

Training Employees for Low Frequency-High Risk Events

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CERTIFICATION STATEMENT

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ABSTRACT

Training for low frequency - high risk events is not necessarily a problem unique to the fire service. Others have studied these phenomena in the military, police work, and emergency medical work. The distinctiveness of this research is what would be considered low frequency. The fire service has invested a great deal of time and effort into making buildings more fire safe. As a result, the number of actual fires has decreased over time. NFPA reporting showed a 52% reduction in the number of reported fires from 1977 to 2007.(NFPA 2008) Without this real world experience many fire departments have turned to increased training to keep firefighting skills sharp. The problem this study addresses is the reoccurrence of poorly performed basic firefighting skills by some firefighters on the fire ground despite the increased amount of time devoted to training.

Information was gathered using descriptive techniques. The research questions this study has investigated are:

1. What teaching methods would allow employees to retain the most knowledge and skill?
2. What factors affect the ability to recall and act upon one's skill and knowledge?
3. How can one reasonably predict actual performance on emergency scenes by evaluating performance in simulated emergency response training?
4. What evaluation methods are other departments using that could be used at the Sharonville Fire Department?

To answer these questions literature was reviewed. Further surveys were sent out to fire departments within Hamilton County. These surveys were used to gauge attitude toward training, as well as to find out how fire fighters felt about their own skills and knowledge. The

information gathered revealed that most firefighters surveyed have found themselves performing well on the training ground but at times poorly on the fire ground. Further, most fire fighters surveyed agree that basic fire fighting skills will deteriorate over time due to lack of actual fires.

Some of the recommendations supported by this research are:

1. The orientation process should focus more on basic fire fighting skills.
2. During orientation and training the employees skill level should be documented in a trackable manor.
3. Daily training should focus on basic skills 50% of the time.
4. Basic shills should be tested yearly
5. Scenario based training should be utilized, this should include distractions and/or distracting information during the scenario.

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INTRODUCTION

Statement of the Problem

Despite a dramatic increase in the number of hours spent in training at the Sharonville Fire Department over the past five years, various mistakes have been made on the fire ground. These mistakes in large part encompass what are considered basic fire fighting skills. The inability to retain these basic firefighting skills has become evident not only by a decrease in fire ground efficiency but in an increase in employee counseling. Further, our training officer, much like other training officers in the county, is finding he must go back to training on the basics. *The problem this study addresses is the reoccurrence of poorly performed basic firefighting skills by some firefighters on the fire ground despite the increased amount of time devoted to training.*

The fire service has spent much time and efforts making buildings more safe and less likely to burn. The International Code Council by way of the Ohio Building Code has researched and written building code “founded on principles intended to establish provisions consistent with the scope of a building code that adequately protects public health, safety and welfare”. (Ohio Building Code 2007) As a result, the fire service is seeing less and less fire. The NFPA reports that the number of reported fires has decreased by 52% of the past 20 years (NFPA 2008) With fewer actual fires, the fire service as a whole must rely more heavily on classroom and scenario-based training and less on traditional on-the-job training. A need has been seen by the chief of the department to change our orientation process, yet very little research is available within the department to know how best to meet this need.

Purpose of the Study

The purpose of this study is to determine strategies that will help firefighters acquire and maintain adequate skill levels needed for low occurrence events.

The research method chosen for this applied research is descriptive. Much data has already been collected about learning and the ability to retain and recall that knowledge. With this research I will assess how best to apply this data to training within the fire service.

The research questions this study will investigate are:

1. What teaching methods would allow employees to retain the most knowledge and skill?
2. What factors affect the ability to recall and act upon one's skills and knowledge?
3. How can one reasonably predict actual performance on emergency scenes by evaluating performance in simulated emergency response training?
4. What evaluation methods are other departments using that could be used at the Sharonville Fire Department?

BACKGROUND AND SIGNIFICANCE

As stated in the introduction, the Sharonville Fire Department has seen an increase of poor performance of basic firefighting skills on the fire ground. This performance issue has occurred at a time when hours spent on shift training and new employee orientation utilizes more time than it has in any previous years. Currently shift training is carried out one shift per week for three hours. Further, new employee orientation is carried out for 30 days. This is in contrast to six years ago when shift training was carried out two times per month for 3 hours and new employee orientation was 2 weeks. This change in shift training and new employee orientation from 2002 to today shows an increase in both areas of 100 percent.

