CITY OF DELAWARE
CIVIL SERVICE COMMISSION
MEETING TO BE HELD VIRTUALLY VIA CISCO Webex **
3:00 P.M.

AGENDA

June 2, 2021

1. ROLL CALL

2. APPROVAL of the Motion Summary for the meeting held May 5, 2021 as recorded and transcribed.

3. PUBLIC COMMENTS

PUBLIC COMMENT OPTIONS:

- JOIN VIRTUAL MEETING: To provide live public comment please email emccloskey@delawareohio.net or call 740-203-1013 to sign up by 3 p.m. the date of the meeting. **Name and address are required for public comment**. Comments are limited to 3 minutes.

- EMAIL, LETTER, PETITION: written public comment, maximum of 500 words, is to be received by 3 p.m. the date of the meeting to be presented to the Commission for submission and read into the record. **Name and address are required.**

- FACEBOOK: Comments received on Facebook will not be presented during the meeting and will be addressed by staff subsequent to the meeting as appropriate.

4. UPDATE to Firefighter Certified List
   A. Review of Memo relating to information requested at the May 5, 2021 Civil Service Commission Meeting.

5. UPDATE to Fire Lieutenant Promotional List

6. STAFF COMMENTS

7. COMMITTEE COMMENTS

8. ADJOURNMENT

This meeting will be a virtual meeting. Residents are encouraged to view online through the City of Delaware Facebook page. To comply with the CDC recommendation prohibiting group meetings, no in person attendance by Council, staff, or the public will be available.

CIVIL SERVICE COMMISSION
Motion Summary
May 5, 2021

ITEM 1. ROLL CALL

Chairman Rybka called the virtual meeting to order at 3:04 p.m.

Members Virtually Present: Kent Shafer, City Council Liaison, Mary Jane Santos, Vice-Chairman Eric Coss and Chairman John Rybka

Staff Virtually Present: Lorrie Diaz, Human Resource Coordinator, Jessica Feller, Human Resource Manager, Bruce Pijanowski, Police Chief, John Donahue, Fire Chief and Natalia Harris, City Attorney

ITEM 2. APPROVAL of the Motion Summary for the Civil Service Commission meeting held January 13, 2021, as recorded and transcribed.

Motion: Ms. Santos motioned to approve the motion summary for the January 13, 2021 Civil Service Commission meeting, seconded by Vice-Chairman Coss. This motion was approved by a 3-0 vote.

ITEM 3. PUBLIC COMMENT

PUBLIC COMMENT:
Joseph Murphy
IAFF Local 6060 President

Nick Highly
Firefighter
Station 301
Delaware, Ohio

ITEM 4. UPDATE to Firefighter Certified List

Chairman Rybka requested to defer action regarding this list for the next meeting and requested demographics on police, firefighters and how many reside in the City limits.

Vice-Chairman Coss requested information regarding scores of how many passed and failed and at what standards.

Motion: Ms. Santos motioned to table discussion on the Firefighter Certified List until the June meeting, seconded by Vice-Chairman Coss. Motion approved by a 3-0 vote.

ITEM 5. UPDATE to Police Officer Recruitment Process

Motion: Vice-Chairman Coss motioned to approve the Police Officer Recruitment Process as presented, seconded by Ms. Santos. Motion approved by a 3-0 vote.

ITEM 6. STAFF COMMENTS

ITEM 7. COMMITTEE COMMENTS

Chairman Rybka discussed the Comprehensive Plan that is currently before Council for consideration of adoption and that it has a section to identify a diversity plan.

Ms. Santos discussed the use of social workers to work with the Police Department. Chief Pijanowski discussed the hiring a full-time social worker as a service coordinator.

ITEM 8. ADJOURNMENT

Motion: Chairman Rybka moved to adjourn the Civil Service Commission meeting, seconded by Ms. Santos. The Civil Service Commission meeting was adjourned at 4:22 p.m.

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John M. Rybka, Chairman

_____

Elaine McCloskey, Clerk

City of Delaware
2021 Firefighter Certified List

FULL-TIME LIST

Current List Order	Original List Order	CANDIDATES	Part-time	Full-Time	Written Exam	Avg. Interview Score	Combined Score	Educ Pts	Para medic Pts	Mili tary Pts	Overall Score	Date on Certified List	Roll Off Date (1 year)	Status as of 7/1/20 CSC Mtg	Status as of 5/5/21 CSC Mtg	Status as of 6/2/21 CSC Mtg
1	F2	Alexander Evers	X	X	96.68	80.00	88.34	2	5		95.34	6/2/2021	6/2/2022		Requested to be added to list 5/5/21, approval postponed	Added to list 6/2/21
2	F3	Jack Ferguson		FT only	85.00	88.00	86.50		5		91.50	6/2/2021	6/2/2022		Requested to be added to list 5/5/21, approval postponed	Added to list 6/2/21
3	F4	Parker Shope	X	X	86.88	80.00	83.44		5		88.44	6/2/2021	6/2/2022		Requested to be added to list 5/5/21, approval postponed	Added to list 6/2/21
4	F5	Thomas Glasstetter	X	X	88.06	78.80	83.43	3			86.43	6/2/2021	6/2/2022		Requested to be added to list 5/5/21, approval postponed	Added to list 6/2/21
5	F6	Samuel Bletner		FT only	84.93	78.80	81.87	2			83.87	6/2/2021	6/2/2022		Requested to be added to list 5/5/21, approval postponed	Added to list 6/2/21
6	F7	Brandon Bynorth		FT only	83.19	74.00	78.60		5		83.60	6/2/2021	6/2/2022		Requested to be added to list 5/5/21, approval postponed	Added to list 6/2/21
7	F8	Nicholas Frena	X	X	90.14	75.20	82.67				82.67	6/2/2021	6/2/2022		Requested to be added to list 5/5/21, approval postponed	Added to list 6/2/21
8	F9	Wayne Brookover	X	X	90.56	73.20	81.88				81.88	6/2/2021	6/2/2022		Requested to be added to list 5/5/21, approval postponed	Added to list 6/2/21
9	F10	Nathan Wright	X	X	86.94	75.60	81.27				81.27	6/2/2021	6/2/2022		Requested to be added to list 5/5/21, approval postponed	Added to list 6/2/21
10	F11	Micah Mecklenburg	X	X	86.53	73.20	79.87				79.87	6/2/2021	6/2/2022		Requested to be added to list 5/5/21, approval postponed	Added to list 6/2/21

PART-TIME LIST

Current List Order	Original List Order	CANDIDATES	Part-time	Full-Time	Written Exam	Avg. Interview Score	Combined Score	Educ Pts	Para medic Pts	Mili tary Pts	Overall Score	Date on Certified List	Roll Off Date (1 year)	Status as of 7/1/20 CSC Mtg	Status as of 5/5/21 CSC Mtg	Status as of 6/2/21 CSC Mtg
1	F2	Alexander Evers	X	X	96.68	80.00	88.34	2	5		95.34	6/2/2021	6/2/2022		Requested to be added to list 5/5/21, approval postponed	Added to list 6/2/21
2	F4	Parker Shope	X	X	86.88	80.00	83.44		5		88.44	6/2/2021	6/2/2022		Requested to be added to list 5/5/21, approval postponed	Added to list 6/2/21
3	F5	Thomas Glasstetter	X	X	88.06	78.80	83.43	3			86.43	6/2/2021	6/2/2022		Requested to be added to list 5/5/21, approval postponed	Added to list 6/2/21
4	F8	Nicholas Frena	X	X	90.14	75.20	82.67				82.67	6/2/2021	6/2/2022		Requested to be added to list 5/5/21, approval postponed	Added to list 6/2/21
5	F9	Wayne Brookover	X	X	90.56	73.20	81.88				81.88	6/2/2021	6/2/2022		Requested to be added to list 5/5/21, approval postponed	Added to list 6/2/21
6	F10	Nathan Wright	X	X	86.94	75.60	81.27				81.27	6/2/2021	6/2/2022		Requested to be added to list 5/5/21, approval postponed	Added to list 6/2/21
7	F11	Micah Mecklenburg	X	X	86.53	73.20	79.87				79.87	6/2/2021	6/2/2022		Requested to be added to list 5/5/21, approval postponed	Added to list 6/2/21

HIRED/REMOVED/DISQUALIFIED

Current List Order	Original List Order	CANDIDATES	Part-time	Full-Time	Written Exam	Avg. Interview Score	Combined Score	Educ Pts	Para medic Pts	Mili tary Pts	Overall Score	Date on Certified List	Roll Off Date (1 year)	Status as of 7/1/20 CSC Mtg	Status as of 5/5/21 CSC Mtg	Status as of 6/2/21 CSC Mtg
	B2	Dominic Fredo		FT only	92.53	80.40	86.47	1		1	88.47	10/3/2018	10/3/2020		Rolled off after 1 year	Rolled off after 1 year
	C10	Cody Dauphin		FT only	85.00	74.40	79.70				79.70	6/5/2019	6/5/2021	Extend on list for one year to 6/5/21	Hired FT on 7/22/20	Hired FT on 7/22/20
	F1	Stephen Kisak		FT only	90.97	90.80	90.89	2	5		97.89	5/5/2021	5/5/2022		Requested to be added to list 5/5/21, approval postponed	FT employment elsewhere
	C1	Sam Vondenhuevel		FT only	92.08	77.20	84.64	2	5		91.64	6/5/2019	6/5/2021	Extend on list for one year to 6/5/21		Rolled off after extension
	C2	Thomas Patterson		FT only	85.28	91.60	88.44			1	89.44	6/5/2019	6/5/2021	Extend on list for one year to 6/5/21		Rolled off after extension
	C7	Connor Sitz		FT only	83.13	76.00	79.57	2			81.57	6/5/2019	6/5/2021	Extend on list for one year to 6/5/21		Rolled off after extension

List certified by the Civil Service Commission on the 2nd day of June, 2021

John Rybka
Chair, Civil Service Commission

NOTES

1 *4 names added on 10/3/2018 (B1-B4)*
2 *11 names added to FT list on 6/5/19 (C1-C11)*
3 *7 names added to PT list on 6/5/19 (D1-D7)*
4 *2 names added to FT & PT list 11/6/19 (E1-E2)*
5 *11 names added to FT & PT list 5/5/21 (F1-F11)*

Extra Point Values

Education Points (Assoc = 1 pt, Bach = 2 pts, Mast = 3 pts)
Paramedic Cert. Points (5 pts)
Military Status Points (Hon Disch, active duty or reserve = 1 pt)

EST 1808
CITY OF
DELAWARE
OHIO

MEMORANDUM

TO: John Rybka, Civil Service Commission Chair and Civil Service Commission Members
FROM: Lorrie Diaz, Human Resources Coordinator
DATE: 05/13/2021
RE: Information Requested at the May 5, 2021 Civil Service Commission Meeting

Included below is the information you requested response to your request for: (1) firefighting and police recruitment; (2) respective demographics (including how many live in Delaware City); and (3) what the Firefighter Certified List would look like under the previous Physical Ability Test standards.

Firefighting and Police Recruiting

We have always done our best to assure our recruiting efforts reach the most trafficked locations where qualified and interested job seekers are looking for jobs. We do so as far and wide as limited budgets and limited hiring (1-2 employees per year) make sense and allow us to do. Recruiting efforts include:

1) National Testing Network – NTN offers the written exam, which is the first step in both recruiting processes and does a great deal of advertising for all tests they offer. The test is offered on a national level and the test taker can schedule the time to take the exam that works best for them. In addition, there is a waiver program for individuals who cannot afford to pay for the test. These have all increased their minority participation in testing by removing these barriers and providing high quality testing that measures the entire range of important characteristics. This has resulted in a 187% increase in diverse candidates taking the NTN exam since 2012. (In 2020, 39% of all NTN test takers were minority, 20% were female)
2) Recruiting.com – we set up a customized hiring website four years ago to communicate our job openings and value of working for the city. We have pages dedicated to Fire and Police that have videos and advertise the pay with a sliding bar down the page, as previous diversity trainings shared that pay is a distinguishing factor to set these jobs apart. The back end of this service is called "jobing.com" and they advertise our jobs, increase our SEO (search engine optimization) and scrape/post out our jobs to other sites (Ohio Means Jobs, Indeed, Zip Recruiter, etc.)
3) NEOGOV, our applicant tracking system, advertises all jobs on governmentjobs.com
4) All positions are advertised through various social media accounts by PIO & HR – Facebook, Twitter, Facebook community groups, LinkedIn

5) All positions are posted separately on the #1 recruiting site – Indeed.com
6) Jobs are advertised on state and sometimes national association websites, email distribution lists, and social media
7) Positions are posted in local and state college websites (Handshake) and local career & technical centers
8) Positions are provided to the Second Ward Community Initiative (SWCI) and the Delaware African American Heritage Council to post and share
9) All positions are shared with all City employees to make quality referrals and share out through their social media
10) Pre-Covid, the Police and Fire departments and HR actively participated in school visits, recruiting fairs, community events, First Fridays, department tours, ride alongs, unpaid internships, open practice PAT, etc. to encourage interest and facilitate learning about these careers

Demographics – updated from prior City reports on diversity as of 5/10/21

	US	Ohio	Delaware County	Delaware City	City of Delaware - All Employees	City of Delaware - Police	US Census Bureau - Police	City of Delaware - Fire	US Census Bureau - Fire
White	60.0	78.4	83.8	85.0	94.6	88.2	67.0	98.5	79.9
Black or African American	13.4	13.1	3.9	5.3	2.7	2.9	12.4	1.5	6.3
American Indian	1.3	0.3	0.2	0.1	0.0	0.0	0.6	0.0	0.5
Asian	5.9	2.5	7.6	3.3	0.0	0.0	2.2	0.0	1.6
Pacific Islander	0.2	0.1	0.1	0.0	0.3	1.5	0.1	0.0	0.0
Two or More Races	2.8	2.4	2.0	3.2	0.9	1.5	2.0	0.0	1.5
Hispanic or Latino	18.5	4.0	2.8	3.4	1.5	5.9	14.4	0.0	9.1
Female	50.8	51.0	50.3	51.9	23.0	16.0	15.0	3.0	4.0

*#s are percentages obtained from the US Census Bureau 2010-2019

Most of our hires come from the local central Ohio area. Currently, 53% of our Police Department and 31% of our Fire Department live in the City of Delaware, while 75% and 55% live within Delaware County. 6% of Police employees live in Franklin County and the remaining PD members

live in Marion, Morrow or Union Counties. 16% of Fire employees live in Franklin County and the remaining members live in Licking, Knox, Marion, Morrow and Union Counties.

Firefighter Certified List under previous PAT standards

While Chief Donahue was able to share that four individuals would have failed the recent PAT without the extra 5-20 seconds allowed from the ideal pace to the maximum pace on up to two exercises, we have no way of determining how many candidates would have failed to complete the additional 100 yard hose drag during this PAT. We also have no way to predict how many candidates would have passed the PAT in past recruitment processes with a 100-yard shorter hose drag and the additional time on up to two exercises, as those things were not measured. We do know that we went from a 63% failure rate over 3 years to a 22% failure rate this process with the changes.

The City of Delaware strongly believes that candidates must meet a specific standard of fitness to be able to meet the physical demands of the job of firefighter/paramedic, but this is one step in a very thorough screening process that includes a written exam, three interviews, psychological indexing and assessment, background and reference checks, polygraph, medical physical and drug screen. The goal is to hire the most qualified candidates who meet all of the standards required to perform the job and not to make one aspect of the screening process so difficult that it rules out more than half of the pool of candidates or has an adverse impact on females.

EST 1808
CITY OF
DELAWARE
OHIO

MEMORANDUM

TO: Civil Service Commission Members
FROM: John L. Donahue, Fire Chief
DATE: 05/26/2021
RE: Changes made to the 2018 Firefighter Physical Ability Test (PAT)

Attached with this memo are four (4) documents reference to the firefighter recruiting process and the physical ability test that were discussed at the May 5, 2021 meeting.

1. 2017 Physical Ability Test
2. 2017 Ergometrics FF PAT Validation
3. 2018-2019 PAT Instructions
4. 2021 PAT Instructions

The 2017 Physical Ability Test was an unvalidated test that was used prior to 2018. This was the test that was the basis for discussions in 2015 with the Civil Service Commission and was requested to be changed to a validated test conducted in-house.

The 2017 Ergometrics FF PAT Validation report provided the data and recommendations to the City of Delaware and the Delaware Fire Department. The validation report evaluated Delaware Fire Department members and established new recommended events. The personnel were tested and evaluated based on the 2017 Physical Ability Test requirements. Ergometrics then provided this report and recommendations. The comprehensive report details how the analysis was conducted and the results. The proposed recommendations on the new validated report begin on page 38.

The 2018-2019 PAT Instructions became the basis of the next generation of test. This was based from the 2017 Ergometrics FF Validation report, with a higher standard than what was recommended by Ergometrics as requested by the Local Union. This test ultimately led to a failure of 63.46% of the candidates. These changes included:

1. Increase the 85' ladder to a 100-ladder climb', and adjust the time based on ratio timeframe.
2. Increase the 100' 1¾"-hose drag to 200'.
3. Change the disqualification time to the Ideal Pace.

The 2021 PAT Instructions were based solely on the 2017 Ergometrics FF PAT and removed the higher standards that were requested by the Local Union. The changes are highlighted in yellow in the 2021 PAT Instructions when compared to the 2018-2019 PAT Instructions. Additionally, the

optional scoring method (as proposed in the Ergometrics report on page 39) was used, which required the candidates to have nine (9) of the events completed in the Ideal Pace category. If that was not implemented, all candidates would have been required to complete all the events prior to the disqualification time.

The safety and security of our firefighters has always been paramount for me. We have and continue to purchase the best personal protective equipment. Physical fitness areas have been included in all fire stations and outfitted by the Firefighters Union. In the 2018-2020 Collective Bargaining Agreement, an annual incentive was provided to bargaining members who successfully completed the physical ability test. There currently is not a requirement for fitness, medical or cancer screenings. These are all items I am currently working to achieve.

In summary, the changes made in 2021 did not lessen the recommended standards that were developed and validated by Ergometrics based on their evaluations of our firefighters. What was removed was the higher standards above the validated test that were requested by the Firefighters Union.

Should you have any questions, please do not hesitate to contact me.

Delaware Fire Department
Firefighter Physical Abilities Testing
Currency Analysis

ERGOMETRICS & Applied Personnel Research, Inc.
www.ergometrics.org - 425.774.5700

ERGOMETRICS

Delaware Fire Department

Firefighter Physical Abilities Testing Currency Analysis

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Table of Contents

Part 1

EXECUTIVE SUMMARY

This report details the process and outcome of the validation of the Delaware Fire Department's existing physical abilities test (PAT) for entry-level firefighter candidates to determine the currency of the exam. The purpose of this analysis was to review the current events and recommend a relevant, job-related, and defensible format and protocol for entry-level candidates.

The importance of a project of this type cannot be underestimated. There are a variety of rationales that have made completion of this project paramount, including safety concerns, legal requirements, and incumbent acceptance. There are also other specific reasons to undertake such a study:

1. Research has confirmed that firefighters with low fitness are three times as likely to have injuries and far more likely to have long-term injuries. Preventing such long-term injuries will save the department money and, more importantly, contribute to the overall well-being of the department's dedicated workforce.

2. NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*, requires fire departments to develop physical performance requirements for candidates and members who engage in emergency operations.

3. Delaware Fire Department desired to validate and update their existing protocol with procedures that allow firefighter candidates to demonstrate actual ability in firefighter tasks, simulating realistic situations.

PROJECT GOALS

The goals of the current project were to:

- Identify and document the critical physically limiting job tasks that Delaware firefighters are expected to be able to perform via surveys of subject-matter-experts (SMEs).

- Determine and validate the minimum physical standards required to perform these tasks based on content validation methods, including physiological measurements and analysis of incumbent performance.

- Recommend a defensible and valid test format and protocol to assess these requirements for incoming firefighter candidates.

TASK ANALYSIS

Based on our past research and a thorough review of the literature, we developed an initial list of possible tasks that may likely have an impact on overall physical demands. We took the list of physically demanding firefighter tasks and organized these tasks into major activity areas, such as fire attack, forcible entry, search and rescue. To be clear, this list was intended to represent only the most demanding and limiting tasks and not the full spectrum of tasks performed.

The physically limiting task analysis was first extensively reviewed and completed by an expert panel of subject matter experts from the Delaware Fire Department (DFD; Survey Instructions included in Appendix A and actual survey included in Appendix B). Edits and additions were made to accurately reflect typical DFD firefighter physically limiting tasks. The survey was also rated by these SMEs during the focus group meeting.

All but four tasks were rated as at least "Important" to successful job performance. Sixty-two of the 68 physically limiting tasks were rated as "Important" to "Extremely Critical" to successful performance. The lowest rated tasks were considered at least somewhat important to successful performance. All of the tasks were rated as requiring at least some effort. Twenty of the tasks were rated as requiring "Excessive Physical Effort" or "Maximal Physical Effort." On average, the time spent on the physically limiting tasks was between 10 to 60 minutes. Additionally, the majority of the tasks were rated as requiring training and that they could be simulated. The top five physically limiting tasks based on criticality are listed below:

- Extending uncharged hoseline from fire apparatus to fire.
- Rescuing a victim from a roof or window using a ladder.
- Dragging an incapacitated partner or victim by one firefighter from a damaged or burning structure.
- Carrying an incapacitated partner or victim by two firefighters from a damaged or burning structure.
- Dragging a charged hose through a fire site, both inside (hallways/stairways) and outside (obstacles/ice conditions)

The top five physically limiting tasks based on physical effort are listed below:

- Dragging an incapacitated partner or victim by one firefighter from a damaged or burning structure.
- Carrying an incapacitated partner or victim by two firefighters from a damaged or burning structure.
- One firefighter maneuvering a charged 2 ½ inch hoseline.
- Rescuing a victim from a roof or window using a ladder.
- Crawling through smoke-filled structure pulling charged hoseline.

As expected, the majority of physical tasks were rated as requiring upper body strength, lower body strength, aerobic capacity, and coordination/agility. Overall, the results demonstrate that the job of firefighter involves physically demanding tasks that require strength, aerobic capacity, and coordination to be able to perform well. Overall, the analysis demonstrated the criticality and frequency of physically limiting tasks within the Delaware Fire Department. The analysis also demonstrated the relatively high physical effort and longer duration of performance.

The physically limiting task analysis provided evidence for the validity, effectiveness, and job-relatedness of Delaware FD's current PAT events. Below, each event, except for the 500-yard Shuttle Run, was related to at least one highly rated task from the physically limiting task analysis in terms of both criticality and physical effort. Although the 500-yard Shuttle Run is not directly linked to the physically limiting task analysis, the event requires upper and lower body strength, aerobic capacity, and coordination/agility, and each of these physical dimensions is important to successful performance of the physically limiting tasks. Overall, the majority of the events currently being used in the PAT are assessing real, on-the-job experiences that are both critical and physically demanding for Firefighters.

CONCLUSIONS AND RECOMMENDATIONS

Overall, the majority of the events on the Delaware PAT are job-related and important to successful firefighter performance. The events within the test represent critical and common job requirements. Strength requirements are representative and do not exceed task demands. The aerobic demands of the PAT are consistent with documented job demands, and are clearly set at the lower bound estimate of minimally acceptable. This would likely account for a 20% improvement in aerobic capacity during intense academy training. A few changes to the events are proposed to ensure all events are directly related to critical physically limiting tasks performed by Delaware FD Firefighters. Additionally, changes to the scoring procedure and overall administration of the PAT would also likely enhance the existing test.

Part 2

TASK ANALYSIS

Documentation on essential job functions is the cornerstone of a defensible physical abilities testing process. This section reviews the steps taken and the data collected to define the essential and limiting job tasks for the Delaware Fire Department (DFD).

TASK ANALYSIS DEVELOPMENT

As a starting point, Ergometrics compiled a list of commonly performed firefighter tasks. We selected any tasks defined as limiting or important in defining firefighter physical ability. A variety of resources were reviewed, including published standards from many other organizations, as well as studies performed by federal agencies. Particularly relevant was a national study on the impact of aging in public safety and the job analysis instrument Ergometrics previously created for firefighter task analyses, which is used to validate Candidate Physical Abilities Tests (CPATs), developed by the International Association of Fire Fighters (IAFF). Of the thousands of tasks that have been defined as relevant for the firefighter occupation across the country, only a relatively few (about 100) have been identified as important in defining physical abilities.

A key concept here is the notion of a "limiting task." These are tasks which tend to set the limits of what a firefighter is expected to accomplish. If a firefighter can perform all the required "limiting tasks," then it can be assumed that all other tasks could be performed with less effort. For example, if a firefighter is able to carry a 60-pound piece of equipment, such as a smoke ejection fan, then it can be assumed that the same firefighter would be able to carry tools and equipment of lesser weight. Hence, documentation of every tool carried by firefighters is not necessary, instead one needs to focus on tools that impose the heaviest demands. There are many tasks that are routine and important, but are not particularly limiting (i.e., almost everyone could accomplish these tasks). Once the list of physically demanding firefighter tasks was obtained, these tasks were organized into major activity areas such as fire attack, forcible entry, search and rescue.

SME PANEL REVIEW

On August 26th, 2016, Ergometrics conducted a subject matter expert (SME) panel session to gain more in-depth information regarding the department's firefighter operations, tasks, methodology, administration and philosophy, and to obtain information for the physically limiting task analysis. The SME panel consisted of individuals holding the firefighter position or higher (see Table 2.1). The group was selected by the department as well-respected in the department. This group participated in the following activities:

- Review and modification of the primary operations.
- Review and modification of the physically limiting tasks.
- Detailed ratings of the primary operations and physically limiting tasks.

