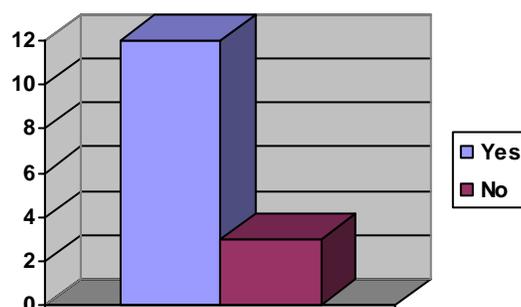
all active members. Still another company reports conducting regular in-house training to improve skill retention of its' members.

In addition, the author discussed the problems of skill retention with a retired Deputy Chief from the Philadelphia Fire Department. This discussion was used to discover what steps a local career fire department employs to improve or maintain skill retention. Could any of these steps, if found useful by the volunteer fire service, be easily adapted for their operations? One example discussed was in the area of apparatus operation. At the start of each shift, the member assigned to drive and operate the engine company would drive the apparatus on to the station driveway apron and conduct various tests or checks on the pump. These tests or checks included: placing the pump in operation, checking the water level in the water tank, and taking steps necessary to flow water out of the pump. Ladder company operators would conduct tests on the station driveway apron that included: operating the aerial ladder or device to verify the various operating positions, operate the safety devices to insure proper operation.

Once they arrived on the scene of an incident where there was a report of a fire, the engine company operators would place the pump into operation. These procedures help to reinforce the skills necessary to operate these pieces of apparatus safely and efficiently (Bernard Dyer, personal communication, October 27, 2004).

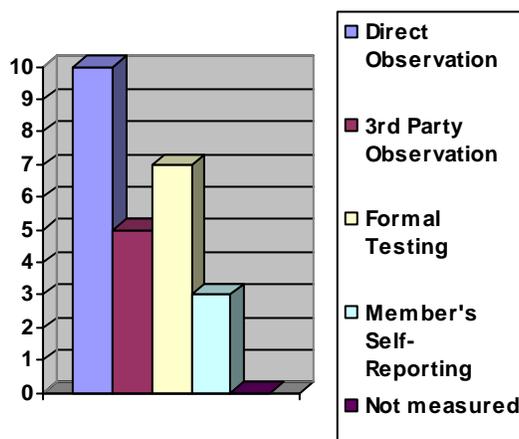
The feedback form question "Does your company employ steps to measure a members' retention of firefighting/EMS skills?" was asked on the feedback form to see if the respondents conduct a formal assessment process. Twelve (80%) of the respondents replied that their company did employ steps to measure their members' retention of firefighting/EMS skills. Three (20%) of the respondents replied that their company did not employ any steps to measure their members' retention of firefighting / EMS skills (Figure 3).

Figure #3: Does your company employ steps to measure a member's retention of firefighting/EMS skills?



Respondents answering “yes” to the question “Does your company employ steps to measure a members’ retention of firefighting/EMS skills?” were then asked in the next feedback form question (“What methods does your fire company employ to measure a members’ skill retention”?) to select which of the five methods they employ. Ten (66.6%) respondents replied that they direct daily observation by officers or training staff to measure their member’s skill retention. Seven (58.3%) use formal testing of competencies at assessment centers by company training staff. Five (41.6%) report that they use third party observations by Fire / EMS instructors at a training center. Five (41.6%) report they allow the members’ own reporting of ability or inability to retain skills as measurement of skill retention. None of the respondents to the feedback forms reported that skill retention was not measured (Figure 4).

Figure #4: Methods your company employs to measure a member's skill retention?



A fire company assessing its members' skills can use this tool to help make improvements in training and instruction that may produce a rise in the level of skill retention. Twelve (80%) of the respondents replied that their company did employ steps to measure the retention of firefighting / EMS skills of their members.

In answering the final research question, (“What changes can be made to the training structure to improve skill retention by BVFC firefighters?”), the feedback form provided some suggested areas of change that may improve the training structure. This was possible despite the fact the feedback form question (“If your company employs other methods of measuring skill retention not listed in question 4, please list below.”) was attempting to solicit information on measuring skill retention. One fire company related that they have implemented a regular review of training exercises and incidents with members. This review process allows members to make positive as well as negative comments about their skills. Another fire company replied that they have developed an annual review of skills required for the safe and efficient operation of self-contained breathing apparatus and emergency vehicles. In addition, the author spoke with a Los Angeles City Fire Department (LAFD) Battalion Chief to learn more about their training methods. Chief Christopher Logan explained the many variations conducted by the LAFD. Some

of these programs could easily be incorporated into a volunteer fire company's training structure. However, these programs may not be presented as frequently in the volunteer fire service because of the availability of members to attend the training sessions. Some examples of these programs are as follows; on a daily basis in the LAFD, there is a "6 Minute Drill". This drill is designed as a quick reminder or review of a training topic or emergency incident. There is also a daily "Rookie Drill" where basic skills are reviewed with newer members for approximately 30 minutes. In addition, individual company members present a daily training session on differing topics. Each weekend, companies train on various practical training evolutions such as raising ladders or rappelling. On a quarterly basis, Battalion Chiefs provide training to their companies on various topics that may include: high rise firefighting, swift water rescue, brush fire tactics, or hazardous material responses (Christopher Logan, personal communication, October 15, 2004). These examples may provide viable ideas for improving skill retention within the training structure of the BVFC.

