



## APPLICATION FORM

All applications must include the following information. Separate applications must be submitted for each eligible program. **Deadline: June 1, 2016.** Please include this application form with electronic entry.

### PROGRAM INFORMATION

County: Henrico County

Program Title: Fire Fit: An Intensive Focus on Firefighter Wellness

Program Category: Organizational Development

### CONTACT INFORMATION

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Department: County Manager's Office

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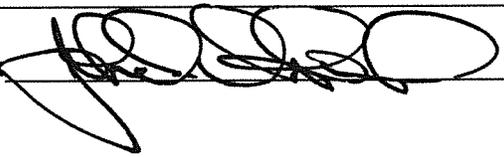
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### SIGNATURE OF COUNTY ADMINISTRATOR OR CHIEF ADMINISTRATIVE OFFICER

Name: John A. Vithoukas

Title: County Manager

Signature: 

## **1. Short Overview of the Program**

The physical demands on firefighters are intense and non-negotiable. At a moment's notice, these first responders need to be able to exert significant physical strength and display substantial cardiorespiratory stamina in order to do their jobs effectively. In October 2013, the Division of Fire (DOF) implemented a Work Performance Evaluation (WPE) to evaluate sworn personnel's ability to physically perform firefighter duties, and to clearly define a standard for firefighter fitness. Sworn personnel were told that passing the WPE was crucial to their ability to perform their jobs safely and effectively, and that doing so would be an annual expectation. In October 2014, while the majority of sworn personnel passed the WPE, there were still some who were unable to meet this expectation. The DOF collaborated with the Department of Human Resources (HR) to create and implement an intensive initiative to support and train these employees, providing them with the resources they needed to meet this benchmark the following year. After attending this program, the 2015 WPE results showed a 15% increase in completion, an 81% reduction in those who completed the Over the Benchmark (OBM) and a 75% reduction in the number of firefighters who Did Not Finish (DNF).

## **2. Problem/Challenge/Situation**

Despite the focus on supporting the community in their time of greatest need, too often the last people firefighters take care of is themselves – and this in turn creates a risk to their own safety and also to the residents they serve. Firefighters need to be able to carry significant weight while climbing stairs, navigating heavy obstacles, and dealing with highly stressful events – all on little sleep and missed meals so they can immediately respond to emergencies as they arise.

Henrico County DOF is the second largest fire department in the Commonwealth of Virginia, responding annually to more than 40,000 calls for service. The DOF is staffed with 548 employees – more than 500 of whom are sworn uniformed firefighters – serving more than 320,000 people 24 hours a day, 365 days a year. Thus there is a critical need for sworn personnel to have the physical strength and stamina to perform their duties safely and effectively. In October 2012, Anthony E. McDowell became Fire Chief after beginning his DOF career as a firefighter in 1997. Having occupied several different DOF roles throughout his career, he had an intimate understanding of this significant imperative. In 2013, the DOF implemented the WPE to set the standard for firefighter performance and reinforce the expectation that firefighters be fit and healthy enough to perform their duties. 87% of sworn personnel successfully completed the WPE in 2013, which meant there was a critical need to support the remaining employees in reaching this core expectation to perform their jobs effectively and safely. The DOF recognized that there might be emotional as well as physical barriers holding some firefighters back from achieving their fitness goals, and therefore collaborated with HR to create a comprehensive initiative addressing a wide range of potential obstacles to firefighter performance.

### **3. How the Program Was Carried Out**

In 2013, the Division of Fire implemented a Work Performance Evaluation in which 478 sworn personnel were evaluated with 87% successfully completing the event at or below the benchmark time of 8:44. The purpose of the WPE is to evaluate each member's ability to complete a series of job-specific tasks, and to set the standard for Division-wide performance on essential fire ground skills. The WPE serves as an important component in helping to protect the health and safety of firefighters and the public they are sworn to protect. When the WPE was repeated in 2014, 96% successfully completed the event. This

was an improvement, but still revealed a need to support those who had not passed so that they could be set up for success in subsequent evaluations.

The DOF decided to collaborate with Henrico County's Department of Human Resources to design an initiative focused on firefighter wellness. Two HR divisions – Fitness and Wellness (F&W) and Organizational Learning and Talent Development (OLTD) – joined the DOF in designing a program to support firefighters who, for any reason, were unable to complete the WPE. After much evaluation, the team identified four topics as being critical for struggling firefighters: maintaining personal energy and motivation, improving physical fitness, enhancing firefighter skills, and understanding nutritional choices. DOF and HR staff collaborated to design a 24-hour immersive experience exploring these areas that addressed psychological and physical readiness, as well as providing participants with resources and additional support after the program's completion. They called this initiative "Fire Fit."

The Fire Fit initiative was offered on three separate occasions – once in December 2014 and twice in February 2015 – to a total of 26 sworn fire personnel, and included the following components:

**Fire Fit Day One: Fire Chief's Address and *Wake Up! Eliminate Your Exhaustion, Expand Your Energy***

Fire Fit began with the Fire Chief addressing participants, emphasizing the expectation that every sworn firefighter complete the WPE successfully in order to safely perform their duties in the field. He acknowledged that this expectation was a culture change from times in the past when some employees thought it was acceptable to be out of shape. He stressed the critical need for firefighters to work out,

eat right, and deal with stress effectively – not only because it is core to their function but also because Henrico County is invested in employee wellbeing and safety. He presented the 24-hour Fire Fit initiative as an opportunity to become healthier and more effective rather than as a punitive measure. To illustrate his dedication to this topic, the Fire Chief was a participant in the December Fire Fit initiative. He also delivered his remarks in subsequent offerings, and Assistant Fire Chiefs participated in each of the February events.

The remainder of Day One consisted of an in-depth training called *Wake up! Eliminate Your Exhaustion, Expand Your Energy* (Appendix A – Outline) taught by an OLTD trainer – an immersive, introspective experience exploring personal motivation, energy management throughout intensive daily demands, and forming healthy habits. Topics included:

- Dealing with overload, overwork, and adrenalin addiction
- Will power versus rituals
- Basic principles of nutrition and hydration
- Sleep and its importance to performance
- Emotional disconnectedness and renewal
- Tapping into positive emotional energy to fuel individual high performance to create a profound organizational impact
- Active investment in emotional wellbeing
- Engaging in activities that are enjoyable, fulfilling, and affirming of individual values
- Maintaining mental energy

- Embracing “spiritual” (values-based) energy to fuel motivation, passion, perseverance, direction and commitment to individual personal and professional goals
- Uncovering our daily purpose and aligning our actions with our purpose as a means to higher professional engagement

### **Fire Fit Day Two: Fitness Assessment, Chaplain Conversations, and Firefighter Skills**

Day two of Fire Fit focused on physical fitness assessments and firefighter specific drill training. Participants started the day by completing a three-event fitness assessment consisting of one minute of push-ups, one minute of sit-ups, and a 1.5 mile run. This battery of assessments was chosen because they provided a good overall indication of fitness. A local high school track was used for the fitness tests. Minimal staffing and equipment were needed to successfully complete the fitness testing process, and included a Cooper Institute Certified proctor (HR F&W fitness trainer) who explained the sit-ups and push-ups testing protocol as well as monitored the participants during the entire assessment. (Appendix B – Cooper Institute fitness assessment standards). After the physical fitness assessment scores were tallied and shared with the course participants, they had the opportunity to speak one-on-one with a fitness trainer regarding their individual results. (Appendix C – Fire Fit Course participant’s Fitness Assessment Results)

After the fitness assessment, a Chaplain from DOF lead a conversation exploring possible emotional elements interfering with optimal performance, and also to provide support and guidance through the Fire Fit program.

Firefighters spent the remainder of the day at the Henrico County DOF drill facility working through the biomechanics (lifting and pulling) of basic engine operations skills such as hose line advancement, ground ladder deployment and positioning, and forcible entry, with a strategic emphasis on the importance of optimal physical fitness required to perform these essential job functions.

### **Fire Fit Day Three: Firefighter Fitness Program and Nutrition**

The final day of Fire Fit focused on physical fitness training as outlined in the DOF's Firefighter Fitness Training program – a structured six-month fire-station-based workout program utilizing minimal equipment to improve work performance (Appendix D – Firefighter Fitness Training Program Manual) – and nutrition education. The physical fitness education was provided by the HR F&W trainer. The goal of this portion of Fire Fit was to improve overall cardiovascular and muscular endurance so the participants had the tools needed to better perform in the 2015 WPE. In addition, the Firefighter Fitness Training program includes core-based movements to strengthen and stabilize the core, range of motion flexibility exercises to help prevent musculoskeletal injuries, and exercise progression steps – all necessary for continued physical performance improvement.

The second half of the day involved a visit to a local grocery store and nutrition education. The store's registered dietitian led an eye-opening and thought-provoking discussion on reading food labels; how to develop a meal plan for the fire station given budgetary limitations; and a grocery store tour to assist participants in meal planning – finding foods that are high in health promoting nutrients (vitamins and minerals) and low in saturated fats and cholesterol.

After completion of Fire Fit, participants were encouraged to continue to work with F&W for one-on-one fitness coaching; to actively engage in fitness training at their stations; to reach out to OLTD for help with stress management; and to access HR's Employee Assistance Program or DOF's chaplains for further emotional support if desired.

#### **4. Financing and Staffing**

The cost of delivering Fire Fit was highly economical. HR did not incur additional costs outside of salaries paid to employees in F&W and OLTD. Nutrition education was provided by a local grocery store on-staff registered dietitian free of charge. Cooper Institute Fitness assessments were administered by salaried fitness trainers at no additional cost to the county, and access to the high school track was free. The only cost incurred was for instruction in Basic Engine Operations, due to overtime salaries paid for a total of two firefighters for the 12 hours needed to deliver this portion of instruction three separate times.

#### **5. Program Results**

The results of Fire Fit have been many and significant, ranging from improved WPE pass rates to powerful personal stories of health improvement.

Since the implementation of the 2013 WPE, there has been a clear improvement in the number of sworn personnel who are successfully passing it within benchmark time (8:44):

- There was a 15% percent increase in WPE completion from 2013 to 2015: in 2013, 411 completed; in 2014, 464 completed; and in 2015, 471 completed.
- Between 2013 and 2015 there was a 75% reduction in the number of firefighters who Did Not Finish (DNF) the WPE course: 2013 – 16 DNF; 2014 – 7 DNF; 2015 – 4 DNF
- In the same time period, there has been an astounding 81% reduction in the number of firefighters who completed the WPE course Over the Bench Mark (OBM) time: 2013 – 62 OBM; 2014 – 17 OBM; 2015 – 8 OBM. (See Appendix E 2013, 2014 and 2015)

In addition to completion and benchmark time records, DOF collected 2014 and 2015 Average Air Consumption and Average Post WPE Pulse Rate – both of which show a marked improvement from 2014 to 2015. (See Appendix F: 2014 and 2015 Average Air Consumption and Average Post WPE Pulse Rate Results)

The participant evaluations for the *Wake Up* portion of Fire Fit were overwhelmingly positive, with an average overall course rating of 93% for all three sessions. This was a significant achievement since several firefighters felt embarrassed or stigmatized for “failing” the WPE and had begun the morning expressing resentment at being sent to mandatory training. Even more powerful were the voluntary written statements by participants after Day One:

- This reminded me about what’s important in life, and started a thought process to better myself
- I will use this information to encourage and support others with their striving to find balance and to be patient, and for me to personally improve my habits
- The greatest impact for me was realizing the different facets (physical, mental, emotional, spiritual) from which we draw our energy

- I will develop constructive rituals to foster “second nature” healthy habits
- It made me much more aware and gave me ideas for direction
- I will use this to become healthier and emotionally strong

In addition, overall Fire Fit evaluations received the following comments:

- The program has been developed in such a way that anyone and everyone can get some valuable “take-aways” from all sections provided
- It was helpful to learn the core workouts for the whole division on a station to station hands-on basis
- Fire Fit was without a doubt beneficial!

Perhaps most powerful were the individual stories that arose from the Fire Fit experience. During the *Wake Up* portion of the Fire Fit Program, one participant had a life changing “ah-ha” regarding significant personal challenges he had been facing. The self-assessment element of this initiative allowed him to recognize this challenge and gave him tools to begin to address it. In addition, a few participants spoke with F&W and OLTD instructors privately during the three days about challenges at home related to family members, alcohol dependence, or mental health issues, and received resources and support to help them navigate these issues.

One particular story that stands out relates to a firefighter who was struggling with significant weight gain. After the Fire Fit experience, he met with a F&W fitness trainer over a period of 11 months. During this time he lost a remarkable 55.6 pounds and altered his eating by focusing on the proper balance of macronutrients for his body’s needs. Due to his personal commitment, he was also able to reduce his

run time by 14 minutes, thus improving his overall physical fitness and emotional well-being – as well as enabling him to better perform his firefighter job duties and keep the public safe.

## **6. Brief Summary**

Firefighters are the Department of Fire’s greatest resource, contributing to the health and safety of our entire community. They dedicate their lives to being there for others, helping residents through their medical and health emergencies on a daily basis. To do so, they skip meals and miss sleep in order to respond to calls within minutes. They also suppress their own stress responses in order to remain calm during crises – despite the harrowing conditions and difficult outcomes they at times face. Week after week, year after year, this can have a detrimental effect on their own health and wellbeing – so much so that it can threaten their ability to do their jobs as effectively as they once did.

In October 2013, the Division of Fire implemented a Work Performance Evaluation (WPE) to evaluate sworn personnel’s ability to physically perform firefighter duties, and to clearly define a standard for firefighter fitness. Sworn personnel were told that passing the WPE was crucial to their ability to perform their jobs safely and effectively, and that doing so would be an annual expectation. In October 2014, while the majority of sworn personnel passed the WPE, there were still some who were unable to meet this expectation. The DOF collaborated with the Department of Human Resources to create and implement an intensive initiative – called “Fire Fit” – to support and train these employees, providing them with the resources they needed to meet this benchmark the following year. After attending this program, the 2015 WPE results showed a 15% increase in completion, an 81% reduction in those who

completed the evaluation Over the Benchmark (OBM) and a 75% reduction in the number of firefighters who Did Not Finish (DNF).

Fire Fit is a vitally important investment in Henrico County's firefighters, providing support and resources so that participants can maximize their fitness, wellness, and ability to function at their peak both in life and on the fire ground. Even beyond the time invested in Fire Fit and the significantly increased WPE pass rates, the true benefit of this program will play out in future years as more firefighters are able to take preventative care of their bodies and minds, living healthier lives while they safely support the community in doing the same. If a person's life can be saved because a firefighter was more physically and mentally capable of intervening in an emergency, then the success of this program is profound and immeasurable.

**Supplemental Materials:**

- Appendix A: Wake up! Eliminate Your Exhaustion, Expand Your Energy outline
- Appendix B: Cooper Institute Standards
- Appendix C: Fitness Assessment Scores
- Appendix D: Division of Fire's Firefighter Fitness Manual
- Appendix E: WPE Results
- Appendix F: 2014 and 2015 Average Air Consumption and Average Post WPE Pulse Rate Results

# Wake Up! Eliminate Your Exhaustion, Expand Your Energy: FIRE FIT

## FIRE CHIEF'S CHARGE

### INTRODUCTIONS

- Welcome, Objectives, Agenda
- Self-Assessment, Introductions

### OVERWORK AND OVERLOAD

- Research on the effect of Overload and Overwork
- Discussion: Overload and its effects
- Workaholic Assessment, Adrenalin Addiction explanation, Research re: work vs family centric

### FOUNDATION: THEORY

- Energy vs. Time
- Oscillation = Renewal; Ultradian Rhythms
- Will Power vs. Rituals

## PHYSICAL ENERGY

### Nutrition and Hydration

- Breakfast = energy
- Snacks to fuel energy
- Glycemic index

**Sleep** – lecture and open discussion

**Exercise** – lecture, gentle movement, create rituals, discussion

## EMOTIONAL ENERGY

- Emotional Disconnectedness
- Flow/active investment in emotional energy
- Create rituals

### REVIEW, INTRO TO AFTERNOON

- Content review
- Intro to afternoon
- Past ROI from class

## MENTAL ENERGY

- Use it or lose it (exercise and the brain)
- Recovery (where get best ideas?)
- Creativity and Oscillation

## SPIRITUAL ENERGY Part 1: Getting buy in

- Money and happiness
- The power of purpose

- Things that bring you joy vs what you spend time on
- Erma Bombeck “If I Had My Life to Live Over”

### **SPIRITUAL ENERGY Part 2: Personal assessment**

- Purpose and Values handout
- Does my behavior match my values?
- Common performance barriers
- Values driving your rituals

### **WRAP UP**

- Ritual Accountability Log
- What did I learn?



## ASSESSMENTS AND GOAL SETTING

Name: \_\_\_\_\_

Age: \_\_\_\_\_ yrs.    Weight: \_\_\_\_\_ lbs.    Date of Test: \_\_\_\_\_

ASSESSMENT	Current Raw Score	Current Fitness Category	Goal Raw Score	Goal Fitness Category	Time to Retest (weeks)
<b>MEDICAL SCREENING</b>					
Resting Heart Rate (bpm)					
Resting Blood Pressure (mm Hg)	/				
<b>Body Composition</b>					
Waist Circumference (inches)					
% Body Fat					
<b>FITNESS ASSESSMENT</b>					
<b>Flexibility</b>					
Sit-and-Reach (inches)					
<b>Dynamic Strength (Muscular End)</b>					
1 Minute Sit-Up/Curl-Up (reps)					
1 Minute Push-Up (reps)					
<b>Absolute Strength</b>					
DVR Bench Press _____ lbs. lifted/_____ body wt					
FW Bench Press _____ lbs. Convert to DVR lbs. _____ lbs. _____ lbs. lifted/_____ body wt					
<b>Cardiorespiratory Fitness</b>					
1.5 Mile Run (min and sec) _____:_____	:				
1 Mile Walk (ml/kgmin) HR _____ bpm Time _____:_____ min and sec					
<b>Anaerobic Power</b>					
Vertical Jump (inches)					
300 Meter Run (seconds)					

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_





## CARDIORESPIRATORY FITNESS TESTS

### Males

%	AGE 20-29				AGE 30-39				
	Balke Treadmill (time)	$\dot{V}O_2$ max (ml/kg/min.)	12 min. Run Distance (miles)	1.5 Mile Run (time)	Balke Treadmill (time)	$\dot{V}O_2$ max (ml/kg/min.)	12 min. Run Distance (miles)	1.5 Mile Run (time)	
99	31:03	59.8	1.98	8:35	30:00	58.3	1.93	8:49	
95	28:01	55.4	1.86	9:18	27:02	54.0	1.82	9:34	S
90	26:40	53.5	1.80	9:40	25:22	51.6	1.75	10:02	
85	25:30	51.8	1.75	10:00	24:12	49.9	1.70	10:24	
80	25:00	51.1	1.73	10:09	23:03	48.3	1.66	10:47	E
75	23:09	48.4	1.66	10:45	22:10	47.0	1.62	11:06	
70	22:30	47.5	1.63	10:59	21:30	46.0	1.59	11:22	
65	22:00	46.8	1.61	11:10	21:00	45.3	1.57	11:33	
60	21:05	45.4	1.58	11:31	20:05	44.0	1.54	11:56	G
55	20:30	44.6	1.55	11:45	20:00	43.9	1.53	11:58	
50	20:00	43.9	1.53	11:58	19:00	42.4	1.49	12:25	
45	19:02	42.5	1.49	12:23	18:05	41.1	1.46	12:50	
40	18:30	41.7	1.47	12:38	17:39	40.5	1.44	13:04	F
35	18:00	41.0	1.45	12:53	17:00	39.5	1.41	13:24	
30	17:15	39.9	1.42	13:16	16:20	38.6	1.39	13:46	
25	16:31	38.8	1.39	13:40	15:41	37.6	1.36	14:09	
20	15:46	37.8	1.36	14:06	15:00	36.7	1.33	14:34	P
15	15:00	36.7	1.33	14:34	14:01	35.2	1.29	15:13	
10	13:31	34.5	1.27	15:35	13:00	33.8	1.25	15:58	
5	11:18	31.3	1.18	17:22	11:11	31.1	1.18	17:29	
1	7:40	26.1	1.04	21:25	8:00	26.5	1.05	20:58	VP

n=2,463

n=13,308

Updated: 2013

Norms are based on Cooper Clinic patients



# CARDIORESPIRATORY FITNESS TESTS

## Males

%	AGE 40-49				AGE 50-59				
	Balke Treadmill (time)	$\dot{V}O_2$ max (ml/kg/min.)	12 min. Run Distance (miles)	1.5 Mile Run (time)	Balke Treadmill (time)	$\dot{V}O_2$ max (ml/kg/min.)	12 min. Run Distance (miles)	1.5 Mile Run (time)	
99	28:30	56.1	1.87	9:10	27:00	54.0	1.81	9:34	
95	26:00	52.5	1.77	9:51	23:31	49.0	1.67	10:38	S
90	24:00	49.7	1.69	10:28	24:56	46.7	1.61	11:11	
85	23:00	48.2	1.65	10:48	20:31	44.6	1.55	11:45	
80	21:44	46.4	1.60	11:16	19:39	43.4	1.52	12:07	E
75	20:41	44.9	1.56	11:41	18:36	41.9	1.48	12:36	
70	20:01	43.9	1.53	11:58	18:00	41.0	1.45	12:53	
65	19:30	43.2	1.51	12:11	17:14	39.9	1.42	13:17	
60	19:00	42.4	1.49	12:25	16:45	39.2	1.40	13:32	G
55	18:00	41.0	1.45	12:53	16:01	38.1	1.37	13:57	
50	17:25	40.1	1.43	13:11	15:29	37.4	1.35	14:16	
45	17:00	39.5	1.41	13:24	15:00	36.7	1.33	14:34	
40	16:15	38.5	1.38	13:49	14:16	35.6	1.30	15:03	F
35	15:45	37.7	1.36	14:07	13:52	35.0	1.29	15:20	
30	15:01	36.7	1.33	14:34	13:00	33.8	1.25	15:58	
25	14:30	35.9	1.31	14:53	12:30	33.0	1.23	16:21	
20	13:48	34.9	1.28	15:22	12:00	32.3	1.21	16:46	P
15	13:00	33.8	1.25	15:58	11:00	30.9	1.17	17:38	
10	12:00	32.3	1.21	16:46	10:00	29.4	1.13	18:38	
5	10:01	29.5	1.13	18:37	8:20	27.0	1.07	20:53	
1	7:01	25.1	1.01	22:20	5:25	22.8	0.95	25:01	VP

n=19,566

n=11,693

Updated: 2013



## CARDIORESPIRATORY FITNESS TESTS

### Males

%	AGE 60-69				AGE 70-79				
	Balke Treadmill (time)	$\dot{V}O_2$ max (ml/kg/min.)	12 min. Run Distance (miles)	1.5 Mile Run (time)	Balke Treadmill (time)	$\dot{V}O_2$ max (ml/kg/min.)	12 min. Run Distance (miles)	1.5 Mile Run (time)	
99	25:00	51.1	1.73	10:09	24:00	49.7	1.69	10:28	
95	21:18	45.8	1.59	11:26	18:45	42.1	1.48	12:31	S
90	19:08	42.6	1.50	12:21	17:00	39.5	1.41	13:24	
85	18:00	41.0	1.45	12:53	16:00	38.1	1.37	13:58	
80	17:01	39.6	1.41	13:23	15:00	36.7	1.33	14:34	E
75	16:07	38.3	1.38	13:53	14:01	35.2	1.29	15:13	
70	15:29	37.4	1.35	14:16	13:05	33.9	1.26	15:54	
65	15:00	36.7	1.33	14:34	12:33	33.1	1.23	16:19	
60	14:14	35.5	1.30	15:04	12:01	32.3	1.21	16:45	G
55	13:45	34.9	1.28	15:25	11:26	31.5	1.19	17:15	
50	13:02	33.8	1.25	15:56	10:51	30.7	1.17	17:47	
45	12:30	33.0	1.23	16:21	10:21	29.9	1.15	18:16	
40	12:00	32.3	1.21	16:46	10:00	29.4	1.13	18:38	F
35	11:30	31.6	1.19	17:11	9:04	28.1	1.09	19:39	
30	11:00	30.9	1.17	17:38	8:52	27.8	1.09	19:53	
25	10:05	29.6	1.14	18:32	8:05	26.7	1.06	20:51	
20	9:30	28.7	1.11	19:10	7:24	25.7	1.03	21:47	P
15	8:36	27.4	1.08	20:12	6:39	24.6	1.00	22:54	
10	7:26	25.7	1.03	21:44	5:30	22.9	0.95	24:52	
5	6:00	23.7	0.97	23:58	4:01	20.8	0.89	27:56	
1	3:05	19.4	0.85	6:18	2:15	18.2	0.82	32:46	VP

n=3,285

n=467

Updated: 2013



## DYNAMIC STRENGTH

### 1 Minute Push-Up Test

#### Males

#### AGE

%	20-29	30-39	40-49	50-59	60+	
99	100	86	64	51	39	
95	62	52	40	39	28	S
90	57	46	36	30	26	
85	51	41	34	28	24	
80	47	39	30	25	23	E
75	44	36	29	24	22	
70	41	34	26	21	21	
65	39	31	25	20	20	
60	37	30	24	19	18	G
55	35	29	22	17	16	
50	33	27	21	15	15	
45	31	25	19	14	12	
40	29	24	18	13	10	F
35	27	21	16	11	9	
30	26	20	15	10	8	
25	24	19	13	9.5	7	
20	22	17	11	9	6	P
15	19	15	10	7	5	
10	18	13	9	6	4	
5	13	9	5	3	2	VP
	n=1,045	n=790	n=364	n=172	n=26	

Total n = 2,397

Norms are based on members of employee wellness program



## DYNAMIC STRENGTH

### 1 Minute Sit-Up Test

#### Males

#### AGE

%	<20	20-29	30-39	40-49	50-59	60+	
99	>62.0	>55.0	>51.0	>47.0	>43.0	>39.0	
95	62.0	55.0	51.0	47.0	43.0	39.0	<b>S</b>
90	55.0	52.0	48.0	43.0	39.0	35.0	
85	53.0	49.0	45.0	40.0	36.0	31.0	
80	51.0	47.0	43.0	39.0	35.0	30.0	<b>E</b>
75	50.0	46.0	42.0	37.0	33.0	28.0	
70	48.0	45.0	41.0	36.0	31.0	26.0	
65	48.0	44.0	40.0	35.0	30.0	24.0	
60	47.0	42.0	39.0	34.0	28.0	22.0	<b>G</b>
55	46.0	41.0	37.0	32.0	27.0	21.0	
50	45.0	40.0	36.0	31.0	26.0	20.0	
45	42.0	39.0	36.0	30.0	25.0	19.0	
40	41.0	38.0	35.0	29.0	24.0	19.0	<b>F</b>
35	39.0	37.0	33.0	28.0	22.0	18.0	
30	38.0	35.0	32.0	27.0	21.0	17.0	
25	37.0	35.0	31.0	26.0	20.0	16.0	
20	36.0	33.0	30.0	24.0	19.0	15.0	<b>P</b>
15	34.0	32.0	28.0	22.0	17.0	13.0	
10	33.0	30.0	26.0	22.0	15.0	10.0	
5	27.0	27.0	23.0	17.0	12.0	7.0	
1	<27.0	<27.0	<23.0	<17.0	<12.0	<7.0	<b>VP</b>
	n=46	n=312	n=1,431	n=1,558	n=919	n=205	

Total n = 4,471

Norms are based on Cooper Clinic patients



## CARDIORESPIRATORY FITNESS TESTS

### Females

% AGE	20-29				30-39				
	Balke Treadmill (time)	$\dot{V}O_2$ max (ml/kg/min.)	12 min. Run Distance (miles)	1.5 Mile Run (time)	Balke Treadmill (time)	$\dot{V}O_2$ max (ml/kg/min.)	12 min. Run Distance (miles)	1.5 Mile Run (time)	
99	27:19	54.4	1.83	9:29	26:00	52.5	1.77	9:51	
95	24:00	49.7	1.69	10:28	22:27	47.4	1.63	11:00	S
90	22:00	46.8	1.61	11:10	21:00	45.3	1.57	11:33	
85	21:00	45.3	1.57	11:33	20:00	43.9	1.53	11:58	
80	20:01	43.9	1.53	11:58	19:00	42.4	1.49	12:25	E
75	19:00	42.4	1.49	12:25	18:00	41.0	1.45	12:53	
70	18:01	41.0	1.45	12:53	17:01	39.6	1.41	13:23	
65	18:00	41.0	1.45	12:53	16:19	38.6	1.39	13:47	
60	17:00	39.5	1.41	13:24	15:49	37.8	1.37	14:04	G
55	16:15	38.5	1.38	13:49	15:18	37.1	1.34	14:23	
50	15:45	37.7	1.36	14:07	15:00	36.7	1.33	14:34	
45	15:01	36.7	1.33	14:34	14:00	35.2	1.29	15:14	
40	14:36	36.0	1.32	14:50	13:26	34.4	1.27	15:38	F
35	14:00	35.2	1.29	15:14	13:00	33.8	1.25	15:58	
30	13:08	34.0	1.26	15:52	12:09	32.5	1.22	16:38	
25	12:24	32.9	1.23	16:26	12:00	32.3	1.21	16:46	
20	12:00	32.3	1.21	16:46	11:00	30.9	1.17	17:38	P
15	11:00	30.9	1.17	17:49	10:01	29.5	1.13	18:37	
10	10:01	29.5	1.13	18:37	9:01	28.0	1.09	19:43	
5	8:21	27.1	1.07	20:31	7:35	25.9	1.30	21:31	
1	6:00	23.7	0.97	23:58	5:27	22.9	0.95	24:57	VP

n=1,397

n=4,642

Updated: 2013

Norms based on Cooper Clinic patients



## CARDIORESPIRATORY FITNESS TESTS

### Females

%	AGE 40-49				AGE 50-59				
	Balke Treadmill (time)	$\dot{V}O_2$ max (ml/kg/min.)	12 min. Run Distance (miles)	1.5 Mile Run (time)	Balke Treadmill (time)	$\dot{V}O_2$ max (ml/kg/min.)	12 min. Run Distance (miles)	1.5 Mile Run (time)	
99	25:00	51.1	1.73	10:09	21:30	46.0	1.59	11:22	
95	21:01	45.3	1.57	11:32	18:03	41.1	1.46	12:52	S
90	20:00	43.9	1.53	11:58	17:00	39.5	1.46	13:24	
85	18:04	41.1	1.46	12:51	15:29	37.4	1.35	14:16	
80	17:05	39.7	1.42	13:22	15:00	36.7	1.33	14:34	E
75	16:45	39.2	1.40	13:32	14:04	35.3	1.30	15:11	
70	16:00	38.1	1.37	13:58	13:30	34.5	1.27	15:35	
65	15:03	36.7	1.33	14:32	12:59	33.7	1.25	15:58	
60	14:45	36.3	1.32	14:44	12:30	33.0	1.23	16:21	G
55	14:01	35.2	1.29	15:13	12:00	32.3	1.21	16:46	
50	13:46	34.9	1.28	15:24	11:29	31.6	1.19	17:13	
45	13:01	33.8	1.25	15:57	11:01	30.9	1.17	17:38	
40	12:30	33.0	1.23	16:21	10:30	30.2	1.15	18:07	F
35	12:00	32.3	1.21	16:46	10:01	29.5	1.13	18:37	
30	11:18	31.3	1.18	17:22	9:40	29.0	1.12	18:59	
25	10:40	30.4	1.16	17:58	9:00	28.0	1.09	19:44	
20	10:00	29.4	1.13	18:38	8:20	27.0	1.07	20:32	P
15	9:10	28.2	1.10	19:32	7:35	25.9	1.03	21:31	
10	8:08	26.7	1.06	20:47	6:46	24.8	1.00	22:43	
5	7:00	25.1	1.01	22:22	5:35	23.1	0.95	24:42	
1	5:00	22.2	0.93	25:49	3:43	20.4	0.88	28:39	VP

n=6,709

n=4,539

Updated: 2013



## CARDIORESPIRATORY FITNESS TESTS

### Females

%	AGE 60-69				AGE 70-79				
	Balke Treadmill (time)	$\dot{V}O_2$ max (ml/kg/min.)	12 min. Run Distance (miles)	1.5 Mile Run (time)	Balke Treadmill (time)	$\dot{V}O_2$ max (ml/kg/min.)	12 min. Run Distance (miles)	1.5 Mile Run (time)	
99	20:00	43.9	1.53	11:58	20:00	43.9	1.53	11:58	
95	15:47	37.8	1.36	14:05	15:01	36.7	1.33	14:34	S
90	14:30	35.9	1.31	14:53	12:30	33.0	1.23	16:21	
85	13:31	34.5	1.27	15:35	11:43	31.9	1.20	17:00	
80	12:30	33.0	1.23	16:21	11:00	30.9	1.17	17:38	E
75	12:00	32.3	1.21	16:46	10:23	30.0	1.15	18:14	
70	11:19	31.3	1.18	17:21	10:01	29.5	1.13	18:37	
65	11:00	30.9	1.17	17:38	10:00	29.4	1.13	18:38	
60	10:25	30.0	1.15	18:12	9:05	28.1	1.10	19:38	G
55	10:00	29.4	1.13	18:38	8:59	28.0	1.09	19:44	
50	9:46	29.1	1.12	18:52	8:37	27.4	1.08	20:11	
45	9:16	28.4	1.10	19:25	8:01	26.6	1.05	20:56	
40	8:41	27.5	1.08	20:06	7:33	25.9	1.03	21:34	F
35	8:09	26.8	1.06	20:46	7:01	25.1	1.01	22:20	
30	7:43	26.1	1.04	21:20	6:49	24.8	1.00	22:38	
25	7:05	25.2	1.01	22:14	6:29	24.4	0.99	23:10	
20	6:45	24.7	1.00	22:44	6:07	23.8	0.98	23:46	P
15	6:15	24.0	0.98	23:32	5:15	22.6	0.94	25:20	
10	5:33	23.0	0.95	24:46	4:30	21.5	0.91	26:51	
5	4:45	21.9	0.92	26:19	3:15	19.7	0.86	29:51	
1	3:07	19.5	0.86	30:13	1:17	16.8	0.78	36:12	VP

n=1313

n=187

Updated: 2013



## DYNAMIC STRENGTH

### 1 Minute Modified Push-Up Test

Females

AGE

%	20-29	30-39	40-49	50-59	60+	
99	70	56	60	31	20	
95	45	39	33	28	20	S
90	42	36	28	25	17	
85	39	33	26	23	15	
80	36	31	24	21	15	E
75	34	29	21	20	15	
70	32	28	20	19	14	
65	31	26	19	18	13	
60	30	24	18	17	12	G
55	29	23	17	15	12	
50	26	21	15	13	8	
45	25	20	14	13	6	
40	23	19	13	12	5	F
35	22	17	11	10	4	
30	20	15	10	9	3	
25	19	14	9	8	2	
20	17	11	6	6	2	P
15	15	9	4	4	1	
10	12	8	2	1	0	
5	9	4	1	0	0	VP
	n=579	n=411	n=246	n=105	n=12	

Total n = 1,353

Norms are based on members of employees wellness program



## DYNAMIC STRENGTH

### 1 Minute Full Body Push-Up Test

#### Females

#### AGE

%	20-29	30-39	40-49	
99	53.0	48.0	23.0	
95	42.0	39.5	20.0	S
90	37.0	33.0	18.0	
85	33.0	26.0	17.0	
80	28.0	23.0	15.0	E
75	27.0	19.0	15.0	
70	24.0	18.0	14.0	
65	23.0	16.0	13.0	
60	21.0	15.0	13.0	G
55	19.0	14.0	11.0	
50	18.0	14.0	11.0	
45	17.0	13.0	10.0	
40	15.0	11.0	9.0	F
35	14.0	10.0	8.0	
30	13.0	9.0	7.0	
25	11.0	9.0	7.0	
20	10.0	8.0	6.0	P
15	9.0	6.5	5.0	
10	8.0	6.0	4.0	
5	6.0	4.0	1.0	
1	3.0	1.0	0.0	VP

Full body push-ups are generally used by law enforcement and public safety organizations. These norms are based on >1000 female U.S. Army soldiers who were tested in the 1990's by the U.S. Army.



## DYNAMIC STRENGTH

### 1 Minute Sit-Up Test

#### Females

#### AGE

%	<20	20-29	30-39	40-49	50-59	60+	
99	>55.0	>51.0	>42.0	>38.0	>30.0	>28.0	
95	55.0	51.0	42.0	38.0	30.0	28.0	<b>S</b>
90	54.0	49.0	40.0	34.0	29.0	26.0	
85	49.0	45.0	38.0	32.0	25.0	20.0	
80	46.0	44.0	35.0	29.0	24.0	17.0	<b>E</b>
75	40.0	42.0	33.0	28.0	22.0	15.0	
70	38.0	41.0	32.0	27.0	22.0	12.0	
65	37.0	39.0	30.0	25.0	21.0	12.0	
60	36.0	38.0	29.0	24.0	20.0	11.0	<b>G</b>
55	35.0	37.0	28.0	23.0	19.0	10.0	
50	34.0	35.0	27.0	22.0	17.0	8.0	
45	34.0	34.0	26.0	21.0	16.0	8.0	
40	32.0	32.0	25.0	20.0	14.0	6.0	<b>F</b>
35	30.0	31.0	24.0	19.0	12.0	5.0	
30	29.0	30.0	22.0	17.0	12.0	4.0	
25	29.0	28.0	21.0	16.0	11.0	4.0	
20	28.0	24.0	20.0	14.0	10.0	3.0	<b>P</b>
15	27.0	23.0	18.0	13.0	7.0	2.0	
10	25.0	21.0	15.0	10.0	6.0	1.0	
5	25.0	18.0	11.0	7.0	5.0	0.0	
1	<25.0	<18.0	<11.0	<7.0	<5.0	0.0	<b>VP</b>
	n=15	n=144	n=289	n=249	n=137	n=26	

Total n = 860

Norms are based on Cooper Clinic patients

Fire Fit Assessments													
	Last Name	First Name	Age	Gender	1.5 mile Run time (min:sec)	1.5 mile Run Score	1 mile walk (min:sec)	1 mile walk Score	Push-ups	Push-ups Score	Sit-ups	Sit-ups Score	3 Test Average
1			37	M			2708	1%	1	1%	9	1%	1%
2			54	M			1647	1%	9	20%	1	1%	7%
3			52	F	2314	5%			25	99%	14	40%	48%
4			53	F			1357	55%	33	99%	44	99%	84%
5			53		1935	5%			18	55%	15	15%	25%
6			40	M	2340	1%			19	45%	9	1%	16%
7			43	M	2814	1%			15	30%	12	1%	11%
8			52	M	1719	15%			33	90%	21	30%	45%
9			47	M			1719	1%			14	1%	1%
10			52	M	21:03	1%			30	90%	21	30%	40%
11			31	F	1542	35%			15	60%	16	10%	35%
12			38	M	1251	40%			40	80%	37	55%	58%
13			61	M			1719	1%	16	55%	4	1%	19%
14			48		1604	10%			20	45%	13	1%	19%
15			53	M			1627	5%	20	65%	18	15%	28%
16			55	M	1513	35%			20	65%	18	15%	38%
17			40	M	1516	20%			30	80%	25	20%	40%
18			60		2115	10%			27	90%	15	20%	40%
19			51		1706	15%			26	80%	37	85%	60%
20			48	M	18:31	5%			29	75%	18	5%	28%
21			40	M	2035	1%			26	70%	24	20%	30%
22			49		2309	1%			20	45%	2	1%	16%
23			52	M	2832	1%			12	35%	12	5%	14%



# **FIREFIGHTER FITNESS TRAINING PROGRAM**

**A Guide to Improving Your Work Performance**



**CREATED BY JOSHUA GASKINS  
ISSUED BY THE DEPARTMENT OF HUMAN RESOURCES  
FITNESS AND WELLNESS DIVISION  
HENRICO COUNTY, VIRGINIA  
JUNE 2014**

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A firefighter's physical fitness is vital to his/her work performance. Optimal fitness can be attained with a combination of exercise, lifestyle, nutrition and habit changes.

# FIELD FITNESS PROGRAM

## DEVELOPMENT AND IMPLEMENTATION

The Henrico County Firefighter fitness program offers the ability to design your own workouts with structured parameters for all firefighters who want to improve and/or maintain a current fitness status. An additional benefit is that the program is a fire-station-based program with a minimal equipment approach, that can also be completed at home or at fitness facility.

**Following the firefighter fitness program can assist in one or more of the following:**

- Improve the WPE completion time
- Improve cardiovascular endurance
- Improve muscular endurance
- Improve core strength and stability
- Improve flexibility, mobility and range of motion around joints
- Improve muscular strength
- Improve overall fitness and conditioning
- Help reduce the risk of musculoskeletal injuries
- Gain the ability to design workouts

**How to use this program:**

1. The easiest way to start is with the Level 1 program and then progress as needed or recommended, especially if you are unsure of your current fitness level.
2. Add the Level 1 program to your existing regimen to add core strength and stability.
3. Begin with the Level 2 program if current fitness level is intermediate-to-advanced.
4. **If WPE time of completion was greater than the 8-minutes and 44-second (8:44) benchmark:**
  - a. By meeting this criterion it is recommended to begin with the Level 1 program, and then progress to Level 2 to partake in the entire 6-month program.
5. **If WPE time of completion was less than 8-minutes and 44-seconds (8:44):**
  - a. By meeting this criterion you can begin with the Level 2 program by meeting the standards of the comprehensive fitness assessment, or
  - b. Complete the entire 6-month program as it is and progress to Level 2 after completing Level 1 and the comprehensive fitness assessments.

The firefighter fitness program is delivered by a Company Officer, supported by Division of Fire (DOF) Peer Fitness Trainers (PFTs), and built by the Henrico County Fitness and Wellness staff with full support and approval by the Division of Fire. DOF PFTs have received training in how to administer this fitness program.