In addition to amount of time spent training other large scale operational changes have taken place within the Sharonville Fire Department since 2002. In July of 2002 the largely volunteer and part-time staff of the department was changed over to a largely career staff. As the plans for this change were being made the chief of the department did see a need to ensure the new staff was experienced. As a result the age requirement was extended and efforts were made to hire experienced fire fighters. As a result the career staff while new to the City of Sharonville had an average of 11 years experience in the fire service.

Despite this increase in hours spent training, and an experienced staff basic firefighting skills were still lacking. This has been experienced across all unit days. The training officer has also noticed this trend and has adjusted the training schedule and training themes to incorporate more basic firefighting skills. This has been documented in minutes from officers meetings. In these meetings performance issues and training issues are discussed. Over the last 18 months some of the failures that have been documented both in employee counseling and in officers meetings are: no scene size up; failure to “clear the hose bed;” failure to don personal protective

equipment in a timely manner; failure to secure a water supply; inability to operate the pump; inability to set up the aerial tower; and poor vehicle placement.

Through research changes will be made to the current training program within the department. The goal of these changes will be to provide orientation and training in a manor such that basic fire fighting skills are better retained. To guage the impact of change in orientation and training, each employee will need to be evaluated and tracked in a meaningful way so progress and retention can be gauged and quantified.

LITERATURE REVIEW

The need to train fire fighters to a common standard dates back to the early 1970s (IFSTA 1998). These standards were developed by a committee and today are known as NFPA Standard 1001, Standard for Fire Fighter Professional Qualifications. While NFPA 1001 is widely accepted throughout this country as a measurement for basic qualifications it is a minimum standard. In other words many departments choose to go above and beyond but no department should ever deviate below this standard. In 1997 the standard was amended to add Job Performance Requirements (JPRs). A Job Performance Requirement reflects either what a firefighter actually does on the job or should be expected to do (IFSA 1998). These JPRs are the result of a job task analysis done by the NFPA. To further understand JPR as it relates to this research, JPR 3-3.11 will be used as an example. JPR 3-3.11 requires the firefighter to “perform vertical ventilation on a structure...given... personal protective equipment, ground and roof ladder...” (IFSTA 1997, p.3). The skill being performed by the student is vertical ventilation, yet to successfully complete this JPR the student must also possess the skills of donning personal protective equipment, setting up a ladder, and running a chain saw or using an ax. The knowledge associated with this skill is taught through reading chapter 10 of the IFSTA book. In this chapter the what, when and why of ventilation is defined. Given this information one could reasonably believe that a student who has completed fire training has a basic knowledge of firefighting and a basic skill set to complete firefighting tasks.

The study of knowledge and memory goes back many years. Ebbinghaus was the first person to study memory experimentally. This study of memory has gone on for 100 years and is today known as the total time hypothesis. (Baddely 2004). The total time hypothesis is described as a “basic relationship that underlies the whole of human learning.” (Baddely 2004, p. 42).

This relationship is quite broad, but within its framework it can be summarize that there are good ways and bad ways to learn. In other words, there are ways to get the most value from time spent learning, and there are ways to apply that time so knowledge is retained.

The first part of Baddely's work deals with time spent learning. More time is not necessarily always better. To more fully understand the relationship of time spent learning in terms of retention Ebbinghaus' learning graph is studied. This graph shows the relationship of number of minutes spent learning to the number of days of repetition of given knowledge. This graph shows that more is not always better. More retention of knowledge with less time spent on repetition on any one day best describes the findings. This can be likened to the person cramming for the test the night before the test. This method does not allow for knowledge retention. Better knowledge retention has been shown when knowledge is gained over several days in shorter bursts. Additionally Baddely was able to repeat the findings of Ebbinghaus more recently while studying postal worker being trained to code incoming mail. This study found that more knowledge was retained with shorter amounts of time learning. Three schedules were set for the postal worker learning time. First an intensive schedule of two two-hour sessions per day, next an intermediate schedule involving two one-hour sessions, and lastly a gradual approach involving one one-hour session per day. Indeed the one-hour-per-day group learned as much in 55 hours as the four-hour-per-day group learned in 80. (Braddely 2004). Further, the one-hour-per-day group continued to improve at a faster rate, and when tested after several months without further practice was found to have retained their skill better than the four-hour-per-day group.

“Training programs for some jobs, like police officers and soldiers, provide examples of situations where the level of trainee performance is of paramount importance.” (Surface 2002)

Looking at research of military special forces, training is described as having two functions for jobs where “lives are on the line.” (Surface 2002, p.42). The first function is to prepare the trainee to perform the duties, task or mission of the job. The second function is a screening function. This screening function is described as training to a minimum acceptable proficiency. If the trainee cannot perform to this level he must repeat previous training or be forced out of the training program. Training to a minimum acceptable proficiency in jobs such as police officer and soldier is crucial to job performance must also be understood. This means evaluating the job itself through post mission evaluation and using this practical information to evaluate the training process.