Discussion

The results of the feedback form indicate that skill retention is, to varying degrees, a problem in the volunteer fire service. It is not the author's intention to focus on the skill retention problems in the career fire service. On the feedback form, the inquiry "skill retention in my company has been or is currently a problem" was made to respondents. This inquiry was not a research question; it was asked as a general information question to determine if skill retention problems are unique to the BVFC. A total of 18 of the respondents responded to this statement. Thirteen (72.3%) of the respondents noted that skill retention is sometimes a problem in their fire company. Two (11.1%) of the respondents reported that often skill retention was a problem in their company. One (5.5%) of the respondents stated that skill retention never has been or is currently a problem in their company. One (5.5%) of the respondents stated that rarely is skill

retention a problem in their company. One (5.5%) reported that skill retention was always a problem in their fire company.

With all but one of the respondents acknowledging that skill retention has been a problem in their companies, it becomes necessary to examine the many and wide ranging theories or concepts regarding adult education and skill retention. In response to the first research question, (what factors have an impact on adult learning and skill retention?) it is widely accepted that adults learn differently from children. “Research on adult learning suggests that retention of learning is a key challenge. Adults remember only about 10% of what they read and 50% of what they see and hear. But they retain 70% of what they say themselves and about 90% of what they do” (Plsek & Associates, 2001). To lend support to this theory, it is also recognized that motor skills are usually retained easier and for longer periods of time. However, it is suggested that for someone to retain a skill it should be performed as soon as possible and as frequently as possible. In order to learn this skill properly and to have some assurance it will be retained, the steps of the operation should be presented in a “meaningful way” to the learner and in an organized fashion with sequential steps that allow the learner to see the relationship between the steps. We remember skills we *do* better than those we are simply told how to do, such as the well known riding a bicycle example” (Wall, Haught, Dowler, 1982).

Malcom Knowles presented the concept of “andragogy” that suggests that teaching adults is different from teaching children. Within the concept of andragogy, there are four assumptions regarding educating adults:

1. “Adults both desire and enact a tendency toward self-direction as they mature, though they may be dependent in certain situations.
2. Adults’ experiences are a rich resource for learning. Adults learn more effectively through experiential techniques of education such as problem solving.

3. Adults are aware of specific learning needs generated by real-life tasks or problems. Adult education programs, therefore, should be organized around 'life applications' categories and sequenced according to the learner's readiness to learn.
4. Adults are competency-based learners (as opposed to students) in that they wish to apply newly acquired skills or knowledge to their immediate circumstances. Adults are therefore 'performance centered' in their orientation to learning" (Jones- Hall, 1989, p.66)

Lieb points out some barriers to adult learning. "Unlike children and teenagers, adults have many responsibilities that they must balance against the demands of learning. Because of these responsibilities, adults have barriers against participating in learning" (Lieb, 1991).

The responsibilities that Lieb refers to include: family responsibilities and child care, a lack of money, time or interest. These responsibilities can have a significant impact on the volunteer fire service because participation in the fire company often is secondary due to the many responsibilities of family life.

The second research question to be addressed is what methods or techniques can be used to improve skill retention? Training sessions would have to be reformed into a "more positive and open learning experience" (Bridges, 1994). Training centered learning as related by Martin M. Broadwell causes students to forget 75% of what was learning as quickly as two days after it is heard. Bingham suggests "instructors should use less lecture and more class participation" (Bingham, 1997). Instructors/facilitators who bring out the students' experiences will help to stir their minds. Bingham reinforces the position that "real learning takes place when they actually do it. Firefighters learn by doing" (Bingham, 1997).

However there are times when lectures will be needed to present new information to members of the BVFC. Alice Bridges suggests replacing the auditorium style of seating with a

“interactive seating arrangement”. This type of arrangement would include a cluster type of seating where the chairs and tables are arranged in a wide V pattern. Others suggest a circular style. These arrangements allow the participants eye contact and free interaction. These arrangements encourage participants to question and interact with the facilitator. Once the seating arrangements have been decided upon, the facilitator should consider the type of audio visual devices that will be used. These devices should include current forms of audio and visual devices such as: videos, music, slides and even computer generated programs. A creative environment will get the participants involved. “We have a new generation of firefighters to train. The MTV generation doesn’t want Lawrence Welk instruction” (Bingham, 1997).