In addition to the SME panel meeting, Ergometrics participated in a ride-along to observe the firefighter position and the general activities of DFD firefighters. The information collected was used to further identify the physically limiting tasks and to familiarize Ergometrics' consultant with day-to-day operations.

TABLE 2.1 – SME PANEL

	Last Name	First Name	Rank	Years of DFD Service	Age	Gender	Ethnicity
1.	Schaeffer	Zack	Firefighter	4	18-24	Male	Caucasian
2.	Archangel	Clint	Lt.	11	35-44	Male	Caucasian
3.	Kasik	Matt	Lt.	16	35-44	Male	Caucasian
4.	Zierden	Erik	Lt.	25	45-54	Male	Caucasian
5.	LeMaster	Brian	Firefighter	4	25-34	Male	Caucasian

BENCHMARK CRITICAL TASKS

A principal goal of the physically limiting task analysis was to define a set of limiting physical tasks that represented critical job functions but would also demonstrate the ability to perform the full range of tasks confronting firefighters. Based on the physically limiting task analysis with the expert panel, the following critical tasks were found representative of the most demanding tasks that a firefighter would likely be called upon to perform while wearing full protective gear, including Self Contained Breathing Apparatus (SCBA):

- Dragging dry supply line from apparatus to distant hydrant.
- Extending uncharged hoseline from fire apparatus to fire.
- Two firefighters maneuvering a charged 2 ½ inch hoseline.
- Dragging a charged hose through a fire site, both inside (hallways/stairways) and outside (obstacles/icy conditions).
- Crawling through smoke-filled structure pulling charged hoseline.
- Rescuing a victim from a roof or window using a ladder.
- Moving heavy objects to gain access to fire and/or to free trapped persons.
- Moving and carrying heavy objects, equipment or materials to gain access to or to free trapped firefighters/medics or victims.
- Administering cardiopulmonary resuscitation (CPR).

- Dragging an incapacitated partner or victim by one firefighter from a damaged or burning structure.
- Carrying an incapacitated partner or victim by two firefighters from a damaged or burning structure.

PHYSICALLY LIMITING TASK ANALYSIS SCALES

SMEs rated the primary operations on Criticality, Physical Effort, and Average Time Spent at an Emergency Call. Each individual physically limiting task was rated on Criticality, Physical Effort, Average Time Spent at an Emergency Call, and Physical Dimension Required (e.g., upper body strength). Additionally, SMEs determined whether or not each physically limiting task could be trained and could be simulated. The rating scales used for the physically limiting task analysis survey are included below:

Task Criticality: ***How important is this task to successfully performing the job? Regardless of the frequency or amount of time spent on this task, indicate the task's criticality.***		
1	Not Critical	This task is not important to successful performance. Failure to perform this task properly would have no impact on the organization including the workload of others.
2	Least Critical	This task is somewhat important in the job, and may be useful for some small part of the job. Failure to perform this task properly would have little or only minor impact on the organization.
3	Important	This task is important for successful performance in the job. Failure to perform this task properly would have negative consequences for the organization.
4	Critical	This task is very important for successful performance in the job. Failure to perform this task properly would have noticeable negative consequences for the organization.
5	Extremely Critical	This task is one of the most essential tasks of the job and is extremely important to successful performance. Failure to perform this task properly would have significant negative consequences for the organization.
Physical Effort: ***How much physical effort does this task require for the average firefighter?***		
1	No effort	This task requires no physical effort to successfully perform.
2	Minimal Physical Effort	This task requires minimal physical effort no greater than that encountered in everyday life.
3	Moderate Physical Effort	This task requires moderate physical effort increasing respiratory rate and placing some strain on muscles.
4	Excessive Physical Effort	This task requires excessive physical effort requiring nearly all of a firefighter's strength and endurance.
5	Maximal Physical Effort	This task requires the maximum amount of strength and endurance that a firefighter is capable of performing.

Typical Time Spent During Call on Primary Operation: ***Regardless of the importance of the task, indicate how much time incumbents spend performing it during a typical emergency call.***					
1	< 5 minutes	2	5-10 minutes	3	10-30 minutes
4	30-60 minutes	5	1-4 hours	6	> 4 hours

Typical Time Spent During Call on Task: ***Regardless of the importance of the task, indicate how much time incumbents spend performing it during a typical emergency call.***					
1	< 1 minute	2	1-3 minutes	3	4-6 minutes
4	6-10 minutes	5	10-15 minutes	6	> 15 minutes

Physical Dimensions (Mark all that apply): *Indicate the specific physical capability or capabilities required for successful performance of the task.*		
1	**Upper Body Strength**	Ability of the upper body muscles (e.g., arms, chest) to exert force to lift, push, pull, or hold objects. The magnitude of the force depends on the size of the muscles.
2	**Lower Body Strength**	Ability of the lower body muscles (e.g., legs, hips) to exert force to lift, push, pull, or hold objects. The magnitude of the force depends on the size of the muscles.
3	**Aerobic Capacity**	Ability of the respiratory and cardiovascular systems to provide oxygen continuously for medium- to high-intensity activities performed over a moderate time period (e.g. greater than 5 minutes).
4	**Coordination / Agility**	Ability to perform motor activities in a proficient sequential pattern by using neurosensory cues such as change of direction.
Specific Training: *Is specific training required to physically perform this task?*		
1	Yes	A new incumbent is unlikely to have the ability to competently perform this task. The incumbent must be taught everything necessary to perform this task.
0	No	No specialized training is required to perform this task nor any related background is expected or required.
Task Simulation: Can this task be simulated?		
1	Yes	It is both possible and feasible to design and implement an exercise that closely resembles the actual task as performed on the job.
0	No	It is either not possible or not feasible (due to safety, cost, access to materials, etc.) to both design and implement an exercise that closely resembles the actual task performed on the job.

PRIMARY OPERATIONS RESULTS

Overall, the average criticality rating of the primary operations was 2.2 (Critical to Extremely Critical to Successful Performance). Nine of the 12 primary operations were rated as Critical to Extremely Critical to successful performance. The top rated primary operations were Pump Operations, Hose and Extinguisher Operations, Search, and Rescue. In general, the primary operations were considered to take at least moderate physical effort. The primary operations rated as requiring the most physical effort included Rescue and Wearing Full Protective Gear. On average, the primary operations were rated as taking between five and 30 minutes to complete during a typical emergency call.

TABLE 2.2 – JOB ANALYSIS RESULTS – PRIMARY OPERATIONS

Task	Primary Operations Criticality	Primary Operations Physical Effort	Primary Operations Average Time Emergency Call
Task 1. Fire Attack: Staging, Hose Laying, and Extinguishing Operations			
Pump Operations: Connecting or hooking up apparatus to fire hydrant and operating pumps to supply water in appropriate pressure and volume - using couplings, hoses, spanner wrenches, and other tools.	5.0	3.4	1.8
Hose and Extinguisher Operations: Laying dry line and advancing charged lines or extinguisher to deliver water, foam, and other extinguishing agents to emergency scene.	5.0	4.0	2.6
Equipment Transport: Staging other necessary tools and equipment by carrying from vehicles to emergency scenes.	3.0	2.8	2.6
Task 2. Manual Ladder Operations			

Task	Primary Operations Criticality	Primary Operations Physical Effort	Primary Operations Average Time Emergency Call
Carrying, raising, extending, and climbing manual ladders to perform search, rescue or other operations.	4.4	3.8	2.4
Task 3. Forcible Entry			
Prying open, cutting, or breaking down doors, or otherwise entering structures, vehicles, aircraft and other entrapments in order to search for and rescue victims and provide access to the emergency scene - using axes, halligan tools, hooks, rabbit tools, battering rams, sledge hammers, power saws and other tools.	4.8	4.0	2.4
Task 4. Ventilation and Overhaul			
Ventilation: Opening or breaking windows, chopping or cutting holes in roofs, breaching walls or doors, and aiming fog stream out of window or hanging fans in windows or doors to remove heat, smoke, and/or gas from structures or entrapments.	4.0	3.6	2.6
Overhaul: Opening up walls and ceilings, cutting or pulling up floors and moving or turning over debris, in order to check for hidden fires which could rekindle or spread - using hooks, axes, saws, and pitchforks.	4.2	4.0	3.2
Task 5. Search and Rescue			
Search: Searching assigned area in order to locate victims and to obtain further information about incident following standard search procedures.	5.0	4.0	3.0
Rescue: Assisting, hoisting, carrying or dragging victims from emergency area by means of interior access (stairs, hallways, etc.) or, if necessary, by ladders, fire escapes, or other means of escape - using rescue harnesses, ropes, backboards, and other equipment. Extricating victims from vehicles, aircraft, cave-ins, collapsed buildings or other entrapments in order to save lives - using shovels, torches, drills, pry bars, saws, jacks, jaws, air bags, and other equipment.	5.0	4.8	2.8
Task 6. Salvage and Clean-Up			
Salvage: Moving and covering furniture, appliances, merchandise and other property; covering holes in structures; stabilizing damaged structural components; and redirecting or cleaning up water in order to minimize damage - using plastic and canvas covers, ropes, staple guns, mops, squeegees, and other tools. Tearing down weak and dangerous structural components (e.g.), floors, walls, roofs, overhangs and stairs) using hooks, axes, saws and other tools.	3.0	2.8	3.2
Clean Up/Pick Up: Picking up, cleaning and returning equipment to vehicle and rolling or folding hose, so that the company can go back in service.	2.6	2.4	3.8
Task 7. Movement in Hazardous Environment			
Wearing full protective gear. Working in poor conditions of smoke, heat, icy surfaces. Having to navigate through obstacles that impede movement. Climbing over, under, and around obstacles.	4.8	4.4	3.2

PHYSICAL LIMITING TASK RESULTS

All but four tasks were rated as at least "Important" to successful job performance. Sixty-two of the 68 physically limiting tasks were rated as "Important" to "Extremely Critical" to successful performance. The lowest rated tasks were considered at least somewhat important. All of the tasks were rated as requiring at least some effort. Twenty of the tasks were rated as requiring "Excessive Physical Effort" or "Maximal Physical Effort." On average, the time spent on the physically limiting tasks was between 10 to 60 minutes. Additionally, the majority of the tasks were rated as requiring training and could be simulated. Below are a few of the key findings (see Table 2.3 for detailed ratings):

- The average criticality rating was 3.87 (Important to Critical).
- The average physical effort rating was 3.59 (Moderate to Excessive Physical Effort).
- The average time spent during a call was 3.56 (Between 10 to 60 minutes).

The top 10 physically limiting tasks based on criticality are listed below:

- Extending uncharged hoseline from fire apparatus to fire.
- Rescuing a victim from a roof or window using a ladder.
- Dragging an incapacitated partner or victim by one firefighter from a damaged or burning structure.
- Carrying an incapacitated partner or victim by two firefighters from a damaged or burning structure.
- Dragging a charged hose through a fire site, both inside (hallways/stairways) and outside (obstacles/ice conditions)
- Crawling through smoke-filled structure pulling charged hoseline.
- Administering cardiopulmonary resuscitation (CPR).
- Dragging dry supply line from apparatus to distant hydrant.
- Two firefighters maneuvering a charged 2 ½ inch hoseline.
- Moving heavy objects to gain access to fire and/or free trapped persons.

The top 10 physically limiting tasks based on physical effort are listed below:

- Dragging an incapacitated partner or victim by one firefighter from a damaged or burning structure.
- Carrying an incapacitated partner or victim by two firefighters from a damaged or burning structure.
- One firefighter maneuvering a charged 2 ½ inch hoseline.
- Rescuing a victim from a roof or window using a ladder.
- Crawling through smoke-filled structure pulling charged hoseline.
- Two firefighters transporting very large individual (300+ lbs.) down multiple flights of stairs.
- Dragging a charged hose through a fire site, both inside (hallways/stairways) and outside (obstacles/ice conditions).
- Two firefighters maneuvering a charged 2 ½ inch hoseline.
- Moving and carrying heavy objects, equipment or materials to gain access to or to free trapped firefighters or victims.
- Moving heavy objects to gain access to fire and/or to free trapped persons.

All of the 10 lowest rated physically limiting tasks were considered at least important to successful performance. The lowest rated tasks in terms of criticality are listed below:

- Repeated exit and entry from fire site in winter, resulting in large fluctuations in body temperature.
- One worker hanging a smoke ejector during a structural fire.
- Carrying, pushing, throwing, or dragging mattresses, furniture, or other property structures.
- Walking along uneven/narrow surfaces or ceiling joints.
- Removing debris from fire scene.
- Rolling up hose and placing on apparatus.
- Carrying undamaged furniture from burning buildings to reduce fire and smoke damage to building and contents.
- Removing, carrying, and throwing salvage covers to protect equipment.
- Cleaning equipment in the station.
- Hanging and rolling hose in the station.

TABLE 2.3 –PHYSICALLY LIMITING TASK RATINGS

Physically Limiting Tasks	Criticality (1 - 5 Scale)	Physical Effort (1 - 5 Scale)	Time Spent (1 - 6 Scale)	Training Required? (0 = No, 1 = Yes)	Able to Simulate? (0 = No, 1 = Yes)
Task 1. Fire Attack: Staging, Hose Laying, and Extinguishing Operations					
1. Dragging dry supply line from apparatus to distant hydrant.	4.60	3.80	2.40	0.80	1.00
2. Extending uncharged hoseline from fire apparatus to fire.	5.00	3.00	2.00	1.00	1.00
3. Carrying equipment 125 feet or more from the truck to the fire site.	3.60	3.00	3.60	0.40	1.00
4. Hoisting tools or other equipment (saws, hand tools, fans, ladders, hose) using rope.	3.20	3.60	2.20	1.00	1.00
5. Shoulder loading from the ground and carrying 1 ¾ inch hose during a fire.	4.00	3.40	2.80	1.00	1.00
6. Shoulder loading from a hose bed and carrying 2 ½ inch hose during a fire.	3.60	3.80	2.80	1.00	1.00
7. One firefighter/medic maneuvering a charged 2 ½ inch hoseline.	4.00	5.00	2.60	1.00	1.00
8. Two firefighter/medics maneuvering a charged 2 ½ inch hoseline.	4.60	4.40	3.80	1.00	1.00
9. Extending, holding and supporting a 1 ¾ inch charged attack line with flowing water.	4.40	3.80	4.60	1.00	1.00
10. Dragging a charged hose through a fire site, both inside (hallways/stairways) and outside (obstacles/icy conditions).	4.80	4.40	4.20	1.00	1.00
11. Directing a charged hose for an extended period of time (100 pounds of nozzle thrust).	3.80	3.40	5.40	1.00	1.00
12. Crawling through smoke-filled structure pulling charged hoseline.	4.80	4.60	4.20	1.00	1.00
13. Climbing stairs in structural fire wearing full protective gear with loads of 10-50 lbs. of firefighter/medic tools, Hotel Packs, attack lines, air bottles, and other similar equipment	4.20	4.00	3.20	0.80	1.00

Physically Limiting Tasks	Criticality (1 - 5 Scale)	Physical Effort (1 - 5 Scale)	Time Spent (1 - 6 Scale)	Training Required? (0 = No, 1 = Yes)	Able to Simulate? (0 = No, 1 = Yes)
(1-3 flights of stairs).					
14. In high-rise fires, climbing stairs wearing full protective gear with loads of 10-50 lbs. of firefighter/medic tools, Hotel Packs, attack lines, air bottles, and other similar equipment (4-5 flights of stairs).	4.00	4.00	3.80	0.80	1.00
15. Open hydrant with wrench.	3.80	2.20	1.20	0.40	1.00
16. Directing charged hoseline while standing on ladder.	3.80	3.00	3.20	1.00	1.00
Task 2. Manual Ladder Operations					
1. Removing, carrying, and raising of a 28 ft. ground extension ladder by one person at a structural fire.	4.00	3.80	2.60	1.00	1.00
2. Extend the fly of 35 ft. ground extension ladder by hoisting with rope.	3.60	3.20	1.20	1.00	1.00
3. Carrying or raising of a 35 ft. ground extension ladder by two individuals at a structural fire.	3.80	3.40	2.60	0.80	1.00
4. Climbing a ladder (in excess of 100 ft. in height) during a structural fire.	3.80	3.40	2.00	0.80	1.00
5. Climbing a ladder (in excess of 100 ft.) while carrying tools.	4.00	3.40	2.00	1.00	1.00
6. Rescuing a victim from a roof or window using a ladder.	5.00	4.80	3.20	1.00	1.00
7. Using hand tools such as axes, halligan tools, pike poles, or sledgehammers while on a ladder.	3.40	3.60	2.60	1.00	1.00
Task 3. Forcible Entry					
1. Using heavy hand tools such as axe or sledgehammer for extended period of 5 minutes or longer to accomplish difficult forcible entry through steel doors or concrete walls.	4.00	4.20	3.80	1.00	1.00
2. Using heavier power tools such as power saws or chain saws for extended period of 5 minutes or longer to accomplish forcible entry tasks.	4.20	3.60	3.60	1.00	1.00
3. Moving heavy objects to gain access to fire and/or to free trapped persons.	4.60	4.20	3.00	0.40	1.00
4. Moving and carrying heavy objects, equipment or materials to gain access to or to free trapped firefighters/medics or victims.	4.60	4.40	3.40	0.40	1.00
5. Carrying equipment from emergency scene; cutting, lifting or prying open vehicles, machinery, etc., to free persons trapped or pinned inside using appropriate extrication tools.	4.40	4.00	3.60	1.00	0.80
6. Using heavy hand tools such as a cutter and spreader in automobile extrication for extended period of 5 minutes or longer.	4.20	3.80	4.50	1.00	0.40

Physically Limiting Tasks	Criticality (1 - 5 Scale)	Physical Effort (1 - 5 Scale)	Time Spent (1 - 6 Scale)	Training Required? (0 = No, 1 = Yes)	Able to Simulate? (0 = No, 1 = Yes)
7. Using heavier power tools such as power saws or chain saws for extended period of 5 minutes or more to open up walls, floor, or roofs.	3.80	3.60	4.00	0.80	0.60
Task 4. Ventilation and Overhaul					
1. Breaching holes in walls using sledge hammers, rams, axes, power saws, or other equipment.	3.80	4.20	3.80	0.80	1.00
2. Breaking through a roof while on a ladder or a pitched roof using axes, chainsaws, or hand saws.	4.20	4.20	3.40	1.00	1.00
3. Using a pike pole to pull down a ceiling in all types of construction.	4.00	4.00	4.80	0.80	1.00
4. One worker hanging a smoke ejector during a structural fire.	3.00	2.80	2.20	1.00	1.00
5. Using heavy hand tools such as axes or sledgehammers for extended period of 5 minutes or longer to open up walls, floors, or roofs.	3.40	3.40	4.20	0.80	1.00
6. Using heavier power tools such as power saws or chain saws for extended period of 5 minutes or more to open up walls, floor, or roofs.	4.00	3.80	3.80	1.00	0.60
Task 5. Search and Rescue					
1. Using Jaws of Life at an incident.	4.40	3.60	4.20	1.00	0.40
2. Administering cardiopulmonary resuscitation (CPR).	4.80	3.60	4.80	0.80	1.00
3. Using hand and power tools such as hack saws, pry bars, wedges, air chisel, glass cutter in confined areas to extricate victims.	3.60	3.40	5.20	1.00	0.60
4. Dragging an incapacitated partner or victim by one firefighter/medic from a damaged or burning structure.	5.00	5.00	3.60	1.00	0.80
5. Carrying an incapacitated partner or victim by two firefighters/medics from a damaged or burning structure.	5.00	5.00	3.60	1.00	1.00
6. Two firefighters/medics carrying a patient without a back board during an emergency.	4.00	4.00	2.80	1.00	1.00
7. Two firefighters/medics carrying a patient on a back board during an emergency.	4.00	3.60	2.80	1.00	1.00
8. Digging to free victims trapped in tunnels, pipes, excavations or cave-ins or other entrapments using shovels, picks, spades or other hand tools.	4.00	3.60	5.20	0.60	0.60
9. Climbing or crawling through confined spaces in a structural fire while carrying a hand tool.	4.20	3.60	4.80	1.00	0.80
10. While carrying equipment, walking or crawling along joists where balance and careful foot placement are required in order to	3.60	3.00	2.60	0.60	1.00

Physically Limiting Tasks	Criticality (1 - 5 Scale)	Physical Effort (1 - 5 Scale)	Time Spent (1 - 6 Scale)	Training Required? (0 = No, 1 = Yes)	Able to Simulate? (0 = No, 1 = Yes)
prevent unnecessary structural damage.					
11. Carrying or assisting victims down ladder or stairs using drags, cots, or improvised equipment and proper lifting techniques.	4.40	4.00	2.60	1.00	1.00
12. Physically restraining violent or emotionally disturbed individual for their own safety or the safety of others.	4.20	3.80	2.60	1.00	0.40
13. Two firefighters/medics transporting very large individual (300+ lbs.) down multiple flights of stairs.	3.80	4.60	3.60	1.00	1.00
Task 6. Salvage and Clean Up					
1. Carrying, pushing, throwing, or dragging mattresses, furniture, or other property from structures.	3.00	3.00	3.20	0.40	1.00
2. Removing, carrying and throwing salvage covers to protect equipment.	2.60	2.20	3.00	0.40	1.00
3. Tearing down dangerous structural components using hand or power tools.	3.40	3.40	4.20	1.00	0.40
4. Removing debris from fire scene.	2.80	2.80	4.60	0.60	1.00
5. Rolling up hose and placing on apparatus.	2.80	2.20	4.80	0.80	1.00
6. Hanging and rolling hose in the station.	2.25	2.25	5.50	0.75	1.00
7. Cleaning equipment in the station.	2.40	2.20	6.00	0.60	0.60
8. Using heavier power tools such as power saws or chain saws for extended period of 5 minutes or more to tear down dangerous structures.	3.20	3.40	5.00	1.00	0.60
9. Carrying undamaged furniture from burning buildings to reduce fire and smoke damage to building and contents.	2.80	2.80	4.40	0.40	1.00
10. Tearing down or shoring up weak and dangerous structural components (floors, overhangs, cornices, etc.).	3.20	3.00	5.20	1.00	0.40
Task 7. Movement in Hazardous Environment					
1. Walking along uneven/narrow surfaces (i.e., roof) or ceiling joints.	3.00	2.60	2.80	0.60	1.00
2. Operating at elevated heights (i.e., top of a 100-foot ladder truck).	4.20	3.40	5.20	1.00	1.00
3. Moving through debris, garbage, and furniture at the fire site that impedes movement.	4.00	3.60	3.60	0.80	1.00
4. Pulling self up and over obstacles or into an opening.	3.80	4.00	1.80	0.80	1.00
5. Climbing fence or wall in full protective clothing with equipment.	3.20	3.60	1.60	0.80	0.80
6. Crawling for 100 feet or more in confined space or to stay below smoke.	4.40	3.40	4.00	1.00	1.00
7. Moving through deteriorating conditions at fire site (particularly in winter as water freezes).	4.00	3.75	4.00	1.00	0.75

Physically Limiting Tasks	Criticality (1 - 5 Scale)	Physical Effort (1 - 5 Scale)	Time Spent (1 - 6 Scale)	Training Required? (0 = No, 1 = Yes)	Able to Simulate? (0 = No, 1 = Yes)
8. Repeated exit and entry from fire site in winter, resulting in large fluctuations in body temperature.	3.20	3.40	4.20	0.80	0.20
9. Repeated exit and entry from fire site in summer, high heat conditions such that there is inadequate opportunity to cool down.	3.60	3.40	4.20	0.80	0.20

The physical dimensions of the physical tasks were also analyzed (see Table 2.4). As expected, the majority of physical tasks were rated as requiring upper body strength, lower body strength, aerobic capacity, and coordination/agility. Overall, the results demonstrate that the job of firefighter involves physically demanding tasks that require strength, aerobic capacity, and coordination to be able to perform well.