Any DOF member who seeks to improve their fitness level may seek the assistance of a DOF PFT. The DOF PFTs will provide the group training to all DOF members participating in the program and will be a continuing resource for DOF members.

Any DOF member who needs or seeks specific training assistance or accommodations outside of this program will be referred to the Henrico County Fitness and Wellness Division for assessment and consultation.

Any copying or reproducing of this manual or anything in this manual outside of Henrico County Fire or Henrico County Fitness and Wellness is strictly prohibited.

# COMPREHENSIVE FITNESS ASSESSMENTS

**Fitness Assessments:** The following assessments can be self-administered at the beginning and at the completion of the Level 1 program. The information obtained from the following assessments should be interpreted by a DOF PFT or a staff fitness trainer in the Henrico County Fitness and Wellness Division. It can also be used solely for monitoring individual progress.

- 1. Core Assessment:** Plank Hold Test (note form and stability for each segment; modify where needed- e.g., on knees)
  - a. 30 second plank hold (Move forward if successfully completed)
  - b. 15 second 1-arm plank hold each side (Complete c & d despite attempt successfulness)
  - c. 15 second 1-leg plank hold each side
  - d. 30 second plank hold
  
- 2. Flexibility Assessment:** the YMCA sit-and-reach test (Trunk Flexion)
  - a. A yardstick is placed on the floor and tape is placed across it at a right angle to the 15-inch mark.
  - b. The participant sits with the yardstick between the legs, with legs extended at right angles to the taped line on the floor
  - c. Heels of the feet should touch the edge of the taped line and be about 10 to 12 inches apart. (Note the zero point at the foot/box interface and use the appropriate norms.)
  - d. The participant should slowly reach forward with both hands as far as possible, holding this position ~2 seconds. Be sure that the participant keeps the hands parallel and does not lead with one hand.
  - e. Fingertips can be overlapped and should be in contact with the measuring portion or yardstick of the sit-and-reach box.
  - f. The score is the most distant point (in centimeters or inches) reached with the fingertips. The better of the two trials should be recorded.
    - i. To assist with the best attempt, the participant should exhale and drop the head between the arms when reaching. Testers ensure the knees stay extended, but not pressed down.
    - ii. Breathe normally and do not hold breath.(\*see appendix for percentiles of performance)
  
- 3. Cardiovascular Assessment** (choose one of the following):
  - a. 1.5 mile test for time
    - i. Cover the distance in the shortest period of time.
  - b. Cooper 12-minute test
    - i. Cover the greatest distance in the allotted time period.
  - c. Rockport One-Mile Fitness Walking Test (for those unable to run/jog/severely deconditioned)
    - i. Walk 1 mile as fast as possible on a level surface.
    - ii. Obtain a 10-second heart rate (HR) immediately on completion of the 1-mile (multiply by 6 to find beats per minute).(\*see appendix for percentiles of performance)

#### 4. Muscular Endurance Assessments: (complete both)

- a. One minute push-up test
  - i. Complete as many repetitions as possible in one minute.
  - ii. Begin in the push-up position, with the body in a straight line.
  - iii. When time begins, lower the body as one unit, until the chest makes contact with the fist of the DOF peer fitness trainer.
  - iv. Once contact with the fist is made, raise the body, as one unit, until both arms are fully locked out.
  - v. Rest in the UP position only.
  - vi. The DOF peer fitness trainer will count the repetitions out loud as the participant's arms reach full extension.
  - vii. The DOF peer fitness trainer will NOT count any push-ups incorrectly performed and will stop the test if the firefighter or participant fails to keep the body off of the floor.

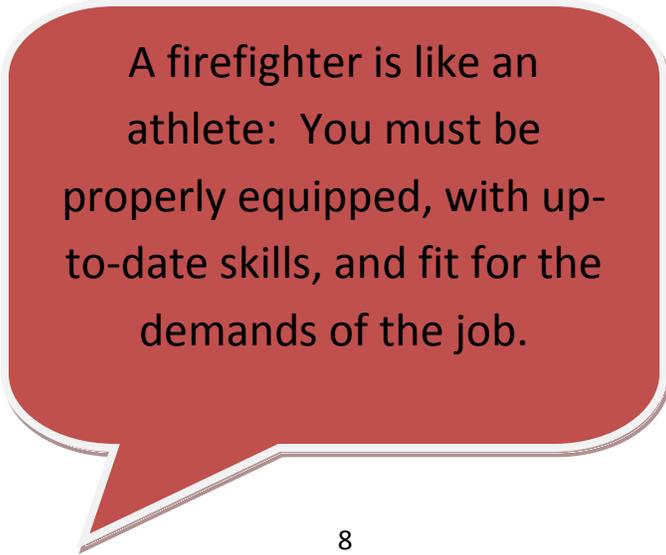
(\*see appendix for fitness categories of performance)

- b. One minute Sit-up test
  - i. Complete as many repetitions as possible in one minute.
  - ii. Begin in the sit-up position with the elbows on the knees and the hands touching the sides of the head (over the ears).
  - iii. When time begins, lower the torso until the shoulder blades touch the floor, then return to the UP position by touching the elbows to the top of the knees.
  - iv. Any resting must be held in the UP position.
  - v. The hands must remain in contact with the head the entire time.
  - vi. The hips must stay on the floor the entire time.
  - vii. DOF peer fitness trainers will NOT count any sit-up performed incorrectly.

(\*see appendix for percentiles of performance)

#### 5. Other voluntary assessments:

- a. Resting HR
- b. Resting blood pressure (BP)
- c. Weight
- d. Waist-to-hip ratio (the circumference of the waist divided by the circumference of the hips.)
  - Very High Risk = men- WHR > 0.95, women- WHR > 0.86
  - Age 60-69 Very High Risk = men- WHR > 1.03, women- WHR > 0.90
- e. Muscular strength
  - i. 1-, 4-, 6-, or 8-rep max (RM) bench press and leg press



A firefighter is like an athlete: You must be properly equipped, with up-to-date skills, and fit for the demands of the job.

# KEY CONCEPTS

## 1. Abdominal Bracing (aka Core Engagement)

This is the “stiffening” or “tightening” of the abdomen wall muscles without pulling in or pushing out. By doing so, the back extensor muscles also contract, therefore supporting the trunk. This will enhance stability by increasing the effectiveness of the obliques, a crisscross muscle.

## 2. Neutral Spine (aka Correct Postural Alignment)

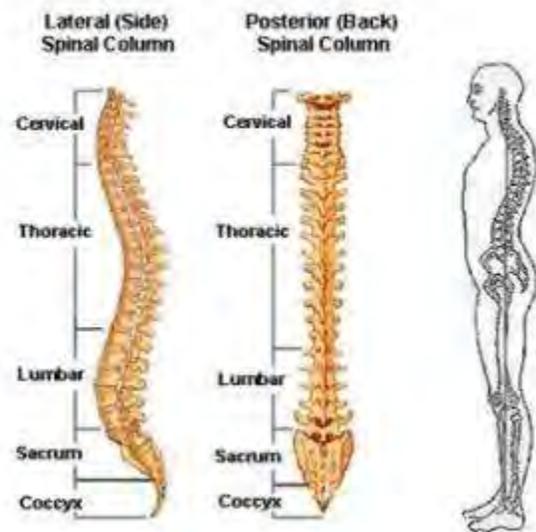
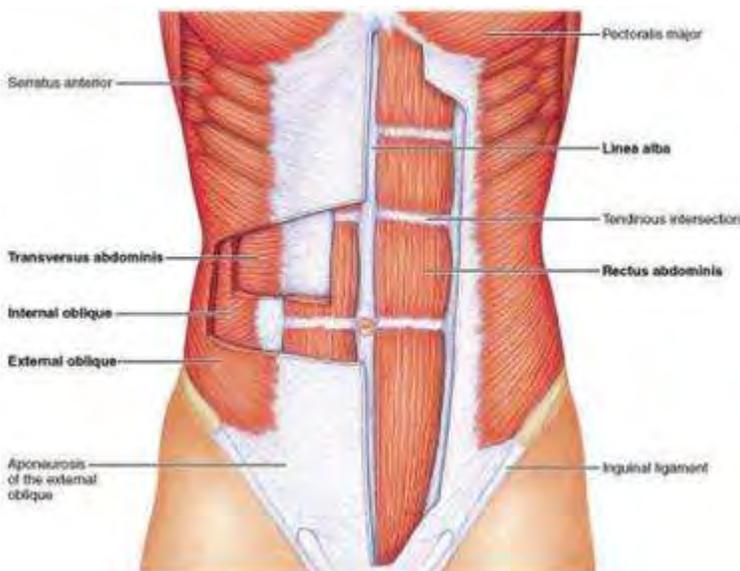
This is the posture where all three curves in the spine are normal and maintained. The spine is evenly balanced at this position. The position of the pelvis is neither rotated anteriorly or posteriorly too much. (An anterior rotation of the pelvis causes the low back to arch and belly protrusion. A posterior rotation of the pelvis causes the low back to flatten with no curve in the lumbar portion of the spine.)

## 3. Activation of the Pelvic Floor

These are the muscles at the bottom of the pelvis and are responsible for stabilizing the pelvis and the spine. Not only are they crucial in core stability, but keeping them strong helps keep the organs in their respective positions preventing a prolapse.

## 4. Lengthening of the Spine

Either sitting or standing, by lengthening the spine or making yourself taller, with correct postural alignment, you will keep the joints of the spine decompressed. The body will be more apt to strenuous work without a warm-up if you are in this position rather than with a slouched posture while sitting or standing.





# LEVEL 1 TRAINING PROGRAM

## The Core

Is known as the power center,  
and is where most movements  
are transferred through.



# LEVEL 1 TRAINING PROGRAM OVERVIEW

## Summary:

- The easiest way to start is with the Level 1 program and then progress as needed or recommended, especially if you are unsure of your current fitness level.
- Add the Level 1 program to your existing regimen to add core strength and stability.
- Level 1 is also recommended for Firefighters who did not complete the WPE or completed the WPE with a time greater than the 8:44 (8 minutes, 44 seconds) benchmark.

## Goal:

- To provide a beginner-to-intermediate level fitness program
- To focus on developing:
  - core strength and stability
  - cardiovascular endurance
  - muscular strength and endurance
  - flexibility
- To use a progressive approach to:
  - help prevent back injury
  - enhance overall performance

## Equipment Needed:

- Mat
- Treadmill/Elliptical

## Tier 1 Overview:

Movements	Duration	Frequency	Sets	Reps/Time	Rest Period
-Most basic -Make modifications where needed.	4 weeks	-3x/week -1 day rest b/w each session	1-2	-Various workout schemes	Up to 60 seconds between sets.

## Tier 2 Overview: Perform after Tier 1 completion.

Movements	Duration	Frequency	Sets	Reps/Time	Rest Period
-1 <sup>st</sup> Progression from Tier 1. -Make modifications where needed.	4 weeks	-3x/week -1 day rest b/w each session	2	-Various workout schemes	Up to 45 seconds between sets.

## Tier 3 Overview: Perform after Tier 2 completion.

Movements	Duration	Frequency	Sets	Reps/Time	Rest Period
-2 <sup>nd</sup> Progression from Tier 1. -Make modifications where needed.	4 weeks	-3x/week -1 day rest b/w each session	2-3	-Various workout schemes	Up to 15-30 seconds between sets.

After completion of all 3 tiers, perform the Comprehensive Fitness Assessments to monitor progress. To monitor progress more frequently you can do the assessments after every tier.



# DYNAMIC WARM-UP INSTRUCTIONS

## Core Training Significance:

To prevent unwanted injuries from duty or activities of daily living. Core training and strengthening are essential to an exercise program.



# DYNAMIC WARM-UP INSTRUCTIONS

## Instructions:

Perform this warm-up for all 3 tiers of the Level 1 Program.

- The goal of the warm-up is to actively take the core and back muscles through the range of motion to prepare for the more dynamic movements of the workout.
- Listed are the overview and the detailed instructions for each movement. Refer back to this section for the detailed movement instructions if a review is needed during tier 2 or 3.

## LEVEL 1 DYNAMIC WARM-UP OVERVIEW

EXERCISE	SETS	REPS	TIME	REST
LIGHT CARDIO/DYNAMIC MOBILITY	1	N/A	5 MINUTES	N/A
CAT	1	5-8	N/A	15-30 SECONDS
LATERAL TILT	1	5-8 EACH SIDE	N/A	15-30 SECONDS
TABLETOP SPINAL ROTATION W/ FLEXION & EXTENSION	1	5-8 EACH SIDE	N/A	15-30 SECONDS
SUPINE TRUNK ROTATION	1	5-8 EACH SIDE	N/A	15-30 SECONDS

\*Note: Additional time and/or movements may be added during warm-up if needed. See level 2 warm-up for more, pp. 74-49.

### Cat



#### A. Preparation:

- Kneel on the floor on all fours.
- Align the hands directly beneath the shoulders.
- Align the knees directly beneath the hips.

#### B. Movement:

- Begin by rounding the spine toward the ceiling.
- Try to make a "c" curve from the head to the tail.
- Keep the shoulder blades down as the spine rounds.
- Draw the navel in, toward the spine as you exhale, to increase the rounding of the spine.
- Release the rounded spine and allow the belly to drop their belly toward the floor and relax the abdominal muscles.
- Repeat for the recommended number of repetitions.

## Lateral Tilt



### A. Preparation:

- i. Stand with the feet shoulder-width apart.
- ii. Hold the arms up at shoulder level, forming a “T” position with the body.

### B. Movement:

- i. Begin by gently tilting the torso to one side.
- ii. Be sure to keep the chest open and the core muscles engaged.
- iii. Begin to tilt, reaching as far down toward the floor as possible without losing posture.
- iv. Alternate to the other side.
  - i. Repeat for the recommended number of repetitions.

## The Warm-up

The goal of the warm-up should be to prepare the body for the subsequent workout by actively moving the muscles through its range of motion and the body through all planes of motion.

## Tabletop Spinal Rotation with Flexion and Extension



### A. Preparation:

- i. Kneel on the floor on all fours.
- ii. Align the hands directly beneath the shoulders.
- iii. Align the knees directly beneath the hips.
- iv. Place one hand behind the head (without putting downward pressure on the head).

### B. Movement:

- i. Begin by rotating the spine while lifting the elbow toward the ceiling.
- ii. Rotate back inward toward the opposite forearm.
- iii. There should be no movement from the lumbar spine/sacrum area, however the cervical spine/head is allowed to move with the upper body.
- iv. Take the body/joint through a full available range of motion using controlled momentum/movement.
- v. Repeat on the alternate side.
- vi. Repeat for the recommended number of repetitions.

## Supine Trunk Rotation



### A. Preparation:

- i. Lie face-up with hips and knees flexed about 90°.
- ii. Place the arms straight out to the side (abducted), with the palms of the hand in contact with the floor.

### B. Movement:

- i. Begin by slowly rotating the hips to one side, stopping when either the opposite shoulder blade begins to leave the floor or the outer thigh touches the floor.
- ii. Take the body/joint through a full available range of motion using controlled momentum/movement.
- iii. Alternate side to side.
- iv. Repeat for the recommended number of repetitions.



# LEVEL 1 TIER 1 PROGRAM

## Proper Technique

Which is also known as the quality of the movement, should be the primary focus before quantity.



# LEVEL 1 - TIER 1 PROGRAM OVERVIEW

## Instructions:

Complete all 4 segments of the workout 3 times per week, every other day for 4 weeks.

- Segment 1- Dynamic Warm-up
- Segment 2- Bodyweight Resistance workout
- Segment 3- Cardiovascular workout
- Segment 4- Flexibility/Cool-down

Total time of workout completion = approximately 1 hour

## TIER 1 - SEGMENT 1 DYNAMIC WARM-UP

DYNAMIC WARM-UP OVERVIEW				
EXERCISE	SETS	REPS	TIME	REST
LIGHT CARDIO/DYNAMIC MOBILITY	1	N/A	5 MINUTES	N/A
CAT	1	5-8	N/A	15-30 SECONDS
LATERAL TILT	1	5-8 EACH SIDE	N/A	15-30 SECONDS
TABLETOP SPINAL ROTATION W/ FLEXION & EXTENSION	1	5-8 EACH SIDE	N/A	15-30 SECONDS
SUPINE TRUNK ROTATION	1	5-8 EACH SIDE	N/A	15-30 SECONDS

\*See the Dynamic Warm-up section of this workbook for detailed instructions, pp.15-19.

\*\*Note: Additional time and/or movements may be added during warm-up if needed.

Move to the next page.

# TIER 1 - SEGMENT 2

## BODYWEIGHT RESISTANCE WORKOUT

A. Listed are the 10 exercises you will perform. The table provides a general layout of Tier 1. Use B to create a workout scheme. Be sure to use variety as much as possible throughout the 4 weeks.

BODYWEIGHT RESISTANCE WORKOUT OVERVIEW				
EXERCISE	SETS	REPS	TIME EQUIVALENCY	REST
AIR SQUAT	1-2	12-15	45 SECONDS	UP TO 60 SECONDS
AB CRUNCH REVERSE	1-2	12-15	45 SECONDS	UP TO 60 SECONDS
COBRA	1-2	12-15	45 SECONDS	UP TO 60 SECONDS
PUSH-UP	1-2	12-15	45 SECONDS	UP TO 60 SECONDS
BRIDGE	1-2	12-15	45 SECONDS	UP TO 60 SECONDS
SIDE PLANK	1-2	12-15 RAISES EACH SIDE WITH A 3 SEC. HOLD	45 SECONDS	UP TO 60 SECONDS
PRONE 1-LEG/OPPOSITE ARM EXTENSION	1-2	12-15 EACH SIDE	45 SECONDS	UP TO 60 SECONDS
AB DRAW-IN LEG SLIDE	1-2	12-15 EACH	45 SECONDS	UP TO 60 SECONDS
TOE TOUCH CRUNCH	1-2	20 REPS	45 SECONDS	UP TO 60 SECONDS
PLANK HOLD	1-2	MAX HOLD	MAX	UP TO 60 SECONDS

B. Pick a workout scheme:

CHOOSE ONE OF THE FOLLOWING TO USE FOR THE BODYWEIGHT WORKOUT:
A. 5 MINI-BLOCK COUPLETS- CHOOSE TWO EXERCISES AND PERFORM THE RECOMMENDED REPETITIONS FOR EACH BACK-TO-BACK WITH MINIMAL REST BETWEEN THEM. REST UP TO 60 SECONDS BETWEEN EACH COUPLET. DO 1-2 SETS OF EACH COUPLET.
B. FULL CIRCUIT. COMPLETE ALL 10 EXERCISES IN SUCCESSION WITH MINIMAL REST BETWEEN EACH. REST UP TO 2-MINUTES BETWEEN ROUNDS (UP TO 2 ROUNDS).
C. PERFORM AS MANY QUALITY REPS AS POSSIBLE FOR 45 SECONDS FOR EACH EXERCISE. REST UP TO 60 SECONDS BETWEEN EACH EXERCISE. DO 1-2 SETS OF EACH EXERCISE.
D. COMBINATION OF SEGMENT 2 BODYWEIGHT TRAINING AND SEGMENT 3 CARDIO. -PERFORM ONE ROUND OF THE EXERCISES. THEN COMPLETE HALF THE TIME OF SEGMENT 3. THEN REPEAT TO FINISH. -CHOOSE SCHEME A. ADD A 200-METER RUN/JOG BETWEEN EACH COMPLETED COUPLET FOR A TOTAL OF FIVE 200M RUNS.

C. Rest 2-4 minutes. Move to the next segment. Move to the flexibility segment if scheme D was completed.

# TIER 1 - SEGMENT 2

## MOVEMENT INSTRUCTIONS

### Air Squat



#### A. Preparation:

- i. Stand with feet about shoulder-width apart and slightly turn toes out.
- ii. Keep the head up, looking slightly above parallel.

#### B. Movement:

- i. Keep the midsection tight.
- ii. Send the butt back and down.
- iii. The knees should track over the mid-line of the foot.
- iv. Keep as much pressure on the heels as possible.
- v. Lift the arms out and up as you descend.
- vi. Stop when the fold of the hip is below the knee – breaking parallel with the thigh.
- vii. Squeeze the glutes and hamstrings and rise without any forward lean or shifting of balance.
- viii. Keep the heels pressed down, and return to a standing position.
- ix. Repeat for the recommended number of repetitions.

#### Modifications:

- Sit to a chair/bench.
- To help with back pain, place a stability ball against the wall. Be sure to place the ball on the lower back, and the feet a little farther out in front of the body.
- If the range of motion is the limiting factor, descend as far as proper form allows.

## Ab Crunch Reverse



### A. Preparation:

- i. Lie on the floor with the knees bent and the shoulders flat against the floor.
- ii. Place the hands next to the body to help anchor the upper body during the exercise.

### B. Movement:

- i. Begin by contracting the abdomen and drawing the knees in to the chest.
- ii. Hold and release.
- iii. Do not use momentum during the movement. Use abdominal contraction to draw the knees in.
- iv. Drop the feet back toward the floor.
- v. Repeat for the recommended number of repetitions.

## Cobra



### A. Preparation:

- i. Lie on the floor face-down in the prone position, and place the arms beside the ears.
- ii. Activate the core by drawing the navel toward the spine and squeezing the glutes.

### B. Movement:

- i. With the core and glutes activated, begin by lifting the chest and the arms off the floor.
- ii. Pause momentarily at the top of the lift, then return to the starting position; be sure to keep a neutral spine.
- iii. Upon completion of the movement, repeat.
- iv. DO NOT over emphasize the arching of the back in order to lift the chest off the floor. Only lift to where you are comfortable – no lower back pain should be felt.
- v. Repeat for the recommended number of repetitions.

#### **Modification:**

To eliminate spinal compression or back pain, begin in the all fours position with the hands and knees on the floor. Extend both the opposite arm and leg simultaneously. Pause. Then repeat.

## Push-up



### A. Preparation:

- i. In a prone position, place the hands at a width that will allow the forearms to be perpendicular to the floor when the elbows are flexed at 90°.
- ii. Come into a plank position with the elbows extended; make sure the entire body is in a neutral position.

### B. Movement:

- i. Begin by flexing at the elbows. While maintaining a neutral spine, lower the body to the floor.
- ii. Push the body back to the starting position without allowing the elbows to lift in front of the shoulders or postural compensation.
- iii. Repeat for the recommended number of repetitions.

#### Modifications:

- Place the knees on the floor. Be sure the back is flat.
- Place the hands on an elevated surface. The higher the surface the lower the difficulty.
- To increase the difficulty, place the feet on an elevated surface.

## Bridge



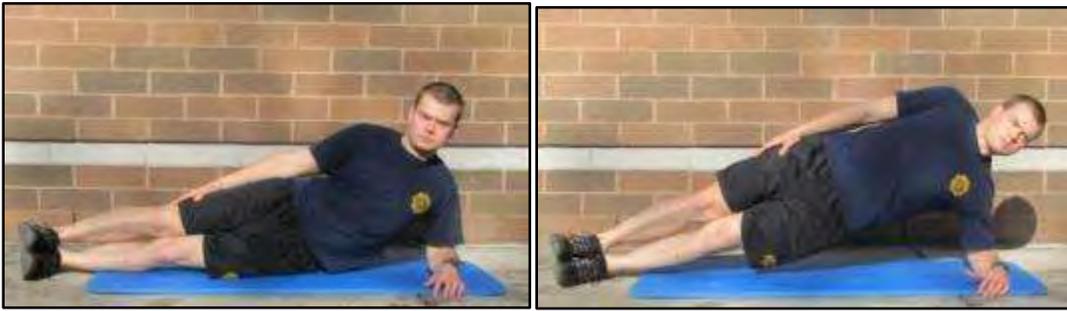
### A. Preparation:

- i. Lie face-up on the floor in a supine position with the knees bent, feet flat, toes pointing straight ahead and arms by sides.
- ii. Activate the core by drawing the navel in toward the spine and squeezing the glutes.

### B. Movement:

- i. With the core activated and glutes squeezed, begin by lifting the hips off floor to form a straight line between the knees and the shoulders.
- ii. Hold the position and slowly return back to floor.
- iii. If you feel the hamstring cramping, check the pelvis for neutral alignment, or just stretch the hamstrings and repeat.
- iv. Repeat for the recommended number of repetitions.

## Side Plank Raise



### A. Preparation:

- i. Lie on the right side of the body with the elbows, shoulders, hips and knees in alignment and the legs straight.
- ii. Before movement begins, optimal postural alignment is mandatory.
- iii. Place the right elbow directly under the right shoulder for support.

### B. Movement:

- i. Draw the lower abdomen inward toward the spine.
- ii. While maintaining the drawing-in maneuver, begin by lifting the body up onto the forearm and feet as shown in the picture above and hold for 3 seconds.
- iii. While still maintaining the drawing-in maneuver, lower the body to the floor.
- iv. The cervical spine must stay in a neutral position!
- v. Repeat for the recommended number of repetitions.

#### Modification:

Bend either the leg closest to the floor or both knees.

## 1-Leg/Opposite Arm Extension- Alternating



### A. Preparation:

- i. Lie face-down in the prone position with the arms extended and toes into the floor.

### B. Movement:

- i. Engage the core and the pelvic floor muscles.
- ii. While keeping the leg straight, extend the hip as high as the range of motion will allow without lifting the hips off the floor.
- iii. Keep the pelvis in contact with the floor while simultaneously raising the opposite arm in front of you, until it is parallel to the floor.
- iv. Hold momentarily and then alternate with the other leg and opposite arm.
- v. Repeat for the recommended number of repetitions.

#### Modification:

To eliminate spinal compression or back pain, begin in the all fours position with the hands and knees on the floor. Extend both the opposite arm and leg simultaneously. Pause. Then repeat.

## Abdominal Draw-In Leg Slide



### A. Preparation:

- i. Lie face-up with the knees bent and feet flat on the floor.
- ii. You may place the hands under the low back to use as a pressure control.

### B. Movement:

- i. Draw the lower abdomen inward toward the spine.
- ii. Perform a slight posterior tilt. The backward motion of the pelvis (posterior pelvic tilt) should place slight pressure on the floor. Be sure to relax the glutes!
- iii. While maintaining pressure on the hands, slowly slide one leg forward.
- iv. Be sure to slide the leg away from the body while maintaining pelvic/abdominal stabilization and not allowing the knee to pass the hip joint.
- v. Slowly return the leg. Alternate sides or continue on one side.
- vi. Repeat for the recommended number of repetitions.

#### Modification:

To increase the difficulty, hold both feet off the floor so your hips are stacked and legs are parallel to the floor.

## Plank Hold



### A. Preparation

- i. In a prone position on the forearms, place the elbows under the shoulders.
- ii. The alternate position is the elbows extended with the hands placed directly under the shoulders with a flat back.

### B. Movement:

- i. Draw the lower abdomen inward toward the spine.
- ii. In optimal postural alignment, tighten the glutes and lift the body up onto the forearms.
- iii. While maintaining the abdominal draw-in contraction, hold optimal alignment for the desired duration.
- iv. The spine should be in a neutral position (from cervical to lumbar spine), and the glutes should remain tight without compensatory motion.
- v. Keep the chin tucked in.
- vi. Reduce the hold time if form is compromised. Form is more important than how long you hold!

## Toe Touch Crunch



### A. Preparation:

- i. Lie face-up with the legs extended and the feet in the air so the heels are facing the ceiling.
- ii. Hold the arms directly over the face.

### B. Movement:

- i. Begin by contracting the abdomen and lift the upper body off the floor, until the shoulder blades lose contact with the floor as you reach for the toes with the hands.
- ii. Exhale and return back to the starting position.
- iii. Repeat for the recommended number of repetitions.

#### Modifications:

- Bend the knees so the hips are stacked and the legs are parallel to the floor. Then crunch.
- Placing the feet on the floor will be the easiest option for crunching.
- To eliminate back pain, try lying across a stability ball and then perform the crunch.

## Plank Variations

These are the best for improving the core stabilizers and improving endurance of the core musculature.

Most back injuries occur due to muscular fatigue. So adding planks to your regimen will help reduce the risk.

# TIER 1 - SEGMENT 3

## CARDIOVASCULAR WORKOUT

**Instructions:**

Complete the treadmill walk listed in the table.

- Included are a 5-minute warm-up walk and a 3-minute cool-down walk.
- This is a low-to-moderate and interval-based intensity workout.
- If a higher intensity cardio session is needed, refer to Tier 2 on page 44 or Tier 3 on page 59.

Note: This treadmill workout can also be followed on an elliptical if unable to use the treadmill.

Treadmill Walk	
Time	Pace (mph)
00:00 – 05:00	2.7 (Warm up walk)
05:00 – 06:00	3.0
06:00 – 08:00	3.4
08:00 – 09:00	3.8
09:00 – 11:00	4.0
11:00 – 12:00	4.2
12:00 – 13:00	3.8
13:00 – 14:00	4.2
14:00 – 15:00	3.5
15:00 – 16:00	4.2
16:00 – 17:00	4.4
17:00 – 18:00	3.8
18:00 – 19:00	4.4
19:00 – 20:00	4.2
20:00 – 22:00	3.8
22:00 – 25:00	3.0 (Cool down walk)



# TIER 1 - SEGMENT 4

## FLEXIBILITY & COOL-DOWN

**Instructions:**

Perform after completion of the first 3 segments of Tier 1.

- Focus on elongating used muscle groups to help improve overall flexibility at the joints.
- Each stretch should be performed until there is slight discomfort.

See the flexibility section to find the detailed movement instructions, pp. 61-69.

FLEXIBILITY & COOL-DOWN OVERVIEW				
EXERCISE	SETS	REPS	TIME	REST
STANDING HAMSTRING REACH	1-2	N/A	15-30 SECONDS	0-15 SECONDS
SEATED GLUTE-KNEE TO CHEST	1-2	N/A	15-30 SECONDS	0-15 SECONDS
SEATED ERECTOR SPINAE	1-2	N/A	15-30 SECONDS	0-15 SECONDS
SEATED GROIN	1-2	N/A	15-30 SECONDS	0-15 SECONDS
SIDE-LYING QUAD	1-2	N/A	15-30 SECONDS	0-15 SECONDS
KNEELING HIP FLEXOR	1-2	N/A	15-30 SECONDS	0-15 SECONDS
UPWARD DOG	1-2	N/A	15-30 SECONDS	0-15 SECONDS
SIDE BEND- TFL	1-2	N/A	15-30 SECONDS	0-15 SECONDS
IRON CROSS	1-2	N/A	15-30 SECONDS	0-15 SECONDS
SUPINE SHOULDER ROTATION	1-2	N/A	15-30 SECONDS	0-15 SECONDS
SUPINE 3-PT. ELBOW DROP	1-2	N/A	15-30 SECONDS EACH	0-15 SECONDS

\*See the Flexibility/Cool-down section of this workbook for detailed instructions, pp. 61-69.

# LEVEL 1 TIER 2 PROGRAM

**Congratulations, you've made it to Level 1 Tier 2. Now that you have mastered the Level 1 Tier 1 movements, begin to further challenge the core and body with these new and more challenging moves.**

## Workout Design

The core workouts are designed to train all the major movement patterns including flexion, extension, rotation, adduction, abduction and side to side.



# LEVEL 1 - TIER 2 PROGRAM OVERVIEW

## Instructions:

Complete all 4 segments of the workout 3 times per week, every other day for 4 weeks.

- Segment 1- Dynamic Warm-up
- Segment 2- Bodyweight Resistance workout
- Segment 3- Cardiovascular workout
- Segment 4- Flexibility workout

Total time of workout completion = approximately 1 hour

## TIER 2 - SEGMENT 1 DYNAMIC WARM-UP

DYNAMIC WARM-UP OVERVIEW				
EXERCISE	SETS	REPS	TIME	REST
LIGHT CARDIO/DYNAMIC MOBILITY	1	N/A	5-10 MINUTES	N/A
CAT	1	5-8	N/A	15-30 SECONDS
LATERAL TILT	1	5-8 EACH SIDE	N/A	15-30 SECONDS
TABLETOP SPINAL ROTATION W/ FLEXION & EXTENSION	1	5-8 EACH SIDE	N/A	15-30 SECONDS
SUPINE SPINAL ROTATION	1	5-8 EACH SIDE	N/A	15-30 SECONDS

\*See the Dynamic Warm-up section of this workbook for detailed instructions, pp.15-19.

\*\*Note: Additional time and/or movements may be added during warm-up if needed.

Move to the next page.

# TIER 2 - SEGMENT 2

## BODYWEIGHT RESISTANCE WORKOUT

A. Listed are the 10 exercises you will perform. The table provides a general layout of Tier 2. See B for a workout scheme. Be sure to use variety as much as possible throughout the 4 weeks.

BODYWEIGHT RESISTANCE WORKOUT OVERVIEW				
EXERCISE	SETS	REPS	TIME EQUIVALENCY	REST
AIR SQUAT	2	15-20	45 SECONDS	UP TO 45 SECONDS
OBLIQUE CRUNCH STRAIGHT LEG RAISE	2	12-15	45 SECONDS	UP TO 45 SECONDS
SUPERMAN	2	12-15	45 SECONDS	UP TO 45 SECONDS
PLANK-TO-PUSH-UP	2	12-15	45 SECONDS	UP TO 45 SECONDS
1-LEG BRIDGE	2	12-15	30-45 SECONDS EA.	UP TO 45 SECONDS
SIDE PLANK HOLD	2	1 EACH	20-30 SECONDS EA.	UP TO 45 SECONDS
SUPERMAN PLANK: ALTERNATING	2	3-5 LIFTS EACH LIMB	45 SECONDS	UP TO 45 SECONDS
AB DRAW-IN DOUBLE-LEG SLIDE	2	12-15	45 SECONDS	UP TO 45 SECONDS
BODY ROW	2	12-15	30-45 SECONDS	UP TO 45 SECONDS
PLANK HOLD: 1-LEG	2	1-2 EACH	30 SECONDS EA.	UP TO 45 SECONDS

B. Pick a workout scheme:

CHOOSE ONE OF THE FOLLOWING TO USE FOR THE BODYWEIGHT WORKOUT:
<p>A. 5 MINI-BLOCK COUPLETS- CHOOSE TWO EXERCISES AND PERFORM THE RECOMMENDED REPETITIONS FOR EACH BACK-TO-BACK WITH MINIMAL REST BETWEEN THEM. REST UP TO 60 SECONDS BETWEEN EACH COUPLET. DO 2 SETS OF EACH COUPLET.</p>
<p>B. FULL CIRCUIT. COMPLETE ALL 10 EXERCISES IN SUCCESSION WITH MINIMAL REST BETWEEN EACH. REST UP TO 2-MINUTES BETWEEN ROUNDS (2 ROUNDS).</p>
<p>C. PERFORM AS MANY QUALITY REPS AS POSSIBLE FOR 45 SECONDS FOR EACH EXERCISE. REST UP TO 60 SECONDS BETWEEN EACH EXERCISE. DO 2 SETS OF EACH EXERCISE.</p>
<p>D. COMBINATION OF SEGMENT 2 BODYWEIGHT TRAINING AND SEGMENT 3 CARDIO.            -PERFORM ONE ROUND OF THE EXERCISES. THEN COMPLETE HALF THE TIME OF SEGMENT 3. THEN REPEAT TO FINISH.            -CHOOSE SCHEME A. ADD A 200-METER RUN/JOG BETWEEN EACH COMPLETED COUPLET FOR A TOTAL OF FIVE 200M RUNS.</p>

C. Rest 2-4 minutes. Move to the next segment. Move to the flexibility segment if scheme D was completed.

# TIER 2 - SEGMENT 2

## MOVEMENT INSTRUCTIONS

### Air Squat



#### A. Preparation:

- i. Stand with the feet about shoulder-width apart and slightly turn toes out.
- ii. Keep the head up, looking slightly above parallel.

#### B. Movement:

- i. Keep the midsection very tight.
- ii. Send the butt back and down.
- iii. The knees should track over the mid-line of the foot.
- iv. Keep as much pressure on the heels as possible.
- v. Lift the arms out and up as you descend.
- vi. Stop when the fold of the hip is below the knee – breaking parallel with the thigh.
- vii. Squeeze the glutes and hamstrings and rise without any forward lean or shifting of balance.
- viii. Keep the heels pressed down and return to a standing position.
- ix. Repeat for the recommended number of repetitions.

#### Modifications:

- Sit to a chair/bench.
- To help with back pain, place a stability ball against the wall. Be sure to place the ball on the lower back, and the feet a little farther out in front of the body.
- If the range of motion is the limiting factor, descend as far as proper form allows.

## Oblique Crunch Straight Leg Raise

Progression #1. See Page 30, if regression is needed.



### A. Preparation:

- i. Lie face-up with the legs straight and the toes pulled toward the shin.
- ii. Extend the arms overhead so the back of the hands touch the floor.

### B. Movement:

- i. As you draw-in the abs, begin to lift one-leg off the floor.
- ii. Simultaneously begin to crunch.
- iii. Move the opposite arm toward the hip as you crunch.
- iv. At the top of the crunch position, with the shoulder blades off the floor, the leg should be lifted so it is almost perpendicular to the floor.
- v. Return both arms and leg while keeping the abdomen tight.
- vi. Repeat on the other side.
- vii. Repeat for the recommended number of repetitions.

## Superman

Progression #1. See Page 26 or 28, if regression is needed.



### A. Preparation:

- i. Lie face-down on the floor in the prone position, and extend the arms overhead.
- ii. Activate the core by drawing the navel toward the spine and squeezing the glutes.

### B. Movement:

- i. With the core and glutes activated, lift the chest and both arms off the floor while simultaneously lifting both legs off the floor.
- ii. Pause momentarily at the top of the lift, then return to the starting position; at all times keep the chin tucked into the chest.
- iii. Upon completion of the movement, repeat.
- iv. DO NOT over emphasize the arching of the back to lift the chest off the floor. Only lift to where it is comfortable – no lower back pain should be felt.
- v. Repeat for the recommended number of repetitions.

#### Modification:

To eliminate spinal compression, begin in the all fours position with the hands and knees on the floor. Extend both the opposite arm and leg simultaneously. Pause.

## Plank-to-Push-up

Progression #1 from Extended Plank Hold Position. See page 29 option 2.



### A. Preparation

- i. In a prone position on the forearms, place the elbows under the shoulders.

### B. Movement:

- i. Draw the lower abdomen inward toward the spine.
- ii. In optimal postural alignment, tighten the glutes and lift the body up onto the forearms.
- iii. While maintaining the abdominal draw-in contraction, transfer bodyweight from the forearms to the hands so you move in to the push-up position.
- iv. Return back down onto the forearms while maintaining the plank position.
- v. The spine should be in a neutral position (from cervical to lumbar spine), and the glutes should remain tight without compensatory motion.
- vi. Be sure to keep the chin tucked in.
- vii. Repeat for the recommended number of repetitions.

## 1-Leg Bridge

Progression #1. See Page 27, if regression is needed.



### A. Preparation

- Lie face-up on the floor in the supine position with both knees bent.
- Extend one leg held off the floor at about 45-degrees with arms by sides.
- Activate core by drawing the navel in toward the spine and squeezing the glutes.

### B. Movement:

- With the core activated and the glutes squeezed, lift both hips off floor to form a straight line between knees and shoulders.
- Pause and slowly return back to floor, touching the floor momentarily then repeat.
- If you feel the hamstring cramping, check the pelvis for neutral alignment, or just stretch the hamstrings and repeat.
- Repeat on the alternate side.
- Repeat for the recommended number of repetitions.

## Side Plank Hold

Progression #1. See Page 28, if regression is needed.



### A. Preparation

- Lie on the right side of the body with the elbows, shoulders, hips and knees in alignment and the legs straight.
- Before the movement begins, optimal postural alignment is mandatory.
- Place the right elbow directly under the right shoulder for support.

### B. Movement:

- Draw the lower abdomen inward toward the spine.
- While maintaining the drawing-in maneuver, begin by lifting the body up onto the forearm.
- Hold for 20-30 seconds.
- Repeat on the other side.
- The cervical spine must stay in a neutral position!

#### Modification:

Bend either the leg closest to the floor or both knees.

## Superman Plank (1-limb alternating)

Progression #1: From the extended plank hold or all-fours position with arm/leg extensions.



### A. Preparation:

- i. Get into the push-up position with the hands directly under the shoulders.
- ii. The feet should be shoulder-width apart for better support.
- iii. Before movement begins, optimal postural alignment is mandatory.

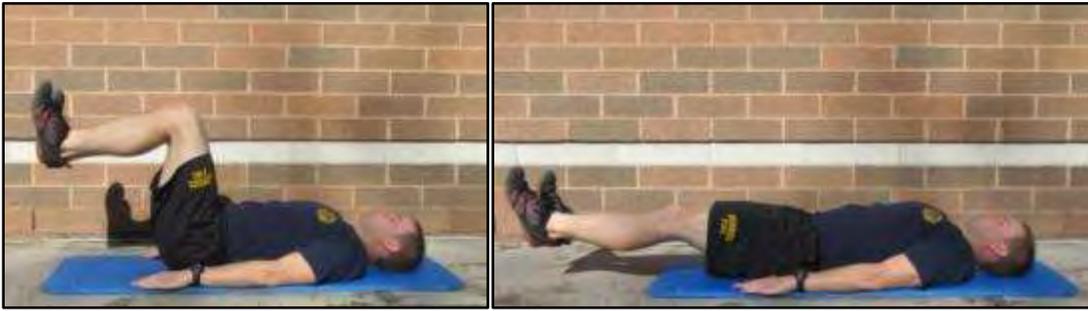
### B. Movement:

- i. Draw the lower abdomen inward toward the spine.
- ii. While maintaining the drawing-in maneuver, lift one arm off the floor reaching out over the head. Hold for a moment.
- iii. Keep the spine in the neutral position and the eyes down on the floor.
- iv. Return the hand back down and repeat the movement with the other arm.
- v. Return the hand back down and extend the hip, lifting the leg straight off the floor.
- vi. Return the leg back down and repeat on the other side.
- vii. Repeat for 3-5 lifts on each limb.

