

Running Head: EFFICACY OF ROPE RESCUE TRAINING

The Effectiveness of the Rochester Fire Department Rope Rescue Training Program

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Certification Statement

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

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Abstract

The development, presentation, and evaluation of training vary widely across the United States and are dependent upon available resources, available talent, and local needs analyses. The Rochester Fire Department's rope rescue training program is no exception, and has been developed over many years due to changing experiences, changing talent, newer technologies, and changing local needs. The problem was that the Rochester Fire Department had not evaluated the efficacy of its rope rescue-training program. The purpose of this research was to evaluate the efficacy of the rope rescue-training program. Evaluative research was used to determine how other fire departments evaluate rope rescue skills, the current retention rates for basic rope rescue skills among Rochester Fire Department personnel, the perspectives of line personnel, chief officers, and department instructors regarding the efficacy of rope rescue training, and the perspectives of line personnel regarding being evaluated on their rope rescue skills. The research was conducted using several questionnaires, a survey, and skills testing. The research revealed that although personnel are fairly proficient in basic rope rescue skills there were some areas of concern that should be addressed in training. The research revealed that the Rochester Fire Department conducts training similar to other fire departments, but does not evaluate the training in a similar way. The research also revealed that the training program is viewed as necessary and relevant, and is mostly well received by line personnel, chief officers, and department instructors. The recommendations included making necessary changes to the program, equipment, and processes, continued use of evaluations to measure proficiency and increase confidence among personnel, and conduct further research into how personnel might attain more proficiency.

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Introduction

The development of training programs and curricula in fire departments across the United States is certainly varied and dependent upon local needs analyses, available resources, and local talent. The rescue-training program in the Rochester Fire Department is no different. It has been developed and refined over many years to accommodate changing local demographics and needs, ever-increasing technology, and the changing talent of students and instructors within the department. Rope rescue training is just a small part of the technical rescue discipline, and basic rope rescue skills have been determined to be an important part of the services provided by our department. It is important that the training program be evaluated in order to ensure that training programs provide necessary knowledge and skills to personnel, make sure that the training is relevant to local needs, that it is the best use of available training dollars, and that it is the best use of the limited amount of time that line personnel can devote to training.

The problem is that the Rochester Fire Department has not evaluated the efficacy of its rope rescue-training program. The purpose of this research is to evaluate the efficacy of the rope rescue-training program. Using evaluative research methodology, this research seeks to answer the following questions: how do other fire departments evaluate rope rescue skills, what are current retention rates for basic rope rescue skills among Rochester Fire Department personnel, what are the perspectives of line personnel regarding the efficacy of rope rescue training, what are the perspectives of line personnel in regards to being evaluated on their rope rescue skills, what are the perspectives of chief

officers and department instructors regarding the efficacy of the rope rescue-training program?

Background and Significance

The city of Rochester is the third largest city in the state of Minnesota. The Rochester Fire Department serves an area of approximately 127 square miles that includes approximately 124,000 permanent residents in the city proper and four surrounding rural townships. Adding to the population are patients and families seeking medical care and treatment at the Mayo Clinic. The Department has daily minimum staffing of twenty-five (25) line personnel operating eight companies (six engines, two ladders, and a battalion chief) out of five fire stations. The Department is currently authorized one hundred-six (106) full-time positions consisting of the Fire Chief, the Deputy Chief of Administration, the Deputy Chief of Operations, three shift battalion chiefs, one training battalion chief, three fire prevention specialists, four civilian employees, one mechanic, and ninety-three (93) line personnel. The line personnel comprise three shifts, each supervised by a battalion chief. A captain supervises each company on each of the three Shifts (a total of twenty-four companies). All line personnel are trained and operate in the services that the department provides to the community. In 2015, the Department has an operating budget of just over \$14,600,000.

The Rochester Fire Department's rescue training program has developed over many years, focusing only on the types of rescue that personnel may potentially perform within the department's jurisdiction. These types of rescue include vehicle and machinery extrication, swift- and flat-water rescue, high- and low-angle rescue, confined-space rescue, structural collapse, and trench rescue. Over the many years of the program,

interested individuals volunteered to teach classes within the department that they either developed from their own knowledge and experience, or from classes that they had attended.

In 2010, the department formed a Rescue Group in order to develop a standardized, repeatable curriculum to be delivered by the group members to all line personnel (C. Bailey, personal communication, February 17, 2015). The group was composed of two line personnel from each of the three shifts, the Battalion Chief of Training, and one shift battalion chief. The group members also served as the department instructors for all rescue-related topics. This group developed a schedule of monthly classes that could be repeated every two years and focused heavily on rope rescue (since many of the other types of rescue require the use of ropes). The schedule started in January 2011 and has been repeated since that time. The group developed curriculum for the rope rescue classes that included basic rope rescue skills including knots, anchoring, belay, mechanical advantages, and rappelling. Rope rescue training is offered to all line personnel three to four times per year, and all line personnel participate unless they are sick, injured, on vacation, etc.

The department rescue instructors noticed varying levels of interest in rope rescue displayed by the line personnel. The instructors also noticed that many mistakes were being made in regards to basic skills that the line personnel should have mastered over the last three years of being taught the standardized curriculum. The researcher determined that these mistakes represent either a shortcoming in the training program (basic skills not being taught correctly, lack of emphasis on basic skills, inadequate time dedicated to basic skills, etc.) or a problem with learning by the line personnel.

An evaluation of the rope rescue program is necessary to determine the source of the mistakes being made by the line personnel. If it is determined that the issue is with the training program or with the way that the curriculum is being taught, changes can be made to promote retention of basic skills, thereby reducing the mistake that personnel have been making. On the other hand, if the issue is determined to not be with the rope rescue-training program itself, the issue is likely an adaptive problem with the line personnel (they do not think basic rope rescue skills are important, they do not care if they are proficient, etc.). If the issue is determined to be adaptive, the department and the Rescue Group will have to work to change the attitudes and perspectives of personnel. Additionally, the Operations Chiefs have, at various times, discussed their observations that any type of skills evaluation seem to increase the consternation amongst the line personnel, thereby potentially adding an element to an adaptive issue (personal communications, February and March, 2015).

This research relates to the United States Fire Administration goals of improving the fire and emergency services' capability for response and recovery from all hazards and improving the fire and emergency services' professional status. This research also relates to the Executive Leadership course of the Executive Fire Officer Program in that evaluation of training and gathering perspectives of the department will be a critical means of feedback by which changes can be made to the program that will help the department overcome both technical and adaptive issues that may be identified.

Literature Review

The National Cooperative Highway Research Program (NCHRP, 2006) states, "successful public and private organizations will be those that ensure that their employees

continue to learn as their professions and the tools of the profession advance” (pg. 9). Compton (2010) suggests that it is not by accident that organizations reach exceptional status, but because they are able to hold onto critical concepts that move people’s performance in the direction of excellence (pg. 89). A critical concept for the fire service is adequate and relevant training to make sure that personnel are ready for every emergency. “Training is one of the most pervasive methods for enhancing the productivity of individuals and communicating organizational goals to new personnel” (Arthur, Bennett, Edens, and Bell, 2003, pg. 234). The NCHRP (2006) also suggests that both the organization and individual share the responsibility for identifying and meeting training and development needs, as these needs are the “primary tool for improving performance” (pg. 8).

Thiel, Stern, Kimball, and Hankin, (2003) state, “Safe, effective, and realistic firefighter training is essential in preparing the fire service to achieve its mission of preserving life and property” (pg. 1). Heifetz, Grashow, and Linsky (2009) suggest that there is a commitment to learning in organizations with significant adaptive capacity (pg. 105). Though they were not referring directly to learning through training, the parallel can be drawn. They go on to state, “adaptive solutions have to capture and build from today’s realities toward new possibilities” (pg. 113). Purchase (2006) contends that training leads to competency and that maintaining competency of personnel is a big challenge for departments of all sizes (pp. 167-168). Pendley (2012) asserts that both the organization and the individual share responsibility for maintaining competency: the organization must provide high-quality initial training and continued structure to the

program, and the individual must be responsible for maintaining their own competency according to the required proficiency level.

Students may not have the necessary skill set to perform tasks with which they are not familiar, and should be identified by instructors, in advance, so that these students are not called upon to perform tasks without adequate training and practice (Thiel et al., 2003, pg. 16). A training program must develop the skills and competencies of department personnel to prepare them to meet the guidelines established by the department (Purchase, 2006, pg. 168).

Collins (2004) asserts that training is even more critical for high-risk, low-frequency events, like those involving rope rescue, because they are likely unfamiliar to rescuers and can be dangerous if the correct actions are not taken (pg. 167). The authority having jurisdiction has the responsibility to focus training and resources to maintain proficiency in the area of technical rescue, which requires a combination of training, study, skill, and some frequency of technical rescue operations (Rhea and Rousseau, 2010, pg. 2). Purchase (2006) gives a historical perspective to technical rescue in the fire service,

“The need for specialized technical rescue teams became apparent as the fire service took on the responsibility for providing rescue to victims of earthquakes, structural collapse, and confined space incidents. Some of these incidents became national media events. The Federal Emergency Management Agency (FEMA) initiated the organization of strategically placed rescue teams, called Urban Search and Rescue (USAR). Departments across the country followed suit by

developing their own versions of the USAR model, adding technical rescue to their response and ultimately training needs” (pg. 167).

Although rope rescue is just part of the technical rescue discipline, LaFemina (2008) suggests that “rope skills have not only become more refined, they’ve become a requirement in today’s fire service”. Collins (2004) insists that realistic, manipulative training is essential for safe and effective rescue operations, which is why rescue personnel must practice and be proficient (pg. 172). “The fire service should continue to utilize performance based training as many of the functions of fire service personnel are specific, detailed, and used infrequently in the emergency environment” (Platz, 2010, pg. 53). In a survey of Iowa City Fire Department personnel with less than five years of service, Platz (2010) found that technical rescue was ranked as the third highest priority of training topics behind dispatch orientation and policies/guidelines (pg. 48).

“Rescue operations are time-sensitive and, as such, it’s important for rescuers to have a sense of how long it takes them to perform a task and how their total time compares to the recognized standard” (Pendley, 2012). Swain (2007) asserts that since calls for emergency services require a quick and effective response, “any time wasted in getting organized and deciding upon a course of action worsens the problem” (pg. 351). He goes on to state that quick and effective response is accomplished through “comprehensive, intensive, time-consuming, continuous, and often expensive” training that includes accumulation of basic knowledge and the development of skills through drills with equipment and lifelike situations (pg. 351). The training program must be constructed so that it ensures that skills that are not used very often are exercised periodically in order to remain available to personnel during the rare emergency in which

those skills must be used (Purchase, 2006, pg. 168). Platz (2010) postulates that in order to aid in retention, the five critical components to competence-based training include the acquisition of knowledge and skills, the application of these knowledge and skills in training evolutions, the application of these knowledge and skills during real events, and the certification and maintenance of competence in these knowledge and skills (pg. 22).

The NCHRP insists that any training program must employ multiple delivery systems including traditional classroom, coaches, mentors, and other methods to ensure learning transfer occurs effectively (2006, pg. 15). “Adults learn best when they are involved in a process. Words can be forgotten quickly, but when words go hand in hand with actions – with doing and participating – your employees are more likely to learn and retain” (Hubbard, 2005, pg. 70). Hubbard also asserts that it is important for students to practice the task they have learned, citing studies that indicate without practice students will forget fifty-five percent (55%) of what they were supposed to learn within one hour, sixty-five percent (65%) within one day, and up to seventy-five percent (75%) within one week (pg. 71). Arthur et al (2003) agree, saying that learned psychomotor skills would not be apparent in a person’s performance if the person does not have the opportunity to use them (pg. 242). Pendley (2006) suggests that since most technical rescue skills fade significantly within six months without use, recurrent training should include a combination of skill station and scenario-based evolutions, but must be based on the assessments of the training instructors (pg. 343).

Hubbard (2005) proposes that, in order to have employees learn a specific task, it is important that the instructor tell the employee how to perform the task step by step, then the instructor should physically demonstrate the task step by step, and finally the

instructor should have the employee demonstrate how the task is to be performed (pg. 71). The environment in which the training occurs is also important. Hubbard (2005) insists that adult learners must feel at ease, saying that a person who is under pressure or frightened hardly learns at all and that it is important “to create an atmosphere in which everyone is free to make mistakes and can learn from their mistakes without feeling awkward or embarrassed” (pg. 71).

Technical rescue standards that have been well defined by NFPA, along with federal regulations established by the Occupational Safety and Health Administration, have determined what is expected of local fire departments and clearly demonstrate that local fire departments have a legal and ethical responsibility to provide up-to-date technical rescue equipment and training to their response personnel (Pendley, 2006, pg. 336). Collins (2004) also suggests that “each fire/rescue agency should correlate its training standards with the local and regional hazards it faces” (pg. 172). Pendley (2006) also asserts that although certification of personnel is a good thing according to NFPA 1006, *Standard for Rescue Technician Professional Qualifications*, more important is that when personnel are trained to this standard (and evaluated by a qualified person who did not conduct the training), it gives credibility to the personnel and makes the personnel feel more confident and competent in their knowledge, skills, and abilities (pp. 336-337).

Sendelbach (2014) asserts that in the fire service, “we recognize the standards published by the National Fire Protection Association (NFPA) as the benchmark against which we measure most everything.” Eady (2006) states that NFPA 1006 is the standard that sets forth requirements for the rescuer to assure skill proficiency by requiring the rescuer to demonstrate specific skills and objectives safely and completely. She goes on

to insist that the learning process is not over once the rescuer achieves these requirements for certification to the “technician level” but that “retention of knowledge and regression of abilities are viable concerns for individual qualifications.” Summerville (2009) recommended that Kernersville Fire Rescue Department adopt skills assessments based on national standards using skills checklists, practical evolutions, and appropriate scenarios, noting that this approach “would greatly enhance the development of firefighter skills and potentially increase the organization’s overall operations (pg. 3 and pg. 35). Thiel et al. (2003) also suggest that many of the injuries and fatalities during the last decade have been a result of the failure to comply with national consensus standards and the fire profession’s best practices (pg. 17).

Some type of performance test is necessary to effectively evaluate the level of learning that personnel retain from skills training (Kirkpatrick & Kirkpatrick, 2006, pg. 51). The NCHRP (2006) asserts that trainers and their agencies should develop evaluation methods that can accurately assess the degree to which the training program meets both training objectives and the agency’s overall strategic plan goals (pg. 7). Kirkpatrick and Kirkpatrick (2006) insist that there are three specific reasons why training should be evaluated: to justify the cost and mere existence of the training, to determine whether or not to continue the training, and to gain insight as to how the training can be improved in the future (pg. 17).

