HANDS-ON TRAINING FOR STRUCTURAL FORCIBLE ENTRY

EXECUTIVE DEVELOPMENT

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ABSTRACT

When performing forcible entry effectively, firefighters have initiated rescue and suppression efforts quickly, while minimizing the damage to the structure. The problem was while forcible entry was a necessary skill, training facilities had difficulty simulating this evolution.

The purpose of this project was to determine what type of forcible entry training is necessary for Chippewa Valley firefighters, and to gather examples of props/simulators being used around the nation. Descriptive research was used to answer the following research questions:

1. What forcible entry skills are required for certification testing approval by recognized national accreditation boards?
2. What forcible entry skills are needed by the firefighters of the Chippewa Valley Technical College (CVTC) area?
3. What types of forcible entry props/simulators are currently being utilized at training facilities around the nation?
4. What forcible entry skills can be performed at the props/simulators currently in use around the nation?
5. How has the addition of training with forcible entry props/simulators affected the performance of the firefighters on the fireground?

The procedure began with a literature review of adult learning, forcible entry training and props. Telephone interviews were held with national fire training accrediting agencies. A survey was sent to state fire service directors requesting input on their training props.

Results showed that accrediting agencies require that facilities be able to test forcible entry. Various props were identified through the survey. Although many facilities had some type of forcible entry practical skills capabilities, few could address all the requirements of NFPA 1001.

Recommendations included; adding props at Wisconsin technical colleges, inventory forcible entry tools throughout the CVTC district, compare firefighters trained on forcible entry props to others, organize a training facilities conference, visits to training facilities with forcible entry training props, and development of a resource pool of training facilities around the nation.

TABLE OF CONTENTS

INTRODUCTION

Chippewa Valley Technical College is one of 16 technical colleges that make up the Wisconsin Technical College System. Each of the technical colleges are prepared to be the provider for fire service training needs. The recipients of the training are typically fire departments within each college district. The Wisconsin Technical College System Board, through a state consultant, provides fire service training support for state-mandated training at each district, through curriculum materials, special funding and training for instructional staff. The consultant works with a state advisory committee to determine what support will be given and to what level the state will train.

Currently, the state of Wisconsin, in the Wisconsin Administrative Code, requires firefighters to meet National Fire Protection Association (NFPA) 1001 standards to operate inside a burning structure. Therefore, the technical colleges must be able to provide the training to meet NFPA 1001. Regional training centers are being constructed at many of the colleges, to accomplish the wide variety of skills the firefighters must be able to demonstrate to meet NFPA 1001. The problem is although forcible entry is one of the skills that needs to be taught, it remains a skill that training facilities have difficulty simulating for a variety of reasons.

The purpose of this research project was to determine what type of forcible entry training is necessary for the firefighters in the Chippewa Valley District and to gather examples of forcible entry training simulators (props) currently being used around the nation for decision-making. Descriptive research methods were used to answer the following questions:

1. What forcible entry skills are required for certification testing approval by recognized national accreditation boards?

2. What forcible entry skills are needed by the firefighters of the Chippewa Valley Technical College area?
3. What types of forcible entry props/simulators are currently being utilized at training facilities around the nation?
4. What forcible entry skills can be performed at the props/simulators currently in use around the nation?
5. How has the addition of forcible entry training props/simulators affected the performance of the firefighters on the fireground?

BACKGROUND AND SIGNIFICANCE

The school district of Chippewa Valley Technical College (CVTC) covers all or parts of 11 counties in northwestern Wisconsin, and is responsible for workforce development. The Fire Service Program at CVTC is made up of three branches; an associate degree program, state-supported courses to meet state adopted National Fire Protection Association (NFPA) standards, and specialty continuing education classes.

Located within CVTC's district are 53 fire departments; one full-time department, three combination departments and 49 paid per call/volunteer departments. These fire departments have the option of using CVTC Fire Service Training as their training provider. If they do not choose to use CVTC as their training provider, the departments can train in-house, train through an apprentice program, or bring in a private training provider.

Regardless of where the training delivery originates, Chapter ILHR 30 (also called COMM 30) of the Wisconsin Administrative Code requires that fire department members meet

NFPA 1001, the professional qualifications for firefighters" standard (DILHR, 1995). The regulatory body for fire training requirements is the state of Wisconsin, Department of Commerce, previously referred to as DILHR (Department of Industry, Labor and Human Relations). COMM 30, Fire Department Safety and Health, is the specific document describing training requirements for fire departments in Wisconsin. Through COMM 30, the state has adopted certain NFPA standards including NFPA 1001. Fire department members, in recognized fire departments, must meet this standard before entering a burning structure. Firefighters must demonstrate competency in all necessary firefighting skills to meet NFPA 1001. Among the skills that must be demonstrated to meet NFPA 1001 is forcible entry.