#### Modification:

If unable to balance or hold, place the knees down and do the same movements in the all fours position with the hands and knees both on the floor.

## Abdominal Draw-In Double Leg Slide



### A. Preparation:

- i. Lie face-up with the knees bent at 90-degrees and feet off the floor.
- ii. Place the hands under the low back to use as a pressure control.

### B. Movement:

- i. Draw the lower abdomen inward toward the spine.
- ii. Perform a slight posterior tilt. The backward motion of the pelvis (posterior pelvic tilt) should place slight pressure on the hands. Be sure to relax the glutes!
- iii. Maintain abdomen bracing and slowly slide both legs away from the body.
- iv. The closer the feet get to the floor the harder the movement becomes.
- v. Pull the legs back to the starting position.
- vi. Repeat for the recommended number of repetitions.

## Body Row



### Modifications:

- To decrease the difficulty, raise the bar or bend the knees.
- To increase the difficulty, lower the bar or place your feet on an elevated surface.

### A. Preparation

- i. Set a bar, rings or straps at shoulder height. (height may need to be adjusted based on individual abilities)
- ii. Place the hands on the bar at shoulder-width distance.

### B. Movement:

- i. Step feet in toward the bar.
- ii. With a firm grip, lower the body back at an angle toward the floor.
- iii. Push the heels through the floor, squeeze the glutes and tighten the abdomen.
- iv. While keeping the legs straight (but not locking the knees), pull the chest toward the bar so the hands are at about armpit level driving the elbows behind you.
- v. Return slowly.
- vi. Repeat for the recommended number of repetitions.

## 1-leg Plank Hold

Progression #1. See page 29 plank hold, if regression is needed.



### A. Preparation

- i. Begin in the plank position on the forearms with elbows directly under the shoulders and resting on toes.
- ii. Activate the core and contract the pelvic floor.

### B. Movement:

- i. Lift off the floor and form a straight line from head to toe.
- ii. Draw-in the abdominals, and extend the hip by activating glutes and lifting one leg off the floor.
- iii. Hold for time and slowly return leg to floor and then the body to the floor, keeping the chin tucked and the back flat.
- iv. Rest momentarily.
- v. After completion of one side, repeat on the alternate side.

#### **Modification:**

If unable to hold the leg up for the length of time, try doing toe taps instead.

# TIER 2 - SEGMENT 3

## CARDIOVASCULAR WORKOUT

**Instructions:**

Complete the treadmill walk/jog interval workout listed in the table.

- Included are a 5-minute warm-up walk and a 3-minute cool-down walk.
- This is a moderate intensity treadmill walk/jog workout.
- The 2-minute walking period is used as the recovery part of the interval workout between the jogs.

Note: This treadmill workout can also be followed on an elliptical if unable to use the treadmill.

Treadmill Walk/Jog	
Time	Pace (mph)
00:00 – 05:00	3.0 (Warm up walk)
05:00 – 07:00	3.5
07:00 – 09:00	5.0
09:00 – 11:00	3.8
11:00 – 13:00	5.5
13:00 - 15:00	4.0
15:00 – 17:00	5.0
17:00 – 19:00	3.5
19:00 – 21:00	6.0
21:00 – 23:00	4.5
23:00 – 25:00	5.5
25:00 – 27:00	4.0
27:00 – 30:00	3.0 (Cool down walk)



# TIER 2 - SEGMENT 4

## FLEXIBILITY & COOL-DOWN

**Instructions:**

Perform after completion of first 3 segments.

- Focus on elongating used muscle groups to help improve overall flexibility at the joints.
- Each stretch should be performed until there is slight discomfort.

See the flexibility section to find the detailed movement instructions, pp. 61-69.

FLEXIBILITY & COOL-DOWN OVERVIEW				
EXERCISE	SETS	REPS	TIME	REST
STANDING HAMSTRING REACH	1-2	N/A	15-30 SECONDS	0-15 SECONDS
SEATED GLUTE-KNEE TO CHEST	1-2	N/A	15-30 SECONDS	0-15 SECONDS
SEATED ERECTOR SPINAE	1-2	N/A	15-30 SECONDS	0-15 SECONDS
SEATED GROIN	1-2	N/A	15-30 SECONDS	0-15 SECONDS
SIDE-LYING QUAD	1-2	N/A	15-30 SECONDS	0-15 SECONDS
KNEELING HIP FLEXOR	1-2	N/A	15-30 SECONDS	0-15 SECONDS
UPWARD DOG	1-2	N/A	15-30 SECONDS	0-15 SECONDS
SIDE BEND- TFL	1-2	N/A	15-30 SECONDS	0-15 SECONDS
IRON CROSS	1-2	N/A	15-30 SECONDS	0-15 SECONDS
SUPINE SHOULDER ROTATION	1-2	N/A	15-30 SECONDS	0-15 SECONDS
SUPINE 3-PT. ELBOW DROP	1-2	N/A	15-30 SECONDS EACH	0-15 SECONDS

\*See the Flexibility/Cool-down section of this workbook for detailed instructions, pp. 61-69.



# LEVEL 1 TIER 3 PROGRAM

**Congratulations, you've made it to Level 1 Tier 3. Now that you have mastered the Level 1 Tier 2 movements, begin to further challenge the core and body with these new and more challenging moves.**

The Core Focuses on  
Functionality...

Rather than isolating single muscle groups. It is engaged in other exercises, not just abdominal exercises.

# LEVEL 1 - TIER 3 PROGRAM OVERVIEW

## Instructions:

Complete all 4 segments of the workout 3 times per week, every other day for 4 weeks.

- Segment 1- Dynamic Warm-up
- Segment 2- Bodyweight Resistance workout
- Segment 3- Cardiovascular workout
- Segment 4- Flexibility/Cool-down

Total time of workout completion = approximately 1 hour and 15 minutes

## TIER 3 - SEGMENT 1 DYNAMIC WARM-UP

DYNAMIC WARM-UP OVERVIEW				
EXERCISE	SETS	REPS	TIME	REST
LIGHT CARDIO/DYNAMIC MOBILITY	1	N/A	5-10 MINUTES	N/A
CAT	1	5-8	N/A	15-30 SECONDS
LATERAL TILT	1	5-8 EACH SIDE	N/A	15-30 SECONDS
TABLETOP SPINAL ROTATION W/ FLEXION & EXTENSION	1	5-8 EACH SIDE	N/A	15-30 SECONDS
SUPINE TRUNK ROTATION	1	5-8 EACH SIDE	N/A	15-30 SECONDS

\*See the Dynamic Warm-up section of this workbook for detailed instructions, pp. 15-19.

\*\*Note: Additional time and/or movements may be added during warm-up if needed.

Move to the next page.

# TIER 3 - SEGMENT 2

## BODYWEIGHT RESISTANCE WORKOUT

A. Listed are the 10 exercises you will perform. The table provides a general layout of Tier 2. See B for a workout scheme. Be sure to use variety as much as possible throughout the 4 weeks.

BODYWEIGHT RESISTANCE WORKOUT OVERVIEW				
EXERCISE	SETS	REPS	TIME EQUIVALENCY	REST
PRISONER AIR SQUAT	2-3	15-20	45 SECONDS	15-30 SECONDS
BICYCLE CRUNCH	2-3	15-20 EACH SIDE	45 SECONDS	15-30 SECONDS
PLANK: KNEE TO OPPOSITE ELBOW	2-3	12-15 EACH SIDE	45 SECONDS	15-30 SECONDS
HAND-RELEASE PUSH-UP	2-3	15-20	45 SECONDS	15-30 SECONDS
ALTERNATING 1-LEG BRIDGE	2-3	12-15 EACH SIDE	45 SECONDS	15-30 SECONDS
ALTERNATING T-PLANK	2-3	8-12 EACH SIDE	30-45 SECONDS WITH A HOLD	15-30 SECONDS
SUPERMAN PLANK: ALTERNATING 1-ARM/LEG WITH 3 SEC. HOLD	2-3	8-12 EACH SIDE	45 SECONDS WITH A HOLD	15-30 SECONDS
SPLIT SQUAT	2-3	12-15 EACH SIDE	30 SECONDS EA.	15-30 SECONDS
BODY ROW 1-LEG	2-3	12-15	30-45 SECONDS	15-30 SECONDS
SIDE PLANK WITH LEG RAISE	2-3	1 HOLD EACH	HOLD FOR 20-30+ SECONDS EACH	15-30 SECONDS

B. Pick a workout scheme:

**CHOOSE ONE OF THE FOLLOWING TO USE FOR THE BODYWEIGHT WORKOUT:**

- A. 5 MINI-BLOCK COUPLETS- CHOOSE TWO EXERCISES AND PERFORM THE RECOMMENDED REPETITIONS FOR EACH BACK-TO-BACK WITH MINIMAL REST BETWEEN THEM. REST UP TO 60 SECONDS BETWEEN EACH COUPLET. DO 2-3 SETS OF EACH COUPLET.
- B. FULL CIRCUIT. COMPLETE ALL 10 EXERCISES IN SUCCESSION WITH MINIMAL REST BETWEEN EACH. REST UP TO 2-MINUTES BETWEEN ROUNDS (2-3 ROUNDS).
- C. PERFORM AS MANY QUALITY REPS AS POSSIBLE FOR 45 SECONDS FOR EACH EXERCISE. REST UP TO 60 SECONDS BETWEEN EACH EXERCISE. DO 2-3 SETS OF EACH EXERCISE.
- D. COMBINATION OF SEGMENT 2 BODYWEIGHT TRAINING AND SEGMENT 3 CARDIO.  
 -PERFORM ONE ROUND OF THE EXERCISES. THEN COMPLETE HALF OR ONE-THIRD OF THE TIME OF SEGMENT 3. THEN REPEAT 1-2 MORE TIMES TO FINISH.  
 -CHOOSE SCHEME A. ADD A 200-METER RUN/JOG BETWEEN EACH COMPLETED COUPLET FOR A TOTAL OF FIVE 200M RUNS.

C. Rest 2-4 minutes. Move to the next segment. Move to the flexibility segment if scheme D was completed.

# TIER 3 - SEGMENT 2

## MOVEMENT INSTRUCTIONS

### Prisoner Air Squat



#### A. Preparation:

- i. Stand with the feet about shoulder-width apart and slightly turn toes out.
- ii. Keep the head up, looking slightly above parallel.
- iii. Interlock the fingers behind the head and squeeze the shoulder blades.

#### B. Movement:

- i. Keep the midsection very tight.
- ii. Send the butt back and down.
- iii. The knees should track over the mid-line of the foot.
- iv. Keep as much pressure on the heels as possible.
- v. Keep the chest open and the shoulder blades squeezed as you descend.
- vi. Stop when the fold of the hip is below the knee – breaking parallel with the thigh.
- vii. Squeeze the glutes and the hamstrings and rise without any forward lean or shifting of balance.
- viii. Keep the heels pressed down and return to a standing position.
- ix. Repeat for the recommended number of repetitions.

## Bicycle Crunch



### A. Preparation:

- i. Lie face-up with the legs straight and the toes pulled toward the shins.
- ii. Place the fingers on the ears.

### B. Movement:

- i. Engage the abdominal muscles and begin to lift one-leg off the floor.
- ii. Bend one leg as you bring the knee to the chest.
- iii. Simultaneously begin to “crunch,” bringing the opposite elbow toward the knee.
- iv. Keep the fingers in touch with the ears.
- v. Return both the arm and the leg. Begin the movement on the opposite side so both sides of the body are moving at the same time.
- vi. Try to keep the feet elevated off of the floor during the entire set to keep tension in the abdomen.
- vii. Repeat for the recommended number of repetitions.

## Plank: Knee to Opposite Elbow



### A. Preparation:

- i. Begin in the push-up position with hands directly under shoulders and the toes into the floor, hip-width apart.

### B. Movement:

- i. Engage the abdominal muscles and begin to lift one leg off the floor.
- ii. Flex the hip by bringing one knee toward the opposite elbow across the body.
- iii. Simultaneously turn at the waist so the hips are almost perpendicular to the floor.
- iv. Extend the hip and return the leg. Be sure the upper body is square with the floor just like the starting position.
- v. Continue on the same side or alternate legs.
- vi. Repeat for the recommended number of repetitions.

### Modifications:

If balance or stabilization is an issue, instead of the twist bring your knee to the same elbow. Then alternate.

## Hand-Release Push-up



### A. Preparation:

- i. In a prone position, place the hands at a width that will allow the forearms to be perpendicular to the floor when the elbows are flexed at 90°.
- ii. Come into a plank position with elbows extended. Make sure the entire body is in a neutral position.

### B. Movement:

- i. Begin by flexing at the elbows and lower the body all the way to the floor, while maintaining a neutral spine.
- ii. The chest and the thighs should lower at the same rate.
- iii. Release the hands from the floor momentarily.
- iv. Push back to the starting position, without postural compensation.
- v. Repeat for the recommended number of repetitions.

## Alternating 1-Leg Bridge

Progression #2. See page 40, if regression is needed.



### A. Preparation

- i. Lie on the floor in a supine position with both knees bent, feet flat, toes pointing straight ahead and the arms by the sides.
- ii. Activate the core by drawing the navel in toward the spine and squeezing the glutes.

### B. Movement:

- i. With the core activated and the glutes squeezed, lift both hips off the floor to form a straight line from the knees to the shoulders.
- ii. Pick one foot off the floor and bring the knee toward the chest without compensating postural alignment.
- iii. Return the hips back down to the floor touching the floor momentarily, and then repeat with the other leg.
- iv. If you feel the hamstring cramping, check the pelvis for neutral alignment, or just stretch the hamstrings and repeat.
- v. Repeat for the recommended number of repetitions.

## Alternating T-Plank

Progression #2. See page 39, if regression is needed.



### A. Preparation:

- i. Begin in the plank position on the elbows.
- ii. Activate the core. (Note it is important to lock the pelvis and rib cage so the spine remains rigid during the movement)

### B. Movement:

- i. Roll onto one elbow or hand by lifting the other off the floor and pivoting the feet.
- ii. Extend the other arm above the shoulder, attempting to stack the shoulders and hips at the full range of motion, forming a side-lying "T" position with the body.
- iii. Hold momentarily.
- iv. Maintain activation of the core and roll/transfer the body back to the starting position.
- v. Transition to the opposite side, forming the side-lying "T" position again and hold momentarily.
- vi. Repeat for the recommended number of repetitions.

#### Modifications:

- For a stronger base, stagger the feet to allow an easier pivot.
- Try just alternating lifting the arms off the floor, if deemed unprepared for the "T" position.
- You can also do this movement on your hands.

## Superman Plank: Alternating 1-Arm/Opposite Leg with a 3-second Hold

Progression #2. See page 41, if regression is needed.



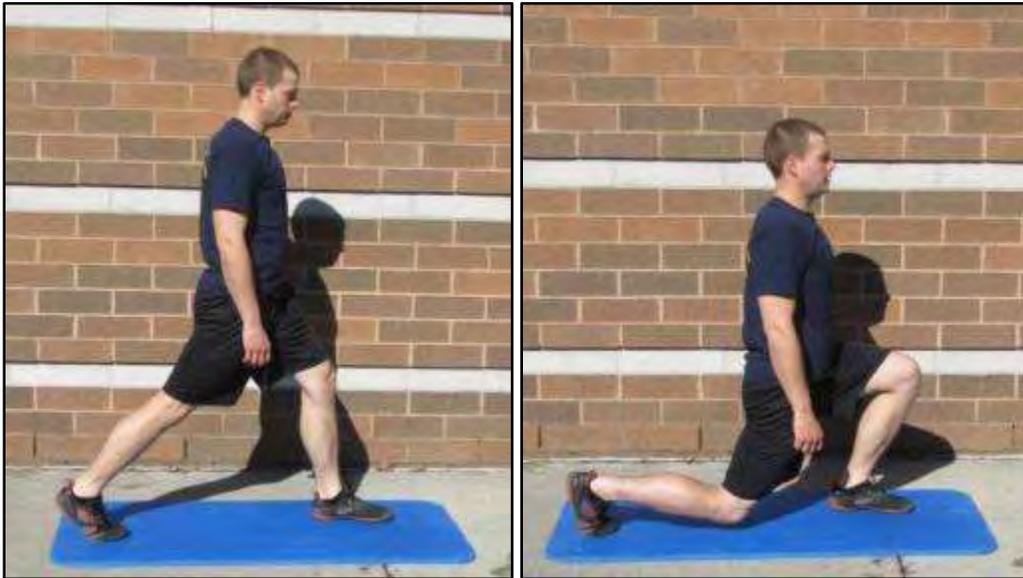
### A. Preparation:

- i. Get into the push-up position with the hands directly under the shoulders.
- ii. Both feet should be shoulder-width apart for better support.
- iii. Before movement begins, optimal postural alignment is mandatory.

### B. Movement:

- i. Draw the lower abdomen inward toward the spine.
- ii. While maintaining the drawing-in maneuver, lift one arm off the floor reaching out over the head. Hold for 3 seconds.
- iii. Note: if too easy, lift the opposite leg off the floor simultaneously and keep the leg straight.
- iv. Keep the spine in the neutral position and the eyes down on the floor.
- v. Return the hand back down and repeat on the other arm.
- vi. Repeat for the recommended number of repetitions.

## Split Squat



### A. Preparation:

- i. Stand in proper alignment with the hands by the side of the body or on the hips.
- ii. Place the feet straight ahead and shoulder width apart.
- iii. Step one foot back about 3-feet so only the toes are on the floor with a slight bend in the knee.

### B. Movement:

- i. From optimal postural alignment, draw the lower abdomen inward toward the spine for stabilization.
- ii. While maintaining optimal spinal alignment, descend slowly by bending at the hips, knees and ankles.
- iii. During the descent maintain weight distribution between the front heel and mid-foot and on the back toes.
- iv. Do not allow the feet to cave inward or shift outward.
- v. The knees should track between the first and second toes.
- vi. Perform downward reps slowly. Concentrate on the descent and the alignment of the body.
- vii. Only descend as far as you can maintain optimal alignment.
- viii. Keep the upper torso erect to reduce potential injury to the spine, knee and ankle.
- ix. Return back up to the starting position, pushing the front heel and back toes through the floor and squeezing through the glutes.
- x. Repeat for the recommended number of repetitions.

## Body Row 1-leg

Progression #1. See page 42, if regression is needed.



### A. Preparation

- i. Set a bar, rings or straps at shoulder height. (Height may need to be adjusted based on individual abilities)
- ii. Place the hands on the bar at shoulder-width distance.

### B. Movement:

- i. Step feet in toward the bar.
- ii. With a firm grip, lower the body back at an angle toward the floor.
- iii. Engage the core and lift one leg off the floor in a straight line.
- iv. Push the other heel through the floor, squeeze the glutes and tighten the abdomen.
- v. Keeping the legs straight (but not locking the knees), pull the chest toward the bar so the hands are at about armpit level driving the elbows behind you.
- vi. Repeat for the recommended number of repetitions.

#### Modifications:

- To decrease the difficulty, raise the bar or bend the knees.
- To increase the difficulty, lower the bar or place one foot on an elevated surface while the other hovers.

## Side Plank with Leg Raise

Progression #2. See page 40, if regression is needed.



### A. Preparation

- i. Lie on the right side with the elbows, shoulders, hips and knees in alignment and the legs straight.
- ii. Before the movement begins, optimal postural alignment is mandatory.
- iii. Place the right elbow directly under the right shoulder for support.
- iv. Stack the feet on top of each other.

### B. Movement:

- i. Draw the lower abdomen inward toward the spine.
- ii. While maintaining the drawing-in maneuver, lift the body up onto the forearm.
- iii. Then lift the top leg, keeping it straight, so it is hovering in the air.
- iv. Hold for 15-25 seconds or more (seconds may vary depending on individual abilities).
- v. While still maintaining the drawing-in maneuver, lower the body to the floor.
- vi. The cervical spine must stay in a neutral position!
- vii. Repeat on the other side.

#### Modifications:

- To decrease the difficulty, instead of holding the leg up, lift and lower the leg repetitiously for the required time.
- To increase the difficulty, do the movement while on your hand with the elbow extended.

# TIER 3 - SEGMENT 3

## CARDIOVASCULAR WORKOUT

**Instructions:**

Complete the treadmill jog interval listed in the table.

- Included are a 5-minute warm-up jog/fast walk and a 5-minute cool-down walk.
- This is a moderate-to-moderately-hard intensity treadmill jog workout.
- The intervals are a longer and slower jog : shorter and faster jog, using a pyramid style of speed by steadily going faster in the intervals, and then recovering at a slower pace.
- If you are unable to keep up with this pace, then use this same pyramid style at a slower pace or add 1-minute walking intervals after each faster jog.

**Note: This treadmill workout can also be followed on an elliptical if unable to use the treadmill.**

Treadmill Jog	
Time	Pace (mph)
00:00 – 05:00	4.0 (Warm up jog)
05:00 – 10:00	5.5
10:00 – 12:00	6.0
12:00 – 15:00	5.5
15:00 – 17:00	6.5
17:00 – 20:00	7.0
20:00 – 22:00	6.0
22:00 – 25:00	6.5
25:00 – 27:00	5.5
27:00 – 30:00	5.0
30:00 – 35:00	3.0 (Cool down walk)



# TIER 3 - SEGMENT 4

## FLEXIBILITY & COOL-DOWN

**Instructions:**

Perform after completion of first 3 segments.

- Focus on elongating used muscle groups to help improve overall flexibility at the joints.
- Each stretch should be performed until there is slight discomfort.
- See the flexibility section to find the detailed movement instructions, pp. 61-69.

FLEXIBILITY & COOL-DOWN OVERVIEW				
EXERCISE	SETS	REPS	TIME	REST
STANDING HAMSTRING REACH	1-2	N/A	15-30 SECONDS	0-15 SECONDS
SEATED GLUTE-KNEE TO CHEST	1-2	N/A	15-30 SECONDS	0-15 SECONDS
SEATED ERECTOR SPINAE	1-2	N/A	15-30 SECONDS	0-15 SECONDS
SEATED GROIN	1-2	N/A	15-30 SECONDS	0-15 SECONDS
SIDE-LYING QUAD	1-2	N/A	15-30 SECONDS	0-15 SECONDS
KNEELING HIP FLEXOR	1-2	N/A	15-30 SECONDS	0-15 SECONDS
UPWARD DOG	1-2	N/A	15-30 SECONDS	0-15 SECONDS
SIDE BEND- TFL	1-2	N/A	15-30 SECONDS	0-15 SECONDS
IRON CROSS	1-2	N/A	15-30 SECONDS	0-15 SECONDS
SUPINE SHOULDER ROTATION	1-2	N/A	15-30 SECONDS	0-15 SECONDS
SUPINE 3-PT. ELBOW DROP	1-2	N/A	15-30 SECONDS EACH	0-15 SECONDS

\*See the Flexibility/Cool-down section of this workbook for detailed instructions, pp. 61-69.

Move to the next page.

# **FLEXIBILITY & COOL-DOWN INSTRUCTIONS**

## **Why Stretch?**

Elongates shortened muscles to prevent injury, improves performance, and improves flexibility around all joints.



# FLEXIBILITY/COOL-DOWN INSTRUCTIONS

## Instructions:

Hold each stretch for 15-30 seconds to the point of slight discomfort. Perform 1-2 sets for each stretch.

## Standing Hamstring Reach



### A. Preparation:

- i. Stand and lift the one leg onto a steady surface. Extend the lifted leg. If there is no surface to place the leg, keep the foot on the floor and bend the opposite knee slightly.

### B. Movement:

- i. Bend forward from the hips and reach for the toes of the extended leg.
- ii. Ensure that forward flexion is coming from the hips and not from the thoracic vertebrae. (Keep the shoulders pulled back and chest open)
- iii. Hold the stretch and then repeat on the other side.

### Modifications:

- Sit on the floor. Bring one foot to your inner thigh and the working leg out straight. While maintaining good posture fold at the hip and reach for your toes.
- Lie face up on the floor with both legs straight. While keeping one leg straight on the floor, pull the other leg up. Keep your leg as straight as possible.
- Downward dog stretch- Start in plank on your hands. Then walk your hands toward your feet and push your hips upward, keeping your legs straight and heels down.

## Seated Glute- Knee-to-Chest



### A. Preparation:

- i. In a seated position bend one knee, and cross the foot over the thigh.

### B. Movement:

- i. Wrap the arms around the knee and pull the knee toward the chest.
- ii. Hold the stretch and then repeat on the other side.

#### **Modification:**

Pigeon stretch- the only difference is you will be lying face down on the floor using this same crossover position. Place your hands or elbows on the floor for support.

## Seated Erector Spinae



### A. Preparation:

- i. In a seated position bend one knee, and cross the foot over the thigh.
- ii. Place the opposite elbow on the outside of the bent knee.

### B. Movement:

- i. While pressing the elbow into the knee for leverage, turn the body at the waist in the opposite direction, looking over the back shoulder.
- ii. Place the other hand on the floor, behind the hip, for balance.
- iii. Hold the stretch and then repeat on the other side.

## Seated Groin



### A. Preparation:

- i. In a seated position with the back straight, press the bottoms of the feet together.
- ii. Pull the feet toward the body.

### B. Movement:

- i. While pulling the feet toward the body, flex forward from the hips.
- ii. Do not round the thoracic vertebrae. Keep the chest open.
- iii. Ensure the pelvis is neutral and the weight is not on the tailbone.
- iv. Hold for recommended time.

#### Modification:

Prayer stretch- With your feet shoulder-width apart or wider, drop your hips as low as possible, keeping your heels on the floor. Put your hands together then use your elbows to push open your knees for the stretch.

## Side-Lying Quad



### A. Preparation:

- i. Lie on one side of the body comfortably and get into a straight line so the hips and shoulders stack each other.
- ii. Bend the knee that is on the top.
- iii. Look forward and be sure the neck is in the neutral position, or resting on the arm.

### B. Movement:

- i. While the knee is bent, grab the ankle.
- ii. Pull the ankle toward the glute while rotating pelvis posteriorly.
- iii. Hold and then repeat on the other side.

#### Modifications:

- This stretch can also be performed by lying on your belly or standing upright.

## Kneeling Hip Flexor



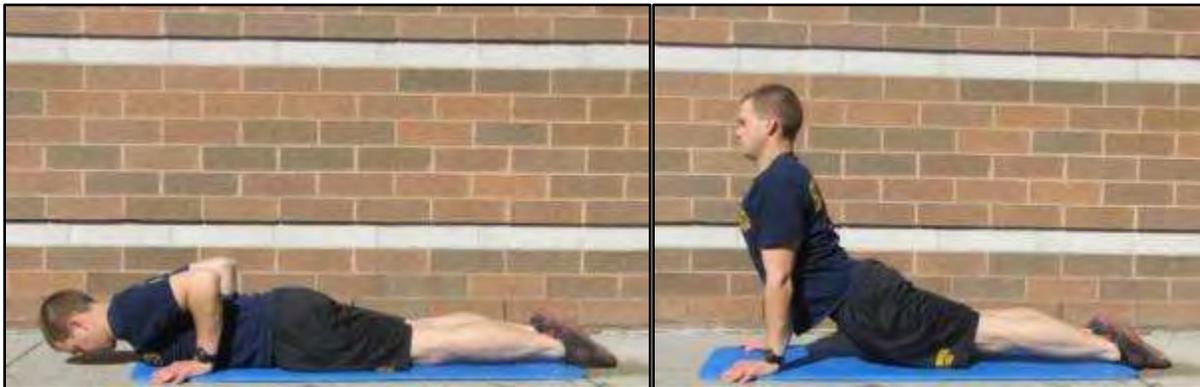
### A. Preparation:

- i. Begin with the back leg in a kneeling position so the knee is directly under the hip and the front leg bent at a 90° angle with the foot flat.

### B. Movement:

- i. Draw the belly button inward.
- ii. Squeeze the buttocks while rotating pelvis posteriorly.
- iii. Slowly, move the body forward until a mild tension is achieved in the front of the hip being stretched.
- iv. Hold and then repeat on the other side.

## Upward Dog



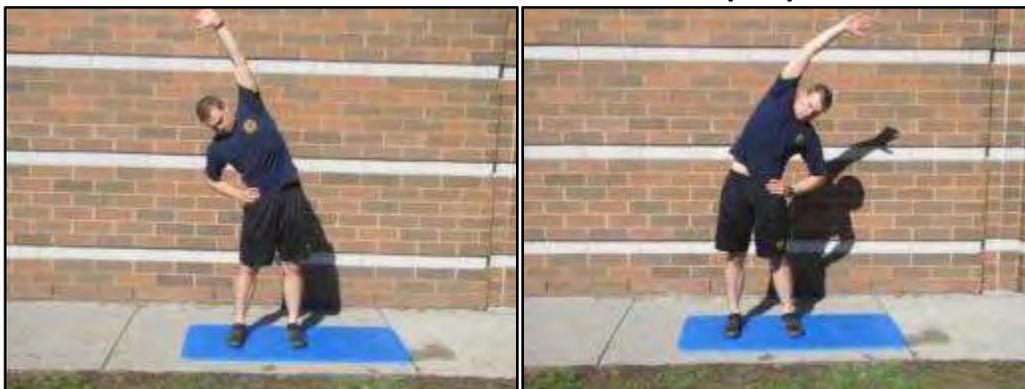
### A. Preparation:

- i. THIS EXERCISE SHOULD BE AVOIDED IF ANY LOW BACK PAIN/DISCOMFORT/INJURIES ARE A CURRENT ISSUE!
- ii. Lie face-down and place the hands just outside the tops of the shoulders.

### B. Movement:

- i. Inhale deeply and begin pressing upward (push up). As you slowly push up, exhale and push the pelvis toward the floor/mat. It is very important to relax the buttocks & spine muscles!
- ii. Hold the position at the top until you need to take a breath.
- iii. As you inhale, slowly lower the body to the floor.
- iv. Repeat up to 10 times.
- v. This is not a strength exercise! It is designed to aid in restoring normal motion in the spine.

## Side Bend- Tensor Fascia Latae (TFL)



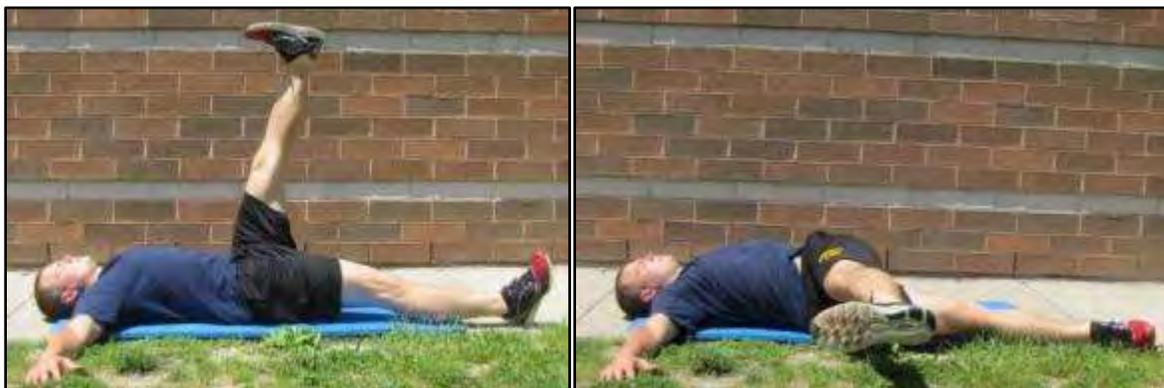
### A. Preparation:

- i. Stand with the feet shoulder-width apart, one arm overhead and the other hand on the hip.

### B. Movement:

- i. Core activation should be maintained prior to and throughout the stretch.
- ii. While activating same side glute, perform a posterior tilt (flatten back) while maintaining an erect posture.
- iii. To enhance the stretch, reach same side arm up and over.
- iv. It is important not to deviate forward or backward while reaching up and over.
- v. The pelvis should be 'tucked under' throughout stretch (posterior pelvic tilt).
- vi. A posterior tilt, along with hip external rotation and activation of the gluteus maximus, allows for greater TFL isolation.
- vii. Hold the stretch and then repeat on the other side.

## Iron Cross



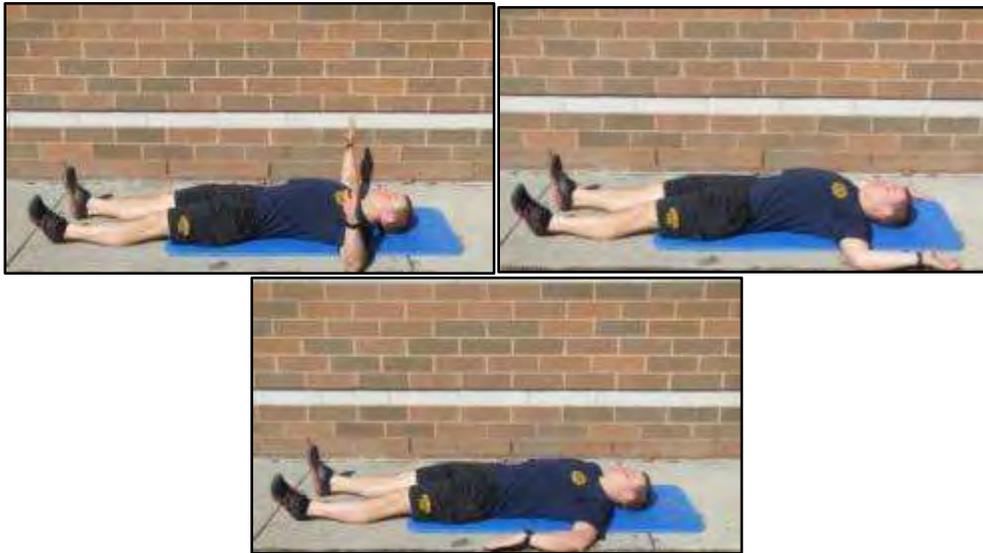
### A. Preparation:

- i. Lie on the floor face-up with the arms extended at shoulder height and palms down.
- ii. Ensure that you maintain adequate drawing-in to maintain ideal spinal angles.

### B. Movement:

- i. Begin the movement by lifting one straight leg up and over toward the opposite hand.
- ii. The movement should be fluid and SLOW. Rotation should occur through the entire Lumbo-Pelvic-Hip Complex.
- iii. Watch that the head and shoulders stay on the floor; that there is a fluid movement through the lumbar spine, hips, and pelvis; and that the kicking foot can touch the outstretched hand – if not, more corrective stretching is needed.
- iv. Hold the stretch and then repeat on the other side.

## Supine Shoulder Rotation



### A. Preparation:

- i. Lie on the floor face-up with elbows straight out from shoulders and bent 90°.

### B. Movement:

- i. Slowly rotate hands from below elbow to above elbow attempting to touch floor with the hands in both directions.
- ii. Hold each position for the recommended time.

## Supine Three Point Elbow Drop



### A. Preparation:

- i. Lie on the floor face-up and grab both elbows with the hands.

### B. Movement:

- i. Slowly drop elbows from side to side and overhead attempting to touch the floor on all sides.
- ii. Hold each position for the recommended time.

## **Congratulations, you have completed the Level 1 Training Program!**

**Be sure to complete the comprehensive fitness assessments to document your improvement and to test whether your body is ready for the Level 2 Program.**

**Now that you have mastered the Level 1 movements, begin to further challenge your body with these new and more challenging moves with added resistance and more challenging exercise schemes.**

# LEVEL 2 TRAINING PROGRAM

## Metabolic Conditioning

Is a training method that uses compound exercises with minimal rest in an effort to maximize calorie burn during and after the workout.



# LEVEL 2 TRAINING PROGRAM OVERVIEW

## Summary:

- A successful completion of the Level 1 Training Program with marked improvements deems readiness.
- Start the Level 2 program if the current fitness level is intermediate-to-advanced, need resistance training or variability in a current regimen.
- Level 2 is for individuals who completed the WPE with a time that is less than 8 minutes and 44 seconds (8:44, the benchmark).

## Goal:

- To provide a metabolic conditioning program 3 times per week, with one day of rest between each session, to further improve overall fitness and work performance.
- **In addition, it is recommended to add at least one extra session of cardio per week that is interval based, long and slow, pace training or at least 30 minutes in duration.**

## Program Layout:

- 5 Segments
  1. Dynamic Warm-Up
    - Includes a light cardio session, dynamic movements and drills to prepare the body for exercise.
  2. Bodyweight Mini-Block Circuit
    - A short, fast-paced bodyweight circuit to amp the metabolism and prepare the body for the High-Intensity Interval Resistance Training Workout (HIRT) portion of the workout.
  3. HIRT
    - This is the main workout. This is a metabolic conditioning based workout that uses strength movements and mini-cardio bursts to improve cardiovascular endurance, muscular strength, and muscular endurance.
  4. Core & Abs
    - Includes various core exercises to improve local muscular endurance, strength and stability of the muscles surrounding the spine, midsection and hips.
  5. Cool-down & Stretching
    - After all is completed, stretching all major muscle groups will help lengthen the muscles used and improve overall flexibility. During this portion, the heart rate should decrease, making it safer to depart from the workout.

## Equipment Needed: This will depend on which movements are being performed that day.

- A pair of dumbbells
- A pair of kettlebells
- A tractor tire
- A long-lever sledgehammer
- Agility Cones
- Battle Rope
- Pull-up bar
- Barbell plate (10-45#)

## Benefits of Rest Days

The body will adapt to stress.  
The training effect will take place.  
The body will replenish energy.  
The body will repair tissue damage.  
Your performance will improve.

# DYNAMIC WARM-UP INSTRUCTIONS

## SEGMENT 1

A. Complete the following warm-up drills to properly prepare the body for exercise.

LEVEL 2 DYNAMIC WARM-UP AND DRILLS			
DRILLS	SETS	REPS	DISTANCE
3-5 MINUTE JOG	1		
TRUNK TWISTS	1	10 EACH	
KNEE HUGS	1	10 EACH	
BUTT KICKS	1		25 YARDS
CHERRY PICKERS- 3 COUNT	1	10	
INCH WORMS	1		10 YARDS
ARM SWINGS & ARM CIRCLES	1	10 EACH	
INSIDE HEEL TAPS	1	10 EACH	
SCORPIONS	1	10 EACH	
BOOT-STRAPPERS	1	10	
WINDMILLS	1	10 EACH	
FRANKENSTEINS	1		25 YARDS
HIGH KNEES	1		25 YARDS
JUMPING JACKS	1	25	
GROINERS	1	5 EACH	
IRON CROSS SWINGS	1	10 EACH	
AIR SQUATS	1	10	
PUSH-UPS	1	10	
LUNGES WITH BACK EXTENSION	1	5 EACH	
SHOULDER ROTATIONS	1	12 EACH	
SHOULDER FLOOR SLIDES	1	12	
ANY OTHER MOVEMENT THE TRAINER DEEMS NECESSARY			

B. After completion, move on to Segment 2.

# LEVEL 2 DYNAMIC WARM-UP AND DRILLS

## INSTRUCTIONS

### Trunk Twists

#### A. Preparation:

- i. Stand with the feet shoulder-width apart.
- ii. Hold the arms out straight at shoulder height.

#### B. Movement:

- i. Be sure to keep the core engaged throughout the movement.
- ii. Twist the body side to side at the waist, alternating sides using a medium tempo.
- iii. Repeat for the recommended number of repetitions.

### Knee Hugs

#### A. Preparation:

- i. Stand with the feet hip-width apart and the arms by the sides of the body.

#### B. Movement:

- i. Be sure to maintain a neutral spine throughout the movement. Avoid an upper body forward lean.
- ii. Flex at the hip and pull one knee toward the chest.
- iii. Grab the knee with the arms and pull the knee up and toward the mid-line of the body.
- iv. Place the foot back down and repeat the movement on the other side. Repeat for the recommended number of repetitions.

### Butt Kicks

#### A. Preparation:

- i. Stand with the feet hip-width apart and the arms by the sides of the body.

#### B. Movement:

- i. Begin by kicking one foot behind the body while bending the knee so the foot “kicks” the buttock.
- ii. Be sure to keep the knees directly under the hips while performing this movement.
- iii. Focus on proper form rather than speed when performing this warm-up drill.
- iv. Repeat for the recommended distance.

### Cherry Pickers- 3-count

#### A. Preparation:

- i. Stand with the feet wider than shoulder width apart.
- ii. Place the hands on the hips

#### B. Movement:

- i. While maintaining a flat back position, keep a slight bend in the knees and fold forward at the hip joint.
- ii. Push the hips back so you feel a slight stretch in the hamstrings.
- iii. Reach the fingers toward the floor in front of the toes and touch the floor. That's 1.
- iv. Reach the fingers directly between the feet and touch the floor. That's 2.
- v. Reach the fingers slightly behind the feet and touch the floor. That's 3.
- vi. Return to the starting standing position to complete the first repetition.
- vii. Repeat for the recommended number of repetitions.

## Inch Worms

### A. Preparation:

- i. Begin in the push-up position.

### B. Movement:

- i. Taking small steps walk the feet toward the hands.
- ii. Keep the legs straight and push the hips upward into a pike position.
- iii. While keeping the feet still and legs straight, walk the hands forward to return to the push-up position.
- iv. Repeat for the recommended distance.

## Arm Swings

### A. Preparation:

- i. Begin in a standing position with the arms by the side of the body and the feet hip-width apart.

### B. Movement:

- i. While keeping the arms straight, swing the arms forward over the head and back behind the hips so they brush by the sides of the body.
- ii. Be sure to use the full range of motion allowed by the shoulder joint.

## Arm Circles (forward and reverse)

### A. Preparation:

- i. Begin in a standing position with the arms out to the sides forming a “T” with the body and the feet hip-width apart.

### B. Movement:

- i. While keeping the arms straight, make medium circles forward.
- ii. Repeat for the recommended number of repetitions.
- iii. Repeat in the other direction.

## Inside Heel Taps

### A. Preparation:

- i. Begin in a standing position with the arms by the sides of the body and feet hip-width apart.