The NCHRP (2006) maintains that for a training program to be effective and successful it must employ an evaluation strategy that is used to continually refine the training. Two critical mistakes that organizations make when attempting to ensure their employees are transferring what they learned in training to normal behavior are “trying to

do too much and not focusing efforts on mission-critical behavior” and “not following up and following through” (Kirkpatrick & Kirkpatrick, 2005, pg. 167). Sendelbach (2014) states “The old management adage, ‘You can't manage what you don't measure’ is as applicable to the fire service as it is to any other profession.” Purchase (2006) stipulates that in order for a fire department to be assured of continued success in its training program, evaluation of the program should occur often, with the primary goal of the evaluation process being the identification of improvement to the program itself (pg. 171). The NCHRP (2006) suggests that evaluation of the training program is a circular, continuous process, saying,

“The best programs have an evaluation methodology and cycle to help recalibrate learning programs based on feedback from the training programs from supervisors about the performance of employees who take the courses. Training is not an end unto itself, but an instrument to improve individual and organizational performance. Therefore, performance assessment is an essential ingredient in training program evaluation” (pg. 15).

Hubbard (2005) agrees, stating “If the instruction did not accomplish all that it was designed to do, try to find out what went wrong so that the next program can be planned more successfully” (pg. 72). Kirkpatrick and Kirkpatrick (2005) suggest that many training instructors put a great deal of time, resources, and effort into preparing and delivering curriculum, but put little effort forth in making sure that the trainees (students) retain and apply what they learn (pg. 64). Purchase (2006) states that evaluation is “a fluid, never-ending part of the training process that begins from the moment we recognize a need for training” (pg. 192). He also goes on to say that the main goal of the evaluation

process is to identify ways to improve the program and ultimately enhance the performance of the employees who are trained (pg. 192). Competency-based skills evaluation is the best way to maximize training time, as it should be conducted at scheduled intervals to make certain that personnel can perform to the level of the pre-determined set of standards, and those skills not performed well are practiced until the employee is able to meet the standards (Kouwe, Harchar, Rielage, and McNally, 2006, pg. 159).

Kirkpatrick and Kirkpatrick (2006) describe a four-level process to evaluate training programs that includes evaluation of reaction, learning, behavior, and results (pg. 20). Perhaps one of the more pertinent levels of this process is to measure the trainees' reaction, because it helps to understand how well the training is received by the audience (Mind Tools, 2015). It is also important to point out that a positive reaction by the trainees does not necessarily indicate that learning has occurred, but a negative reaction to the training certainly reduces the possibility that the trainees experienced a desired level of learning (Kirkpatrick & Kirkpatrick, 2006, pg. 22). Chapman (2014) describes the second level of evaluation as that of learning, which is measured prior to and after the training. Johnson and Dick (2012) assert that in Kirkpatrick's third level of evaluation, behavior, the evaluator is looking for how the training participants are applying what they learned to their day-to-day activities (pg. 100). The fourth level of evaluation of training program is the measurement of results that the training has had on the business or environment (Chapman, 2014).

Murray (2005) states "evaluation works best when the measurements can be compared to clearly stated goals, objectives, or standards that a given organization is

trying to achieve” (pg. 350). Arthur et al. (2003) agree that the originally identified objectives of training are the most appropriate criteria for assessing the effectiveness (pg. 235). “Training evaluation harkens back to the training needs assessment process, since estimating value is linked to the worth of the needs that were met – or were at least attempted to be met” (Rothwell & Benkowski, 2002, pg. 219). Purchase (2006) suggests that the best way to make the evaluation process objective is to use performance standards that correlate to the fire department’s service level, since these performance standards, if met, also determine the success of the organization (pg. 193). Pennington (2013) states that many fire departments use a set of standards as the basis for conducting evaluations of the performance of their firefighters, and that “these evaluations can be great tools to help firefighters identify strengths and recognize weaknesses that may need attention.”

Martin (2004) noted that if Cobb County (GA) Fire and Emergency Services implemented skills training for personnel using practical skills check sheets and annual evaluations, he expected that individual performance would improve (pg. 24). A performance test process can be based on a checklist, where the employee demonstrates a particular skill, procedure, or equipment the way that he/she was trained, while the evaluator observes and checks off what the employee did or did not do (Rothwell & Benkowski, 2002, pg. 219). Pendley (2012) states that the Peoria, Arizona Fire Department uses a skill checklist similar to the National Registry of Emergency Medical Technicians that documents skill and competency levels for each individual. He describes their evaluation process,

The PFD began a new trial skill evaluation program for rope rescue in 2009.

There were three skill evaluations for which each rescuer was evaluated at least twice a year for three years. This was not considered a training session; each member either passed or did not meet the standard. The goal of this program was to raise competency and to define responsibility for establishing and meeting set standards. Through this process, the PFD realized that most rescuers like the structure given by the evaluation program and enjoy demonstrating their proficiency. Rescuers like to be recognized as competent, and they especially like to know that the person belaying them (managing their safety line) is also competent. Rescuers who have difficulty completing a particular skill or procedure in the set amount of time most likely haven't been practicing and may not feel motivated to maintain their skills at the defined proficiency level. If a team member does not meet the standard on the first evaluation, we schedule a second evaluation on another day. We also make sure that the team member has the tools and opportunity to practice. If they do not pass a second time, we set up a plan to help them succeed.

Pennington (2013) cautions against using supervisors or superior officers in this type of evaluation process, as supervisors may have a difficult time "dropping the hammer" by being completely honest in their evaluations of subordinates while attempting to be "politically correct."

Murray (2005) suggests that most people prefer to avoid being evaluated because they believe that if the evaluation reveals any problems, they will be to blame even if the evaluation is simply intended to identify problems that may exist and provide some

information as to how to solve them (pg. 352). Pennington (2013) maintains that the term “evaluation” should not be viewed negatively, as it is simply an analysis of performance in training and during emergency response in order to keep firefighters focused and prepared. Pertinent to this research is that results of the evaluation of the rope rescue program (especially the observations and attitudes of the line personnel) represent today’s realities, and potential improvements to the program represent new possibilities.

Procedures

In order to answer the first research question, “how do other fire departments evaluate rope rescue skills?”, a survey was developed using an online survey service. The survey consisted of eight (8) questions, and was sent to one representative of each of the twenty (20) largest fire departments in Minnesota using a web link in electronic mail. One representative from each department was identified either through the department’s website or through personal relationships with the researcher. The representative from each department was the Fire Chief or Training Officer for their respective departments. A copy of the questions and possible responses for this survey is located in Appendix A. The first question of the survey asked the respondent to indicate whether their department’s personnel were career, volunteer, or a combination of the two. The remaining questions were designed to determine if each department trained in rope rescue, if they evaluate their personnel, and how they perform the evaluations.

In order to answer the second research question, “what are current retention rates for basic rope rescue skills?”, an evaluation was crafted to assess the retention rates of line personnel, including captains, motor operator, and firefighters. The evaluation

consisted of four stations including basic knots and donning protective equipment, rappelling, lowering and raising operations, and a belaying operation (all individual skills). The Rescue Group developed check sheets that included important and critical criteria for each station. A copy of the check sheets for each station is located in Appendix B. The critical criteria were considered pass/fail and a score of at least seventy percent (70%) on all criteria was required to pass. The Rescue Group members served as evaluators for these evaluations. Although the researcher is a member of the Rescue Group, he did not serve as an evaluator, so as to not bias the research. The personnel were evaluated individually, in groups of three (one company), over six days while they were on duty. The check sheets and pictures of what was expected at each station were sent out to the personnel thirty calendar days prior to the beginning of the evaluations. This was done because the Battalion Chief of Training felt that, since this was the first skills evaluation of this type, it would reduce the anxiety related to the evaluation and potential “push-back” from the line personnel by allowing them to know exactly what to expect and give them plenty of time to review and practice the skills.

The first station consisted of donning personal protective equipment and tying basic knots. Each participant was presented a Class III harness, helmet, and gloves. They were expected to don the harness, helmet, and gloves within five (5) minutes. They were then expected to inspect the personal protective equipment of one of the other members of their company within two (2) minutes. Each participant was then expected to tie six knots (figure eight, figure eight on a bight, figure eight follow through, water knot, frost knot and a prussik on a life safety rope) using rope and webbing. Each knot was to be tied within two (2) minutes.

The second station was a rappel scenario. The participant was given the necessary equipment including a fixed line that was already attached to a high-point anchor. The participant mounted a step stool, tied into the fixed line with a rescue 8 rappel device, the stool was removed, the participant descended the fixed line approximately one (1) foot, was directed to tied off and show “hands-free”, and then was directed to release the tie-off and descend the line until their feet touched the floor. The reason for the short travel distance was to eliminate the need for a belay on the participant.

The third station consisted of a raise/lower operation using an MPD (multi-purpose device manufactured by CMC) and was located on the mezzanine level. This portion of the evaluation consisted of eleven (11) possible points with three (3) critical criteria. The system was pre-constructed correctly and was stowed in the bag. The participant was directed to construct a load-sharing anchor given two offset anchor points. There was a high-point change-of-direction already established and a load (50’ hose bundle) was located at the edge. The participant was expected to use the high point change-of-direction and connect the rope to the load. When the participant was ready to operate the system, they were directed to raise the load to the height of the railing, the evaluator pushed the load over the railing, and the participant was directed to lower the load to the floor below (approximately twelve (12) feet) in a controlled manner. The participant was then directed to switch to a raise operation with a 3-to-1 or a 5-to-1 mechanical advantage. The participant was directed to raise the load back to the starting point. The participant was then directed to build the raise/lower system from pieces (as though the system was taken apart to be cleaned) with no time limit.

The final station consisted of a tandem-prussik belay. This portion of the evaluation consisted of eleven (11) possible points with four (4) critical criteria. The tandem-prussik belay was already set up correctly. Each participant was expected to choose anchor points, anchor the system, and operate the belay on a one hundred (100) pound load (a large truck tire). The load was moved with a raise/lower system through a high-point anchor and was operated by the evaluator. The evaluator called out the raise, lower, and belay commands. Once the participant had the belay system anchored, the evaluator raised the load approximately five (5) feet, stopped, and switched the operation to lower simulating that the load was caught up on an obstacle. The evaluator lowered the load approximately one (1) foot, stopped, and switched the operation back to a raise. The participant was expected to maintain slight tension on the belay rope throughout these transitions. The evaluator then raised the load until the automatic load release was engaged, which was designed to drop the load without warning. The participant was expected to catch the load with the belay, with the load dropping no more than five (5) feet. The participant was expected to complete the entire evolution in less than fifteen (15) minutes. The participant was then expected to reconstruct the tandem-prussik belay system from pieces (as though the system was taken apart to be cleaned) with no time limit.

The fact that the skills check sheets and pictures of what was expected during the evaluation were sent out thirty (30) days in advance of the evaluation presented a significant limitation to this research in that the evaluation was not a true test of retention, since the participants were allowed to know what the evaluation consisted of, and were allowed to practice for the evaluation specifically, rather than demonstrating the skills

retained from department rescue training. Another limitation was the fact that the evaluators were also department members and Rescue Group instructors. There was a potential for “teaching moments” during the evaluation and a potential for relationships between the evaluators and the participants to skew the results.

Two questionnaires were developed to answer the third research question, “what are the perspectives of line personnel regarding the efficacy of rope rescue training?”, and the fourth research question, “what are the perspectives of line personnel in regards to being evaluated on their rope rescue skills?” The questionnaires were designed using an online survey service and personnel were invited to complete the questionnaires via electronic mail. Most questions on both questionnaires included a response of “don’t know/not sure” to allow the respondent to indicate if they did not know the accurate response to the question or if they felt ambivalent toward the question. The first questionnaire was sent to all captains, motor operators, and firefighters prior to the rope rescue skill evaluations. This questionnaire consisted of ten questions and was sent to line personnel prior to the skill evaluations. A copy of this questionnaire is located in Appendix C. The first question of this questionnaire asked the respondent to indicate their rank (captain, motor operator, or firefighter), in order to determine if there are any trends associated with rank. Of the remaining questions, six (6) were designed to elicit the perspectives of line personnel regarding the department’s rope rescue program, and three (3) were designed to gain the perspectives of line personnel regarding the rope rescue skill evaluations. The second questionnaire consisted of seven (7) questions and was sent only to line personnel (captains, motor operators, and firefighters) who had completed the rope rescue skill evaluations approximately two weeks after the

evaluations. A copy of this questionnaire is located in Appendix D. The first question of this questionnaire asked the respondent to indicate their rank (captain, motor operator, or firefighter). The remaining questions were designed to elicit the perspectives of line personnel regarding only the rope rescue skill evaluations.

Another questionnaire was employed to answer the final research question, “what are the perspectives of chief officers and department instructors regarding the efficacy of the rope rescue-training program?” This questionnaire was also designed using an online survey service, and only operations chief officers (one deputy chief and three battalion chiefs) and the six (6) department rescue instructors were invited to complete the questionnaire via electronic mail. These personnel were not invited to complete the two questionnaires that were sent to line personnel. A copy of this questionnaire is located in Appendix E. The questionnaire consisted of nine questions. Most questions on this questionnaire included a response of “Don’t know/not sure” to allow the respondent to indicate if they did not know the accurate response to the question or if they felt ambivalent toward the question. The first question asked the respondent to indicate whether they were a chief officer or a department rescue instructor. Five (5) of the remaining questions were designed to elicit perspectives related to the rope rescue training program, and three (3) questions were designed to elicit perspectives regarding the rope rescue skill evaluations.

There are several potential limitations that may be expected while employing the use of questionnaires and surveys. The questionnaire/survey is entirely voluntary, which may lead to a smaller sample size, even though reminder invitations were sent to those who had not responded. The respondents may interpret the questions or statements

differently, which may lead to deviation or inconsistencies in responses. The questionnaire/survey does not lend itself to a thorough explanation of the potential implications of the perceived question or statement, which may lead to deviation in responses (i.e. the respondents may simply answer the question in accordance with what he/she thinks the researcher desires or unintended perceptions). In the case of the internal department questionnaires, the respondents may answer the questions in a way that they perceive will reduce further responsibility for training and education.

Results

A survey was sent to twenty (20) of the largest fire departments in Minnesota in an effort to answer the first research question, “how do other fire departments evaluate rope rescue skills?” Representatives from fifteen (15) fire departments completed the survey (a 75% return). A table of results is located in Appendix F. The first question asked the respondent if their department was considered a career, volunteer, or combination department. Of the fifteen (15) respondents, eight (8) identified their departments as career (53%), zero (0) identified their department as volunteer, and seven (7) respondents (47%) indicated that their departments were a combination of career and volunteer (or paid-on-call).