In the past, forcible entry training at CVTC has had limited practical skill application during training. There are several reasons for the lack of hands-on training for forcible entry. These include the expense in the destruction and one time use of a simulation (prop), lack of reusable forcible entry training props, difficulty in securing acquired structures for forcible entry training, and the limited types of entry an acquired structure can provide. These barriers to hands-on forcible entry training have caused much of the instruction to be limited to classroom discussion of door types, window styles, and building construction, display of forcible entry tools, simulations of the tools in action without actually forcing anything, and videotapes of others completing the evolutions. While the classroom instruction, demonstrations and simulations are necessary and important, hands-on training provides the greatest skill retention (Butler and Cusick, 1983). Mastery of a skill depends on the firefighter's ability to meet the objective. Skill testing must usually be done on a performance basis (Butler and Cusick, 1983).

This research is significant to the fire service in both the quality of department's emergency response and the fire service training area. The review of literature will clarify

forcible entry skills that must be perfected by firefighters to increase their ability to enter a structure efficiently. The speed of entry impacts the rescue and suppression efforts. Survey results will identify forcible entry props currently being used around the nation. This information will provide a base from which CVTC and other departments and training centers can draw ideas to construct their own props and/or gather information on current props readily available that are applicable to their region. Finally, availability of information on props being utilized may encourage departments to construct a simulator and allow firefighters in their region the much valued practical skills work.

The results of the study identified a variety of forcible entry training props. These props were locally designed and constructed, commercially built and marketed, or designed and constructed on a national level. The responsibility to CVTC is to decipher which prop characteristics would best benefit the firefighters in the CVTC region and meet the NFPA 1001 standard.

This research paper was developed to satisfy the Executive Fire Officer Program applied research requirement and is associated with the Executive Development course at the National Fire Academy. This research relates to the service quality portion of the course by addressing improved training methods in forcible entry. Innovative designs of forcible entry simulators will come from assimilating ideas from the research findings.

LITERATURE REVIEW

Theory of Adult Learning

Steven Brookfield, a well-known researcher and educator in the field of adult education summarizes the principles of adult learning, androgogy, into eight distinctive categories. In his book *Understanding and Facilitating Adult Learning*, Brookfield (1991), states when teaching adult learners the facilitator must consider these principles.

1. Adults learn throughout their lives.
2. Adults exhibit diverse learning styles.
3. Adults learn in different ways, at different times, for different purposes.
4. Adults like their learning to be problem centered and to be meaningful to their life situation.
5. Adults want the outcome of their learning outcomes to have some immediacy of application.
6. The past experiences of adults affect their current learning.
7. The adult's subscription to a self-concept of him/herself as a learner is linked to effective learning.
8. Adults exhibit a tendency toward self-directedness in their learning. (p.31)

Five of these basic principles of adult learning are reiterated in the National Fire Academy curriculum, *Instructional Techniques for Company Officers* (ITCO), (Butler and Cusick, 1983). Butler and Cusick (1983) propose five characteristics of adult learners;

1. Adult learning should be problem centered.
2. Learning must be experience centered with meaningful goals.

3. Firefighters must actively participate and search for methods and means for achieving the goals.
4. Firefighters must have feedback toward the progress of the goal.
5. All adults learn at different speeds. (pp. 1-29 – 1-30)

These principles or characteristics of adult learning relate to all types of learning, whether it is mostly cognitive or psychomotor. Three of the characteristics of adult learning are relate specifically to hands-on training or psychomotor. During hands-on training firefighters must actively participate, apply the information to a variety of situations, and solve problems. Butler and Cusick (1983) believe "activities and simulations challenge the learner to remember and deal with the facts and….good participation experiences yield greatest learning" (p. 3-10).

It is of utmost importance for the health and safety of firefighters responding to the call, and the public requiring their help, that emergency responders have developed complete mastery of the skills required to successfully mitigate each incident. The definition given to learning by Butler and Cusick (1983) in the ITCO curriculum is "a observable change in behavior after new information and/or skills have been presented and practiced" (p.1-26). In order to show that mastery of a practical skill has been achieved, firefighters must meet the objective and physically demonstrate the complete evolution.

The practical exercise must be completed, for the instructor to adequately address the characteristics of adult learning when dealing with a practical skill. The hands-on experience during the practical exercise makes the skill immediately applicable, uses past experiences of the learner and creates an environment where the adult can problem-solve. The challenge of firefighter training is balancing the classroom lectures and drama of instructional demonstration with the all-important hands-on experience of the practical exercise (Cetuk, 1992). Hands-on

training also is very beneficial for different learning styles. Butler and Cusick (1983) believe the training that is the most effective and will be remembered the best is training that involves the highest number of senses. If firefighters say as they do, 90% of the information will be retained (Butler and Cusick, 1983).