Evaluating the training process itself is clearly a direction taken by the NFPA as well as IFSTA. In the spirit of continually evaluating the process set forth by NFPA, the standards set forth by the NFPA are reviewed every 3 to 5 years.(IFSTA 1997) As is pointed out in the introduction of IFSTA 4th edition, sweeping changes have been made to NFPA 1001 in 1987, 1992 and again in 1997.(IFSTA 1997). Yet, there remains no clear guideline as to what to do after the basic training is complete. During discussions fire fighters speak of the training process itself. There is a general feeling that the training and orientation process at Sharonville Fire Department has not been properly evaluated. Before looking at the evaluation of training itself we must acknowledge what training is and what we expect to be gained from it. According to Goldstein, training can be defined “as the systematic acquisition of skills, rules, concepts or attitudes that result in improved performance in another environment”.(Goldstein 1993, p.63). This speaks directly to the goal of fire department training, specifically “improving performance in another environment.” (Goldstein 1993, p.63). As part of evaluating the training process Surface (2002) refers to reactions. He defines reactions as the perceptions of trainees about

training. This reaction is further broken down into affective reaction, how much the trainee liked the training and utility reaction, how useful the trainee found the training in terms of practical benefit. Through research Surface found that utility type reactions were more strongly related to actual on-the-job performance.

Further researching jobs Surface refers to as “lives are on the line” (Surface 2002, p.42) we look to research carried out by Engle. Engle has researched what he calls working memory capacity (WMC). WMC is “the ability to maintain relevant information in the focus of attention in the face of irrelevant and distracting stimuli.” (Engle 2005, p.71). Within this study Engle tells us the experience of stress leads to worrisome thoughts. Human nature is to control these worrisome thoughts or suppress them altogether. This very action of suppressing worry takes part of the capacity of the brain required to perform WMC tasks. Most researchers believe this trait as stable. In other words this is the mechanism that makes us human and plays a role in our survival and rational thinking in times of stress. Some researchers even go so far as to say this vary trait forces the human brain to slow its WMC so it can take in more information over time to make more rational decisions. Eysench & Calvo also studied these same traits. They believe similarly to Engle but add these changes during times of stress and worry appear to be related more to motivation and experience than simply the stress itself. He also continues that this stress can lead to fluctuation in WMC, and this fluctuation can vary from person to person based on experience and motivation. Klein and Boals (2001) follow up these studies and argue that individuals under high levels of life stress would more likely experience unwanted or worrisome thoughts and consequently have to expand limited resources in an attempt to suppress those thoughts. These individuals would thus have fewer resources to apply to WMC and as a consequence would be likely to perform their given task poorly in a high life stress environment.

Klein and Boals were then able to demonstrate that subjects who were trained to deal with life stress and were made aware of its presence and relationship to WMC were better able to perform tasks even under stressful conditions.

Chief Rick Lasky writes clearly about the “real life” phase of training. His department has successfully implemented a mentoring program to get new recruits to understand the history and true workings of a fire department. “Mentoring people means giving them the stuff that they need to learn and improve.” (Lasky 2006, p.24). His philosophy is that if firefighters understand the history of the fire service and the fire department they are less likely to repeat mistakes. Further mentoring gives the seasoned firefighter the chance to relive the real life experiences at the same time giving the new firefighter reason to learn.

Given the information obtained on the literature review a survey of fire fighters will be done. In this survey I will seek to find out how respondents feel about their time spent learning. Do they feel they train often enough. Further information will be sought from respondents on the utility of training Surface talks about. This will be in an effort to gauge how respondents feel about training in terms of need to train and like or dislike of training. And lastly information will be sought from respondents as to how they feel about distractors on the fire ground, and if they have had distractors or worrisome thought cause them to perform poorly on the fire ground.

Procedures

In an effort to research this issue on a broader scale Lt. Smith, the training officer for the Sharonville Fire Department, was interviewed several times. In the course of these interviews Lt. Smith echoed the concern of poor fire ground performance. Through communication with other fire department training officers it has been confirmed that this issue affects many departments in the county. This will be addressed further through formal interviews with other agencies and personnel. To combat this problem the department is now requiring each employee to complete proficiency testing. This testing encompasses a series of check off sheets that are specific to each piece of apparatus and addresses basic skills. Because this method of testing has been in place for less than one year, no conclusive results can yet be gauged.