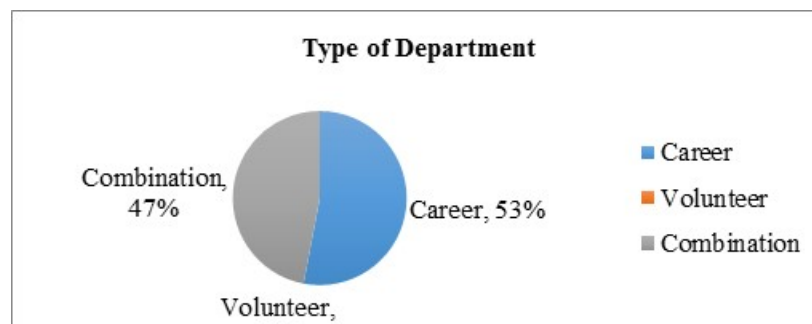


Figure 1 – Results of type of fire department

The next four (4) questions of the survey were related to rope rescue and rope rescue training. The second question of the survey asked if the respondent's department performed rope rescue. Of the fifteen (15) total respondents, fourteen (14) indicated that their departments perform rope rescue (93%) and one (1) stated that their department did not (7%). The third question asked if the respondents' department personnel participate in regular rope rescue training. Of the fifteen (15) total respondents, fourteen (14) indicated that their personnel have participated in regular rope rescue training (93%) and one (1) stated that their personnel did not (7%). The fourth question asked the respondents who indicated that their personnel participate in regular rope rescue training to also indicate if their department rope rescue was based on the National Fire Protection Association (NFPA) consensus standards 1006 and 1670, the Minnesota Fire Service Certification Board's (MFSCB) Technical Rescuer – Ropes I certification test (which is based on NFPA 1006/1670 but contains some differences), or some other curriculum. Of the fifteen (15) total respondents, nine (9) indicated that their department's rope rescue curriculum was derived directly from NFPA 1006/1670 (60%), two (2) indicated their department's curriculum was derived from the MFSCB Technical Rescuer – Ropes I certification test (13%), two (2) indicated that it was a combination of the two (13%), and two (2) respondents indicated that this question was not applicable to their departments (13%). The fifth question asked respondents to indicate how often their personnel participate in rope rescue training. Of the fifteen (15) total respondents, three (3) indicated that their personnel participate in rope rescue training one or two times per year (20%), five (5) indicated that their personnel participate in rope rescue training three or four times per year (33%), three (3) indicated that their personnel participate in rope

rescue training four to eight times per year (20%), and four (4) indicated that their personnel participate in rope rescue training more than eight times per year (27%).

The next two questions of the survey were related to the evaluation of rope rescue training. The sixth question of the survey asked the respondents whether their departments use any type of validation or certification evaluation to verify proficiency in rope rescue skills. Of the fifteen (15) total respondents, eight (8) said their departments use a validation or certification evaluation (53%) and seven (7) said their departments do not (47%). The seventh question asked the respondents that, if their departments use an evaluation, how often do their personnel participate in the evaluation. Of the eight (8) respondents who stated that their departments use an evaluation, two (2) stated that personnel are evaluated immediately after the training (25%), five (5) stated that personnel are evaluated on an annual basis (63%), and one (1) indicated that personnel are evaluated quarterly (13%). The final question asked respondents to describe their evaluation. Of the eight (8) respondents who stated that their departments use an evaluation, seven (7) described an individual skills assessment (87%), and one (1) described a crew evaluation (13%).

An evaluation of rope rescue skills was employed to answer the second research question, “what are current retention rates for basic rope rescue skills?” The participant group who participated in the evaluation was comprised of line personnel including twenty (20) captains (83% of the potential captain participants), twenty-one (21) motor operators (88% of the potential motor operator participants), and thirty-four (34) firefighters (83% of the potential firefighter participants). The personnel who did not participate in the evaluation were not present on the days of the evaluation due to illness,

vacation, injury on duty, etc. Results were categorized by rank in order to identify any possible trends between ranks of personnel. A table of results for the evaluation is contained in Appendix G.

The first station of the evaluation consisted of two parts: the donning and inspection of personal protective equipment and tying basic knots. In the donning and inspection of personal protective equipment there were nine (9) points possible with four (4) critical criteria. Of the twenty (20) captain participants, fifteen (75%) got a perfect score of 100%, five (25%) passed with a score of 89% (8 out of 9 possible points), and zero (0%) captains failed this portion of the evaluation. Of the twenty-one (21) motor operator participants, ten (48%) got a perfect score of 100%, eight (38%) passed with a score of 89%, one (5%) passed with a score of 78%, one (5%) failed with a score of 67% (6 out of 9 possible points), and one (5%) motor operator failed this portion of the evaluation due to missing one or more of the critical criteria. Of the thirty-four (34) firefighter participants, twenty-four (71%) got a perfect score of 100%, five (15%) passed with a score of 89%, three (9%) passed with a score of 78%, one (3%) failed with a score of 67%, and one (3%) firefighter failed this portion of the evaluation due to missing one or more of the critical criteria.

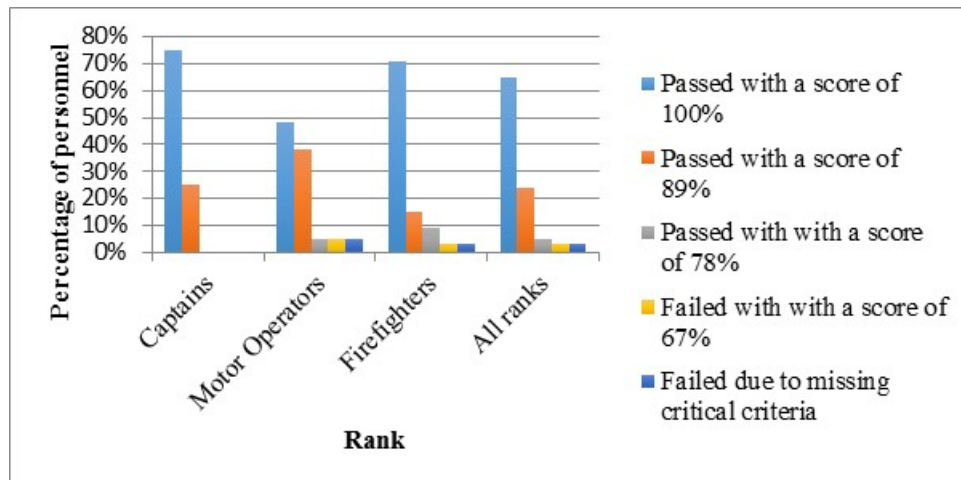


Figure 2 - Results for PPE portion of rope rescue skills evaluation

The knots portion of the first station consisted of tying six (6) knots using rope, webbing, and a pre-tied prussik. The participants had a time limit of two (2) minutes to tie each knot and failure to do so resulted in a failure for that knot. There were seven points possible in this portion of the evaluation, with six (6) critical criteria and all of the knots deemed critical. Of the twenty (20) captain participants, twelve (60%) got a perfect score of 100%, five (25%) passed with a score of 86% (6 out of 7 possible points), and three (15%) captains failed this portion of the evaluation due to exceeding the time limit or incorrectly tying more than two knots. Of the twenty-one (21) motor operator participants, ten (48%) got a perfect score of 100%, six (29%) passed with a score of 86%, and five (24%) motor operators failed this portion of the evaluation due to exceeding the time limit or incorrectly tying more than two knots. Of the thirty-four (34) firefighter participants, twenty-eight (82%) got a perfect score of 100%, four (15%) passed with a score of 86%, and two (6%) firefighters failed this portion of the evaluation due to exceeding the time limit or incorrectly tying more than two knots.

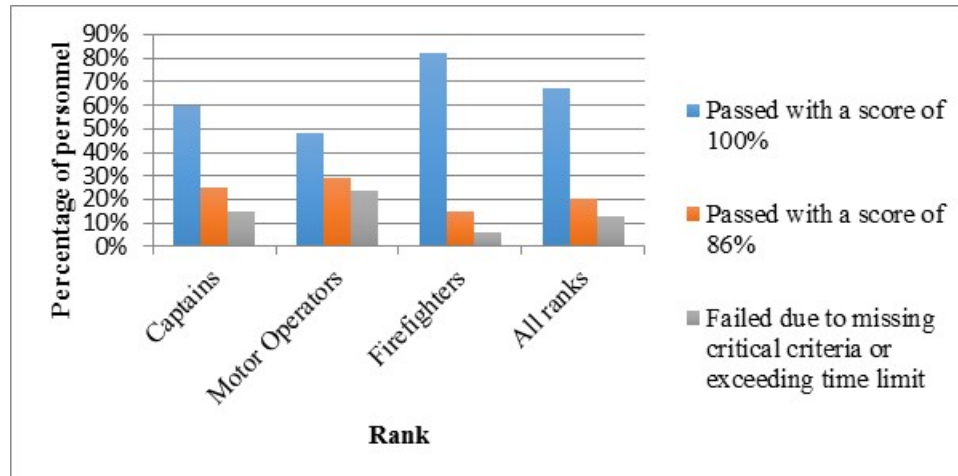


Figure 3 – Results for knots portion of rope rescue skills evaluation

The second station of the evaluation was a rappel scenario. There were eleven points possible with four (4) critical criteria. Of the twenty (20) captain participants, eighteen (90%) got a perfect score of 100%, two (10%) passed with a score of 91% (10 out of 11 possible points), and zero (0%) captains failed this portion of the evaluation. Of the twenty-one (21) motor operator participants, fourteen (67%) got a perfect score of 100%, five (38%) passed with a score of 91%, one (5%) passed with a score of 82% (9 out of 11 possible points), one (5%) passed with a score of 73% (8 out of 11 possible points), and zero (0%) motor operators failed this portion of the evaluation. Of the thirty-four (34) firefighter participants, twenty-five (74%) got a perfect score of 100%, nine (26%) passed with a score of 91%, and zero (0%) firefighters failed this portion of the evaluation.

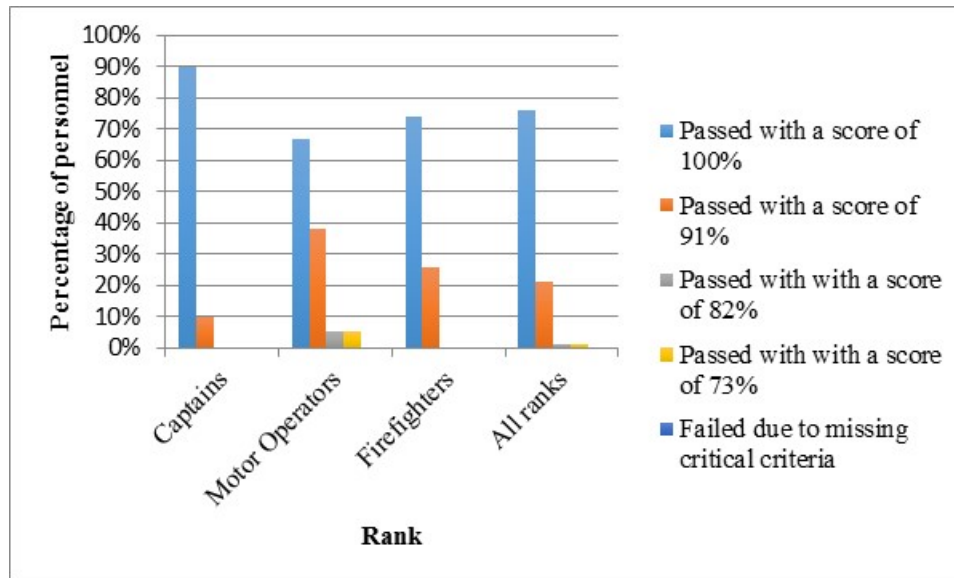


Figure 4 - Results for rappel portion of rope rescue skills evaluation

The third station consisted of a raise/lower operation using an MPD (multi-purpose device manufactured by CMC). This portion of the evaluation consisted of eleven (11) possible points with three (3) critical criteria. Of the twenty (20) captain participants, eighteen (90%) got a perfect score of 100%, one (5%) passed with a score of 91% (10 out of 11 possible points), one (5%) passed with a score of 82% (9 out of 11 possible points), and zero (0%) captains failed this portion of the evaluation. Of the twenty-one (21) motor operator participants, sixteen (76%) got a perfect score of 100%, four (19%) passed with a score of 91%, and one (5%) motor operator failed this portion of the evaluation due to missing critical criteria. Of the thirty-four (34) firefighter participants, thirty (88%) got a perfect score of 100%, four (12%) passed with a score of 91%, and zero (0%) firefighters failed this portion of the evaluation.

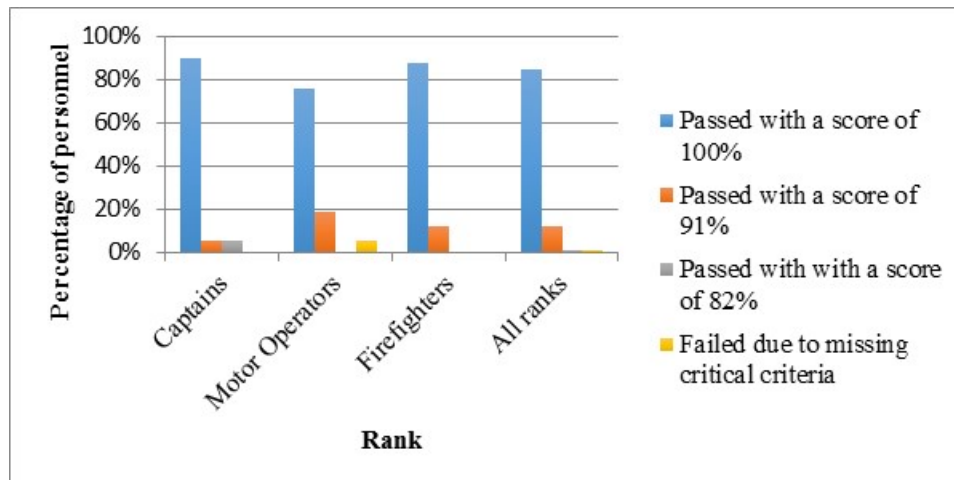


Figure 5 - Results for raise/lower portion of rope rescue skills evaluation

The final station consisted of a tandem-prussik belay. This portion of the evaluation consisted of eleven (11) possible points with four (4) critical criteria. Of the twenty (20) captain participants, four (20%) got a perfect score of 100%, twelve (60%) passed with a score of 91% (10 out of 11 possible points), two (10%) passed with a score of 82% (9 out of 11 possible points), and two (10%) captains failed this portion of the evaluation due to missing one or more critical criteria. Of the twenty-one (21) motor operator participants, eight (38%) got a perfect score of 100%, twelve (57%) passed with a score of 91%, and one (5%) motor operator failed this portion of the evaluation due to missing critical criteria. Of the thirty-four (34) firefighter participants, seven (21%) got a perfect score of 100%, twenty-three (68%) passed with a score of 91%, one (3%) passed with a score of 82% (9 out of 11 possible points), and three (9%) firefighters failed this portion of the evaluation due to missing critical criteria.

