

Running Head: MEETING THE FITNESS CHALLENGE

Leading Community Risk Reduction

Meeting the Fitness Challenge

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CERTIFICATION STATEMENT

I hereby certify that this paper constitutes my own product, that where the language of other 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.

Signed: _____

Abstract

The problem was that firefighters did not know what exercise programs would enable completion of annual fitness tests. Employees could be terminated upon failure of the test. The purpose of this research was to identify exercise criteria to ensure successful completion. Descriptive research answered the questions: (a) what are the national standards for fitness? (b) what are the state standards for fitness? (c) what are other Air National Guard Bases doing to meet the standards? (d) what is the criteria for Michigan Civil Service Firefighters? Procedures used to complete this project included interviews, literature reviews and surveys. This research's recommendations suggest steps to implement a fitness program that prepares firefighters to successfully complete the annual fitness testing.

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Introduction

Meeting the Fitness Challenge

Fitness issues are getting increased attention in the fire service. Annual fitness testing is being mandated to firefighters across the nation. National Fire Protection Association (NFPA) Standards are providing guidance for Health and Wellness program within fire departments. The Department of Defense adopted the NFPA standards and is implementing annual fit testing through the use of timed task oriented performance criteria. This appears to add an element of work capacity to the firefighter fitness equation. Is simply being physically fit enough? Fitness levels are often based on an individual's age, however, the necessary work capacity for firefighters remains the same throughout ones career (Lusa, Sirpa, Louhevaara Veikko, Kari and Kinnunen, 1994). The adoption of a physical fitness evaluation supports these ideals.

The problem is that Michigan Civil Service Firefighters do not know what fitness programs will ensure fitness activities that will enable them to comply with physical fitness standards, such as annual fitness testing. Failure to meet the physical fitness standard may cause termination of employment if one cannot pass the annual agility type testing. While the intent of the "...fitness program is not punitive, but to reduce the potential of occupational injuries" (NFPA 1500 Handbook, 1993) the process for determining fitness is migrating toward determining work capacity which may effect the individuals ability to continue working as a firefighter.

The purpose of this research is to identify criteria for a physical fitness program for the Michigan Civil Service firefighters that would ensure successful completion of the annual fitness evaluation. This research also makes a recommendation for

implementation of actions to enhance the firefighter physical fitness program at the Battle Creek Air National Guard Base. The recommendation elements will provide a beginning point for the fire department to develop and sustain a viable fitness program and develop data that can be used in future research.

The methodology for this research was descriptive. A descriptive approach was taken by conducting a literature review of physical fitness criteria used by the federal and state governments that employ firefighters on military installations. A brief literature review was conducted that provides insight to the issues of physical fitness within the fire service. This approach was taken to identify existing conditions that may impede establishment and participation of an adequate physical fitness program that enhances firefighter and the public's safety.

This first question in the study was; What, if any, are the national criteria and industry standards for firefighter fitness? The Michigan Civil Service firefighter program was established by the Air National Guard. The programs must meet the requirements of the United States Air Force and Department of Defense. A review of the standards at the highest level of administration was necessary.

The Air National Guard coordinated with each state to establish fire protection at bases throughout the country. The individual states agreed to administer the programs with reimbursement from the federal government. This resulted in firefighters being employed by the State of Michigan as Civil Service Employees who must also meet State of Michigan firefighter qualifications. This produced the second question of this research; What, if any, are the state level criteria and industry standards for firefighter fitness?

Every state that had Air National Guard bases formed fire departments in the same manner as the bases in Michigan. The same federal and state level criteria should have applied. The third question of this research; What, if any, programs are currently in place at other Air National Guard units for state level civil service firefighters, was developed to identify what those units maybe doing to meet the requirements.

Finally, question four was developed to identify possible solutions to the existing problem. The final question; What, if any, is the criteria for State of Michigan Civil Service firefighters? The results of the first three questions would be used to determine the outcome.

Background and Significance

The primary Department of Defense (DoD) Instruction number 6055.6, *DoD Fire and Emergency Services Program* (2000) established fire protection programs within the DoD. This directive stated “DoD components shall establish and maintain an installation F&ES program, as an element of the overall DoD accident prevention program” (p. 2). To comply with this guidance, the Air National Guard (ANG) instituted a program to fund full-time fire protection services at their facilities across the United States.

Under the guidelines provided by the ANG and the DoD, the state must provide firefighters that could meet the requirements of several layers of regulations and standards. The primary guidelines for the program started at the federal level with the Department of Defense Instruction number 6055.6, *DoD Fire and Emergency Services Program* (2000). This document established very broad guidelines to Fire and Emergency Services (F&ES) on to the standards that should be implemented in fire protection.

The National Guard Regulation 5-1/Air National Guard 63-101 (NGR 5-1/ANG 63-101, 2002) further implemented fitness standards on the Civil Service firefighters by imposing the requirements of NFPA Std. 1582, *Standard on Comprehensive Occupational Medical Program for Fire Departments* (2003), NFPA Std. 1500, *Fire Department Safety and Health Program* (2003) and NFPA Std. 1583, *Standard on Health-Related Fitness Programs for Fire Fighters* (2000). Both standards provided references to established fitness programs for firefighters.

The United States Air Force had been working on a physical fitness program for several years. The process for annual evaluations began with testing using an ergonomic recumbent bicycle combined with bench presses to determine fitness levels. A new standard of evaluation was being developed (K. Shaw, personal communication, 5 January 2005). The method of evaluation being worked and close to adoption was an agility test of sorts. The process is a timed event wearing full protective clothing with breathing apparatus. Firefighters have eight minutes to complete the following tasks the tasks in Table 1.