TABLE 2.4 –PHYSICALLY LIMITING TASKS PHYSICAL DIMENSION RATINGS

Physically Limiting Tasks	Upper Body Strength (0 = No, 1 = Yes)	Lower Body Strength (0 = No, 1 = Yes)	Aerobic Capacity (0 = No, 1 = Yes)	Coordination/ Agility (0 = No, 1 = Yes)
Task 1. Fire Attack: Staging, Hose Laying, and Extinguishing Operations				
1. Dragging dry supply line from apparatus to distant hydrant.	0.60	1.00	0.80	0.40
2. Extending uncharged hoseline from fire apparatus to fire.	0.80	0.80	0.20	0.80
3. Carrying equipment 125 feet or more from the truck to the fire site.	1.00	0.80	0.60	0.20
4. Hoisting tools or other equipment (saws, hand tools, fans, ladders, hose) using rope.	1.00	0.20	0.40	0.20
5. Shoulder loading from the ground and carrying 1 ¾ inch hose during a fire.	0.80	0.80	0.60	0.60
6. Shoulder loading from a hose bed and carrying 2 ½ inch hose during a fire.	0.80	0.60	0.60	0.40
7. One firefighter/medic maneuvering a charged 2 ½ inch hoseline.	1.00	1.00	0.80	1.00
8. Two firefighter/medics maneuvering a charged 2 ½ inch hoseline.	1.00	1.00	0.80	1.00
9. Extending, holding and supporting a 1 ¾ inch charged attack line with flowing water.	1.00	0.60	0.60	0.80
10. Dragging a charged hose through a fire site, both inside (hallways/stairways) and outside (obstacles/icy conditions).	1.00	1.00	0.60	1.00
11. Directing a charged hose for an extended period of time (100 lbs. of nozzle thrust).	0.80	0.60	0.60	0.60
12. Crawling through smoke-filled structure pulling charged hoseline.	1.00	1.00	1.00	1.00
13. Climbing stairs in structural fire wearing full protective gear with loads of 10-50 lbs. of firefighter/medic tools, Hotel Packs, attack lines, air bottles, and other similar equipment (1-3 flights of stairs).	1.00	1.00	0.80	0.40

Physically Limiting Tasks	Upper Body Strength (0 = No, 1 = Yes)	Lower Body Strength (0 = No, 1 = Yes)	Aerobic Capacity (0 = No, 1 = Yes)	Coordination/ Agility (0 = No, 1 = Yes)
14. In high-rise fires, climbing stairs wearing full protective gear with loads of 10-50 lbs. of firefighter/medic tools, Hotel Packs, attack lines, air bottles, and other similar equipment (4-5 flights of stairs).	1.00	1.00	1.00	0.40
15. Open hydrant with wrench.	0.80	0.00	0.00	0.00
16. Directing charged hoseline while standing on ladder.	0.80	0.60	0.20	1.00
Task 2. Manual Ladder Operations				
1. Removing, carrying, and raising of a 28 ft. ground extension ladder by one person at a structural fire.	1.00	0.60	0.20	0.80
2. Extend the fly of a 35 ft. ground extension ladder by hoisting with rope.	1.00	0.00	0.00	0.40
3. Carrying or raising of a 35 ft. ground extension ladder by two individuals at a structural fire.	1.00	0.40	0.00	0.80
4. Climbing a ladder (in excess of 100 ft. in height) during a structural fire.	0.40	1.00	0.60	0.80
5. Climbing a ladder (in excess of 100 ft.) while carrying tools.	0.80	1.00	0.60	0.60
6. Rescuing a victim from a roof or window using a ladder.	0.80	0.60	0.80	1.00
7. Using hand tools such as axes, halligan tools, pike poles, or sledgehammers while on a ladder.	1.00	0.40	0.80	0.60
Task 3. Forcible Entry				
1. Using heavy hand tools such as axe or sledgehammer for extended period of 5 minutes or longer to accomplish difficult forcible entry through steel doors or concrete walls.	1.00	0.40	1.00	0.60
2. Using heavier power tools such as power saws or chain saws for extended period of 5 minutes or longer to accomplish forcible entry tasks.	1.00	0.40	0.80	1.00
3. Moving heavy objects to gain access to fire and/or to free trapped persons.	1.00	0.80	0.60	0.40
4. Moving and carrying heavy objects, equipment or materials to gain access to or to free trapped firefighter/medics or victims.	1.00	0.80	0.60	0.40
5. Carrying equipment from emergency scene; cutting, lifting or prying open vehicles, machinery, etc., to free persons trapped or pinned inside using appropriate extrication tools.	1.00	0.80	0.60	0.60
6. Using heavy hand tools such as a cutter and spreader in automobile extrication for extended period of 5 minutes or longer.	0.80	0.40	0.40	0.60
7. Using heavier power tools such as power saws or chain saws for extended period of 5 minutes or more to open up walls, floor, or roofs.	0.80	0.40	0.20	0.60
Task 4. Ventilation and Overhaul				
1. Breaching holes in walls using sledge hammers, rams, axes, power saws, or other equipment.	1.00	0.40	0.80	0.60
2. Breaking through a roof while on a ladder or a pitched roof using axes, chainsaws, or hand saws.	1.00	0.40	0.60	0.80

Physically Limiting Tasks	Upper Body Strength (0 = No, 1 = Yes)	Lower Body Strength (0 = No, 1 = Yes)	Aerobic Capacity (0 = No, 1 = Yes)	Coordination/ Agility (0 = No, 1 = Yes)
3. Using a pike pole to pull down a ceiling in all types of construction.	0.80	0.20	0.60	0.20
4. One worker hanging a smoke ejector during a structural fire.	0.80	0.40	0.00	0.00
5. Using heavy hand tools such as axes or sledgehammers for extended period of 5 minutes or longer to open up walls, floors, or roofs.	0.80	0.40	0.60	0.40
6. Using heavier power tools such as power saws or chain saws for extended period of 5 minutes or more to open up walls, floor, or roofs.	1.00	0.40	0.80	0.60
Task 5. Search and Rescue				
1. Using Jaws of Life at an incident.	1.00	0.40	0.60	0.60
2. Administering cardiopulmonary resuscitation (CPR).	0.80	0.00	1.00	0.40
3. Using hand and power tools such as hack saws, pry bars, wedges, air chisel, glass cutter in confined areas to extricate victims.	1.00	0.20	0.60	0.80
4. Dragging an incapacitated partner or victim by one firefighter/medic from a damaged or burning structure.	1.00	1.00	1.00	0.80
5. Carrying an incapacitated partner or victim by two firefighters/medics from a damaged or burning structure.	1.00	1.00	1.00	1.00
6. Two firefighters/medics carrying a patient without a back board during an emergency.	1.00	0.80	0.80	0.80
7. Two firefighters/medics carrying a patient on a back board during an emergency.	1.00	0.80	0.80	0.80
8. Digging to free victims trapped in tunnels, pipes, excavations or cave-ins or other entrapments using shovels, picks, spades or other hand tools.	1.00	0.40	0.60	0.60
9. Climbing or crawling through confined spaces in a structural fire while carrying a hand tool.	0.60	0.60	0.80	1.00
10. While carrying equipment, walking or crawling along joists where balance and careful foot placement are required in order to prevent unnecessary structural damage.	0.00	0.20	0.00	1.00
11. Carrying or assisting victims down ladder or stairs using drags, cots, or improvised equipment and proper lifting techniques.	0.60	0.80	0.20	0.80
12. Physically restraining violent or emotionally disturbed individual for their own safety or the safety of others.	1.00	0.80	0.60	0.20
13. Two firefighters/medics transporting very large individual (300+ lbs.) down multiple flights of stairs.	1.00	1.00	0.80	0.80
Task 6. Salvage and Clean Up				
1. Carrying, pushing, throwing, or dragging mattresses, furniture, or other property from structures.	0.80	0.60	0.20	0.20
2. Removing, carrying and throwing salvage covers to protect equipment.	0.80	0.40	0.00	0.40
3. Tearing down dangerous structural components using hand or power tools.	1.00	0.40	0.20	0.60

Physically Limiting Tasks	Upper Body Strength (0 = No, 1 = Yes)	Lower Body Strength (0 = No, 1 = Yes)	Aerobic Capacity (0 = No, 1 = Yes)	Coordination/ Agility (0 = No, 1 = Yes)
4. Removing debris from fire scene.	0.80	0.40	0.40	0.40
5. Rolling up hose and placing on apparatus.	0.60	0.40	0.00	0.60
6. Hanging and rolling hose in the station.	0.40	0.20	0.00	0.60
7. Cleaning equipment in the station.	0.60	0.20	0.00	0.00
8. Using heavier power tools such as power saws or chain saws for extended period of 5 minutes or more to tear down dangerous structures.	1.00	0.40	0.40	0.40
9. Carrying undamaged furniture from burning buildings to reduce fire and smoke damage to building and contents.	0.80	0.60	0.20	0.60
10. Tearing down or shoring up weak and dangerous structural components (floors, overhangs, cornices, etc.).	0.80	0.40	0.00	0.40
Task 7. Movement in Hazardous Environment				
1. Walking along uneven/narrow surfaces (i.e., roof) or ceiling joints.	0.00	0.20	0.20	1.00
2. Operating at elevated heights (i.e., top of a 100-foot ladder truck).	0.60	0.40	0.00	1.00
3. Moving through debris, garbage, and furniture at the fire site that impedes movement.	0.60	0.60	0.40	0.80
4. Pulling self up and over obstacles or into an opening.	1.00	0.80	0.00	0.60
5. Climbing fence or wall in full protective clothing with equipment.	1.00	0.60	0.20	0.60
6. Crawling for 100 feet or more in confined space or to stay below smoke.	0.40	0.60	0.60	0.80
7. Moving through deteriorating conditions at fire site (particularly in winter as water freezes).	0.40	0.40	0.40	0.40
8. Repeated exit and entry from fire site in winter, resulting in large fluctuations in body temperature.	0.40	0.60	0.60	0.20
9. Repeated exit and entry from fire site in summer, high heat conditions such that there is inadequate opportunity to cool down.	0.40	0.60	0.60	0.20

CONTINUOUS EFFORT RATINGS

In addition to rating each individual physically limiting task, the SMEs also rated the overall expected time at a fire scene and the expected time of continuous effort. All SMEs agreed that in "normal" fire-scene situations, it is expected to take one to four hours to perform all necessary tasks from staging to clean-up. In "more difficult" fire-scene situations, all of the SMEs expected it would be over four hours to perform all necessary tasks. However, the expected amount of time of *continuous effort* was rated as under an hour. Specifically, all but one SME felt that in "normal" situations, 10 to 30 minutes is the expected amount of continuous effort without a significant break for rest and recovery. The majority of the SMEs agreed that 30 to 60 minutes was the expected time of continuous effort for "more difficult" situations. On average, five to 10 minutes of "all out" effort was expected for "normal" and "more difficult" fire-scene situations. Overall, the results indicate that even though time spent at a fire scene may be over a long period of time, the time spent engaging in continuous effort ranges from five to 60 minutes, depending on the situation.

TASK ANALYSIS ITEMS MOST RELATED TO DELAWARE FD PAT EVENTS

The physically limiting task analysis provided evidence for the validity, effectiveness, and job-relatedness of Delaware FD's current PAT events. Below, each event, except for the 500 Yard Shuttle Run, was related to at least one highly rated item from the physically limiting task analysis in terms of both criticality and physical effort. Although the 500-yard Shuttle Run is not directly linked to the physically limiting task analysis, the event requires upper and lower body strength, aerobic capacity, and coordination/agility, and each of these physical dimensions is important to successful performance of the physically limiting tasks. What this tells us is that the events currently being used in the PAT are assessing real, on-the-job experiences that are both critical and physically demanding for firefighters.

Task 1. Aerial Ladder Climb (85 Feet)

	Criticality	Physical Effort	Typical Time During Call
Climbing a ladder (in excess of 100 ft. in height) during a structural fire.	3.80	3.40	2.60
Climbing a ladder (in excess of 100 ft.) while carrying tools.	4.00	3.40	2.00

Task 2. Pulling a Charged 2 ½ inch Hose with Nozzle Attached (2 Sections – 100 Feet)

	Criticality	Physical Effort	Typical Time During Call
One firefighter maneuvering a charged 2 ½ inch hoseline.	4.00	5.00	2.60
Dragging a charged hose through a fire site, both inside (hallways/stairways) and outside (obstacles/icy conditions).	4.80	4.40	4.20

Task 3. Removal of a 24-Foot Extension Ladder

	Criticality	Physical Effort	Typical Time During Call
Removing, carrying, or raising of a 28 ft. ground extension ladder by one person at a structural fire.	4.00	3.80	2.60

Task 4. Stairway Climb

	Criticality	Physical Effort	Typical Time During Call
Climbing stairs in structural fire wearing full protective gear with loads of 10-50 lbs. of firefighter tools, Hotel Pack, attack lines, air bottles, and other similar equipment (1 to 3 flights of stairs).	4.20	4.00	3.20
In high-rise fires, climbing stairs wearing full protective gear with loads of 10-50 lbs. of firefighter tools, Hotel Pack, attack lines, air bottles, and other similar equipment (4 to 5 flights of stairs).	4.00	4.00	3.80

Task 5. Fly Ladder Raise

	Criticality	Physical Effort	Typical Time During Call
Extend the fly of a 35 ft. ground extension ladder by hoisting with a rope.	3.60	3.20	1.20

Task 6. Weight Lift and Twist

	Criticality	Physical Effort	Typical Time During Call
Moving heavy objects to gain access to fire and/or to free trapped persons.	4.60	4.20	3.00
Moving and carrying heavy objects, equipment, or materials to or to free trapped firefighters or victims.	4.60	4.40	3.40
Digging to free victims trapped in tunnels, pipes, excavations, or cave-ins or other entrapments using shovels, picks, spades, or other hand tools.	4.00	3.60	5.20

Task 7. Sandbag Lift and Drag

	Criticality	Physical Effort	Typical Time During Call
Dragging an incapacitated partner or victim by one firefighter from a damaged or burning building.	5.00	5.00	3.60
Carrying or assisting victims down ladder or stairs using drags, cots, or improvised equipment and proper lifting techniques.	4.40	4.00	2.60
Carrying an incapacitated partner or victim by two firefighters from a damaged or burning building.	5.00	5.00	3.60

Task 8. 500 Yard Shuttle Run

	Criticality	Physical Effort	Typical Time During Call
Not linked to a particular task. Event involves lower body strength, upper body strength, aerobic capacity, and agility, which are all documented as being important for successful performance.	NA	NA	NA

Task 9. Bent Knee Sit-Ups*

	Criticality	Physical Effort	Typical Time During Call
Carrying equipment from emergency scene; cutting, lifting, or prying open vehicles, machinery, etc., to free persons trapped or pinned inside using appropriate extrication tools.	4.40	4.00	3.60
Carrying or assisting victims down ladder or stairs using drags, cots, or improvised equipment and proper lifting techniques.	4.40	4.00	2.60
While carrying equipment, walking, or crawling along joists where balance and careful foot placement are required in order to prevent unnecessary structural damage.	3.60	3.00	2.60

*Although sit-ups are not a simulated event, core strength is required for all types of movement, including bending, lifting, twisting, carrying, hammering, reaching overhead, sitting, and standing, which are all movements documented as being critical to successful firefighter performance. Additionally, core strength is important for balance and stability, which are also found to be important for successful performance.

Task 10. Wearing a Gas Mask

	Criticality	Physical Effort	Typical Time During Call
Crawling through smoke-filled structure pulling charged hoseline.	4.80	4.60	4.20
Climbing or crawling through confined spaces in a structural fire while carrying a hand tool.	4.20	3.60	4.80
Crawling for 100 feet or more in confined space or to stay below smoke.	4.40	3.40	4.00

Task 11. Beam Walk with Hose

	Criticality	Physical Effort	Typical Time During Call
While carrying equipment, walking or crawling along joists where balance and careful foot placement are required in order to prevent unnecessary structural damage.	3.60	3.00	2.60
Walking along uneven/narrow surfaces (e.g., roof) or ceiling joints.	3.00	2.60	2.80

Proposed Event - Hose Hoist

	Criticality	Physical Effort	Typical Time During Call
Hoisting tools or other equipment (saws, hand tools, fans, ladders, hose) using rope.	3.20	3.60	2.20

Part 3

PHYSICAL ABILITY STANDARDS

PHYSIOLOGY

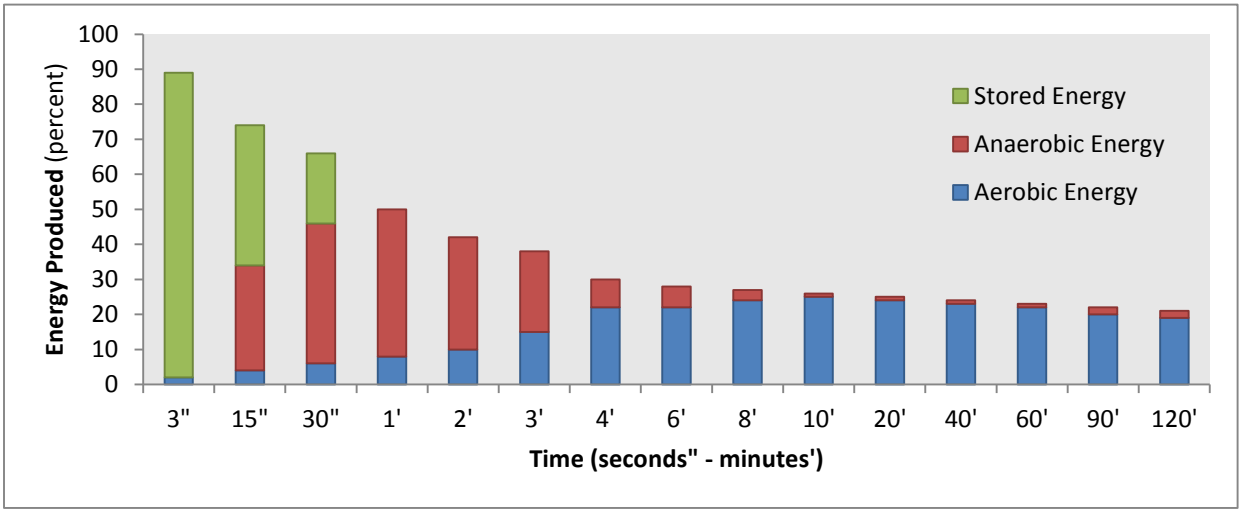
There are two primary physical dimensions to the performance of any task: strength and stamina. Strength is defined as sufficient muscle mass to exert enough force to move and handle objects required by the job. Stamina represents the body's ability to utilize oxygen to produce energy in sustaining prolonged repetitive activity.

STAMINA

The amount of energy required at rest is so small that the human body does not consume much oxygen. Accordingly, the resting energy needs are easily met by the aerobic system. During the initial stages of exercise, however, the situation changes. When the work demands placed on an individual's body increase, the body needs extra energy immediately. Unfortunately, the rate of aerobic energy production is sluggish (i.e., oxygen must be breathed in, transferred from the lungs to the blood, carried to the heart, and then pumped to the muscles where it is actually needed). Thus, a delay exists in the delivery of oxygen from the outside. If a sudden demand for more energy arises, an emergency back-up system must exist that will permit the body to function until the aerobic "assembly line" speeds up its production. The anaerobic energy system serves this function.

Since a specific amount of work requires a given amount of energy, the body must always have an appropriate level of energy available to meet the demands placed on it. The following figure illustrates how energy is produced during the initial stages of exercise and during moderate intensity exercise:

FIGURE 3.1 – RELATIVE IMPORTANCE OF VARIOUS ENERGY PRODUCING SYSTEMS OVER TIME[1]



After five to six minutes of continuous exercise, the majority of energy the body requires has to be produced aerobically. The longer the duration of exercise, the greater the importance of the aerobic system. Exercise over 10 minutes has to be performed aerobically, except for the occasional and brief increases in work output in which the anaerobic system can again contribute briefly.

A key concept for fitness standards is maximal oxygen uptake. This has been described by Astrand[2]:

> ***Maximal oxygen uptake.*** *If an individual increases the intensity level of exercise, a number of things will happen. Increases occur in heart rate, respiration and oxygen intake, as well as in the activity levels of other parts of the aerobic systems. A point occurs, however, beyond which oxygen intake cannot increase even though more work is being performed. At this point, the individual has reached a level that is commonly referred to as maximal oxygen uptake (VO2 max). This measure is considered to be the best single indicator of aerobic fitness, since it involves the optimal ability of three major systems of the body (pulmonary, cardiovascular and muscular) to take in, transport and utilize oxygen. Thus, the higher an individual's level of maximal oxygen uptake, the greater the level of physical work that can be performed.*

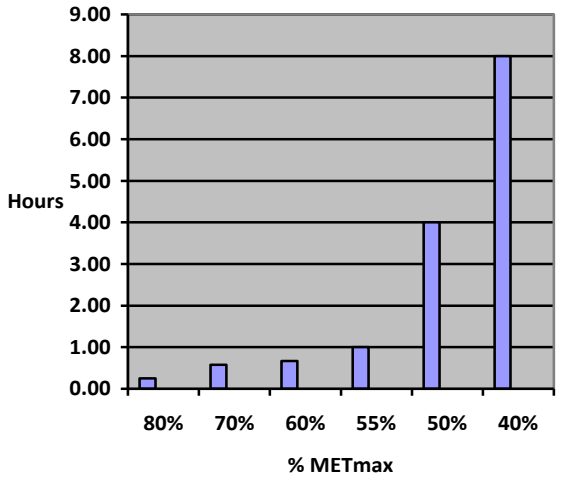
[1]Figure from Body Energy 1981 James Skinner, Anderson World Inc.

[2]Astrand, P.O., & K. Rodahl. Textbook of Work Physiology, 3rd ed. New York, NY: McGraw-Hill, 1986

VO2Max is a measure of oxygen consumption relative to body size. Another common measure which we prefer is normalized for body size and is referred to as METs. One MET is the energy expenditure at rest, 3 METs is 3 times that energy expenditure and 10 METs is 10 times rest. Most of the energy cost of work is moving your own body around. Thus, walking is a 3 MET task for everyone, large or small. However, when external loads are added, the relative work load is dependent upon body size. Walking with a 40 lb. pack may be a 4.5 MET task for a 220 lb. individual and a 5.5 MET task for a 160 lb. individual.

There is a relationship between maximum aerobic capacity and the length of time effort can be maintained. Effort within 85-90% of maximum capacity can be sustained for up to 10 minutes. Day or shift-long efforts can be sustained if the workload is no more than 40% of maximum capacity. This is a level of effort commonly found in industrial work settings. Hour-long efforts can be sustained if the workload is within 50-60% of maximum capacity. See Figure 3.2.

FIGURE 3.2 – MAXIMAL AEROBIC CAPACITY AND POSSIBLE ENDURANCE



The strength and stamina requirements of essential job functions can be directly measured in many circumstances. This can be as simple as weighing objects that firefighters must handle or as complex as assessing force exerted to chop through a roof. Whatever essential job functions represent sustained physical activity, that is activity that lasts 10 minutes or longer, aerobic capacity comes into play. The aerobic requirements of essential job functions can be assessed by simulating those functions while firefighters wear heart-rate monitors to gauge the level of energy expenditure. An alternative to the direct measurement of strength and stamina requirements is to have firefighters rate the performance of these tasks using anchored rating scales. For the study reported above, we have relied on estimates derived from existing research in which energy costs have been directly measured.

In reading this section, it is important to remember some terms. Energy cost can be defined in a number of ways, all of which relate to fuel being utilized by the body. Our measurements of energy consumption relate to heart rate (HR) which in turn relates to volume of oxygen entering the blood stream. Thus, energy cost is often expressed as milliliters of oxygen per kilogram of body weight per minute or ml/kg/min. This is an absolute measure of fuel being consumed. A measure that is relative to body size is known as METs. The conversion formula for ml/kg/min is to divide this value by 3.5. A VO2max value of 45 ml/kg/min is equivalent to 12.85 METs.

RESERVE CAPACITY

Physical ability tests, especially work sample type tests, often focus on the capacity needed to perform a single repetition of a key job task. Testing if an individual can barely perform the task once ignores reserve capacity needed to perform tasks safely. This type of test does not provide information on how hard this task is for a given person. Individuals working near their maximum strength capacity are three times more likely to suffer muscular-skeletal strain type injuries. Ayoub, Selan, and Jiang (1987)[3], reported that the critical point approximates 75% of capacity for occasional lifting (a few times per hour). They further delineated normative percentage of maximum for repetitive day-long lifting that individuals could lift safely. For lifting tasks, approximately 15-20% of an individual's strength capacity is the acceptable limit for continuous work. For periodic lifting tasks, 50-60% of capacity is within safe limits, while 75-85% of capacity can be acceptable if the lifts occur only a few times per shift, or less. Thus, by knowing the weights that have to be lifted and the frequency that they have to be lifted, maximum strength requirements are determined so that individuals can safely perform the job.

When it comes to stamina-related tasks the same rationale is appropriate. It has been determined through many years of research that for repetitive tasks, over an eight-hour workday with normal breaks, an individual will not normally function at an aerobic intensity greater than 30-40% of her/his maximum aerobic capacity. For firefighters, it is more often the intermittent workloads that can last between 15 minutes and one hour. Higher intermittent workloads can be handled provided that the demand does not exceed 50-60% of the individual's maximum capacity for 30-minute periods, or 75-85% of capacity for 15-minute periods.

IMPACT OF BODY SIZE AND PACE ON TASK PERFORMANCE

In order to understand candidate performance on any work simulation task, it is important to consider the impact of the workload relative to the size of the candidate. There is a different absolute energy cost for a smaller person carrying loads than a larger person. To understand the impact of body size and also to estimate work load in firefighter tasks, we use a well-established formula developed for the military that estimates workload based on load carried, body size, speed of walking, and terrain. The formula is known as the Pandolf Equation[4] (continued on the next page):

[3]Ayoub, M. M., Selan J. J., & Jiang B. C. (1987). *Manual Materials Handling in Handbook of Human Factors Engineering* Ed. Salvendy Gavriel, Chischester. New York, NY: John Wiley.

[4]Pandolf, K., Givoni, B., & Goldman, R. (1978). Predicting energy expenditure with loads while standing or walking. *Journal of Applied Physiology, 43,* 577–581.