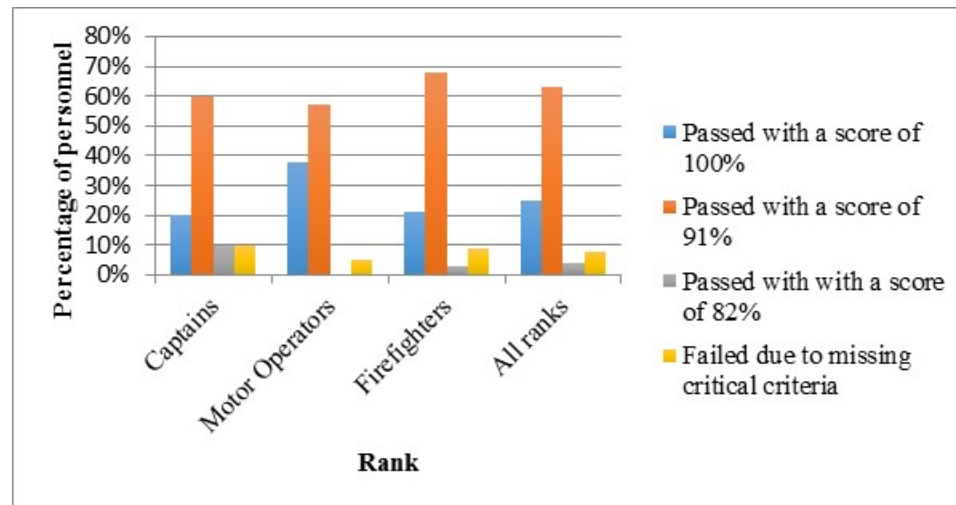


Figure 6 - Results for belay portion of rope rescue skills evaluation

Two questionnaires were developed to answer the third research question, “what are the perspectives of line personnel regarding the efficacy of rope rescue training?”, and the third research question, “what are the perspectives of line personnel in regards to being evaluated on their rope rescue skills?” The questionnaires were intended to gather perspectives relevant to both research questions before and after the rope rescue skill evaluations. The first questionnaire was sent to eighty-three (83) potential respondents and seventy-four (74) respondents completed it (an 89% return). A table of results for the first questionnaire sent to line personnel is located in Appendix H. The second questionnaire was sent to seventy-five (75) potential respondents and sixty-two (62) respondents completed it (an 83% return). A table of results for the second questionnaire sent to line personnel is located in Appendix I.

The first question of the first questionnaire asked the respondent to identify their current rank. Of the seventy-four respondents, eighteen (18) stated that they were captains (24%), twenty-three (23) identified themselves as motor operators (31%), and thirty-three (33) identified themselves as firefighters (45%).

The next six (6) questions of the first questionnaire sent to line personnel were designed to elicit perspectives regarding the department's rope rescue training program. The second question of the first questionnaire asked whether or not the respondent thought that the department should have a rope rescue-training program. Of the eighteen (18) captains who responded, sixteen (16) thought the department should have a rope rescue training program (89%), one (1) thought the department should not (6%), and one (1) was not sure or had no opinion (6%). Of the twenty-three (23) motor operators who responded, seventeen (17) thought the department should have a rope rescue training program (74%), five (5) thought the department should not (22%), and one (1) was not sure or had no opinion (4%). Of the thirty-three (33) firefighters who responded, twenty-seven (27) thought the department should have a rope rescue training program (82%), three (3) thought the department should not (9%), and three (3) were not sure or had no opinion (9%).

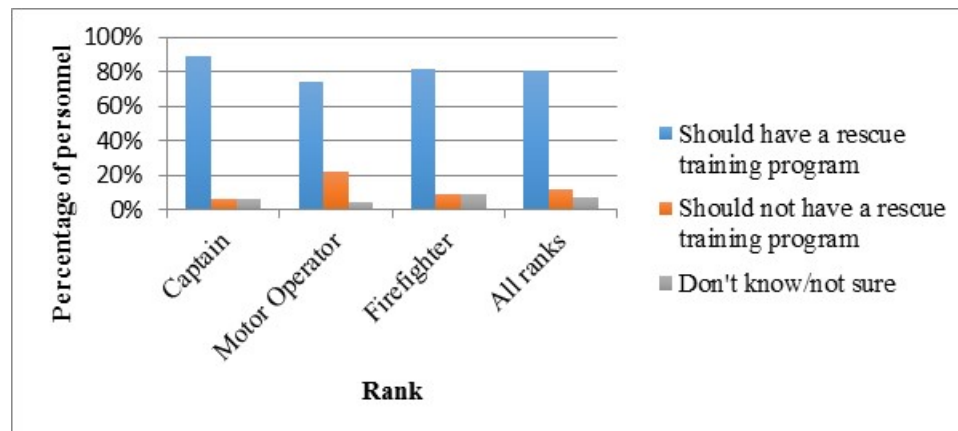


Figure 7 – Results of whether the department should have a rescue-training program

The third question asked whether the respondents considered themselves proficient, somewhat proficient, or not proficient in basic rope rescue skills. Of the eighteen (18) captains who responded, eight (8) thought they were proficient (44%), ten

(10) stated that they felt somewhat proficient (56%), zero (0) felt they were not proficient (0%), and zero (0) captains were not sure or had no opinion (0%). Of the twenty-three (23) motor operators who responded, seven (7) thought they were proficient (30%), fourteen (14) stated that they felt somewhat proficient (61%), two (2) felt they were not proficient (9%), and zero (0) motor operators were not sure or had no opinion (0%). Of the thirty-three (33) firefighters who responded, thirteen (13) thought they were proficient (39%), seventeen (17) stated that they felt somewhat proficient (52%), two (2) felt they were not proficient (6%), and one (1) firefighter was not sure or had no opinion (3%).

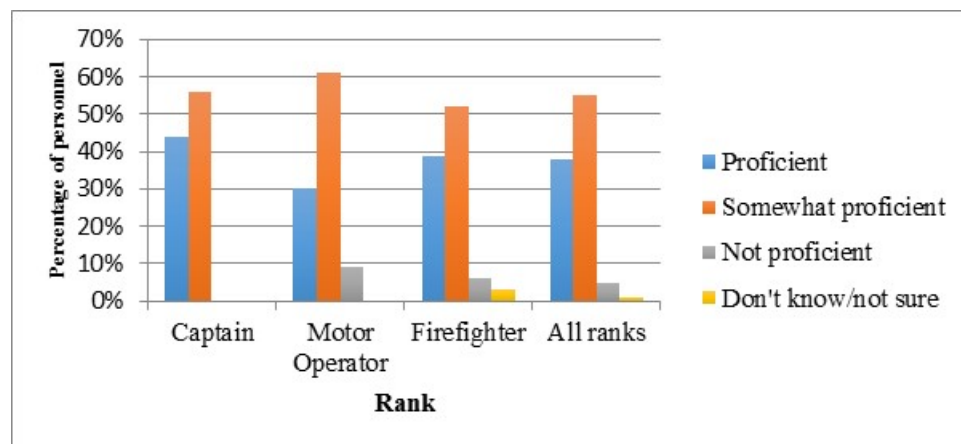


Figure 8 – Results of whether personnel thought they were proficient in basic rope rescue skills

The fourth question asked whether respondents thought that being proficient in basic rope rescue skills was important in their current position. Of the eighteen (18) captains who responded, fifteen (15) stated that it was important (83%), three (3) stated that it was not (17%), and zero (0) captains were not sure or had no opinion (0%). Of the twenty-three (23) motor operators who responded, sixteen (16) stated that it was important (70%), six (6) stated that it was not (26%), and one (1) motor operator was not sure or had no opinion (4%). Of the thirty-three (33) firefighters who responded, twenty-

six (26) stated that it was important (79%), four (4) stated that it was not (12%), and three (3) firefighters were not sure or had no opinion (9%).

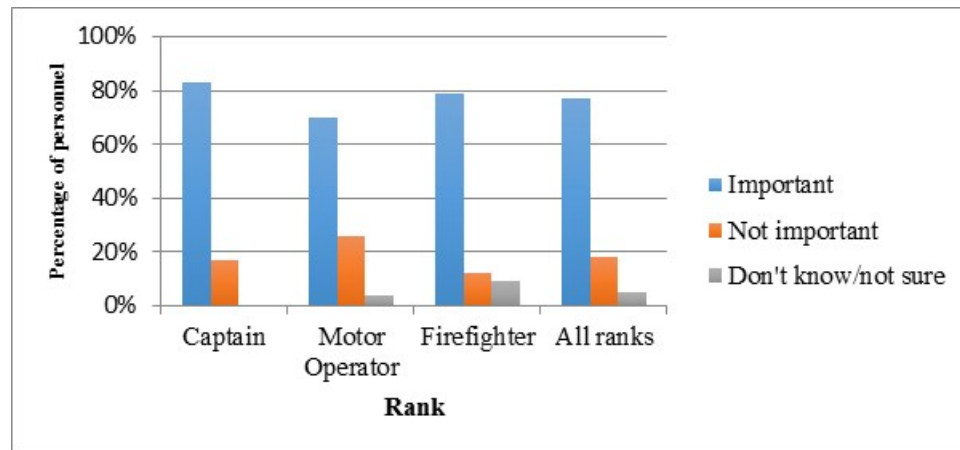


Figure 9 – Results of whether personnel thought proficiency was important in their current position

In order to maintain clarity, responses delineated by rank are not shown for the results of the remaining questions of the first questionnaire. There were no clearly identifiable trends according to the rank of the respondents, and differences in rank for the remaining questions are not important to this research. The fifth question of the first questionnaire for line personnel asked whether or not the respondent thought that most line personnel were proficient in basic rope rescue skills. Of the seventy-four (74) total respondents, thirty-five (35) thought that most line personnel were proficient (47%), twenty-three (23) thought that most were not proficient (31%), and sixteen (16) of the respondents were not sure or had no opinion (22%).

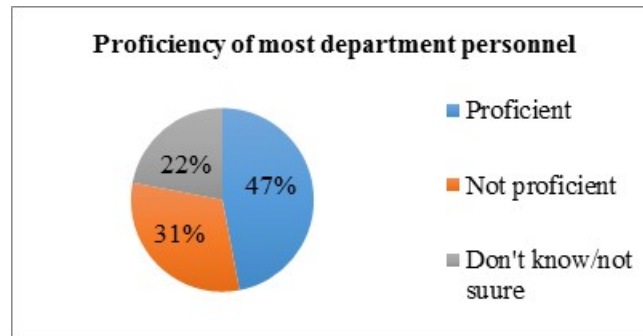


Figure 10 – Results of whether personnel thought that most personnel were proficient

The sixth question asked the respondent whether or not they thought that the department's rescue training program was helpful, somewhat helpful, or not helpful in attaining proficiency in basic rope rescue skills. Of the seventy-four (74) total respondents, forty-three (43) thought that the rescue training program was helpful (58%), twenty-seven (27) thought it was somewhat helpful (36%), three (3) thought it was not helpful (4%), and one (1) respondent was not sure or had no opinion (1%).

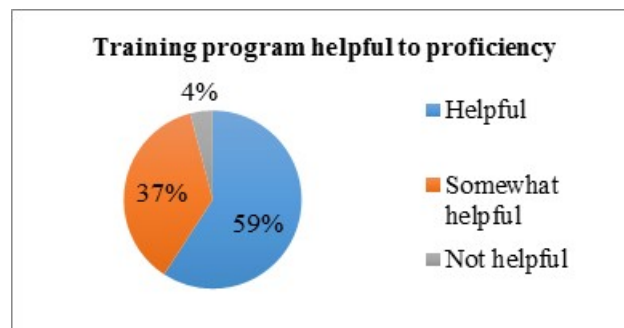


Figure 11 – Results of whether department's training program is helpful to attaining proficiency

The seventh question asked what changes in delivery methods that the respondent felt the department could use that would improve proficiency among personnel in basic rope rescue skills. Of the seventy-four (74) total respondents, thirty (30) thought that more one-on-one instruction would help (41%), forty (40) thought that more time dedicated to practical application would help (54%), six (6) thought that more classroom instruction would help (8%), twenty-six (26) thought that more scenario-based training

would help (35%), twelve (12) indicated that no changes are needed (16%), and seven (7) respondents thought that the department already conducts too much rope rescue training (9%).

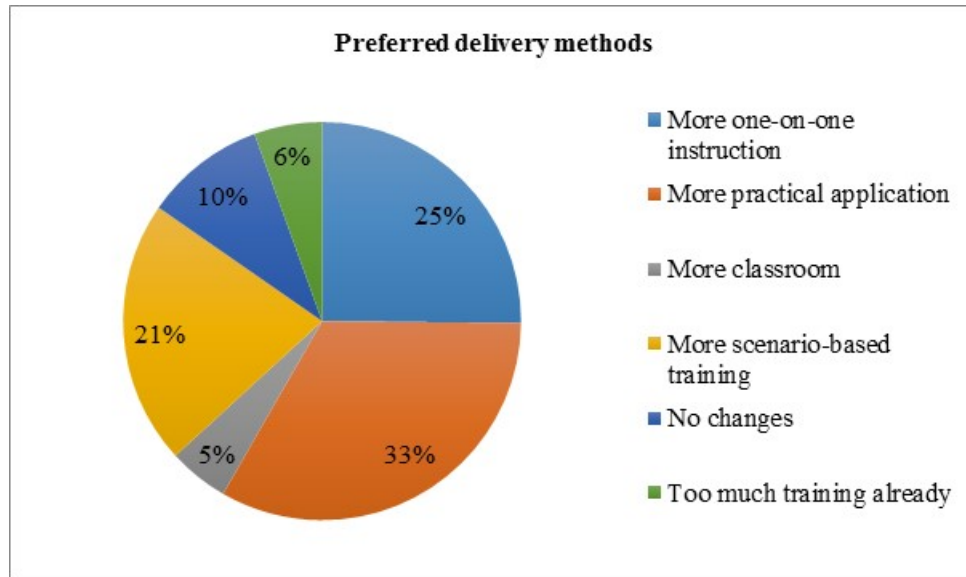


Figure 12 – Results of respondents' preferred delivery methods to improve proficiency

The remaining three questions of the first questionnaire sent to line personnel were designed to elicit perspectives regarding the process of rope rescue skill evaluation. The eighth question of the first questionnaire asked if the respondent thought that the upcoming evaluation would help them become more proficient in basic rope rescue skills. Of the seventy-four (74) total respondents, forty-seven (47) felt that the evaluation would help them be more proficient (64%), seventeen (17) felt it would not (23%), and ten (10) respondents were not sure or had no opinion (14%). Results of this question are displayed in Figure 13. The ninth question asked the respondent to indicate whether or not they practiced the basic rope rescue skills prior to the evaluation. Of the seventy-four (74) total respondents, fifty-nine (59) stated they would practice (80%), ten (10) stated they would not (14%), and five (5) respondents were not sure or had no opinion (7%).

Results of this question are displayed in Figure 13. The final question of the first questionnaire asked the respondent if they thought that an evaluation is a good way to measure proficiency. Of the seventy-four (74) total respondents, forty-six (46) felt that an evaluation was a good way to measure proficiency (63%), twelve (12) felt it was not (16%), and sixteen (16) were not sure or had no opinion (22%). Results of this question are displayed in Figure 13.