To further broaden this research recent NIOSH reports on line of duty deaths were studied. Within these reports NIOSH makes recommendations “to minimize the risk of similar occurrences.” (May 2008, p.1). Many of these recommendations include training and following procedures of basic firefighting skills. Some of the recommendations cited include: “ensure that fire fighters are sufficiently trained in survival skills” (May 2008 p.1), “ensure that water supply is established and hose laid out prior to crews entering the fire structure” (May 2008 p.2). “ensure that the first arriving fire unit conducts an initial size-up” (October 2008 p.1), “ensure that all firefighters wear a full array of turnout clothing and personal protective equipment” (October 2008 p.2). “ensure adequate size up” (November 2008 p.1). and “ensure ventilation is coordinated with the interior attack” (November 2008 p.2).

While poor performance on the fire ground has not caused injury or death at the Sharonville Fire Department, these NIOSH reports show other departments have not been as fortunate. The recommendations within the NIOSH reports mirror some of the very performance issues reported both in employee counseling and officers meetings at the Sharonville Fire Department. It becomes clear that addressing these performance issues is important not only to the operation of the department but for the safety of the firefighters.

This research of poor fire ground performance comes at a time when these skills are used infrequently. Through run report analysis it is clear that while our actual run volume has increased by an average of five percent per year over the last six years, our actual number of fires has decreased. Again, analysis of our run reports shows we are using an extinguishing agent (actually fighting fire) on less than one percent of our runs.

The Sharonville Fire Department typically hires employees that have had basic fire training at one of three schools: The Ohio Fire Academy, Scarlet Oaks Vocational School, or Butler County Career Development Center. A given employee can graduate from any one of these three schools with the same basic knowledge. This knowledge base is tough to a standard set forth by the National Fire Protection Association (NFPA). Further, all three schools mentioned above teach from the International Fire Service Training Association (IFSTA) text. Within these text books basic fire skills are clearly stated in print, further enforced with work books that require the student to take practice test questions, and again reinforced using skill sheets to grade hands on proficiencies.

To get perspectives from the firefighters on these performance issues interviews were conducted at several shift trainings. The interviews were conducted with open ended questions and solely represent the Sharonville Fire Department. A larger group and further interview

information will be covered later in this research. When interviewed and asked about these mistakes most employees note the same core issues, most notably the lack of activity. This lack of actual fire ground activity precedes the rest of the issues noted. Other than lack of activity the most common issues as viewed by firefighters are:

- Lack of structured trainings
- Stress
- Only training on the mechanical not the mental
- Lack of evaluation of the training process

Lack of structure is described as being shown a basic skill by one member of the department one way followed by another member demonstrating this same skill a different way. Many junior firefighters feel like they are being shown the “short cuts” or the pearls before they are comfortable with the basics. Others assume that senior members have acquired basic skills and/or actual fire ground knowledge based on years of service and experience, not realizing they have had very little exposure to either. Stress was mentioned by everyone interviewed. This stress came in several ways. One stressor is the unknown. The junior firefighter feels comfortable on the training ground but finds uncertainty due to the dynamics of the fire ground, thus leading to stress. In other words, training is very practical and routine. An example is to pull this hose to this floor, find the fire and put water on it. Several firefighters noted they would like more training on the how and why of the skills and of the decision making process leading to using each skill versus the repeated mechanics of simply doing a task. In addition, there is a feeling that the training process itself is not evaluated enough. In other words, if several members are found to need remedial training on the same task those members are simply remediated. There is little thought given to why they need remediation or to the quality and

adequacy of the initial training. Lastly, there is a general feeling that training on theory can never take the place of living fire ground reality. Training on any given skill is felt to be just theory until it is applied in a real life setting. Most employees will admit that mistakes made on the actual fire ground will likely not be repeated. This is in large part because there is an immediate consequence to that mistake. Conversely when a mistake is made during training, the skill can simply be repeated until the employee gets it right and/or is proficient.

In order to answer the question posed, two main sources of data were collected. First literature was collected to begin to research, areas of training, education and knowledge. Further information was gathered to look at the retention of these areas as it related to outside distracters. After the literature was reviewed it was clear that a survey was needed to complete the research.

To further gather data firefighters were surveyed. The departments surveyed were picked bases on demographics similar to Sharonville Fire Department. These demographics include, combination full time and part time staffing. Similar size in terms of service area and number of employees. Similar training constraints including availability of training venues and financial. As well as similar run volume. As a direct result of literature review I will also ask questions relating to time spent orienting and training, evaluation of the training program itself as well as evaluating knowledge retention. I also asked each training officer how they view education verse training and how much time is spent on each.