Table 1.

Agility Testing Tasks

Task 1: One Arm Hose Carry. Carry one 50 ft. section of 2.5 or 3 inch hose 100 ft.

Task 2: Ladder Raise. Carry a 12. ft ladder a distance of 50 ft. and raise it against a wall.

Task 3: Charged Hose Drag. Drag a charged 1.5 or 1.75-inch hose 100 ft.

Task 4: First Ladder Climb. Climb a 24 ft. ladder (10 rungs) three times.

Task 5: High Volume Hose Pull. Pull a 50 ft. section of 4.5 or 5-inch hose 100 ft.

Task 6: Forcible Entry: Move a 225.5 lb. tire 12 inches using a 10 lb. sledgehammer or the Kaiser sled set to the appropriate level.

Task 7: Victim Drag. Drag a mannequin weighing 150 lbs. 100 ft.

Task 8: Second Ladder Climb. Climb a 24 ft. ladder (10 rungs) twice.

Task 9: Ladder Lower. Lower a 12 ft. ladder and carry it a distance of 50 ft.

Task 10: Spreader Tool Carry. Carry an 80 lb. spreader tool (Hurst tool) 100 ft.

Note. Table created by author from personal communication with K. Shaw, 5 January 2005.

National Fire Protection Association Std. 1500, *Fire Department Safety and Health Program* (2003) required fire departments to establish physical performance testing of firefighters. It further stated that all members will be evaluated and certified by the fire department as meeting those standards. Members who did not pass the evaluation would not be allowed to engage in firefighting operations without appropriate rehabilitation to the desired level of fitness.

Significance of Study and Linkage

This research project is related to the National Fire Academy's (NFA) Leading Community Risk Reduction program because the course is intended to prepare the fire service leader to evaluate risks to the community outside of existing paradigms. The risk to the community in subject matter is that the method of evaluating physical fitness in the fire service may limit the hiring of potentially good firefighters and shorten the careers of current firefighters. A potential for high turnover rates among older firefighter could threaten the experience level within a given fire department thus affecting the safety of the community.

At the same time that the fire service is being asked to work smarter, the physical fitness programs are being constructed to emphasize physical strength and ability (work capacity) rather than pure fitness. The problem with this approach is that there seemed to be plenty of information about getting physically fit, however, very little on the minimum requirements for preparing for an annual evaluation.

This research project relates to the five operational objectives of the United States Fire Administration's (Executive Development R123, 2003, p. 3). In this document, objectives 1 and 2 focus on reducing the loss of life from fire in the age group 14 years old and below, and reduce the loss of life from fire in the age group 65 years old and above. The fitness of firefighters is certainly an issue that will lead to enhanced fire fighting operations. The work capacity of firefighters can be a factor during operations in the types of structures that children and the elderly typically inhabit.

Objective Three. "Reduce the loss of life from fire of firefighters" (Executive Development R123, 2003, p. 3). The correlation between firefighters over the age of 35 and medical injuries, such as heart attacks, is documented (USFA Firefighter Fatality

Retrospective Study: 1990-2000 (2002). Enhancing firefighter physical fitness and work capacity will reduce the chances of occupational death and injury.

Objective Four. “To promote within communities a comprehensive, multi-hazard risk-reduction plan led by the fire service organization” (Executive Development R123, 2003, p. 3). By maintaining a healthier work force, a risk reduction can be projected to the Department of State Civil Service through the reduction of Workman’s Compensation claims, and possibly loss of firefighter lives on the job. The Fire Crash Rescue Program in the State of Michigan is only 13 years old and has yet to experience the death of a firefighter. However, there have been conditions identified that could have resulted in catastrophic events on the fire ground at given times.

Objective Five. “To respond appropriately in a timely manner to emerging issues” (Executive Development R123, 2003, p. 4). The issue of firefighter fitness is rapidly expanding. Fire organizations will be implementing fitness programs due to the requirements of NFPA standards 1500, 1582 and 1583. The implementation and assessments will identify some firefighters that will never meet the work capacity standards, however, they may be physically fit.

I will carry out this research project focusing on descriptive research method. Data will be collected to answer the research questions: (a) What, if any, are the national criteria and industry standards for firefighter fitness? (b) What, if any, are the state level criteria and industry standards for fire fighter fitness? (c) What, if any, programs are currently in place at other Air National Guard Units for state level civil service firefighters?; and (d) What, if any, is the criteria for State of Michigan Civil Service Firefighters?

Literature Review

The purpose of this review is to gather and review information relating to the primary research questions. Literature that is specific to the federal and state requirements for fitness was located by going to each entity's primary web sites and reviewing material available to employees in each respective governmental agency. The Department of Defense, United States Air Force, Air National Guard and personal interviews provided literature relevant to the fitness issues for the Fire Crash Rescue Officer field within the State of Michigan. A review of National Fire Protection Association standards that are referenced in military documentation was conducted. Using the Internet, a search of firefighter health and fitness was conducted to provide material that supported question four of this research. By analyzing the existing body of knowledge from these firefighting organizations, fitness experts, federal, state and other Air National Guard Bases produced material that was relevant to each research question that was further used to develop the discussions and recommendations of this author.

The literature search and review that supports the four research questions also provided the basic layout of this section. The research questions to be answered by this literature review utilized a top down approach and were (a) What, if any, are the National criteria and industry standards for firefighter fitness?; (b) What, if any, are the State level criteria and industry standards for firefighter fitness?; (c) What, if any, programs are currently in place at other Air National Guard Units for State level Civil Service Firefighters?; and (d) What, if any, is the criteria for State of Michigan Civil Service Firefighters?