Butler and Cusick (1983) stress the need for realistic hands-on training. Butler and Cusick (1983) explain, "Participatory experience is particularly effective as it approaches actual operational experience, that is, a situation as identical as possible to that actually encountered on the fireground" (p. 3-11). Some of the evolutions required in firefighter training lend themselves well to applying the principles of adult learners during the practical portion of training. When a fire instructor teaches about personal protective equipment (PPE), he/she will be able to address the principles easily. The PPE objectives from the nationally known *Essentials Curriculum* can be readily practiced in the classroom, on the apparatus bay or in the field. Fire Protection Publications (1998) identifies these hands-on objectives as donning personal protective equipment, filling an SCBA cylinder, and changing an air cylinder. Department and training centers usually have the equipment and buildings available to complete very realistic training, whether it be donning a self contained breathing apparatus (SCBA), ground ladder training, or hose evolutions.

There are skills that are difficult to practice in a realistic setting. Effective fire attack is one of the vital skills firefighters must demonstrate to meet accepted national standards (NFPA 1001, 1997). In the past, acquired structures that met NFPA 1403, the standard on Live Fire Training Evolutions, were used to complete the fire attack practical skills evolution. Laws and regulations created to protect the environment have controlled and limited the use of acquired structures.

Many departments/training centers have constructed, or are in the process of constructing, props or permanent structures that are safe for repetitive burning of either Class A combustibles, or Class B gas fuels, such as propane or natural gas. Many cost considerations must be reviewed before constructing such a prop/simulator (NFPA 1402, 1997). The high level of authenticity with minimum exposure to risk, that can be found in a training center burn building, is an excellent means of training firefighters (NFPA 1403, 1997).

Now that burn buildings are being constructed for safe live fire simulations, forcible entry is one of the few remaining critical firefighter skills that lacks the hands-on component during department/training center instruction. FPP (1989) authors believe "For successful rescue and suppression to take place, such obstructions (e.g., locked doors and barriers) must be effectively removed, with speed and without unnecessary damage". (p. 1)

Forcible Entry

Forcible entry is defined by Fire Protection Publications (FPP), as the techniques used to get into buildings or other areas of confinement when normal means of entry are locked or blocked (FPP, 1989). Effecting a prompt rescue and/or fire suppression access to the interior is of paramount importance. FPP authors (1989) believe forcible entry is of major importance in achieving overall offensive objectives. Proper forcible entry techniques can minimize damage to the structure entered, besides providing interior access (FPP, 1998). To maintain good public relations, firefighters should do the least damage possible to achieve their goal of entry. Public opinion about the fire department's action at nuisance calls, is part of the reason that close attention must be paid to methods of forcing entrance, especially when no visible signs of an emergency exists (FPP, 1989). Thorough training must be completed to hone forcible entry skills

so that the appropriate techniques are used in a variety of situations. FPP (1989) claims that damage should decrease as the knowledge and skill of entry crews increase.

Mittendorf (1998) has identified three methods of forcible entry generally used in truck company operations including conventional forcible entry, through-the-lock forcible entry and power-tool forcible entry. Mittendorf's (1998) definitions for each method follow:

> *Conventional forcible entry* entails using common tools such as an axe, halligan, crowbar, bolt cutters, or battering ram to force, cut or breach an object to gain entry.
>
> *Through-the –lock forcible entry* focuses on pulling out a locking device (i.e., lock cylinder) and tripping the lock with an appropriate tool.
>
> *Power-tool entry* entails using rotary saws, rabbit tools, and air bags to cut or force objects and security devices such as steel doors, metal bars on windows, and case-hardened padlock. (Mittendorf, 1998, p. 82)

Morris (2000) in *The Firefighter's Handbook* has categorized forcible entry methods similar to Mittendorf as conventional, through-the-lock, and power tools.

Conversely, FPP(1989) in their *Forcible Entry* manual do not divide forcible entry into methods. These authors have discussed forcible entry through the identification of forcible entry tools and their purposes (FPP, 1989). FPP (1989) groups forcible entry tools into the following four categories; prying and spreading tools, cutting and boring tools, striking and battering tools, and lock entry tools.

Each of these forcible entry methods/categories requires a variety of tools with which the firefighter should be familiar, in order to accomplish forcible entry effectively. Although the tools are numerous, many of them have similar purposes. A comparison of forcible entry tools

discussed by each of the authors, Mittendorf (1998), Morris (2000), and FPP (1989) (see Appendix A).

Basic Forcible Entry Skills for Firefighters

The firefighting skill of forcible entry falls under the recommended standards of the NFPA 1001. NFPA authors explain the minimum requirement for firefighters in regards to forcible entry in NFPA 1001 (1997), Chapter 3-3.3*.