### B. Movement:

- i. As you travel forward, kick the foot upward so the inside of the foot faces upward.
- ii. Tap the foot with the opposite hand and then return the foot to the floor.
- iii. Continue to alternate legs.
- iv. Repeat for the recommended number of repetitions.

## Scorpions

### A. Preparation:

- i. Begin by lying face-down with the arms stretched out at shoulder height and the legs straight, forming a “T” position with the body.

### B. Movement:

- i. Lift the right leg and begin to swing it to the other side of the body.
- ii. Slightly let the hip/pelvis lose contact with the floor, but keep the shoulders down.
- iii. As you swing the leg to the other side, bend the knee and reach the foot toward the opposite hand on the floor, or as far as your range of motion allows.
- iv. Pull the leg back to the starting position and alternate on the other side.
- v. Repeat for the recommended number of repetitions.

## Boot-Strappers

### A. Preparation:

- i. Begin in the push-up position.
- ii. Walk the feet in toward the chest, bend the knees and place them directly under the hips so the thighs are perpendicular to the floor and the knees are 90-degrees.
- iii. Keep the knees off the floor, the hips at shoulder height, and the hands under the shoulders.

### B. Movement:

- i. Begin by pushing the hips upward as you straighten the legs, forming a pike position. Push the weight of the body into the heels toward the floor.
- ii. Fully extend the shoulders so the head is slightly in front of the shoulders pointing down and arms are fully locked out. Pause.
- iii. Drop the knees back to the starting position.
- iv. Repeat for the recommended number of repetitions.

## Windmills

### A. Preparation:

- i. Stand with the feet slightly wider than shoulder width apart.
- ii. Extend the left arm straight overhead and the right arm pointing down toward the right foot.
- iii. Keep the eyes on the left hand in the air for the entire movement.

### B. Movement:

- i. Begin by pushing the hip out to the left.
- ii. Then while maintaining a neutral spine and open chest, slowly reach toward the right foot with the right hand.
- iii. The left leg should stay straight and the right leg should slightly bend.
- iv. Be sure to perform the movement with proper form without squatting or twisting the back
- v. Return back to the starting position.
- vi. Repeat for the recommended number of repetitions.
- vii. Then repeat on the other side.

## Frankensteins

### A. Preparation:

- i. Stand with the feet hip-width apart.
- ii. Extend the arms straight out in front with the palms facing down.

### B. Movement:

- i. While maintaining a neutral spine, kick the leg up straight so it kicks the hand. Avoid an upper body forward lean.
- ii. Return the foot back to the floor and repeat with the other leg.
- iii. Repeat for the recommended number of repetitions.

## High-Knees

### A. Preparation:

- i. Stand with the feet hip-width apart and the arms by the sides of the body.

### B. Movement:

- i. While maintaining a neutral spine, bend one knee and flex the hip so the knee moves toward the chest. Avoid an upper body forward lean.
- ii. Be sure to keep the toes pulled toward the shins and the ankles directly under the knees.
- iii. Alternate sides rapidly.
- iv. Repeat for the recommended distance.

## Jumping Jacks

### A. Preparation:

- i. Stand with the feet hip-width apart and the arms by the sides of the body.

### B. Movement:

- i. Begin by simultaneously jumping both legs open away from the mid-line of the body and swinging the arms out away from the mid-line so the arms go over head.
- ii. Simultaneously jump the legs back together, and swing the arms back down by the sides of the body to return to the starting position.
- iii. Repeat for the recommended number of repetitions.

## Groiners

### A. Preparation:

- i. Begin in the push-up position.

### B. Movement:

- i. While maintaining a flat back position, begin by pulling one foot up to the outside of the hand on the same side of the body.
- ii. Place the heel down and keep the back leg straight.
- iii. Drop the hips a few inches for a light stretch, and then return the hips.
- iv. Place the foot back to the starting position and repeat on the other side.
- v. Repeat for the recommended number of repetitions.

## Iron Cross Swings

### A. Preparation:

- i. Begin by lying face-up with the arms out at shoulder height and palms facing up, forming a "T" position with the body.
- ii. Keep the legs straight throughout the movement.
- iii. Throughout the movement keep the shoulders, head and upper back in contact with the floor.

### B. Movement:

- i. Begin by lifting the right leg and swing it over to the opposite side of the body toward the opposite hand.
- ii. Rotate the hip slightly so the toe points toward the hand during the swing.
- iii. While swinging back, let the hip rotate the other direction so it "opens," and then swing it toward the other side of the body so the toe points toward the hand of the same side.
- iv. Repeat for the recommended number of repetitions and then repeat on the other leg.

**Air Squats- see page 25 for review.**

**Push-ups- see page 27 for review.**

## Lunges with Back Extension

### A. Preparation:

- i. Stand in proper alignment with the hands by the sides of the body or on the hips.
- ii. Stand with the feet between hip and shoulder width apart.

### B. Movement:

- i. While maintaining optimal spinal alignment, step forward and descend slowly by bending at the hips, knees and ankles.
- ii. During the descent, maintain weight distribution between the front heel and mid-foot.
- iii. Do not allow the feet to cave inward or shift outward.
- iv. Only descend down as far as you can while maintaining optimal alignment without compensating form.
- v. While you are in the down position reach the arms overhead and lean back slightly.
- vi. Return the upper body back center so the torso is straight.
- vii. Push through the front heel and return to the starting position. Alternate legs.
- viii. Repeat for the recommended number of repetitions.

Shoulder Rotations- see page 67 for review.

## Shoulder Floor Slides

### A. Preparation:

- i. Begin by lying face-up with the arms out at shoulder height and palms facing up, forming a “T” position with the body.
- ii. Keep the legs straight throughout the movement.
- iii. Throughout the movement keep the shoulders, head, upper, and lower back in contact with the floor.
- iv. Bend the arms at 90-degrees and keep the upper arms in contact with the floor.
- v. Rotate the shoulders so the back of the hands are touching the floor next to the head. (Note: if the shoulders are inflexible, they may not make contact with the floor without arching the back.)

### B. Movement:

- i. Begin by extending the arms over head, so they slide against the floor.
- ii. Pull the arms back down, bending the elbows and squeezing the shoulder blades together.
- iii. Repeat for the recommended number repetitions.

## Importance of the Dynamic Warm-up

While it prepares the neuromuscular system to work efficiently together, it simulates and prepares the body for more intense movements. This is much better than a regular cardio warm-up.

# BODYWEIGHT MINI-BLOCK CIRCUIT

## SEGMENT 2

In this segment you will choose one upper body exercise and one lower body exercise. Then you will choose a rep scheme (listed below) to follow. Each day you perform the bodyweight circuit, within a 7 day cycle, you will use as many variations of the exercises and rep schemes as possible, without ever using the same one twice.

### A. Pick one upper-body and one lower-body bodyweight exercise:

UPPER (PP. 81-87)	LOWER (PP. 88-95)
PUSH-UP	AIR SQUAT
SPIDER PUSH-UP	FORWARD LUNGE
PLANK-TO-PUSH-UP	REVERSE LUNGE
BODY ROW	SQUAT JUMP
PULL-UP	JUMPING LUNGE
PIKE PUSH-UP	SURRENDER
T- PUSH-UP	ICE SKATER
CHIN-UP	LOW SPRAWL
ANY OTHER VARIATION	ANY OTHER VARIATION

### B. Pick one rep scheme:

#### CHOOSE ONE OF THE FOLLOWING TO USE FOR THE BODYWEIGHT WORKOUT:

- A. **PYRAMID: BEGIN AT ONE REP OF EACH AND INCREASE BY ONE REP EACH ROUND. REPEAT AS MANY ROUNDS AS POSSIBLE FOR 5 MINUTES (1-EACH, 2-EACH, 3-EACH, & SO FORTH).**
- B. **3 ROUNDS: RD. 1= 5 REPS EACH; RD. 2= 10 REPS EACH; RD. 3= 15 REPS EACH**
- C. **3 ROUNDS: RD. 1= 10 REPS EACH; RD. 2= 15 REPS EACH; RD. 3= 20 REPS EACH**
- D. **3 ROUNDS: RD. 1= 20 REPS EACH; RD.2= 15 REPS EACH; RD. 3= 10 REPS EACH**
- E. **5-7 REPS EACH. AS MANY ROUNDS AS POSSIBLE IN 3-5 MINUTES.**
- F. **5 ROUNDS: 8 REPS EACH**
- G. **5 MINUTES: 30 SECONDS UPPER, 30 SECONDS LOWER. (TOTALS 5 SETS OF BOTH)**
- H. **1 ROUND: 40 REPS EACH (COMPLETE THE 40 REPS ANYWAY)**
- I. **ATHLETE'S CHOICE. CREATE ANY SCHEME THAT CAN BE COMPLETED IN LESS THAN 7 MINUTES.**

### C. After completion rest 2-4 minutes. Move on to Segment 3.

# SEGMENT 2

## UPPER BODY MOVEMENT INSTRUCTIONS

### Push-up



#### A. Preparation:

- i. In a prone position, place the hands at a width that will allow the forearms to be perpendicular to the floor when the elbows are flexed at 90°.
- ii. Come into a plank position with the elbows extended; make sure the entire body is in a neutral position.

#### B. Movement:

- i. Begin by flexing at the elbows. While maintaining a neutral spine, lower the body to the floor.
- ii. Push the body back to the starting position without postural compensation.
- iii. Repeat for the recommended number of repetitions.

### Spider Push-up



#### A. Preparation:

- i. In a prone position, place hands at a width that will allow the forearms to be perpendicular to the floor when the elbows are flexed at 90°.
- ii. Come into a plank position with elbows extended; make sure the entire body is in a neutral position.

#### B. Movement:

- i. Begin by flexing at the elbows. While maintaining a neutral spine, lower the body to the floor.
- ii. As you are lowering, slightly abduct the hip by pulling the knee out away from the midline.
- iii. Simultaneously drive the knee toward the elbow as you reach the bottom position of the push-up.
- iv. Push the body back to the starting position without postural compensation.
- v. Repeat on the other side and continue to alternate.
- vi. Repeat for the recommended number of repetitions.

## Plank-to-Push-up



### A. Preparation

- i. In a prone position on the forearms, place the elbows under the shoulders.

### B. Movement:

- i. Draw the lower abdomen inward toward the spine.
- ii. In optimal postural alignment, tighten the glutes and lift the body up onto the forearms.
- iii. While maintaining the abdominal draw-in contraction, transfer bodyweight from the forearms to the hands so you move in to the push-up position.
- iv. Return back down onto the forearms while maintaining the plank position.
- v. The spine should be in a neutral position (from cervical to lumbar spine), and the glutes should remain tight without compensatory motion.
- vi. Be sure to keep the chin tucked in.
- vii. Repeat for the recommended number of repetitions.

## Body Row



### A. Preparation

- i. Set a bar, rings or straps at shoulder height. (height may need to be adjusted based on individual abilities)
- ii. Place the hands on the bar at shoulder-width distance.

### B. Movement:

- i. Step feet in toward the bar.
- ii. With a firm grip, lower the body back at an angle toward the floor.
- iii. Push the heels through the floor, squeeze the glutes and tighten the abdomen.
- iv. While keeping the legs straight (but not locking the knees), pull the chest toward the bar so the hands are at about armpit level driving the elbows behind you.
- v. Return slowly.
- vi. Repeat for the recommended number of repetitions.

## Pull-up



### A. Preparation

- i. Place the hands on the pull-up bar with the palms facing forward.
- ii. The grip width should be at least shoulder width apart with entire body hanging straight down.

### B. Movement:

- i. Draw the belly button inward toward the spine.
- ii. Maintaining optimal spinal alignment, in a controlled manner, pull the body upward. The shoulder blades should move downward and the will arms follow.
- iii. Only move for as far as you can maintain core stability. Return to the starting position.
- iv. The return motion must be controlled involving shoulder girdle upward rotation and elevation. Note: The return motion should be stopped just before the muscles relax.
- v. Do not allow head to “jet” forward.
- vi. Relax the arms as much as possible, placing the emphasis on the back muscles.
- vii. Do not round the back!
- viii. Common mistakes to avoid:
  - Raising the legs to help begin the pulling-up motion
  - Rotating the shoulders forward
  - Hunching up the shoulders by the ears (indicating possible weakness in lower-mid shoulder girdle musculature)
  - Arching low back and rocking body
- ix. Repeat for the recommended number of repetitions.

## Pike Push-up



### A. Preparation:

- i. Begin in a push-up position and lift the hips up high to form a pike position with the arms outstretched.

### B. Movement:

- i. Maintain the pike position with the body and bend the elbows to lower the head and upper body toward the floor.
- ii. Push back to the starting position. Keep the abdominal muscles tight.
- iii. Exhale as you push back up and inhale as you lower the upper body toward the floor again.
- iv. Repeat for the recommended number of repetitions.

## T-Push-up



### A. Preparation:

- i. In a prone position, place the hands at a width that will allow the forearms to be perpendicular to the floor when the elbows are flexed at 90°.
- ii. Come into a plank position with the elbows extended; make sure the entire body is in a neutral position.

### B. Movement:

- i. Tighten the glutes and abs. While keeping the back straight, lower the upper body toward the floor by bending the elbows.
- ii. Push yourself back up to the starting position. Rotate the torso and legs to one side, about 90-degrees so that the body is facing away from the floor. Simultaneously, raise the arm to the sky so that the upper body forms a "T" position.
- iii. Return the torso and legs to the starting position for a push-up so that the upper body again faces the floor. This completes 1 repetition.
- iv. Repeat this action, except this time extend the other arm into the air to equally work both sides.
- v. Repeat for the recommended number of repetitions.

## Chin-Up



### A. Preparation

- i. Place the hands on the pull-up bar with the palms facing the body.
- ii. The grip width should be about shoulder-width apart, with the entire body hanging straight down.

### B. Movement:

- i. Draw the belly button inward toward the spine.
- ii. Maintaining optimal spinal alignment, in a controlled manner, pull the body upward and drive the elbows down, keeping them by the side of the body.
- iii. Only move for as far as you can maintain core stability. Return to the starting position.
- iv. The return motion should be stopped just before the muscles relax.
- v. Do not allow head to “jet” forward.
- vi. Relax arms as much as possible, placing the emphasis on back muscles.
- vii. Do not round back!
- viii. Common mistakes to avoid:
  - Raising the legs to help begin the pulling motion
  - Rotating the shoulders forward
  - Hunching up the shoulders by the ears (indicating possible weakness in lower-mid shoulder girdle musculature)
  - Arching low back and rocking body
- ix. Repeat for the recommended number of repetitions.

# SEGMENT 2

## LOWER BODY EXERCISE DESCRIPTIONS

### Air Squat



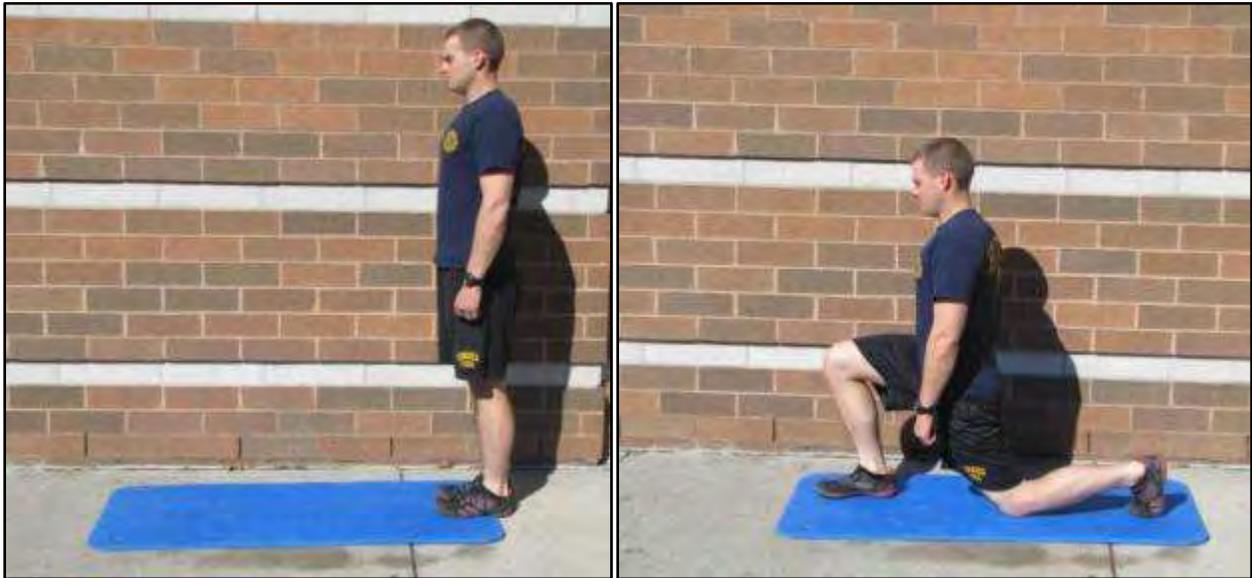
#### A. Preparation:

- i. Stand with feet about shoulder-width apart and slightly turn toes out.
- ii. Keep the head up, looking slightly above parallel.

#### B. Movement:

- i. Keep the midsection tight.
- ii. Send the butt back and down.
- iii. The knees should track over the mid-line of the foot.
- iv. Keep as much pressure on the heels as possible.
- v. Lift the arms out and up as you descend.
- vi. Stop when the fold of the hip is below the knee – breaking parallel with the thigh.
- vii. Squeeze the glutes and hamstrings and rise without any forward lean or shifting of balance.
- viii. Keep the heels pressed down, and return to a standing position.
  - i. Repeat for the recommended number of repetitions.

## Forward Lunge



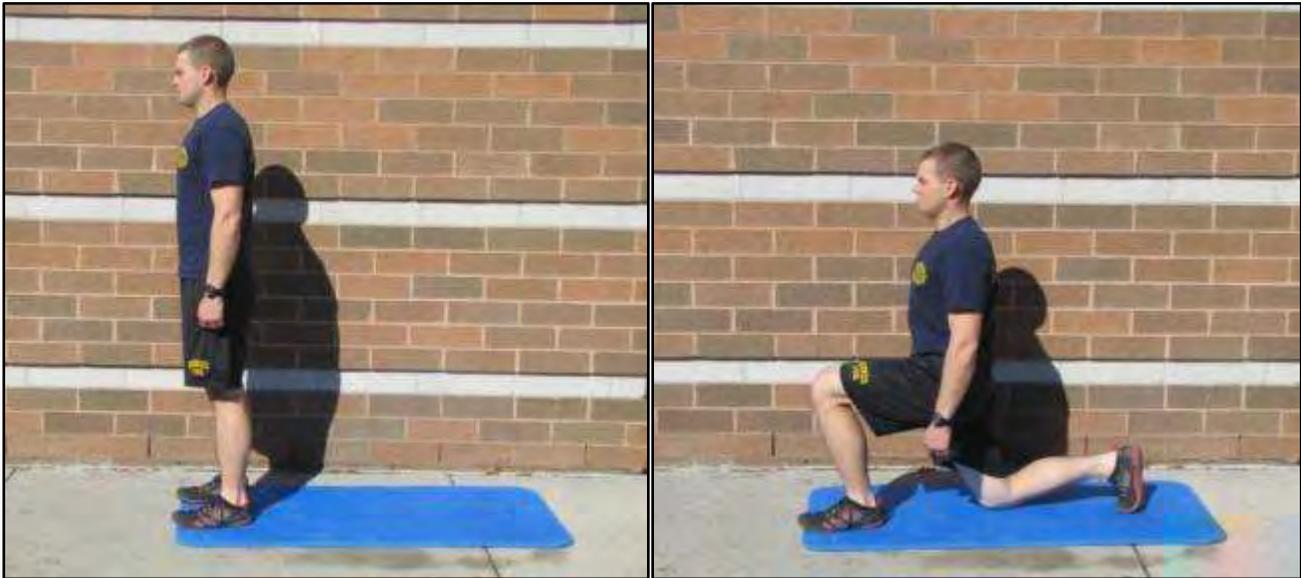
### A. Preparation:

- i. Stand in proper alignment with hands by the side of the body or on the hips.
- ii. Place the feet straight ahead and shoulder-width apart

### B. Movement:

- i. From optimal postural alignment, draw the lower abdomen inward toward the spine
- ii. While maintaining optimal spinal alignment, step forward about 3-feet and descend slowly by bending at the hips, knees and ankles.
- iii. During the descent, maintain weight distribution between the front heel and mid-foot.
- iv. Do not allow the feet to cave inward or shift outward.
- v. Perform downward reps slowly and concentrate on the descent and the alignment of the body.
- vi. Only descend down as far as you can maintain optimal alignment without compensating form.
- vii. Keep upper torso erect and do not lean forward.
- viii. Push through the front heel and stand back up to the starting position. Alternate legs.
- ix. Repeat for the recommended number of repetitions.

## Reverse Lunge



### A. Preparation:

- i. Stand in proper alignment with the hands by the side of the body or on the hips.
- ii. Place the feet straight ahead and shoulder-width apart.

### B. Movement:

- i. From optimal postural alignment, draw the lower abdomen inward toward the spine.
- ii. While maintaining optimal spinal alignment, step backward about 3-feet so only the toes are on the floor, and descend slowly by bending at the hips, knees and ankles.
- iii. During the descent, maintain weight distribution between the front heel and mid-foot.
- iv. Do not allow the feet to cave inward or shift outward.
- v. Perform downward reps slowly. Concentrate on the descent and the alignment of the body.
- vi. Only descend down as you can maintain optimal alignment without compensating form.
- vii. Keep upper torso erect to reduce potential injury to the spine, knee and ankle.
- viii. Return back up to the starting position, pushing the front heel and back toes through the floor and squeezing through the glutes. Alternate legs.
- ix. Repeat for the recommended number of repetitions.

## Squat Jump



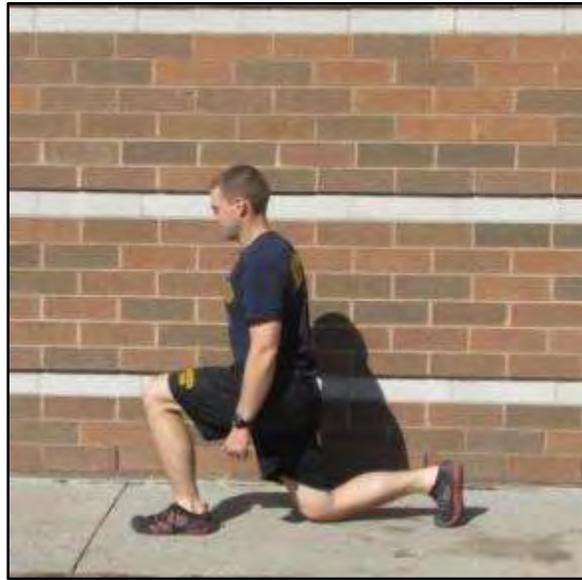
### A. Preparation:

- i. Begin with the feet shoulder-width apart, toes forward and the arms by the side of the body.

### B. Movement:

- i. Squat down slightly with the knees aligned over the mid-foot and jump up into the air, extending the arms up overhead (as if reaching for the sky).
- ii. Bring the arms back to sides during landing.
- iii. Land softly in a controlled manner, on the reactive part of the feet maintaining control of entire body.
- iv. Repeat for the recommended number of repetitions.

## Jumping Lunge



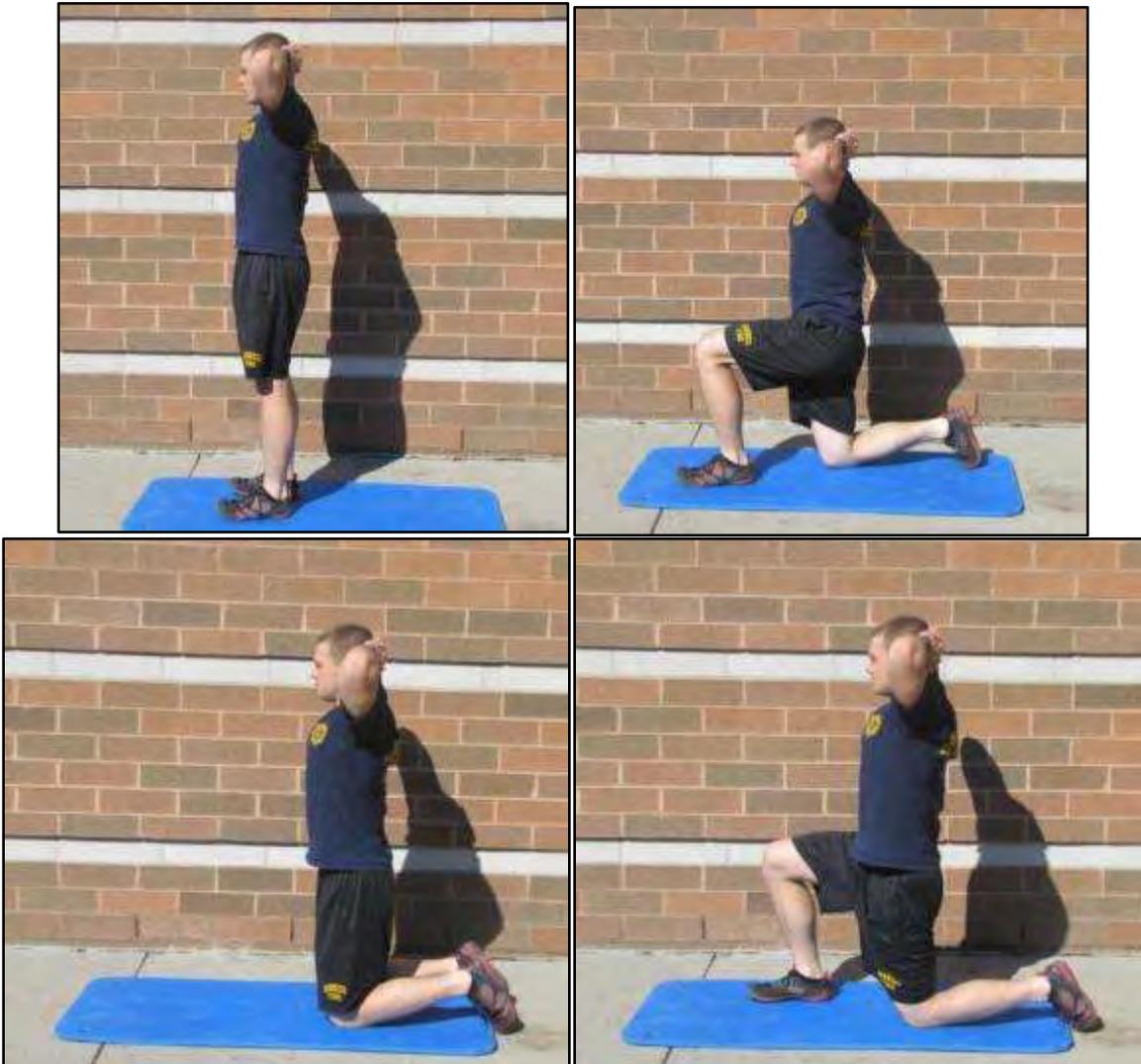
### A. Preparation:

- i. Stand straight up, with the feet shoulder-width apart and staggered about 3-feet.
- ii. Drop the back knee, and plant the toes in the floor.

### B. Movement:

- i. Jump up off the floor, and quickly switch the position of the feet in mid-air.
- ii. Keep the torso straight throughout the entire exercise.
- iii. Land in the mirror-image of the original position - the forward leg bent at ninety degrees at the knee and hip, with the opposite foot back behind the body.
- iv. Bend the knees to absorb the impact.
- v. Jump back off the floor, switching the feet to the original position.
- vi. Repeat for the recommended number of repetitions.

## Surrender



### A. Preparation:

- i. Begin by standing with the back straight, eyes focused ahead of you, arms behind the head and the feet shoulder-width apart.

### B. Movement:

- i. With the arms still in place, step backward with one foot placing the one knee on the floor.
- ii. From this position, drop the other leg so that both knees are on the floor.
- iii. Re-enter the starting position by stepping the foot forward followed by the other foot.
- iv. Repeat the motion, starting with the other leg this time.
- v. Repeat for the recommended number of repetitions.

## Ice Skater



### A. Preparation:

- i. Begin in a runner's stance, with the knees and elbows bent.

### B. Movement:

- i. Perform a lateral hop, accelerating through the outside leg. Keep the body in proper alignment.
- ii. Land on a flat foot (the heel and toes at the same time) and decelerate through knee and hip flexion.
- iii. Jump back to the starting position with same technique.
- iv. Make sure to control the hips in the frontal plane and keep the centre of gravity inside the planted leg.
- v. Repeat for the recommended number of repetitions.

## Low Sprawl



### A. Preparation:

- i. Begin by lying face-down with the hands under the armpits and toes into the floor, like you're going to do a push-up.

### B. Movement:

- i. Forcefully explode off the floor, extending the elbows.
- ii. While keeping the hands in contact with the floor, simultaneously jump the feet by the hands driving the knees out.
- iii. Hop back to the push-up position by kicking the legs out into full extension and dropping onto hands.
- iv. In the brief push-up position make sure legs are fully extended, glutes contracted, and back is flat with abdominals drawn in.
- v. Perform repetitions as quickly as can be controlled.
- vi. Repeat for the recommended number of repetitions.

# H.I.R.T.

## SEGMENT 3

Segment 3 is the High-Intensity Interval Resistance Training (H.I.R.T.) workout. This will be performed after completion of segment 2. Similar to segment 2, you will select one exercise from each of the upper body and lower body sections, and also choose one exercise from the cardio section. The weight used must be challenging, yet light enough to maintain form and technique in order to be effective! Next, you will choose the rep scheme/workout layout. Each day that you perform the metabolic circuit, within a 7 day cycle, you will use as many variations of the exercises and rep schemes as possible, without using the same combination twice.

1. Pick one upper, one lower, and one “cardio.” Be sure the “cardio” choice coincides with the rep scheme.

UPPER (PP. 98-106)	LOWER/COMBINATION (PP. 107-116)	CARDIO (PP. 117-124)
PLANK ROW	KB SWING	1. MOUNTAIN CLIMBER SPRAWLS
PUSH PRESS	OFFSET SQUAT	2. BURPEES
ALTERNATING FLOOR/BENCH PRESS	GOBLET SQUAT	3. MOUNTAIN CLIMBERS
UPRIGHT ROW	STIFF-LEGGED DEADLIFT	4. SLEDGEHAMMER-TO-TIRE HIT
BENT-OVER ROW	DEADLIFT	5. BEAR CRAWL 25-50 YARDS
SHOULDER PRESS	SIDE LUNGE	6. TIRE FLIPS: 5-10 FLIPS (DEPENDS ON SIZE)
WEIGHTED DIP	CLEAN	7. BATTLE ROPE VARIATIONS
WEIGHTED PUSH-UP	SNATCH/FLOOR-TO-OVERHEAD	8. 200M, 300M OR 400M RUN
SHOULDER-TO-SHOULDER KB PRESS	TURKISH GETUP	9. SUICIDE- 5 TO 10 YDS BETWEEN EACH CONE
PULL-UP	OVERHEAD LUNGE	10. 100-YD SHUTTLE (4X25YDS)

\*Additional cardio choices- rowing, jump rope, and bike/elliptical if needed

### Variation Tips

Alternate between a dumbbell and kettlebell for most of the exercises.

Try a single-arm or single-leg variation.

Piston-style or alternating arms is challenging to the core and balance.

2. Pick the rep scheme or workout layout:

**CHOOSE ONE OF THE FOLLOWING TO USE FOR THE HIRT WORKOUT:**

- A. PERFORM 10 REPS OF THE UPPER AND LOWER BODY EXERCISE FOLLOWED BY 1 MINUTE OF CARDIO #1, 2, 3, 4, 5, 7, 9. PERFORM AS MANY ROUNDS AS POSSIBLE IN 12-20 MINUTES. (CHOOSE THE TIME)
- B. 3-5 ROUNDS- 10-12 REPS OF THE UPPER AND LOWER BODY EXERCISE FOLLOWED BY CARDIO #8, 9, OR 10.
- C. TABATA PROTOCOL- 20 SECONDS OF AS MANY REPS AS POSSIBLE OF THE UPPER BODY. REST 10 SEC. 20 SECONDS OF AS MANY REPS AS POSSIBLE OF THE LOWER BODY. REST 10 SEC. 20 SECONDS OF AS MANY REPS AS POSSIBLE OF THE CARDIO # 2, 3, 4, 5, 6, 7 OR 9. COMPLETE 4-8 CYCLES.
- D. DO 45 SECONDS OF EACH SECTION. REST 1 MINUTE. REPEAT 3-5 ROUNDS.
- E. DOUBLE TABATA PROTOCOL- 40 SECONDS OF WORK OF THE UPPER BODY. REST 20 SEC. 40 SECONDS OF WORK OF THE LOWER BODY. REST 20 SEC. 40 SECONDS OF WORK OF THE CARDIO #1-7, 9 & 10. COMPLETE 4-6 ROUNDS.
- F. 3-5 ROUNDS- 8-12 REPS OF UPPER, LOWER AND 5 REPS OF TIRE FLIPS.
- G. LADDER- START AT 1 REP AND ASCEND BY 1 REP EVERY ROUND UP TO 10 FOR THE UPPER AND LOWER BODY EXERCISE. USE CARDIO #4, 6, 7, 8, 9 OR 10.
- H. 15 MINUTES AS MANY ROUNDS AS POSSIBLE OF 10 REPS OF UPPER AND LOWER BODY AND 20 REPS/STROKES OF CARDIO #1, 2, 4, OR 7.
- I. 20 MINUTES, AS MANY ROUNDS AS POSSIBLE OF 6 REPS OF UPPER, LOWER, AND CARDIO #6 OR 8.
- J. ATHLETE'S CHOICE. CHOOSE ANY TWO EXERCISES AND 1 CARDIO AND CREATE YOUR OWN SCHEME. TIME CAP IS 20 MINUTES.

3. After completion rest 3-5 minutes. Move on to Segment 4.

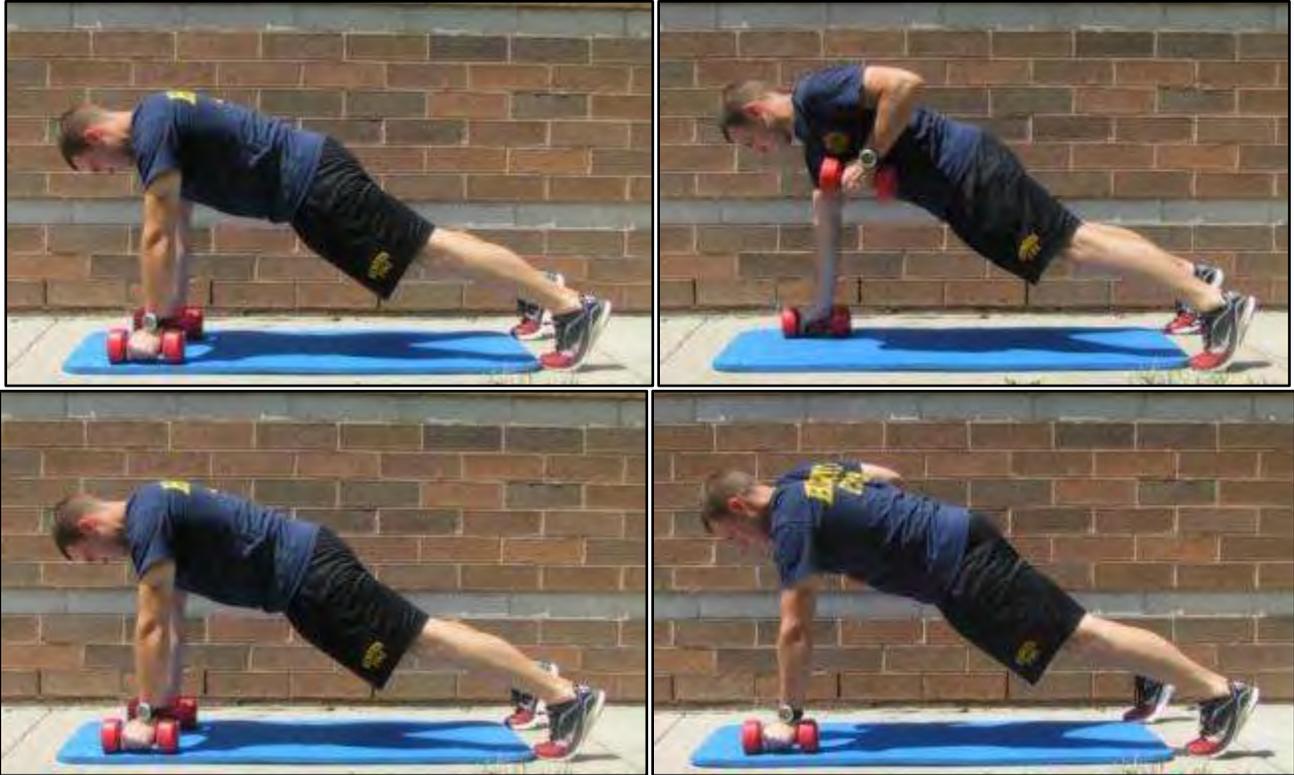
## Kettlebell Training

An effective training tool that vastly improves strength, endurance, mobility, flexibility, and body composition because of the dynamic and multi-directional movements it possesses.

# H.I.R.T. - SEGMENT 3

## UPPER BODY EXERCISE DESCRIPTIONS

### Plank Row



#### A. Preparation:

- i. Begin in a plank position with the legs wider than hip-width distance; the wider stance makes you more stable.
- ii. Hold onto the dumbbells, keeping the wrists locked to protect the joints.

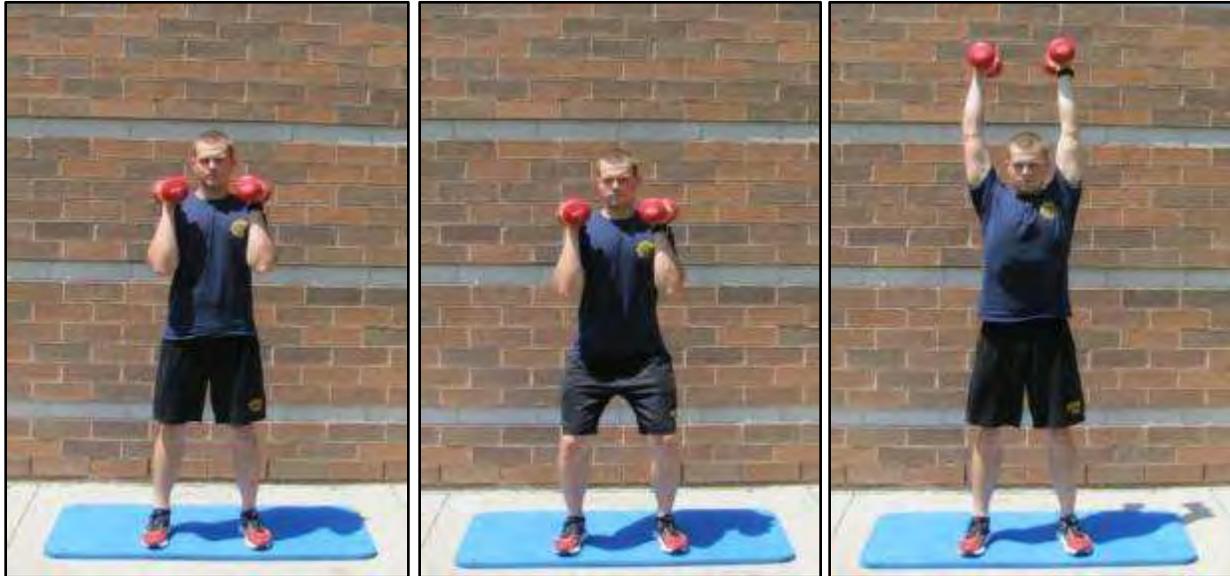
#### B. Movement:

- i. With the core tight and the glutes engaged, exhale, stabilizing the torso as you lift the right elbow to row; feel the right scapula sliding toward the spine as you bend the elbow up toward the ceiling.
- ii. While maintaining a neutral spine through the neck, return the weight to the floor and repeat the movement on the left side.
- iii. Repeat for the recommended number of repetitions.

### Dumbbell Training

Alternating arm exercises or single arm exercises put more emphasis on the core to help correct imbalances and weaknesses.

## Push Press Dumbbell Variation



## Kettlebell Variation



### A. Preparation:

- i. Position the feet hip-width apart and the DB/KB in the "rack" position; bent arms resting against the trunk and the palms toward the midline.

### B. Movement:

- i. Dip the lower body into a shallow squat.
- ii. Powerfully extend the lower body and shrug the shoulders to accelerate up.
- iii. Finish the movement by extending the arms overhead.
- iv. As the KB's center of mass shifts back overhead, the body weight should counterbalance forward.
- v. Absorb the descent with the lower body by bending the knees.
- vi. Repeat for the recommended number of repetitions.