$M_w=1.5*W+2.0*(W+L)*(L/W)^2+T*(W+L)*(1.5*V2+0.35*V*G)$

Where: M_w = Metabolic Cost of Walking (Watts)

W = Body Mass (kg)

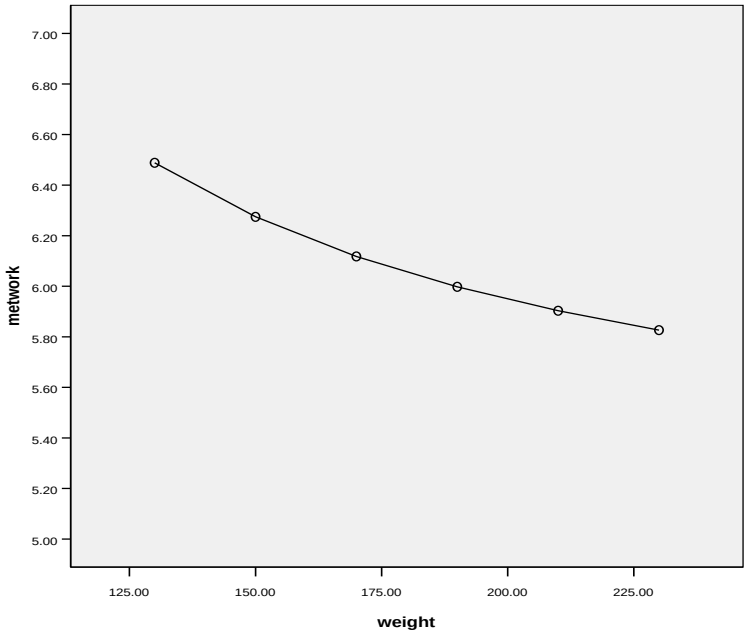
L = Load Mass (kg)

T = Terrain Factor (1.0 = Black Top Road; 1.1 = Dirt Road; 1.2 = Light Brush; 1.5 = Heavy Brush; 1.8 = Swampy Bog; 2.1 = Loose Sand; Snow, dependent on depth of depression

(T=1.30+0.082*D, where D=depression depth in cm)(110)

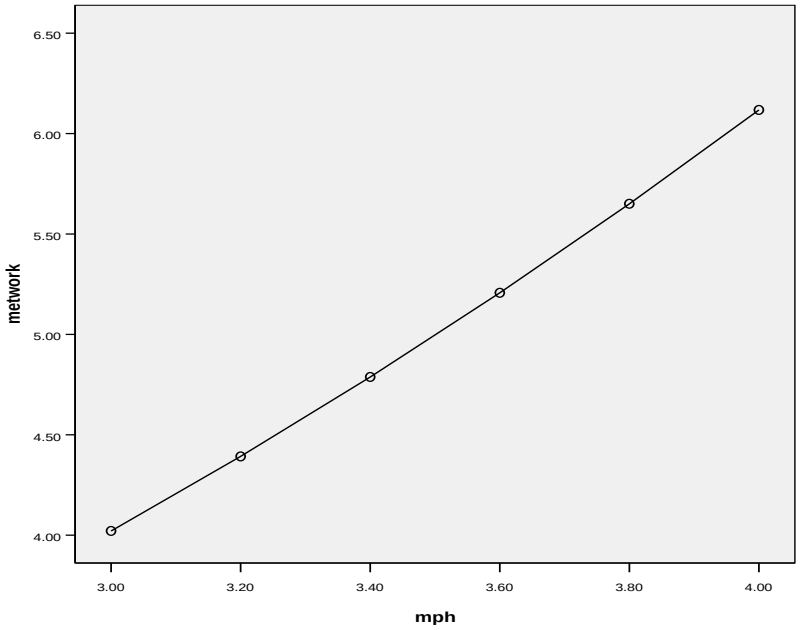
The Pandolf equation has been independently validated using a range of loads and body masses. Holding most of the variables constant and varying body mass, we can chart the impact of different body sizes when carrying a 40-pound load on a level paved road. See Figure 3.3.

FIGURE 3.3 – IMPACT OF PARTICIPANT WEIGHT ON WORK LOAD (METS) IN WALKING TASK WHILE CARRYING 40-POUND PACK



As shown in figure 3.4, when walking at 4 mph with a 40 lb. pack, a 130 lb. person has a workload of 6.5 METs and a 220 lb. person has a workload of 5.9 METs. One way to equalize the demand is to modify the work pace. Figure 3.4 shows how walking speed has a dramatic impact on total workload. Walking at 3 mph with a 40 lb. pack has a 4 MET workload while walking at 4 mph has a 6.2 MET workload (for a 170 lb. individual). Thus, giving slightly more time to complete tasks for smaller individuals has the effect of equalizing the total workload of the test. It is interesting to note that walking speed has a relatively higher impact on workload than body size. This is true because in most tasks, moving your own body is the major proportion of the work. A consequence is that a smaller person only has to slow down a slight amount to equalize their workload with a larger person.

FIGURE 3.4 – IMPACT OF WALKING SPEED ON WORK LOAD (METS) WHILE CARRYING 40-POUND PACK



STRENGTH DEMANDS FOR FIREFIGHTERS

LIFTING AND CARRYING OF TOOLS AND EQUIPMENT

The following are examples of maximum lifting and carrying. The distances carried vary greatly depending upon fire scene. Almost all lifting and carrying would have the additional weight of SCBA and personal protective gear (about 50 lbs.). Table 3.1 provides a list of examples of objects handled by firefighters. The weights and lifting/pulling forces were obtained from a number of sources, including product catalogs, direct measurement of the objects by Ergometrics, and published research. The principal published references were:

- Gledhill, N. & Jamnik, V. K. (1992). Characterization of the physical demands of firefighting. *Canadian Journal of Sport Sciences, 17(*3), 207-213.
- Jamnik, V. K. & Gledhill, N. (1992). Development of fitness screening protocols for physically demanding occupations. *Canadian Journal of Sport Sciences, 17*(3), 222-227
- Job Demands Analysis City of Vancouver Firefighter, *Human Effort*, 1999. Retrieved from http://www.metrovancouver.org/services/labour/Physical%20Job%20Demands%20Analysis/PJDAFireFighterVan.pdf

TABLE 3.1 – STRENGTH DEMANDS

Object	Weight/Force	Range of Motion	Assistance
Hand Suction Hose	92	Carry/Lift - Below waist to overhead	2 person
Stretcher	65-150	Carry/Lift - Ground to overhead	2 person
Dry Chemical Extinguisher	52	Carry/Lift - Below waist to shoulder	1 person
Spreader/Extrication Tools	52	Carry/Lift - Ground to waist	
CO2 Extinguisher	44	Carry/Lift - Ground to waist	
SCBA	30	Carry/Lift - Ground to shoulder	
Remove 35 ft, Ladders from Aerial Storage	95	Carry/Lift - Ground to shoulder	2 person
24 ft, ladder	67	Carry/Lift - Ground to shoulder	
Sand Pail, Carry 100 ft. at Auto Accidents	79	Carry/Lift - Ground to waist	
Come Along or Pike Pole	15	Carry/Lift - Ground to overhead	
Hoses			
5 ½ inch hose (100 ft.)	124	Carry/Lift - Ground to waist	2 person
3 inch (50 ft.)	57	Carry/Lift - Ground to shoulder	
2 ½ inch (50 ft.)	50	Carry/Lift - Ground to shoulder	
2 ½ inch Charged Hose	150 (total weight) 33 lbs. to lift one end	Carry/Lift - Ground to shoulder	
1 ¾ inch (50 ft.)	19	Carry/Lift - Ground to shoulder	
1 ¾ inch Charged Hose (50 ft.)	75 (total weight) 25 lbs. to lift one end	Lift - Ground to shoulder	
1 ½ inch (50 ft.)	15	Carry/Lift - Ground to shoulder	
High-Rise Hose Pack	75	Carry/Lift - Ground to shoulder	
Pike Pole on ceiling	44-70	Reach - Shoulder or above	
Two 50 ft, 1 ¾ inch Sections Charged Hose	50-60	Pulling - hip/leg involved	Surface impacts resistance
100 ft, 3 inch Dry Hose	39	Pulling - hip/leg involved	
3 50 ft, sections of 1 ¾ inch Charged Hose	65-100lbs. depending on length and drag friction. (90 avg.)	Pulling - hip/leg involved	
Pulling 3 sections 1 ¾ inch Hose with Hand Line	35-70	Pulling - hip/leg involved	

From an analysis of the equipment weights and forces encountered in firefighting operations, it was determined that the most commonly required muscular strength and endurance demands were the result of lifting and carrying firefighter equipment, pulling and dragging hoses, and victim rescue. Most of the limiting strength tasks could be performed using the entire body, including legs and core body strength. Lifting ground to waist height of 50-75 lbs. is common, with some tasks requiring up to 100 lbs. The most sustained lifting activity would be when hoisting objects using ropes. Objects such as ladders would need to be lifted to shoulder height, requiring up to 70 lbs. Dragging a charged hose with resistance up to 100 lbs. would also be a minimum requirement. Dragging a 170 lb. victim would also require 100 lbs. of force. These exertions are not repetitious, and for the most part would only be performed once or twice in a row. Efforts would generally be less than one minute. Thus, a firefighter could handle these demands safely as long as their maximum capacity was 10-15% higher.

Thus, minimum strength requirements are defined by:

- Ability to lift floor to waist 110 lbs.
- Ability to lift to shoulder 85 lbs.
- Ability to drag for 100 feet against a resistance of 100 lbs.
- Ability to hoist loads up to 50 feet and weighing 50 lbs.

STRENGTH DEMANDS IMPOSED BY THE DELAWARE FD PAT

Given the preceding discussion of strength requirements, it is appropriate to compare these findings to the measured forces exerted in the existing Delaware FD PAT. Table 3.2 lists these forces. The efforts required do not exceed in any category the minimum abilities defined by the job analysis.

TABLE 3.2 – FORCES EXERTED ON DELAWARE FD PAT

Equipment	Quantity	Weight	Force	Range of Motion
Event #1 Aerial Ladder Climb				
Ladder Belt	1	3.6	7	
Event #2 2 ½" Hoseline Pull				
2 ½" Hose 50' Sections w/ 2 ½" nozzle	2		92.67	Dragging for measurement over shoulder for test
Event #3 Removal of 24' Ladder				
24' Extension Ladder	1	78	Lift from rack: 77.33 Lift from ground: 41	
Event #4 Stairway Climb				
1 ½" Hose Rolled in bag	2	45		
1 ½" Nozzle	1	5		
SCBA w/ Bottle, no Mask	1	31		
Total # of steps involved	93 up, 93 down, total = 186			
Event #5 Fly Ladder Raise				
35' Extension Ladder	1		45	Hand over hand
Event #6 Weight Lift & Twist				
15 Pound Weight	1	15		
Event #7 Sandbag Lift and Drag				
125 Pound Sandbag	1	125	Lift: 141.67 Pull: 102	
Event #8 500 Yard Shuttle Run				
Box fan	1	52		Lift from ground

Equipment	Quantity	Weight	Force	Range of Motion
Salvage Cover	1	21		Lift from ground
2 ½" Nozzle	1	13		Lift from ground
Halligan Bar	1	8		Lift from ground
1 ¾" Hose 200' (50' Sections) w/ 1 ½" nozzle	4		71 start, 134.5 end	
Event #9 Bent Knee Sit-Ups				
N/A				
Event #10 Wearing a Gas Mask				
N/A				
Event #11 Beam Walk with Hose				
1 ½" Hose Rolled (50')	1	19		Lift to chest, pick up from ground
Proposed New Event Hose Hoist				
Hose Hoist			56.5	

AEROBIC DEMANDS OF FIREFIGHTERS

Research clearly supports the high physical demand of performing firefighter tasks. Tasks performed for sustained times of one to two hours average maximal oxygen uptake (V02max) of 23.4 ml/kg/min or 6.7 METS (Gledhill and Jamnik[5] , 1992). Gledhill and Jamnik also support that there are peak demands that averaged 41.5 ml/kg/min or 11.8 METS. Both sustained lower MET tasks and periodic higher MET tasks require a maximum fitness level around 12-12.8 METs (Gledhill and Jamnik, 1992; Sharkey, 1970; Sothmann et al, 1990; Spurlin and Doolittle, 1980).

Research by Brian Sharkey for the US Forest Service in the 1970's established an aerobic capacity of 45 ml/kg/min (12.8 METs) to be the recommended minimum for wildland firefighters. Sothmann et al.[6] review of the field found 42 and 45 ml/kg/min to be the most frequently defined standards. There is sufficient research to conclude that 42 (12 METs) would be the minimum standard and 45 (12.8 METs) the more desirable standard (Spurlin & Doolittle, 1980).

[6]Sothmann, M., Saupe, K., Jasenof, D., Blaney, J., Fuhrman, S. D., Woulfe, T., Raven, P. B., Pawelczyk, J. P. Dotson, C. O., Landy, F. J., & Smith, J. J. (1990). Advancing age and the cardiorespiratory stress of fire suppression: Determining a minimum standard for aerobic fitness. *Human Performance, 3*(4), 217-236.

A sample of the energy costs for various firefighter tasks is shown in Table 3.3 to demonstrate the energy costs of the various tasks (Gledhill & Jamnik, 1992; Sharkey, 1970). To be clear, 12 METs represents a consensus of research findings on the aerobic capacity required to handle typical firefighter tasks. This does not necessarily mean that 12 METs should be the minimum passing score on an entry-level or incumbent test. Setting a passing-point determination must take into account a number of factors such as error of measurement in the test protocol and organizational goals, in addition to the goal of reaching a target fitness level.

TABLE 3.3 – AEROBIC DEMANDS WHILE PERFORMING SAMPLE OF DEMANDING FIREFIGHTER TASKS

Task	METs
Using a hand tool (for instance, digging or chopping with a Pulaski, combitool, McLeod, or brush hook)	6.4
Lifting and carrying light loads (examples are clearing loose brush or trees, deploying or repositioning hose, throwing dirt with a shovel, firing operations, or structure protection)	5.7
Hiking with light loads (field pack and tools)	5.4
Performing under adverse conditions (including long work shifts; rough, steep terrain; heat, cold, altitude, smoke; insufficient food, inadequate fluid replacement, lack of sleep)	5.4 - 8.6+
Emergency responses (fast pull-out to safety zone, rescue, or evacuation assistance to others)	8.6+
Carrying 50 to 74 lb. load, upstairs	9.4
Climbing ladder with full gear	10.2
Walking on level with SCBA and protective gear	5.4
Carry equipment up high-rise stairs such as high-rise pack + tools	12.6
Advance 200’ dry 2 ½ inch hose	7.3
Advance charged 2 ½ inch hose	8.8
Forcible entry	8.7
Pitched roof ventilation	8.1
Raising fly section of 50’ ladder	4.8
Working with a pike pole	6.7
Victim rescue – carry (143 lbs.)	5.0
Victim rescue – drag (200 lbs.)	5.7
Hoist 50’ hose	7.6
Automobile rescue – carry equipment	5.8
Automobile rescue – extrication with tools	6.3

Part 4

ANALYSIS OF DELAWARE FD PAT

The best way to understand the physiological demands of the Delaware FD PAT was to conduct an analysis in which we closely monitored a sample of job incumbents. For this experiment we used the same course and test protocol created by Delaware FD. Additionally, one new event recently developed by Delaware FD incumbents was also examined.

All participants wore a heart-rate monitor throughout the test and recordings of heart rate were taken during completion of the test. A submaximal fitness test was also administered to all participants prior to going through the Delaware FD PAT.

PARTICIPANTS

A total of five incumbent firefighters that represented a range in terms of age and size participated in the data collection. Most of the incumbents had more than six years of experience. Summary statistics are shown in Table 4.1.

TABLE 4.1 – PILOT TEST PARTICIPANTS

Participant Variable	Minimum	Maximum	Average
Age	21	49	33.60
Weight (pounds)	150	210	180.60
Height (inches)	69	70	69.60
Body Mass Index	22.15	30.13	26.18
Gender	NA	100% Male	NA
Ethnicity	NA	100% Caucasian	NA

The average participant age was 34. All of the participants were Caucasian males. It was a generally fit population as can be seen by the Body Mass Index (average = 26.18, which is technically considered overweight, however this is not a problem in individuals who are highly muscular). Body Mass Index was based on the metric formula:

BMI = (Weight in Kilograms/(Height in Meters x Height in Meters))

Maximum heart rate was calculated with the equation:

MHR = 191.5 - (0.007 * age*2).

HEART RATE

For each event, heart rate was recorded at the start of the event and at the end of the event. The most challenging events included the Aerial Ladder Climb, Pulling Charged Hose, Stairway Climb, Sandbag Lift

and Drag, and the 500-yard Shuttle Run. The least taxing events included Wearing a Gas Mask, Bent-knee Sit-ups, and the Fly Ladder Raise. Although, on average, heart rates remained high throughout the PAT, incumbents still had some recovery time, which is demonstrated by all of the starting heart rates being lower than the ending heart rates.

TABLE 4.2 – STARTING HEART RATE FOR EACH EVENT

	EVENT	Minimum	Maximum	Mean	Std. Deviation
1	Aerial Ladder Climb	81	124	95.20	16.78
2	Pulling Charged Hose	91	135	114.20	17.60
3	Removal of 24-Foot Extension Ladder	92	136	115.60	17.23
4	Stairway Climb	110	154	131.80	20.01
5	Fly Ladder Raise	96	128	109.80	11.54
6	Weight Lift and Twist	94	125	108.60	14.33
7	Sandbag Lift and Drag	96	128	113.80	13.88
8	500 Yard Shuttle Run	106	144	119.60	17.40
9	Bent Knee Sit-Ups	90	128	117.00	15.33
10	Wearing a Gas Mask	100	125	110.80	11.21
11	Beam Walk with Hose	96	132	111.20	14.03
	Average Maximum Heart Rate	**174.69**	**188.41**	**182.91**	**5.43**
	Percent of Maximum Heart Rate	**46%**	**66%**	**52%**	
	Hose Hoist (Proposed New Event)	90	110	101.33	10.26

TABLE 4.3 – ENDING HEART RATE FOR EACH EVENT

	EVENT	Minimum	Maximum	Mean	Std. Deviation
1	Aerial Ladder Climb	124	162	145.40	15.39
2	Pulling Charged Hose	167	185	171.40	7.64
3	Removal of 24-Foot Extension Ladder	93	160	132.80	27.53
4	Stairway Climb	169	187	180.20	7.19
5	Fly Ladder Raise	87	158	123.20	27.26
6	Weight Lift and Twist	124	158	137.20	12.52
7	Sandbag Lift and Drag	142	163	154.20	9.60
8	500-yard Shuttle Run	170	190	177.60	7.44
9	Bent-knee Sit-Ups	110	142	130.60	12.08
10	Wearing a Gas Mask	101	120	111.20	8.59
11	Beam Walk with Hose	103	140	124.40	15.84
	Average Maximum Heart Rate	**174.69**	**188.41**	**182.91**	**5.43**
	Percent of Maximum Heart Rate	**72%**	**85%**	**79%**	
	Hose Hoist (Proposed New Event)	138	158	150.33	10.79

In addition to examining heart rate, overall performance time for each event was also examined. All incumbents successfully passed each event well below the maximum cutoff time, which is to be expected for physically fit, experienced firefighters.

TABLE 4.4 – PERFORMANCE TIMES FOR PAT (TOTAL SECONDS)

	Minimum	Maximum	Mean	Std. Deviation	Max Time
1. Aerial Ladder Climb	86	116	104.20	12.09	150
2. Pulling Charged Hose	13	19	16.00	2.83	30
3. Removal of 24-Foot Extension Ladder	11	16	12.80	1.92	Untimed
4. Stairway Climb	70	78	73.00	3.74	90
5. Fly Ladder Raise	19	29	24.20	4.15	60
6. Weight Lift and Twist	40	54	46.60	6.11	60 (fifteen twists)
7. Sandbag Lift and Drag	13	20	16.20	2.86	30
8. 500-yard Shuttle Run	154	176	161.80	10.45	210
9. Bent Knee Sit-Ups	24	39	33.40	5.68	60 (25 sit-ups)
10. Wearing a Gas Mask	28	44	34.60	6.23	Untimed
11. Beam Walk with Hose	12	37	20.00	9.93	90 (three attempts)
Hose Hoist (Proposed New Event)	**16**	**34**	**26.33**	**9.29**	**Undefined**

CANDIDATE PERFORMANCE

Delaware FD has been administering the PAT for many years. The department provided Ergometrics with candidate score sheets for the past three administrations to review, along with the incumbent information collected during the pilot testing. On average, candidates tended to take slightly longer on each event compared to the incumbent group. However, the majority of the candidates were able to complete each event within the allotted time. The table below provides the candidate performance times for each event.

TABLE 4.5 – CANDIDATE PERFORMANCE TIMES FOR PAT (TOTAL SECONDS)

	Minimum	Maximum	Mean	Std. Deviation	Max Time
1. Aerial Ladder Climb	81	178	118.51	18.28	150
2. Pulling Charged Hose	11	51	16.99	5.70	30
3. Removal of 24-Foot Extension	NA	NA	NA	NA	Untimed

	Minimum	Maximum	Mean	Std. Deviation	Max Time
Ladder					
4. Stairway Climb	60	115	75.83	7.88	90
5. Fly Ladder Raise	17	72	26.53	7.35	60
6. Weight Lift and Twist	18	56	29.82	9.55	60 (fifteen twists)
7. Sandbag Lift and Drag	11	24	16.07	2.58	30
8. 500-yard Shuttle Run	89	210	161.39	19.67	210
9. Bent-knee Sit-Ups	27	74	37.79	7.03	60 (25 sit-ups)
10. Wearing a Gas Mask	NA	NA	NA	NA	Untimed
11. Beam Walk with Hose	5	46	9.46	5.49	90 (three attempts)
PAT Total Time	470	628	542.80	65.99	

In addition to examining performance times, the passing rate between males and females was also examined. Unfortunately, there were only four female candidates in the sample, which does not allow for true comparisons across groups. However, it is clear that the second event is challenging for both females (three of the four failed on this event) and males (three of 100 failed on this event). Unfortunately, these candidates were not able to proceed to the next event so there is not enough data to make any gender comparisons for the rest of the events. The next hardest event was the Aerial Ladder Climb with three of 104 males failing the event (all four females passed this event).

TABLE 4.6 – CANDIDATE PASSING RATES BY GENDER

	Number of Males Passed Event	Number of Males Failed Event	Number of Females Passed Event	Number of Females Failed Event
1. Aerial Ladder Climb	101	3	4	0
2. Pulling Charged Hose	97	4	1	3
3. Removal of 24-Foot Extension Ladder	97	0	1	0
4. Stairway Climb	95	2	1	0
5. Fly Ladder Raise	95	0	1	0
6. Weight Lift and Twist	95	0	1	0
7. Sandbag Lift and Drag	95	0	1	0
8. 500 Yard Shuttle Run	95	0	1	0
9. Bent Knee Sit-Ups	94	1	1	0
10. Wearing a Gas Mask	94	0	1	0
11. Beam Walk with Hose	94	0	1	0

In addition to comparing candidate performance between males and females, the passing rates by timing of administration (i.e., March, August, and November) was also examined. The August administration had the most failures; however, this administration had three of the four female candidates included in this sample, which may partly explain the higher number of individuals not

passing during this administration. Overall, there does not appear to be significant differences in passing rates in terms of when the PAT is administered. The Department has noted that weather does have an impact on the administration (e.g., rain during the summer and snow during the winter), which could impact candidate performance and should be factored in when deciding whether or not to conduct the PAT inside versus outside.

TABLE 4.7 – CANDIDATE PASSING RATES BY ADMINISTRATION

	# Passed During August PAT	# Failed During August PAT	# Passed During March PAT	# Failed During March PAT	# Passed During November PAT	# Failed During November PAT
1. Aerial Ladder Climb	21	0	29	0	55	3
2. Pulling Charged Hose	15	6	29	0	54	1
3. Removal of 24-Foot Extension Ladder	15	0	29	0	54	0
4. Stairway Climb	14	1	28	1	54	0
5. Fly Ladder Raise	14	0	28	0	54	0
6. Weight Lift and Twist	14	0	28	0	54	0
7. Sandbag Lift and Drag	14	0	28	0	54	0
8. 500-yard Shuttle Run	14	0	28	0	54	0
9. Bent-knee Sit-Ups	14	0	28	0	53	1
10. Wearing a Gas Mask	14	0	28	0	53	0
11. Beam Walk with Hose	14	0	28	0	53	0

Part 5

PROPOSED PAT RECOMMENDATIONS

TESTING PROTOCOL

Our goal in recommending amendments to the current test was to determine if a firefighter candidate has the capacity to handle critical firefighter tasks in a safe and efficient manner and is most likely to be able to sustain an effort for the 20-30 minute periods required at an emergency. Thus, the focus is on demonstrating competence in task performance and the ability to contribute effectively to the team during the full course of an emergency response.

The tasks chosen for amendment within the test are very much in line with the critical tasks described in the physically limiting task analysis. The protocol is designed to keep a firefighter working at a representative MET load to what would be experienced on the fireground. Higher effort tasks are spaced throughout the PAT to allow for some fatigue recovery.

The events on the PAT are mostly simulations of actual tasks that Delaware FD Firefighters routinely perform. Thus, many of the events require at least some training to be able to know how to perform the events properly and safely. Orientations and practice sessions are highly encouraged so candidates can learn how to perform each event as well as practice performing each event to they are prepared on test day.

PROPOSED CHANGES TO EVENTS

Below, we have compared the current PAT events to proposed changes to the PAT and highlighted the changes in terms of both event and order.