The third research question to be discussed is “in what ways can the decline in emergency incidents impact the skill retention of BVFC firefighters?” Of the fire chiefs surveyed on the feedback form, fourteen (77.8%) answered that they did see a relationship between the number of emergency incidents and volunteer team member’s ability to retain skills. Four (22.2%) of the respondents disagreed and did not see a relationship between the number of emergency incidents and the ability of a volunteer team member to retain skills. The majority of these fire chief believe that the decline in the number emergency incidents directly impacts a fire company member’s ability to retain their skills. One reason for this belief is that skills that were commonly practiced at actual fire incidents, referred to as “the big one”, are no longer practiced repetitively due to the decline in emergencies. Consequently, “as sprinklers, smoke detectors and other prevention/automatic suppression advances collectively reduce the number of fires, the experience level of personnel has correspondingly gone down” (Mittendorf, March 1997, p. 38).

Complacency is another result of the emergency incident decline. “When you are repeatedly getting dispatched to these minor nuisance calls, all with similar results, it is not that difficult to let your guard down and think the next one will be more of the same” (Carlin, June

2003, p.83). Carlin also relates that when complacency sets in among fire company members, they may not use their assessment skills when arriving at an actual incident. This result may produce poor fireground performance and possible injury to the members. The general attitude among member will degrade to “why bother putting on all my gear just to reset an alarm panel?” (Carlin, 2003). Carlin suggests that training officers can overcome the lack of emergency incidents by substituting simulated firefighting conditions. During this type of training, the safety aspects of a successful fireground operation should be constantly stressed during these evolutions. During routine responses, company officers can set a good example for their members by closely following company SOP’s. They should also seize the opportunity to use these responses to review preplan procedures, point out hazards, and discuss tactics that could be used during an actual incident. Firefighters should be encouraged to respond to any incident in full protective clothing, carrying the appropriate tools, and acting in compliance with the established company SOPs. These actions will help to reinforce previously learned skills and provide a mental focus in the event the incident should escalate into something more serious. In addition to this response level, Carlin emphasizes the need for firefighters to read as many post-incident reviews as possible. This allows firefighters to learn from the experiences of others so they can avoid similar mistakes.

Finally, the concept of forgetting and the extinction of skills may also impact retention. “You forget things over longer periods of time because you encounter other things, in the meantime, that interfere with your remembering of what you learned” (Wall, Haught, Dowler, 1982, p.77). In this case, what you learned is not available to you at the time it is needed. Extinction is described by the authors as a person having the required skills and training but the person chooses not to respond with these skills because they don’t “pay off”. The “pay off” is a favorable response in the use of the skill to complete a task or satisfy a supervisor’s direction.

These statements seem to suggest the need for constant review and training on firefighting skills to prevent the interference from effects of time that cause skills to be forgotten. Also, company officers should provide the necessary “pay off” by encouraging and complimenting members for the proper practice of previously learned skills. This will prevent the extinction of member’s skills.

The fourth research question for discussion asks, “What steps have other fire companies in the region implemented to improve their members’ skill retention?” Three sections of the feedback form provided information for this research question. Before discovering the steps taken by other fire companies in the region to improve their members’ skill retention, the author was interested in determining if the companies employ steps to measure a member’s retention of firefighting/EMS skills. Twelve (80%) of the respondents replied that their company did employ steps to measure their members’ retention of firefighting/EMS skills. Three (20%) of the respondents replied that their company did not employ any steps to measure their members’ retention of firefighting / EMS skills. The other question that was asked was to determine what methods these companies used to measure a member’s skill retention. Ten (66.6%) respondents replied that they direct daily observation by officers or training staff to measure their member’s skill retention. Seven (58.3%) use formal testing of competencies at assessment centers by company training staff. Five (41.6%) report that they use third party observations by Fire / EMS instructors at a training center. Five (41.6%) report they allow the members’ own reporting of ability or inability to retain skills as a measurement of skill retention. None of the respondents to the feedback forms reported that skill retention was not measured. These results show that the majority of the fire companies are measuring their members’ skill retention. These measurements take place in many varying ways. Most methods are extremely common and simple to undertake. Perhaps the most unusual method is the companies allowing their members’ to report their own

ability or inability to retain skills. This type of reporting would provide the company training officers with knowledge of a member's shortcomings before they were discovered at a critical time on the firegrounds. This would require an open and understanding environment within the company that encourages this type of disclosure. Without this type of environment, members may feel embarrassed or self-conscious about reporting their own shortcomings.