The survey is structured to evaluate how firefighters view there own skill and knowledge retention. As well as find out how many firefighters delineate between skill (training) and knowledge (education) . The survey also collected data related to attitude toward training. Lastly I will find out how long each firefighter has been in the fire service to find out if years of service relate to retention.

Definition of Terms

NFPA (National Fire Protection Agency) The agency that sets standards for the fire community across the country.

IFSTA (International Fire Service Training Association) A training association that writes text books used by most fire training intuitions across the country.

Limitations of the Study

The method of gaining data for this study was not comprehensive, yet the departments that were used are comparable to Sharonville. The departments surveyed were of similar size, geographical area and similar budgets. This study did not look at volunteer departments or large metro departments.

A second limitation of this study is the number of sub areas of the fire service that influence training and skill retention. For example just looking at actual run volume, this study focused on basic firefighting skills. Many departments report run volume but few has volume broken down into actual fires vs non-fire emergency activity.

Results

A survey was sent out to area fire departments to find out their perspective on training as well as their own skill and knowledge retention. A total of 150 surveys were sent out with 80 being returned a 53% return rate. The survey that was sent out included a cover letter that requested no names be attached and all results would be reported in broad terms, targeting no single department. The complete survey and results of all 80 respondents can be found in Appendix 1, page 34.

The survey first seeks to find out if firefighters find themselves performing well on the training ground but poorly on the fire ground assuming the same skill. This speaks directly to the purpose of this research. The survey shows that all but 2 respondents have found themselves performing a specific skill well on the training ground but later performed the same skill poorly on the fire ground. Further, of these same respondents all but 1 consider themselves average or above average in terms of skill level.

Next the survey looks at the orientation process, the results of the survey show that the majority of firefighters feel their orientation was long enough, however most report spending less than 25% of their total orientation time on basic fire fighting skills. The first research question: What teaching methods would allow employees to retain the most knowledge and skill? Begins to emerge here, when looking at orientation. The average orientation time was 2 weeks. Looking at the work done by Braddely in regards to time spent learning Braddely was able to show that less time spent over more days led to higher retention of knowledge. Also taking into account that the survey shows an average of 2.5 hours of training per week, and an average of one day per week. In other words all the hours of training for one week were carried out over only one day.

From this information several conclusions are made. The orientation process should be lengthened and more time should be spent on basic fire fighting skills. With orientation being over a longer period of time, less hours per day should be spent on any one subject. Next looking at training time, again the time spent on training should be carried out over more days.

The next research question: What factors affect the ability to recall and act upon ones's skill and knowledge? Result in several survey questions. When asked if the dynamics and stress of the fire ground have ever caused them to forget or poorly perform a basic skill 76% of respondents answered to the affirmative. Further 68% of those same respondents report this happening occasionally. Additionally 72% of respondents agree that lessons learned on the fire ground are of much greater value and better retained than lessons learned on the training ground. The results of these 2 survey questions clearly show that the stress and dynamics of the actual fire ground are a factor in poor performance of basic fire fighting skills, and that fire fighters feel they better retain skills and knowledge obtained on the fire ground vesis the training ground.

Literature from Engle speaks of distracting information and the ability to recall relevant information in the face of distracting information. Engle goes on to describe this distraction in terms of worrisome though and suppressing this worrisome thought takes away from the ability to recall knowledge. (Engle 2005). Further literature from Eysench & Calvo agree with Engle yet continue to point out that when dealing with distrating information and worrisome thought motivation and experience is a factor.

The survey also shows that 88% of respondents believe basic skills will deteriorate over time as the number of actual fires decreases. The above information, coupled with the fact that NFPA reports a 52% decrease in reported fires over the past 20 years leads to the conclusion that the stress and dynamic of the fire ground, as a result of lack of actual fires, does affect the ability

of fire fighters to perform basic firefighting skills. However, with this conclusion there is much more research that needs to be done to more fully understand this issue, this will be covered further in the discussion section.