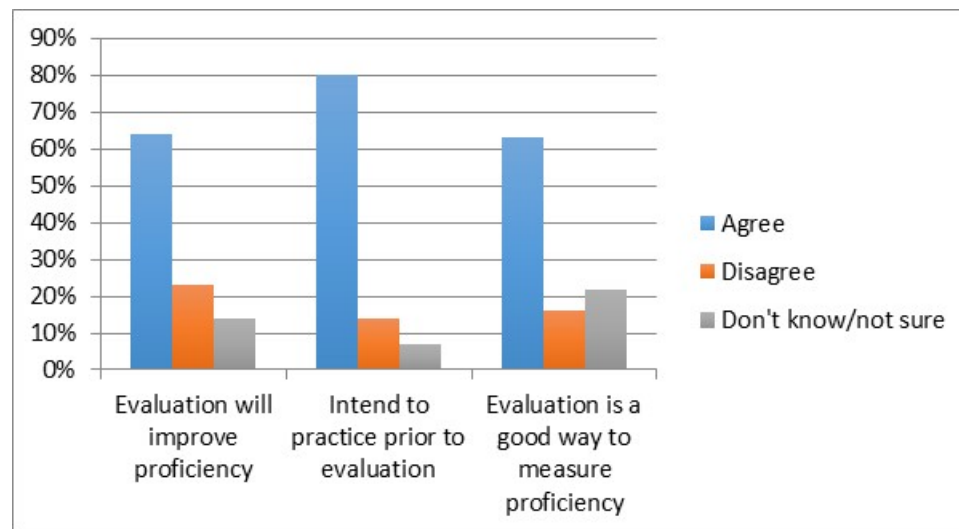


Figure 13 – Results of the final three questions of the questionnaire sent to line personnel prior to the rope rescue skill evaluation

The second questionnaire was sent to line personnel after the rope rescue skills evaluation approximately two weeks after they completed it. This questionnaire was designed to elicit perspectives regarding the process of evaluation. The first question asked the respondent to indicate their rank at the time of the evaluation. Of the sixty-two (62) respondents to this questionnaire, nineteen (19) identified themselves as captains (31%), thirteen (13) said they were motor operators (21%), and thirty (30) said they were firefighters (48%). As there were no clearly identifiable trends between responses according to the rank of the respondents, and to maintain clarity, the results of this questionnaire are presented according to total responses.

The second question asked the respondents whether they thought the evaluation was very difficult, difficult, moderately easy, easy, or too easy. Of the sixty-two (62) total respondents, one (1) indicated that the evaluation was very difficult (2%), eleven (11) stated that it was difficult (18%), forty-one (41) stated that it was moderately easy (66%), eight (8) said it was easy (13%), one (1) stated that the evaluation was too easy (2%), and zero (0) respondents were not sure or had no opinion (0)%.

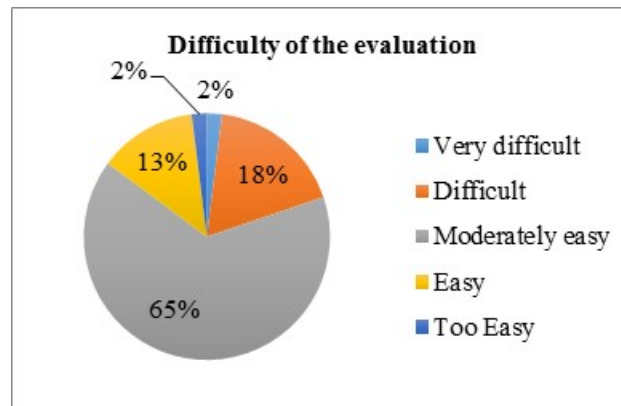


Figure 14 – Results of how difficult respondents perceived the rope rescue skill evaluation

The third question asked if the respondent thought the evaluation was as difficult as they thought it would be prior to participating in the evaluation. Of the sixty-two (62) total respondents, twenty-eight (28) said that the evaluation was as difficult as they thought it would be (45%), thirty-one (31) said it was not (50%), and three (3) respondents were not sure or had no opinion (5%).

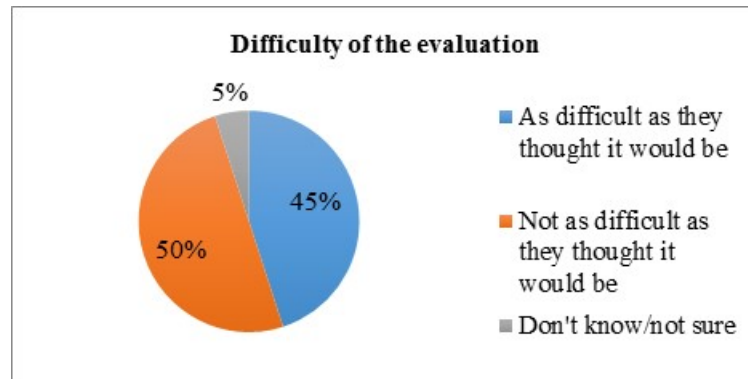


Figure 15 – Results of whether the respondents thought the evaluation was as difficult as they thought it would be prior to participating in the evaluation

The fourth question asked if the respondent reviewed the skill check sheets prior to participating in the evaluation. Of the sixty-two (62) total respondents, fifty (50) stated that they had reviewed the skill check sheets prior to the evaluation (81%), twelve (12) stated they did not (19%), and zero (0) respondents were not sure or had no opinion (0%).

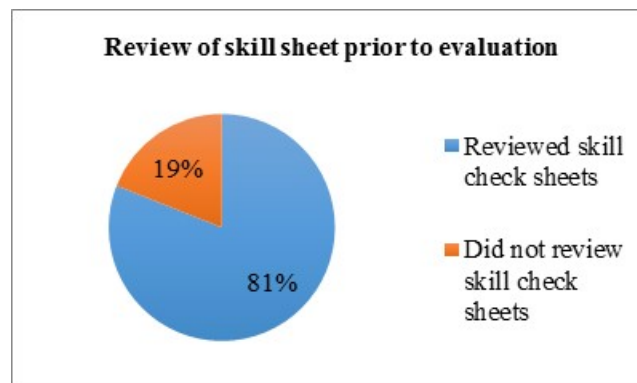


Figure 16 – Results of whether respondents reviewed skill check sheet prior to the evaluation

The fifth question of the second questionnaire sent to line personnel asked the respondents to indicate how much time they practiced the basic rope rescue skills prior to the evaluation. Of the sixty-two (62) total respondents, twenty-three (23) stated they practiced for less than one hour before the evaluation (37%), twenty-three (23) said they practiced for one to two hours (37%), twelve (12) indicated they practiced between two

and four hours (19%), and four (4) respondents said they practiced for more than 4 hours (6%).

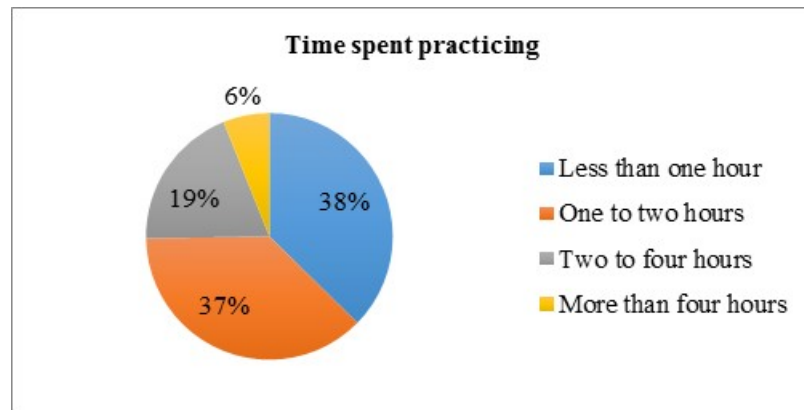


Figure 17 – Results of the amount of time respondents spent practicing skills prior to the evaluation

The sixth question asked if the respondent felt that participating in the evaluation, along with any practice or review they performed prior to the evaluation, has made them more proficient in basic rope rescue skills. Of the sixty-two (62) total respondents, forty-seven (47) felt the evaluation has made them more proficient (76%), eleven (11) stated that it did not (18%), and four (4) respondents were not sure or had no opinion (6%). Results of this question are displayed in Figure 18.

The final question of the second questionnaire sent to line personnel asked the respondents if they felt that an evaluation was a good way to measure the effectiveness of department training. Of the sixty-two (62) total respondents, thirty-eight (38) said they felt that an evaluation was a good way to measure effectiveness of department training (61%), fifteen (15) said that it was not (24%), and nine (9) respondents were not sure or had no opinion (15%). Results of this question are displayed in Figure 18.

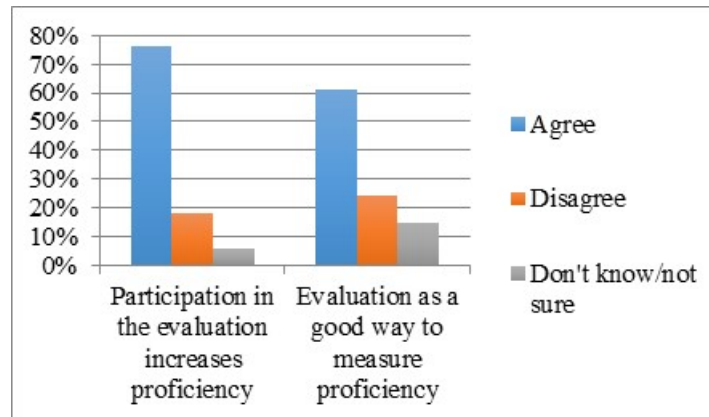


Figure 18 – Results of the final two questions of the second questionnaire sent to line personnel

In order to answer the fourth research question, “what are the perspectives of chief officers and department instructors regarding the efficacy of the rope rescue-training program?,” a questionnaire was sent to chief officers (operations-level supervisors) and the department’s rescue instructors. Of the potential ten (10) respondents, nine (9) completed the questionnaire (a 90% return). The first question asked the respondent to identify himself or herself as chief officer or rescue instructor. Of the nine (9) total respondents, three (3) identified themselves as chief officers (33%) and six (6) identified themselves as rescue instructors (67%). However, as there were no identifiable trends between the responses of the two groups, the results are presented as a group. There is a table of results for this questionnaire located in Appendix J.

The next two questions of the questionnaire were related to the importance of the department’s training program. The second question on the questionnaire sent to chief officers and department rescue instructors asked the respondent to consider the importance of rope rescue training, and the high-risk/low frequency analysis of rope rescue, as compared to training in the other disciplines in which the department trains. Of the nine (9) total respondents, seven (7) considered rescue training as important as training in other disciplines (78%), one (1) said it was less important (11%), and one (1)

respondent was not sure or had no opinion (11%). The third question asked the respondent if they felt it was important that the department have a rope rescue-training program. Of the nine (9) total respondents, nine (9) indicated that they felt it was important that the department have a rope rescue training program (100%), zero (0) felt that it was not (0%), and zero (0) respondents were not sure or had no opinion (0%).

The next three questions of the questionnaire were related to proficiency in basic rope rescue skills. The fourth question asked the respondents to indicate whether they felt that the personnel they supervise or to whom they provide training are proficient in basic rope rescue skills. Of the nine (9) total respondents, five (5) indicated that they felt the people they supervise or to whom they provide training are proficient (56%), four (4) indicated that they felt the people they supervise or to whom they provide training are somewhat proficient (44%), zero (0) stated that they felt their people were not proficient (0%), and zero (0) respondents were not sure or had no opinion (0%). The fifth question asked the respondent to indicate at what rank they thought that personnel should be proficient in basic rope rescue skills. Of the nine (9) total respondents, seven (7) indicated that they felt it was important for all line personnel to be proficient (78%) and two (2) felt that it is important for only firefighters to be proficient (22%). The sixth question of the questionnaire for chief officers and department rescue instructors asked the respondents whether they felt that the department's rescue training program had been helpful, somewhat helpful, or not helpful in helping line personnel attain proficiency in basic rope rescue skills. Of the nine (9) total respondents, all nine (9) felt that the department's training program was helpful (100%).

The final three questions of the questionnaire for chief officers and department rescue instructors were related to their perspectives regarding the use of evaluations of basic rope rescue skills. The seventh question of the questionnaire asked the respondent if they felt that line personnel should be evaluated on basic rope rescue skills to identify deficiencies in both individual skills and the department's rope rescue training program. Of the nine (9) total respondents, eight (8) indicated that they felt line personnel should be evaluated (89%) and one (1) felt they should not (11%).

The eighth question asked respondents if they felt that an evaluation is a good way to measure proficiency. Of the nine (9) total respondents, all nine (9) thought that an evaluation is a good way to measure proficiency (100%). The final question asked the respondents if they thought that line personnel would experience increased anxiety if required to participate in an evaluation. Of the nine (9) total respondents, all nine (9) thought that line personnel would experience increased anxiety (100%).

Discussion

The literature review for this research was extensive. Unfortunately, there were no sources located that described results of rope rescue skills evaluations in fire departments. Similarly, there were limited sources located that described the opinions and perspectives of firefighters regarding the use of an evaluation to determine proficiency levels in basic rope rescue skills. However, sources were located describing the use and the importance of using evaluations to establish the efficacy of skills-based training and the methods by which to conduct such evaluations.

While this research focuses on parts of the first and second level of Kirkpatrick and Kirkpatrick's (2006) process of evaluating training programs, which is the

measurement of learning, it is important to discuss the other levels. The first is the measurement of the trainees' reaction to the training, according to Mind Tools (2015). The second level in the process of evaluation is that of learning, as described by Chapman (2014), and should be evaluated before and after the training has occurred in an effort to gauge how much learning has occurred. This research uses a combination of the first and second levels of Kirkpatrick and Kirkpatrick's four-level process of evaluation. The third level of evaluation includes the measurement of behavior, which according to Johnson and Dick (2012), is how the trainees apply what they learned in their everyday activities. Given the lack of run data and after-action reviews available in the Rochester Fire Department, this level of evaluation is also not available for use in this research. Additionally, the fourth level of evaluation of training programs is the measurement of results or the effect that the training has had on the business or environment (Chapman, 2014). This level of evaluation is also of no benefit to this research.

The results of the survey sent to Minnesota fire departments regarding the rope rescue training and evaluation revealed that approximately half were career departments and half were combination departments. The fact that the department was a career or combination department did not seem to correlate to whether they had a rope rescue program. Ninety-three percent (93%) of the departments indicated that they perform rope rescue and their personnel participate in rope rescue training. All but two of the departments who responded (87%) indicated that their curriculum is based on NFPA 1006/1670 or the Minnesota Fire Service Certification Board Technical Rescuer – Ropes I certification test. These results are all consistent with the Rochester Fire Department. The departments that responded to the survey were fairly evenly split as far as how often

their personnel participate in rope rescue training. Approximately half of the responding departments (53%) indicated that they perform some form of evaluation to measure the efficacy of training, with a significant majority of the departments (88%) using some form of individual skills assessment either immediately after training or on an annual basis. The overall results of the survey of Minnesota fire departments indicate that if the Rochester Fire Department were to do an evaluation of the efficacy of its rope rescue training, an individual skills assessment is preferred, which is also consistent with Peoria, Arizona Fire Department as described by Pendley (2012).

The use of questionnaires and a survey to answer the research questions was relatively successful in that the return rates for the questionnaires sent to the line personnel were an eighty-nine percent (89%) return for the questionnaire sent prior to the rope rescue skill evaluation, an eighty-three percent (83%) return for the questionnaire sent to line personnel after the rope rescue skill evaluation, a ninety percent (90%) return for the questionnaire sent to chief officers and department rescue instructors, and a seventy-five percent (75%) return on the survey sent to Minnesota fire departments. Somewhat unexpected and surprising is the return rate for the survey sent to Minnesota fire departments, but the researcher believes this success might be due to the personal relationships between the researcher and representatives from the departments who responded.