## Alternating Floor Press (DB/KB) Dumbbell Variation



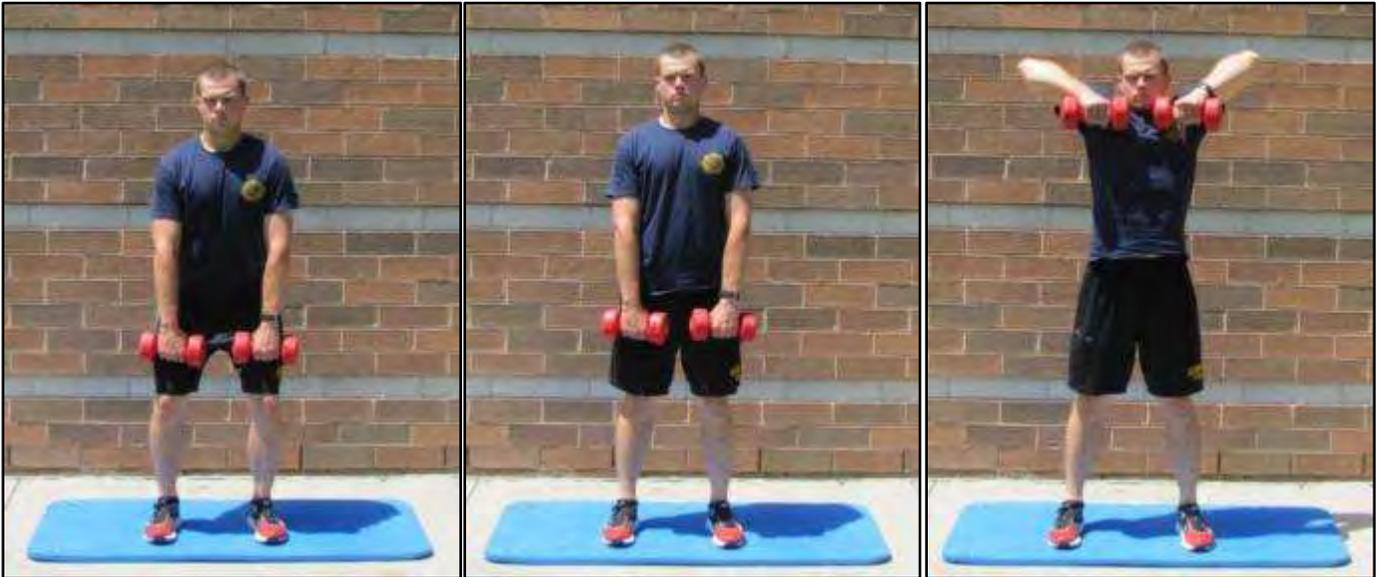
### A. Preparation:

- i. Lie face-up holding the dumbbells between 45- and 90-degrees away from the body. The knees can be straight or bent.
- ii. Begin with the dumbbells in the down position above the armpits with the elbows touching the floor.

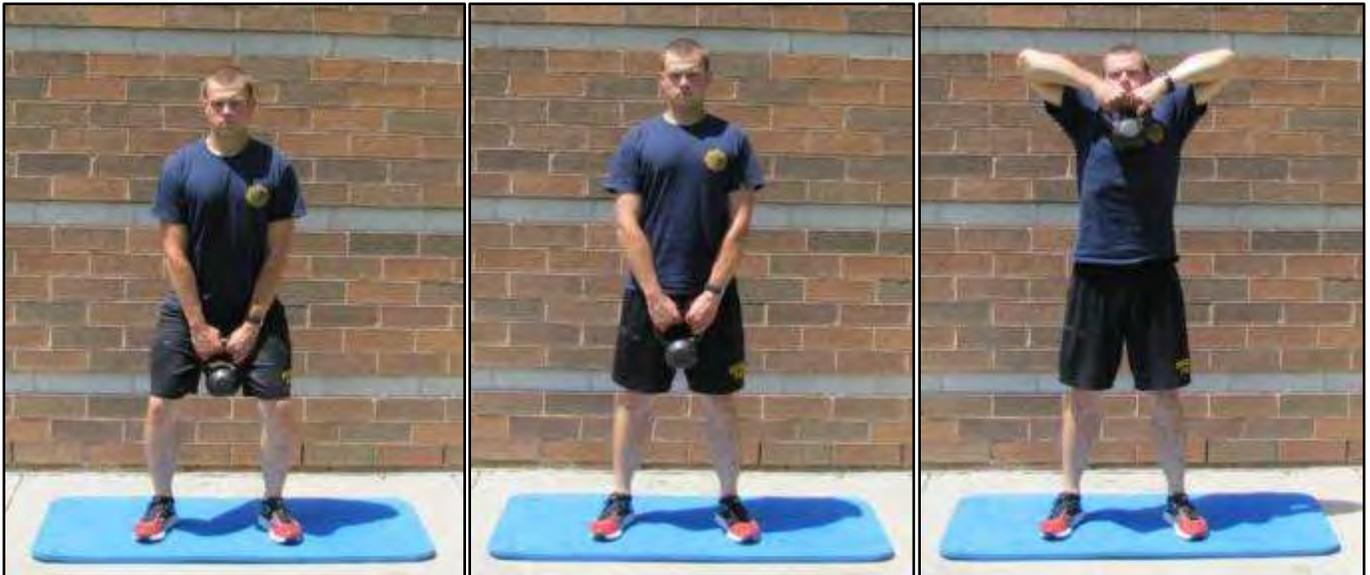
### B. Movement:

- i. Engage the core by flattening the back into the floor.
- ii. Push and extend one elbow straight up above the chest, while keeping the opposite arm down in the starting position.
- iii. As you lower the weight, simultaneously extend the other elbow so both dumbbells are moving at the same time. Be sure to keep the core engaged.
- iv. Be sure the upper arm comes in contact with the floor every time you lower the weight. Tuck the elbows for emphasis on triceps, or to focus on the chest- angle the arms to the side.
- v. Repeat for the recommended number of repetitions.

## Upright Row Dumbbell Variation



## Kettlebell Variation



### A. Preparation:

- i. Begin standing with the feet hip width apart and a dumbbell or a single kettlebell in each hand in front of the thighs with the palms facing in.

### B. Movement:

- i. Exhale and raise the dumbbells, bending the arms at the elbow up to chest height and keeping the elbows above the weight.
- ii. Pause and slowly lower the weights back down to the starting position.
- iii. Repeat for the recommended number of repetitions.

## Bent-Over Row Dumbbell Variation



## Kettlebell Variation



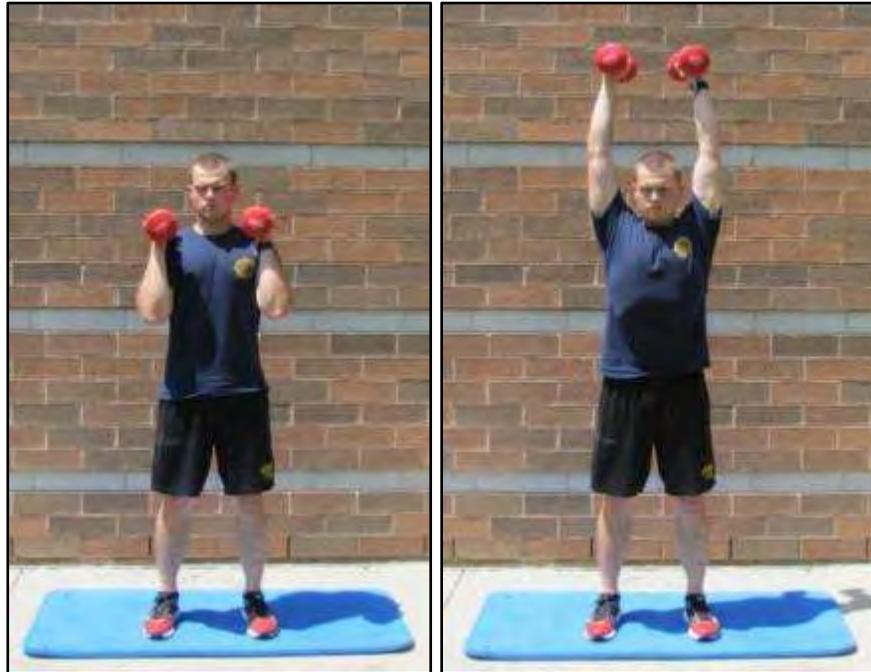
### A. Preparation:

- i. With a dumbbell or kettlebell in each hand (palms facing the torso), bend the knees slightly and bring the torso forward by bending at the hips.
- ii. As you bend forward make sure the core is engaged. Keep the back straight, until it is almost parallel to the floor.
- iii. The weights should hang directly under the shoulders as the arms hang perpendicular to the floor and the torso.

### B. Movement:

- i. While keeping the torso stationary, lift the dumbbells somewhere between the sides of the body and 90-degrees, and drive the elbows back. Exhale.
- ii. Squeeze the back muscles.
- iii. Slowly lower the weight again to the starting position as you inhale.
- iv. Repeat for the recommended number of repetitions.

## Shoulder Press Dumbbell Variation



## Kettlebell Variation



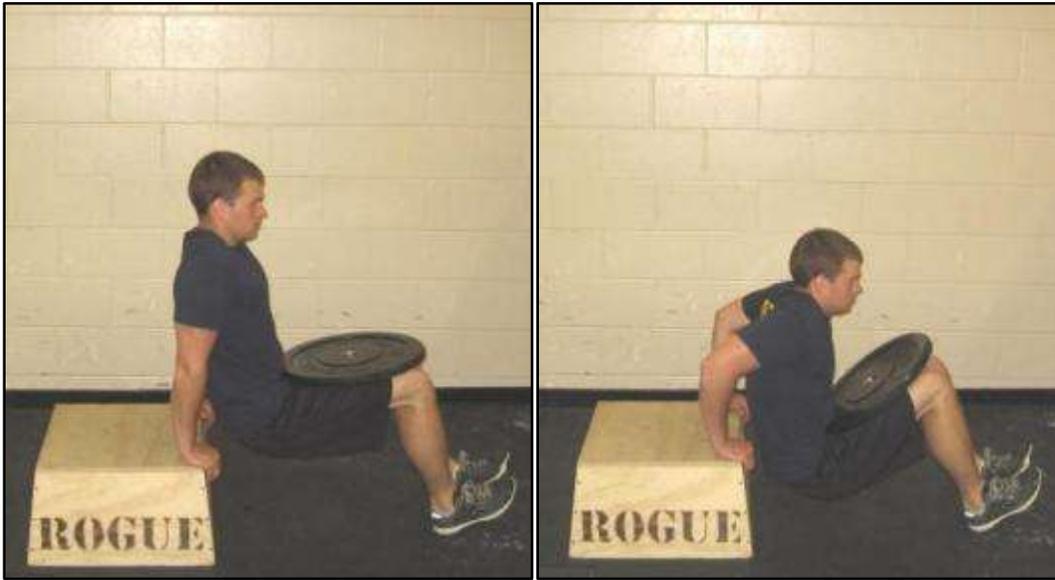
### A. Preparation:

- i. Begin with the feet shoulder-width apart and the dumbbells/kettlebells by the shoulders in the rack position, palms facing each other.
- ii. Maintain proper posture throughout the exercise with the shoulder blades retracted and depressed and the core engaged.

### B. Movement:

- i. Perform a shoulder press to full elbow extension above the head, keeping the shoulders stacked on the hips and the core engaged.
- ii. Return slowly to the starting position. You can also alternate the arms or do 1 arm at a time.
- iii. Repeat for the recommended number of repetitions.

## Weighted Dip



### A. Preparation:

- i. Sit on a bench. Place a weight on the thighs for added resistance.
- ii. Begin with the hands next to or slightly under the hips.
- iii. Lift up onto the hands and bring the hips forward.

### B. Movement:

- i. Bend the elbows (no lower than 90 degrees) and lower the hips down, keeping the hips very close to the bench. Keep the shoulders down.
- ii. Push back up without locking the elbows and repeat.
- iii. To make it easier, move the feet in. To make it harder, walk the feet out or elevate them on another bench or chair.
- iv. Repeat for the recommended number of repetitions.

## Weighted Push-up



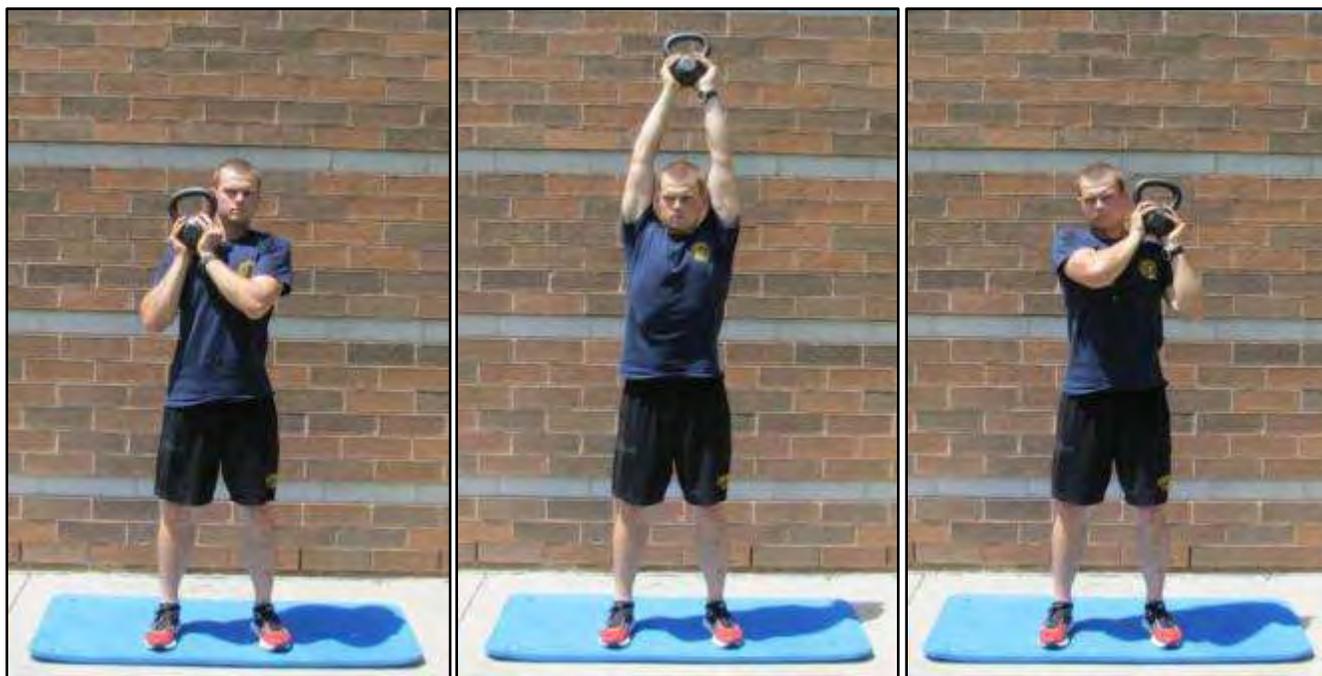
### A. Preparation:

- i. In a prone position, place the hands at a width that will allow the forearms to be perpendicular to the floor when the elbows are flexed at 90°.
- ii. Carefully place a plate on the upper back for added resistance.
- iii. Come into a plank position with the elbows extended; make sure the entire body is in a neutral position.

### B. Movement:

- i. Begin by flexing at the elbows. While maintaining a neutral spine, lower the body to the floor.
- ii. Push the body back to the starting position without postural compensation.
- iii. Repeat for the recommended number of repetitions.

## Shoulder-to-Shoulder Press



### A. Preparation:

- i. Using both hands, hold the kettlebell by its base slightly above the right shoulder.
- ii. Stand shoulder-width apart with core engaged.

### B. Movement:

- i. Lift the kettlebell directly over the head, fully extending the arms.
- ii. Lower the arms so that the kettlebell is now slightly above the left shoulder.
- iii. Repeat back to other shoulder.
- iv. Repeat for the recommended number of repetitions.

## Pull-up

(Variations: mixed grip, underhand, overhand, kipping, butterfly, weighted)



### A. Preparation

- i. Place the hands on the pull-up bar with the palms facing forward.
- ii. The grip width should be at least shoulder width apart with entire body hanging straight down.

### B. Movement:

- i. Draw the belly button inward toward the spine.
- ii. Maintaining optimal spinal alignment, in a controlled manner, pull the body upward. The shoulder blades should move downward and the will arms follow.
- iii. Only move for as far as you can maintain core stability. Return to the starting position.
- iv. The return motion must be controlled involving shoulder girdle upward rotation and elevation. Note: The return motion should be stopped just before the muscles relax.
- v. Do not allow head to “jet” forward.
- vi. Relax the arms as much as possible, placing the emphasis on the back muscles.
- vii. Do not round the back!
- viii. Common mistakes to avoid:
  - Raising the legs to help begin the pulling-up motion
  - Rotating the shoulders forward
  - Hunching up the shoulders by the ears (indicating possible weakness in lower-mid shoulder girdle musculature)
  - Arching low back and rocking body
- ix. Repeat for the recommended number of repetitions.

# H.I.R.T. - SEGMENT 3 LOWER BODY/COMBO

## EXERCISE DESCRIPTIONS

### Kettlebell Swing (1-arm)



### Kettlebell Swing (2-arm)



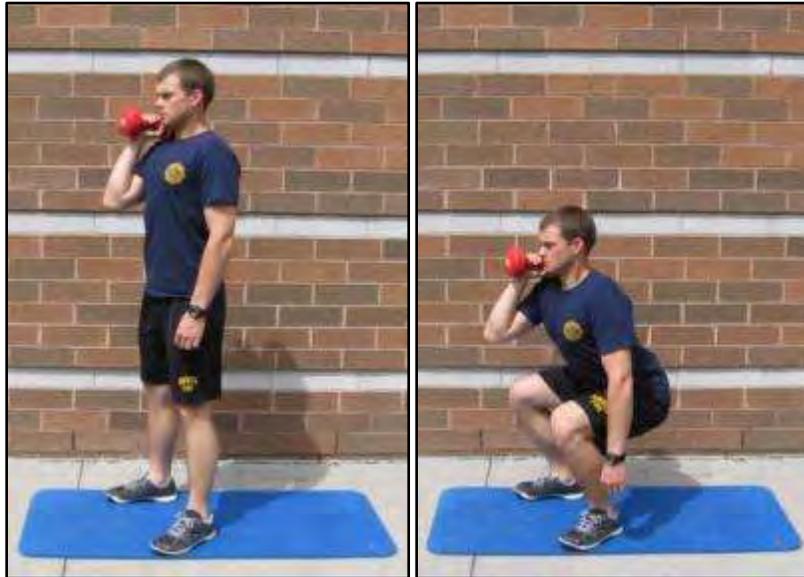
#### A. Preparation:

- i. Begin from a lowered squat position with hand either on one or both hands on the KB positioned between the legs.
- ii. Pull the KB back toward the thighs by rocking the bodyweight onto the heels.

#### B. Movement:

- i. Powerfully extend the lower body, driving through the hips to accelerate the bottom of the KB up and away. Be sure to keep the spine neutral.
- ii. As the KB ascends, counterbalance the forward pull of the KB by shifting the bodyweight back.
- iii. As the KB descends along the same pathway, absorb the KB force with the entire body by not allowing it to pull the chest down. Keep the momentum of the KB.
- iv. Repeat for the recommended number of repetitions.

## Offset Squat Dumbbell Variation



## Kettlebell Variation



### A. Preparation:

- i. Begin with the feet about shoulder-width apart and slightly turn toes out.
- ii. Hold a single weight in the racked position on one side of the body.
- iii. Stand upright with an engaged core, not allowing the weight to pull you to one side.
- iv. Keep the head up looking slightly above parallel.

### B. Movement:

- i. Keep the midsection very tight.
- ii. Send the butt back and down.
- iii. The knees should track over the mid-line of the foot.
- iv. Keep as much pressure on the heels as possible.
- v. Stop when the fold of the hip is below the knee—breaking parallel with the thigh.
- vi. Squeeze the glutes and hamstrings and rise without leaning forward or shifting balance.
- vii. Be sure to switch the weight to the other side in between sets to work both sides of the body.
- viii. Repeat for the recommended number of repetitions.

## Goblet Squats

### Dumbbell Variation



### Kettlebell Variation



#### A. Preparation:

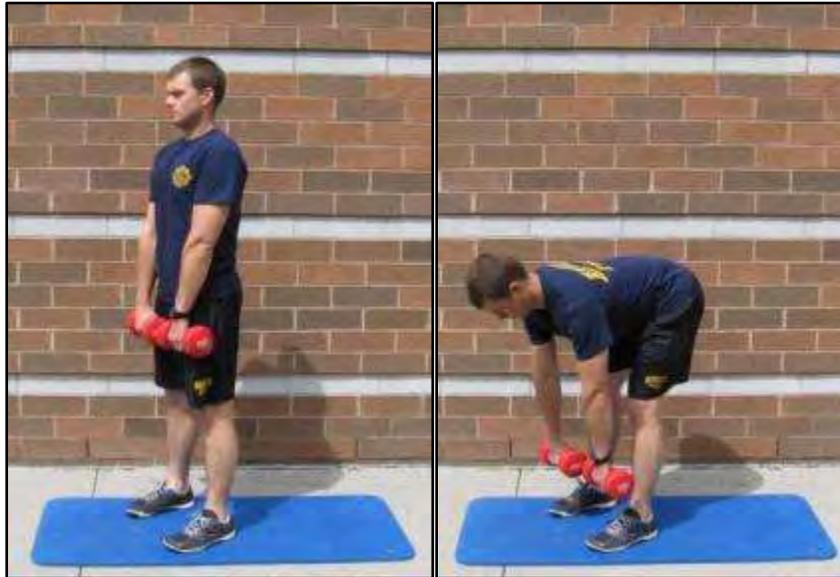
- i. Begin with the feet about shoulder-width apart and slightly turn toes out.
- ii. Hold a single weight under the chin with the elbows forming a triangular shape.
- iii. Stand upright with an engaged core, not allowing the weight to pull you forward.
- iv. Keep the head up looking slightly above parallel.

#### B. Movement:

- i. Keep the midsection very tight.
- ii. Send the butt back and down.
- iii. The knees should track over the mid-line of the foot.
- iv. Keep as much pressure on the heels as possible.
- v. Stop when the fold of the hip is below the knee— breaking parallel with the thigh.
- vi. Squeeze the glutes and hamstrings and rise without leaning forward or shifting balance.
- vii. Repeat for the recommended number of repetitions.

## Stiff-Legged Deadlift

### Dumbbell Variation



### Kettlebell Variation



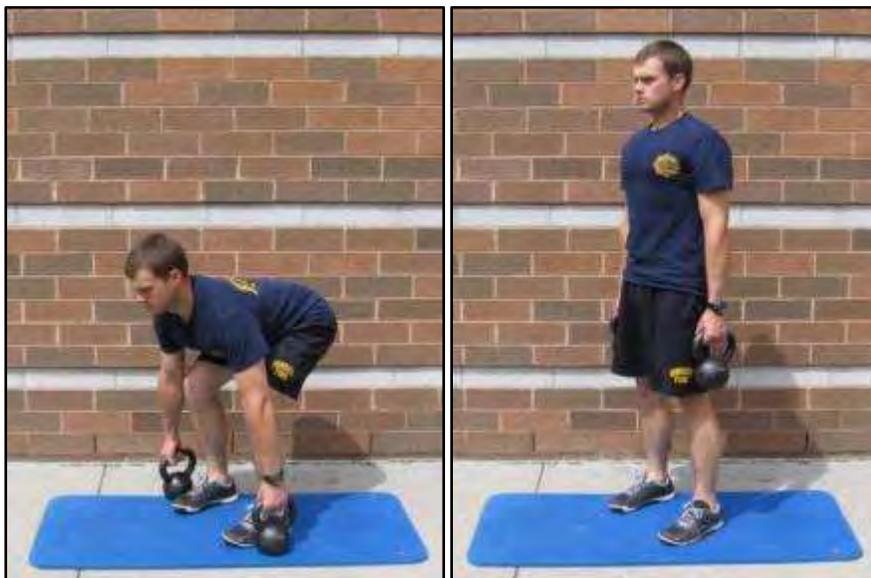
#### A. Preparation:

- i. Stand tall, retract scapulas and draw in navel toward the spine while squeezing glutes.
- ii. Maintain proper position to ensure that the hip, knee and toes are tracking in line.
- iii. The core must remain activated throughout the entire movement.
- iv. Do not allow flexion of the lower lumbar (rounding of the low back).

#### B. Movement:

- i. Keep the arms straight at all times.
- ii. Lower the weights down as deep as neutral spine angles can be maintained.
- iii. Maintain proper posture throughout the exercise with the shoulder blades retracted and depressed.
- iv. Ensure no compensations of the knees, ankles or hips.
- v. Return to the starting position, pushing through the glutes (to keep pressure off the lower back) and keeping the head and chest up, this will ensure that pressure is not placed solely on the lower back.
- vi. Inhale on the way down and exhale on the way up.
- vii. Repeat for the recommended number of repetitions.

## KB Deadlift



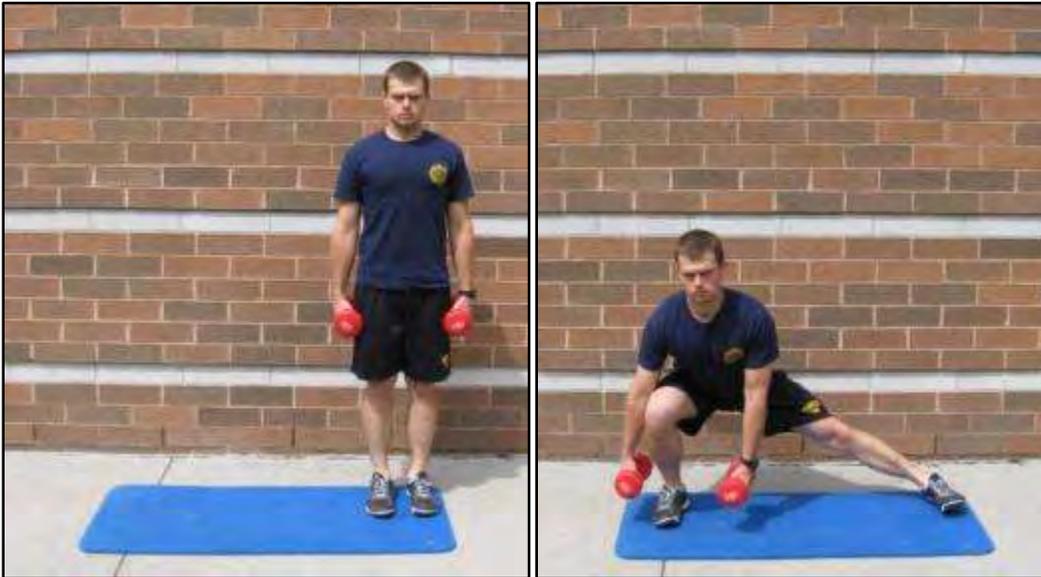
### A. Preparation:

- i. Stand with the feet between hip- and shoulder-width apart with the weight balanced in heels.
- ii. Keep the lower back arched with the lower lumbar curve locked in.
- iii. The shoulders should be slightly in front of the weight.
- iv. Place the kettlebells outside of the knees with the arms straight and palms facing each other.

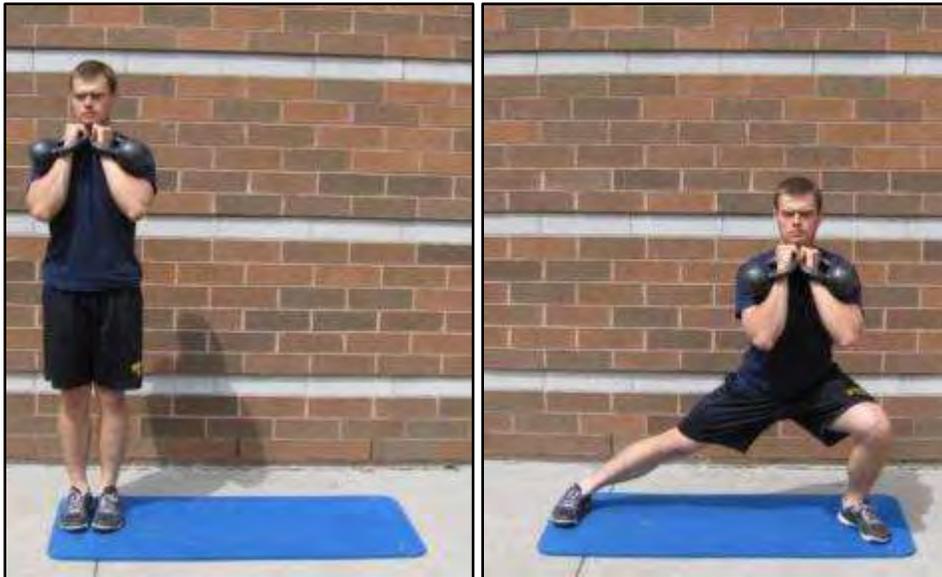
### B. Movement:

- i. Drive through the heels and extend the legs with the shoulders and hip rising at the same rate.
- ii. Be sure to maintain the low back arch.
- iii. Once the weight passes the knees, open the hips all the way up.
- iv. Keep the head neutral and looking forward. Come to a full extension at the hips so you are standing straight up.
- v. When returning back to the floor, push the hips back and shoulders slightly forward; delay the knee bend.
- vi. Return back to the starting position with the weights on the floor.
- vii. Repeat for the recommended number of repetitions.

## Side Lunge Dumbbell Variation



## Kettlebell Variation



### A. Preparation:

- i. Stand with the feet facing straight ahead about shoulder-width apart.
- ii. The hands are either by the shoulders in the starting position of an overhead press or by the sides of the thighs.
- iii. Be sure the spine is neutral with the core engaged.

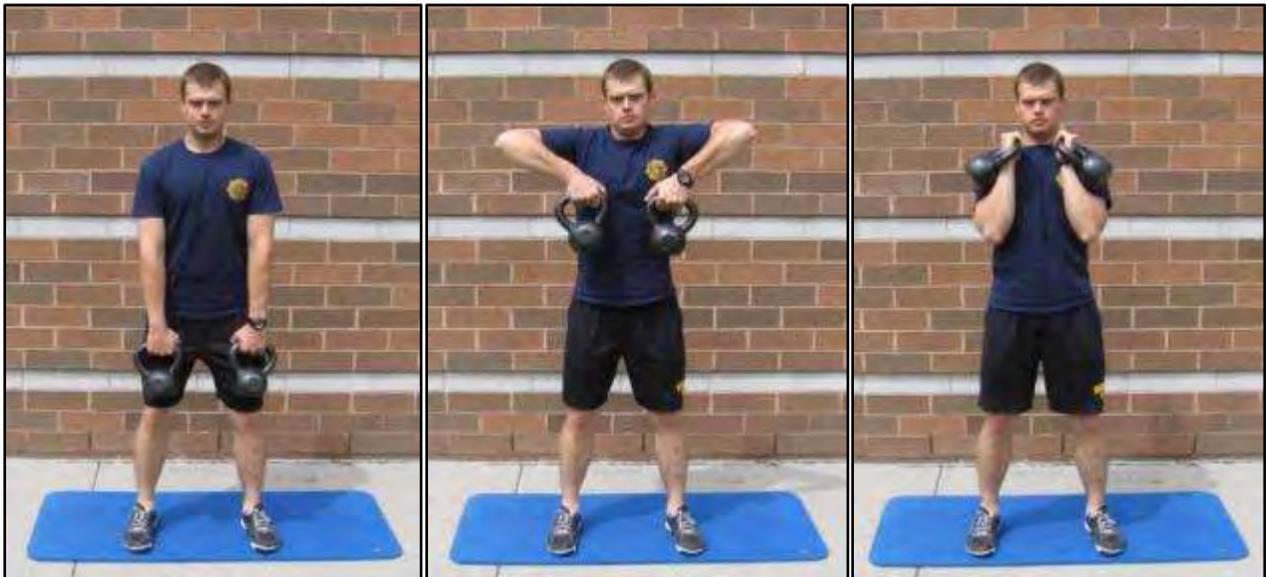
### B. Movement:

- i. Lunge laterally into the right leg with the foot slightly angled out.
- ii. Allow the hips to drift back and slightly flex at the hip joint.
- iii. Keep the right knee in alignment over the right ankle and reach the dumbbells down to either side of the lead foot while descending, maintaining integrity of the spine.
- iv. Keep the trailing leg straight.
- v. Ascend from the lunge and return to the starting position.
- vi. Repeat the entire movement for the opposite leg and continuously alternate sides.
- vii. Repeat for the recommended number of repetitions.

## Hang Clean Dumbbell Variation



## Kettlebell Variation



### A. Preparation:

- i. Begin from an athletic stance with hands on the dumbbell or kettlebell in front of the thighs.
- ii. Be sure the spine is neutral with the core engaged.

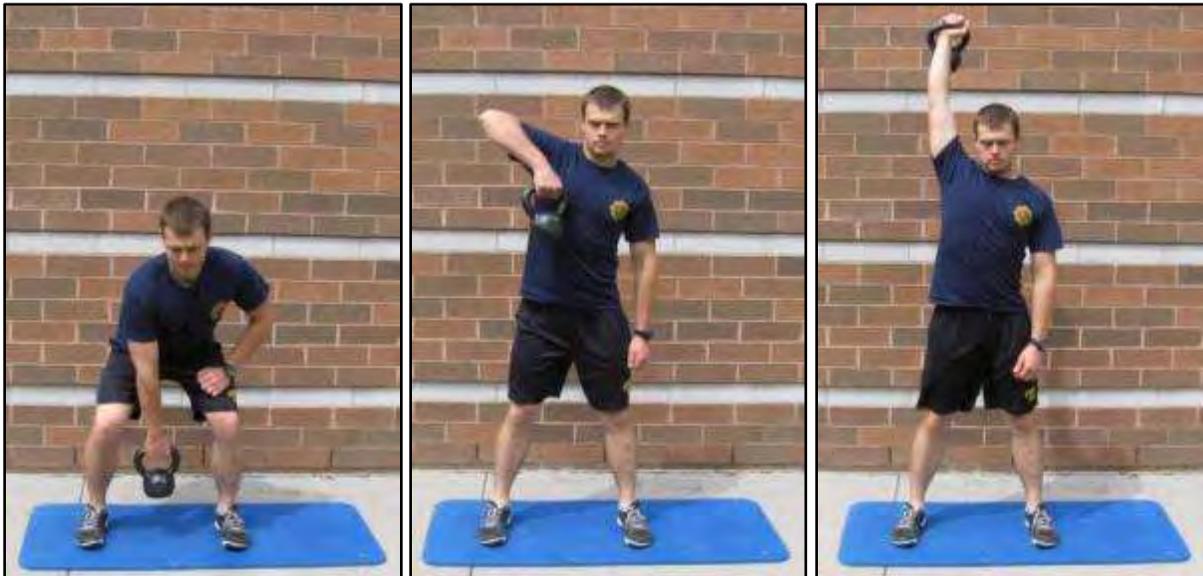
### B. Movement:

- i. Powerfully extend the lower body to accelerate the weight up.
- ii. Catch the weight in the racked position as shown.
- iii. Return to the starting position through the same pattern of movement and speed in the opposite direction, controlling the momentum and then using it to initiate the next repetition so as to develop a rhythmic timing.
- iv. Repeat for the recommended number of repetitions.

## Snatch (1-arm) Dumbbell Variation



## Kettlebell Variation



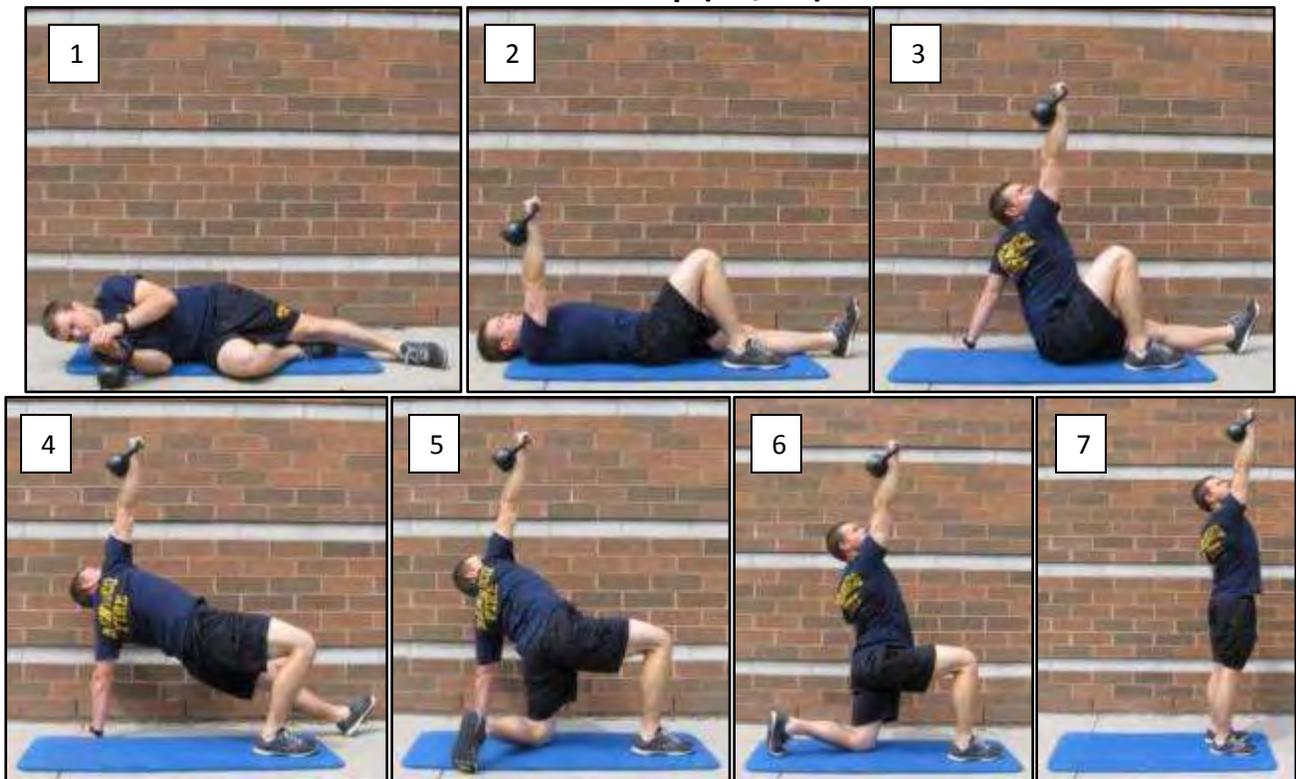
### A. Preparation:

- i. Stand with the feet shoulder-width apart and hold a kettlebell/dumbbell in one hand with the palm facing the body. The weight should be between the legs.
- ii. Be sure to keep the weight in the heels, core engaged and the spine neutral.

### B. Movement:

- i. Bend the knees and flex at the hips as if you are performing a kettlebell swing.
- ii. Once the weight has swung between the legs, pull it up explosively.
- iii. Driving with the hips, pull the weight up until the arm is fully extended and you're holding the weight above the head.
- iv. The final part of the movement is when the kettlebell rotates over the wrist and rests on the forearm.
- v. When lowering the weight, stay in control; don't allow the weight to pull you down.
- vi. Repeat the repetitions on the other side of the body.
- vii. Repeat for the recommended number of repetitions.

## Turkish Getup (KB/DB)



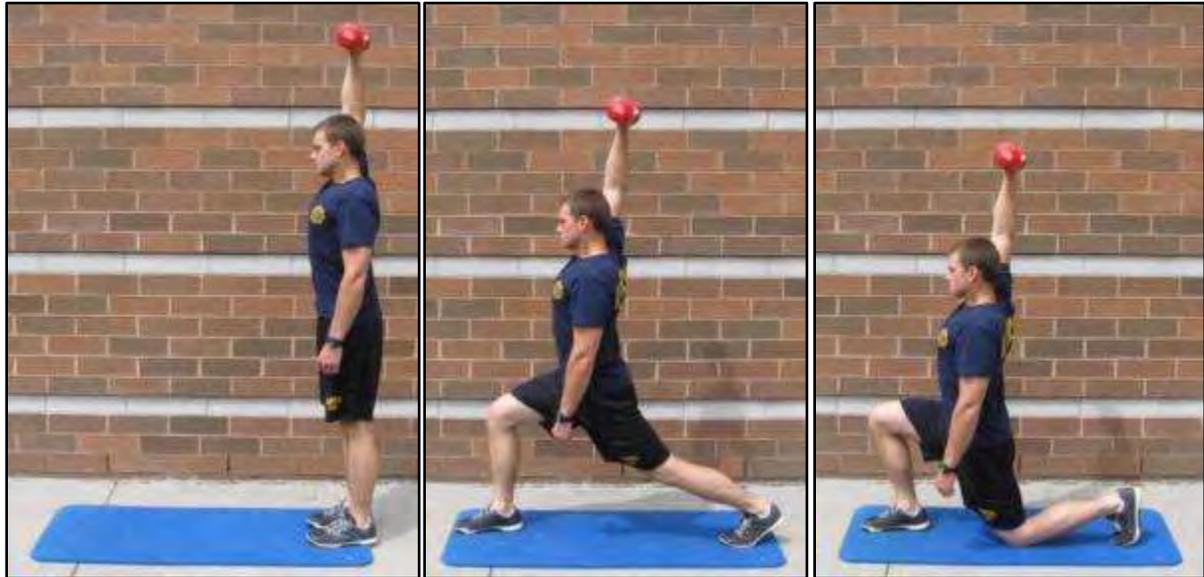
### A. Preparation:

- i. To begin, roll onto the right side toward the kettlebell and grab the kettlebell with two bent arms. (1)
- ii. Roll onto the back lying face-up, firmly gripping onto the kettlebell and press the weight up with right hand. (2)
- iii. Make sure the arms are fully extended vertical from the floor and elbows are locked, from this point onward, unless directed, the kettlebell will be held in this position.
- iv. Bend the right knee and plant the foot firmly onto the floor. (2)
- v. Keep the eyes on the kettlebell the entire movement to ensure stability.

### B. Movement:

- i. Lift the right shoulder off from the floor, sort of like doing a twisting ab crunch.
- ii. Twist until you have to support the weight onto the left elbow (which will be firmly on the floor.)
- iii. Pop off from the left elbow onto the hand, the hand should be slightly behind but out wide. (3)
- iv. Raise the butt and extend left leg off the floor. (4) With the weight balanced on the left hand and right leg, begin to pass the left leg underneath you, knee and toes on the floor, ending up in a lunge position. (5 & 6)
- v. Stand up, hold the position, and then reverse the process to sit back down. (7)
- vi. Be sure to keep the kettlebell pressed up overhead with elbows locked out.
- vii. Repeat for the recommended number of repetitions.

## Overhead Lunge 1-arm Dumbbell Variation



## Kettlebell Variation



### A. Preparation:

- i. Stand upright with the feet shoulder-width apart.
- ii. Stand in proper alignment and press the weight directly overhead with the elbow locked out.