The next research question: How can one reasonably predict actual performance on emergency scenes by evaluating performance in simulated emergency response training? Led to the survey question about performance. Specifically asked respondents if they perform well on the training ground do they believe they will perform well on the fire ground. Of the respondents 72% agree that they will perform well on the fire ground if they perform well on the training ground. However, we must also take into account the earlier question in which all but 2 respondents agreed that they have performed a skill well on the training ground but later poorly on the actual fire ground. Again these respondents, all but 1, felt their skill level was average or above. Very little literature could be found as to predicting actual performance based on training. This also couples with the last research question: What evaluation methods are other departments using that could be used at the Sharonville Fire Department? Of the fire departments surveyed non tracked employees or had evaluation methods that would offer meaningful data in terms of tracking employees from the training ground to the fire ground. Based on the limited literature available on this subject, and the contradiction in the survey the research question: How can one reasonably predict actual performance on emergency scenes by evaluating performance in simulated emergency response training? Cannot be answered at this time. Further, this question could easily pose a research unto itself. This will be further addressed on the discussion section.

Discussion

The results of this study were aimed at looking at orienting and training employees in a way that allowed for optimal retention of skill and knowledge in a time where the number of actual fires continues to decrease country wide. The survey was designed to capture employees feelings about their own skill retention as well as their attitude toward training. Further the survey simply asked if there is a belief the basic fire fighting skills will deteriorate over time as the number of actual fires decreases.

The first research question is. What teaching methods would allow employees to retain the most knowledge and skill? To answer this question we can first look at Braddely's work on time spent learning. His work can best be summarized by saying repetition of skill and knowledge allows for the most retention. However this repetition is best applied over shorter periods in more days versus longer period in lesser days. Next we can look at Surfaces's work where he speaks to training were "lives are on the line". Surface describes training for these jobs as having two functions. The first of which is to prepare the trainee to perform the duties, task or mission of the job. The second is a screening function to screen out employees that cannot meet minimum acceptable proficiencies.

When surveyed fire fighters report that training serves them better than educating, 50% disagree that more education versus training would lead to better performance on the fire ground. Further 38% report that reading educational type material would help them perform better on the fire ground. Looking at skill and knowledge retention as it relates to orientation of employees the survey also finds that most employees 78% report spending less than 25% of total orientation time working on basic fire fighting skills.

Taking the above literature as well as the survey information as one part as it relates to the Sharonville Fire Department several areas must be address to improve upon our current scenario. First, looking at orientation, and taking into account Surface's work, orientation should be used as a time "to prepare the trainee to perform the duties, task or mission of the job." (Surface 2002) The survey shows that employees are reporting spending less that 25% of their total orientation time on firefighting skills. This shows a disconnect as it relates to time spent learning. Clearly orientation is the time to asses existing skills and knowledge as well at teach new. Also looking at the second function of training as a screening tool, more time must be spent during orientation on basic firefighting skills to ensure an employee can complete the job tasks that will be expected of them.

The second research question is. What factors affect the ability to recall and act upon one's skills and knowledge? To answer this question we will first look at research carried out by Engle. In his research Engle talk directly to "the ability to maintain relevant information in the focus of attention in the fact of irrelevant and distracting stimuli". (Engle 2005). Engle goes on to describe this distracting stimuli in terms of stress and worrisome thought. When people find themselves having this worrisome though it is natural to try to suppress, however suppressing worrisome thought takes away from the ability to recall knowledge and skill. Klein and Boals follow up this study and reviel that people who were trained to deal with this worrisome thought were better able to perform in the presence of outside stressors.

When surveyed 76% of firefighters believe that the dynamics and stress of the fire ground have caused them to forget or poorly perform basic skills. To add to that 58% believe a lesson learned on the fire ground is better retained that a lesson learned during training.

To change the current scenario within The Sharonville Fire Department this information should be acted upon in several ways. The first is to train and educate fire fighter about the dynamic of the actual fire ground. Klein and Boal tell us that simply being aware of the presents of stress will lead to better recall of knowledge. Next we should train on the history of the fire service, the fire department and previous fires. This speaks to the writing from Lasky where he describes the importance of training on history. This will serve two purposes, one making training seem more relevant based on past events, and secondly making employees aware of the dynamic of an actual fire ground.

The last two research questions are. How can one reasonably predict actual performance on emergency scenes by evaluating performance in simulated emergency response training? And What evaluation methods are other departments using that could be used at the Sharonville Fire Department. Have proven to be very closely related. Looking at the survey 72% of fire fighters feel that they perform well on the fire ground if they perform well on the training ground. With that, to truly gauge actual performance would require a much closer evaluation of the orientation and training program itself. Currently Sharonville Fire Department does not closely evaluate it's orientation or training program in way that meaningful data could be extracted. To truly gauge performance on the training ground and relating it to the fire ground employees would need to be tracked. Evaluations of training performance would need to be available when evaluating fire ground performance. I currently cannot find a department that collects this type of data.