In a section of the feedback form that asked for additional comments regarding skill retention, the respondents reported additional facts that not only address measurement of skill retention, but they also give insight into the steps taken to improve skill retention. The respondents reported conducting frequent training on essential skills. One fire company requires all active members to participate in training, not just new members. Another company conducts an annual review of essential skills and requires participation from all active members. Still another company reports conducting regular in-house training to improve skill retention of its' members. These are training programs commonly used in the region. One of the more interesting ideas that could be easily adapted into the operations of the volunteer fire service comes from a local career department. The idea comes from daily routine performed by an engine company operator in the Philadelphia Fire Department. At the start of each shift, the member assigned to drive and operate the engine company would drive the apparatus on to the station driveway apron and conduct various tests or checks on the pump. These tests or checks included: placing the pump in operation, checking the water level in the water tank, and taking steps necessary to flow water out of the pump (Bernard Dyer, personal communication, October 27, 2004). This operation could be incorporated into the response procedure of the BFVC. The apparatus operator of the engine company, while standing by at an incident, could take a moment and place the pump in operation, verify the water tank level, and flow a small amount of water out of the pump. This would allow the apparatus operator to review the steps necessary to place the pump

into operation and also review the steps necessary to solve the problems that commonly occur while operating a pump. A similar procedure could be developed and carried out by the ladder company operator. The timing of this procedure would have to be approved by the officer in charge of the apparatus to prevent any delay in carrying out an order. This would allow the officer time to monitor the radio communications and determine the severity of the incident and the appropriateness of the review procedure.

The fifth research question asked, “What changes can be made to the training structure to improve skill retention by BVFC firefighters?” There are some suggestions for change that could be made to the training structure of the BVFC to improve the skill retention of the members. One fire company’s response to the feedback form related that they have implemented a regular review of training exercises and incidents with members. This review process allows members to make positive as well as negative comments about their skills. As mentioned previously in the Discussion section of this ARP, a fire company that encourages their members’ to participate in a process that solicits negative comments as well as positive comments about the company’s training program and the members’ skill level must have an open and understanding environment within the company that encourages this type of disclosure. Another program that could easily be incorporated into the BVFC training structure comes from the Los Angeles City Fire Department. Some examples of these programs are as follows; on a daily basis in the LAFD, there is a “6 Minute Drill”. This drill is designed as a quick reminder or review of a training topic or emergency incident (Christopher Logan, personal communication, October 15, 2004). A similar type of program could easily be adapted by the BVFC. There is a small amount of time prior to the start of each training session where a member could present a presentation similar to the LAFD’s 6 Minute Drill. This would improve the members’ retention of skills by keeping them abreast of current fire service training activities and incidents. The members would need to

become physically involved in the training process by researching a topic for presentation.

Additionally, this would allow participation by all members and help eliminate established fire service practice of passive lectures where the student sits and is subjected to “I’ll tell you everything you need to know” (Bridges, 1994), to formats where the student is totally involved.

Consideration may be given in the BVFC to abandoning the idea that we are training our members and change our process to the concept of facilitating learning for our members.

Recommendations

With the information learned in the writing of this ARP, several recommendations will be made to the current training program at the BVFC to facilitate a higher level of skill retention. The problem statement of this ARP reported there has been a noticeable lack of skill retention from some members of the Brookline Volunteer Fire Company. The lack of skill retention has become apparent when apparatus operators have failed to problem solve pump operation problems and members have failed to correctly operate equipment such as gas powered saws. Since the members operating this equipment have previously demonstrated the mastery of this equipment, a procedure must be implemented to maintain an acceptable skill level. The BVFC SOPs titled “Standard Operating Procedure for Driver Training” and the “Standard Operating Procedure on Power Saws” should be revised to allow the addition of operation of this equipment at non-emergency incidents, as practice, to maintain the skill retention of the members responsible for operating this equipment (Appendix E & Appendix F). This recommendation is made “since people retain 70% of what they say themselves and about 90% of what they do” (Plsek & Associates, 2001).

The officers responsible for training should receive training on conducting adult education. This type of training is necessary since adults have different needs that must be addressed in their education.

Consideration should be given to the inclusion of all members into the facilitation of training. However, the individual member's ability should be taken into consideration, so the member is not overwhelmed by the task. This participation could be included into something similar to the LAFD's 6 minute drill.

The current policy of conducting training sessions four times per month on Monday evenings should continue with the inclusion of these recommendations. In addition, the practice of assigning new members a training officer for their 6 month probationary period should continue. Consideration should be given to changing the title of "training officer" to mentor. Mentoring is a growing trend in the corporate world. "Mentoring is a means of supporting and developing the staff" (Holmes, 2002, p. 83). Holmes suggests that mentoring take place "outside of the line relationship", but within a professional relationship. A professional relationship will allow the mentor to work with the member to develop objectives and skills and provide the necessary feedback.

Because the topic of skill retention is such an important part of day to day firefighting operations, those interested should conduct further investigation beyond this minor exploration of the problems and solutions of adult education and skill retention in the volunteer fire service.