### A. Movement:

- i. From optimal postural alignment, draw the lower abdomen inward toward the spine.
- ii. While maintaining optimal spinal alignment, step forward about 3-feet and descend slowly by bending at the hips, knees and ankles.
- iii. During the descent, maintain weight distribution between the front heel and mid-foot.
- iv. Do not allow the feet to cave inward or shift outward.
- v. Perform downward reps slowly and concentrate on the descent and the alignment of the body.
- vi. Only descend down as far as you can without compensating form.
- vii. Keep upper torso erect and do not lean forward. Be sure to keep the weight pressed up.
- viii. Push through the front heel and stand back up to the starting position. Alternate sides.
- ix. Repeat for the recommended number of repetitions.

# H.I.R.T. - SEGMENT 3

## CARDIO EXERCISE DESCRIPTIONS

### Mountain Climber Sprawl



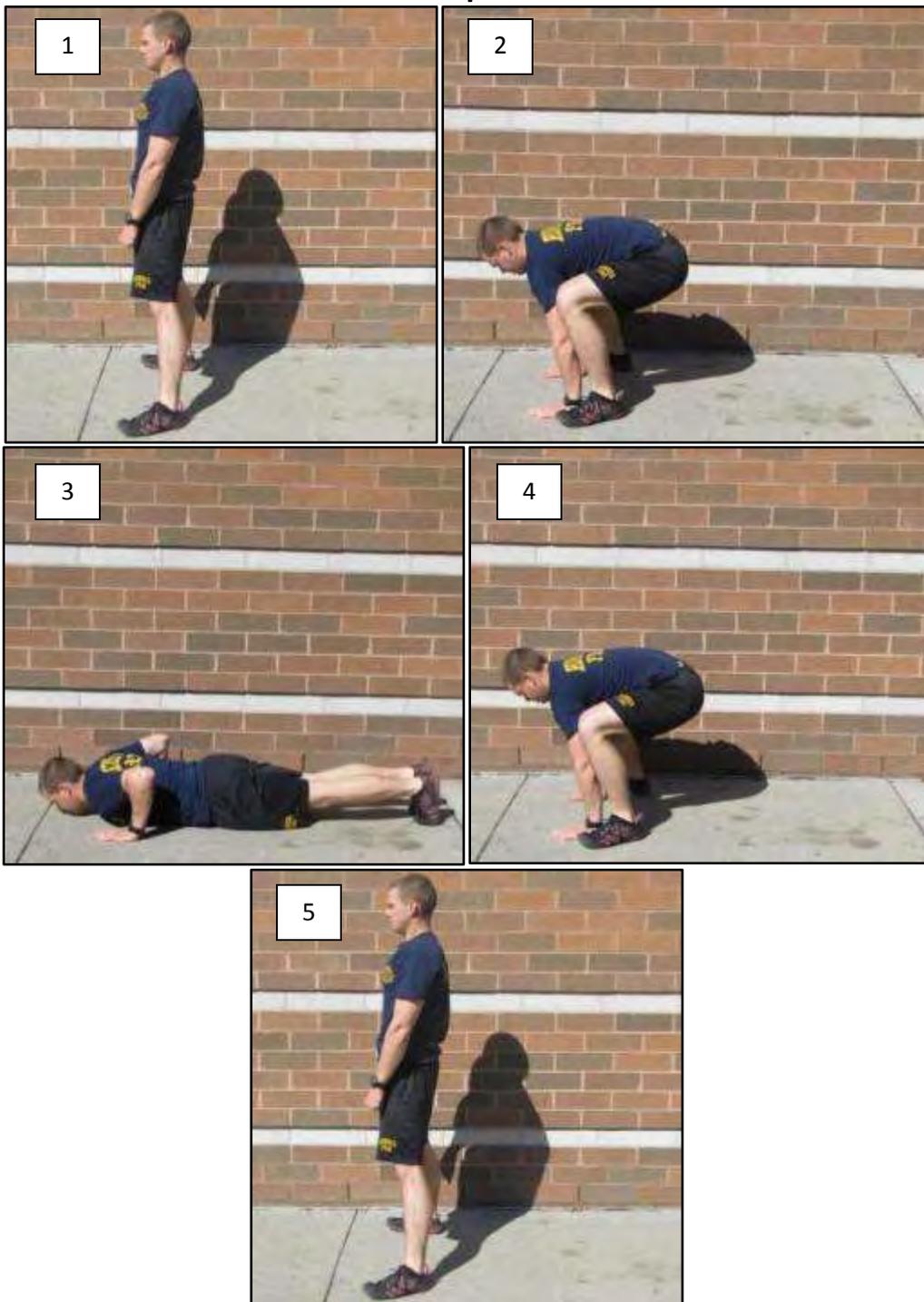
**A. Preparation:**

- i. Stand with the feet shoulder-width apart and spine in proper alignment.

**B. Movement:**

- i. Descend toward the floor like performing a squat, but instead place the hands on the floor to the inside of the feet.
- ii. With the core engaged extend one leg back and straighten it out.
- iii. Jump that same leg back in and jump the other leg back extending it fully.
- iv. Bring the extended leg back to the outside of the hand.
- v. Stand up and return to the starting position.
- vi. Repeat for the recommended number of repetitions.

## Burpee



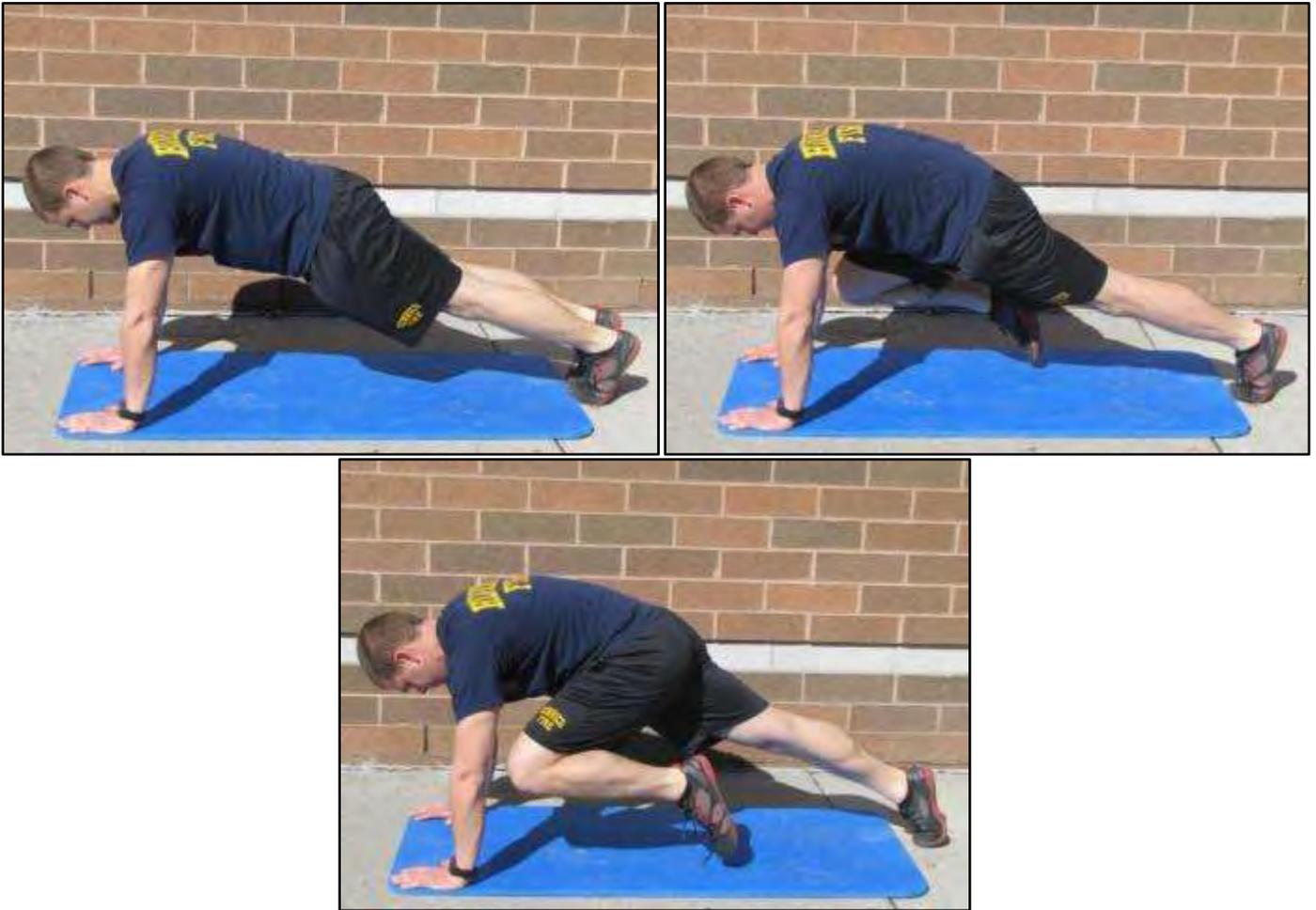
### A. Preparation:

- i. Stand with the feet shoulder-width apart and the spine in proper alignment.

### B. Movement:

- i. Quickly drop the chest to knees, place the hands outside of the feet. Extend to a push-up position by kicking the legs out into full extension.
- ii. Drop the chest to the floor, as to perform a push-up.
- iii. Quickly hop feet back under the body and go right into the squat position again.
- iv. Jump to a standing position. Perform repetitions as quickly and controlled.
- v. Repeat for the recommended number of repetitions.

## Mountain Climbers



### A. Preparation:

- i. Get into the push-up position with the hands directly under the shoulders.
- ii. The feet should be hip-to-shoulder width apart.
- iii. Before the movement begins, optimal postural alignment and core engagement is mandatory.

### B. Movement:

- i. While maintaining core engagement, flex the hip and drive one knee toward the chest bringing the toes off the floor momentarily.
- ii. Tap the toe before extending the leg back out.
- iii. As you extend the leg back out, simultaneously begin to move the other leg so that both legs are moving at the same time.
- iv. Be sure the hips do not rise above shoulder-height during the movement.
- v. Repeat for the recommended number of repetitions.

## Sledgehammer-To-Tire Hit



### A. Preparation:

- i. This exercise is performed with a sledgehammer and a tire.
- ii. Grip the sledgehammer with one hand about 4 inches away from the head and the other at the bottom of the handle.

### B. Movement:

- i. Pull the sledgehammer above the head, as if you're holding it upright.
- ii. Forcefully swing it down to make contact with the tire.
- iii. You may prefer to switch the grip area of the top hand during the swing. You can slide the hand down the shaft of the hammer to end up near the bottom hand when the hammer strikes the tire.
- iv. After hitting the tire, return to the original position and pre-hit grip.
- v. Repeat for the recommended number of repetitions.

## Sledgehammers

This directly translates into work performance. Its benefits include grip strength, core strength, power, work capacity, speed and agility.

## Bear Crawl



### A. Preparation:

- i. Get on both hands and knees.
- ii. Lift the knees off the floor so they are hovering just above the floor.

### B. Movement:

- i. Keeping the knees only an inch from the floor, crawl forward.
- ii. Keep both knees inside the elbows, and prevent the hips from swaying side to side.
- iii. Crawl for the specified distance.

## Tire Flip



### A. Preparation:

- i. Place a tire on the floor in front of you.
- ii. Stand with a wider-than-deadlift stance with the feet angled out and the body close to the tire.
- iii. Place the hands under the tire to prepare to lift.
- iv. Keep the lower back arched with the lower lumbar curve locked in.

### B. Movement:

- i. Drive through the heels and extend the legs with the shoulders and hip rising at the same rate.
- ii. Be sure to maintain the low back arch.
- iii. As you lift the tire and extend the hips so the hips open up, be sure to keep the body close to the tire. When you are fully extended at the hip you should be close to the tire.
- iv. Once you are extended at the hips, simultaneously step one leg forward and push the tire forward so you are driving the force through the tire.
- v. Push the tire down like a chest press.
- vi. Repeat for the recommended number of repetitions.

## Battle Ropes



Battle ropes increase total body strength and conditioning. More importantly they are awkward, which can translate to work performance duties.

### 1. Preparation:

- Be sure to wrap/tie the battle rope to a secured hook or sled to ensure safety when using the rope.
- To effectively use the rope, it is important to remember to keep the core engaged and the body rigid so the rope does not pull you around, but rather you stay in control of the rope.

### 2. Movements:

#### A. Alternating Up/Down Waves

- i. Stand in an athletic stance. Tightly grip the rope and in an alternating motion, pull the rope up and push down fast, creating small waves.

#### B. Double Up/Down Waves

- i. Stand in an athletic stance. Tightly grip the rope, and pull up and push down simultaneously, creating small and fast waves.

#### C. Side-to-Side Waves

- i. Stand in an athletic stance. Tightly grip the rope, and pull both sides of the rope outward (like you are ripping them apart), and then rapidly pull them back together creating small, fast side-to-side waves.

#### D. Outward Circle Waves

- i. Stand in an athletic stance. Tightly grip the rope, and simultaneously create small outward circles so that the hands are going in opposite directions. The left is counter-clockwise and the right is clockwise.

#### E. Inward Circle Waves

- i. Stand in an athletic stance. Tightly grip the rope, and simultaneously create small inward circles so that the hands are going in opposite directions. The left is clockwise and the right is counter-clockwise.

#### F. Jumping Jack Waves/Star Jumps

- i. Stand in an athletic stance. Tightly grip the rope, and perform a jumping jack so that the rope is pulled up to shoulder height and the feet open. Then jump the feet together while simultaneously pulling the rope down in a slam manner to the floor.

#### G. Rope Slams

- i. Stand in an athletic stance. Tightly grip the rope, and powerfully pull the rope up and push down so the rope creates big waves and strikes the floor with much force.

## 200m, 300m, or 400m Run

Mark out 200, 300 or 400 meters. Use this distance for the run during the cardio portion of the workout.

### Suicide Run



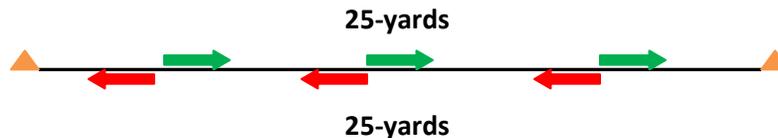
#### A. Preparation:

- i. Setup four cones so they are spaced out 5 to 10 yards between each other (totaling 15 to 30 yards between start and finish).
- ii. Stand at the first cone in a sprint stance.

#### B. Movement:

- i. Run as fast as you can to the first cone, turn around back to the start cone.
- ii. Quickly tag the cone and run to the second cone.
- iii. Turn around back to the start cone.
- iv. Finally run back to the last cone as fast as you can then quickly turn around and sprint through the first cone.
- v. This should be completed as fast as possible.

### 100-yd Shuttle Run (4x25 yds)



#### A. Preparation:

- i. Setup two cones 25 yards apart.
- ii. Stand at the first cone in a sprint stance.

#### B. Movement:

- i. Run as fast as you can to the 25-yard cone.
- ii. Quickly turn around back to the start cone.
- iii. Repeat one more time, so you cover a total distance of 100 yards.
- iv. This should be completed as fast as possible.

## Long & Slow Cardio vs. High-Intensity Intervals

Both are beneficial in improving cardiovascular endurance. In fact, you should have a mixture throughout the week if you are doing cardio more than 3x/week. Intervals are great for speed training, agility, increased mitochondria size, and increased metabolic rate. Try adding long and slow sessions in between the high-intensity days for a healthy balance.

# CORE & ABS SEGMENT 4

This will be completed after completion of segment 3. You will choose only 3 of the exercises to work on during the core portion of the workout.

**A. Choose 3 of the following to complete:**

CORE EXERCISES:
BUTTERFLY SIT-UP
V-UP
PRONE SUPERMAN
BICYCLE CRUNCH
PLANK WALK
FLUTTER KICKS
HOLLOW ROCKS
SCUBA SITUPS
LEG RAISE
PLANK (USE VARIATIONS)
SUPERMAN PLANK (ON HANDS)
WINDSHIELD WIPERS
RUSSIAN TWIST
SIDE PLANK (USE VARIATIONS)
BREAKDANCE PLANK
HANGING KNEE RAISE/KNEES-TO-ELBOW

**B. Choose the rep scheme:**

**CHOOSE ONE OF THE FOLLOWING TO USE FOR THE CORE WORKOUT:**

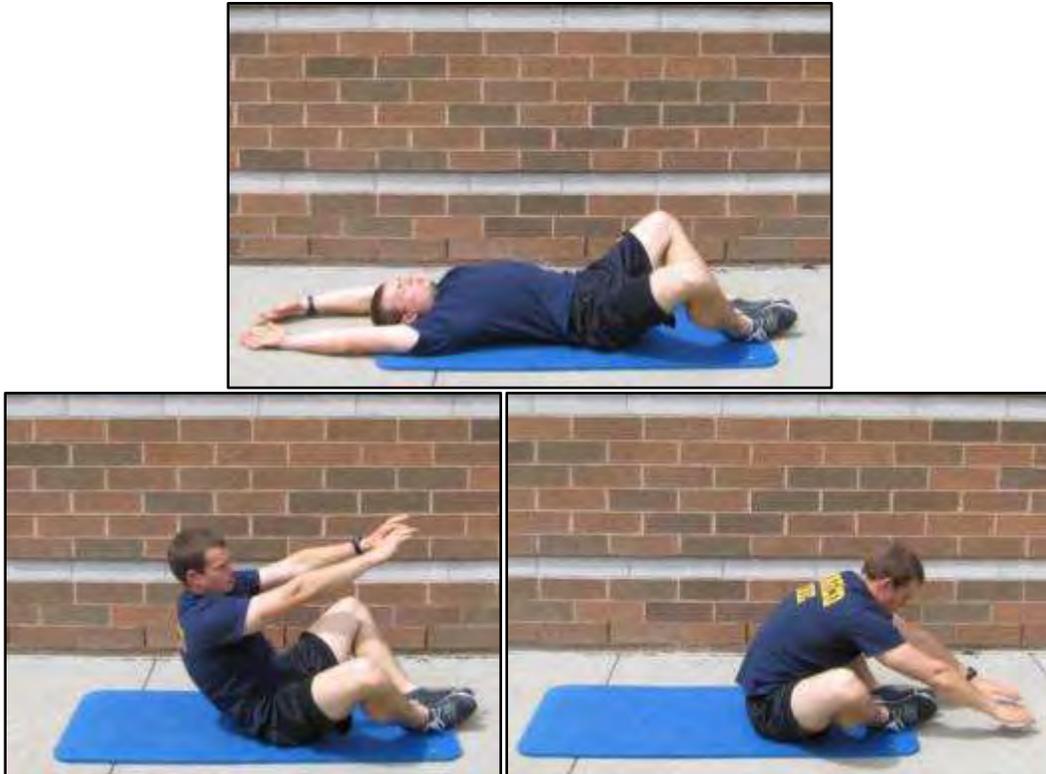
- A. TABATA PROTOCOL- CYCLE THROUGH THE EXERCISES USING 20 SECONDS OF WORK, 10 SECONDS REST FOR 6 TO 9 MINUTES.
- B. DOUBLE TABATA PROTOCOL- CYCLE THROUGH THE EXERCISES USING 40 SECONDS OF WORK, 20 SECONDS OF REST FOR 6 TO 9 MINUTES.
- C. 2 ROUNDS- 25 REPS EACH
- D. 3 ROUNDS- CYCLE THROUGH EACH FOR 1 MINUTE, 0-15 SECONDS OF REST BETWEEN EACH.
- E. 2 MINUTES OF EACH
- F. 1 ROUND- 50 REPS EACH
- G. 3 ROUNDS- CYCLE THROUGH EACH FOR 30 SECONDS, 0-15 SECONDS OF REST BETWEEN EACH.

**C. Rest 1-2 minutes. Move on to Segment 5.**

# CORE & ABS

## SEGMENT 4 EXERCISE DESCRIPTIONS

### Butterfly Sit-up



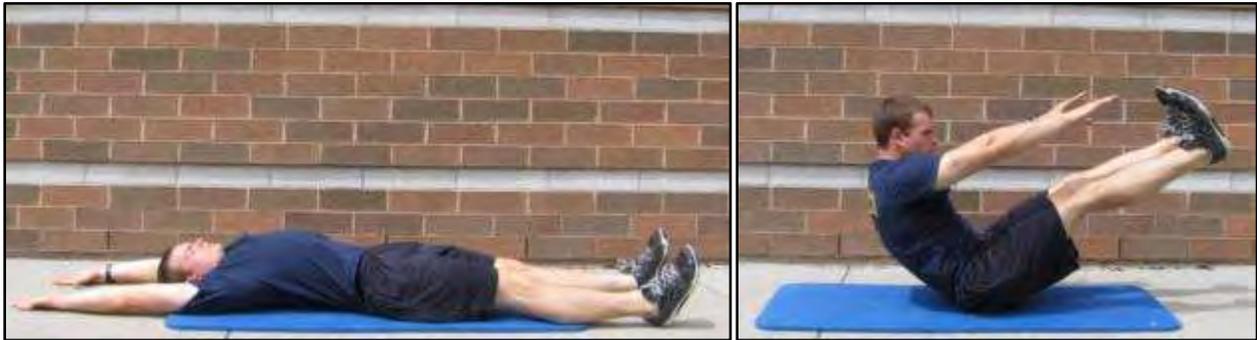
#### A. Preparation:

- i. Lie on the floor face-up with the arms overhead and the soles of the feet together so the legs are open like the butterfly stretch.
- ii. Before movement begins, be sure to properly engage the core and rotate the pelvis so the back is flat against the mat.

#### B. Movement:

- i. Powerfully throw the weight of the body and arms forward so you come up from the lying position to the seated position.
- ii. Touch the floor or the feet.
- iii. Keep the abs tight and return back to the starting position so the shoulder blades touch the floor.
- iv. Repeat for the recommended number of repetitions.

## V-Up



### A. Preparation:

- i. Lie on the floor face-up.
- ii. Stretch the arms out straight behind the head.

### B. Movement:

- i. Simultaneously flex at the hips and curl the abs to raise the legs and torso off the floor.
- ii. Bring the hands to meet the feet.
- iii. Ensure the arms and legs remain straight throughout the movement.
- iv. Pause at the mid-point and then return back to the starting position.
- v. Repeat for the recommended number of repetitions.

## Superman



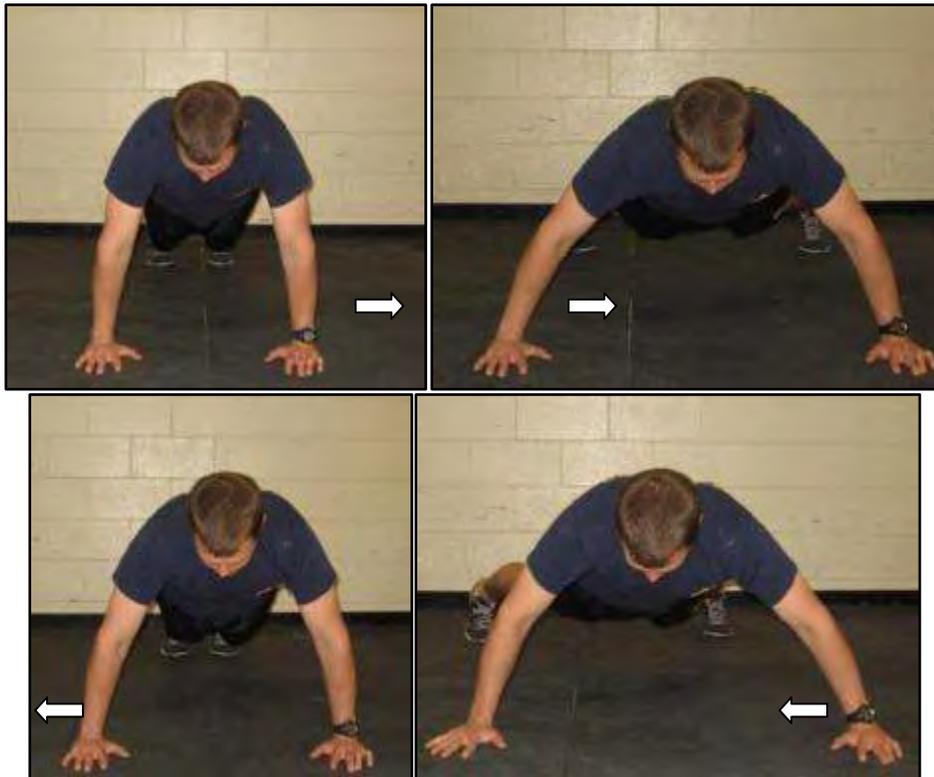
See the Level 1 Program for review on the preparation and movement directions, p. 38.

## Bicycle Crunch



See the Level 1 Program for review on the preparation and movement directions, p. 51.

## Plank Walk



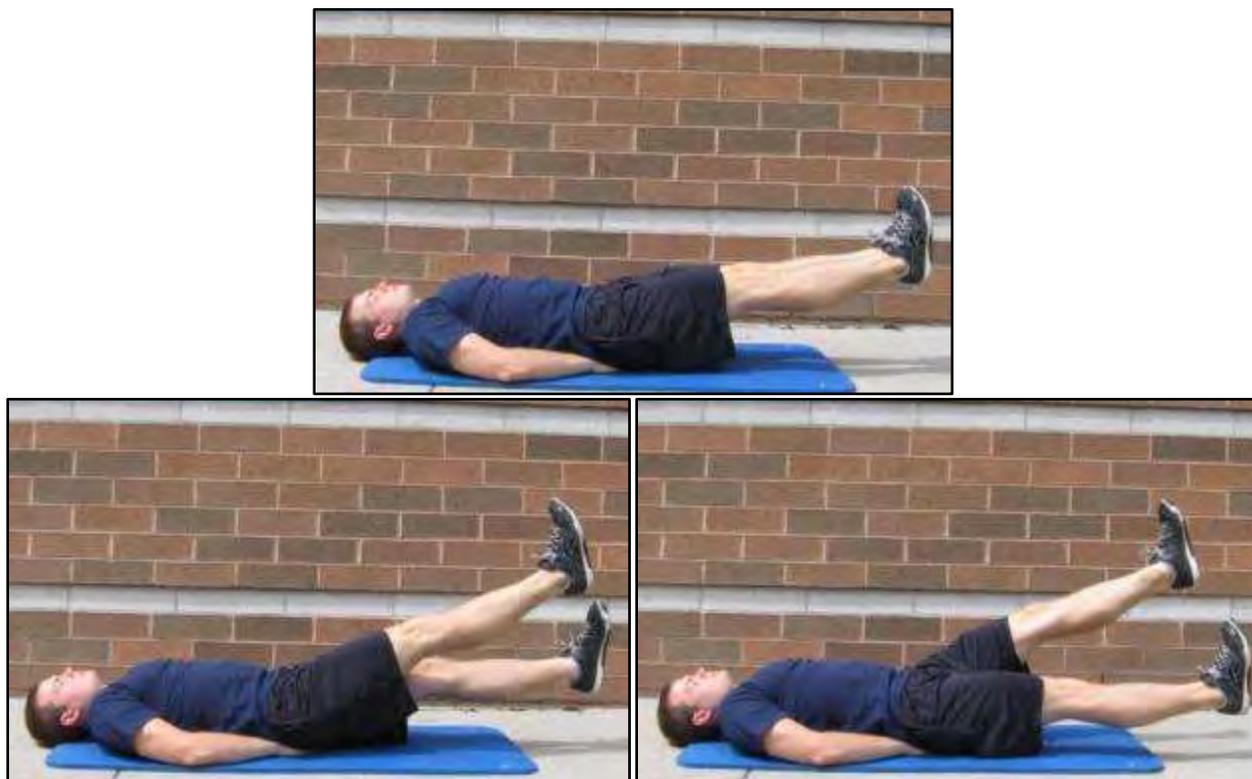
### A. Preparation:

- i. Assume the plank position on the hands, just like the push-up position.
- ii. Be sure the back is straight and core engaged.

### B. Movement:

- i. Simultaneously move the left hand and left leg out away from the body so the legs and arms are open.
- ii. Quickly follow the right hand and right leg to close, so you are back to the starting position.
- iii. Repeat to the other direction and continue to go left 1 step, right 1 step.
- iv. Repeat for the recommended number of repetitions.

## Flutter Kicks



### A. Preparation:

- i. Lie on the floor face-up with legs extended straight.
- ii. Place the hands under the upper glutes/low back area for pressure control and to keep the low back from rounding. (this may not be needed)
- iii. Properly engage the core and rotate the pelvis so the pressure is placed into the floor or the hands so the back is flat.

### B. Movement:

- i. Lift both legs 6 to 12 inches off the floor, and keep the legs straight.
- ii. Begin to flex at the hips with small quick kicks.
- iii. Alternate the legs so one is moving up and the other is moving down simultaneously.
- iv. Be sure to keep the core engaged and to not allow the back to excessively arch.
- v. Repeat for the recommended number of repetitions.

## Hollow Rocks



### A. Preparation:

- i. Lie on the floor face-up with the legs out straight and arms overhead.
- ii. Properly engage the core and rotate the pelvis so the pressure is placed into the floor so the back is flat.

### B. Movement:

- i. Lift the arms, head and legs slightly off the floor. This is the hollow position.
- ii. Assume this hollow position throughout the entire movement, but while rocking.
- iii. Using momentum, rock forward so the heels touch the floor.
- iv. Then rock backward so the back touches the floor again and touch the floor with the hands. That is one rep.
- v. Be sure to keep the core engaged and to not allow the back to excessively arch.
- vi. If there is too much pressure in the lower back during the movement, slightly close the hollow position so the arms and legs are closer to each other, rather than being further apart.
- vii. Repeat for the recommended number of repetitions.

## Scuba Situps



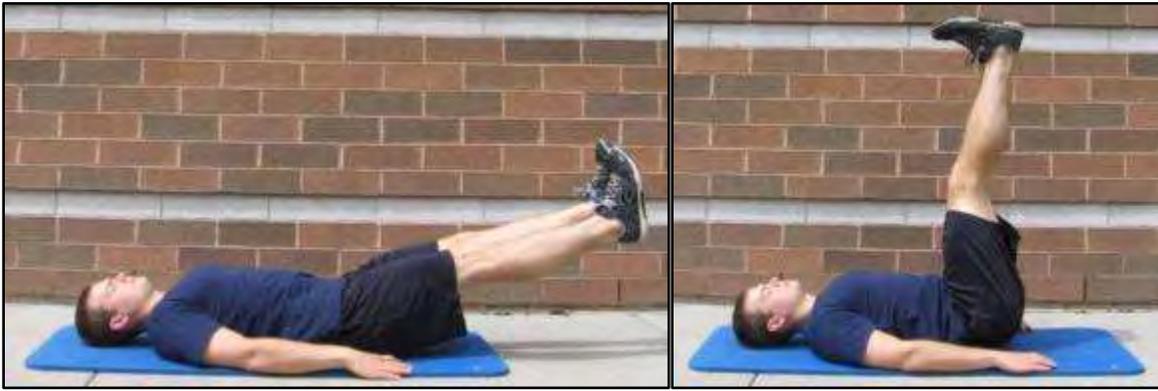
### A. Preparation:

- i. Lie on the floor face-up with the legs bent with the feet flat on the floor and the arms by the sides of the body.
- ii. Properly engage the core and rotate the pelvis so the pressure is placed into the floor so the back is flat.

### B. Movement:

- i. Simultaneously flex at the hips and curl the abs to raise the knees and torso off the floor.
- ii. As you sit up bring the knees to the chest where you can balance on the glutes.
- iii. Pause at the mid-point and then return back to the starting position, keeping the core engaged.
- iv. Do not lie back flat on the floor.
- v. Return to where the shoulder blades touch the floor and the legs are kicked straight out.
- vi. Repeat for the recommended number of repetitions.

## Leg Raise



### A. Preparation:

- i. Lie on the floor face-up with the legs straight and arms by the sides of the body.
- ii. Properly engage the core and rotate the pelvis so the pressure is placed into the floor so the back is flat.

### B. Movement:

- i. Keeping the legs straight, flex at the hips so you lift the legs to make a 90-degree angle, and the legs are perpendicular to the floor.
- ii. Pause at the midpoint and then return back to the starting position, keeping the core engaged as you lower the legs.
- iii. If pressure in the lower back is felt, place the hands under the lower back or upper glutes for pressure control.
- iv. Repeat for the recommended number of repetitions.

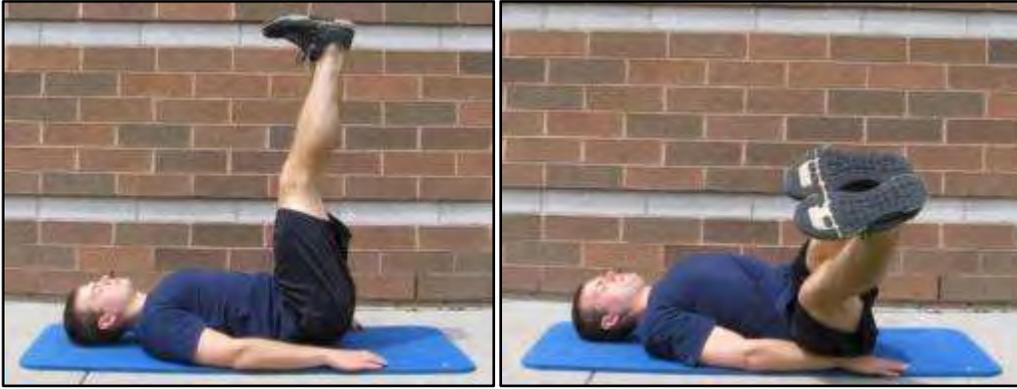
## Plank Hold Variations

Use any variation found in the Level 1 program, pp. 29, 43, 52, and 54.

## Superman Plank (on hands)

See the Level 1 Program for review on the preparation and movement directions, pp. 41 and 55.

## Windshield Wipers



### A. Preparation:

- i. Lie on the floor face-up with the legs straight and arms by the sides of the body.
- ii. Properly engage the core and rotate the pelvis so the pressure is placed into the floor so the back is flat.

### B. Movement:

- i. Extend the legs straight together in the air, at a 90-degree angle.
- i. While making sure to keep the legs together shoulders down, and core stabilized, lower the feet and legs to the floor by slowly lowering both legs to the right side.
- ii. Return legs to original upright position (perpendicular to the body).
- iii. Rotate torso (while together) to the opposite, left, side.
- iv. Repeat for the recommended number of repetitions.

## Russian Twist



### A. Preparation:

- i. Begin in a seated position with a KB in the hands and knees bent.
- ii. Properly engage the core and anteriorly rotate the pelvis so the pressure is placed into the floor so the back is flat.
- iii. Sit up until there is a 90° angle at the hip (the torso will be around 45° to the floor)
- iv. Hold the weight close to the chest.
- v. Lift the feet off the floor.

### B. Movement:

- i. Keep the lower body still and move the weight to one side of the body.
- ii. Twist with the abs and back until the right shoulder is pointing forwards (or as far as you can go).
- iii. Turn back to the other direction with the weight.
- iv. Repeat for the recommended number of repetitions.

## Side Plank Variations

Use any variation found in the Level 1 program, pp. 28, 40, 54, and 58.

## Breakdance Plank



### A. Preparation:

- i. Begin in the push-up position with hands directly under the shoulders.
- ii. The feet should be shoulder-width apart for better support.
- iii. Before the movement begins, optimal postural alignment is mandatory.

### B. Movement:

- i. Draw the lower abdomen inward toward the spine.
- ii. Lift the right foot off of the floor and kick it under the body so it goes to the opposite side of the body.
- iii. There should be a slight twist of the hips and torso as you kick through.
- iv. Return the foot back and quickly repeat on the other side.
- v. This is a rapid movement with no rest between alternating sides.
- vi. Repeat for the recommended number of repetitions.

## Hanging Knee Raise/knees-to-elbow



### A. Preparation:

- i. Hang from a pull-up bar with palms facing forward and arms just outside shoulder-width apart.
- ii. Pull the lower abdomen in and rotate the pelvis posteriorly so the core is engaged and the back is flat.

### B. Movement:

- i. Using momentum, explosively pull the knees upwards toward the chest.
- ii. Continue the movement upwards so the body slightly tilts back while the knees come toward the elbows.
- iii. Return the legs back in a controlled manner to the starting position. Maintain an engaged core so you can eliminate any swinging or pausing.
- iv. Repeat for the recommended number of repetitions.

# FLEXIBILITY & COOL-DOWN

## SEGMENT 5

This section will be completed after segment 4. This is intended to help bring the heart rate down and to stretch out all major muscle groups. Complete most, if not all, of these stretches. Refer back to Level 1 for review of the stretches, pp. 61-69.

FLEXIBILITY & COOL-DOWN OVERVIEW				
EXERCISE	SETS	REPS	TIME	REST
STANDING HAMSTRING REACH	1-2	N/A	15-30 SECONDS	0-15 SECONDS
SEATED GLUTE-KNEE TO CHEST	1-2	N/A	15-30 SECONDS	0-15 SECONDS
SEATED ERECTOR SPINAE	1-2	N/A	15-30 SECONDS	0-15 SECONDS
SEATED GROIN	1-2	N/A	15-30 SECONDS	0-15 SECONDS
KNEELING HIP FLEXOR	1-2	N/A	15-30 SECONDS	0-15 SECONDS
UPWARD DOG	1-2	N/A	15-30 SECONDS	0-15 SECONDS
SIDE BEND- TFL	1-2	N/A	15-30 SECONDS	0-15 SECONDS
IRON CROSS	1-2	N/A	15-30 SECONDS	0-15 SECONDS
SUPINE SHOULDER ROTATION	1-2	N/A	15-30 SECONDS	0-15 SECONDS
SUPINE 3-PT. ELBOW DROP	1-2	N/A	15-30 SECONDS EACH	0-15 SECONDS
ANY OTHER STRETCH THE TRAINER DEEMS NECESSARY	1-2	N/A	15-30 SECONDS EACH	0-15 SECONDS

\*See the Level 1 Flexibility section for review of the movements, pp. 61-69.



# APPENDIX

The following sheets are for copying or for reference.



# PROGRAM OVERVIEW

## Firefighter 6-month Program Layout

- **Comprehensive Fitness Assessment #1**
  
- **Level 1 Program = Total Program Length = 3 months**
  - **WPE > 8:44**
  - **Development of core strength and stability**
  - **Addition of exercises to an existing regimen**
    - **Tier 1 = 4 weeks**
    - **Tier 2 = 4 weeks**
    - **Tier 3 = 4 weeks**
  
- **Comprehensive Fitness Assessment #2**
  
- **Level 2 Program – Total Program Length = 3 months**
  - **WPE less than 8:44**
  - **Completion of Level 1 Program**
  - **Current fitness level is intermediate-to-advanced**
  
- **Comprehensive Fitness Assessment #3**

## Needed Equipment:

- **Mat**
- **Pair of dumbbells**
- **Pair of kettlebells**
- **Battle rope**
- **Sledgehammer**
- **Medium-to-large tire**
- **Agility cones**
- **Pull-up bar**
- **Barbell plate (10-45#)**



**Level 1 Tier 1 Quick Reference Workout Card**

**Dynamic Warm-up: Segment 1**

<b>LEVEL 1 DYNAMIC WARM-UP OVERVIEW</b>				
EXERCISE	SETS	REPS	TIME	REST (S)
LIGHT CARDIO/DYNAMIC MOBILITY	1	N/A	5 MIN	N/A
CAT	1	5-8	N/A	15-30
LATERAL TILT	1	5-8 EACH SIDE	N/A	15-30
TABLETOP SPINAL ROTATION W/ FLEXION & EXTENSION	1	5-8 EACH SIDE	N/A	15-30
SUPINE TRUNK ROTATION	1	5-8 EACH SIDE	N/A	15-30

Additional time and/or movements may be added during warm-up if needed. See level 2 warm-up for more.

**Tier 1: Segment 2**

<b>BODYWEIGHT RESISTANCE WORKOUT OVERVIEW</b>				
EXERCISE	SETS	REPS	TIME EQUIVALENCY (S)	REST (S)
AIR SQUAT	1-2	12-15	45	UP TO 60
AB CRUNCH REVERSE	1-2	12-15	45	UP TO 60
COBRA	1-2	12-15	45	UP TO 60
PUSH-UP	1-2	12-15	45	UP TO 60
BRIDGE	1-2	12-15	45	UP TO 60
SIDE PLANK	1-2	12-15 RAISES EACH SIDE WITH A 3 SEC. HOLD	45	UP TO 60
PRONE 1- LEG/OPPOSITE ARM EXTENSION	1-2	12-15 EACH SIDE	45	UP TO 60
AB DRAW-IN LEG SLIDE	1-2	12-15 EACH	45	UP TO 60
TOE TOUCH CRUNCH	1-2	20 REPS	45	UP TO 60
PLANK HOLD	1-2	MAX HOLD	MAX	UP TO 60

**CHOOSE ONE OF THE FOLLOWING TO USE FOR THE BODYWEIGHT WORKOUT:**

- E. 5 MINI-BLOCK COUPLETS- CHOOSE TWO EXERCISES AND PERFORM THE RECOMMENDED REPETITIONS FOR EACH BACK-TO-BACK WITH MINIMAL REST BETWEEN THEM. REST UP TO 60 SECONDS BETWEEN EACH COUPLET. DO 1-2 SETS OF EACH COUPLET.
- F. FULL CIRCUIT. COMPLETE ALL 10 EXERCISES IN SUCCESSION WITH MINIMAL REST BETWEEN EACH. REST UP TO 2-MINUTES BETWEEN ROUNDS (UP TO 2 ROUNDS).
- G. PERFORM AS MANY QUALITY REPS AS POSSIBLE FOR 45 SECONDS FOR EACH EXERCISE. REST UP TO 60 SECONDS BETWEEN EACH EXERCISE. DO 1-2 SETS OF EACH EXERCISE.
- H. COMBINATION OF SEGMENT 2 BODYWEIGHT TRAINING AND SEGMENT 3 CARDIO.  
 -PERFORM ONE ROUND OF THE EXERCISES. THEN COMPLETE HALF THE TIME OF SEGMENT 3. THEN REPEAT TO FINISH.  
 -CHOOSE SCHEME A. ADD A 200-METER RUN/JOG BETWEEN EACH COMPLETED COUPLET FOR A TOTAL OF FIVE 200M RUNS.