This section will conclude with a summary of the literature that was reviewed during the research of firefighter fitness issues for Crash Rescue Fire Officers in Michigan and other states.

National Criteria and Industry Standards for firefighter fitness

The literature review for national criteria and industry standards constitutes a limited amount of documentation. This was due to the Michigan civil service employees being under the direction of the Department of Defense. Question one in this research: What, if any, are the national criteria and industry standard for firefighter fitness is addressed with a review of military regulations and instructions.

Military and Civil Service Fire and Emergency Services Program

The Fire and Emergency Services program (F&ES) was established to provide fire protection to military installations across the country. Therefore, a review of the literature that details the creation of the Fire Crash Rescue program started with the Department of Defense Fire Emergency Services program. Department of Defense Instruction 6055.6, *DoD Fire and Emergency Services Program* (2000), despite being an updated edition from the one that was in place at the inception of the Michigan Civil Service Fire Crash Rescue Officers, directs the activities of fire protection. The DoD required all DoD components to establish and maintain an installation F&ES program on each installation (p. 2). Each head of the DoD components was given the responsibility to “Establish and maintain programs that conform to the requirements and procedures specified in the instruction....Provide management support, resources, and professionally qualified F&ES staff to ensure effective implementation of such programs at all organizational levels” (p. 3). The Secretary of the Air Force was tasked with

implementing and maintaining a DoD Firefighter wellness program for all DoD components that is “consistent with the NFPA 1500, *Standard on Fire Department Occupational and Health Program*” (p. 4). No edition of the standard was cited. The DoD adopted many codes and standards by reference without citing specific editions.

DoD F&ES shall comply with the standards outlined in relevant standards promulgated by the Department of Labor-Occupational Safety and Health Administration (OSHA), the National Fire Protection Association (National Fire Codes), MIL-HDBK 1008 Series, the Commission on Fire Accreditation International (Self Assessment Manual), (references (c), (f) and (i)), and other fire safety criteria published by the Department of Defense. (p. 9)

Physical and medical requirement guidance was addressed in the DoD 6055.6, *DoD Fire and Emergency Services Program* (2000). DoD components are directed to include medical and physical programs that are consistent with NFPA 1500, *Standard on Fire Department Occupational and Health Program* and NFPA 1582, *Standard on Medical Requirements for Fire Fighter* (p. 16). Once again, there was no reference to the edition of the standard that must be followed. Specific physical fitness requirements were not addressed in this document.

The primary directive for Air Force Fire Protection was Air Force Instruction 32-2001, *The Fire Protection Operations and Fire Prevention Program*. This Instruction implemented the DoD requirement with further guidance from the Department of the Air Force. This document provided limited guidance into the physical fitness program,

however, it does reference the USAF Surgeon General guidelines which could not be located. The guidelines were being developed at that time.

3.2.2. Firefighter Fitness/Wellness Program. All military AFSC 3E7XX, civilian GS-081, local national, and contracting firefighters whose position descriptions require participation in fire fighting operations (to include fire chiefs, assistant chiefs, and fire inspectors) will participate in the HQ USAF Surgeon General approved DoD fitness/wellness program. This program is designed to insure that firefighters sustain a minimum degree of physical fitness and well being. Firefighter physical fitness will also be observed during emergency responses and training session...(p. 7)

The National Guard Bureau developed NGR 5-1/ANG Instruction 63-101 (2002) to provide states with the guidelines that the fire protection program must meet. Chapter 36 of this document provided guidance for the administration of Air National Guard Fire Protection Activities.

Health and fitness issues were addressed as authorized charges in which medical charges included personnel participating in the Occupational Safety and Health program and in particular, NFPA 1500, *Fire Department Safety and Health Program*. No edition of the standard is cited. In reviewing the referenced material at the end of the document, multiple references were listed including DoD 6055.6, *DoD Fire and Emergency Service Program*, (latest edition), NFPA Std. 1500, *Fire Department Safety and Health Program*

(latest edition), and NFPA 1582, *Standard on Medical Requirements for Fire Fighters* (latest edition) and others (p. 36-8).

National Guard Regulation 5-1/ANG 63-101 established the requirement on each state to meet National Fire Protection Association Standards (NFPA) as directed by the Department of Defense, United States Air Force and Air National Guard. The military had already adopted the NFPA standards to a very high degree and expects the most current standard to be implemented. For the purposes of this research, National Fire Protection Standard 1500, *Fire Department Safety and Health Program* (2003) and NFPA 1582, *Standard on Comprehensive Occupational Medical Program for Fire Departments* (2003) [sic] are the most significant. The name of for the NFPA Std. 1582 had changed with the newest edition. National Guard Regulation 5-1/ANG 63-101 provides specific language to the medical issues by requiring firefighters to meet the requirement of NFPA 1582, *Standard on Medical Requirements for Fire Fighters*, however the name of this document has changed since the writing of the military regulation and is now referred to as NFPA 1582, *Standard on Comprehensive Occupational Medical Program for Fire Departments* (2003).

National Fire Protection Association Standards

The National Fire Protection Association (NFPA) published several documents that the Department of Defense, United States Air Force and Air National Guard directives require to be followed.

National Fire Protection Association Standard 1500, *Standard on Fire Department Occupational Safety and Health Program* (2003) begins to implement medical and physical fitness requirements for the fire services. Chapter 10 of this

document addresses medical and physical issues for firefighters and fire departments.

Para. 10-1 in this chapter requires personnel who engage in fire suppression to meet the medical requirements of NFPA 1582, *Standard on Medical Requirements for Fire Fighters and Information for Fire Department Physicians* (latest edition)[sic] and NFPA 1583, *Standard on Health Related Fitness Programs for Fire Fighters* (2000).