Recommendations

Orienting and training firefighter for maximum skill and knowledge retention is more important now than ever. This is in large part due to the declining number of actual fires. The recommendations based on this research will encompass several areas of the operation of the Sharonville Fire Department. Those areas include orientation, daily trainings, weekly trainings, scenario based training, and evaluation of the training process.

First the orientation process should be changed to include more basic skill assessment and training. Through this assessment the training officer will know what training and knowledge the employee has as well as their proficiency with basic skills. This should also be documented in a manner that it is tractable allowing for future evaluation. Further those employees that cannot perform or retain basic fire fighting skills during the orientation period should not be retained.

The last 2 research questions could not be conclusively answered due to lack of data. This was true not only within the Sharonville Fire Department but within other departments that were surveyed and interviewed. Specifically when asking: How can one reasonably predict actual performance on emergency scenes by evaluating performance in simulated emergency response training? As stated earlier, very little literature could be found on this subject. This would lead to the conclusion that tracking employees on the training ground, and on the fire ground, then bringing that information together in a meaningful way is critical. Without such information a department can never know how well or poorly they are training their people, again talking about a time when training is as important as it has ever been due to lack of actual fires.

Once employees are oriented to the satisfaction of the training officer, and have shown proficiency in their basic skills, the focus becomes continued retention. For this the daily trainings should focus on basic fire skills 50% of the time. Further these basic skills should be tested yearly to ensure continued proficiency. As part of evaluating proficiencies scenario based training should be used, during this type of training outside distracters should be utilized, these distracters could be as simple as setting off a pass devise or playing loud music during training. This will prepare employees to recall skill and knowledge in the face of outside distracters. Further training should encompass history, both in terms of why the fire departments exist as well as revisiting actual events, this will legitimize training.

With this continued training and constant revisiting of basic skills the amount of time spent per day is a factor. As was discussed in literature review less time over more days leads to better retention. Take this information with the survey showing of the departments surveyed respondents averaged 2.5 hours of training per week with an average of 1 day per week. In other words all there training is coming in one day, not being spread out over time. Also couple this with the survey information that all but 2 respondents have had the problem of performing well on the training ground but poorly on they fire ground. This in and of itself indicates the need for a change to more frequently for less hours.

The training process itself must be continually evaluated. This needs to be done in several ways. First feed back from those being trained should be sought. This feed back should come at a time following an actual fire. This will allow employees to put the training ground and the fire ground together as one. They can then asses what training areas were useful and what training areas were not. Next evaluation of the training process must be done when mistakes are

made, these employees should be interviewed along with the training officer to find out what skills need to be improved upon as well as what difficulties were involved with retention.

For future research on this topic the research already done has shown many areas that need further research. First the surveying of firefighters should be done on a broader scale. This would serve several purposes. With more surveying one could seek out if higher run volume does necessarily equate to better retention of basic skills. Further how training is carried out in terms of hours spent needs to be more carefully studied.

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APPENDIX 1 – FIRE FIGHTER QUESTIONNAIRE

How long have you been in the fire service? 13 yrs avg _____ Years

How long have you been at this fire department? 12 yrs avg _____ Years

1). How often have you found yourself performing a specific skill well on the training ground but later performed it poorly on the fire ground? (Circle one)

1.) Never	2	2.5%
2.) Yes occasionally	50	62.5%
3.) Yes sometimes	16	20%
4.) Yes frequently	12	15%
Total	80	100%

2). How would you describe your basic firefighting skills? (Circle one)

1.) Well above average	8	10%
2.) Slightly above average	44	55%
3.) Average	27	33.75%
4.) Slightly below average	1	1.25%
5.) Well below average.	0	0%
Total	80	100%

3). How long was your orientation at this fire department? 2 wks avg _____ wks/months

4.) Was this orientation time? (Circle one)

1.) Too long	3	3.75%
2.) Just long enough	41	51.25%
3.) Too short	36	45%
Total	80	100%

5). What percentage of time did you spend during orientation on basic firefighting skills?

15 % avg _____

6.) How frequently do you train currently at your fire department? 2.5hrs wk avg

Do you think this amount of time is: (Circle one)

1.) Too much training	4	5%
2.) Just enough training	34	42.5%
3.) Too little training	42	52.5%
Total	80	100%

7.) Which statement best describes your attitude toward training? (Circle one)

1.) I enjoy training.	71	88.75%
2.) I train because I have to.	6	7.5%
3.) I dislike training.	3	3.75%
4.) Training is a waste of time.	0	0%
Total	80	100%

8.) How would you rate the quality of training you receive at your fire department?