The Rochester Fire Department started the current rope rescue-training program approximately four years ago. One of the primary reasons for the program was to enable personnel to learn the tools of their profession and move their performance in the direction of excellence as indicated by the NCHRP (2006) and Compton (2010). Another

reason for performing rope rescue (and all of the sub disciplines within technical rescue) is the responsibility assumed by the fire service for rescuing people as postulated by Purchase (2006) and LaFemina (2008). For the Rochester Fire Department, these types of incidents are certainly high-risk, low-frequency events, and the department recognized the need for specialized training as asserted by Collins (2004). The department developed the goal on an organizational level to provide rope rescue services to the people living in and visiting the community and, to that end, developed the training necessary to attain that goal as suggested by Arthur et al. (2003). The questionnaires revealed that eighty-nine percent (89%) of captains, seventy-four percent (74%) of motor operators, eighty-two percent (82%) of firefighters, and one hundred percent (100%) of chief officers and rescue group instructors felt that the department should have a rope rescue training program. These results certainly represent overwhelming majorities that view the program as important to the fire department's mission. Additionally, seventy-eight percent (78%) of chief officers and department rescue instructors felt that rope rescue training is at least as important as training in other disciplines, given the low frequency and potential high risk involved in these types of events. While this research did not seek to have personnel rank the priority of training in different disciplines, it is probable that rope rescue training would be ranked highly, as found by Platz (2010) in the Iowa City Fire Department.

The department and some of its members collaborated to identify the training needs, develop the curriculum, and deliver the training to all department personnel in order to improve performance in rope rescue in order to attain the goal of providing this service to the community, as put forth by the NCHRP (2006). The department

established the consensus standards NFPA 1006 and NFPA 1670 as the core of the training program as proposed by Pendley (2006), Collins (2004), Sendelbach (2014), and Eady (2006). The department also used these consensus standards as benchmarks by which to measure competency of both the department and its personnel as recommended by Thiel et al. (2003) and Purchase (2006). The training was developed to be safe, effective, and realistic as recommended by Thiel et al. (2003). The fact that the department identified the training need and made this commitment to training shows a significant adaptive capacity as suggested by Heifetz, Grashow, and Linsky (2009).

The adoption of the training and the competency of personnel in basic rope rescue skills have not been without their challenges in both time and money, as proposed by Purchase (2006) and Pendley (2012). However, the department has focused resources and training toward initial training and the maintenance of proficiency in technical rescue skills as recommended by Rhea and Rousseau (2010) and Collins (2004). The training has always been hands-on and based on individual and crew performance that is consistent with what Platz (2010) recommended. Since the department does not perform rope rescue frequently, it is imperative that the training program allows the personnel opportunity to apply and to practice the knowledge and skills integral to rope rescue through classroom instruction, skills training, and scenario based training as proposed by Hubbard (2005), Platz (2010), Swain (2007) and the NCHRP (2006). The frequency with which rope rescue training is conducted not only serves to allow personnel to practice skills, but also serves to diminish the amount of knowledge and skills that personnel forget, as discussed by Hubbard (2005), Arthur et al. (2003), and Pendley (2006).

The significant missing element to the Rochester Fire Department rope rescue training program was some form of evaluation. The department can't manage what it hasn't measured, as suggested by Sendelbach (2014). As Kirkpatrick and Kirkpatrick (2005) and the NCHRP (2006) recommend, some type of evaluation of skills is necessary to make sure that the training has been effective, has met the goals and objectives, and justifies the cost of the training. It also lends credibility to the training and the personnel, suggested by Pendley (2006), in that personnel can see a specific level of proficiency as compared to the department's expectations. The basic rope rescue skills evaluation developed for this research was intended to identify any shortcomings in the program itself, and the way in which the training is being delivered, by comparing results of the evaluation to the original objectives of the training program. This is consistent with the recommendations put forth by Purchase (2006), the NCHRP (2006), Hubbard (2005), Murray (2005), Rothwell and Benkowski (2002), Aruthur et al. (2003), and Kirkpatrick and Kirkpatrick (2005).

The evaluation developed for this research utilized a method of skills checklists and practical evolutions based on the national consensus standards as recommended by Summerville (2009), Martin (2004), Rothwell and Benkowski (2002), and Pennington (2013), and was used to answer the first research question, "what are current retention rates for basic rope rescue skills?" It will be important for the department to utilize the results of the evaluation to focus on the components on which the personnel did not do well in order to maximize available training time as suggested by Kouwe et al. (2006). Additionally, the evaluation was conducted in a very similar way to how the Peoria Arizona Fire Department conducts its evaluations, as described by Pendley (2012).

The results of the basic rope rescue skills evaluation indicate that the training provided by the department has been fairly effective in attaining and maintaining a significant level of proficiency in these skills. Only one person (a motor operator) failed more than one of the stations in the evaluation. However, there were some glaring deficiencies identified. Ten people (13%) failed the knots portion of the evaluation and six people (8%) failed the belay portion of the evaluation. The researcher feels this is significant because these are the most basic rope skills and the evaluation was not difficult. The knots are basic firefighter skills with which everyone in the fire service should be proficient, as these skills are taught during Firefighter I certification classes. The belay acts as a safety in the event that components of the mainline fail. It is the last opportunity to avoid catastrophe and is the most important part of a rope rescue system. The time limits associated with each portion of the evaluation were consistent with the recommendations of Pendley (2012) and Swain (2007), in that personnel need to be able to perform these skills quickly and efficiently. If they cannot do so in an evaluation, they will not be able to perform quickly and efficiently during an emergency situation. It should also be noted that the Battalion Chief of Training and the department rescue instructors conducted the evaluation, which Pennington (2013) advised against. The use of department personnel in conducting the evaluation saved the department time and money.

There were no significant identifiable trends between captains, motor operators, and firefighters as groups in the rope rescue skills evaluation. The passing rates were fairly similar between all three groups across all five components of the evaluation; captains passed ninety-five percent (95%) of the components, motor operators passed

ninety-one percent (91%) of all components, and firefighters passed ninety-six percent (96%) of all components. A possible explanation for the motor operators lagging slightly behind the other two groups is that the motor operators, as a group, are generally older and have more years of service on the department. Rope skills may not be as important to them, leading to less practice and proficiency. Interestingly, of the motor operators who answered the first questionnaire, only seventy percent (70%) thought that basic rope rescue skills were important to their position, while eighty-three percent (83%) of captains and seventy-nine percent (79%) of firefighters considered basic rope rescue skills important to their positions. These results are similar to the perspectives of the chief officers and department rescue instructors in that seventy-eight percent (78%) of respondents thought that all line personnel should be proficient in basic rope rescue skills and twenty-two percent (22%) felt that only firefighters should be proficient.

The goal of this research is to not only evaluate the technical aspects of the training program, but also evaluate the perspectives and opinions of personnel regarding the necessity and efficacy of the training. This portion of the research was designed to answer the second and fourth research questions, “what are the perspectives of line personnel regarding the efficacy of rope rescue training?,” and “what are the perspectives of chief officers and department instructors regarding the efficacy of the rope rescue-training program?” Therefore, it is beneficial to compare the results of the evaluation to the perspectives of personnel regarding their proficiency in basic rope rescue skills. As Purchase (2006) and Collins (2004) suggest, proficiency is important in skills that are not used very often in emergency situations. In order to correlate levels of proficiency with the results of the evaluation, this research considers being proficient as attaining a perfect

score or missing one point on all components of the evaluation, missing more than one point but still passing the components of the evaluation is considered being somewhat proficient, and a failure on any of the components is considered not being proficient. This analysis may be somewhat arbitrary and the researcher recognizes that there are many ways which the results of the questionnaires and evaluation can be analyzed.

The questionnaire sent to line personnel prior to the evaluation asked respondents if they felt that they were proficient in basic rope rescue skills. The captains were slightly more likely to rate themselves as proficient (44%) or somewhat proficient (56%) than the other groups. The results of the evaluation showed that seven captains (35%) were proficient (got perfect scores or missed one point on all components), eight captains (40%) were somewhat proficient (passed but missed more than one point in one of the components), and five captains (25%) were not proficient (failed by attaining less than 70% or missing a critical criteria) in at least one component of the evaluation. The comparison of the results of the evaluation to the perspectives of the captains prior to the evaluation show that the captains, as a group, felt more confident in their skills than they actually demonstrated.

The motor operators and firefighters were somewhat less positive in response to this question of the first questionnaire. Only thirty percent (30%) of motor operators thought they were proficient, sixty-one percent (61%) thought they were somewhat proficient, and nine percent (9%) felt they were not proficient. The results of the evaluation indicate that nine motor operators (43%) were proficient in basic rope rescue skills (got perfect scores or missed one point on all components), six (29%) were somewhat proficient (passed but missed more than one point in one of the components),

six (29%) were not proficient (failed by attaining less than 70% or missing a critical criteria) in at least one component of the evaluation. Similar to the captains, some of the motor operators demonstrated that they were less proficient. However, there were motor operators who demonstrated that they were more proficient than they thought prior to the evaluation.

Prior to the evaluation, thirty-nine percent (39%) of firefighters thought they were proficient, fifty-two percent (52%) thought they were somewhat proficient, and six percent (6%) felt they were not proficient. The results of the evaluation showed that sixteen firefighters (47%) demonstrated proficiency (got perfect scores or missed one point on all components), eleven (32%) were somewhat proficient (passed but missed more than one point in one of the components), seven (21%) were not proficient (failed by attaining less than 70% or missing a critical criteria) in at least one component of the evaluation. Similar to the motor operators, some of the firefighters were more proficient than they thought, and some of the firefighters demonstrated that they were not as proficient as they thought prior to the evaluation.

The fifth question of the questionnaire sent to line personnel prior to the rope rescue skills evaluation asked the respondents whether or not they thought that most line personnel were proficient in basic rope rescue skills. Forty-seven percent (47%) indicated that they felt that most personnel were proficient and thirty-one percent (31%) felt that personnel were somewhat proficient. Additionally, fifty-six percent (56%) of chief officers and department rescue instructors felt that line personnel were proficient and forty-four percent (44%) felt that line personnel were somewhat proficient in basic rope rescue skills. Generally, these results are similar (given that 22% of line personnel

were not sure or had no opinion) and the results are somewhat similar to the results of the evaluation indicating that actual proficiency levels are close to the perceived proficiency levels of department personnel.

All personnel were asked if the department rescue-training program was helpful in attaining proficiency in basic rope rescue skills. Only fifty-eight percent (58%) of line personnel thought the program was helpful, thirty-six percent (36%) thought it was somewhat helpful, and four percent (4%) thought it was not helpful. At the same time, all of the chief officers and department rescue instructors thought that the department's rescue training program was helpful in attaining proficiency in basic rope rescue skills. These results are somewhat confusing and indicate further research is required as to why the line personnel responded the way they did and what improvements they think can be made to attain proficiency. When asked what changes in delivery methods that line personnel felt would help attain proficiency, the responses of more one-to-one instruction, more practical application of skills, and more scenario-based training were chosen (41%, 54%, and 35%, respectively) more than classroom instruction, no changes to the program, and the department already conducts too much rope rescue training (8%, 16%, and 9%, respectively). These results were somewhat expected since basic rope rescue skills require hands-on training and practice, which is consistent with the recommendations of Hubbard (2005), the NCHRP (2006), Platz (2010), and Collins (2004).

The remaining questions of all three questionnaires were designed to answer the fourth research question, "what are the perspectives of line personnel, chief officers, and department rescue instructors in regards to using an evaluation to determine proficiency

in basic rope rescue skills?” The use of an evaluation to measure proficiency was met with mostly positive responses. Eighty-nine percent (89%) of the chief officers and department rescue instructors felt that line personnel should be evaluated to identify deficiencies in individual skills and the department training. Sixty-four percent (64%) of line personnel felt that an evaluation would make them more proficient, presumably due to more practice in preparation for the evaluation, as eighty percent (80%) of line personnel indicated that they would practice for the evaluation. Additionally, all of the chief officers and department rescue instructors (100%) and sixty-three percent (63%) of the line personnel thought that an evaluation was a good way to measure proficiency. These results may indicate that, from a supervisory perspective, an evaluation is a good way to measure proficiency, whereas the line personnel may not feel comfortable with being evaluated.

All of the chief officers and department rescue instructors (100%) felt that line personnel would experience increased anxiety with having to participate in the evaluation. These results certainly correlate with how line personnel perceived the evaluation, as established by the questions on the questionnaire sent to line personnel after the evaluation. Sixty-six percent (66%) of line personnel thought the evaluation was moderately easy and thirteen percent (13%) thought it was easy, while a lot fewer thought it was very difficult or difficult (2% and 18%, respectively). Additionally, fifty percent (50%) thought that the evaluation was not as difficult as they thought it would be prior to participating in the evaluation. Eighty-one percent (81%) of line personnel stated that they reviewed the skills check sheets, and sixty-two percent (62%) indicated that they practiced the skills for more than one hour prior to the evaluation. These results indicate

that line personnel expected the evaluation to be more difficult and were possibly experiencing anxiety prior to the evaluation as described by Murray (2005). The evaluation was intended to be an analysis of performance, which is what Pennington (2013) discussed.

The second questionnaire sent to line personnel repeated two questions from the first questionnaire. These were in regards to whether they felt that the evaluation made them more proficient and whether they thought that an evaluation was a good way to measure proficiency. This was done in an attempt to ascertain whether participation in the evaluation itself would change perspectives regarding the benefits of the evaluation. Seventy-six percent (76%) felt that the evaluation made them more proficient, and sixty-one percent (61%) felt that an evaluation was a good way to measure proficiency when asked after the evaluation. This compares to sixty-four percent (64%) and sixty-three percent (63%), respectively, when asked the same questions prior to the evaluation. Though there wasn't much change in the results prior to and after the evaluation, twelve percent (12%) more line personnel felt that the evaluation (and the review and practice prior) made them more proficient.

The evaluation and gathering of perspectives regarding the department's rescue training program will only be of value if the department uses the results to make improvements to the program. The results of the evaluation indicate that the department's rope rescue training program has been effective in attaining and maintaining proficiency of basic rope rescue skills among the line personnel. However, the evaluation also identified some deficiencies that need to be corrected if the department is to approach excellence in this area. The results of this research in regards

to the perspectives of line personnel, chief officers, and the department rescue instructors indicates that the use of an evaluation for these skills is, to a significant extent, a good way to measure and ensure a desired level of proficiency in basic rope rescue skills. A skills evaluation of this type may also be used to measure proficiency in basic skills in the other disciplines of Rochester Fire Department training.

Recommendations

The literature review and the results of this research lead to the following recommendations for the Rochester Fire Department:

- The Rochester Fire Department should make necessary changes to the rope rescue-training program to focus on areas that the evaluation identified as not being met, such as the load-releasing hitch on the tandem-prussik belay. Follow-up training and subsequent evaluation should be conducted for those individuals who failed components of the evaluation. This is necessary to ensure that all personnel are proficient in basic rope rescue skills.
- The Rochester Fire Department should continue the use of skills evaluations to encourage proficiency and confidence in basic rope rescue skills. This research indicates that personnel think the evaluation is of some benefit to attaining and maintaining proficiency in basic rope rescue skills.
- It may benefit the Rochester Fire Department to conduct further research into how line personnel think they can better attain proficiency and how the department can assist them to that end.