> 3-3.3* Force entry into a structure, given personal protective equipment, tools, and an assignment, so that the tools are used properly, the barrier is removed, and the opening is in a safe condition and ready for entry.
>
> (a) *Prerequisite Knowledge:* Basic construction of typical doors, windows, and walls within the department's community or service area; operation of doors, window, and locks; and the dangers associated with forcing entry through doors, windows, and walls.
>
> **(b)** *Prerequisite Skills:* The ability to transport and operate hand and power tools and to force entry through doors, windows, and walls using assorted methods and tools. (p. 1001-7)

The asterisk indicates there is more information in the NFPA 1001 Appendix. The NFPA 1001 Appendix (A-3-3.3) (NFPA 1001, 1997) clarifies the forcible entry skills needed to be compliant with the standard. NFPA states "The Fire Fighter I should be able to force entry through wood, glass, and metal doors that open in and out: overhead doors; and windows common to the community or service area (NFPA 1001, 1997)."

The IFSTA *Essentials of Firefighting* curriculum contains job sheets for forcible entry training for entry level firefighters (FPP, 1998). In order to successfully complete the *Essentials*

of Firefighting training the firefighter must accomplish the following skills (FPP, Essentials Student Applications, 1998).

JS 8B-1 – Properly Break Ordinary Plate Glass

JS 8B-2 – Properly Break Tempered Plate Glass

JS 8B-3 – Force an Out-Swinging Door

JS 8B-4 – Force an In-Swinging Door (Stopped Jamb)

JS 8B-5 – Force an In-Swinging Door (Rabbeted jamb)

JS 8B-6 – Force an In-Swinging Door Mounted in a Metal Frame

JS 8B-7 – Force a Double-Swinging Door

JS 8B-8 – Collapse a Revolving Door

JS 8B-9 – Force a Sliding Door

JS 8B-10 – Force a Checkrail (Double Hung) Window

JS 8B-11 – Force a Casement Window

JS 8B-12 – Force a Projected Window

JS 8B-13 – Force an Awning or Jalousie Louvered Window

JS 8B-14 – Force a Lexan Window

JS 8B-15 – Open a Metal Wall

JS 8B-16 – Open a Wood Floor (pp. 8A-1, 8B-1)

Forcible Entry Training

"The way you practice and train affects your performance during actual execution" (Cetuk, 1992). Firefighters are expected to efficiently operate the tools of forcible entry, no matter how numerous. Hands-on training can help accomplish this. Mittendorf (1998) believes a combination of fire prevention, pre-fire planning and training can increase knowledge and

proficiency with respect to tools, equipment, and forcible entry techniques *before* implementation is necessary. FPP (1989) concurs:

> There is no substitute for training as a means to ensure that forcible entry is made in the most efficient manner. Efficient forcible entry is speedy, minimizes damage, and is accomplished without injury to personnel. It is a critical phase of an offensive fire attack and must be carried out with little delay so that an aggressive interior fire attack and rescue operation can take place. Training provides not only the opportunity to sharpen skills, but also enables firefighters to accept forcible entry assignments with confidence and reasonable assurance that the job will be carried out successfully. (p. 15)

In the IFSTA *Essentials Manual* (FPP, 1998), the importance of forcible entry training is discussed. "Forcible entry is a learned skill….forcible entry is not easy and must be practiced often." (FPP, 1998). Many different situations must be presented to firefighters so they are given the opportunity to problem-solve for situations they can not predict. By confronting various situations during training exercises, firefighters can develop a number of strategies for forcing entrance (FPP, 1989). Morris (2000) reinforces FPP's position as to the importance of training for forcible entry. The firefighter must have the skills, gained by training and experience, to apply this knowledge (i.e., forcible entry) using a variety of tools (Morris, 2000). Kidd and Czajkowski (1997) have found that although the need for hands-on forcible entry training cannot be denied, obtaining enough practice materials is difficult.

Forcible Entry Training Simulations or Props

While the importance of forcible entry training has been stressed, little research is available on simulators, or props, that can be used for repetitive hands-on forcible entry training. Through a thorough search at the Learning Resource Center at the National Fire Academy, 26 articles were found describing fire training facilities around the nation. Many specialized training props were mentioned at each of the facilities described, from SCBA mazes (Burns, 1981) to propane-fueled fire scenarios (Morrissette, 1995). Only two of the 26 articles contained information about forcible entry training props. Clark's article "Come one, come all", (Clark, 1983) includes a diagram that shows the training grounds and the location of a forcible entry shed, but no description of forcible entry skills that can be performed on the prop. Granito and Lincoln (1983) describe the plans for the Nassau County Fire Service Academy. These plans include, "Heavy duty forcible entry conditions" (Granito and Lincoln, 1983, p.100) at a commercial/industrial building complex, and a "forcible entry display and activity area, nondestructive type for demonstration purposes" (Granito and Lincoln, 1983, p. 102).

Mittendorf (1998) suggests contacting companies that handle or manufacture doors, gates and security devices. Some are willing to donate their products to the fire service for training purposes (Mittendorf, 1998).

Kidd and Czajkowski (1997) have written a drill guide geared to company officers. They have described methods to make doors for forcible entry, at an acquired structure, last through several evolutions (Kidd and Czajkowski, 1997).