	Current Event Protocol	Proposed Event Protocol
1	Aerial Ladder Climb	Aerial Ladder Climb
2	Pulling Charged 2 ½ Hose	Pulling Charged 1 ¾ Hose (Modified Event)
3	Removal of a 24-Foot Extension Ladder	Removal of a 24-Foot Extension Ladder
4	Stairway Climb	Stairway Climb
5	Fly Ladder Raise	Fly Ladder Raise
6	Weight Lift and Twist	Weight Lift and Twist
7	Sandbag (125 lb.) Lift and Drag	Rescue Drag (165 lb. Mannequin Dragged 100 ft.) (Modified Event)
8	500-yard Shuttle Run	Hose Hoist (New Event)
9	Bent-knee Sit-ups	Wearing a Gas Mask (New Order)
10	Wearing a Gas Mask	Beam Walk with Hose (New Order)
11	Beam Walk with Hose	CPR (New Event)

The first proposed change is to use a 1 ¾ inch hose instead of a 2 ½ inch hose for Event 2 – Pulling Charged Hose. Although one firefighter maneuvering a 2 ½ inch hose is documented as being a critical task of firefighters, it is also one of the most physically demanding tasks and requires a great deal of physical effort. The pilot test clearly illustrated that maneuvering a 2 ½ inch hose is one of the most challenging events of the Delaware PAT. An alternative is to switch to a 1 ¾ inch hose, which is documented to be critical and involve excessive physical effort but just not as intense as maneuvering a 2 ½ inch hose. Additionally, at a fire scene, it is more common for a single firefighter to maneuver a 1 ¾ inch hose, whereas it is more common for two firefighters to a 2 ½ inch hose together. This modification is supported by the results of the physically limiting task analysis.

The second proposed change is to modify Event 7 – Sandbag Lift and Drag so that it involves solely a rescue drag using a rescue mannequin (e.g., IAFF Rescue Randy, 165 lbs.) instead of a sandbag. Based on discussions with the Department, they commonly had issues with the sandbag tearing, so using a rescue mannequin, which is designed to be durable, would help in terms of the administration of this event. Additionally, it is proposed that the lifting element of the event be removed since lifting usually involves two firefighters and training is required to ensure firefighters use proper lifting techniques to prevent injuries. For this event, it is proposed that candidates drag a 165 lb. rescue mannequin approximately 70 to 100 ft. This modification is supported by the results of the physically limiting task analysis.

Due to the limited support for Event 8 – 500-yard Shuttle Run and Event 9 Bent-knee Sit-ups, it is proposed that these events be removed from the PAT. Although these events tap into physical dimensions required for successful performance of firefighters, there is not a direct connection between these events and physically limiting tasks performed by firefighters on the job. Additionally, the physical dimensions required to perform these events are assessed by the more job-related elements of the PAT.

It is proposed that after Event 7 – Rescue Drag, candidates move to a new event, the Hose Hoist, which was developed by Delaware FD incumbents and was pilot tested during the physically limiting task analysis. This proposed event is supported by the physically limited task analysis results. Candidates would then proceed to the event Wearing a Gas Mask (now Event 9) and then Beam Walk with Hose (now Event 10).

It is proposed that the last event be a new event, CPR, which would essentially replace the events, 500-yard Shuttle Run and Bent-knee Sit-ups. Administering cardiopulmonary resuscitation (CPR) is documented as being a critical and demanding task required for successful firefighter performance and it is commonly performed by Delaware FD firefighters. This event would be a good addition to the Delaware PAT to assess both upper body strength and aerobic capacity.

PROPOSED CHANGES IN SCORING

Currently the Delaware PAT is scored on a pass/fail basis, where candidates must pass each event. An alternative is to score each event using the following method:

- Candidates receive 1 point for completing events in the required time and for meeting all technical requirements
- Candidates receive 0 points for completing events over the ideal time but in less time than the disqualification time

- Candidates disqualified for completing events at or above the disqualification time or do not meet technical requirements

Essentially this scoring method allows a full point for each event in which the candidate is within an acceptable range of the target or ideal pace designed for the event. It also allows candidates to continue the test with 0 points if they fall under the maximum allowed time for the event. A candidate can still pass the test with no more than two zero-point event performances (9 out of 11 possible points). Overall, the goal of any entry-level PAT is to assess fitness at a minimum acceptable level for entry-level firefighters. This scoring method would likely increase the opportunity for candidates to demonstrate that they are at this minimally acceptable level. Provided below are proposed times to receive one point, zero points, and disqualification times.

TABLE 5.1 – PROPOSED SCORING TIMES FOR PAT

	Ideal Pace (1 Point) (sec)	Max Time for 0 Point (sec)	Disqualification Time (sec)
1. Aerial Ladder Climb	150	151-160	Over 160
2. Pulling Charged Hose	30	31-50	Over 50
3. Removal of 24-Foot Extension Ladder	25	26-35	Over 35
4. Stairway Climb	90	91-110	Over 110
5. Fly Ladder Raise	60	61-70	Over 70
6. Weight Lift and Twist	60	61-70	Over 70
7. Rescue Drag (Modified Event)	40	41-59	Over 59
8. Hose Hoist (New Event)	35	36-50	Over 50
9. Wearing a Gas Mask (New Order)	60	61-70	Over 70
10. Beam Walk with Hose (New Order)	90	91-95	Over 95
11. CPR (New Event)	120	NA	NA

PROPOSED CHANGES IN OVERALL PROTOCOL

For any testing process, consistency is critical. Candidates should receive the same information and be treated the same throughout the test. Ideally, a PAT should be administered indoors in a heated or cooled facility to maintain a temperature of approximately 70 degrees Fahrenheit. It is acceptable to test when facility temperature is between 60 and 80 degrees Fahrenheit. Temperature will likely not impact candidate performance in that range, but to ensure a smooth process and candidate satisfaction, 70 degrees is recommended. If testing inside is not feasibly possible, outdoor administration is acceptable. However, keep in mind that temperature and weather conditions cannot be controlled and may impact candidate performance. For example, rain may make Event 2 more difficult by increasing the weight of the hose.

In addition to having a consistent testing environment, consistency in instruction is also important. Prior to the PAT and while on the course, candidates should receive the same information. This includes receiving the same instructions as well as feedback in terms of pacing while performing an event.

As an example, provided below are sample instructions for the proposed CPR event:

Event Start:

"Kneel by the mannequin. You'll do compressions for 2 minutes. If you don't see two green lights, you're going too slow, you're in the wrong place, or you're not pressing hard enough. I'll tell you when to stop. Before the timer starts, you have 10 seconds to get on pace. Ready, set, go."

(Start timer.)

(For the first 10 seconds, give candidates any necessary feedback on pace, where to place hands, correct angle to press on chest, and how hard to press. Don't record any warnings during this 10 second period.)

After 10 seconds:

"Your two minutes start now."

Warnings (when applicable):

"Warning: First warning light."

"Warning: Second warning light."

Event Completion:

2 min. 10 sec. have elapsed on stopwatch:

"Stop. You have completed the test."

Lastly, candidate flow through the course should be controlled so that candidates have equal time on each event as well as equal recovery time between events. Instead of processing candidates in groups, where four to five candidates complete each event at a time, it is proposed that candidates go through the events individually to increase the consistency in terms of timing between events. More than one candidate can be on the course at one time, as long as they are spaced out so that one candidate is not waiting on another candidate to finish an event to be able to move forward. Consistency of the time between events is important since fluctuations across candidates may change the difficulty of the test. For example, the CPR Event would likely be easier for candidates who were able to rest for a few minutes while they wait for a group of candidates to finish the event compared to candidates who had no recovery time and moved directly from the Beam Walk to the CPR Event. Overall, standardizing the time between the events will provide candidates with the same amount of recovery time, which will enhance the fairness of the test.

EXAMPLE DESCRIPTION OF RESCUE DRAG EVENT

As noted above, one proposed modification is to change the Sandbag Lift and Drag to completely a rescue drag event. Provided is an example description of this event. From the starting point and in a standing position, candidates drag a rescue mannequin around a marked course for two laps. They drag the mannequin around a barrel drum or tire, continue along the course around another barrel drum or tire 25 feet away, and proceed back to the starting line. They repeat this process for a second lap. The event is completed when both the candidate and the mannequin have completely crossed the starting line on the second lap. Candidates must drag the mannequin using ONLY the pull harness attached to

the mannequin. It is unacceptable to drag the mannequin by a limb, lift under the mannequin's arms, or carry the mannequin.

EXAMPLE DESCRIPTION OF CPR EVENT

As noted above, one proposed modification is to add a CPR Event. Provided is an example description of this event. Time on the CPR event is controlled. Passing is based on correct performance only. The candidate kneels down next to the CPR mannequin and performs chest compressions at a rate of 100 compressions per minute for two minutes. Pacing is achieved by following LED warning lights on the mannequin. Two green lights indicate correct pace, one green light indicates slightly falling off pace, a yellow light indicates further falling off pace, and a red light indicates seriously off pace. The candidates are allowed 10 seconds at the start of CPR to achieve correct pacing for compressions with both green LED lights showing green. Time is started after the 10 second pacing practice is completed. The candidate then must maintain correct compressions until a total of two minutes have passed.

APPENDIX A

PHYSICALLY LIMITING TASK ANALYSIS INSTRUCTIONS

Introduction

You will now review a list containing several statements describing the tasks completed on the job. The tasks are grouped together by primary areas of responsibility. As you review this list, please consider the following and let the proctor know if any of the tasks need to be removed or edited or if a task needs to be added:

- Is each task performed on the job?
- Have there been any equipment or technology changes that have changed how any task is performed?
- Are there new operational procedures that have changed how any of the tasks are performed?
- Have there been any changes in shift scheduling or work/living organization that have changed how any of the tasks are performed?
- Have there been changes in the response area that have changed how any of the tasks are performed?
- Have there been changes in mutual aid that has changed how any of the tasks are performed?
- Has training changed how any of the tasks are performed?
- Are there any new tasks or categories of tasks that need to be added?

Any suggested changes will be discussed with the group. After the tasks are finalized, you will rate each task on a variety of scales.

APPENDIX B

PHYSICALLY LIMITING TASK ANALYSIS SURVEY

Purpose

In order to fulfill legal requirements for the use of tests in the selection and promotion of employees, it is necessary to obtain information on actual job requirements.

The information discussed and collected will be used only in documenting the validity of proposed new selection procedures. The information will be used for research purposes only. Only group-level data will be reported. The purpose of this study is to ensure that testing processes are valid and fair measures of the candidates' potential. Thank you for your participation in this project.

Demographic Information

Name _____
Rank _____
Job Title _____
Shift _____
Station _____
Length of Service in Department (Years) _____
Length of Service in Current Position (Years) _____

Ethnicity

- ❍ African American
- ❍ Asian
- ❍ Caucasian
- ❍ Hispanic
- ❍ Native American
- ❍ Two or more ethnicities
- ❍ Other

Gender

- ❍ Male
- ❍ Female

Age

- ❍ 18-24 years old
- ❍ 25-34 years old
- ❍ 35-44 years old
- ❍ 45-54 years old
- ❍ 55 years or older

Education

- ❍ High School/GED
- ❍ Some college
- ❍ 2 year college degree
- ❍ Bachelor's degree
- ❍ Advanced Degree (e.g., Master's, Ph.D.)

Instructions

This survey is to help us focus on critical/relevant physically limiting tasks. The first section, "Average Amount of Time Spent," asks you to estimate the amount of time a firefighter typically spends on each primary operation during an emergency where 2-4 hours total are spent on the scene.

The next section, "Specific Tasks," asks you to rate each task in the list. Please rate each task using the scales provided below. In addition, please note any suggestions for rewording task statements that can facilitate our in-person discussion. Think about what is missing from this list as well as adequacy of existing statements. Note that if you rate "not performed" for a particular task, you do not need to provide any other ratings for this task.

For the final section, "Continuous Effort," estimate the length of time a firefighter may spend in continuous effort (no significant rest periods) performing tasks at a fire scene. You will be asked to estimate the length of time in both a "normal" situations and "more difficult" situations that firefighters may encounter.

Task Rating Scales

Task Criticality:
How important is this task to successfully performing the job? Regardless of the frequency or amount of time spent on this task, indicate the task's criticality.

1	**Not Critical**	This task is not important to successful performance. Failure to perform this task properly would have no impact on the organization including the workload of others.
2	**Least Critical**	This task is somewhat important in the job, and may be useful for some small part of the job. Failure to perform this task properly would have little or only minor impact on the organization.
3	**Important**	This task is important for successful performance in the job. Failure to perform this task properly would have negative consequences for the organization.
4	**Critical**	This task is very important for successful performance in the job. Failure to perform this task properly would have noticeable negative consequences for the organization.
5	**Extremely Critical**	This task is one of the most essential tasks of the job and is extremely important to successful performance. Failure to perform this task properly would have significant negative consequences for the organization.

Physical Effort:
How much physical effort does this task require for the average firefighter?

1	**No effort**	This task requires no physical effort to successfully perform.
2	**Minimal Physical Effort**	This task requires minimal physical effort no greater than that encountered in everyday life.
3	**Moderate Physical Effort**	This task requires moderate physical effort increasing respiratory rate and placing some strain on muscles.
4	**Excessive Physical Effort**	This task requires excessive physical effort requiring nearly all of a firefighter's strength and endurance.
5	**Maximal Physical Effort**	This task requires the maximum amount of strength and endurance that a firefighter is capable of performing.

Typical Time Spent During Call on Primary Operation:
Regardless of the importance of the task, indicate how much time incumbents spend performing it during a typical emergency call.

1	**< 5 minutes**	**2**	**5-10 minutes**	**3**	**10-30 minutes**
4	**30-60 minutes**	**5**	**1-4 hours**	**6**	**> 4 hours**

Typical Time Spent During Call on Task:
Regardless of the importance of the task, indicate how much time incumbents spend performing it during a typical emergency call.

1	**< 1 minute**	**2**	**1-3 minutes**	**3**	**4-6 minutes**
4	**6-10 minutes**	**5**	**10-15 minutes**	**6**	**> 15 minutes**

Physical Dimensions (Mark all that apply):
Indicate the specific physical capability or capabilities required for successful performance of the task.

1	**Upper Body Strength**	Ability of the upper body muscles (e.g. arms, chest) to exert force to lift, push, pull, or hold objects. The magnitude of the force depends on the size of the muscles.
2	**Lower Body Strength**	Ability of the lower body muscles (e.g., legs, hips) to exert force to lift, push, pull, or hold objects. The magnitude of the force depends on the size of the muscles.
3	**Aerobic Capacity**	Ability of the respiratory and cardiovascular systems to provide oxygen continuously for medium- to high-intensity activities performed over a moderate time period (e.g., greater than 5 minutes).
4	**Coordination / Agility**	Ability to perform motor activities in a proficient sequential pattern by using neurosensory cues such as change of direction.

Specific Training:
Is specific training required to physically perform this task?

1	**Yes**	A new incumbent is unlikely to have the ability to competently perform this task. The incumbent must be taught everything necessary to perform this task.
2	**No**	No specialized training is required to perform this task nor any related background is expected or required.

Task Simulation:
Can this task be simulated?

1	**Yes**	It is both possible and feasible to design and implement an exercise that closely resembles the actual task as performed on the job.
2	**No**	It is either not possible or not feasible (due to safety, cost, access to materials, etc.) to both design and implement an exercise that closely resembles the actual task performed on the job.

Primary Operations			Criticality					Physical Effort					Average Amount of Time Spent at an Emergency Call					
			Not performed	Least Critical	Important	Critical	Extremely Critical	No effort	Minimal Physical Effort	Moderate Physical Effort	Excessive Physical Effort	Maximal Physical Effort	< 5 min	5-10 min	10-30 min	30-60 min	1 -4 hours	> 4 hours
Task 1. Fire Attack: Staging, Hose Laying, and Extinguishing Operations	1.	**Pump Operations**: Connecting or hooking up apparatus to fire hydrant and operating pumps to supply water in appropriate pressure and volume – using couplings, hoses, spanner wrenches, and other tools.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥
	2.	**Hose and Extinguisher Operations**: Laying dry line and advancing charged lines or extinguisher to deliver water, foam, and other extinguishing agents to emergency scene.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥
	3.	**Equipment Transport**: Staging other necessary tools and equipment by carrying from vehicles to emergency scenes.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥
Task 2. Manual Ladder Operations	4.	Carrying, raising, extending, and climbing manual ladders to perform search, rescue or other operations.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥
Task 3. Forcible Entry	5.	Prying open, cutting, or breaking down doors, or otherwise entering structures, vehicles, aircraft and other entrapments in order to search for and rescue victims and provide access to the emergency scene – using axes, halligan tools, hooks, rabbit tools, battering rams, sledge hammers, power saws and other tools.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥
Task 4. Ventilation and Overhaul	6.	**Ventilation**: Opening or breaking windows, chopping or cutting holes in roofs, breaching walls or doors, and aiming fog stream out of window or hanging fans in windows or doors to remove heat, smoke and/or gas from structures or entrapments.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥
	7.	**Overhaul**: Opening up walls and ceilings, cutting or pulling up floors and moving or turning over debris, in order to check for hidden fires which	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥

Primary Operations			Criticality					Physical Effort					Average Amount of Time Spent at an Emergency Call					
			Not performed	Least Critical	Important	Critical	Extremely Critical	No effort	Minimal Physical Effort	Moderate Physical Effort	Excessive Physical Effort	Maximal Physical Effort	< 5 min	5-10 min	10-30 min	30-60 min	1 -4 hours	> 4 hours
		could rekindle or spread – using hooks, axes, saws, and pitchforks.																
Task 5. Search and Rescue	8.	**Search:** Searching assigned area in order to locate victims and to obtain further information about incident following standard search procedures.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥
	9.	**Rescue**: Assisting, hoisting, carrying or dragging victims from emergency area by means of interior access (stairs, hallways, etc.) or, if necessary, by ladders, fire escapes, or other means of escape – using rescue harnesses, ropes, backboards, and other equipment. Extricating victims from vehicles, aircraft, cave-ins, collapsed buildings or other entrapments in order to save lives – using shovels, torches, drills, pry bars, saws, jacks, jaws, air bags, and other equipment.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥
Task 6. Salvage and Clean-Up	10.	**Salvage**: Moving and covering furniture, appliances, merchandise and other property; covering holes in structures; stabilizing damaged structural components; and redirecting or cleaning up water in order to minimize damage – using plastic and canvas covers, ropes, staple guns, mops, squeegees, and other tools. Tearing down weak and dangerous structural components (e.g., floors, walls, roofs, overhangs and stairs) using hooks, axes, saws and other tools.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥
	11.	**Clean Up/Pick Up**: Picking up, cleaning and returning equipment to vehicle and rolling or folding hose, so that the company can go back in service.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥

Primary Operations			Criticality					Physical Effort					Average Amount of Time Spent at an Emergency Call					
			Not performed	Least Critical	Important	Critical	Extremely Critical	No effort	Minimal Physical Effort	Moderate Physical Effort	Excessive Physical Effort	Maximal Physical Effort	< 5 min	5-10 min	10-30 min	30-60 min	1 -4 hours	> 4 hours
Task 7. Movement in Hazardous Environment	12.	Wearing full protective gear. Working in poor conditions of smoke, heat, icy surfaces. Having to navigate through obstacles that impede movement. Climbing over, under, and around obstacles.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥

	Specific Tasks	Criticality					Physical Effort					Typical Time Spent During Call						Physical Dimensions (Mark all that apply)				Is specific training required to physically perform this task?		Can this task be simulated?	
		Not performed	Least Critical	Important	Critical	Extremely Critical	No effort	Minimal Physical Effort	Moderate Physical Effort	Excessive Physical Effort	Maximal Physical Effort	< 1 min	1-3 min	4 - 6 min	6-10 min	10-15 min	> 15 min	Upper Body Strength	Lower Body Strength	Aerobic Capacity	Coordination / Agility	No	Yes	No	Yes
TASK 1. FIRE ATTACK: STAGING, HOSE LAYING, AND EXTINGUISHING OPERATIONS																									
1.	Dragging dry supply line from apparatus to distant hydrant.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
2.	Extending uncharged hoseline from fire apparatus to fire.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
3.	Carrying equipment 125 feet or more from the truck to the fire site.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
4.	Hoisting tools or other equipment (saws, hand tools, fans, ladders, hose) using rope.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
5.	Shoulder loading from the ground and carrying 1 ¾ inch hose during a fire.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
6.	Shoulder loading from a hose bed and carrying 2 ½ inch hose during a fire.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
7.	One firefighter/medic maneuvering a charged 2 ½ inch hoseline.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
8.	Two firefighter/medics maneuvering a charged 2 ½ inch hoseline.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
9.	Extending, holding and supporting a 1¾ inch charged attack line with flowing water.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
10.	Dragging a charged hose through a fire site,	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①

	Specific Tasks	Criticality					Physical Effort					Typical Time Spent During Call						Physical Dimensions (Mark all that apply)				Is specific training required to physically perform this task?		Can this task be simulated?	
		Not performed	Least Critical	Important	Critical	Extremely Critical	No effort	Minimal Physical Effort	Moderate Physical Effort	Excessive Physical Effort	Maximal Physical Effort	< 1 min	1-3 min	4 - 6 min	6-10 min	10-15 min	> 15 min	Upper Body Strength	Lower Body Strength	Aerobic Capacity	Coordination / Agility	No	Yes	No	Yes
	both inside (hallways/stairways) and outside (obstacles/icy conditions).																								
11.	Directing a charged hose for an extended period of time (100 lbs. of nozzle thrust).	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
12.	Crawling through smoke-filled structure pulling charged hoseline.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
13.	Climbing stairs in structural fire wearing full protective gear with loads of 10-50 lbs. of firefighter/medic tools, Hotel Packs, attack lines, air bottles, and other similar equipment (1-3 flights of stairs).	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
14.	In high-rise fires, climbing stairs wearing full protective gear with loads of 10-50 lbs. of firefighter/medic tools, Hotel Packs, attack lines, air bottles, and other similar equipment (4-5 flights of stairs).	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
15.	Open hydrant with wrench.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
16.	Directing charged hoseline while standing on ladder.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①

Specific Tasks	Criticality					Physical Effort					Typical Time Spent During Call						Physical Dimensions (Mark all that apply)				Is specific training required to physically perform this task?		Can this task be simulated?	
	Not performed	Least Critical	Important	Critical	Extremely Critical	No effort	Minimal Physical Effort	Moderate Physical Effort	Excessive Physical Effort	Maximal Physical Effort	< 1 min	1-3 min	4 - 6 min	6-10 min	10-15 min	> 15 min	Upper Body Strength	Lower Body Strength	Aerobic Capacity	Coordination / Agility	No	Yes	No	Yes
TASK 2. MANUAL LADDER OPERATIONS																								
17. Removing, carrying, and raising of a 28 ft. ground extension ladder by one person at a structural fire.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
18. Extend the fly of a 35 ft. ground extension ladder by hoisting with rope.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
19. Carrying or raising of a 35 ft. ground extension ladder by two individuals at a structural fire.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
20. Climbing a ladder (in excess of 100 ft. in height) during a structural fire.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
21. Climbing a ladder (in excess of 100 ft.) while carrying tools.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
22. Rescuing a victim from a roof or window using a ladder.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
23. Using hand tools such as axes, halligan tools, pike poles, or sledgehammers while on a ladder.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
TASK 3. FORCIBLE ENTRY																								
24. Using heavy hand tools such as axe or	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①

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	sledgehammer for extended period of 5 minutes or longer to accomplish difficult forcible entry through steel doors or concrete walls.																								
25.	Using heavier power tools such as power saws or chain saws for extended period of 5 minutes or longer to accomplish forcible entry tasks.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
26.	Moving heavy objects to gain access to fire and/or to free trapped persons.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
27.	Moving and carrying heavy objects, equipment or materials to gain access to or to free trapped firefighters/medics or victims.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
28.	Carrying equipment from emergency scene; cutting, lifting or prying open vehicles, machinery, etc., to free persons trapped or pinned inside using appropriate extrication tools.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
29.	Using heavy hand tools such as a cutter and spreader in automobile extrication for extended period of 5 minutes or longer.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①

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30.	Using heavier power tools such as power saws or chain saws for extended period of 5 minutes or more to open up walls, floor, or roofs.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
TASK 4. VENTILATION AND OVERHAUL																									
31.	Breaching holes in walls using sledge hammers, rams, axes, power saws, or other equipment.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
32.	Breaking through a roof while on a ladder or a pitched roof using axes, chainsaws, or hand saws.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
33.	Using a pike pole to pull down a ceiling in all types of construction.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
34.	One worker hanging a smoke ejector during a structural fire.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
35.	Using heavy hand tools such as axes or sledgehammers for extended period of 5 minutes or longer to open up walls, floors, or roofs.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①

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36.	Using heavier power tools such as power saws or chain saws for extended period of 5 minutes or more to open up walls, floor, or roofs.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
TASK 5. SEARCH AND RESCUE																									
37.	Using Jaws of Life at an incident.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
38.	Administering cardiopulmonary resuscitation (CPR).	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
39.	Using hand and power tools such as hack saws, pry bars, wedges, air chisel, glass cutter in confined areas to extricate victims.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
40.	Dragging an incapacitated partner or victim by one firefighter/medic from a damaged or burning structure.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
41.	Carrying an incapacitated partner or victim by two firefighters/medics from a damaged or burning structure.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
42.	Two firefighters/medics carrying a patient without a back board during an emergency.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
43.	Two firefighters/medics carrying a patient on	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①