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Appendix A

Fire Companies Surveyed for Skill Retention Information

Delaware County

Collingdale Borough

Collingdale Fire Company 1
Collingdale Fire Company 2

Darby Borough

Darby Fire Company 1
Darby Fire Patrol 2

Haverford Township

Oakmont Fire Company
Llanerch Fire Company
Bon Air Fire Company
Manoa Fire Company

Middletown Township

Lenni Heights Fire Company
Lima Fire Company
Middletown Fire Company

Ridley Township

Folsom Fire Company
Holmes Fire Company
Leedom Fire Company
Milmont Fire Company
S. M. Vauclain Fire Company
Woodlyn Fire Company

Montgomery County

Abington Township

Abington Fire Company
Edge Hill Fire Company
Mc Kinley Fire Company
Roslyn Fire Company
Weldon Fire Company

Cheltenham Township

Cheltenham Fire Company
Elkins Park Fire Company
Glenside Fire Company
Lamott Fire Company
Ogontz Fire Company

Lower Merion Township

Belmont Hills Fire Company
Bryn Mawr Fire Company
Gladwyne Fire Company
Merion Fire Company of Ardmore
Narberth Fire Company
Penn Wynne Fire Company
Union Fire Association

Upper Merion Township

King of Prussia Fire Company
Swedeland Fire Company
Swedesburg Fire Company

Appendix B

Applied Research Project
National Fire Academy’s Executive Fire Officer Program

Project Title: Skill Retention – A Must for Today’s Volunteer Fire Service

Skill Retention – The extent to which a skill that was previously learned can be recalled by the learner.

- 1. Skill retention in my Company has been or is currently a problem?
(Check one that applies)

Never ___ Rarely ___ Sometimes ___ Often ___ Always _____
- 2. Do you see a relationship between the number of emergency incidents and a volunteer team members’ ability to retain skills? Yes _____ No _____
- 3. Does your Company employ steps to measure a members’ retention of firefighting/ EMS skills?
Yes _____ No _____ (If you answer no, skip question 4).

- 4. What methods does your Company employ to measure a member’s skill retention?
(Check all that apply to your Company)

Direct daily observation by Officers or Training Staff _____
 Third party observation by Fire/EMS Instructors at a Training Center _____
 Formal testing of competencies or assessment centers by Company Training Staff _____
 Member’s own reporting of ability or inability to retain skills _____
 Skills are not measured _____

- 5. If your Company employs other methods of measuring skill retention not listed in Question 4, please list below.

- 6. List additional comments related to skill retention or adult education not covered by this survey.

Name: _____ Fire Company _____

Contact Phone Number: _____

Email (Please write clearly): _____

Would you like to receive a copy of the completed research paper? Yes ___ No ___

Appendix C

BROOKLINE VOLUNTEER FIRE COMPANY

1315 Darby Road

Havertown, PA 19083

446-9955

449-4567

September 1, 2004

Chief John F. Viola
Brookline Fire Company
1315 Darby Rd.
Havertown, PA. 19083

Dear Chief Viola,

I am currently enrolled in the National Fire Academy's Executive Fire Officer Program. This program requires each student to submit an applied research paper after each of the four program courses. My applied research paper is titled "Skill Retention – A Must for Today's Volunteer Fire Service".

Enclosed is a survey form that asks brief questions about skill retention problems and programs to overcome these types of problems. Could you please take a few minutes and complete the survey? Enclosed is a stamped pre-addressed envelope for the return of the completed survey. If possible, I would like to receive the completed surveys returned before October 25, 2004. I will not mention specific Fire Companies in my paper without your permission. In addition, I would be happy to provide you a copy of the survey results or a copy of the research paper. If you have any questions regarding this request, please contact me at (610) 789-0171.

I greatly appreciate your help. Thank you for your time.

Sincerely,

Mark R. Sweeney
Deputy Chief

Appendix D

Raw Data from Feedback Forms

1. Skill Retention in my Company has been or is currently a problem?

Never - 1
 Rarely - 1
 Sometimes - 13
 Often - 2
 Always - 1

2. Do you see a relationship between the numbers of emergency incidents and a volunteer team member's ability to retain skills?

Yes – 14
 No - 4

3. Does your Company employ steps to measure a member's retention of firefighting/ EMS skills?

Yes – 12
 No – 3

4. What methods does your Company employ to measure a member's skill retention?

Direct daily observation by Officers or Training Staff – 10
 Third Party observation by Fire/EMS Instructors at a Training Center – 5
 Formal testing of competencies or assessment centers by Company Training Staff – 7
 Member's own reporting of ability or inability to retain skills – 5
 Skills are not measured – 0

5. If your Company employs other methods of measuring skill retention not listed in question 4, please list below.

- Company drills are used to learn and practice skills. Officers review the skills with the members.
- Company drills allow officers to observe members.
- Company reviews drills and incidents with members allowing them to make positive and negative comments about their skills.
- Members are observed by officers at drills and incidents.
- The Company is currently developing an annual review of skills for SCBA and vehicle operations.
- Company is in the process of developing written tests with practice stations to measure skill retention.