Chatterton (1998) has also written a drill guide focusing on volunteer fire departments. In his book, *Volunteer Training Drills: A Year of Weekly Drills*, he has developed two drills for forcible entry training. His first drill outline entitled "Forcible Entry-Conventional" (Chatterton,

1998) suggests incorporating video from local structures for class discussion, but does not include hands-on training. He also suggests acquired structures be used for training purposes. "Ideally, try to locate a property that is about to be torn down so that the members can get hands-on practice with the ax and halligan" (Chatterton, 1998, p.70). The second drill Chatterton has created requires the availability of a door with locks, specifically an Adams Rite lock. In this drill, Chatterton does hint of the creation of a forcible entry training prop when he suggests, "you can get an old door and mount several locks of different types along the edges" (Chatterton, 1998, p.146).

A third resource for training drills is *The Sourcebook for Fire Company Training Evolutions* by Michael Wieder. Wieder's book contains one drill dealing with forcible entry. Wieder (1995) identifies four forcible entry objectives to be mastered through this drill. These objectives include performing the following:

- Review the types of rescue and forcible entry tools that are carried on the apparatus.
- Locate the tools on the apparatus.
- Start and demonstrate the basic operation of each tool.
- Service the tools appropriately. (p.19-1)

The demonstration portion of Wieder's drill does not include having the students actually force their way into a structure. The Wieder's (1995) demonstration portion of his drill requires "Each firefighter…start each tool twice, and take the tool through its range of motion. Once complete, make sure that all the tools are restored to a ready state" (p. 19-2).

Firefighter Certification and Forcible Entry Skills

"The two organizations that accredit training agencies to certify firefighters are the National Professional Qualifications Board, sometimes called the NPQB or the Pro Board, and

the International Fire Service Accreditation Congress (IFSAC)" (FPP, 1993). Both of these organizations accredit training organizations that are certifying firefighters to standards (FPP, 1993)

Certification is important because it provides consistency in skill and verification of one's mastery of skills. Certification shows that the individual has met the objectives of the applicable standard and should be ready to handle the responsibilities of the job (FPP, 1993). Mr. Rich Hall, the IFSAC Manager, (personal communication, January 27, 2000) stated, "IFSAC requires that an accredited entity be able to test, either through written or practical exam, 100% of the NFPA standard for which accreditation is being sought". Hall also clarified the issue of forcible entry practical skills that each accredited agency must be able to test. "All accredited entities must have the capacity to test forcible entry through a practical test" (R. Hall, personal communication, January 27,2000).

Mr. V. Ken Elmore, the Chairman of the Committee on Accreditation for the ProBoard, explained the certification process that must be followed by agencies attempting to become accredited with the Pro Board. Elmore (personal communication, March 8, 2000) stated:

> During the testing procedure, the candidate must be able to demonstrate the skill, if the standard objective for the job performance requirement uses the term "demonstrate". There are critical skills that may be required at each test, an example being SCBA. We can not expect the agency to test each and every skill. We use a sampling from the standard being tested.

When questioned about testing of forcible entry skills, Elmore (personal communication, March 8, 2000) stated that "the forcible entry test is one that may be chosen in the sample to be tested". He explained that the accredited agency must have a skill evaluation sheet, which provides steps

for evaluating each particular skill, forcible entry included (V.K. Elmore, personal communication, March 8, 2000).

Firefighters who may have to demonstrate a skill for certification testing must have the opportunity to practice that skill, prior to the test, until they have achieved proficiency. With the lack of forcible entry drills, props, or appropriate training simulations, the firefighter may not only fail to complete a certification test successfully, but may fail to do the skill appropriately when it is most needed, on the fireground.

PROCEDURES

Definition of Terms

Forcible Entry. Techniques used by fire personnel to gain entry into buildings, vehicles, aircraft, or other areas of confinement when normal means of entry are locked or blocked (FPP, 1993)

Prop. Simulation, imitative representation (Merriam-Webster, 1987).

Truck Company. A group of firefighters assigned to a fire department aerial apparatus who are primarily responsible for search and rescue, ventilation, salvage and overhaul, forcible entry, and other fireground support functions (FPP, 1993).

COMM 30. Wisconsin Administrative Code that deals with fire department operations for the Health and Safety of firefighters.

Acquired Structure. Structure that is acquired for the purpose of conducting live fire fighting or rescue training evolutions (FPP, 1993).

Class A Fuels. Fires involving ordinary combustibles such as wood, paper, cloth and so on (FPP, 1993).

Class B Fuels. Fires of flammable and combustible liquids and gases such as gasoline, kerosene, and propane (FPP, 1993).

National Fire Protection Association (NFPA). Nonprofit educational and technical association devoted to protecting life and property from fire by developing fire protection standards and educating the public (FPP, 1993).

NFPA 1001. The standard addressing the Professional Qualifications of Firefighters.