A review National Fire Protection Association Standard 1582 was attempted, however, the document name had change with the 2003 edition. The document was re-titled to, NFPA Std. 1582, *Standard on Comprehensive Occupational Medical Program for Fire Departments* (2003) and it provided data on frequency of medical physical assessments and physical fitness and fitness testing requirements for firefighters. Medical fitness and physical fitness testing are required to be evaluated by a fire department physician. The annual fitness evaluation required testing aerobic capacity, muscular strength, muscular endurance and flexibility. Description of testing protocols was found, however, no guidance on how to prepare for the evaluation was given.

A review of National Fire Protection Association Standard 1583, *Health-Related Fitness Programs for Fire Fighters* (2000), was conducted. This document identified program components as being:

- (1) The assignment of a qualified health and fitness coordinator
- (2) A periodic fitness assessment for all members
- (3) An exercise training program that is available to all members
- (4) Education and counseling regarding health promotion for all members
- (5) A process for collecting and maintaining HRF data (p. 5)

Additionally, the health and fitness coordinator duties are outlined to be the administrator of the health and fitness program (p. 6) and an extensive exercise and fitness training program.

5.1 Program Components. The fire department's exercise and fitness training program, administered by the department HFC, shall consist of the following components:

- (1) An educational program that describes the components and benefits of exercise, fitness, fitness training, and weight management
- (2) An individualized exercise prescription based on the results of the fitness assessment
- (3) Warm-up and cool-down exercise guidelines
- (4) Aerobic exercise program
- (5) Muscular (strength, endurance) exercise program
- (6) Flexibility exercise program
- (7) Healthy back exercise program
- (8) Safety and injury prevention program (p. 6)

The Appendixes to the document offered additional non-regulatory guidance on the fitness issue, including a Sample Fitness Plan (p. 14). Appendix B addressed the issues of fitness plans and individualized exercise prescriptions based on the fitness assessment are recommended and include:

- (1) Mode: type of exercise
- (2) Intensity: difficulty of exercise
- (3) Duration: length of exercise session
- (4) Frequency: number of sessions per day or week
- (5) Progression: gradual increases in workload to promote a training adaptation

The individualized exercise prescription should take into consideration the following concepts...(p. 14)

The individualized prescription was further detailed in Paragraph five where issues of exercise selection was, intensity, duration, rest intervals and training frequencies are described. The text on exercise selection referenced the muscular fitness exercise as:

....A minimum of one exercise should be included for each of the following movements:

- (1) Upper-body push
- (2) Upper-body pull
- (3) Lower-body thrust and extension using the hip and knee joint
- (4) Knee flexion (hamstrings)
- (5) Anterior trunk (abdominal)
- (6) Posterior trunk (lower back) (p. 17)

The Federal Emergency Management Agency published the *Health and Wellness Guide for volunteer Fire Services* (2004). This document was not regulatory in nature but provides guidance for firefighter fitness. A review of this document was conducted. This document reinforced the guidance provided by the other documents discussed.

State Criteria and Industry Standards for Firefighter Fitness

The literature review for state criteria and industry standards constituted a limited amount of documentation. This was due to the Michigan civil service employees being under the direction of the Department of Defense and not subject to the requirements in the State of Michigan. Question two in this research: What, if any, are the state criteria and industry standard for firefighter fitness is addressed with a review of state law and guidelines.

Michigan Occupational, Safety and Health Administration (MIOSHA) has published rules and regulations covering General Industry Safety in the State of Michigan. The document contains many sub-parts. *Part 74, Fire Fighting* was reviewed. This document did not address firefighter fitness or health issues beyond personal protection equipment.

Programs at other Air National Guard Units

The literature review for question three in this research: What, if any, programs are currently in place at other Air National Guard units for State Level Civil Service Firefighters was completed using an author developed questionnaire. The result of this questionnaire will be discussed in the appropriate section. Table 2 contains the questions that were used this questionnaire.

Table 2

Questionnaire Distributed to Air National Guard Units

How many firefighters are in your organization?

Does your organization have a wellness and fitness program IAW NFPA 1500?

Does your organization have an Operating Instruction (OI) or Standard Operating Procedure (SOP) to support the program?

Does your organizations physical fitness OI or SOG outline specific training routines and exercises, or is it generic such as requiring cardiovascular, strength and flexibility training?

Is your organizations fitness program enforced (mandatory PT time during on duty hours)?

Is your organization currently conducting annual physical fitness testing?

If your unit has an OI or SOG, that supports a physical fitness program; will you supply it as part of this research?

Note. Table created from author's questionnaire sent to Air National Guard Fire Departments.

Criteria for State of Michigan Civil Service Firefighters

A literature review was not conducted for question four in this research: What, if any, is the criteria for State of Michigan Civil Service Firefighters. The results of the other research questions will be used to determine and recommend an action for this question.

Summary of Literature Review

In summary, a review of the available literature that relates to question 1 is very straight forward as it identified Air Force, Air National Guard, National Fire Protection Association and the Federal Emergency Management Agency as sources of material.

Each organization recommended or required a physical fitness program to be established within each fire department.

The literature review for question two was very limited. The only document that could be found was *Part 74, Firefighting* (2001) and it didn't contain any relevant material to a firefighter physical fitness.

The literature review for question three was completed using a questionnaire that was distributed to other Air National Guard bases.

A literature review was not conducted for question four.

Procedures

The purpose of this research project was to identify a physical fitness exercise routine that would ensure the firefighters in State Civil Service program of Michigan could successfully complete the requirement of the annual fitness test.