6. List additional comments related to skill retention or adult education not covered by this survey.
- The Company conducts constant relevant training on essential skills.
 - All active members are training, instead of just new members.
 - Time between emergencies allow skills to erode.
 - The Company conducts in-house essentials review. All members must participate.
 - The Company conducts constant in-house training.

Appendix E

BROOKLINE FIRE COMPANY**STANDARD OPERATING PROCEDURE ON DRIVER TRAINING****SOP# 03-02****JOHN F. VIOLA, CHIEF**

I. Purpose: To establish procedures and training requirements for apparatus drivers/operators.

II. Scope: This policy applies at all members who are apparatus drivers/operators.

III. General Requirements:

- A. All drivers/operators shall be at least 18 years of age.
- B. Drivers will maintain a valid Pennsylvania Driver's License.
- C. Members will be approved by the Chief and Chief Engineer for the Driver Training Program and to be approved as drivers/operators.
- D. Driver/operators will have the following fire service and fire company experience:
 - 1. Fire Service experience – 2 years
 - 2. Fire Company experience – 1 year
- E. Driver/operators will meet the following training requirements:
 - 1. Basic Firefighting
 - 2. Pump or Aerial Operations within 6 months of being approved to operate a specific apparatus.
- F. Apparatus driver training will take place in the Brookline Fire District only, unless the apparatus is being taken to the Fire Training Grounds or other areas for planned training exercises.
- G. Pump operation training requiring water flow will take place at the Fire Training Grounds or at fire schools.
- H. Driver/operator training will be conducted by approved driver trainers only.
- I. All driver/operator training will be recorded on a Driver Training Sheet.
- J. Driver/operator trainees will know the location and operation of all equipment on the apparatus.

IV. Preventive Maintenance and Specific Apparatus Components

- A. Driver/ operator trainees will have a basic understanding of the following preventive maintenance inspections: (These items will be documented on the Preventative Maintenance Competency Review Sheet on the Fire Apparatus Driver/Operator Qualifications Sheet)
 - 1. Battery
 - 2. Braking system
 - 3. Coolant system

(2)

V. Preventive Maintenance and Specific Apparatus Components -- continued

4. Electrical system
 5. Fuel quantity
 6. Oil (engine and pump primer)
 7. Tires
 8. Steering systems
 9. Belts
- B. Driver/ operator trainees will have a basic understanding of the following specific apparatus components:
1. All Apparatus:
 - All dash board controls
 - Radio operation
 - Engine and fuel type
 2. Ladder 3
 - Interlock axle
 - Emergency brake safety interlock
 - Jake Brake
 - On-Spot snow chains
 - Cab tilt and safety bar
 - Fuel tank capacity – 50 gallons - diesel
 - Onan generator operation and capacity 6 kW.
 - Pump operation with and without safety platform and capacity 400 GPM
 - Waterous relief and transfer valves
 - Aerial System & emergency operation
 - Water tank capacity 300 gallons
 3. Engine 31
 - Cab tilt, safety bar and rain gasket
 - Jake Brake
 - On-Spot snow chains
 - Air inlet and supply valve
 - Fuel tank capacity - 65 gallon - diesel
 - Winco generator operation and capacity 5 kW
 - Pump operation and capacity 1250 GPM
 - Waterous relief and transfer valves
 - Booster reel rewind and blow down operations
 - Deluge Extend-a-gun operation
 - Pump shift – electric and manual
 - Intake relief valve and strainer
 - Water tank capacity 500 gallons

(3)

IV. Preventive Maintenance and Specific Apparatus Components – continued

4. Engine 32
 - Cab tilt and safety bar
 - Jake Extarder
 - On-Spot snow chains
 - Air inlet and supply valve
 - Fuel tank capacity - 65 gallon - diesel
 - Honda generator operation and capacity 5 kW
 - Pump operation and capacity 1250 GPM
 - Hale Total Pressure Master relief and transfer valves
 - Deluge Extend-a-gun operation
 - Nation Foam Servo-Command Foam System
 - Driver's breathing air system
 - Water Tank Capacity 450 gallons
 - Foam Tank Capacity 300 gallons
5. Spill 3
 - Honda generator
 - Fuel tank capacity – 40 gallons - gasoline
 - Battery capabilities and usage

V. Driving Operating Competencies

1. Driver Trainees will operate fire company vehicles on a public way that incorporates the maneuvers and features specified in the following list, so that the vehicle is safely operated in compliance with all applicable state and local laws, departmental standard operating procedures, and the requirements of NFPA 1500. These competencies will be documented in the Driving/Operating Competency section of the Fire Apparatus Driver/Operator Qualifications Sheet
 - Four left and four right turns
 - A straight section of urban business street
 - A two lane rural road at least 1 mile in length
 - One through-intersection
 - Two intersections where a stop has to be made
 - One curve left and one curve right
 - Sections of a highway long enough to make a two lane change.
 - A downgrade steep enough to require downshifting of the automatic transmission and braking (manual shifting of the transmission not permitted)
 - An upgrade steep and long enough to require gear changing to maintain speed