NFPA 1402. The standard addressing the building of training facilities.

NFPA 1403. The standard addressing live fire training.

Reseach Methodology

The desired outcome of this research was to validate the importance of hands-on forcible entry training and compile current forcible entry training props from around the nation for decision-making purposes at Chippewa Valley Technical College. A literature review conducted to describe the relationship between adult learning and hands-on training, identify the forcible entry equipment and skills required by firefighters, identify drills that incorporate hands-on exercises for forcible entry, identify current forcible entry props being used at training facilities, and review accreditation and firefighter certification requirements.

Descriptive research methods were employed to determine the types of hands-on forcible entry training that is being conducted at training facilities around the nation. This research also investigated the types of props or simulations available for the hands-on training. A survey (see Appendix B) was distributed which addressed the research questions. Each training officer or facility manager received a packet containing a cover letter (see Appendix B) explaining the purpose of the survey, the survey, and a self-addressed stamped return envelope.

The survey was distributed to fire personnel listed in the 1999 eighth edition of the National Directory of Fire Chiefs and EMS Directors – fire service related only, training facilities identified in NFPA 1402, and to individuals identified in return surveys as potential information providers. Of the 143 surveys distributed, 47 were returned. The results of the survey appear in Appendix C.

Telephone interviews were conducted with individuals that were responsible for department/training center accreditation. During the telephone interviews with the individuals responsible for accrediting agencies for certification, the following question was asked; In order for an agency to be accredited to certify firefighters to the Firefighter II level, must the candidates seeking certification perform a practical forcible entry skill?

Assumptions and Limitations

The author assumes that adult learners share the same characteristics. This research is approached as such, realizing that this may not be so. It was assumed that the National Directory of State Fire and EMS Directors is current and those listed had training centers and/or knowledge of the training centers in their regions. It was also assumed that the information received on the returned surveys was given honestly, and that the person completing the survey was a knowledgeable representative of those organizations.

Financial and time constraints prevented this survey from being distributed to all fire departments and training facilities in the United States. Therefore, a department or training center, that has excellent forcible entry training props, may have been excluded.

RESULTS

1. What forcible entry skills are required for certification testing approval by recognized national accreditation boards?

Two nationally recognized accreditation boards for firefighter certification are IFSAC and the Pro Board. The returned surveys indicated that 76% of the respondents are affiliated with either the IFSAC or Pro Board accreditation for their firefighter certification. As confirmed during the telephone interviews with representatives of both nationally recognized accreditation agencies, both the Pro Board and IFSAC require firefighters to meet the previously mentioned NFPA 1001 standards for Firefighter I and Firefighter II. Eighty-one % of the responding agencies indicated that they certify to the Firefighter II standard.

Firefighters who complete the firefighter certification must satisfy the NFPA 1001 requirements for forcible entry. The Essentials Student Application Manual listing of forcible entry skills, that was described earlier, is a comprehensive list from which departments can select skills that relate to their region. The list includes skills that rural departments may not use, and could then discard, such as collapsing a revolving door. Regardless of which skills a fire department or training agency does not include as part of their forcible entry practical exam, they must meet the Job Performance Requirement in NFPA 1001 dealing with forcible entry. As stated earlier, this means firefighters must be able to force entry through wood, glass, and metal doors that open in and out; overhead doors; and windows common to the community or service area.

2. **What forcible entry skills are needed by the firefighters of the Chippewa Valley Technical College area?**

The state of Wisconsin is attempting to become IFSAC accredited. Therefore, the firefighters of the Chippewa Valley Technical College district would need to be able to perform most of the forcible entry skills listed in the Essentials of Firefighting Student Applications Manual. The only exception is the skill of collapsing a revolving door. This skill would be

applicable only to the firefighters in the cities of Eau Claire, Chippewa Falls, and Menomonie, as the NFPA standard requires only performance on the forcible entry skills that are common to the community or service area. The firefighters within these municipalities train at CVTC, requiring the technical college to have the ability to train on revolving doors.

Mutual aid is requested very often between the fire departments in the CVTC district. Therefore, the firefighters must be familiar with a large variety of forcible entry tools. The tools that are common to all three writers in Appendix A must be included in training. This would include;

- Ax
- Halligan
- Crowbar
- Bolt Cutters
- Battering ram
- A tool
- K tool
- Key tool
- Chain saw
- Rotary saw

Firefighters should also be familiar with several of the tools that are shared on two of the lists in Appendix A, and tools that are prevalent in the CVTC district which include;

- Reciprocating saw
- Vise grips
- Channel locks
- Air bags
- Air chisels

3. What types of forcible entry props/simulators are currently being utilized at training facilities around the nation?

The survey brought forth a wide variety of props/simulators that are being used around the nation. The respondents that gave completion dates of their props indicated that they had

been completed within the past seven years. Many simulators were being added, refurbished or being replicated by the facilities. Survey question number five and six address the design and type of prop constructed by each facility. These can be placed into three categories; commercially-built props, locally designed and constructed props, and props designed and constructed at a national level.