- The Rochester Fire Department might consider the merits of changing the belay system to another type of belay if there are personnel who continue to struggle with the tandem-prussik belay.

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Appendix A

Survey for other Minnesota Fire Departments

1) Are your department personnel:

- ☐ Career
- ☐ Volunteer
- ☐ Combination

2) Does your department perform rope rescue?

- ☐ Yes
- ☐ No
- ☐ I don't know or I'm not sure

3) Do your department personnel participate in regular rope rescue training?

- ☐ Yes
- ☐ No
- ☐ I don't know or I'm not sure

4) If you answered "yes" to Question #3, is your curriculum:

- ☐ Derived directly from NFPA 1006 and NFPA 1670
- ☐ Derived from the Minnesota Fire Service Certification Board Technical Rescuer – Ropes I
- ☐ Other

5) How often do your personnel participate in some type of rope rescue training?

- ☐ 1-2 times per year
- ☐ 3-4 times per year
- ☐ 4-8 times per year
- ☐ More than 8 times per year

6) Does your department do any type of validation or certification evaluation to make sure that personnel are proficient in rope rescue skills?

- ☐ Yes
- ☐ No
- ☐ I don't know or I'm not sure

7) If you answered “yes” to Question #6, how often do your department personnel participate in this evaluation?

- ☐ Immediately after the training
- ☐ Annually
- ☐ Biannually
- ☐ Other

8) If you answered “yes” to Question #6, please briefly describe your evaluation process.

Appendix B

Skill Check Sheets

Rochester Fire Dept. SKILLS TESTING

“DONNING PPE”

Candidate Name _____

Evaluator: _____

Criteria: The candidate, given a harness, helmet and gloves, shall don all PPE and perform an equipment check on a partner.

	Score	Fail
1. Candidate dons harness, ensuring that all straps and buckles are placed properly and secured.	_____	
2. Shoulder straps are double backed.	_____	_____
3. Waist strap cannot be pulled down over hips.	_____	_____
4. Helmet chin strap secured.	_____	_____
5. Gloves are on.	_____	
6. Were donning tasks completed in less than 5 minutes?	_____	
7. Candidate verbalizes inspection of another rescuer starting at head and working down.	_____	
8. Each strap is inspected for proper placement, tightness, and excess straps secured, if appropriate	_____	_____
9. Were inspection tasks completed in less than 2 minutes?	_____	
Total	_____	

Evaluation

Scoring is based on a 0 -1 scale. 0 = not completed, 1 = met the requirement. A score of 70% is required to pass this Skill Station (7 points)

Bold items are critical criteria. Candidate must pass all critical criteria.

Rochester Fire Dept. SKILLS TESTING

“KNOTS”

Candidate Name _____

Evaluator: _____

Criteria: The candidate with gloved hands will tie knots, bends, and hitches, given rope and webbing, so that the knots, including safety, are properly dressed and recognizable.

	Score	Fail
1. Ties a figure 8.	_____	_____
2. Ties a figure 8 on a bight with double overhand safety*	_____	_____
3. Ties a figure 8 follow-through with double overhand safety*	_____	_____
4. Ties a water knot with safety*	_____	_____
5. Ties a frost knot with safety*	_____	_____
6. Ties a triple-wrap prussik on a rope	_____	_____
7. Were tasks completed in less than 2 minutes per knot?	_____	_____
Total	_____	

Evaluation

Scoring is based on a 0 -1 scale. 0 = not completed, 1 = met the requirement. A score of 80% is required to pass this Skill Station (6 points).

Bold items are critical criteria. Candidate must pass all critical criteria.

* All safety knots will consist of a minimum single overhand knot. Half-hitch is unacceptable as a safety; safety knots shall be within 3 – 4 inches of the base of the primary knot, bend, hitch; when applicable all tails shall extend 3 – 4 inches from the base of knots, bends, and hitches.

Rochester Fire Dept.

SKILLS TESTING

CONSTRUCTION OF A ROPE SYSTEM “MPD - MAIN LINE”

Candidate Name _____

Evaluator: _____

Criteria: The candidate, given a MPD pre-rig will setup a lowering system and then change over to a raising system.

		Score	Fail
1.	Inspect MPD pre-rig before setting system up.	_____	
2.	Attach MPD pre-rig to an anchor system that will support the load.	_____	
3.	All knots are tied correctly and secured with a safety.	_____	
4.	Rope and equipment is protected from cuts and abrasions, and critical angles (120 degrees) are not exceeded.	_____	_____
5.	Perform a system safety check of the system.	_____	_____
6.	Performs a load test prior to life loading the system*	_____	_____
7.	Perform a high angle lowering operation so the load is controlled and can be held in place when needed.	_____	
8.	Change over to a raising system using a 3:1 or 5:1 mechanical advantage.	_____	
9.	Were tasks completed in less than 15 minutes and in a SAFE manner?	_____	
10.	Perform a high angle raising operation so the load is raised a minimum of 10 feet.	_____	
11.	Candidate is able to reassemble pre-rig system when given all components.	_____	
	Total	_____	

Evaluation

Scoring is based on a 0 -1 scale. 0 = not completed, 1 = met the requirement. A score of 70% is required to pass this Skill Station (8 points)

Bold items are critical criteria. Candidate must pass all critical criteria.

* Load test shall consist of a minimum two person pulling against system in a safe manner.

Rochester Fire Dept.

SKILLS TESTING

CONSTRUCTION OF A ROPE SYSTEM: “BELAY”

Candidate Name _____

Evaluator: _____

Criteria: The candidate, given the appropriate equipment and rescue incident information, will operate a belay

		Score	Fail
1.	Evaluate rescue scene for special needs and equipment.	_____	
2.	Construct a multiple point anchor system capable of supporting the load.	_____	
3.	Construct a belay system capable of controlling, holding the load in place, or lowering with minimal effort	_____	
4.	All knots are tied correctly and secured with a safety	_____	
5.	Rope and equipment is protected from cuts and abrasions and critical angles (120 degrees) are not exceeded	_____	_____
6.	Performs a system safety check of existing fixed rope system (visual, load test and audible)	_____	_____
7.	Performs a load test prior to life loading the system*	_____	_____
8.	The belay system constructed was not loaded under normal operations	_____	
9.	Belay system successfully arrested a falling load within 3 ft.	_____	_____
10.	Were tasks completed in less than 15 minutes and in a SAFE manner?	_____	
11.	Candidate is able to reassemble pre rig system when given all components?	_____	
		Total	_____

Evaluation

Scoring is based on a 0 -1 scale. 0 = not completed, 1 = met the requirement. A score of 70% is required to pass this Skill Station (8 points).

Bold items are critical criteria. Candidate must pass all critical criteria.

* Load test shall consist of a minimum two person pulling against system in a safe manner

Rochester Fire Dept.

SKILLS TESTING

CONSTRUCTION OF A ROPE SYSTEM “RAPPEL”

Candidate Name _____

Evaluator: _____

Criteria: The candidate, given necessary equipment will build a fixed line system and demonstrate how to rappel and tying off.

		Score	Fail
1.	Evaluate rescue scene for special needs and appropriate equipment is chosen for the scenario	_____	
2.	Assembles and checks all appropriate equipment and hardware	_____	
3.	Checks appropriateness of anchor, fixed rope, and belay system s	_____	
4.	All knots are tied correctly and secured with a safety if or where required	_____	
5.	Rope and equipment is protected from cuts and abrasions, and critical angles (120 degrees) are not exceeded	_____	_____
6.	Performs a system safety check of existing fixed rope system (visual, load test and audible)	_____	_____
7.	Performs a load test prior to live loading the system*	_____	_____
8.	Secures self/harness to fixed rope system with a descent control device	_____	_____
9.	Ties-off the descent control device and rests suspended on the rope system when commanded to do so by the evaluator	_____	
10.	Unlocks the decent control device and continues rappel in a safe and controlled manner	_____	
11.	Were tasks completed in less than 15 minutes and in SAFE manner?	_____	
Total		_____	

Evaluation

Scoring is based on a 0 -1 scale. 0 = not completed, 1 = met the requirement. A score of 70% is required to pass this Skill Station (8 points).

Bold items are critical criteria. Candidate must pass all critical criteria.

* Load test shall consist of a minimum two person pulling against system in a safe manner.

Appendix C

Rope rescue skills questionnaire for line personnel

1) What is your current rank?

- ☐ Captain
- ☐ Motor Operator
- ☐ Firefighter

2) Do you think that the Department should have a rope rescue training program?

- ☐ Yes
- ☐ No
- ☐ I don't know/I'm not sure

3) In regards to basic rope rescue skills, would you say that you are:

- ☐ Proficient
- ☐ Somewhat proficient
- ☐ Not proficient
- ☐ I don't know/I'm not sure

4) Do you think that being proficient in basic rope rescue skills is important in your current position?

- ☐ Yes
- ☐ No
- ☐ I don't know/I'm not sure

5) Do you think that most line personnel are proficient in basic rope rescue skills?

- ☐ Yes
- ☐ No
- ☐ I don't know/I'm not sure

6) In regards to attaining proficiency in basic rope rescue skills, would you say that the Department's rescue training program has been:

- ☐ Helpful
- ☐ Somewhat helpful
- ☐ Not helpful
- ☐ I don't know/I'm not sure

7) In order to improve the Department's rescue training program, which of the following do you think is needed in order to gain proficiency? (Mark all that apply)

- ☐ More one-to-one instruction
- ☐ More dedicated time to practical application
- ☐ More classroom-type instruction
- ☐ More scenario-type evolutions
- ☐ No changes are needed – we spend the right amount of time on rope rescue
- ☐ There is already too rope rescue training

8) Do you think that participating in the upcoming evaluation process will help you to be more proficient in basic rope rescue skills?

- ☐ Yes
- ☐ No
- ☐ I don't know/I'm not sure

9) Have you, or do you intend to, practice the rope rescue skills prior to the upcoming evaluation process?

- ☐ Yes
- ☐ No
- ☐ I don't know/I'm not sure

10) In general, do you think that an evaluation process is a good way to measure proficiency?

- ☐ Yes
- ☐ No
- ☐ I don't know/I'm not sure

Appendix D

Follow-up questionnaire sent to line personnel

1) What was your rank at the time of the rope rescue skill evaluation?

- ☐ Captain
- ☐ Motor Operator
- ☐ Firefighter

2) Now that you've participated in the rope rescue skill evaluation, would you classify it as:

- ☐ Very difficult
- ☐ Difficult
- ☐ Moderately easy
- ☐ Easy
- ☐ Too easy
- ☐ I don't know/I'm not sure

3) Would you say that it was as difficult as you thought it would be (prior to participating)?

- ☐ Yes
- ☐ No
- ☐ I don't know/I'm not sure

4) Did you review the skill check sheets prior to participating in the evaluation?

- ☐ Yes
- ☐ No
- ☐ I don't know/I'm not sure

5) How much time would say that you practiced the skills before participating in the evaluation?

- ☐ Less than 1 hour
- ☐ 1-2 hours
- ☐ 2-4 hours
- ☐ More than 4 hours

6) Would you say that the evaluation has made you more proficient in these rope rescue skills?

- ☐ Yes
- ☐ No

☐ I don't know/I'm not sure

7) Do you think that this type of evaluation is a good way to measure the effectiveness of Department training?

☐ Yes

☐ No

☐ I don't know/I'm not sure

Appendix E

Questionnaire sent to chief officers and department instructors

1) Are you a:

- ☐ Chief Officer
- ☐ Department Rescue Group member/instructor

2) Do you think it is important that the Department have a rope rescue-training program?

- ☐ Yes
- ☐ No
- ☐ I don't know/I'm not sure

3) Considering all of the disciplines in which the Rochester Fire Department trains and responds to calls for service, and considering a high-risk/low-frequency analysis of rope rescue, do you consider rope rescue training:

- ☐ As important as training in the other disciplines
- ☐ Less important as training in the other disciplines
- ☐ About the same
- ☐ I don't know/I'm not sure

4) In regards to basic rope rescue skills, would you say that the personnel you supervise (or provide training to) are:

- ☐ Proficient
- ☐ Somewhat proficient
- ☐ Not proficient
- ☐ I don't know/I'm not sure

5) At what rank do you think that being proficient in basic rope rescue skills is important for line personnel? (Mark all that apply)

- ☐ Captain
- ☐ Motor Operator
- ☐ Firefighter

6) In regards to line personnel attaining proficiency in basic rope rescue skills, from your perspective, would you say that the Department's rescue training program has been:

- ☐ Helpful
- ☐ Somewhat helpful
- ☐ Not helpful
- ☐ I don't know/I'm not sure

7) Do you think that line personnel should participate in an evaluation process that is intended to identify deficiencies in both individual skills and the rope rescue-training program?

- ☐ Yes
- ☐ No
- ☐ I don't know/I'm not sure

8) In regards to technical skills, do you think that an evaluation process is a good way to measure proficiency?

- ☐ Yes
- ☐ No
- ☐ I don't know/I'm not sure

9) In general, do you think that line personnel will experience increased anxiety if they are required to participate in a skills evaluation process?