(4)

VI. Driving Operating Competencies -- continued

- One underpass or a low clearance or bridge. (*Ladder Drivers will sound the air horns twice when approaching bridges under 12 feet in height. The Officer will verify that all members are seated on the turntable to prevent injury or death*)
- Back the vehicle from a roadway into a restricted space, given a spotter, requiring a 90 degree right-hand and left-hand turns, so that the vehicle is parked within the restricted space without having to stop and pull forward without striking obstructions
- Maneuver a vehicle around obstructions on a roadway while moving forward or reverse, given a spotter for backing, so that the vehicle is maneuvered through the obstructions without stopping to change directions and without striking obstructions
- Turn the vehicle 180 degrees within a confined space, given a spotter for backing, and in an area in which the vehicle cannot perform a U-turn without stopping and backing up, so that the vehicle is turned 180 degrees without striking obstructions within the given space
- Operate the vehicle using defensive driving techniques under emergency response conditions during a probationary response so that control of the vehicle is maintained

VII. Pump Operators Competencies (also includes Ladder 3 driver trainees)

- Identify pump manufacturer, type and pump rating
- Identify and demonstrate the proper pump shift procedure
- Identify tank size, tank level gauge, fill and dump locations
- Identify preconnects, nozzle type, hoseline size and locations
- Identify supply line locations, sizes, and lengths
- Identify deluge gun, portable and fixed
- Stop the apparatus at a given site, engage the pump and prepare to operate the pump safely
- Identify the pump transfer switch
- Identify apparatus warning alarms
- Identify and operate throttle and throttle shut down
- Operate and maintain discharge relief valve
- Identify and locate intake relief valve

(5)

VII. Pump Operators Competencies (also includes Ladder 3 driver trainees) -- continued

- Produce an effective hand or master stream on the following list so that the pump is safely engaged, all pressure control and vehicle safety devices are set, the rated flow of the nozzle is achieved and maintained, and the apparatus is continuously monitored for potential problems:
 1. 2 inch preconnect
 - Internal booster tank
 - Pressurized water source
 - Transfer from internal booster tank to pressurized water source
 2. 3 inch preconnect and supply line
 - Internal booster tank
 - Pressurized water source
 - Transfer from internal booster tank to pressurized water source
 3. Deluge gun and aerial master stream (ladder pipe)
 - Internal booster tank
 - Pressurized water source
 - Transfer from internal booster tank to pressurized water source
- Pump a supply line of 2 ½ inch or larger so that the proper flow and pressure are provided to the next pumper in the relay. (not required for ladder driver trainees)
- Connect and operate the Humat valve in operation on a fire hydrant so that the proper flow and pressure is maintained to the pumper that is connected to the supply line from the Humat valve
- Supply water to fire sprinkler or standpipe system so that water is supplied to the system at the proper volume and pressure (Ladder 3 driver trainees are exempt)
- The drivers of Engine 32 will identify and operate the following foam system functions and system controls:
 1. Identify the foam system make and type
 2. Identify tank size, tank gauges,
 3. Identify foam tank to pump switch
 4. Identify Servo Command Control (Auto, Trans, and Manual Modes)

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- **Engine 32 foam systems functions and controls – continued**

5. Identify foam system valves (A valve, S valve, T valve)
6. Identify foam concentrate damper
7. Identify foam system inlets and outlet valves
8. Identify location and operation of foam metering valves
9. Identify nozzle, metering inductors flow ratings and operating pressures.
10. The procedures to flush the pump after foam operations including the pump panel bleeders.

VIII. Jacobs (Jake brake) Engine Brake Operation

1. The Jake brake is in operation when the dashboard switch is in the low or high position.
2. The Jake brake operates automatically when the driver's foot is removed from the accelerator. The brake is dis-engaged when the driver's foot is re-applied to the accelerator. The brake will also dis-engage when the engine speed falls below 1000 RPM and at speeds between 10-25 mph and when the pump or aerial is in operation.
3. The Jake brake will be operated as required by the following road and weather conditions:
 - Flat, dry pavements – the dashboard switch position can be set on the low or high setting. Ladder 3's Jake brake must remain in the high setting due to the truck's weight.
 - Descending a grade – the dashboard switch position can be set on the low or high setting depending on the length and grade of the hill. A longer or steeper descending grade will require the Jake brake setting to be on the high setting. Ladder 3's Jake brake must remain in the high setting due to the truck's weight.
 - Slippery pavements – the dashboard setting should be in the off setting until braking can be tested. The Jake brake should be tested on the low setting with plenty of distance between other traffic. If the apparatus stops without a loss of control, the Jake brake can continue to be used. If the apparatus losses control, do not attempt to use the Jake brake until the road conditions improve.