This author utilized a descriptive methodology to complete the research for this paper. A descriptive methodology was taken in this research as literature was reviewed to develop an understanding of the physical fitness requirements for firefighters. A review of Department of Defense Instructions, Air Force Instructions, and State of Michigan rules pertaining to fire protection was conducted. Finally, a review of programs utilized in other Air National Guard units was conducted. The result of this review was used to determine what the requirements should be for the civil service Crash Fire Rescue Officers in the State of Michigan.

This research began with an informal interview of the key figures in the administration of the Michigan Civil Service Fire Crash Rescue Program. A direct interview with Chief Master Sergeant (CMSgt.) Kenneth L. Shaw, who is the fire chief at

the Battle Creek Air National Guard base, located at 3367 West Dickman Road in Battle Creek, Michigan was conducted. A telephone contact was made at (269)-969-3327 to set up the interview. This purpose of this interview was to determine the perceived requirements of the fitness program.

The next step in the process was to review literature relevant to question one. What, if any, are the National criteria and industry standard for fire fighter fitness?

A trip to the Battle Creek Air National Guard Base Fire Department was made. Additional information was obtained by retrieving reference documents and books such as *The Fire Chiefs Handbook (2003)*, *NFPA 1500 Handbook (1993)*, *Managing Fire Services (1988)* and the *National Fire Protection Association* standards. A review of firefighter medical and fitness standards that impact the State of Michigan Fire Crash Rescue Offices was accomplished.

In addition to the literature found on site at the Air National Guard Base, information was provided that led to the review of Department of Defense directives and instructions. Literature regarding these directives and instructions was obtained by reviewing documents at the Washington Headquarters Service web site. The Executive Services & Communication Directorate, Directives and Records Division provided access to relevant material. The web site is located at <http://www.dtic.mil/whs/directives/>.

The next step was to review literature relevant to question two. What, if any are the State level criteria and industry standards for firefighter fitness? The research began with the Department of Labor & Economic Growth Director's Office web site at <http://www.michigan.gov/cis>. This office is responsible for publishing Michigan Occupational Safety and Health Administrations Standards and administers the Michigan

Fire Fighters Training Council. General Industry Safety Standard Part 74, Fire Fighting, is the primary regulatory guidance for fire protection in the State of Michigan. No other documents could be found on the web site that pertained to firefighter fitness.

When it was discovered that Part 74 did not address firefight health and fitness issues, the author contacted the International Association of Fire Fighters (IAFF) local 355 president at the City of Battle Creek. Mr. Chuck Asher stated the there was no guidance for firefighter fitness in any state regulation and the State of Michigan was not an NFPA state so the guidance did not apply (C. Asher, personal communication, February 1, 2005).

The next step was to review literature that was relevant to question three. What, if any, are the programs currently in place at other Air National Guard units for State level Civil Service Firefighters? The author developed a questionnaire that was provided to Mr. Greg Winjum at the Air National Guard Bureau. Mr. Winjum distributed the questionnaire via Email to all Air National Guard Fire Chief and asked them to provide the information requested.

Finally, a pursuit of literature to answer question four was conducted. What, if any, is the criteria for State of Michigan Civil Service Firefighters? The results of questions 1-3 were used to develop an answer for research question 4. When a clear answer could not be found, the author utilized the worldwide web and Google.com to attempt to locate private information on firefighter fitness. There was an abundance of web sites that addressed these issues, however, none provided the specific criteria that the author was attempting to identify.

Through the literature review of these documents, the author formed a discussion of the material, and a recommendation that could ensure firefighters have the opportunity to retire with adequate benefits. Additionally, those retirements may come to firefighters based on age rather than years of service, thereby enhancing public safety.

Assumptions and Limitations

A significant limitation to this research was the lack of historical data on firefighter fitness within the State of Michigan Fire Crash Rescue program. The Crash Fire Rescue program is administered by the State of Michigan, with guidance from the Department of Defense, United States Air Force and Air National Guard. There is very limited latitude to deviate from the set instructions and regulations.

Another limitation is the total lack of guidance from the State of Michigan for firefighter fitness. Neither the State of Michigan nor the Department of Military Affairs provides guidance to fire departments for annual fitness testing and preparation criteria.

An assumption of this research was that any fitness testing program would identify the minimum activities or physical attributes that must be achieved to pass the annual test. This proved not to be the case. The annual fitness testing was developed without a reference of how to prepare for it. The author's intent to identify such data might identify minimum capabilities such as firefighters who cannot lift a certain weight or run a certain distance will not be able to successfully complete the annual fitness test. The minimum criteria could not be identified.

Results

Research Question One: What, if any, are the National criteria and industry standards for firefighter fitness.

The Department of Defense Instruction 6055.6, *DoD Fire and Emergency Services Program* (2000), directed the activities of fire protection. The DoD required all DoD components to establish and maintain an installation F&ES program on each installation (p. 2). Each head of the DoD components was given the responsibility to “Establish and maintain programs that conform to the requirements and procedures specified in the instruction.... Provide management support, resources, and professionally qualified F&ES staff to ensure effective implementation of such programs at all organizational levels” (p. 3). The Secretary of the Air Force was tasked with implementing and maintaining a DoD Firefighter wellness program for all DoD components that was “...consistent the NFPA 1500, *Standard on Fire Department Occupational and Health Program*” (p. 4). No edition of the standard was cited. The DoD adopted many codes and standards by reference without citing specific editions.