Three commercial forcible entry props were identified in the survey. The first commercially available prop is the *Forcible Entry Training System (FETS)* (see Appendix D1). Eight survey respondents currently use *FETS* during their forcible entry training. Another commercially available prop is the *Power Jamb***.** The *Power Jamb* is a tool that is installed on a door where the doorknob would be positioned. Finally, there is a prop called *Magna Force* made by *FETS*. This device is mounted on the door and works with a false dead bolt to allow the student to use the halligan and axe to force the door.

The Air Force designed the Firefighter I Multi Task Structural Fire Trainer. This simulator was then constructed at many United States Air Force bases, according to Dover Air Force Base, Retired Deputy Fire Chief Charles Myer (personal communication, January 27, 2000). A copy of the blueprints can be found in Appendix D2. A videotape accompanies this paper that demonstrates the operation of the forcible entry stations the can be completed on this simulator.

The results of the survey contained many examples for props/simulators that were designed and constructed locally by either fire departments or training centers. Examples of the props/simulators can be categorized by the point of forcible entry (i.e. windows, doors, walls, floor and roof, and other). Several training centers, such as the Georgia Fire Academy, have

installed most of these props at their facilities. A videotape which explains the construction and operation of the Georgia Fire Academy forcible entry props accompanies this paper.

Window props/simulators described at other locations included the following;

- Dowel rods at the latch point
- Rebar in frame on window to simulate burglar bars (see Appendix D3)
- A prop with a rigid bottom and side. The opposite side slides to allow for windows of different sizes. Old windows used and glass actually broken.
- Windows from showrooms that are used for simulation, no glass broken
- Various window types located in the burn building (see Appendix D4)

The door props/simulators were the most numerous. Examples of door props, that were locally designed and constructed, include;

- Alterations on the latch area. Most examples used pipe, hinges, or false dead bolt on the door and the frame. A dowel of wood or rebar is inserted and the door is forced, breaking the dowel. Rebar must be cut.
- A variety of door and lock samples, such as in-swinging and out-swinging doors on or in burn buildings or props (see Appendix D4)
- Door and frame stand up prop (see Appendix D5)
- Cellar door mock-up (see Appendix D4)
- Modifying the keeper in the doorframe so that spring allow the door to be forced.
- Wood frame to hold old metal door secure, then use circular saw to cut

A variety of wall props/simulators have been designed to address forcible entry through drywall, wood, or metal walls.

- Metal wall prop using old van roof tops to simulate wall

- Panels to cut through
- Drywall inserted into a preset opening
- Concrete cutting and breaching

The roof/floor props were very similar. Usually, the roof/floor props were installed on a burn building or stand up prop. A panel or pallet was dropped into a permanent frame. Roof/floor prop examples included;

- Roof vent cut out panel
- Combination of 1 x 6 pallets and packing plywood to simulate layered effect

Other forcible entry props/simulators included devices for sawing, prying, chopping 4 x 4's, cutting chains, and breaking padlocks.

4. What skills can be performed at the props/simulators currently in use around the nation?

When asked if the responding agency had forcible entry training props that could be used to accomplish all basic forcible entry skills (question three), the majority of respondents replied negatively. The skill of breaking a door lock was the skill that the highest percentage of the agencies (66%) were able to perform at their facilities. Thirty-four percent were not able to perform this skill. The other basic forcible entry skills able to be performed at the responding agencies were even lower in percentage. The least able to be performed skill was opening a metal wall, which could be performed at only 15% of the responding agencies.

Survey question four and six dealt with additional skills that can be performed at the props that are being utilized. The commercially available props focus on the forcible entry skills related to entry through a door. The FETS prop allows the firefighters to practice the skills of pulling a door lock cylinder with a K Tool and halligan, and using a key tool on a variety of

locks to open a door. The Power Jamb and Magna Force tools allow for repeated use of the halligan and ax as the firefighter team forces entry through a door.

A variety of forcible entry skills can be performed on the Firefighter I Multi Task Structural Fire Trainer, created by the Air Force. The forcible entry skills include breaching a masonry wall, cutting a metal wall, cutting a roof vent hole, cutting through a floor, forcing an in-swinging and out-swinging door, forcing a window, cutting a chain, and cutting a padlock.