- ☐ Yes
- ☐ No
- ☐ I don't know/I'm not sure

Appendix F

Results of survey sent to Minnesota fire departments

			Respondent #														
		Response	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Question #	1																
		Career	1	1	1	1				1		1	1				1
		Volunteer															
		Combination					1	1	1		1			1	1	1	
	2																
		Yes	1	1	1	1	1	1	1	1	1		1	1	1	1	1
		No										1					
		Don't know/not sure															
	3																
		Yes	1	1	1	1		1	1	1	1	1	1	1	1	1	1
		No					1										
		Don't know/not sure															
	4																
		NFPA 1006/1670		1	1				1	1	1		1	1		1	1
		MNFSCB						1				1					
		N/A					1								1		
		Other	Both				Both										
	5																
		1-2 times		1			1					1					
		3-4 times							1	1				1		1	1
		4-8 times			1	1									1		
		More than 8 times	1					1			1		1				
		Don't know/not sure															
	6																
		Yes	1		1			1	1	1	1		1			1	
		No		1		1	1					1		1	1		1
		Don't know/not sure															
	7																
		Immediately after training	1													1	
		Annually			1			1		1	1		1				
		Biannually							1								
		N/A		1		1	1					1		1	1		1
	8																
		Describe															

Table F1 – Survey sent to Minnesota Fire Departments

Appendix G

Results for rope rescue skill evaluations

	Rank	CO	CO	CO	CO	CO	CO	CO	CO	CO	CO	CO	CO	CO	CO	CO	CO
PTS Poss																	
PPE	9	9	9	9	8	8	9	8	9	9	9	8	9	9	9	9	9
Knots	7	7	7	7	7	7	6	7	7	6	7	7	6	0	0	6	7
MPD	11	11	11	11	11	11	11	11	11	11	11	11	11	9	11	11	11
Belay	11	11	11	10	0	9	10	9	10	0	11	10	10	10	10	10	11
Rappel	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	11

	Rank	CO	CO	CO	CO
PTS Poss					
PPE	9	9	9	9	8
Knots	7	7	7	0	6
MPD	11	10	11	11	11
Belay	11	10	10	10	10
Rappel	11	10	11	11	11

	Rank	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO
PTS Poss																	
PPE	9	8	9	8	9	9	9	9	6	9	8	8	8	9	9	8	9
Knots	7	6	0	0	7	6	7	7	0	7	7	7	7	6	7	6	7
MPD	11	11	10	10	11	11	10	11	11	11	11	11	11	11	11	11	11
Belay	11	10	10	10	11	11	11	11	10	11	11	10	10	11	11	10	10
Rappel	11	11	10	9	11	11	10	11	11	10	11	11	11	11	11	11	11

	Rank	MO	MO	MO	MO	MO
PTS Poss						
PPE	9	7	8	9	8	0
Knots	7	6	6	7	0	0
MPD	11	0	11	11	11	10
Belay	11	0	10	10	10	10
Rappel	11	8	11	11	10	10

	Rank	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
PTS Poss																		
PPE	9	9	9	9	9	9	8	9	8	9	9	9	8	0	9	8	7	9
Knots	7	7	7	7	7	7	6	7	7	7	7	7	0	7	7	7	6	7
MPD	11	11	11	11	11	11	10	11	11	11	11	11	11	11	11	11	11	11
Belay	11	11	10	10	10	10	10	9	10	11	11	11	10	10	10	10	10	10
Rappel	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	11

	Rank	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
PTS Poss																		
PPE	9	9	9	9	9	9	6	9	8	9	9	7	9	7	9	9	9	9
Knots	7	7	7	6	7	7	7	7	6	7	7	0	7	7	7	7	7	7
MPD	11	11	11	11	11	11	10	11	11	11	11	10	11	11	11	10	11	11
Belay	11	10	10	10	11	11	10	10	0	11	10	10	10	10	10	0	10	0
Rappel	11	10	11	10	11	11	10	10	11	11	10	10	11	11	10	11	11	10

Table G1 – Results of rope rescue skills evaluation

Appendix H

Results for first questionnaire sent to line personnel

	Respondent #																		Total s
Rank	80 CO	76 CO	75 CO	68 CO	65 CO	64 CO	54 CO	48 CO	43 CO	40 CO	33 CO	31 CO	23 CO	17 CO	12 CO	10 CO	6 CO	5 CO	
#2																			
Yes	1	1	1	1	1	1		1		1	1	1	1	1	1	1	1	1	16
No							1												1
DK-NS									1										1
#3																			
Proficient				1	1						1	1	1		1	1	1		8
Somewhat	1	1	1			1	1	1	1	1				1				1	10
Not																			0
DK-NS																			0
#4																			
Yes	1		1	1	1	1		1		1	1	1	1	1	1	1	1	1	15
No		1					1		1										3
DK-NS																			0
#5																			
Yes			1	1	1		1	1			1	1			1				8
No	1	1				1								1		1	1		6
DK-NS									1	1			1					1	4
#6																			
Helpful	1			1	1	1		1			1	1	1		1		1	1	11
Somewhat		1	1				1		1	1				1		1			7
Not																			0
DK-NS																			0
#7																			
More 1 to 1		1	1			1	1	1	1		1		1						8
Practical		1	1	1	1	1				1				1		1		1	9
Classroom						1	1										1		3
Scenario				1		1						1							3
No changes															1				1
Too Much	1						1		1										3
#8																			
Yes				1	1	1		1		1	1	1	1		1	1	1	1	12
No	1	1	1				1							1					5
DK-NS									1										1
#9																			
Yes		1	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	16
No	1								1										2
DK-NS																			0
#10																			
Yes	1					1		1		1		1	1		1	1	1	1	10
No		1	1	1			1		1										5
DK-NS					1						1			1					3

Table H1 – Results of first questionnaire sent to line personnel (captains)

	Respondent #																								TOTAL
	78	77	74	73	71	69	66	62	61	59	55	53	51	49	47	46	38	32	25	22	20	19	13		
Rank	M O	M O	M O	M O	M O	M O	M O	M O	M O	M O	M O	M O	M O	M O	M O	M O	M O	M O	M O	M O	M O	M O	M O		
#2																									
Yes	1	1	1	1	1		1		1		1	1		1	1		1	1		1	1	1	1		
No								1		1			1			1			1						
DK-NS						1																			
#3																									
Proficient					1	1					1			1					1	1	1				
Some what	1	1	1				1	1	1		1	1		1	1		1	1				1	1		
Not						1										1									
DK-NS																									
#4																									
Yes	1	1	1	1	1		1	1	1			1		1	1			1		1	1	1	1		
No						1				1	1		1			1			1						
DK-NS																	1								
#5																									
Yes	1		1	1	1		1								1			1	1	1	1		1		
No						1			1	1	1	1	1			1						1			
DK-NS		1						1						1			1								
#6																									
Helpful			1	1	1	1	1		1					1	1	1	1	1	1	1	1		1		
Some what	1	1						1			1	1		1								1			
Not										1			1												
DK-NS																									
#7																									
More 1 to 1		1	1			1	1								1	1	1					1			
Practical			1		1	1	1		1	1	1	1				1	1					1			
Classroom					1		1										1								
Scenario			1		1		1				1					1	1					1			
No changes	1			1				1										1		1	1		1		
Too Much													1	1					1						
#8																									
Yes		1	1	1	1	1						1			1	1				1		1	1		
No	1									1			1						1		1				
DK-NS							1	1	1		1			1			1	1							
#9																									
Yes	1	1	1			1	1	1	1		1	1			1	1	1		1	1	1	1	1		
No										1			1					1							
DK-NS				1	1									1											
#10																									
Yes			1	1	1	1		1	1		1	1			1	1		1		1	1	1	1		
No	1	1								1			1												
DK-NS							1							1			1		1						

Table H2 – Results of first questionnaire sent to line personnel (motor operators)

	Respondent #																
	79	72	70	67	63	57	52	50	45	44	42	41	39	36	35	34	30
Rank	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
#2																	
Yes	1	1	1	1	1	1	1			1	1	1	1	1	1	1	
No								1									
DK-NS									1								1
#3																	
Proficient	1	1	1		1	1								1			1
Somewhat				1			1	1	1	1	1	1	1		1	1	
Not																	
DK-NS																	
#4																	
Yes	1	1	1		1	1	1	1		1	1	1	1			1	1
No				1										1			
DK-NS									1						1		
#5																	
Yes	1	1						1		1		1		1		1	1
No			1		1		1						1				
DK-NS				1		1			1		1				1		
#6																	
Helpful	1					1		1			1		1	1	1		1
Somewhat		1	1	1	1				1	1		1				1	
Not							1										
DK-NS																	
#7																	
More 1 to 1				1		1	1		1	1			1	1		1	
Practical		1	1	1	1	1	1	1	1					1	1		1
Classroom																	
Scenario			1	1			1			1	1	1		1		1	
No changes	1																
Too Much																	
#8																	
Yes			1	1	1	1	1	1		1	1	1	1	1		1	1
No	1	1							1								
DK-NS															1		
#9																	
Yes		1	1	1	1	1	1	1		1	1	1	1	1	1	1	1
No	1																
DK-NS									1								
#10																	
Yes	1	1	1				1	1		1	1			1	1	1	1
No				1					1								
DK-NS					1	1						1	1				

Table H3 - Results of first questionnaire sent to line personnel (firefighters)

	Respondent #																TOTAL
	29	28	27	26	24	21	15	18	16	14	11	9	8	7	4	2	
Rank	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	
#2																	
Yes	1	1	1	1		1	1	1		1	1	1		1	1	1	27
No									1				1				3
DK-NS					1												3
#3																	
Proficient	1		1	1		1	1		1								13
Somewhat		1						1		1	1	1		1		1	17
Not					1								1				2
DK-NS															1		1
#4																	
Yes	1	1	1	1		1	1	1	1	1		1		1	1	1	26
No											1		1				4
DK-NS					1												3
#5																	
Yes		1		1	1	1	1			1		1			1		16
No								1	1		1		1			1	9
DK-NS	1		1											1			8
#6																	
Helpful	1	1	1	1	1	1	1			1		1		1			18
Somewhat								1	1		1		1			1	13
Not																	1
DK-NS															1		1
#7																	
More 1 to 1					1		1	1	1		1					1	14
Practical	1	1	1		1	1					1			1	1	1	20
Classroom																	0
Scenario	1			1			1	1					1	1	1	1	16
No changes				1						1		1					4
Too Much											1						1
#8																	
Yes	1	1	1	1	1	1	1	1			1	1			1		24
No									1	1			1			1	7
DK-NS														1			2
#9																	
Yes	1	1	1		1	1	1	1			1	1		1	1		26
No				1					1	1			1				5
DK-NS																1	2
#10																	
Yes	1	1	1		1	1	1	1	1		1				1		21
No										1							3
DK-NS				1								1	1	1		1	9

Table H3 (continued) - Results of first questionnaire sent to line personnel (firefighters)

Appendix I

Results of second questionnaire sent to line personnel

		Respondent #																			TOTAL
		67	60	58	57	54	41	40	39	34	33	28	26	14	13	12	10	9	8	1	
Rank		C O	C O	C O	C O	C O	C O	C O	C O	C O	C O	C O	C O	C O	C O	C O	C O	C O	C O	C O	
Question #	2																				
	Very difficult	1																			1
	Difficult					1			1					1				1			4
	Moderately easy		1	1	1		1	1		1	1				1		1		1		10
	Easy											1	1			1				1	4
	Too easy																				0
	DN-NS																				0
	3																				
	Yes	1	1		1	1	1		1		1			1	1						9
	No			1				1		1		1	1			1		1	1	1	9
	DK-NS																	1			1
	4																				
	Yes	1	1	1	1	1	1	1		1	1	1	1		1	1	1		1	1	16
	No								1					1					1		3
	DK-NS																				0
	5																				
	< 1 hour	1							1					1				1	1		5
	1-2 hours		1				1	1		1	1	1	1							1	9
	2-4 hours			1	1	1									1	1					5
	> than 4 hours																				0
	6																				
	Yes		1	1	1	1	1	1			1	1	1	1	1	1			1	1	15
	No	1							1									1			3
	DK-NS									1											1
	7																				
	Yes		1		1	1	1					1	1	1	1	1	1		1	1	12
	No	1							1	1	1								1		5
	DK-NS			1				1													2

Table I1 – Results of second questionnaire sent to line personnel (captains)

		Respondent #													TOTAL
		65	61	56	53	51	48	37	35	31	23	22	17	3	
Question #	Rank	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	
	2														
	Very difficult														0
	Difficult					1	1								2
	Moderately easy	1	1	1	1			1	1	1	1	1			9
	Easy												1		1
	Too easy													1	1
	DN-NS														0
	3														
	Yes				1	1		1	1		1		1		6
No	1		1			1			1		1		1	6	
DK-NS		1												1	
4															
Yes		1	1			1	1	1	1	1	1	1		9	
No	1			1	1								1	4	
DK-NS														0	
5															
< 1 hour	1		1	1	1						1		1	6	
1-2 hours							1	1	1			1		4	
2-4 hours		1				1				1				3	
> than 4 hours														0	
6															
Yes			1	1	1	1	1	1		1	1	1		9	
No									1				1	2	
DK-NS	1	1												2	
7															
Yes			1	1			1				1	1		5	
No								1	1	1			1	4	
DK-NS	1	1			1	1								4	

Table I2 – Results of second questionnaire sent to line personnel (motor operators)

Question #		Respondent #														
		64	63	62	59	55	52	50	49	46	45	44	43	42	38	32
	Rank	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
	2															
	Very difficult															
	Difficult					1	1							1		1
	Moderately easy	1	1	1	1			1	1	1	1	1	1			
	Easy														1	
	Too easy															
	DN-NS															
	3															
	Yes					1	1		1		1		1	1	1	1
	No	1	1	1	1			1		1		1				
	DK-NS															
	4															
	Yes	1		1	1	1	1	1	1	1		1		1	1	1
	No		1								1		1			
	DK-NS															
	5															
	< 1 hour		1				1				1	1	1			
	1-2 hours	1		1										1	1	
	2-4 hours							1	1							1
	> than 4 hours				1	1				1						
	6															
	Yes	1		1	1	1	1	1	1	1		1		1	1	1
	No		1								1		1			
	DK-NS															
	7															
	Yes	1		1			1	1	1	1		1		1	1	1
	No		1		1						1		1			
	DK-NS					1										

Table I3 – Results of second questionnaire sent to line personnel (firefighters)

		Respondent #															
Question #		66	30	29	25	24	21	20	19	18	16	15	7	6	5	4	TOTAL
	Rank	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	
	2																
	Very difficult																0
	Difficult		1														5
	Moderately easy	1		1	1	1		1	1	1	1	1	1		1	1	22
	Easy						1								1		3
	Too easy																0
	DN-NS																0
	3																
	Yes	1	1	1					1				1				13
	No				1	1	1	1			1		1	1	1	1	16
	DK-NS									1							1
	4																
	Yes	1	1		1	1	1	1	1	1		1	1	1	1	1	25
	No			1							1						5
	DK-NS																0
	5																
	< 1 hour	1		1						1	1	1		1		1	12
	1-2 hours		1		1	1		1					1		1		10
	2-4 hours								1								4
	> than 4 hours						1										4
	6																
	Yes		1	1	1	1	1	1	1	1	1		1	1		1	23
	No	1									1				1		6
	DK-NS															1	1
	7																
	Yes	1	1		1	1	1	1	1			1	1	1	1		21
	No			1							1						6
DK-NS									1						1	3	

Table I3 (continued) – Results of second questionnaire sent to line personnel (firefighters)

Appendix J

Results of questionnaire sent to chief officers and department instructors

		Respondent #									TOTAL
		9	8	7	6	5	4	3	2	1	
Question #	1										
	Chief Officer		1		1		1				3
	Instructor	1		1		1		1	1	1	6
	2										
	As important	1	1		1	1	1	1			6
	Less important									1	1
	Same			1							1
	Don't know/not sure								1		1
	3										
	Yes	1	1	1	1	1	1	1	1	1	9
	No										0
	Don't know/not sure										0
	4										
	Proficient		1			1		1	1	1	5
	Somewhat	1		1	1		1				4
	Not proficient										0
	Don't know/not sure										0
	5										
	Captain		1	1	1	1	1	1	1		7
	Motor Operator		1	1	1	1	1	1	1		7
	Firefighter	1	1	1	1	1	1	1	1	1	9
	6										
	Helpful	1	1	1	1	1	1	1	1	1	9
	Somewhat										0
	Not helpful										0
	Don't know/not sure										0
	7										
	Yes	1	1		1	1	1	1	1	1	8
	No										0
	Don't know/not sure			1							1
	8										
	Yes	1	1	1	1	1	1	1	1	1	9
	No										0
	Don't know/not sure										0
	9										
	Yes	1	1	1	1	1	1	1	1	1	9
	No										0
	Don't know/not sure										0

Table J1 – Results of questionnaire sent to chief officers and department instructors