**Tier 1: Segment 3 (if D was used for Segment 2 this segment can be skipped)**

<b>Treadmill Walk</b>	
Time	Pace (mph)
00:00 – 05:00	2.7 (Warm up walk)
05:00 – 06:00	3.0
06:00 – 08:00	3.4
08:00 – 09:00	3.8
09:00 – 11:00	4.0
11:00 – 12:00	4.2
12:00 – 13:00	3.8
13:00 – 14:00	4.2
14:00 – 15:00	3.5
15:00 – 16:00	4.2
16:00 – 17:00	4.4
17:00 – 18:00	3.8
18:00 – 19:00	4.4
19:00 – 20:00	4.2
20:00 – 22:00	3.8
22:00 – 25:00	3.0 (Cool down walk)

**Flexibility & Cool-down: Segment 4**

EXERCISE	SETS	HOLD TIME (S)	REST (S)	<b>USE ANY VARIATIONS LISTED FROM THE MANUAL</b>
STANDING HAMSTRING REACH	1-2	15-30	0-15	
SEATED GLUTE- KNEE TO CHEST	1-2	15-30	0-15	
SEATED ERECTOR SPINAE	1-2	15-30	0-15	
SEATED GROIN	1-2	15-30	0-15	
KNEELING HIP FLEXOR	1-2	15-30	0-15	
UPWARD DOG	1-2	15-30	0-15	
SIDE BEND- TFL	1-2	15-30	0-15	
IRON CROSS	1-2	15-30	0-15	
SUPINE SHOULDER ROTATION	1-2	15-30	0-15	
SUPINE 3-PT. ELBOW DROP	1-2	15-30	0-15	
ANY OTHER STRETCH THE TRAINER DEEMS NECESSARY	1-2	15-30	0-15	

**Level 1 Tier 2 Quick Reference Workout Card**

**Dynamic Warm-up: Segment 1**

<b>LEVEL 1 DYNAMIC WARM-UP OVERVIEW</b>				
EXERCISE	SETS	REPS	TIME	REST (S)
LIGHT CARDIO/DYNAMIC MOBILITY	1	N/A	5 MIN	N/A
CAT	1	5-8	N/A	15-30
LATERAL TILT	1	5-8 EACH SIDE	N/A	15-30
TABLETOP SPINAL ROTATION W/ FLEXION & EXTENSION	1	5-8 EACH SIDE	N/A	15-30
SUPINE TRUNK ROTATION	1	5-8 EACH SIDE	N/A	15-30

Additional time and/or movements may be added during warm-up if needed. See level 2 warm-up for more.

**Tier 2: Segment 2**

<b>BODYWEIGHT RESISTANCE WORKOUT OVERVIEW</b>				
EXERCISE	SETS	REPS	TIME EQUIVALENCY (S)	REST (S)
AIR SQUAT	2	15-20	45	UP TO 45
OBLIQUE CRUNCH STRAIGHT LEG RAISE	2	12-15	45	UP TO 45
SUPERMAN	2	12-15	45	UP TO 45
PLANK-TO-PUSH-UP	2	12-15	45	UP TO 45
1-LEG BRIDGE	2	12-15	30-45 EA	UP TO 45
SIDE PLANK HOLD	2	1 EA	20-30 EA	UP TO 45
SUPERMAN PLANK: ALTERNATING	2	3-5 LIFTS EA	45	UP TO 45
AB DRAW-IN DOUBLE-LEG SLIDE	2	12-15	45	UP TO 45
BODY ROW	2	12-15	30-45	UP TO 45
PLANK HOLD: 1-LEG	2	1-2 EA	30 EA	UP TO 45

**CHOOSE ONE OF THE FOLLOWING TO USE FOR THE BODYWEIGHT WORKOUT:**

- E. 5 MINI-BLOCK COUPLETS- CHOOSE TWO EXERCISES AND PERFORM THE RECOMMENDED REPETITIONS FOR EACH BACK-TO-BACK WITH MINIMAL REST BETWEEN THEM. REST UP TO 60 SECONDS BETWEEN EACH COUPLET. DO 2 SETS OF EACH COUPLET.
- F. FULL CIRCUIT. COMPLETE ALL 10 EXERCISES IN SUCCESSION WITH MINIMAL REST BETWEEN EACH. REST UP TO 2-MINUTES BETWEEN ROUNDS (2 ROUNDS).
- G. PERFORM AS MANY QUALITY REPS AS POSSIBLE FOR 45 SECONDS FOR EACH EXERCISE. REST UP TO 60 SECONDS BETWEEN EACH EXERCISE. DO 2 SETS OF EACH EXERCISE.
- H. COMBINATION OF SEGMENT 2 BODYWEIGHT TRAINING AND SEGMENT 3 CARDIO.  
 -PERFORM ONE ROUND OF THE EXERCISES. THEN COMPLETE HALF THE TIME OF SEGMENT 3. THEN REPEAT TO FINISH.  
 -CHOOSE SCHEME A. ADD A 200-METER RUN/JOG BETWEEN EACH COMPLETED COUPLET FOR A TOTAL OF FIVE 200M RUNS.

**Tier 2: Segment 3 (if D was used for Segment 2 this segment can be skipped)**

<b>Treadmill Walk/Jog</b>	
Time	Pace (mph)
00:00 – 05:00	3.0 (Warm up walk)
05:00 – 07:00	3.5
07:00 – 09:00	5.0
09:00 – 11:00	3.8
11:00 – 13:00	5.5
13:00 - 15:00	4.0
15:00 – 17:00	5.0
17:00 – 19:00	3.5
19:00 – 21:00	6.0
21:00 – 23:00	4.5
23:00 – 25:00	5.5
25:00 – 27:00	4.0
27:00 – 30:00	3.0 (Cool down walk)

**Flexibility & Cool-down: Segment 4**

EXERCISE	SETS	HOLD TIME (S)	REST (S)	<b>USE ANY VARIATIONS LISTED FROM THE MANUAL</b>
STANDING HAMSTRING REACH	1-2	15-30	0-15	
SEATED GLUTE- KNEE TO CHEST	1-2	15-30	0-15	
SEATED ERECTOR SPINAE	1-2	15-30	0-15	
SEATED GROIN	1-2	15-30	0-15	
KNEELING HIP FLEXOR	1-2	15-30	0-15	
UPWARD DOG	1-2	15-30	0-15	
SIDE BEND- TFL	1-2	15-30	0-15	
IRON CROSS	1-2	15-30	0-15	
SUPINE SHOULDER ROTATION	1-2	15-30	0-15	
SUPINE 3-PT. ELBOW DROP	1-2	15-30	0-15	
ANY OTHER STRETCH THE TRAINER DEEMS NECESSARY	1-2	15-30	0-15	

**Level 1 Tier 3 Quick Reference Workout Card**

**Dynamic Warm-up: Segment 1**

<b>LEVEL 1 DYNAMIC WARM-UP OVERVIEW</b>				
<b>EXERCISE</b>	<b>SETS</b>	<b>REPS</b>	<b>TIME</b>	<b>REST (S)</b>
LIGHT CARDIO/DYNAMIC MOBILITY	1	N/A	5 MIN	N/A
CAT	1	5-8	N/A	15-30
LATERAL TILT	1	5-8 EACH SIDE	N/A	15-30
TABLETOP SPINAL ROTATION W/ FLEXION & EXTENSION	1	5-8 EACH SIDE	N/A	15-30
SUPINE TRUNK ROTATION	1	5-8 EACH SIDE	N/A	15-30

Additional time and/or movements may be added during warm-up if needed. See level 2 warm-up for more.

**Tier 3 Segment 2**

<b>BODYWEIGHT RESISTANCE WORKOUT OVERVIEW</b>				
<b>EXERCISE</b>	<b>SETS</b>	<b>REPS</b>	<b>TIME EQUIVALENCY (S)</b>	<b>REST (S)</b>
PRISONER AIR SQUAT	2-3	15-20	45	15-30
BICYCLE CRUNCH	2-3	15-20 EA	45	15-30
PLANK: KNEE TO OPPOSITE ELBOW	2-3	12-15 EA	45	15-30
HAND-RELEASE PUSH-UP	2-3	15-20	45	15-30
ALTERNATING 1-LEG BRIDGE	2-3	12-15 EA	45	15-30
ALTERNATING T-PLANK	2-3	8-12 EA	30-45 W/ A HOLD	15-30
SUPERMAN PLANK: ALTERNATING 1- ARM/LEG WITH 3 SEC. HOLD	2-3	8-12 EA	45 W/ A HOLD	15-30
SPLIT SQUAT	2-3	12-15 EA	30 EA	15-30
BODY ROW 1-LEG	2-3	12-15	30-45	15-30
SIDE PLANK WITH LEG RAISE	2-3	1 HOLD EA	HOLD FOR 20-30 EA	15-30

**CHOOSE ONE OF THE FOLLOWING TO USE FOR THE BODYWEIGHT WORKOUT:**

- E. 5 MINI-BLOCK COUPLETS- CHOOSE TWO EXERCISES AND PERFORM THE RECOMMENDED REPETITIONS FOR EACH BACK-TO-BACK WITH MINIMAL REST BETWEEN THEM. REST UP TO 60 SECONDS BETWEEN EACH COUPLET. DO 2-3 SETS OF EACH COUPLET.
- F. FULL CIRCUIT. COMPLETE ALL 10 EXERCISES IN SUCCESSION WITH MINIMAL REST BETWEEN EACH. REST UP TO 2-MINUTES BETWEEN ROUNDS (2-3 ROUNDS).
- G. PERFORM AS MANY QUALITY REPS AS POSSIBLE FOR 45 SECONDS FOR EACH EXERCISE. REST UP TO 60 SECONDS BETWEEN EACH EXERCISE. DO 2-3 SETS OF EACH EXERCISE.
- H. COMBINATION OF SEGMENT 2 BODYWEIGHT TRAINING AND SEGMENT 3 CARDIO.  
 -PERFORM ONE ROUND OF THE EXERCISES. THEN COMPLETE HALF OR ONE-THIRD OF THE TIME OF SEGMENT 3. THEN REPEAT 1-2 MORE TIMES TO FINISH.  
 -CHOOSE SCHEME A. ADD A 200-METER RUN/JOG BETWEEN EACH COMPLETED COUPLET FOR A TOTAL OF FIVE 200M RUNS.

**Tier 3 Segment 3 (if D was used for Segment 2 this segment can be skipped)**

<b>Treadmill Jog</b>	
Time	Pace (mph)
00:00 – 05:00	4.0 (Warm up jog)
05:00 – 10:00	5.5
10:00 – 12:00	6.0
12:00 – 15:00	5.5
15:00 – 17:00	6.5
17:00 – 20:00	7.0
20:00 – 22:00	6.0
22:00 – 25:00	6.5
25:00 – 27:00	5.5
27:00 – 30:00	5.0
30:00 – 35:00	3.0 (Cool down walk)

**Flexibility & Cool-down: Segment 4**

<b>EXERCISE</b>	<b>SETS</b>	<b>HOLD TIME (S)</b>	<b>REST (S)</b>	<b>USE ANY VARIATIONS LISTED FROM THE MANUAL</b>
STANDING HAMSTRING REACH	1-2	15-30	0-15	
SEATED GLUTE- KNEE TO CHEST	1-2	15-30	0-15	
SEATED ERECTOR SPINAE	1-2	15-30	0-15	
SEATED GROIN	1-2	15-30	0-15	
KNEELING HIP FLEXOR	1-2	15-30	0-15	
UPWARD DOG	1-2	15-30	0-15	
SIDE BEND- TFL	1-2	15-30	0-15	
IRON CROSS	1-2	15-30	0-15	
SUPINE SHOULDER ROTATION	1-2	15-30	0-15	
SUPINE 3-PT. ELBOW DROP	1-2	15-30	0-15	
ANY OTHER STRETCH THE TRAINER DEEMS NECESSARY	1-2	15-30	0-15	

**Level 2 Quick Reference Workout Card**

**Segment 1: Dynamic Warm-Up**

DRILLS	SETS	REPS	DISTANCE	DRILLS	SETS	REPS	DISTANCE
3-5 MINUTE JOG	1			FRANKENSTEINS	1	10 EA OR	25 YDS
TRUNK TWISTS	1	10 EA		HIGH KNEES	1	15 EA OR	25 YDS
KNEE HUGS	1	10 EA		JUMPING JACKS	1	25	
BUTT KICKS	1	15 EA OR	25 YDS	GROINERS	1	5 EA	
CHERRY PICKERS- 3 COUNT	1	10		IRON CROSS SWINGS	1	10 EA	
INCH WORMS	1	10 OR	10 YDS	AIR SQUATS	1	10	
ARM SWINGS & ARM CIRCLES	1	10 EA		PUSH-UPS	1	10	
INSIDE HEEL TAPS	1	10 EA		LUNGES WITH BACK EXTENSION	1	5 EA	
SCORPIONS	1	10 EA		SHOULDER ROTATIONS	1	12 EA	
BOOT-STRAPPERS	1	10		SHOULDER FLOOR SLIDES	1	12	
WINDMILLS	1	10 EA		ANY OTHER MOVEMENT THE TRAINER DEEMS NECESSARY			

**Segment 2: Bodyweight Mini-Block Circuit**

PICK 1 UPPER	PICK 1 LOWER
PUSH-UP	AIR SQUAT
SPIDER PUSH-UP	FORWARD LUNGE
PLANK-TO-PUSH-UP	REVERSE LUNGE
BODY ROW	SQUAT JUMP
PULL-UP	JUMPING LUNGE
PIKE PUSH-UP	SURRENDER
T- PUSH-UP	ICE SKATER
CHIN-UP	LOW SPRAWL
ANY OTHER VARIATION	ANY OTHER VARIATION

CHOOSE ONE OF THE FOLLOWING TO USE FOR THE BODYWEIGHT WORKOUT:
K. PYRAMID: BEGIN AT ONE REP OF EACH AND INCREASE BY ONE REP EACH ROUND. REPEAT AS MANY ROUNDS AS POSSIBLE FOR 5 MINUTES (1-EACH, 2-EACH, 3-EACH, & SO FORTH).
L. 3 ROUNDS: RD. 1= 5 REPS EACH; RD. 2= 10 REPS EACH; RD. 3= 15 REPS EACH
M. 3 ROUNDS: RD. 1= 10 REPS EACH; RD. 2= 15 REPS EACH; RD. 3= 20 REPS EACH
N. 3 ROUNDS: RD. 1= 20 REPS EACH; RD.2= 15 REPS EACH; RD. 3= 10 REPS EACH
O. 5-7 REPS EACH. AS MANY ROUNDS AS POSSIBLE IN 3-5 MINUTES.
P. 5 ROUNDS: 8 REPS EACH
Q. 5 MINUTES: 30 SECONDS UPPER, 30 SECONDS LOWER. (TOTALS 5 SETS OF BOTH)
R. 1 ROUND: 40 REPS EACH (COMPLETE THE 40 REPS ANYWAY)
S. ATHLETE'S CHOICE. CREATE ANY SCHEME THAT CAN BE COMPLETED IN LESS THAN 7 MINUTES.

**Segment 3: High-Intensity Interval Resistance Training**

PICK 1 UPPER	A. KETTLEBELL OR DUMBBELL	PICK 1 LOWER/COMBINATION	A. KETTLEBELL OR DUMBBELL	PICK 1 CARDIO
PLANK ROW		KB SWING		1. ROWING
PUSH PRESS	OFFSET SQUAT	2. BURPEES		
ALTERNATING FLOOR/BENCH PRESS	GOBLET SQUAT	3. MOUNTAIN CLIMBERS		
UPRIGHT ROW	STIFF-LEGGED DEADLIFT	4. SLEDGEHAMMER-TO-TIRE HIT		
BENT-OVER ROW	DEADLIFT	5. BEAR CRAWL 50 YARDS		
SHOULDER PRESS	SIDE LUNGE	6. TIRE FLIPS: 5-10 FLIPS (DEPENDS ON SIZE)		
WEIGHTED DIP	CLEAN	7. BATTLE ROPE VARIATIONS		
WEIGHTED PUSH-UP	SNATCH/FLOOR-TO-OVERHEAD	8. 200M, 300M OR 400M RUN		
SHOULDER-TO-SHOULDER KB PRESS	TURKISH GETUP	9. SUICIDE- 5 TO 10 YDS BETWEEN EACH CONE		
PULL-UP	OVERHEAD LUNGE	10. 100-YD SHUTTLE (4X25YDS)		

CHOOSE ONE OF THE FOLLOWING TO USE FOR THE HIRT WORKOUT:
A. PERFORM 10 REPS OF THE UPPER AND LOWER BODY EXERCISE FOLLOWED BY 1 MINUTE OF CARDIO #1, 2, 3, 4, 5, 7, 9. PERFORM AS MANY ROUNDS AS POSSIBLE IN 12-20 MINUTES. (CHOOSE THE TIME)
B. 3-5 ROUNDS- 10-12 REPS OF THE UPPER AND LOWER BODY EXERCISE FOLLOWED BY CARDIO #8, 9, OR 10.
C. TABATA PROTOCOL- 20 SECONDS OF AS MANY REPS AS POSSIBLE OF THE UPPER BODY. REST 10 SEC. 20 SECONDS OF AS MANY REPS AS POSSIBLE OF THE LOWER BODY. REST 10 SEC. 20 SECONDS OF AS MANY REPS AS POSSIBLE OF THE CARDIO # 2, 3, 4, 5, 6, 7 OR 9. COMPLETE 4-8 CYCLES.
D. DO 45 SECONDS OF EACH SECTION. REST 1 MINUTE. REPEAT 3-5 ROUNDS.
E. DOUBLE TABATA PROTOCOL- 40 SECONDS OF WORK OF THE UPPER BODY. REST 20 SEC. 40 SECONDS OF WORK OF THE LOWER BODY. REST 20 SEC. 40 SECONDS OF WORK OF THE CARDIO #1-7, 9 & 10. COMPLETE 4-6 CYCLES.
F. 3-5 ROUNDS- 8-12 REPS OF UPPER, LOWER AND 5 REPS OF TIRE FLIPS.
G. LADDER- START AT 1 REP AND ASCEND BY 1 REP EVERY ROUND UP TO 10 FOR THE UPPER AND LOWER BODY EXERCISE. USE CARDIO #4, 6, 7, 8, 9 OR 10.
H. 15 MINUTES AS MANY ROUNDS AS POSSIBLE OF 10 REPS OF UPPER AND LOWER BODY AND 20 REPS/STROKES OF CARDIO #1, 2, 4, OR 7.
I. 20 MINUTES, AS MANY ROUNDS AS POSSIBLE OF 6 REPS OF UPPER, LOWER, AND CARDIO #6 OR 8.
J. ATHLETE'S CHOICE. CHOOSE ANY TWO EXERCISES AND 1 CARDIO AND CREATE YOUR OWN SCHEME. TIME CAP IS 20 MINUTES.

**Segment 4: Core & Abs**

<b>CHOOSE 3</b>
<b>CORE EXERCISES:</b>
BUTTERFLY SIT-UP
V-UP
PRONE SUPERMAN
BICYCLE CRUNCH
PLANK WALK
FLUTTER KICKS
HOLLOW ROCKS
SCUBA SITUPS
LEG RAISE
PLANK (USE VARIATIONS)
SUPERMAN PLANK (ON HANDS)
WINDSHIELD WIPERS
RUSSIAN TWIST
SIDE PLANK (USE VARIATIONS)
BREAKDANCE PLANK
HANGING KNEE RAISE/KNEES-TO-ELBOW

<b>CHOOSE ONE OF THE FOLLOWING TO USE FOR THE CORE WORKOUT:</b>
H. TABATA PROTOCOL- CYCLE THROUGH THE EXERCISES USING 20 SECONDS OF WORK, 10 SECONDS REST FOR 6 TO 9 MINUTES.
I. DOUBLE TABATA PROTOCOL- CYCLE THROUGH THE EXERCISES USING 40 SECONDS OF WORK, 20 SECONDS OF REST FOR 6 TO 9 MINUTES.
J. 2 ROUNDS- 25 REPS EACH
K. 3 ROUNDS- CYCLE THROUGH EACH FOR 1 MINUTE, 0-15 SECONDS OF REST BETWEEN EACH.
L. 2 MINUTES OF EACH
M. 1 ROUND- 50 REPS EACH

**Segment 5: Flexibility & Cool-down**

EXERCISE	SETS	HOLD TIME (S)	REST (S)	USE ANY VARIATIONS LISTED FROM THE MANUAL
STANDING HAMSTRING REACH	1-2	15-30	0-15	
SEATED GLUTE- KNEE TO CHEST	1-2	15-30	0-15	
SEATED ERECTOR SPINAE	1-2	15-30	0-15	
SEATED GROIN	1-2	15-30	0-15	
KNEELING HIP FLEXOR	1-2	15-30	0-15	
UPWARD DOG	1-2	15-30	0-15	
SIDE BEND- TFL	1-2	15-30	0-15	
IRON CROSS	1-2	15-30	0-15	
SUPINE SHOULDER ROTATION	1-2	15-30	0-15	
SUPINE 3-PT. ELBOW DROP	1-2	15-30	0-15	
ANY OTHER STRETCH THE TRAINER DEEMS NECESSARY	1-2	15-30	0-15	



# WORKOUT LOG

EXERCISES	LEVEL/ TIER/ SEGMENT	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
		SCHEME SETS REPS						
1. 2. 3.								
1. 2. 3.								
1. 2. 3.								
1. 2. 3.								
1. 2. 3.								
1. 2. 3.								
1. 2. 3.								







# PERCENTILES FOR YMCA SIT-AND-REACH TEST (INCHES)

PERCENTILE	AGE											
	18-25		26-35		36-45		46-55		56-65		>65	
GENDER	M	F	M	F	M	F	M	F	M	F	M	F
90	22	24	21	23	21	22	19	21	17	20	17	20
80	20	22	19	21	19	21	17	20	15	19	15	18
70	19	21	17	20	17	19	15	18	13	17	13	17
60	18	20	17	20	16	18	14	17	13	16	12	17
50	17	19	15	19	15	17	13	16	11	15	10	15
40	15	18	14	17	13	16	11	14	09	14	09	14
30	14	17	13	16	13	15	10	14	09	13	08	13
20	13	16	11	15	11	14	09	12	07	11	07	11
10	11	14	09	13	07	12	06	10	05	09	04	09

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# PERCENTILE VALUES FOR 1.5-MILE TEST

PERCENTILE	AGE											
	20-29		30-39		40-49		50-59		60-69		70-79	
GENDER	M	F	M	F	M	F	M	F	M	F	M	F
99	08:22	09:23	08:49	09:52	09:02	10:09	09:31	11:34	10:09	12:25	10:27	12:25
95	09:10	10:20	09:31	11:08	09:47	11:35	10:27	13:16	11:20	14:28	12:25	14:33
90	09:34	10:59	09:52	11:43	10:09	12:25	11:09	13:58	12:10	15:32	13:25	16:06
85	09:52	11:34	10:14	12:23	10:44	13:14	11:45	14:33	12:53	16:22	13:57	16:57
80	10:08	11:56	10:38	12:53	11:09	13:38	12:08	15:14	13:25	16:46	14:52	18:05
75	10:34	12:07	10:59	13:08	11:32	13:58	12:37	15:47	13:58	17:34	15:38	18:39
70	10:49	12:51	11:09	13:41	11:52	14:33	12:53	16:26	14:33	18:05	16:22	19:24
65	11:09	13:01	11:34	13:58	11:58	15:03	13:25	16:46	14:55	18:39	16:46	20:02
60	11:27	13:25	11:49	14:33	12:25	15:17	13:53	17:19	15:20	18:52	17:37	20:54
55	11:34	13:58	11:58	14:33	12:53	15:56	13:58	17:38	15:53	19:29	18:05	21:45
50	11:58	14:15	12:25	15:14	13:05	16:13	14:33	18:05	16:19	20:08	18:39	22:22
45	12:11	14:33	12:44	15:35	13:25	16:46	14:35	18:39	16:46	20:38	19:19	22:54
40	12:29	15:05	12:53	15:56	13:50	17:11	15:14	19:10	17:19	20:55	19:43	23:47
35	12:53	15:32	13:25	16:43	14:10	17:38	15:53	19:43	17:49	22:03	20:28	24:54
30	13:08	15:56	13:48	16:46	14:33	18:26	16:16	20:17	18:39	22:34	21:28	25:49
25	13:25	16:43	14:10	17:38	15:00	18:39	16:46	20:55	19:10	23:20	22:22	26:15
20	13:58	17:11	14:33	18:18	15:32	19:43	17:30	21:57	20:13	23:55	23:55	27:17
15	14:33	17:53	15:14	19:01	16:09	20:49	18:22	22:53	21:34	25:02	25:49	27:55
10	15:14	18:39	15:56	20:13	17:04	21:52	19:24	23:55	23:27	26:32	27:55	30:34
5	16:46	21:05	17:30	21:57	18:39	23:27	21:40	26:15	25:58	29:06	30:34	33:32
1	20:55	25:17	20:55	25:10	22:22	27:55	27:08	30:34	31:59	33:05	33:30	37:26

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# PERCENTILE VALUES FOR 12-MINUTE RUN (MILES)

PERCENTILE	AGE											
	20-29		30-39		40-49		50-59		60-69		70-79	
	M	F	M	F	M	F	M	F	M	F	M	F
99	2.02	1.84	1.94	1.77	1.90	1.74	1.82	1.57	1.74	1.49	1.69	1.49
95	1.88	1.71	1.82	1.62	1.79	1.57	1.69	1.42	1.60	1.34	1.49	1.33
90	1.81	1.63	1.77	1.56	1.73	1.49	1.61	1.37	1.51	1.27	1.41	1.25
85	1.77	1.57	1.72	1.50	1.66	1.43	1.55	1.33	1.45	1.23	1.37	1.20
80	1.73	1.54	1.67	1.45	1.61	1.40	1.52	1.29	1.41	1.21	1.32	1.15
75	1.68	1.52	1.63	1.43	1.58	1.37	1.47	1.26	1.37	1.18	1.27	1.13
70	1.65	1.46	1.61	1.39	1.54	1.33	1.45	1.23	1.33	1.15	1.23	1.10
65	1.61	1.44	1.57	1.37	1.53	1.30	1.41	1.21	1.31	1.13	1.21	1.08
60	1.58	1.41	1.55	1.33	1.49	1.29	1.38	1.19	1.29	1.12	1.17	1.05
55	1.57	1.37	1.53	1.33	1.45	1.25	1.37	1.17	1.26	1.10	1.15	1.04
50	1.53	1.35	1.49	1.29	1.44	1.24	1.33	1.15	1.23	1.08	1.13	1.01
45	1.51	1.33	1.46	1.27	1.41	1.21	1.33	1.13	1.21	1.06	1.11	1.00
40	1.49	1.30	1.45	1.25	1.38	1.19	1.29	1.11	1.19	1.05	1.09	0.98
35	1.45	1.27	1.41	1.21	1.36	1.17	1.26	1.09	1.17	1.02	1.07	0.95
30	1.43	1.25	1.38	1.21	1.33	1.14	1.24	1.07	1.13	1.01	1.04	0.93
25	1.41	1.22	1.36	1.17	1.31	1.13	1.21	1.05	1.11	0.99	1.01	0.92
20	1.37	1.19	1.33	1.15	1.28	1.09	1.18	1.02	1.08	0.97	0.97	0.90
15	1.33	1.16	1.29	1.12	1.24	1.06	1.14	1.00	1.03	0.95	0.93	0.89
10	1.29	1.13	1.25	1.08	1.20	1.03	1.10	0.97	0.99	0.92	0.89	0.85
5	1.21	1.05	1.18	1.02	1.13	0.98	1.03	0.92	0.93	0.87	0.85	0.81
1	1.05	0.94	1.05	0.94	1.01	0.89	0.90	0.85	0.83	0.82	0.81	0.77

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# ROCKPORT ONE-MILE WALKING TEST GUIDELINES

The following test assesses the VO<sub>2</sub> max value for cardiovascular fitness (VO<sub>2</sub> max is also known as the maximal rate of oxygen consumption):

1. Walk as fast as possible for one mile. (For full validity, a heart rate of at least 120 beats per minute must be attained.)
  
2. Collect two pieces of information:
  - A. Time by stopwatch: \_\_\_\_\_ (minutes and seconds)  
Convert to decimal minutes  
Decimal minutes (t) = [mins + (seconds/60)] = \_\_\_\_\_
  - B. The heart rate taken for 10 seconds after crossing the one-mile mark. Multiply this by 6 to find beats per minute:  
Minute heart rate: \_\_\_\_\_
  
3. The following regression equation is recommended by the ACSM. This will allow the calculation of the relative value in ml/kg/min (milliliters of oxygen per kilogram of body mass per minute):  
VO<sub>2</sub> Max = 132.853 - (.3877 x Age) - (.0769 x Wt) - (3.2649 x T) - (.1565 x HR) + (6.315 x Gender)  
Wt = weight in pounds  
Age = present age  
Gender: male = 1, female = 0  
T = Time in decimal minutes (Example: 15 minutes and 45 seconds = 15.75)  
Units = ml/kg/min



# PERCENTILE VALUES MAX VO<sub>2</sub> (ML/KG/MIN) ROCKPORT ONE-MILE WALK TEST

PERCENTILE	AGE											
	20-29		30-39		40-49		50-59		60-69		70-79	
	M	F	M	F	M	F	M	F	M	F	M	F
99	61.2	55.0	58.3	52.5	57.0	51.1	54.3	45.3	51.1	42.4	49.7	42.4
95	56.2	50.2	54.3	46.9	52.9	45.2	49.7	39.9	46.1	36.9	42.4	36.7
90	54.0	47.5	52.5	44.7	51.1	42.4	46.8	38.1	43.2	34.6	39.5	33.5
85	52.5	45.3	50.7	42.5	48.5	40.0	44.6	36.7	41.0	33.0	38.1	32.0
80	51.1	44.0	47.5	41.0	46.8	38.9	43.3	35.2	39.5	32.3	36.0	30.2
75	49.2	43.4	47.5	40.3	45.4	38.1	41.8	34.1	38.1	31.0	34.4	29.4
70	48.2	41.1	46.8	38.8	44.2	36.7	41.0	32.9	36.7	30.2	33.0	28.4
65	46.8	40.6	45.3	38.1	43.9	35.6	39.5	32.3	35.9	29.4	32.3	27.6
60	45.7	39.5	44.4	36.7	42.4	35.1	38.3	31.4	35.0	29.1	30.9	26.6
55	45.3	38.1	43.9	36.7	41.0	33.8	38.1	30.9	33.9	28.3	30.2	26.0
50	43.9	37.4	42.4	35.2	40.4	33.3	36.7	30.2	33.1	27.5	29.4	25.1
45	43.1	36.7	41.4	34.5	39.5	32.3	36.6	29.4	32.3	26.9	28.5	24.6
40	42.2	35.5	41.0	33.8	38.4	31.6	35.2	28.7	31.4	26.6	28.0	23.8
35	41.0	34.6	39.5	32.4	37.6	30.9	33.9	28.0	30.6	25.4	27.1	22.9
30	40.3	33.8	38.5	32.3	36.7	29.7	33.2	27.3	29.4	24.9	26.0	22.2
25	39.5	32.4	37.6	30.9	35.7	29.4	32.3	26.6	28.7	24.2	25.1	21.9
20	38.1	31.6	36.7	29.9	34.6	28.0	31.1	25.5	27.4	23.7	23.7	21.2
15	36.7	30.5	35.2	28.9	33.4	26.7	29.8	24.6	25.9	22.8	22.2	20.8
10	35.2	29.4	33.8	27.4	31.8	25.6	28.4	23.7	24.1	21.7	20.8	19.3
5	32.3	26.4	31.1	25.5	29.4	24.1	25.8	21.9	22.1	20.1	19.3	17.9
1	26.6	22.6	26.6	22.7	25.1	20.8	21.3	19.3	18.6	18.1	17.9	16.4

\*American College of Sports Medicine- ACSM's Guidelines for Exercise Testing and Prescription Eighth Edition



## FITNESS CATEGORIES FOR PUSH-UPS (REPETITIONS IN ONE-MINUTE)

CATEGORY	AGE									
	20-29		30-39		40-49		50-59		60-69	
GENDER	M	F	M	F	M	F	M	F	M	F
EXCELLENT	36	30	30	27	25	24	21	21	18	17
VERY GOOD	35	29	29	26	24	23	20	20	17	16
	29	21	22	20	17	15	13	11	11	12
GOOD	28	20	21	19	16	14	12	10	10	11
	22	15	17	13	13	11	10	07	08	05
FAIR	21	14	16	12	12	10	09	06	07	04
	17	10	12	08	10	05	07	02	05	02
NEEDS IMPROVEMENT	16	09	11	07	09	04	06	01	04	01

\*American College of Sports Medicine- ACSM's Guidelines for Exercise Testing and Prescription Eighth Edition

## YMCA PERCENTILES FOR SIT-UPS (REPETITIONS IN ONE-MINUTE)

PERCENTILE	AGE											
	18-25		26-35		36-45		46-55		56-65		>65	
GENDER	M	F	M	F	M	F	M	F	M	F	M	F
90	77	68	62	54	60	54	61	48	56	44	50	34
80	66	61	56	46	52	44	53	40	49	38	40	32
70	57	57	52	41	45	38	51	36	46	32	35	29
60	52	51	44	37	43	35	44	33	41	27	31	26
50	46	44	38	34	36	31	39	31	36	24	27	23
40	41	38	36	32	32	28	33	28	32	22	24	20
30	37	34	33	28	29	23	29	25	28	18	22	16
20	33	32	30	24	25	20	24	21	24	12	19	11
10	27	25	21	20	21	16	16	13	20	08	12	09

\*National Strength and Conditioning Association- Essentials of Personal Training



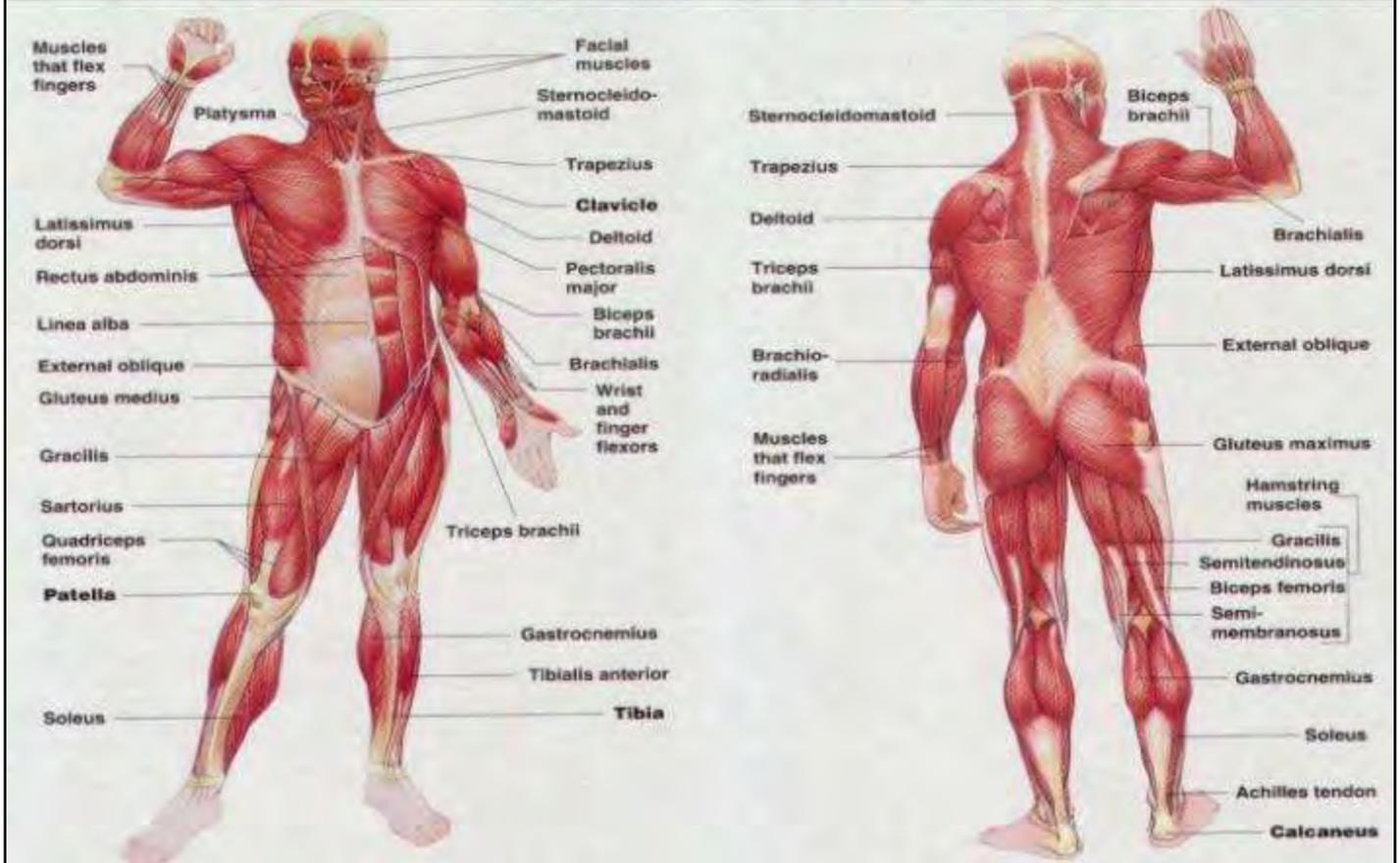
# HEART RATE TRAINING ZONES

AGE	LOW-TO-MODERATE 60-70%	MODERATE-TO-HIGH 70-80%	HIGH 80-90%
	BEATS/MIN		
TO 19	121 - 141	141 - 161	161 - 181
20 - 24	119 - 139	139 - 158	158 - 178
25 - 29	116 - 135	135 - 154	154 - 174
30 - 34	113 - 132	132 - 150	150 - 169
35 - 39	110 - 128	128 - 148	146 - 165
40 - 44	107 - 125	125 - 142	142 - 160
45 - 49	104 - 121	121 - 138	136 - 156
50 - 54	101 - 118	118 - 134	134 - 151
55 - 59	98 - 114	114 - 130	130 - 147
60 - 64	96 - 111	111 - 126	126 - 142
65 - 69	92 - 107	107 - 122	122 - 138
70 - 74	89 - 104	104 - 118	118 - 133
75 - 79	86 - 100	100 - 114	114 - 129
80 - 84	83 - 97	97 - 110	110 - 124
85+	81 - 95	96 - 108	108 - 122

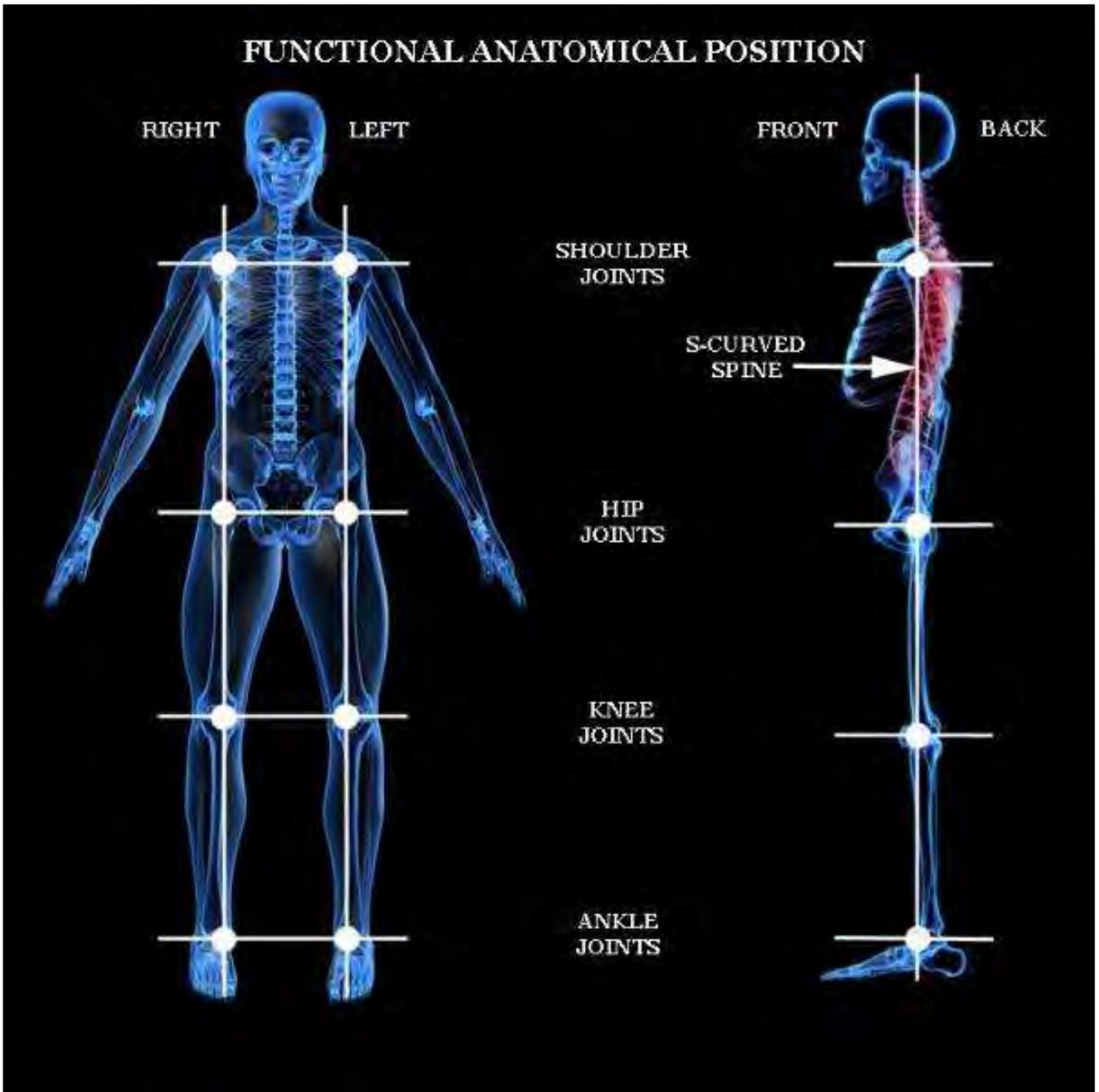


# MAJOR MUSCLES OF THE BODY

## The Muscular System

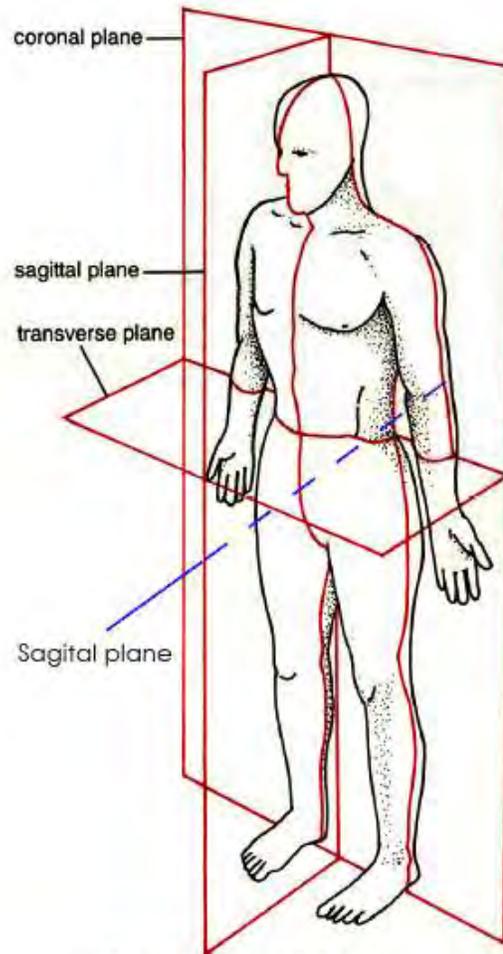


# MAJOR JOINTS OF THE BODY



Bodytrippin.com

# ANATOMICAL PLANES OF THE BODY



*Anatomical planes of the body*

'Brukner and Kahn, 2005'





*Work Performance Evaluation: A Benchmark for Excellence*  
*Henrico County Division of Fire*  
*Henrico County, Virginia*



Commission on  
Fire Accreditation  
International



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## *Abstract*

Despite an increased focus on community risk reduction, the fire service continues to struggle in regard to incumbent firefighter health and wellness. As an example, an article in the *New England Journal of Medicine* 2007 reported, “more than 70% of fire departments lacked programs to promote fitness and health” (Christiani, Costas, Elpidoforos, Stefanos). This included not having any requirement for incumbents to “exercise regularly, undergo periodic medical examinations, or have mandatory return-to-work evaluations after a major illness” (Christiani, 2007). However, a nationwide emphasis on creating work performance evaluation programs is emerging. These programs evaluate annually the ability of a department’s members to conduct critical fireground related functions.