	Specific Tasks	Criticality					Physical Effort					Typical Time Spent During Call						Physical Dimensions (Mark all that apply)				Is specific training required to physically perform this task?		Can this task be simulated?	
		Not performed	Least Critical	Important	Critical	Extremely Critical	No effort	Minimal Physical Effort	Moderate Physical Effort	Excessive Physical Effort	Maximal Physical Effort	< 1 min	1-3 min	4 - 6 min	6-10 min	10-15 min	> 15 min	Upper Body Strength	Lower Body Strength	Aerobic Capacity	Coordination / Agility	No	Yes	No	Yes
	a back board during an emergency.																								
44.	Digging to free victims trapped in tunnels, pipes, excavations or cave-ins or other entrapments using shovels, picks, spades or other hand tools.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
45.	Climbing or crawling through confined spaces in a structural fire while carrying a hand tool.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
46.	While carrying equipment, walking or crawling along joists where balance and careful foot placement are required in order to prevent unnecessary structural damage.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
47.	Carrying or assisting victims down ladder or stairs using drags, cots, or improvised equipment and proper lifting techniques.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
48.	Physically restraining violent or emotionally disturbed individual for their own safety or the safety of others.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
49.	Two firefighters/medics transporting very large individual (300+ lbs.) down multiple flights of stairs.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①

	Specific Tasks	Criticality					Physical Effort					Typical Time Spent During Call						Physical Dimensions (Mark all that apply)				Is specific training required to physically perform this task?		Can this task be simulated?	
		Not performed	Least Critical	Important	Critical	Extremely Critical	No effort	Minimal Physical Effort	Moderate Physical Effort	Excessive Physical Effort	Maximal Physical Effort	< 1 min	1-3 min	4 - 6 min	6-10 min	10-15 min	> 15 min	Upper Body Strength	Lower Body Strength	Aerobic Capacity	Coordination / Agility	No	Yes	No	Yes
TASK 6. SALVAGE AND CLEAN UP																									
50.	Carrying, pushing, throwing, or dragging mattresses, furniture, or other property from structures.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
51.	Removing, carrying and throwing salvage covers to protect equipment.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
52.	Tearing down dangerous structural components using hand or power tools.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
53.	Removing debris from fire scene.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
54.	Rolling up hose and placing on apparatus.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
55.	Hanging and rolling hose in the station.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
56.	Cleaning equipment in the station.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
57.	Using heavier power tools such as power saws or chain saws for extended period of 5 minutes or more to tear down dangerous structures.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
58.	Carrying undamaged furniture from burning buildings to reduce fire and smoke damage to building and contents.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①

	Specific Tasks	Criticality					Physical Effort					Typical Time Spent During Call						Physical Dimensions (Mark all that apply)				Is specific training required to physically perform this task?		Can this task be simulated?	
		Not performed	Least Critical	Important	Critical	Extremely Critical	No effort	Minimal Physical Effort	Moderate Physical Effort	Excessive Physical Effort	Maximal Physical Effort	< 1 min	1-3 min	4 - 6 min	6-10 min	10-15 min	> 15 min	Upper Body Strength	Lower Body Strength	Aerobic Capacity	Coordination / Agility	No	Yes	No	Yes
59.	Tearing down or shoring up weak and dangerous structural components (floors, overhangs, cornices, etc.).	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
TASK 7. MOVEMENT IN HAZARDOUS ENVIRONMENT																									
60.	Walking along uneven/narrow surfaces (i.e., roof) or ceiling joints.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
61.	Operating at elevated heights (i.e., top of a 100-foot ladder truck).	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
62.	Moving through debris, garbage, and furniture at the fire site that impedes movement.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
63.	Pulling self up and over obstacles or into an opening.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
64.	Climbing fence or wall in full protective clothing with equipment.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
65.	Crawling for 100 feet or more in confined space or to stay below smoke.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
66.	Moving through deteriorating conditions at fire site (particularly in winter as water freezes).	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①

	Specific Tasks	Criticality					Physical Effort					Typical Time Spent During Call						Physical Dimensions (Mark all that apply)				Is specific training required to physically perform this task?		Can this task be simulated?	
		Not performed	Least Critical	Important	Critical	Extremely Critical	No effort	Minimal Physical Effort	Moderate Physical Effort	Excessive Physical Effort	Maximal Physical Effort	< 1 min	1-3 min	4 - 6 min	6-10 min	10-15 min	> 15 min	Upper Body Strength	Lower Body Strength	Aerobic Capacity	Coordination / Agility	No	Yes	No	Yes
67.	Repeated exit and entry from fire site in winter, resulting in large fluctuations in body temperature.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
68.	Repeated exit and entry from fire site in summer, high heat conditions such that there is inadequate opportunity to cool down.	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①
69.	Please list and rate any other task (or tasks) that you have to perform that you consider to be harder than the ones listed above. Task:	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	①	②	③	④	⓪	①	⓪	①

	EXPECTED TIME AT FIRE
In **"normal"** fire scene situations, what is the expected time your unit will spend at a fire performing all necessary tasks from staging to cleanup?	☐ < 5 min ☐ 5-10 min ☐ 10-30 min ☐ 30-60 min ☐ 1 -4 hours ☐ > 4 hours
In **"more difficult"** fire scene situations, what is the expected time your unit will spend at a fire performing all necessary tasks from staging to cleanup?	☐ < 5 min ☐ 5-10 min ☐ 10-30 min ☐ 30-60 min ☐ 1 -4 hours ☐ > 4 hours
	EXPECTED TIME OF CONTINUOUS EFFORT
In **"normal"** situations, what is the expected time of continuous working effort without a significant break for rest and recovery by a firefighter spent at a fire performing all necessary tasks from staging to cleanup?	☐ < 5 min ☐ 5-10 min ☐ 10-30 min ☐ 30-60 min ☐ 1 -4 hours ☐ > 4 hours
In **"more difficult"** situations, what is the expected time of continuous working effort without a significant break for rest and recovery by a firefighter spent at a fire performing all necessary tasks from staging to cleanup?	☐ < 5 min ☐ 5-10 min ☐ 10-30 min ☐ 30-60 min ☐ 1 -4 hours ☐ > 4 hours
In **"normal"** fire scene situations, what is the expected time you would spend in "all out" effort, working as fast as you can to perform difficult tasks?	☐ < 5 min ☐ 5-10 min ☐ 10-30 min ☐ 30-60 min ☐ 1 -4 hours ☐ > 4 hours
In **"more difficult"** fire scene situations, what is the expected time you would spend in "all out" effort, working as fast as you can to perform difficult tasks?	☐ < 5 min ☐ 5-10 min ☐ 10-30 min ☐ 30-60 min ☐ 1 -4 hours ☐ > 4 hours

City of Delaware

Fire Department

Civil Service Agility Exam

August 28, 2017

Location: Delaware Fire Department
99 S. Liberty St., Delaware, Ohio

Fire fighting is an extremely physical occupation and requires endurance, strength, coordination and agility. The events listed below are designed to measure each candidate's physical ability in these four (4) areas.

Several of the tasks are actual work samples (realistic physical tasks that might be performed on the job). Others are not work samples, but the abilities required to do the tasks are the same abilities needed to do the fire fighter's job. Each event is listed with a brief description and justification.

Please review the event and expectations prior to the start of the event.
Have the next applicant ready to go upon completion.
Any failure, please make notification to the Chief.
Please escort the applicants to the next event.
Please complete all documentation and provide the documentation to the next evaluators.
Any questions, please contact the Chief.

EVENT #1:
Aerial Ladder Climb (85 feet):
Location: Station 301 Parking Lot South Side
Candidates will climb the ladder from the turntable to the top of the ladder which will be at 85' and proceed back down the ladder to the platform. This test is to be completed in a continuous climb without any stops or hesitation. This event must be completed in two and one-half minutes (2½).

EVENT #2:
Pulling a Charged 2½" Hose with Nozzle Attached (two [2] Sections - 100 feet):
Location: Parking Lot
The hose will be lying in a straight line from the hydrant at the beginning of the test. The candidate will then grasp the nozzle and turn down the line of hose, and drag at least one (1) section of hose past the hydrant. This event must be accomplished without stopping and completed within 30 seconds. At no time can the candidate drop or put the hose down.

EVENT #3:
Removal of a 24-Foot Extension Ladder:
Location: Bn301 Bay Floor
Candidate must remove a 24 foot extension ladder (approximately 78 pounds), mounted with the top beam six (6) feet from ground level, by grasping the ladder at the center. The ladder will be lowered to the ground, flat on both beams. The candidate will then pick up the ladder and return it to the mounting brackets. Candidate may not lower or raise one end of the ladder at a time. The candidate shall maintain control of the ladder at all times.

EVENT #4:
Stairway Climb:
Location: Hall
Two (2) sections of 1½" hose will be secured together with a shoulder rope to be placed over the head and shoulder. The candidate will have an air tank and regulator on his back. A 1½" nozzle will be carried. Starting at the basement level, the candidate will then ascend to the second (2nd) floor, return to the basement level and then repeat the process two (2) more times. This Event must be completed, without stopping, within 90 seconds. Candidate shall not skips stairs and shall have both feet land on the top and bottom landings. Candidate shall touch every step.

EVENT #5:
Fly Ladder Raise:
Location: Parking Lot
Candidate will be required to pull a halyard (rope) to raise and lower the ladder fly (extension) to a 35-foot ladder, within one (1) minute. Candidate shall maintain control of the halyard at all times. If the halyard shall slide and the FD represents the candidate did not maintain control, the candidate will be disqualified.

EVENT #6:
Weight Lift and Twist:
Location: Near Compressor
Candidate will be required to lift a 15 pound weight with grip, (which simulates the weight of a nozzle or play pipe) and alternately place it on the floor, outside each foot, a minimum of 15 times in one (1) minute. Candidate shall come to an upright position between alternating from side to side.

EVENT #7:
Sandbag Lift and Drag:
Location: Bayfloor
Candidate will be required to remove a 125 pound sandbag from a bathtub to the floor and from this point the candidate shall drag the sandbag through a twisting course without stopping, within 30 seconds. Candidate shall maintain control of the sandbag and not let go of the sandbag while moving through the course.

EVENT #8:
500 Yard Shuttle Run:
Location: Rear parking lot at station 301.
The candidate will move through a 500 yard course set up in 50 yard increments, picking up a tool and returning it to starting point each time. A total of ten (10) 50 yard trips will be made with four (4) tools and pulling a charged 1¾ hose line on the final trip. This event to be completed within three and one-half minutes (3½).The candidate shall maintain control and not drop any tools while running the event or when placing them at finish line. Candidate and nozzle shall completely pass the finish line to stop time. The tool order does not matter; however, the hose line must be pulled last.

EVENT #9:
Bent Knee Sit-Ups:
Location: Conference Room
Candidate will be required to perform 25 bent knee sit-ups in one (1) minute. Candidate's back shall touch the floor and their chest must touch their knees.

EVENT #10:
Wearing a Gas Mask:
Location: Basement – enter from outside Boiler Room entrance
The candidate will wear a face piece, with the eyepieces blackened out, through a totally darkened room. The candidate will follow a rope line from the entrance to the end of the room and return. Candidate can not remove the mask.

EVENT #11:
Beam Walk with Hose:
Location: Bayfloor
The candidate will be required to walk across the length of a 4"x 4" x 20' beam while carrying a 50 foot section of 1½" hose with couplings. Each candidate will receive three (3) tries and 90 seconds of elapsed time to pass this event.

NOTE: In order to move on to the next phase of testing, it is necessary that you are successful in passing all physical agility events. Failing any one event will disqualify you for the entire test procedure.

EST 1808
CITY OF
DELAWARE
OHIO

Delaware Fire Department

Physical Ability Test

Test Guide

Implemented: April 4, 2018

EST 1808
CITY OF
DELAWARE
OHIO

Date: of Test: _____

Test Administrator: _____

Support Staff: _____

Support Staff: _____

Lead 1 Proctor: _____

Lead 2 Proctor: _____

Lead 3 Proctor: _____

Assistant Proctor: _____

Assistant Proctor: _____

Assistant Proctor: _____

Assistant Proctor: _____

Assistant Proctor: _____

Assistant Proctor: _____

TEST ADMINISTRATION PROCEDURES

The *Delaware Fire Department Physical Ability Test (PAT) Test Guide* is designed to provide instruction on the administration and performance of the PAT necessary to consistently carry out the test. The guide shall be followed to ensure proper administration and performance of all components of the testing.

The selection of Test Administrator and proctors must be done with care. Individuals from the Fire Department or from the Department of Administrative Services can assist with test administration. These individuals must be knowledgeable regarding testing procedures and familiar with legal issues surrounding candidate testing. Prior to conducting the test, administrators and proctors must be trained in the execution of their duties, as detailed in this Test Guide. All personnel involved in the PAT must be knowledgeable of the tasks and responsibilities of the administrators and the proctors.

A single individual within the Fire Department or Department of Administrative Services office will be responsible for the PAT. This individual, known as the Test Administrator, will make decisions regarding cancellation, postponement, or rescheduling of the PAT due to problems associated with weather, test props, test site, and support staff. Adequate support personnel are required for successful administration of the PAT.

TEST ADMINISTRATOR

The Test Administrator is responsible to ensure that the entire testing process is administered and executed in accordance with this document. Support Staff and all proctors will report to the Test Administrator. The Test Administrator will be responsible to ensure that the course is set-up and ready prior to the testing process beginning. Any procedural questions or issues that occur and need to be answered will be done through the Test Administrator and documented.

SUPPORT STAFF

Support Staff are responsible for the processing of candidates as they arrive at the PAT site and collecting all documentation and rehabilitation forms at the conclusion of the PAT. The Proctors are responsible for processing candidates through the PAT and monitoring test events.

PROCTOR TYPES

Two types of proctors are assigned to the test area: Lead Proctors and Assistant Proctors. Both are essential for proper and consistent administration of the PAT. Proctors must not

interfere with the candidate and are to be located in a safe position away from the candidate's movements at each event. After reviewing the following materials proctors should be able to:

- Assume the roles and responsibilities of Lead and Assistant Proctors
- Read the instructions that must be given to every candidate
- Fill out the scoring sheet properly
- Use the timing mechanism and perform the start/stop procedures
- Perform the requirements for when a candidate fails or quits
- Produce the documentation requirements for each candidate
- Communicate properly between the event and lead proctors
- Prevent the use of encouragement during the PAT
- Understand the need for consistency and accuracy when proctoring the PAT
- Know the warning and failure points of each event
- Understand the limitations and purpose of lead proctors
- Know the basic maintenance and reset of each event

LEAD PROCTOR

The Lead Proctor is responsible for:

- Providing event instruction
- Evaluating the candidate during the event
- Providing warnings during the event (i.e. If a candidate does not go around a traffic cone, the Lead Proctor must stop and instruct candidate to go around missed traffic cone)
- Timing the event
- Documenting the candidates times and success/failure
- Escorting the candidate between the events

The Lead Proctor will utilize two stop watches for the PAT. One stop watch will be used for the event times, and the second stop watch will be used for the PAT overall time.

The event stopwatch begins when the Lead Proctor states "START" for the event and "STOP" when the event is concluded. The second stopwatch used for the overall time is started when the Lead Proctor at Event 1 declares "START" and stops when the Lead Proctor at Event 10 declares "STOP".

The Lead Proctor reads verbal instructions to the candidate as the candidate progresses through the test. The Lead Proctor monitors and documents the warnings given by the Assistant Proctor. The Lead Proctor notifies the candidate and stops the PAT when

infractions, as declared by the Lead or Assistant Proctor, constitute test failure. At the conclusion of the PAT, both the candidate and the Lead Proctor must sign the PAT Evaluation Form.

ASSISTANT PROCTORS

Assistant Proctors are used to assist at each event. They are responsible for ensuring that candidates perform the events as prescribed by the Lead Proctor, declaring verbal warnings to candidates for infractions, providing for candidate safety, and resetting props to starting positions.

EVENT 1 — Aerial Ladder Climb

Event Proctors:

1-Lead Proctor
2-Assistant Proctors

Event Proctor Responsibilities:

The Lead Proctor will read the event instruction to the candidates. They will acknowledge receipt from the Assistant Proctor of the candidate being "on-line" and "off-line". Once the candidate is "on-line", the Lead Proctor will tell the candidate "READY" then states the word "START" to indicate the start of the timed PAT. The Lead Proctor will announce the progression of the event time, announcing every 30 seconds. They are responsible for acknowledging the candidate ringing the bell at the top of the ladder. Once the candidate has both feet on the turntable base, the Lead Proctor will state "STOP" which will stop the timed PAT. When the candidate comes out of the ladder belt, the Lead Proctor will state "REST PERIOD START". The Lead Proctor will record the event time and the candidate's Pass/Fail status. The time will be announced for the candidate and the Lead Proctor to record.

Assistant Proctor #1 will ensure the candidate is properly outfitted with a ladder belt and assist the candidate to the turntable. Once the candidate is on-line, they will be responsible for the belaying of the candidate as they safely ascend and descend the ladder. The Assistant Proctor will then take the candidate off-line and direct them off the truck.

Assistant Proctor #2 (located on the turntable) is responsible for conducting a safety check of the candidate ensuring the proper fit of the ladder belt or harness and securing the candidate to the rope. They are responsible for announcing that the candidate is "on-line" and "off-line". When the candidate comes off the apparatus, they will assist them out of the ladder belt.

The Assistant Proctor's will ready the event for the next candidate.

EVENT 2 — Pulling Charged 1¾" Hose

Event Proctors:

1-Lead Proctor
2-Assistant Proctors

Event Proctor Responsibilities:

In preparation for this event, the candidate will be instructed to get into position next to the hose line prior to the end of the Rest Period. The Lead Proctor will announce the completion of the rest period by stating "REST PERIOD STOP". The Lead Proctor will then read the event instruction to the candidate. The Lead Proctor will tell the candidate "READY" then states the word "START" to indicate the start of the timed PAT. The Lead Proctor will announce the progression of the event time, announcing every 10 seconds. The Event Proctor will state "STOP" which will stop the timed PAT once the nozzle has passed the marked location. When the candidate places the nozzle on the ground, the Lead Proctor will state "REST PERIOD START". The Lead Proctor will record the event time and the candidate's Pass/Fail status.

The Assistant Proctors will ready the event for the next candidate.

EVENT 3 — Removal of 24' Extension Ladder

Event Proctors:

1-Lead Proctor
1-Assistant Proctor

Event Proctor Responsibilities:

In preparation for this event, the candidate will be instructed to get into position in front of the ladder. The Lead Proctor will announce the completion of the rest period by stating "REST PERIOD STOP". The Lead Proctor will read the event instruction to the candidate. The Lead Proctor will tell the candidate "READY" then states the word "START" to indicate the start of the timed PAT. The Event Proctor will state "STOP" which will stop the timed PAT once the ladder has been placed back into the ladder rack. The Lead Proctor will announce the progression of the event time, announcing every 10 seconds. When the candidate places the ladder back on the ladder rack, the Lead Proctor will state "REST PERIOD START". The Lead Proctor will record the event time and the candidate's Pass/Fail status.

The Assistant Proctor will ready the event for the next candidate.

EVENT 4 — Stairway Climb

Event Proctors:

1-Lead Proctor
2-Assistant Proctors

Event Proctor Responsibilities:

In preparation for this event, the candidate will be instructed to get into position to be outfitted with the props for the event. The Lead Proctor will announce the completion of the rest period by stating "REST PERIOD STOP". The Lead Proctor will read the event instruction to the candidate. The Lead Proctor will tell the candidate "READY" then state the word "START" to indicate the start of the timed PAT. The Event Proctor will state "STOP" which will stop the timed PAT once the candidate has both feet on the basement floor. The Lead Proctor will announce the progression of the event time, announcing every 15 seconds. When the candidate is completely out of the SCBA and high-rise pack, the Lead Proctor will state "REST PERIOD START". The Lead Proctor will record the event time and the candidate's Pass/Fail status.

The Assistant Proctor #1 will set up the candidate with all equipment for the event. Once the event is completed, the candidate will take the equipment off of the candidate and ready the event for the next candidate.

The Assistant Proctor #2 will be located at the top of the stairwell.

The Assistant Proctors will ensure the candidate touches all stairs and has both feet located on the top landing. If the candidate misses a step the Assistant Proctor will announce "Warning" and state the violation.

EVENT 5 — Fly Ladder Raise

Event Proctors:

1-Lead Proctor
1-Assistant Proctor

Lead Proctor Responsibilities:

In preparation for this event, the candidate will be instructed to get into position next to the ladder. The Lead Proctor will announce the completion of the rest period by stating "REST PERIOD STOP". The Lead Proctor will read the event instruction to the candidate. The Lead Proctor will tell the candidate "READY" then state the word "START" to indicate the start of the timed PAT. The Event Proctor will state "STOP" which will stop the timed PAT once the ladder has returned to the stow position. The Lead Proctor will announce

the progression of the event time, announcing every 20 seconds. When the candidate has the ladder back in the stowed position, the Lead Proctor will state "REST PERIOD START". The Lead Proctor will record the event time and the candidate's Pass/Fail status.

The Assistant Proctor will ready the event for the next candidate.

EVENT 6 — Weight Lift and Twist

Event Proctors:

1-Lead Proctor
1-Assistant Proctor

Event Proctor Responsibilities:

In preparation for this event, the candidate will be instructed to get into position in the center of the marked box. The Lead Proctor will announce the completion of the rest period by stating "REST PERIOD STOP". The Lead Proctor will read the event instruction to the candidate. The Lead Proctor will tell the candidate "READY" then state the word "START" to indicate the start of the timed PAT. The Event Proctor will state "STOP" which will stop the timed PAT the candidate has completed the repetitions. The Lead Proctor will announce the progression of the event time, announcing every 20 seconds. When the candidate has the weight back in the start position, the Lead Proctor will state "REST PERIOD START". The Lead Proctor will record the event time and the candidate's Pass/Fail status.

The Assistant Proctor will count the repetitions out loud. If the candidate does not fully come to an upright position or the weight does not touch the ground, the Assistant Proctor will announce "Warning" and state the violation. Assistant Proctor will ready the event for the next candidate.

EVENT 7 — Rescue Drag

Event Proctors:

1-Lead Proctor
1-Assistant Proctor

Event Proctor Responsibilities:

In preparation for this event, the candidate will be instructed to get into position next to the Rescue Mannequin. The Lead Proctor will announce the completion of the rest period

by stating "REST PERIOD STOP". The Lead Proctor will read the event instruction to the candidate. The Lead Proctor will tell the candidate "READY" then state the word "START" to indicate the start of the timed PAT. The Event Proctor will state "STOP" which will stop the timed PAT once the mannequin passes the finish line. The Lead Proctor will announce the progression of the event time, announcing every 10 seconds. When the candidate releases the Rescue Mannequin past the finish line, the Lead Proctor will state "REST PERIOD START". The Lead Proctor will record the event time and the candidate's Pass/Fail status.

The Assistant Proctor will ready the event for the next candidate.

EVENT 8 — Hose Hoist

Event Proctors:
1-Lead Proctor
1-Assistant Proctor

Event Proctor Responsibilities:
In preparation for this event, the candidate will be instructed to get into position on the 2nd floor hose tower landing. The Lead Proctor will announce the completion of the rest period by stating "REST PERIOD STOP". The Lead Proctor will read the event instruction to the candidate. The Lead Proctor will tell the candidate "READY" then state the word "START" to indicate the start of the timed PAT. The Event Proctor will state "STOP" which will stop the timed PAT once the hose returns to the 2nd floor landing for the second time. The Lead Proctor will announce the progression of the event time, announcing every 10 seconds. When the candidate releases the rope the Lead Proctor will state "REST PERIOD START". The Lead Proctor will record the event time and the candidate's Pass/Fail status.

The Assistant Proctor will ready the event for the next candidate.

EVENT 9 — Wearing SCBA and Mask

Event Proctors:
1-Lead Proctor
1-Assistant Proctor

Event Proctor Responsibilities:
In preparation for this event, the candidate will be instructed to get into position in front of the entrance door and outfitted with a SCBA Mask. The Lead Proctor will announce the completion of the rest period by stating "REST PERIOD STOP". The Lead Proctor will read

the event instructions to the candidate. The Lead Proctor will then lead the candidate to the rope. The Lead Proctor will tell the candidate "READY" then state the word "START" to indicate the start of the timed PAT. The Event Proctor will state "STOP" which will stop the timed PAT once the candidate returns to the start line. The Lead Proctor will announce the progression of the event time, announcing every 15 seconds. When the candidate releases the rope the Lead Proctor will state "REST PERIOD START". The Lead Proctor will record the event time and the candidate's Pass/Fail status.

The Assistant Proctor will get the candidate fitted with the SCBA Mask and then ready the event for the next candidate.

EVENT 10 — Beam Walk with Hose

Event Proctors:
1-Lead Proctor
1-Assistant Proctor

Event Proctor Responsibilities:
In preparation for this event, the candidate will be instructed to get into position in front of the beam holding the rolled hose. The Lead Proctor will announce the completion of the rest period by stating "REST PERIOD STOP". The Lead Proctor will read the event instructions to the candidate. The Lead Proctor will tell the candidate "READY" then state the word "START" to indicate the start of the timed PAT. The Lead Proctor will state "STOP" at the successful conclusion or failure of the event. The Lead Proctor will announce the progression of the event time, announcing every 30 seconds. When the candidate places the rolled hose on the ground, the Lead Proctor will state "REST PERIOD START". The Lead Proctor will record the event time and the candidate's Pass/Fail status.

The Assistant Proctor will ready the event for the next candidate.