DoD F&ES shall comply with the standards outlined in relevant standards promulgated by the Department of Labor-Occupational Safety and Health Administration (OSHA), the National Fire Protection Association (National Fire Codes), MIL-HDBK 1008 Series, the Commission on Fire Accreditation International (Self Assessment Manual), (references (c), (f) and (i)), and other fire safety criteria published by the Department of Defense. (p. 9)

Physical and medical requirement guidance was addressed in the DoD 6055.6, *DoD Fire and Emergency Services Program* (2000). DoD components were directed to include medical and physical programs that were consistent with NFPA 1500, *Standard*

on *Fire Department Occupational and Health Program* and NFPA 1582, *Standard on Medical Requirements for Fire Fighter* (p. 16). Once again, there was no reference to the edition of the standard that must be followed. Specific physical fitness requirements were not addressed in this document.

The primary directive for Air Force Fire Protection was Air Force Instruction 32-2001, *The Fire Protection Operations and Fire Prevention Program*. This Instruction implemented the DoD requirement with further guidance from the Department of the Air Force. This document provided limited guidance into the physical fitness program.

3.2.2. Firefighter Fitness/Wellness Program. All military AFSC 3E7XX, civilian GS-081, local national, and contracting firefighters whose position descriptions require participation in fire fighting operations (to include fire chiefs, assistant chiefs, and fire inspectors) will participate in the HQ USAF Surgeon General approved DoD fitness/wellness program. This program is designed to insure that firefighters sustain a minimum degree of physical fitness and well being. Firefighter physical fitness will also be observed during emergency responses and training session...(p. 7)

The National Guard Bureau, developed NGR 5-1/ANG Instruction 63-101 (2002) to provide states with the guidelines that the fire protection program must meet. Chapter 36 of this document provided guidance for the administration of Air National Guard Fire Protection Activities. Health and fitness issues are addressed as authorized charges in which medical charges include personnel participating in the Occupational Safety and

Health program and in particular, NFPA 1500, *Fire Department Safety and Health Program*. There was no edition of the standard cited. The material at the end of the document contained multiple references including DoD 6055.6, *DoD Fire and Emergency Service Program*, (latest edition), NFPA Std. 1500, *Fire Department Safety and Health Program* (latest edition), and NFPA 1582, *Standard on Medical Requirements for Fire Fighters* (latest edition) and others (p. 36-8).

National Guard Regulation 5-1/ANG 63-101 established the requirement for each state to meet National Fire Protection Association Standards (NFPA) as directed by the Department of Defense, United States Air Force and Air National Guard. The military had already adopted the NFPA standards to a high degree and expects the most current standard to be implemented. For the purpose of this research, National Fire Protection Standard 1500, *Fire Department Safety and Health Program* (2003) and NFPA 1582, *Standard on Comprehensive Occupational Medical Program for Fire Departments* (2003) [sic] were the most significant. The name of NFPA Std. 1582 changed with the newest edition. National Guard Regulation 5-1/ANG 63-101 provided specific language to the medical issues by requiring firefighters to meet the requirement of NFPA 1582, *Standard on Medical Requirements for Fire Fighters*, however the name of this document had changed since the writing of the military regulation and was now referred to as NFPA 1582, *Standard on Comprehensive Occupational Medical Program for Fire Departments* (2003).

National Fire Protection Association Standard 1500, *Standard on Fire Department Occupational Safety and Health Program* (2003) began to implement medical and physical fitness requirements for the fire services. Chapter 10 of this

document addressed medical and physical issues for firefighters and fire departments.

Para. 10-1 in this chapter required personnel who engage in fire suppression to meet the medical requirements of NFPA 1582, *Standard on Medical Requirements for Fire Fighters and Information for Fire Department Physicians* (latest edition)[sic] and NFPA 1583, *Standard on Health Related Fitness Programs for Fire Fighters* (2000).

A review National Fire Protection Association Standard 1582 was attempted, however, the document name had change with the 2003 edition. The document is now titled, NFPA Std. 1582, *Standard on Comprehensive Occupational Medical Program for Fire Departments* (2003) and it provided data on frequency of medical physical assessments and physical fitness and fitness testing requirements for firefighters. Medical fitness and physical fitness testing are required to be evaluated by a fire department physician. The Annual fitness evaluation required testing aerobic capacity, muscular strength, muscular endurance and flexibility. Description of testing protocols was found, however, it provided no guidance on how to prepare for the evaluation.

A review of National Fire Protection Association Standard 1583, *Health-Related Fitness Programs for Fire Fighters* (2000), was conducted. This document identified program components as being:

- (1) The assignment of a qualified health and fitness coordinator
- (2) A periodic fitness assessment for all members
- (3) An exercise training program that is available to all members
- (4) Education and counseling regarding health promotion for all members
- (5) A process for collecting and maintaining HRFP data (p. 5)

Additionally, a Health and Fitness Coordinator (HFC) duties are prescribed as the administrator of the health and fitness program (p. 6) and an extensive exercise and fitness training program.