IX. Skills Review

1. *To maintain the skills of our drivers/operators the following procedures will performed where possible at non-emergency incidents:*

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X. Skills Review -- continued

- A. While in stand-by positions and with the approval of the Officer in Charge of the apparatus, the driver/operator of engine company apparatus will perform the following:**
- **Place the apparatus in “pump gear”.**
 - **Verify the water level of the water tank.**
 - **Perform the steps necessary to produce a water stream supplied by the water tank.**
 - **Pump a minimal amount of water from a discharge. This step may be omitted when there is a danger of freezing water on the highway.**
- B. While in stand-by positions and with the approval of the Officer in Charge of the apparatus, the driver/operator of the ladder company apparatus will perform the following:**
- **Place the apparatus in “pump gear”.**
 - **Verify the water level of the water tank.**
 - **Perform the steps necessary to produce a water stream supplied by the water tank.**
 - **Pump an minimal amount of water from a discharge. This step may be omitted when there is a danger of freezing water on the highway**

OR

- **Place the apparatus in “aerial pto”**
- **Operate the outriggers on one side or both of the apparatus. This is for review purposes only. Do not set the outriggers. Caution shall be used when the apparatus is parked on a highway without traffic control or near parked vehicles.**

Appendix F

BROOKLINE FIRE COMPANY**STANDARD OPERATING PROCEDURE FOR POWER SAWS****SOP# 01-01****JOHN F. VIOLA, CHIEF**

I. Purpose: To establish and guidelines for the use, operation, inspection, and maintenance of power saws.

II. Scope: This policy applies to all Officers and Crew.

III. Procedures:**A. Location and Types of the Power Saws:**

1. Ladder 3:
 - a. Echo Quick Vent Chain Saw
 - b. Partner Rotary Saw
 - c. Stihl Chain Saw
 - d. Ryobi Reciprocating Saw
2. Engine 32:
 - a. Partner Rotary Saw
2. Spare:
 - a. Quickie Rotary Saw

B. Training

1. A review training exercise will conducted at least annually on the proper operation, routine maintenance, and safety procedures for each saw operated by the Brookline Fire Company.
2. As part of their probationary training sheet, new members will be trained in the proper operation, routine maintenance, and safety procedures for each saw operated by the Fire Company.
A minimum of 1 hour “hands on” training will be conducted.

C. Maintenance:

1. Each saw will be inspected weekly by the Engineer of the truck where the saw is mounted. The inspection will included but is not limited to the following:

(2)

- D. Maintenance - continued:
- a. Full fuel level and a sufficient supply in the saw's extra gas can.
 - b. Proper tension of drive belts and chains.
 - c. Saw starts and runs properly.
 - d. No signs of fuel leaks or other mechanical defects.
 - e. Saw is clean.
1. Fuel Mixture:
The fuel mixture of all saws will be in accordance with the following manufacturer's recommendations:
- A. Partner Saws – 1:40 mix*
 - B. Quick Vent – 1:40 mix
 - C. Ryobi Saw – 1 gal. gas and 6 oz. of 2 cycle oil
 - D. Stihl chain saw– 1:40 mix*
- * using manufacturers brand at 1:40 (5 gal. of gas and 1 pint of oil)
using non-manufacturers 2 cycle oil at 1:25 (5 gal. of gas and 1 2/3 pints of oil)
- D. Skills Review**
1. *To improve the skill retention of our members, the following procedure will be followed each drill night:*
 - A. *The Officer in Charge of the drill will assign 5 members to start and operate each of the saws assigned to Ladder 3, Engine 32, and the spare saw.*
 - B. *The members assigned to start and operate the saws shall be rotated weekly to give each member the opportunity to become familiar with all the types of saw.*
- E. Operational Safety Procedures:
1. Saw will be started and warmed up on the ground. Saws will be shut down while carried up a ladder and restarted on the roof.
Running saws will not be carried up ladders.
 2. Saw will not be refueled while hot.
 3. Eye protection will be worn when operating all saws.
 4. A Safety Guide Person will be positioned behind each saw operator. This person will keep the operator informed as to their position on the roof and insure the safe operation of the saw.
 5. When operating on a pitched roof, the saw operator will work off an aerial or roof ladder.
 6. All roof saws will be pulled toward the operator while cutting.
 7. All roof rafters will be sounded out and marked before cutting. Caution will be used not cut roof supports or rafters.

(3)

E. Operational Safety Procedures -- continued

8. The construction of the roof must be determined before starting a roof operation. **Members will not operate on or over a truss roof without the use of an aerial ladder or platform.**
9. The safety operational precautions listed in this section will also apply to saw operations on all types of flooring.

F. Return to Service:

1. Any problems identified during the operation of a saw will be reported to the Officer in Charge or the Engineer.
2. The saw will be cleaned and refueled after each use as required.

G. Non-Fire Use:

1. Saw will not be used for any non-fire fighting activity without the permission of a Chief Officer