EVENT 11 — CPR

Event Proctors:
1-Lead Proctor
1-Assistant Proctor

Event Proctor Responsibilities:
In preparation for this event, the candidate will be instructed to get into position next to the CPR Mannequin. The Lead Proctor will announce the completion of the rest period by

stating "REST PERIOD STOP". The Lead Proctor will read the event instructions to the candidate. The candidate will be instructed to get into position in front of the CPR Mannequin. The Lead Proctor will tell the candidate "READY" then state the word "START" to indicate the start of the timed PAT. The Event Proctor will state "STOP" which will stop the timed PAT at the successful conclusion or failure of the event. The Lead Proctor will announce the progression of the event time, announcing every 15 seconds. When the candidate completes performing CPR, the Lead Proctor will state "TEST CONCLUSION". The Lead Proctor will record the event time and the candidate's Pass/Fail status.

The Assistant Proctor will ready the event for the next candidate.

Event Failure

Event Proctors:

1-Test Administrator
1-Lead Proctor

Event Proctor Responsibilities:

The Lead Proctor will announce the conclusion of the test and the failure of the event. The reason for the failure will be provided to the candidate. The Lead Proctor will complete all documentation and provide it to the Test Administrator. The candidate will then be directed to the Assistant Proctor for Rehabilitation. The Lead Proctor will bring the candidate to the Test Administrator upon conclusion of Rehabilitation.

The Assistant Proctor will assist the candidate with the rehabilitation and complete all forms. When completed, the Lead Proctor will be notified.

The Test Administrator will review the test with the candidate and the Lead Proctor. Any failure will be reviewed and a reason for the failure will be provided (or explained). The Test Administrator will provide the completed paperwork to the Support Staff.

The Support Staff will be responsible for the recording of the test and compiling all documentation from the test.

Conclusion of Test

Event Proctors:

1-Test Administrator
1-Support Staff
1-Lead Proctor
1-Assistant Proctor

Event Proctor Responsibilities:

The Lead Proctor will announce the conclusion of the test and the passing of the PAT. The candidate will then be directed to the Assistant Proctor for Rehabilitation.

Lead Proctor will complete all documentation and provide it to the Test Administrator. The Lead Proctor will bring the candidate to the Test Administrator.

The Assistant Proctor will conduct an assessment of the candidate and complete the Rehabilitation Form. The Assistant Proctor will direct the candidate to the Lead Proctor.

The Test Administrator will review the test with the candidate and the Lead Proctor. The next steps in the process will be reviewed with the candidate if applicable. Candidate will be released from the Physical Ability Test.

The Test Administrator will provide the completed paperwork to the Support Staff. The Support Staff will be responsible for the recording of the test and the compiling of all documentation from the test.

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Candidate Instructions

Test Administrator:

Welcome the candidate to the physical ability test.

Read verbatim to the candidate to ensure the consistency of the test and instruction.
Firefighting is an extremely physical occupation and requires endurance, strength, coordination and ability. The events listed below are designed to measure each candidate's physical ability in these four (4) areas.

The test you are about to take is a validated test. This means that a third party has reviewed the work requirements at the Delaware Fire Department, and conducted a test of existing Delaware Fire Department personnel and the Physical Ability Test to certify the relevancy to the job. Several of the tasks are actual work samples (realistic physical tasks that might be performed on the job).

Once this introduction is complete, all Proctors will be required to read from the script. This is to ensure all candidates receive a fair and equivalent test. Unfortunately this may seem cold and impersonal. We understand this and hope you do as well.

You have received a copy of the *Delaware Fire Department Physical Ability Test (PAT) Test Guide.* Within the guide you will notice specific statements to the candidate. These are what the statements mean to the candidate.

"READY" – Candidate should be prepared and set to begin the event.
"START" – Candidate begins the event and the event time begins.
"STOP" – Candidate ends the event and the event time stops.
"REST PERIOD START" – Candidate begins a period of recovery after an event period. The Candidate will also be led to the next event location. During this period of time, the candidate may inspect, test or make any preference changes to the next evolution as long as the event being tested remains intact.
"REST PERIOD STOP" – Candidate recovery period ends and the candidate is at the next event station.
"TEST CONCLUSION" – The Physical Ability Test ends due to completion of the entire test or by failure of the event.

Complete verbatim Instruction
Ask and answer any questions the candidate may have.

Read verbatim to the candidate to ensure the consistency of the test and instruction.
Candidate, you are now being handed off to your Lead Proctor and they will be limited to the instructions provided to you at each event. We all wish you well.

Lead Proctor:

Candidate, please follow me to Event #1.

EVENT #1 - 100' Aerial Ladder Climb:

Candidate, Assistant Proctor #1 will assist you in being outfitted with the ladder belt or harness. They will then direct you to the top of the truck's turntable where you will go on-line of the belay system by Assistant Proctor #2. Candidate, you will climb the ladder from the turntable to the top of the ladder which is 100' and ring the bell, and then proceed back down the ladder to the turntable.

You will be told to prepare for the event through my statement of "READY" and will be located at the base of the ladder ready to perform the event. I will then announce "START" and you are to begin the event. Your time will stop when you return and both feet are on the turntable. This event must be completed within 180 seconds. I will announce your time every 30 seconds. I will announce when I hear you ring the bell. This test is to be completed in a continuous climb without any stops or hesitation greater than 5 seconds. Any stop of 5 seconds or more will result in a failure. You will receive a warning if you should pause for a period of time during the climb or decent. In the event you should receive two warnings, this will be the failure of the event. This event will be followed by a 2 minute rest period.

"READY"
"START"
Announce Times – 30, 60, 90, 120, 150 and 180 seconds
"BELL RUNG"
"STOP"
Candidate, you will be assisted off the rope line and then down off the truck and out of the ladder belt. Once out of the ladder belt or harness, I will let you know when your 2 minute rest time will begin.
"REST PERIOD START"
Candidate, please follow me to Event #2

EVENT #2 - Pulling a Charged 1 ¾" Hose with Nozzle Attached (200 feet):

Candidate, the charged hose is laying on the ground from the hydrant to the start line where the nozzle is located. You will grasp the nozzle and turn down the hose line, and drag the line for 200'.

You will be told to prepare for the event through my statement of "READY" and will be at the nozzle standing upright in a position ready to begin the event. I will then announce "START" and you are to begin the event. This event must be completed within 30 seconds. I will announce your time every 10 seconds. At no time will you be permitted to drop or put the hose down, which will create a failure. This event will be followed by a 2 minute rest period.

"READY"
"START"
Announce Times – 10, 20, and 30 seconds
"STOP"
"REST PERIOD START"
Candidate, please follow me to Event #3

EVENT #3 - Removal of a 24-Foot Extension Ladder:

Candidate, a 24 foot extension ladder, which is approximately 78 pounds, is mounted to the wall with the top beam six (6) feet from ground level. You will, by grasping the ladder, lower it to the ground so that it is flat on both beams. You will then pick up the ladder and return it to the mounting brackets.

You will be told to prepare for the event through my statement of "READY" and you will be set-up facing the ladder in a position to remove. I will then announce "START" and you are to begin the event. This event must be completed within 30 seconds. I will announce your time every 10 seconds. You are required to maintain control of the ladder at all times. You are not permitted to lower or raise one end of the ladder at a time. It is permissible during your time period to make an adjustment or reset yourself with the ladder. This event will be followed by a 2 minute rest period.

"READY"
"START"
Announce Times – 10, 20, and 30 seconds
"STOP"
"REST PERIOD START"
Candidate, please follow me to Event #4

EVENT #4 - Stairway Climb

Candidate, you have 100' of 1¾'' hose which is secured together in a high-rise pack. You will wear a SCBA pack without a mask. Starting at the basement level, you will ascend to the second (2nd) floor, return to the basement level and then repeat the process two (2) more times. This event must be completed, without stopping for more than 2 seconds. You shall not skip stairs and shall have both feet land on the top and bottom landings. You shall touch every step. You are permitted to use the stairwell railing.

You will be equipped with the hose and SCBA. You will then be told to prepare for the event through my statement of "READY" and be at the base of the bottom step. I will then announce "START" and you are to begin the event. This event must be completed within 90 seconds. I will announce your time every 15 seconds. This event will be followed by a 3½ minutes rest period.

"READY"
"START"
Announce Times – 15, 30, 45, 60, 75 and 90 seconds
"STOP"
"REST PERIOD START"
Candidate, please follow me to Event #5

EVENT #5 - Fly Ladder Raise

You are required to pull a halyard (rope) to raise and lower the ladder fly (extension) of a 35-foot ladder. The ladder shall go to the full extension and be lowered to the stowed position. You are not required to lock the ladder in place when extended or in the stowed position. You shall maintain control of the halyard at all times. If the halyard slides and you do not maintain control, then you will be disqualified.

You will be told to prepare for the event through my statement of "READY" and are to be facing the ladder in position to raise. I will then announce "START" and you are to begin the event. This event must be completed within 60 seconds. I will announce your time every 20 seconds. This event will be followed by a 2 minute rest period.

"READY"
"START"
Announce Times – 20, 40, and 60 seconds
"STOP"
"REST PERIOD START"
Candidate, please follow me to Event #6

EVENT #6 - Weight Lift and Twist:

You are required to lift a 15 pound weight with grip and alternately place it on the floor, outside each foot for 15 repetitions. One repetition is considered one full cycle of picking the weight up from the start position (Left or Right box), touching the opposite side and bringing it back to the start position. One hand shall be holding the weight at all times. You shall come to an upright position between alternating from side to side.

You will be told to prepare for the event through my statement of "READY" and you are to stand in the middle box. I will then announce "START" and you are to begin the event. This event must be completed within 60 seconds. I will announce your time every 20 seconds. This event will be followed by a 2 minute rest period.

"READY"
"START"
Announce Times – 20, 40, and 60 seconds
"STOP"

"REST PERIOD START"
Candidate, please follow me to Event #7

EVENT #7 - Rescue Drag

Candidate, you will be required to drag a 165 pound mannequin through a 100 foot course. From the start line on the floor, you shall drag the mannequin through the course without stopping. You must maintain control of the mannequin and not let go of the mannequin while moving through the course. The mannequin shall be dragged using any method desired. You will be disqualified for carrying the mannequin over the shoulder or not maintaining control of the mannequin. Striking a cone, in a way that moves it out of its designated location, will cause a warning.

You will be told to prepare for the event through my statement of "READY" and are to stand next to the mannequin. I will then announce "START" and you are to begin the event. This event must be completed within 40 seconds. I will announce your time every 10 seconds. This event will be followed by a 2 minute rest period.

"READY"
"START"
Announce Times – 10, 20, 30 and 40 seconds
"STOP"
"REST PERIOD START"
Candidate, please follow me to Event #8

EVENT #8 - Hose Hoist

Candidate, you will be required to pull a halyard (rope) to raise a rolled 2½" - 50' section of hose from the 1st floor to the 2nd floor landing, where it is required to be brought over the railing and touch the hose tower landing and then lowered to the 1st floor, touching the floor and then brought to the 2nd floor hose tower landing again where the time will stop. You shall maintain control of the halyard at all times. If the halyard slides and you do not maintain control, then you will be disqualified.

You will be told to prepare for the event through my statement of "READY" and are to stand next to the railing holding the halyard. I will then announce "START" and you are to begin the event. This event must be completed within 35 seconds. I will announce your time every 10 seconds. This event will be followed by a 2 minute rest period.

"READY"
"START"
Announce Times – 10, 20 and 30 seconds
"STOP"

"REST PERIOD START"
Candidate, please follow me to Event #9

EVENT #9 – Wearing a SCBA with Mask

Candidate, you will wear a face piece and SCBA mask, with the eyepieces blackened out, through a totally darkened room. You will follow a rope line from the entrance to the end of the room and return. You will be disqualified for removing the mask or causing the SCBA mask to free flow air due to a breach in the seal.

You will be told to prepare for the event through my statement of "READY" and are to stand in the darkened room with your hand on the guide rope, breathing air and wearing the SCBA. I will then announce "START" and you are to begin the event. This event must be completed within 60 seconds. I will announce your time every 20 seconds. This event will be followed by a 2 minute rest period.

"READY"
"START"
Announce Times – 20, 40 and 60 seconds
"STOP"
"REST PERIOD START"
Candidate, please follow me to Event #10

EVENT #10 – Beam Walk with Hose

Candidate, you will be required to walk across the length of a 4"x 4" x 20' beam while carrying a 50 foot section of 1¾ " hose with couplings. You will receive three (3) attempts to pass this event. You will be given a warning for each failed attempt at crossing the entire length of the beam and will fail the event if you receive three warnings.

You will be told to prepare for the event through my statement of "READY" and are to stand in front of one end of the beam holding the hose section. I will then announce "START" and you are to begin the event. This event must be completed within 90 seconds. I will announce your time every 30 seconds. This event will be followed by a 2 minute rest period.

"READY"
"START"
Announce Times – 30, 60 and 90 seconds
"STOP"
"REST PERIOD START"
Candidate, please follow me to Event #11

EVENT #11 – CPR

Candidate, you will be required to perform 2 minutes of CPR. You will be given 10 seconds to begin performing CPR and ensure your hand placement, angle, rate and depth, are proper. The indicator light will provide appropriate feedback by a green light. Non-compliance will be indicated by a yellow light and considered a warning. Three or more warnings during the 2 minute testing period will result in disqualification. If a red light occurs during the 2 minute testing period, it will indicate failure for this event. A metronome set to 110 beats per minute is provided. The CPR mannequin has indicator lights. These are as follows:

Red Only – Less than 60 compressions per minute
Yellow Only – Between 60-79 compressions per minute
Single Green – Between 80-99 compressions per minute
Double Green – Between 100-119 compressions per minute
Double Green with Yellow – 120 and Greater compressions per minute

You will be told to prepare for the event through my statement of "READY" and are to begin CPR for 10 seconds. After 10 seconds, and while still conducting CPR, I will announce "START" and you are to begin the event. This event must be completed within 120 seconds. I will announce your time every 30 seconds. This event will be followed by a 2 minute rest period.

"READY"
"START"
Announce Times – 30, 60, 90 and 120 seconds
"TEST CONCLUSION"
"REST PERIOD START"
Complete verbatim Instruction

Candidate will be taken to Rehabilitation

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Physical Ability Test Forms

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PHYSICAL ABILITY ASSESSMENT
Release of Liability

I,_____(name below)_____, having submitted an application for employment and agreeing to engage in a physical agility assessment, and being fully aware of the risks of injury and death, hereby save and hold harmless the City of Delaware, as well as the agents or employees of all entities assisting in the test from any and all causes of action, suits, debts, damages, judgments, and demands whatsoever arising from my participation in the **Delaware Fire Department** physical ability assessment as part of the recruiting process. I further acknowledge that the City of Delaware and the Delaware Fire Department, or any other agent or employee assisting in the assessment process will be not be held responsible for any injuries or death that may be caused by negligence of the persons or entities listed below during my participation in this physical ability assessment.

I affirm that I am in good physical condition and have no pre-existing conditions that would impact my participation in this assessment. Further, I will not take part in any aspect of this assessment if I feel it is a risk to my health. I will comply with all instructions written, verbal or implied. Further, I understand that my non-compliance will make me personally responsible for any of my actions or lack thereof. I understand that failing to follow directions/instructions may result in my dismissal from the test.

I freely and voluntarily assume any and all risks known or unknown to me that are inherent to being a participant in this program.

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Candidate Scoring Sheet

Candidate Name: _____ Start Time:_____ End Time: _____

Event			Time	Eval Initials	Instructions Read Verbatim	
Test Welcome			Time _____	_____	☐ Yes	☐ No
Event # 1 – 100' Aerial Ladder Climb	☐ Pass	☐ Fail	Time _____	_____	☐ Yes	☐ No
Event # 2 – Pulling Charged 1¾ Hose	☐ Pass	☐ Fail	Time _____	_____	☐ Yes	☐ No
Event # 3 – Removal of 24' Ladder	☐ Pass	☐ Fail	Time _____	_____	☐ Yes	☐ No
Event # 4 – Stairway Climb	☐ Pass	☐ Fail	Time _____	_____	☐ Yes	☐ No
Event # 5 – Fly Ladder Raise	☐ Pass	☐ Fail	Time _____	_____	☐ Yes	☐ No
Event # 6 – Weight Lift and Twist	☐ Pass	☐ Fail	Time _____	_____	☐ Yes	☐ No
Event # 7 – Rescue Drag	☐ Pass	☐ Fail	Time _____	_____	☐ Yes	☐ No
Event # 8 – Hose Hoist	☐ Pass	☐ Fail	Time _____	_____	☐ Yes	☐ No
Event # 9 – Wearing SCBA w/ Mask	☐ Pass	☐ Fail	Time _____	_____	☐ Yes	☐ No
Event # 10 – Beam Walk with Hose	☐ Pass	☐ Fail	Time _____	_____	☐ Yes	☐ No
Event # 11 – CPR	☐ Pass	☐ Fail	Time _____	_____	☐ Yes	☐ No

Rehabilitation

Entry Time _____ Release Time _____

Pulse _____ Respiration _____ Blood Pressure _____ Temperature _____

Comments _____

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Refusal of Medical Advice

This is to certify that I am refusing assessment/treatment/transport. I have been informed of the risks of refusing assessment/treatment/transport. I understand that I should be evaluated immediately for my condition by a physician. I release the City of Delaware from any liability for any adverse results caused by my decision. I understand that I may call 911 and activate EMS anytime, should I change my mind.

☐ Candidate Refusal of Medical Advice _____ Signature

Signatures

Candidate: _____

Lead Proctor: _____

Test Administrator: _____

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Test Administrator Documented Issues

Comments _____

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Signatures

Test Administrator: _____

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OHIO

Delaware Fire Department

Physical Ability Test

Test Guide

Implemented: April 5, 2021

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Date: of Test: _____

Test Administrator: _____

Support Staff: _____

Support Staff: _____

Lead 1 Proctor: _____

Lead 2 Proctor: _____

Lead 3 Proctor: _____

Assistant Proctor: _____

Assistant Proctor: _____

Assistant Proctor: _____

Assistant Proctor: _____

Assistant Proctor: _____

Assistant Proctor: _____

TEST ADMINISTRATION PROCEDURES

The *Delaware Fire Department Physical Ability Test (PAT) Test Guide* is designed to provide instruction on the administration and performance of the PAT necessary to consistently carry out the test. The guide shall be followed to ensure proper administration and performance of all components of the testing.

The selection of Test Administrator and proctors must be done with care. Individuals from the Fire Department or from the Department of Administrative Services can assist with test administration. These individuals must be knowledgeable regarding testing procedures and familiar with legal issues surrounding candidate testing. Prior to conducting the test, administrators and proctors must be trained in the execution of their duties, as detailed in this Test Guide. All personnel involved in the PAT must be knowledgeable of the tasks and responsibilities of the administrators and the proctors.

A single individual within the Fire Department or Department of Administrative Services office will be responsible for the PAT. This individual, known as the Test Administrator, will make decisions regarding cancellation, postponement, or rescheduling of the PAT due to problems associated with weather, test props, test site, and support staff. Adequate support personnel are required for successful administration of the PAT.

TEST ADMINISTRATOR

The Test Administrator is responsible to ensure that the entire testing process is administered and executed in accordance with this document. Support Staff and all proctors will report to the Test Administrator. The Test Administrator will be responsible to ensure that the course is set-up and ready prior to the testing process beginning. Any procedural questions or issues that occur and need to be answered will be done through the Test Administrator and documented.

SUPPORT STAFF

Support Staff are responsible for the processing of candidates as they arrive at the PAT site and collecting all documentation and rehabilitation forms at the conclusion of the PAT. The Proctors are responsible for processing candidates through the PAT and monitoring test events.

PROCTOR TYPES

Two types of proctors are assigned to the test area: Lead Proctors and Assistant Proctors. Both are essential for proper and consistent administration of the PAT. Proctors must not

interfere with the candidate and are to be located in a safe position away from the candidate's movements at each event. After reviewing the following materials proctors should be able to:

- Assume the roles and responsibilities of Lead and Assistant Proctors
- Read the instructions that must be given to every candidate
- Fill out the scoring sheet properly
- Use the timing mechanism and perform the start/stop procedures
- Perform the requirements for when a candidate fails or quits
- Produce the documentation requirements for each candidate
- Communicate properly between the event and lead proctors
- Prevent the use of encouragement during the PAT
- Understand the need for consistency and accuracy when proctoring the PAT
- Know the warning and failure points of each event
- Understand the limitations and purpose of lead proctors
- Know the basic maintenance and reset of each event

LEAD PROCTOR

The Lead Proctor is responsible for:

- Providing event instruction
- Evaluating the candidate during the event
- Providing warnings during the event (i.e. If a candidate does not go around a traffic cone, the Lead Proctor must stop and instruct candidate to go around missed traffic cone)
- Timing the event
- Documenting the candidates times and success/failure
- Escorting the candidate between the events

The Lead Proctor will utilize two stop watches for the PAT. One stop watch will be used for the event times, and the second stop watch will be used for the PAT overall time.

The event stopwatch begins when the Lead Proctor states "START" for the event and "STOP" when the event is concluded. The second stopwatch used for the overall time is started when the Lead Proctor at Event 1 declares "START" and stops when the Lead Proctor at Event 10 declares "STOP".

The Lead Proctor reads verbal instructions to the candidate as the candidate progresses through the test. The Lead Proctor monitors and documents the warnings given by the Assistant Proctor. The Lead Proctor notifies the candidate and stops the PAT when

infractions, as declared by the Lead or Assistant Proctor, constitute test failure. At the conclusion of the PAT, both the candidate and the Lead Proctor must sign the PAT Evaluation Form.

ASSISTANT PROCTORS

Assistant Proctors are used to assist at each event. They are responsible for ensuring that candidates perform the events as prescribed by the Lead Proctor, declaring verbal warnings to candidates for infractions, providing for candidate safety, and resetting props to starting positions.

EVENT 1 — Aerial Ladder Climb

Event Proctors:

1-Lead Proctor
2-Assistant Proctors

Event Proctor Responsibilities:

The Lead Proctor will read the event instruction to the candidates. They will acknowledge receipt from the Assistant Proctor of the candidate being "on-line" and "off-line". Once the candidate is "on-line", the Lead Proctor will tell the candidate "READY" then states the word "START" to indicate the start of the timed PAT. The Lead Proctor will announce the progression of the event time, announcing every 30 seconds. They are responsible for acknowledging the candidate ringing the bell at the top of the ladder. Once the candidate has both feet on the turntable base, the Lead Proctor will state "STOP" which will stop the timed PAT. When the candidate comes out of the ladder belt, the Lead Proctor will state "REST PERIOD START". The Lead Proctor will record the event time and the candidate's Pass/Fail status. The time will be announced for the candidate and the Lead Proctor to record.

Assistant Proctor #1 will ensure the candidate is properly outfitted with a ladder belt and assist the candidate to the turntable. Once the candidate is on-line, they will be responsible for the belaying of the candidate as they safely ascend and descend the ladder. The Assistant Proctor will then take the candidate off-line and direct them off the truck.

Assistant Proctor #2 (located on the turntable) is responsible for conducting a safety check of the candidate ensuring the proper fit of the ladder belt or harness and securing the candidate to the rope. They are responsible for announcing that the candidate is "on-line" and "off-line". When the candidate comes off the apparatus, they will assist them out of the ladder belt.

The Assistant Proctor's will ready the event for the next candidate.

EVENT 2 — Pulling Charged 1¾" Hose

Event Proctors:

1-Lead Proctor
2-Assistant Proctors

Event Proctor Responsibilities:

In preparation for this event, the candidate will be instructed to get into position next to the hose line prior to the end of the Rest Period. The Lead Proctor will announce the completion of the rest period by stating "REST PERIOD STOP". The Lead Proctor will then read the event instruction to the candidate. The Lead Proctor will tell the candidate "READY" then states the word "START" to indicate the start of the timed PAT. The Lead Proctor will announce the progression of the event time, announcing every 10 seconds. The Event Proctor will state "STOP" which will stop the timed PAT once the nozzle has passed the marked location. When the candidate places the nozzle on the ground, the Lead Proctor will state "REST PERIOD START". The Lead Proctor will record the event time and the candidate's Pass/Fail status.

The Assistant Proctors will ready the event for the next candidate.

EVENT 3 — Removal of 24' Extension Ladder

Event Proctors:

1-Lead Proctor
1-Assistant Proctor

Event Proctor Responsibilities:

In preparation for this event, the candidate will be instructed to get into position in front of the ladder. The Lead Proctor will announce the completion of the rest period by stating "REST PERIOD STOP". The Lead Proctor will read the event instruction to the candidate. The Lead Proctor will tell the candidate "READY" then states the word "START" to indicate the start of the timed PAT. The Event Proctor will state "STOP" which will stop the timed PAT once the ladder has been placed back into the ladder rack. The Lead Proctor will announce the progression of the event time, announcing every 10 seconds. When the candidate places the ladder back on the ladder rack, the Lead Proctor will state "REST PERIOD START". The Lead Proctor will record the event time and the candidate's Pass/Fail status.

The Assistant Proctor will ready the event for the next candidate.

EVENT 4 — Stairway Climb

Event Proctors:

1-Lead Proctor
2-Assistant Proctors

Event Proctor Responsibilities:

In preparation for this event, the candidate will be instructed to get into position to be outfitted with the props for the event. The Lead Proctor will announce the completion of the rest period by stating "REST PERIOD STOP". The Lead Proctor will read the event instruction to the candidate. The Lead Proctor will tell the candidate "READY" then state the word "START" to indicate the start of the timed PAT. The Event Proctor will state "STOP" which will stop the timed PAT once the candidate has both feet on the basement floor. The Lead Proctor will announce the progression of the event time, announcing every 15 seconds. When the candidate is completely out of the SCBA and high-rise pack, the Lead Proctor will state "REST PERIOD START". The Lead Proctor will record the event time and the candidate's Pass/Fail status.