Finally, skills able to be performed at the locally designed and constructed props/simulators varied from location to location. No one facility had a prop that could perform all the skills that were locally designed and constructed. This list is a comprehensive list of skills for all responding agencies that had locally designed and constructed their props;

- Through the lock entry
- Cutting metal and wood doors, walls, floors and roofs
- Forcing in-swinging and out-swinging doors
- Concrete cutting and breaching
- Cutting rebar
- Penetrating drywall and pulling ceilings
- Forcing windows
- Breaking glass
- Cutting through chains, padlocks

5. How has the addition of forcible entry training prop/simulators affected the performance of the firefighters?

Only 29% of the responding agencies had not noticed changes in the fireground actions of their firefighters since they had been trained on the forcible entry training props. Of the

remaining agencies, 21% were unsure if behavioral changes had occurred because the survey responder was unable to observe fireground action. This was usually the case when the firefighters were sent away to the responder's facility for training, then return to the department for duty. Change was noticed in firefighter's fireground actions by 50% of the agencies. The survey respondents felt the firefighters who had been trained on the forcible entry prop had a much better understand of the skills. The firefighters were able to enter structure more rapidly and caused less damage to the structure. The tools were used in a safer manner and firefighters were more confident in their abilities.

DISCUSSION

The importance of considering the adult learner, and the conditions with which they learn best, must be an integral part of firefighter training. Butler and Cusick (1983) have stressed the importance of the hands-on practical skills step in the learning process. This involves the consideration of three of the characteristics of the adult learner including active participation, applying the information, and solving problems.

Forcible entry training must not be an exception. Forcible entry training must include active participation, applying the information, and solving problems, to be certain the firefighters have achieved mastery of the skills. To demonstrate a skill to mastery, the skill must have been practiced, and the firefighter must have been observed completing it (Butler and Cusisk, 1983).

Training in a realistic manner is not the only reason for installing training props/simulators. The ability to physically perform a skill is a requirement for most certification testing. Both IFSAC and the Pro Board require certifying agencies, that they have accredited, to have the facilities for firefighters to physically demonstrate mastery of skills to meet NFPA job performance requirements. These job performance requirements include forcible entry skills. The certifying agencies must be able to have firefighters demonstrate the forcible entry skills from NFPA 1001 that are common to their community or service area. Based on the communities enclosed in CVTC's district, all areas defined in the NFPA 1001 Appendix (A-3-3.3) would have to be able to be tested; forcing entry through wood, glass, and metal doors that open in and out; overhead doors; and windows.

In order to train and test to meet the NFPA job performance requirement, CVTC must have access to the correct forcible entry equipment and props. Using the tool lists provided by FPP, Mittendorf, and Morris, a fairly inclusive list can be developed that would address the

CVTC district needs. Fire department administrators need to review the methods of forcible entry and tools available to accomplish the forcible entry methods, then select the appropriate combination of tools to meet their objectives. On the other hand, training facilities, especially facilities that training firefighters for numerous departments, must maintain a wider selection of tools for training and mastery.

The results of this research project indicate that departments and training centers are moving toward construction of training props. The oldest prop reported was built in 1993. There appears to be a move toward performance-based instruction and testing. This supports the belief that hands-on training and testing is important in mastery of skills. Sixty five percent of the survey respondents requested a copy of the results of this study. This indicates that there is an interest in construction or expansion of forcible entry training props at the departments/training centers responding. The responding agencies appear interested in other types of props being used for the improvement of their own facilities.

Many props/simulators described by the responding agencies did not include the ability to perform all necessary forcible entry skills. While this may be due to limits in resources of land, time, and money, it would still be important for CVTC to attempt to be as thorough as possible in creating a forcible entry prop that would meet all necessary forcible entry skills.

RECOMMENDATIONS

In order for Wisconsin to continue moving toward accreditation from IFSAC improvements must be made in the ability to train and test on forcible entry. Currently firefighters simulate forcible entry by "talking through the action". All technical colleges in the state need to provide props/simulators for the firefighters for training and testing purposes.

The wide array of forcible entry tools, used by the different departments in the CVTC district, causes a problem for CVTC. The lists of forcible entry tools, provided by the authors in the literature review, is a starting point in identifying what tool usage needs to be included in CVTC firefighter training. A more thorough survey of the tools used by the departments in the district would be helpful in conducting our training.

More research needs to be done comparing the forcible entry skills of firefighters who have used realistic training props/simulators to those firefighters who have not. Research also needs to be compiled showing the impacts of effective forcible entry on the fireground. Documentation of the time saved in entering a structure and minimization of damage could assist training departments in their requests for resources.

A national symposium focusing on training facilities should be held at a recognized fire service training center, such as the National Fire Academy. Training centers and fire department academies could present information about their facilities through displays, multi-media presentations and group discussions. This would be a great advantage to the many training centers that are struggling with facility development.

Decision-making personnel from CVTC would benefit from doing site visits to locations that are currently using multi-task forcible entry props. This would allow them to take

photographs and observe firefighters using the prop. From these site visits and information in this report, props can be designed to meet the needs of the CVTC area.

Additional research should be conducted to develop a extensive resource pool at the National Fire Academy. Given the importance of the skills of forcible entry, this pool would be useful to those attempting to improve training in this area.

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Appendices Not Included. Please visit the Learning Resource Center on the Web at http://www.lrc.fema.gov/ to learn how to obtain this report in its entirety through Interlibrary Loan.