5.1 Program Components. The fire department's exercise and fitness training program, administered by the department HFC, shall consist of the following components:

- (1) An educational program that describes the components and benefits of exercise, fitness, fitness training, and weight management
- (2) An individualized exercise prescription based on the results of the fitness assessment
- (3) Warm-up and cool-down exercise guidelines
- (4) Aerobic exercise program
- (5) Muscular (strength, endurance) exercise program
- (6) Flexibility exercise program
- (7) Healthy back exercise program
- (8) Safety and injury prevention program (p. 6)

The Appendix's to the document offered additional non-regulatory guidance on the fitness issue, including a Sample Fitness Plan (p. 14). Appendix B addressed the issues of fitness plans and individualized exercise prescriptions based on the fitness assessment. The following elements are recommended to be included in the fitness plan:

- (1) Mode: type of exercise
- (2) Intensity: difficulty of exercise
- (3) Duration: length of exercise session
- (4) Frequency: number of sessions per day or week
- (5) Progression: gradual increases in workload to promote a training adaptation

The individualized exercise prescription should take into consideration the following concepts:...(p. 14)

The individualized prescription was further detailed in Paragraph five where issues of exercise selection was intensity, duration, rest intervals and training frequencies are described. The text on exercise selection referenced the muscular fitness exercise as:

....A minimum of one exercise should be included for each of the following movements:

- (1) Upper-body push
- (2) Upper-body pull
- (3) Lower-body thrust and extension using the hip and knee joint
- (4) Knee flexion (hamstrings)
- (5) Anterior trunk (abdominal)
- (6) Posterior trunk (lower back) (p. 17)

The Federal Emergency Management Agency published the *Health and Wellness Guide for volunteer Fire Services* (2004). This document is not regulatory in nature but provides guidance for firefighter fitness. This document reinforce the guidance provided by the other documents discussed

Research Question Two: What, if any, are the State Criteria and Industry Standards for firefighter fitness?

Michigan Occupational, Safety and Health Administration (MIOSHA) had published rules and regulations covering General Industry Safety in the State of Michigan. The document contained many sub-parts. *Part 74, Fire Fighting* was reviewed. This document did not address firefighter fitness or health issues beyond personal protection equipment.

Research Question Three: What, if any, programs are currently in place at other Air National Guard Units for state level civil service firefighters?

The questionnaire was distributed to 81 Air National Guard Fire departments. Thirty-three departments responded to the survey. The Table 3 shows the results of the survey. The answers to the first question are not shown due to irrelevancy in this research. For question four, a yes answer signified a generic program and a no answer signified a specific program. Some of the respondents that indicated they had guidance were unwilling to submit it as it was under review, thus the not applicable responses for question seven.

Table 3

Physical Fitness Program at Air National Guard Units

Questions	Yes	No	NA
1. How many firefighters in your organization?			
2. Does your organization have wellness and fitness program IAW NFPA 1500?	19	14	0
3. Does your organization have an Operating Instruction (OI) or Standard Operating Guide (SOG) to support the program?	17	16	0
4. Does your organizations physical fitness OI or SOG outline specific training routines and exercises, or is it generic such as requiring cardiovascular, strength and flexibility training?	14	6	13
5. Is your organization's fitness program enforced (mandatory PT time during on duty hours)?	14	19	0
6. Is your organization currently conducting annual physical fitness testing?	18	15	0
7. If your unit has an OI or SOG that supports a physical fitness program, will you supply it as part of this research?	9	0	24

Note. Table created from results of author's questionnaire distributed to Air National Guard Fire Departments. The result of question one are omitted due to lack of relevance. A yes answer for question four indicates a specific training routine and a no answer indicates a generic exercise program, NA means that no program was in existence.

The operating instructions or standard operating guides that were submitted, ranged from proper care and cleaning of physical fitness facilities to prescribed workout routines. The median guidance was primarily giving member generic information on health and fitness issues of exercise, nutrition and life styles.

*Research Question Four: What, if any, is the criteria for State of Michigan
Civil Service Firefighters?*

The purpose of this research was to determine if specific physical fitness routines were available that, if used, would ensure a firefighters successful completion on an annual physical fitness test. Base on the results of research questions 1-3, there was no such routine identified. The laws, regulations and rules that could be found provided guidance to develop the components of a fitness program with some individual exercises being reference. However, a specific combination of exercises and duration that would ensure successful completion of an annual evaluation was not provided.

Discussion

The result of this research revealed limited data was available to provide an answer to research question four. This author's perception of the annual physical fitness testing as with any test, individuals are provided the means and materials to pass the evaluation. This is not the case with the firefighter physical fitness program. It would be reasonable to say that if minimum preparation criteria cannot be met, then the individual would have little hope of passing the evaluation. For instance, there isn't data to show that if a firefighter who could not lift 100 pound has passed or failed the fitness evaluation. This would provide a target for the individual to achieve and to have any hope of being successful. Without minimum guidelines, firefighters are left to prepare without any reference point.

The Department of Defense (DoD 6055.6, 2000), United States Air Force (AFI 32-2001, 1999), Air National Guard (NGR 5-1/ANGI 63-101, 2002) and National Fire Protection Association (NFPA 1583, 2000) have established minimal firefighter fitness

testing criteria, however, none of the organizations have provided specific preparation criteria. The general fitness program provides an array of possible exercises, nutrition and lifestyle elements, however, a combination of elements that would provide success, if followed, was not provided. Each of these organizations put the burden of establishing programs on the local departments. The data suggests that these organizations are unwilling or do not have adequate background information to identify the minimal criteria.

The National Fire Protection Association requires the appointment of a Health and Fitness Coordinator (NFPA 1583, 2000) and a fire department physician (NFPA 1582, 2003) that can work with individual firefighters to establish a health and wellness program specific to their needs. The data suggests that this program will increase firefighter fitness, but will it ensure a reasonable ability to pass the annual fitness evaluation? This author believes there are many people in the world who are in excellent health that may not be able to pass the evaluation due to strength issues.

The State of Michigan Department of Civil Service, Fire Fighter Training Council and Department of Labor and Economic Growth do not address firefighter physical fitness in any form. Neither the State of Michigan Civil Service firefighters nor municipal civilian fire departments are bound by rules or regulations regarding physical fitness.