The Assistant Proctor #1 will set up the candidate with all equipment for the event. Once the event is completed, the candidate will take the equipment off of the candidate and ready the event for the next candidate.

The Assistant Proctor #2 will be located at the top of the stairwell.

The Assistant Proctors will ensure the candidate touches all stairs and has both feet located on the top landing. If the candidate misses a step the Assistant Proctor will announce "Warning" and state the violation.

EVENT 5 — Fly Ladder Raise

Event Proctors:

1-Lead Proctor
1-Assistant Proctor

Lead Proctor Responsibilities:

In preparation for this event, the candidate will be instructed to get into position next to the ladder. The Lead Proctor will announce the completion of the rest period by stating "REST PERIOD STOP". The Lead Proctor will read the event instruction to the candidate. The Lead Proctor will tell the candidate "READY" then state the word "START" to indicate the start of the timed PAT. The Event Proctor will state "STOP" which will stop the timed PAT once the ladder has returned to the stow position. The Lead Proctor will announce

the progression of the event time, announcing every 20 seconds. When the candidate has the ladder back in the stowed position, the Lead Proctor will state "REST PERIOD START". The Lead Proctor will record the event time and the candidate's Pass/Fail status.

The Assistant Proctor will ready the event for the next candidate.

EVENT 6 — Weight Lift and Twist

Event Proctors:

1-Lead Proctor
1-Assistant Proctor

Event Proctor Responsibilities:

In preparation for this event, the candidate will be instructed to get into position in the center of the marked box. The Lead Proctor will announce the completion of the rest period by stating "REST PERIOD STOP". The Lead Proctor will read the event instruction to the candidate. The Lead Proctor will tell the candidate "READY" then state the word "START" to indicate the start of the timed PAT. The Event Proctor will state "STOP" which will stop the timed PAT the candidate has completed the repetitions. The Lead Proctor will announce the progression of the event time, announcing every 20 seconds. When the candidate has the weight back in the start position, the Lead Proctor will state "REST PERIOD START". The Lead Proctor will record the event time and the candidate's Pass/Fail status.

The Assistant Proctor will count the repetitions out loud. If the candidate does not fully come to an upright position or the weight does not touch the ground, the Assistant Proctor will announce "Warning" and state the violation. Assistant Proctor will ready the event for the next candidate.

EVENT 7 — Rescue Drag

Event Proctors:

1-Lead Proctor
1-Assistant Proctor

Event Proctor Responsibilities:

In preparation for this event, the candidate will be instructed to get into position next to the Rescue Mannequin. The Lead Proctor will announce the completion of the rest period

by stating "REST PERIOD STOP". The Lead Proctor will read the event instruction to the candidate. The Lead Proctor will tell the candidate "READY" then state the word "START" to indicate the start of the timed PAT. The Event Proctor will state "STOP" which will stop the timed PAT once the mannequin passes the finish line. The Lead Proctor will announce the progression of the event time, announcing every 10 seconds. When the candidate releases the Rescue Mannequin past the finish line, the Lead Proctor will state "REST PERIOD START". The Lead Proctor will record the event time and the candidate's Pass/Fail status.

The Assistant Proctor will ready the event for the next candidate.

EVENT 8 — Hose Hoist

Event Proctors:
1-Lead Proctor
1-Assistant Proctor

Event Proctor Responsibilities:
In preparation for this event, the candidate will be instructed to get into position on the 2nd floor hose tower landing. The Lead Proctor will announce the completion of the rest period by stating "REST PERIOD STOP". The Lead Proctor will read the event instruction to the candidate. The Lead Proctor will tell the candidate "READY" then state the word "START" to indicate the start of the timed PAT. The Event Proctor will state "STOP" which will stop the timed PAT once the hose returns to the 2nd floor landing for the second time. The Lead Proctor will announce the progression of the event time, announcing every 10 seconds. When the candidate releases the rope the Lead Proctor will state "REST PERIOD START". The Lead Proctor will record the event time and the candidate's Pass/Fail status.

The Assistant Proctor will ready the event for the next candidate.

EVENT 9 — Wearing SCBA and Mask

Event Proctors:
1-Lead Proctor
1-Assistant Proctor

Event Proctor Responsibilities:
In preparation for this event, the candidate will be instructed to get into position in front of the entrance door and outfitted with a SCBA Mask. The Lead Proctor will announce the completion of the rest period by stating "REST PERIOD STOP". The Lead Proctor will read

the event instructions to the candidate. The Lead Proctor will then lead the candidate to the rope. The Lead Proctor will tell the candidate "READY" then state the word "START" to indicate the start of the timed PAT. The Event Proctor will state "STOP" which will stop the timed PAT once the candidate returns to the start line. The Lead Proctor will announce the progression of the event time, announcing every 15 seconds. When the candidate releases the rope the Lead Proctor will state "REST PERIOD START". The Lead Proctor will record the event time and the candidate's Pass/Fail status.

The Assistant Proctor will get the candidate fitted with the SCBA Mask and then ready the event for the next candidate.

EVENT 10 — Beam Walk with Hose

Event Proctors:
1-Lead Proctor
1-Assistant Proctor

Event Proctor Responsibilities:
In preparation for this event, the candidate will be instructed to get into position in front of the beam holding the rolled hose. The Lead Proctor will announce the completion of the rest period by stating "REST PERIOD STOP". The Lead Proctor will read the event instructions to the candidate. The Lead Proctor will tell the candidate "READY" then state the word "START" to indicate the start of the timed PAT. The Lead Proctor will state "STOP" at the successful conclusion or failure of the event. The Lead Proctor will announce the progression of the event time, announcing every 30 seconds. When the candidate places the rolled hose on the ground, the Lead Proctor will state "REST PERIOD START". The Lead Proctor will record the event time and the candidate's Pass/Fail status.

The Assistant Proctor will ready the event for the next candidate.

EVENT 11 — CPR

Event Proctors:
1-Lead Proctor
1-Assistant Proctor

Event Proctor Responsibilities:
In preparation for this event, the candidate will be instructed to get into position next to the CPR Mannequin. The Lead Proctor will announce the completion of the rest period by

stating "REST PERIOD STOP". The Lead Proctor will read the event instructions to the candidate. The candidate will be instructed to get into position in front of the CPR Mannequin. The Lead Proctor will tell the candidate "READY" then state the word "START" to indicate the start of the timed PAT. The Event Proctor will state "STOP" which will stop the timed PAT at the successful conclusion or failure of the event. The Lead Proctor will announce the progression of the event time, announcing every 15 seconds. When the candidate completes performing CPR, the Lead Proctor will state "TEST CONCLUSION". The Lead Proctor will record the event time and the candidate's Pass/Fail status.

The Assistant Proctor will ready the event for the next candidate.

Event Failure

Event Proctors:

1-Test Administrator
1-Lead Proctor

Event Proctor Responsibilities:

The Lead Proctor will announce the conclusion of the test and the failure of the event. The reason for the failure will be provided to the candidate. The Lead Proctor will complete all documentation and provide it to the Test Administrator. The candidate will then be directed to the Assistant Proctor for Rehabilitation. The Lead Proctor will bring the candidate to the Test Administrator upon conclusion of Rehabilitation.

The Assistant Proctor will assist the candidate with the rehabilitation and complete all forms. When completed, the Lead Proctor will be notified.

The Test Administrator will review the test with the candidate and the Lead Proctor. Any failure will be reviewed and a reason for the failure will be provided (or explained). The Test Administrator will provide the completed paperwork to the Support Staff.

The Support Staff will be responsible for the recording of the test and compiling all documentation from the test.

Conclusion of Test

Event Proctors:

1-Test Administrator
1-Support Staff
1-Lead Proctor
1-Assistant Proctor

Event Proctor Responsibilities:

The Lead Proctor will announce the conclusion of the test and the passing of the PAT. The candidate will then be directed to the Assistant Proctor for Rehabilitation.

Lead Proctor will complete all documentation and provide it to the Test Administrator. The Lead Proctor will bring the candidate to the Test Administrator.

The Assistant Proctor will conduct an assessment of the candidate and complete the Rehabilitation Form. The Assistant Proctor will direct the candidate to the Lead Proctor.

The Test Administrator will review the test with the candidate and the Lead Proctor. The next steps in the process will be reviewed with the candidate if applicable. Candidate will be released from the Physical Ability Test.

The Test Administrator will provide the completed paperwork to the Support Staff. The Support Staff will be responsible for the recording of the test and the compiling of all documentation from the test.

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Candidate Instructions

Test Administrator:

Welcome the candidate to the physical ability test.

Read verbatim to the candidate to ensure the consistency of the test and instruction.
Firefighting is an extremely physical occupation and requires endurance, strength, coordination and ability. The events listed below are designed to measure each candidate's physical ability in these four (4) areas.

The test you are about to take is a validated test. This means that a third party has reviewed the work requirements at the Delaware Fire Department, and conducted a test of existing Delaware Fire Department personnel and the Physical Ability Test to certify the relevancy to the job. Several of the tasks are actual work samples (realistic physical tasks that might be performed on the job).

Once this introduction is complete, all Proctors will be required to read from the script. This is to ensure all candidates receive a fair and equivalent test. Unfortunately this may seem cold and impersonal. We understand this and hope you do as well.

You have received a copy of the *Delaware Fire Department Physical Ability Test (PAT) Test Guide.* Within the guide you will notice specific statements to the candidate. These are what the statements mean to the candidate.

"READY" – Candidate should be prepared and set to begin the event.
"START" – Candidate begins the event and the event time begins.
"STOP" – Candidate ends the event and the event time stops.
"REST PERIOD START" – Candidate begins a period of recovery after an event period. The Candidate will also be led to the next event location. During this period of time, the candidate may inspect, test or make any preference changes to the next evolution as long as the event being tested remains intact.
"REST PERIOD STOP" – Candidate recovery period ends and the candidate is at the next event station.
"TEST CONCLUSION" – The Physical Ability Test ends due to completion of the entire test or by failure of the event.

Complete verbatim Instruction
Ask and answer any questions the candidate may have.

Read verbatim to the candidate to ensure the consistency of the test and instruction.
Candidate, you are now being handed off to your Lead Proctor and they will be limited to the instructions provided to you at each event. We all wish you well.

Lead Proctor:

Candidate, please follow me to Event #1.

EVENT #1 - 85' Aerial Ladder Climb:

Candidate, Assistant Proctor #1 will assist you in being outfitted with the ladder belt or harness. They will then direct you to the top of the truck's turntable where you will go on-line of the belay system by Assistant Proctor #2. Candidate, you will climb the ladder from the turntable to the top of the ladder which is 85' and ring the bell, and then proceed back down the ladder to the turntable.

You will be told to prepare for the event through my statement of "READY" and will be located at the base of the ladder ready to perform the event. I will then announce "START" and you are to begin the event. Your time will stop when you return and both feet are on the turntable. This event must be completed within 150 seconds for a point and no longer than 160 seconds. I will announce your time every 30 seconds. I will announce when I hear you ring the bell. This test is to be completed in a continuous climb without any stops or hesitation greater than 5 seconds. Any stop of 5 seconds or more will result in a failure. You will receive a warning if you should pause for a period of time during the climb or decent. In the event you should receive two warnings, this will be the failure of the event. This event will be followed by a 2 minute rest period.

"READY"
"START"
Announce Times – 30, 60, 90, 120, and 150 seconds
"BELL RUNG"
"STOP"
Candidate, you will be assisted off the rope line and then down off the truck and out of the ladder belt. Once out of the ladder belt or harness, I will let you know when your 2 minute rest time will begin.
"REST PERIOD START"
Candidate, please follow me to Event #2

EVENT #2 - Pulling a Charged 1 ¾" Hose with Nozzle Attached (100 feet):

Candidate, the charged hose is laying on the ground from the hydrant to the start line where the nozzle is located. You will grasp the nozzle and turn down the hose line and drag the line for 100'.

You will be told to prepare for the event through my statement of "READY" and will be at the nozzle standing upright in a position ready to begin the event. I will then announce "START" and you are to begin the event. This event must be completed within 30 seconds for a point and no longer than 50 seconds. I will announce your time every 10 seconds. At no time will

you be permitted to drop or put the hose down, which will create a failure. This event will be followed by a 2 minute rest period.

"READY"
"START"
Announce Times – 10, 20, and 30 seconds
"STOP"
"REST PERIOD START"
Candidate, please follow me to Event #3

EVENT #3 - Removal of a 24-Foot Extension Ladder:

Candidate, a 24 foot extension ladder, which is approximately 78 pounds, is mounted to the wall with the top beam six (6) feet from ground level. You will, by grasping the ladder, lower it to the ground so that it is flat on both beams. You will then pick up the ladder and return it to the mounting brackets.

You will be told to prepare for the event through my statement of "READY" and you will be set-up facing the ladder in a position to remove. I will then announce "START" and you are to begin the event. This event must be completed within 25 seconds for a point and no longer than 35 seconds. I will announce your time every 10 seconds. You are required to maintain control of the ladder at all times. You are not permitted to lower or raise one end of the ladder at a time. It is permissible during your time period to make an adjustment or reset yourself with the ladder. This event will be followed by a 2 minute rest period.

"READY"
"START"
Announce Times – 10, 20, and 30 seconds
"STOP"
"REST PERIOD START"
Candidate, please follow me to Event #4

EVENT #4 - Stairway Climb

Candidate, you have 100' of 1¾'' hose which is secured together in a high-rise pack. You will wear a SCBA pack without a mask. Starting at the basement level, you will ascend to the second (2nd) floor, return to the basement level and then repeat the process two (2) more times. This event must be completed, without stopping for more than 2 seconds. You shall not skip stairs and shall have both feet land on the top and bottom landings. You shall touch every step. You are permitted to use the stairwell railing.

You will be equipped with the hose and SCBA. You will then be told to prepare for the event through my statement of "READY" and be at the base of the bottom step. I will then announce

"START" and you are to begin the event. This event must be completed within 90 seconds for a point and no longer than 110 seconds. I will announce your time every 15 seconds. This event will be followed by a 3½ minutes rest period.

"READY"
"START"
Announce Times – 15, 30, 45, 60, 75 and 90 seconds
"STOP"
"REST PERIOD START"
Candidate, please follow me to Event #5

EVENT #5 - Fly Ladder Raise

You are required to pull a halyard (rope) to raise and lower the ladder fly (extension) of a 35-foot ladder. The ladder shall go to the full extension and be lowered to the stowed position. You are not required to lock the ladder in place when extended or in the stowed position. You shall maintain control of the halyard at all times. If the halyard slides and you do not maintain control, then you will be disqualified.

You will be told to prepare for the event through my statement of "READY" and are to be facing the ladder in position to raise. I will then announce "START" and you are to begin the event. This event must be completed within 60 seconds for a point and no longer than 70 seconds. I will announce your time every 20 seconds. This event will be followed by a 2 minute rest period.

"READY"
"START"
Announce Times – 20, 40, and 60 seconds
"STOP"
"REST PERIOD START"
Candidate, please follow me to Event #6

EVENT #6 - Weight Lift and Twist:

You are required to lift a 15 pound weight with grip and alternately place it on the floor, outside each foot for 15 repetitions. One repetition is considered one full cycle of picking the weight up from the start position (Left or Right box), touching the opposite side and bringing it back to the start position. One hand shall be holding the weight at all times. You shall come to an upright position between alternating from side to side.

You will be told to prepare for the event through my statement of "READY" and you are to stand in the middle box. I will then announce "START" and you are to begin the event. This event must be completed within 60 seconds for a point and no longer than 70 seconds. I will announce your time every 20 seconds. This event will be followed by a 2 minute rest period.

"READY"
"START"
Announce Times – 20, 40, and 60 seconds
"STOP"
"REST PERIOD START"
Candidate, please follow me to Event #7

EVENT #7 - Rescue Drag

Candidate, you will be required to drag a 165 pound mannequin through a 100 foot course. From the start line on the floor, you shall drag the mannequin through the course without stopping. You must maintain control of the mannequin and not let go of the mannequin while moving through the course. The mannequin shall be dragged using any method desired. You will be disqualified for carrying the mannequin over the shoulder or not maintaining control of the mannequin. Striking a cone, in a way that moves it out of its designated location, will cause a warning.

You will be told to prepare for the event through my statement of "READY" and are to stand next to the mannequin. I will then announce "START" and you are to begin the event. This event must be completed within 40 seconds for a point and no longer than 59 seconds. I will announce your time every 10 seconds. This event will be followed by a 2 minute rest period.

"READY"
"START"
Announce Times – 10, 20, 30 and 40 seconds
"STOP"
"REST PERIOD START"
Candidate, please follow me to Event #8

EVENT #8 - Hose Hoist

Candidate, you will be required to pull a halyard (rope) to raise a rolled 2½" - 50' section of hose from the 1st floor to the 2nd floor landing, where it is required to be brought over the railing and touch the hose tower landing and then lowered to the 1st floor, touching the floor and then brought to the 2nd floor hose tower landing again where the time will stop. You shall maintain control of the halyard at all times. If the halyard slides and you do not maintain control, then you will be disqualified.

You will be told to prepare for the event through my statement of "READY" and are to stand next to the railing holding the halyard. I will then announce "START" and you are to begin the event. This event must be completed within 35 seconds for a point and no longer than 50

seconds. I will announce your time every 10 seconds. This event will be followed by a 2 minute rest period.

"READY"
"START"
Announce Times – 10, 20 and 30 seconds
"STOP"
"REST PERIOD START"
Candidate, please follow me to Event #9

EVENT #9 – Wearing a SCBA with Mask

Candidate, you will wear a face piece and SCBA mask, with the eyepieces blackened out, through a totally darkened room. You will follow a rope line from the entrance to the end of the room and return. You will be disqualified for removing the mask or causing the SCBA mask to free flow air due to a breach in the seal.

You will be told to prepare for the event through my statement of "READY" and are to stand in the darkened room with your hand on the guide rope, breathing air and wearing the SCBA. I will then announce "START" and you are to begin the event. This event must be completed within 60 seconds for a point and no longer than 70 seconds. I will announce your time every 20 seconds. This event will be followed by a 2 minute rest period.

"READY"
"START"
Announce Times – 20, 40 and 60 seconds
"STOP"
"REST PERIOD START"
Candidate, please follow me to Event #10

EVENT #10 – Beam Walk with Hose

Candidate, you will be required to walk across the length of a 4"x 4" x 20' beam while carrying a 50 foot section of 1¾ " hose with couplings. You will receive three (3) attempts to pass this event. You will be given a warning for each failed attempt at crossing the entire length of the beam and will fail the event if you receive three warnings.

You will be told to prepare for the event through my statement of "READY" and are to stand in front of one end of the beam holding the hose section. I will then announce "START" and you are to begin the event. This event must be completed within 90 seconds for a point and no longer than 95 seconds. I will announce your time every 30 seconds. This event will be followed by a 2 minute rest period.

"READY"
"START"
Announce Times – 30, 60 and 90 seconds
"STOP"
"REST PERIOD START"
Candidate, please follow me to Event #11

EVENT #11 – CPR

Candidate, you will be required to perform 2 minutes of CPR. You will be given 10 seconds to begin performing CPR and ensure your hand placement, angle, rate and depth, are proper. The indicator light will provide appropriate feedback by a green light. Non-compliance will be indicated by a yellow light and considered a warning. Three or more warnings during the 2 minute testing period will result in disqualification. If a red light occurs during the 2 minute testing period, it will indicate failure for this event. A metronome set to 110 beats per minute is provided. The CPR mannequin has indicator lights. These are as follows:

Red Only – Less than 60 compressions per minute
Yellow Only – Between 60-79 compressions per minute
Single Green – Between 80-99 compressions per minute
Double Green – Between 100-119 compressions per minute
Double Green with Yellow – 120 and Greater compressions per minute

You will be told to prepare for the event through my statement of "READY" and are to begin CPR for 10 seconds. After 10 seconds, and while still conducting CPR, I will announce "START" and you are to begin the event. This event must be completed within 120 seconds. I will announce your time every 30 seconds. This event will be followed by a 2 minute rest period.

"READY"
"START"
Announce Times – 30, 60, 90 and 120 seconds
"TEST CONCLUSION"
"REST PERIOD START"
Complete verbatim Instruction

Candidate will be taken to Rehabilitation

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Physical Ability Test Forms

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PHYSICAL ABILITY ASSESSMENT
Release of Liability

I,_____(name below)_____, having submitted an application for employment and agreeing to engage in a physical agility assessment, and being fully aware of the risks of injury and death, hereby save and hold harmless the City of Delaware, as well as the agents or employees of all entities assisting in the test from any and all causes of action, suits, debts, damages, judgments, and demands whatsoever arising from my participation in the **Delaware Fire Department** physical ability assessment as part of the recruiting process. I further acknowledge that the City of Delaware and the Delaware Fire Department, or any other agent or employee assisting in the assessment process will be not be held responsible for any injuries or death that may be caused by negligence of the persons or entities listed below during my participation in this physical ability assessment.

I affirm that I am in good physical condition and have no pre-existing conditions that would impact my participation in this assessment. Further, I will not take part in any aspect of this assessment if I feel it is a risk to my health. I will comply with all instructions written, verbal or implied. Further, I understand that my non-compliance will make me personally responsible for any of my actions or lack thereof. I understand that failing to follow directions/instructions may result in my dismissal from the test.

I freely and voluntarily assume any and all risks known or unknown to me that are inherent to being a participant in this program.

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Candidate Scoring Sheet

Candidate Name: _____ Start Time:_____ End Time: _____

Event	1 Pt	0 Pt	Fail	Time	Eval Initials	Instructions Read Verbatim
Test Welcome				Time _____	_____	☐ Yes ☐ No
Event # 1 – 85' Aerial Ladder Climb	☐ <150	☐ <160	☐ >160	Time _____	_____	☐ Yes ☐ No
Event # 2 – Pulling Charged 1¾ Hose	☐ <30	☐ <50	☐ >50	Time _____	_____	☐ Yes ☐ No
Event # 3 – Removal of 24' Ladder	☐ <25	☐ <35	☐ >35	Time _____	_____	☐ Yes ☐ No
Event # 4 – Stairway Climb	☐ <90	☐ <110	☐ >110	Time _____	_____	☐ Yes ☐ No
Event # 5 – Fly Ladder Raise	☐ <60	☐ <70	☐ >70	Time _____	_____	☐ Yes ☐ No
Event # 6 – Weight Lift and Twist	☐ <60	☐ <70	☐ >70	Time _____	_____	☐ Yes ☐ No
Event # 7 – Rescue Drag	☐ <40	☐ <59	☐ >59	Time _____	_____	☐ Yes ☐ No
Event # 8 – Hose Hoist	☐ <35	☐ <50	☐ >50	Time _____	_____	☐ Yes ☐ No
Event # 9 – Wearing SCBA w/ Mask	☐ <60	☐ <70	☐ >70	Time _____	_____	☐ Yes ☐ No
Event # 10 – Beam Walk with Hose	☐ <90	☐ <95	☐ >95	Time _____	_____	☐ Yes ☐ No
Event # 11 – CPR	☐ <120	☐ N/A	☐ N/A	Time _____	_____	☐ Yes ☐ No

Rehabilitation

Entry Time _____ Release Time _____

Pulse _____ Respiration _____ Blood Pressure _____ Temperature _____

Comments _____

_____

_____

Refusal of Medical Advice

This is to certify that I am refusing assessment/treatment/transport. I have been informed of the risks of refusing assessment/treatment/transport. I understand that I should be evaluated immediately for my condition by a physician. I release the City of Delaware from any liability for any adverse results caused by my decision. I understand that I may call 911 and activate EMS anytime, should I change my mind.

☐ Candidate Refusal of Medical Advice _____ Signature

Signatures

Candidate: _____

Lead Proctor: _____

Test Administrator: _____

EST 1808
CITY OF
DELAWARE
OHIO

Test Administrator Documented Issues

Comments _____

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Signatures

Test Administrator: _____

City of Delaware
Fire Lieutenant Promotional List (June 2021-2022)

List Order	Name	DOH	Date Application Period Closed	Years of Service	Assessment Center Score		Review Panel Score		Subtotal	Additional Points for Education: Assoc = 1 pt Bachelors = 2 pts Masters = 3 pts	Additional Points for Years of Service: 6-10 yrs = 1 pt 11-15 yrs = 2 pts 16-20 yrs = 3 pts 20+ yrs = 4 pts	Total Score:	Date Placed on Certified List	Expiration Date	Status as of 6/2/21 CSC Mtg
					Actual	Weighted (70%)	Actual	Weighted (30%)							
1	**Brian LeMaster**	08/01/12	01/26/21	8.5	87.0	**60.9**	76.5	**22.95**	83.85	1	1	**85.85**	6/2/2021	6/2/2022	Added to list
2	**Robert Jarvis**	05/07/03	01/26/21	17.7	85.3	**59.71**	59.7	**17.91**	77.62	2	3	**82.62**	6/2/2021	6/2/2022	Added to list
3	**Jared Drenik**	06/04/14	01/26/21	6.7	86.0	**60.2**	67.0	**20.10**	80.30	1	1	**82.30**	6/2/2021	6/2/2022	Added to list
4	**Michael Gamble**	01/18/12	01/26/21	9.0	79.2	**55.44**	68.7	**20.61**	76.05	1	1	**78.05**	6/2/2021	6/2/2022	Added to list

List certified by the Civil Service Commission on the 2nd day of June, 2021

John Rybka
Chair, Civil Service Commission