(Circle one)

1.) Very low	2	2.5%
2.) Low	18	22.5%
3.) Adequate	38	47.5%
4.) High	21	26.25%
5.) Very High	1	1.25%
Total	80	100%

9.) Has the dynamics and stress of the fire ground ever caused you to forget or poorly

perform basic skills. (Circle one)

1.) No never	19	23.75%
2.) Yes occasionally	55	68.75%
3.) Yes sometimes	6	7.5%
4.) Yes frequently	0	0%
Total	80	100%

10.) Lessons learned on the fire ground are of much greater value to me and better retained than lessons learned on the training ground. (Circle one)

1.) Strongly disagree	2	2.5%
2.) Disagree	17	21.25%
3.) Uncertain	14	17.5%
4.) Agree	39	48.75%
5.) Strongly Agree	8	10%
Total	80	100%

11.) I know when I perform well on the training ground that I will perform well on the actual fire ground. (Circle one)

1.) Strongly disagree	1	1.25%
2.) Disagree	5	6.25%
3.) Uncertain	16	20%
4.) Agree	40	50%
5.) Strongly agree	18	22.5%
Total	80	100%

12.) The training I receive is relevant to the fire ground (Circle one)

1.) Strongly disagree	4	5%
2.) Disagree	8	10%
3.) Uncertain	5	6.25%
4.) Agree	54	67.5%
5.) Strongly agree	9	11.25%
Total	80	100%

13.) The current training I am receiving gives me a clear picture of what to expect on the actual fire ground. (Circle one)

1.) Strongly disagree	4	5%
2.) Disagree	10	12.5%
3.) Uncertain	25	31.25%
4.) Agree	40	50%
5.) Strongly agree	1	1.25%
Total	80	100%

For the next questions think of training as learning and practicing a skill, and education as learning the what when and why of the same skill. Ie. Skill: “going up on a roof and cutting a 4ft x 4ft hole.” Education: “Learning that vertical ventilation is used to remove smoke, and heat from a structure and should be cut as close to the fire as possible.”

14.) What percentage of your training hours is spent training vs. educating

72% avg Training 28% Educating

15.) I (firefighters) would be better prepared on the fire ground if training sessions

focused more on education. (Circle one)

1.) Strongly disagree	5	6.25%
2.) Disagree	36	45%
3.) Uncertain	25	31.25%
4.) Agree	14	17.5%
5.) Strongly agree	0	0%
Total	80	100%

16.) The fire training I receive at this department is too basic. (Circle one)

1.) Strongly disagree	3	3.75%
2.) Disagree	46	57.5%
3.) Uncertain	13	16.25%
4.) Agree	17	21.25%
5.) Strongly agree	1	1.25%
Total	80	100%

17.) I would be more interested in training if it involved more new material. (Circle one)

1.) Strongly disagree	0	0%
2.) Disagree	20	25%
3.) Uncertain	13	16.25%
4.) Agree	37	46.25%
5.) Strongly agree	10	12.5%
Total	80	100%

18.) Reading trade journals and fire educational type books help me perform better on the fire ground. (Circle one)

1.) Strongly disagree	6	7.5%
2.) Disagree	25	31.25%
3.) Uncertain	20	25%
4.) Agree	26	32.5%
5.) Strongly agree	3	3.75%
Total	80	100%

19.) Looking at the fire service as a whole. Basic firefighting skills will deteriorate over time as the number of actual fires decreases. (Circle one)

1.) Strongly disagree	0	0%
2.) Disagree	6	7.5%
3.) Uncertain	3	3.75%
4.) Agree	49	61.25%
5.) Strongly agree	22	27.5%
Total	80	100%

20.) In your opinion what is the most effective way to train to ensure retention of infrequently used skills?

Answer in the space below. Listed in order of most frequent responses

- 1.) Train on basic skills one shift then those same skills in a scenario the next shift.
- 2.) Live fire training
- 3.) Make training more like a fire ground, take it more seriously
- 4.) Train every shift

APPENDIX 2 – DEPARTMENTS SURVEYED

Sharonville Fire Department
11637 Chester Rd.
Cincinnati, OH 45246

City of Blue Ash Fire Department
10647 Kenwood Rd.
Blue Ash, OH 45242

Loveland-Symmes Fire Department
126 S. Lebanon Rd.
Loveland, OH 45140

City of Springdale Fire Department
11230 Lawnview Dr.
Springdale, OH 45246