The data suggests that the State Level Civil Service Firefighter program in each state is struggling with the fitness issue as well. The analysis of the data was difficult. Only nine actual operating instructions were obtained from the 81 Air National Guard Fire Departments. None of the material produced tangible exercise routines or information that a firefighter could use to establish a minimum target exercise routine.

Several of the documents mirror the requirements of NFPA 1583, (2000) and provided guidance to participate in strength, flexibility and aerobic exercises.

The only document that approached establishing minimal routines was NFPA 1583, (2000). The results of this are again include here because it is the only document that provided something close to a work-out routine. This document identified program components as being:

- (1) The assignment of a qualified health and fitness coordinator
- (2) A periodic fitness assessment for all members
- (3) An exercise training program that is available to all members
- (4) Education and counseling regarding health promotion for all members
- (5) A process for collecting and maintaining HRF data (p. 5)

Additionally, a health and fitness coordinator duties are prescribed as the administrator of the health and fitness program (p. 6) and an extensive exercise and fitness training program.

5.1 Program Components. The fire department's exercise and fitness training program, administered by the department HFC, shall consist of the following components:

- (1) An educational program that describes the components and benefits of exercise, fitness, fitness training, and weight management

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- (8) Safety and injury prevention program (p. 6)

The Appendix's to the document offered additional non-regulatory guidance on the fitness issue, including a Sample Fitness Plan (p. 14). Appendix B addressed the issues of fitness plans and individualized exercise prescriptions based on the fitness assessment. The following elements are recommended and should be included in the fitness plan:

- (1) Mode: type of exercise
- (2) Intensity: difficulty of exercise
- (3) Duration: length of exercise session
- (4) Frequency: number of sessions per day or week
- (5) Progression: gradual increases in workload to promote a training adaptation

The individualized exercise prescription should take into account...(p. 14)

The individualized prescription was further detailed in Paragraph five where issues of exercise selection was, intensity, duration, rest intervals and training frequencies are described. The text on exercise selection referenced the muscular fitness exercise as:

...A minimum of one exercise should be included for each of the following movements:

- (1) Upper-body push
- (2) Upper-body pull
- (3) Lower-body thrust and extension using the hip and knee joint
- (4) Knee flexion (hamstrings)
- (5) Anterior trunk (abdominal)
- (6) Posterior trunk (lower back) (p. 17)

The missing element in this document again was the lack of a target for an individual to strive for that would ensure enough flexibility, strength and aerobic capacity was achieved in order for the member to have a reasonable chance of success at passing the annual evaluation. What would be the result if a firefighter participated in all of these exercises, but at a level far below that which would need to be achieved for success? Could one be physically fit, yet not pass the annual fitness evaluation?

Recommendations

The problem, as previously stated, is that the Michigan Civil Service firefighters did not know what fitness programs would ensure fitness activities that enabled them to comply with physical fitness standards. Failure to meet physical fitness standards may

cause termination of employment. While no single document, regulation, law or standard provides all the necessary data to identify this as a problem, the assembly and evaluation of the many pieces of literature found in this study seem to reveal that the problem is real and has an impact on the Department of Defense, State of Michigan and Fire Crash Rescue Officers.

The available data did not produce the sought after physical fitness routine that would ensure that firefighters could pass the annual evaluation. It appears that the regulating agencies recognize the need for minimum fitness standard and at the same time recognize that program should be tailored to each individual. However, no data is available on the specific minimum training standard that should be maintained to ensure success in the evaluation. Given the results of this research, the Michigan Civil Service program must develop its own standards for fitness training without the benefit of specific target criteria. The absence of applicable state and local regulations and the wide range of operating instructions from other Air National Guard units reduced the available resources to develop a program to National Fire Protection Standards.

The following National Fire Protection Standards that should be used to develop a comprehensive wellness/fitness program and further develop specific exercise routines are: (a) NFPA 1500: Standard on Fire Department Occupational Safety and Health (NFPA, 2003); (b) NFPA 1582: Standard on Comprehensive Occupational Medical Program for Fire Departments (NFPA, 2003); and (c) NFPA 1583: Standard on Health-Related Fitness Programs for Fire Fighters (NFPA, 2000).

A team of individuals should be organized to develop and implement a fire department health and wellness program. This team should start with an appointment of a

health and fitness coordinator as described in NFPA 1583. This individual should be trained and certified in physical fitness programs. The health and fitness coordinator should be the lead individual in establishing the development and implementation team.

The Battle Creek Air National Guard fire department should author, implement and enforce a departmental operating instruction that promotes the health and wellness program. The operating instruction should be all inclusive of the program components as described in NFPA 1583 which included:

- (1) An educational program that describes the components and benefits of exercise, fitness, fitness training, and weight management
- (2) An individualized exercise prescription based on the results of the fitness assessment
- (3) Warm-up and cool-down exercise guidelines
- (4) Aerobic exercise program
- (5) Muscular (strength, endurance) exercise program
- (6) Flexibility exercise program
- (7) Healthy back exercise program
- (8) Safety and injury prevention program

Upon development of the program, a formal training program must be established to ensure firefighters understand the requirements of the program and missing elements such as the lack of data to show exactly what an individual must do to ensure successful completion of the annual fitness evaluation. The training program must stress that being

physically fit does not guarantee successful completion of the evaluation and that individuals must strive for increased strength, flexibility and cardio vascular health in a phases of training.

Finally, the Battle Creek Air National Guard can take a lead roll in developing data that could possibly show the target performance criteria that is currently not available. The health and fitness coordinator can develop a charting system that tracks individual's strength and cardiovascular levels and the correlation between those maximum abilities and successful completion of the annual fitness test. This data would be used to establish minimum levels that must be achieved beyond simple fitness to ensure firefighters can successfully pass the evaluation.

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