The Henrico County Division of Fire has chosen to make the health and wellbeing of its members a priority. In 2013, the Henrico County Division of Fire implemented a work performance evaluation (mirrored from the validated Indianapolis Fire Department—see Appendix:IFD). These events, performed in full PPE including SCBA and on-air, integrated a stair climb, hose drag, forcible entry, ladder carry and raise, ceiling breach, mannequin drag, and tool carry. Overall, 478 sworn personnel were evaluated during five weeks with 87% (n=414) successfully completing the event at or below the benchmark time of 8:44.

This report (AAR) seeks to identify the strengths and recognized areas for improvement of the Henrico County Division of Fire’s Work Performance Evaluation (WPE) and to empower and inform departments looking to establish similar programs. Criteria recorded during the event i.e. age, years of service, heart rate pre & post event, air consumption, and time to complete are included for statistical review. This document should serve as a reference for both internal and external stakeholders, as a compass point to guide the future decisions of the Division of Fire regarding member health and wellness initiatives, and as a foundation for those departments exploring to establish such an event.





## *Acknowledgements*

The Division of Fire acknowledges the invaluable assistance in the development of the Work Performance Evaluation by members of the Department of Human Resources including Becky Tate, Liz Stovall, Carol Augsberger (ret.); Assistant Henrico County Attorney Lee Ann Anderson; and the substantial contribution provided by the Division of Fire's IT, Planning & Technology section--specifically Robin Patton and Ruqsaar Shukoor. Lastly, the development and implementation of the Work Performance Evaluation would not have been possible without the diligent efforts of the WPE Cadre.

FF. Jeff Adams  
FF. Bill Boger  
FF. Chad Bourne  
FF. Carlos Castillo  
FF. Billy Clougher  
FF. Laruen Challis  
FF. Dennis Kielsgard  
FF. Jairus Munson  
FF. Dave Mylum  
FF. Chris Ray  
FF. Charles Robinson  
FF. Kenny Simon  
FF. Jed Stone  
FF. Mark Wilson

Lt. David Harding  
Lt. Cleve Long  
Lt. Benjamin Martin  
Lt. Todd Phillips  
Lt. Ronnie Thomas

Captain David Corbin  
Captain Dan Hamilton





## *Organizational Background*

The County of Henrico covers approximately 244 sq miles with a variety of urban, suburban, rural, and metropolitan communities. Situated mostly north and east of the state capital Richmond, Henrico County quarters a population of over 300,000 which can as much as double during certain special events such as during NASCAR held at Richmond International Raceway. Henrico County also features 4 major transportation thoroughfares; I-64, I-95, I-295, and I-895, in addition to a railway and shipping industry.



The Henrico County Division of Fire serves as one of the first Internationally Accredited Fire Departments (1998-2013). The organization includes over 500 highly trained and certified firefighters in addition to a small complement of civilian positions, twenty fire stations, and responds annually to over 40,000 calls for service. All sworn personnel are Virginia state certified firefighters and Emergency Medical Technicians (EMT). Over 200 also possess advanced life support (ALS) certifications. The Division of Fire also participates in standing mutual aid agreements with surrounding localities.





The Division of Fire professionally staffs twenty-four hour operational periods with three shifts working alternating days. Services are provided to the citizens and visitors of Henrico County utilizing the following resources: twenty engines, fifteen advanced life support ambulances, five ladder trucks, three heavy rescue squads, two EMS supervisors, three Battalion Chiefs and one District Chief. The Division of Fire provides the following services to its citizens and visitors:

- Urban, suburban, and rural fire protection
- Basic and advanced life support first response and emergency transport
- Specialized rescue teams (HAZMAT, Technical Rescue, Dive/Swift Water)
- Fire Prevention, Education, and Investigations
- Response and Recovery to natural and man-made disasters





## *Work Performance Evaluation—Significance and Background*

A literature review suggests that the need for physical fitness and annual evaluations began receiving initial attention by fire departments nationwide in the early 1980's. In 1997, the International Association of Firefighters (IAFF) in cooperation with the International Association of Fire Chiefs (IAFC) published a Wellness Fitness Initiative that laid the foundational groundwork for a wellness and fitness program for incumbent firefighters encompassing the following areas: medical, fitness, behavioral health, injury-rehab, cost justification, data collection, and implementation.

In an Executive Fire Officer Program Applied Research Project, Bullhead City Fire Department Assistant Chief Rick Southey noted the obvious benefits of such a program, "A physically fit employee stays on the job longer, thinks more clearly, operates more safely, gets along better with co-workers, and generally gets more personal satisfaction out of the job. Further, there is verifiable evidence that participating in an employee fitness program will stimulate and enhance productivity" (1998, p.11). There is an obvious hazard inherent in ignoring the need to establish health and wellness programs for department's incumbent members as reinforced by the last decade's LODD statistics.

In 2012, 39 firefighters suffered line of duty deaths (LODD) as a result of heart attacks. This represents 48.1% of the total reported LODD for that year. Of those reported, 77% of the heart attacks occurred in individuals older than 45. Since the inception of LODD reporting, heart attacks with the exception of 2001, continue as the number one killer of firefighters. The fire service continues to face the challenge of balancing the need to protect civilian life and property simultaneously with the safeguarding of its own (setting the stage for a retirement enriched with a full quality of life).

The Henrico County Division of Fire (DOF) began its health and fitness initiatives over 25 years ago. Utilizing outside fitness contractors, annual physical fitness evaluations were administered to incumbent firefighters. This testing involved a stationary bicycle, and later a treadmill, ergometer, push-up, sit-up, and flexibility tests. The contractor conducted periodic station site visits to offer additional fitness instruction and counseling. Henrico County's





Employee Health Services section provides each sworn member an annual medical screening which includes lab work, chest x-ray and a complete history and physical exam.

In 1995, the DOF initiated a candidate and recruit test modeled loosely after the *Combat Challenge*, which simulated critical fire ground functional tasks. In 1996 and 1997, the DOF extended a similar test to all incumbents called the *Physical Ability Performance Assessment* (PAPA). During the same period several DOF members obtained certification as *Peer Fitness Trainers* (PFTs) through the International Association of Firefighters and International Association of Fire Chiefs, as part of the Wellness-Fitness Initiative (WFI).

In 2003, the DOF implemented the *Candidate Physical Abilities Test* (CPAT) as part of the new hire process. The CPAT evaluates an applicant's ability to perform essential job tasks at fire scenes. In 2009, after considering work performance evaluation programs from Fairfax County (VA), Horry County (SC), and Prince William (VA) the DOF implemented the Fairfax model to evaluate the ability of its incumbent firefighters to complete critical fire ground functional tasks. During 2010-2012 the DOF did not conduct any further incumbent work performance evaluations. During this same timeframe a Wellness and Fitness Section was created within the County's Human Resource Department with the goal of improving employee wellness by offering exercise classes, training, and consultation. In 2013, the Division of Fire developed a five year Continuous Improvement Strategy (CIS). The CIS established the implementation of a work performance evaluation as a specific objective in support of the goal of Division workforce development. Subsequently, the Division implemented a WPE based on the Indianapolis Fire Department model.





## *Work Performance Evaluation—Purpose & Process*

The Henrico County Division of Fire implemented a Work Performance Evaluation (WPE) program for incumbent firefighters with the intent to both ensure the physical readiness of sworn personnel to perform critical fireground related job functions and to protect the health and safety of its members. A WPE comprises a series of simulated job relevant, task oriented objectives that measures an individual's ability to physically perform the essential fireground functions of a firefighter.

The development of the WPE was tasked to the Division of Fire's Safety & Wellness Captain in 2013. He, along with a peer Captain responsible for the Division's Peer Fitness Trainer Program, held discussions with the DOF's executive staff, members of the Department of Human Resources, and the County Attorney's office to arrive at a process that was both fair and applicable to the goal of improving firefighter wellness and safety. The decision to model the WPE after Indianapolis Fire Department was based on both its validation (in partnership with Indiana University School of Medicine's Department of Family Medicine and Bowen Research Center) as well as its ability to conduct the process entirely in an environment outside (the Division of Fire does not currently possess a warehouse space that is capable of housing such a process).

Over a ninety day period, the course was set-up and trialed at the Drill Facility by a cadre of the DOF's Peer Fitness Trainers (PFT) and proctors for the CPAT test. Approximately thirty individuals completed the WPE during the trial period. The Henrico County Division of Fire did modify the pre/post vital sign assessments to mirror its own standard operating guideline regarding firefighter rehabilitation (see Appendix: EO-17). A new SOG was developed specifically regarding the WPE (see Appendix: HR-28).

The formal WPE process began in October of 2013. Personnel were selected from the PFTs and CPAT program to act as proctors. Schedules for all sworn personnel were constructed and sent to each respective Battalion Chief. The Division of Fire gathered member specific and group identifying information and performance data. This data was analyzed to establish individual and group performance levels, and as a means to track changes over time. All sworn firefighters are required to participate annually in the WPE.





The Fire Chief or his designee will refer all Division members that are unable to complete the WPE for any reason to the Henrico County Fitness and Wellness Division for a voluntary physical fitness assessment. The Department of Human Resources' Fitness and Wellness Division will conduct a thorough physical fitness assessment and make recommendations to the referred member. The Division of Fire pledges to fully support the recommendations of the Fitness and Wellness Division. This includes adjusting work location assignment as necessary to accommodate the recommended fitness and rehabilitation activities.





## *Observations & Results (Strengths/Opportunities)*

In reviewing the 2013 Work Performance Evaluation for strengths and areas which provide opportunities for improvement it quickly became evident that people and partnerships were central to its successful planning and execution. Other areas proving important to a successful outcome include the need for information push, equipment and allocated resources, adequate staffing, timing and weather considerations.

### **People & Partnerships:**

The successful implementation of the WPE resulted in large degree from the coordination between the Henrico County Division of Fire, County Attorney, and Department of Human Resources. This preparation was substantial in an effort to provide a fair, consistent, and validated evaluation to the membership. Significant contributions were also made by the Fire Training Section, Fire Logistics, Fire Station Fifteen, and Fire Information and Technology

### **Information Push:**

A strong information push occurred prior to the start of the event in an effort to clearly define and explain the event to the incumbent members. A professionally quality video was developed which demonstrated each specific event and showed actual members participating. This included a direct address to the membership from the Fire Chief supporting the efforts of the WPE. A standard operating guideline (SOG) was also developed specifically for this event. Members were invited to trial the WPE during its development during which led to a reduced level of anxiety among Division members.

### **Staffing:**

Staffing, specifically the ability to reach outside of daily staffing and hire overtime, was also instrumental in the success of the event. Not only did the event conclude earlier than scheduled (5 vs. 6 weeks), but during several incidents where an injury or incident occurred that warranted the provision of emergency medical service care, appropriate and excellent care was able to be delivered with no interruption to the event. The set number of proctors (6) allowed for the prompt reset of the course, facilitating check-in and check-out, and provision of rehab monitoring all while limiting the individual company out of service time. In hiring overtime, the





Division limited the impact to the operational companies who otherwise would have seen select individuals absent from their primary assignment for over 5 weeks. By assigning the same thoroughly trained individuals to proctor the event, the standard was set and maintained at a very high level of professionalism and expertise.

It is worth noting that a strong level of empathy, excitement, and encouragement was demonstrated by the proctors. A minimum of these three attributes should continue to remain a staple of any assembly of proctors for future events. The use of overtime was limited to proctors. Members were evaluated on-duty with the impact to district response areas minimal through the frequent and consistent communication between the WPE coordinator and on-duty Battalion officers and District Chief. A schedule of units to attend was developed ahead of time that considered other ongoing Division activities and training.

### **Equipment & Allocated Resources:**

A tent designed for mobile deployment in the case of a mass casualty incident was transformed into a mobile command center for the duration of the WPE. This tent housed resources provided by County Information and Technology including computer, scanner, printer, and network access and assembled at the DOF training grounds (Drill Facility) in a location that would not interfere with company training or recruit school instruction. Also, logistics was able to support the provision of dedicated ALS and BLS EMS supplies including three cardiac defibrillator monitors, stretcher, and Advanced Life Support medications. Lastly, a compliment of station provisions such as a locker and workspace were provided for the duration of the event. A generator capable of supporting the provided heating and ventilation unit was also available to make conditions as comfortable as possible.

### **Timing & Weather:**

In only one incident did rain delay and subsequently cancel the morning session scheduled. Otherwise the weather and timing provided for no extreme heat or cold. An SOG was in place to provide for a clear directive of acceptable conditions to continue the event. The timing of the WPE provided the optimal window not only for weather, but also in consideration to limiting the impact to current DOF initiatives including district training, a recruit school, and active shooter training.





### **Back to Basics:**

A direct benefit to conducting any evaluation that requires the demonstration of basic, critical fire ground tasks is the opportunity to observe performance each task. The Division of Fire currently utilizes SCBA bottles with a full operating capacity of 2016 psi while it is beginning to phase in 4500 psi bottles. It was noted that 26% of personnel reported to the WPE with less than a full SCBA (2000 psi or less as described by NFPA 1404). SCBA's in front line protection of personnel must be "full" at all times. There is a need to remind personnel of performing proper morning checks of SCBA's and having low air pressure situations corrected immediately. Firefighters consistently demonstrated proper lifting techniques including ladder carry and victim drag, and in donning and doffing PPE. Members also routinely demonstrated **PRIDE** in the Division of Fire's core values-**Professionalism, Respect, Integrity, Dedication, and Empathy** in receiving, attending, and executing the event. Overwhelmingly the event was viewed as favorable by informal feedback to proctors.

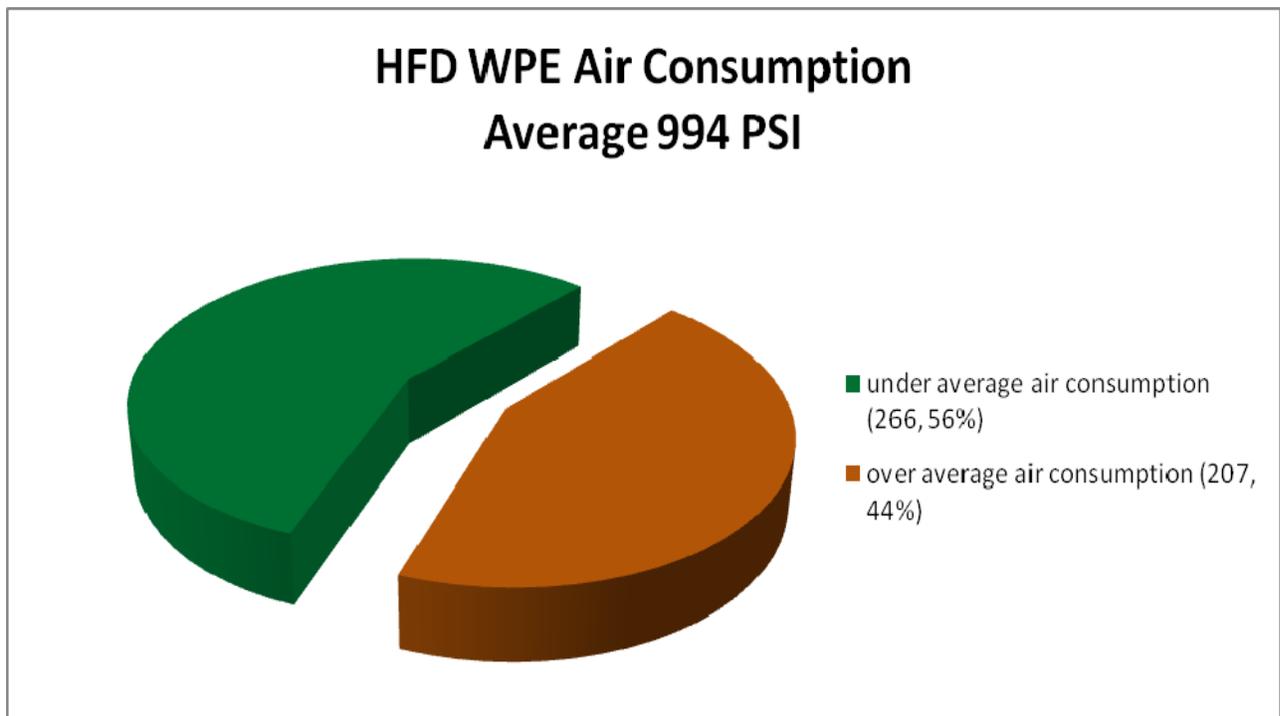
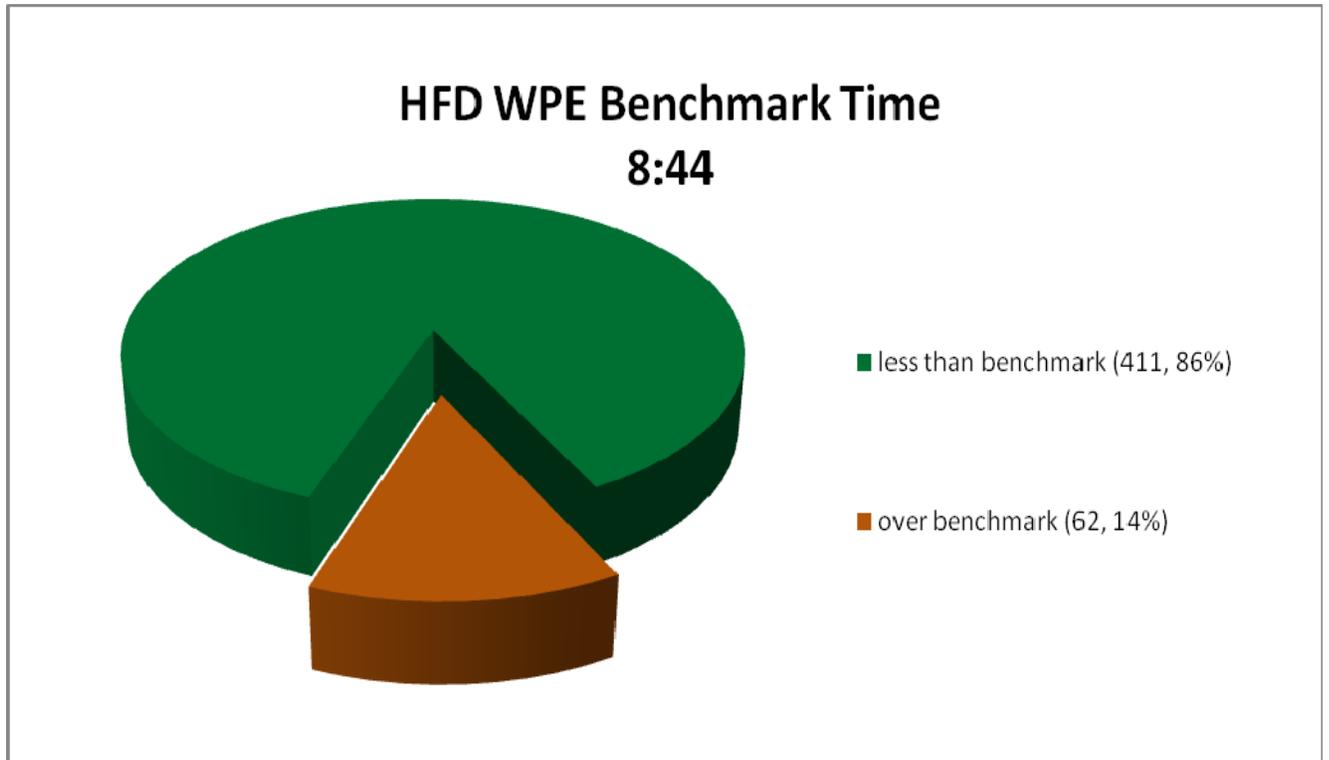
### **Opportunities for Improvement:**

The foremost complaint received from incumbents concerns the ergonomics of dragging the rescue mannequin. A harness with handles on the anterior chest of the mannequin was pre-rigged for a consistent approach (simulating the straps of a SCBA). Members were not allowed to deviate from grabbing the harness with both hands (to include applying webbing or utilizing a drag rescue device). Many members noted an increased strain on their lower back during this portion of the WPE. Future discussion is warranted regarding creating a more favorable ergonomic position. An additional suggestion includes utilizing the Molitor Machine ceiling-breach station of the Candidate Physical Aptitude Evaluation (CPAT) to simulate actually pushing and pulling ceiling. This is in lieu of a non-weighted pike pole with no resistance to either a pushing or pulling motion. Facility recommendations include the establishment of 220 AMP service at the drill school so that the generator is not needed saving in fuel costs in addition to setting the MCI tent (Command center) in an area that is not prone to drainage (minor flooding).



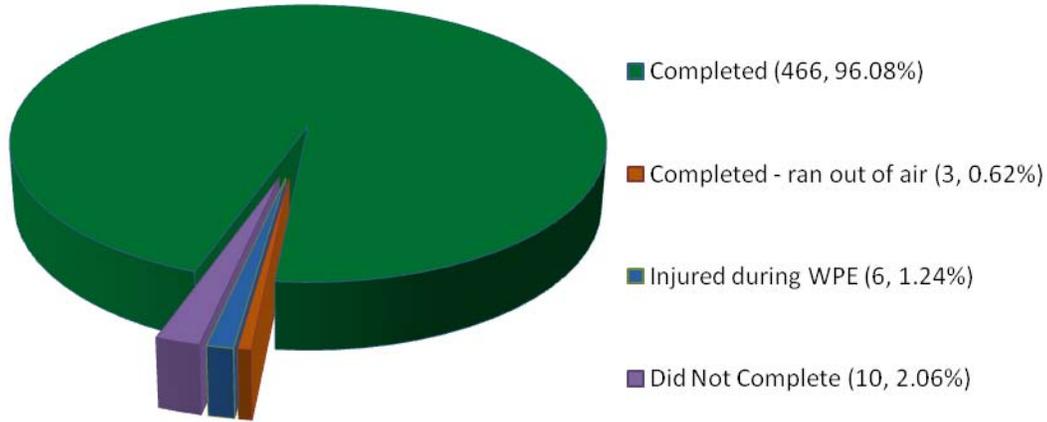


**Results**





### HFD WPE Course Completion



By age group:		WPE completion time		Air consumption	
		(seconds)	(minutes:seconds)	(psi)	
Age 20-25	n=2	362.50	06:02		660
Age 26-30	n=65	386.65	06:26		919
Age 31-35	n=89	398.54	06:38		944
Age 36-40	n=86	424.70	07:04		943
Age 41-45	n=104	445.84	07:25		930
Age 46-50	n=79	480.24	08:00		1076
Age 51-55	n=30	496.57	08:16		1102
Age 56-60	n=12	570.38	09:30		1190
Age 61 and above	n=6	555.17	09:15		1372

By years of service:					
1-5	n=101	391.45	06:31		922
6-10	n=137	417.96	06:57		977
11-15	n=111	446.79	07:26		931
16-20	n=44	476.84	07:56		1023
21-25	n=56	481.47	08:01		1054





26-30	n=20	526.65		08:46		1208
>30	n=4	596.00		09:56		1248

## Pre Pulse

## Post Pulse

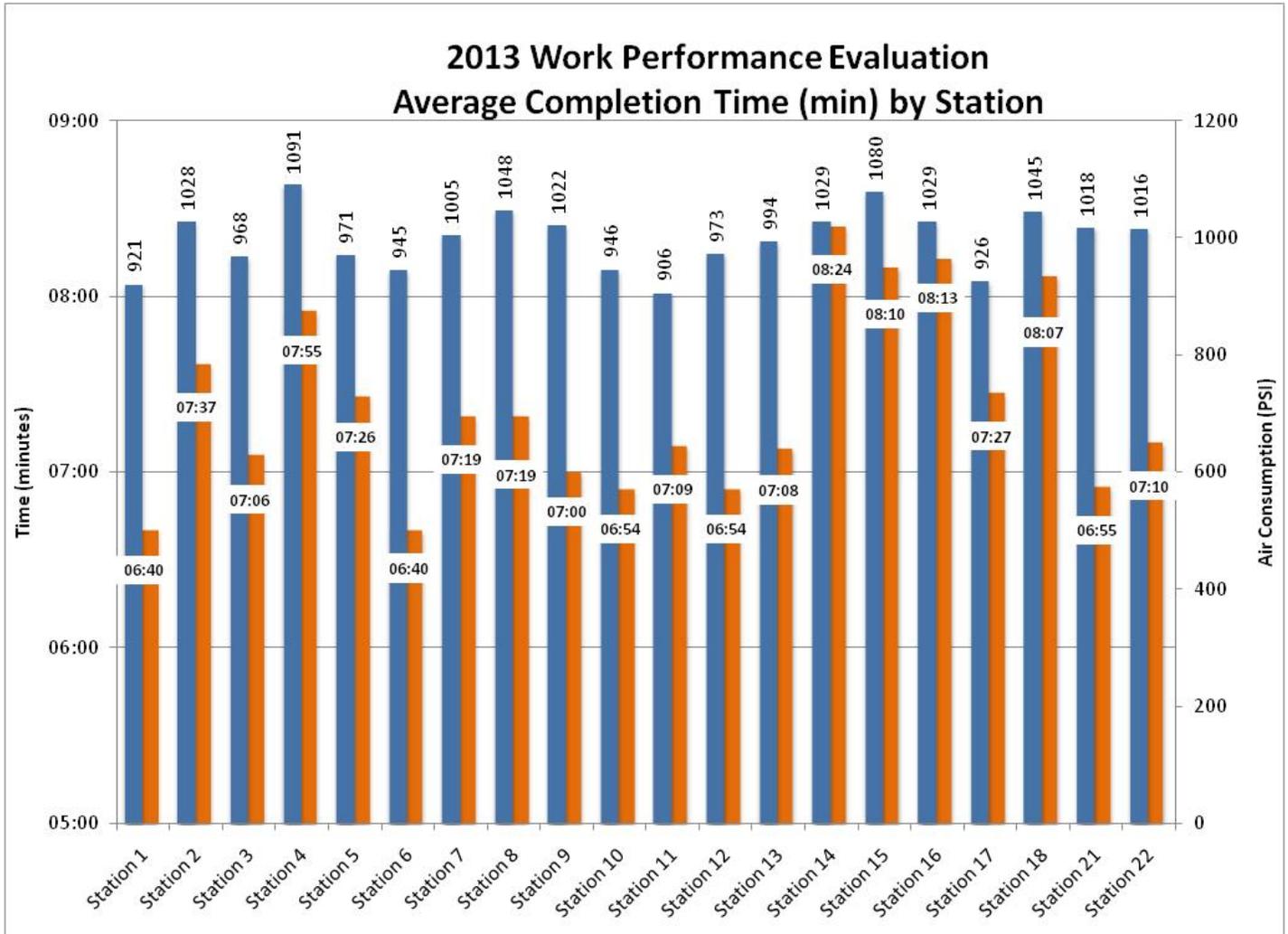
## By age group:

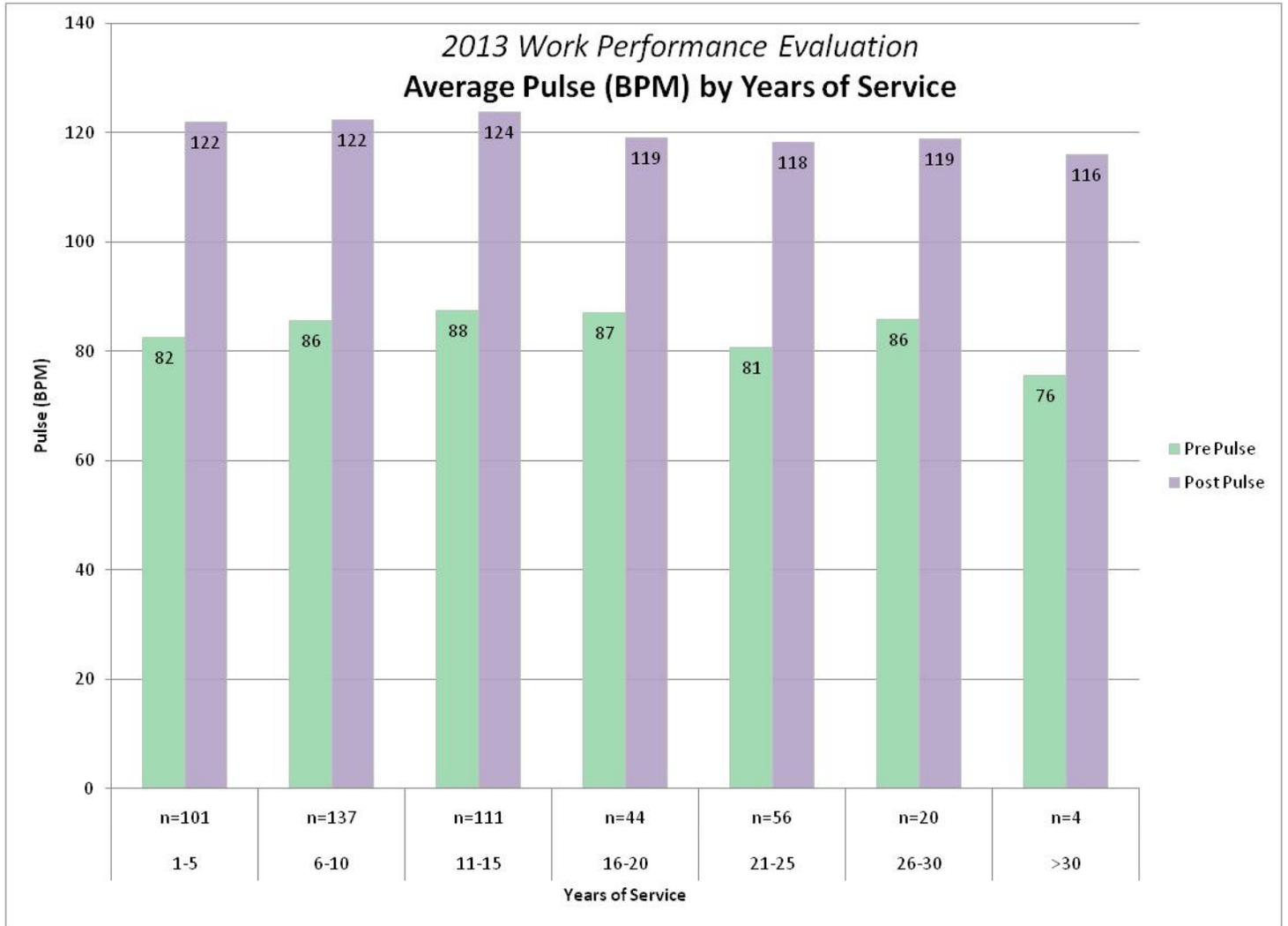
Age 20-25	n=2	362.50		90		117
Age 26-30	n=65	386.65		81		122
Age 31-35	n=89	398.54		85		125
Age 36-40	n=86	424.70		86		121
Age 41-45	n=104	445.84		88		123
Age 46-50	n=79	480.24		83		120
Age 51-55	n=30	496.57		86		116
Age 56-60	n=12	567.38		82		118
Age 61 and above	n=6	555.17		90		118

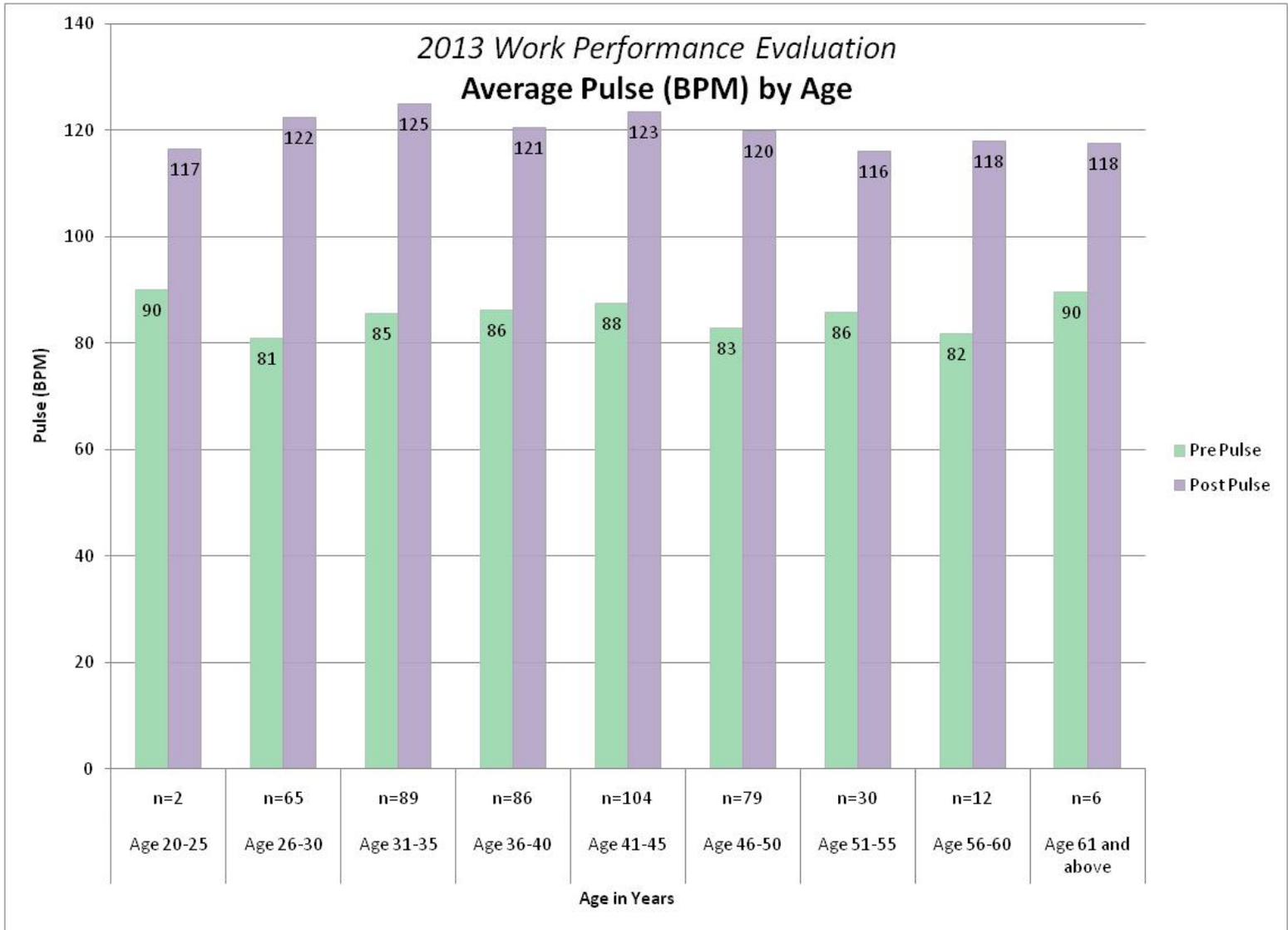
## By years of service:

1-5	n=101	391.45		82		122
6-10	n=137	417.96		86		122
11-15	n=111	446.79		88		124
16-20	n=44	476.84		87		119
21-25	n=56	481.47		81		118
26-30	n=20	526.65		86		119
>30	n=4	596.00		76		116











## *Recommendations*



Continue to require all incumbent members to participate in the WPE annually..



Continue to staff the Work Performance Event with off-duty personnel. The set number of proctors (6) allowed for the prompt reset of the course, facilitating check-in and check-out, and provision of rehab monitoring all while limiting the individual company out of service time.



Provide training and funding to expand peer fitness role.



Evaluate HR-16 (Physical Fitness) for possible update. Discuss practicality and necessity of requiring mandatory one hour of physical fitness per duty day.



Establish acceptable pre and post evaluation vital sign parameters that include heart rate and blood pressure. Provide for consistency with rehabilitation SOG to include operational events i.e. working fire, hazmat or technical rescues.



Utilize the WPE for physical evaluation of ability to return to full-duty following injury / illness and extended time away from full duty.



A concentrated effort should begin advertising the Employee Fitness and Wellness Section (Human Resources). Currently, not a lot about this section is known by the incumbent Division of Fire members regarding the availability of resources and services offered.



Establish and implement a perceived exertion scale which could include “effort employed” and “difficulty perceived”.



The conclusion and review of the WPE offers an opportunity to review staffing, equipment, and the facility costs of the event. Once realized, a budget should be developed so that the Division of Fire may continue to act as a responsible steward of its allocated financial resources.





## *Summary*

A goal of leadership at any level within an organization should include the creation of opportunities for its members to both improve and reinforce their job competency. The Henrico County Division of Fire leadership has chosen to place a value on creating opportunities for benchmarking and improving firefighter health and wellness. An annual and validated WPE offers the opportunity for an organization to directly gauge the wellness of the membership as it applies to conducting critical fireground related functions. The confidence that both members and the organization can derive from success in such a WPE is invaluable, and truly represents an opportunity to galvanize the organization.

The Henrico County Division of Fire saw a successful completion rate of over 87% (completion at or below the benchmark time of 8:44) in year one of administering the Work Performance Event which represents a tremendous showing. In terms of air usage, 56% of its membership completed the WPE utilizing at or below the average air consumption amount. The professionalism showed by the membership during the event is highly suggestive of an even higher successful percentage in next year's event. Members who did not successfully complete the WPE were provided voluntary referral to the County's Health and Wellness section, to include personal training and nutrition counseling both on and off-duty at no charge to the employee.

**The Henrico County Division of Fire applauds the efforts of those proactive departments who recognize the value in improving firefighter health and wellbeing, and encourages those departments in the early stages of exploration to make an event such as the Work Performance Evaluation an annual organizational priority.**





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## *Appendix*



Mendenhall, D., et al. (2005) *Validation of a Physical Work Performance Evaluation for Incumbent Firefighters*



Henrico County Division of Fire WPE (Proctor) Reference Guide



Henrico County Division of Fire WPE (Participant) Reference Guide



Henrico County Division of Fire WPE Participant Study Log



Henrico County Division of Fire SOG HR-28



Henrico County Division of Fire SOG EO-17



Henrico County Division of Fire SOG TR-7



Henrico County Division of Fire Unable to Complete Letter



Henrico County Division of Fire WPE Statistical Review (Graphs/Charts)



# VALIDATION OF A PHYSICAL WORK PERFORMANCE EVALUATION FOR INCUMBENT FIREFIGHTERS

12/05/2005

BY DARRELL MENDENHALL, MS; STEVEN MOFFATT, MD; TISCH WILLIAMS, MA; MIKE REEVES; JAMES GREESON; C. SHAWN SHELTON, BA; HOWARD STAHL; TERRELL W. ZOLLINGER, DRHP; ROBERT M. SAYWELL JR., PH.D., MPH; and CAROLYN MUEGGE, MS, MPH

INTENSE PHYSICAL EXERTION IS AN OCCUPATIONAL hazard inherent to firefighting. Since the National Fire Protection Association (NFPA) began reporting line-of-duty injury and fatality data in 1977, heart attack has been the leading cause of death, accounting for approximately half of all firefighter fatalities. In nearly all cases, these fatal heart attacks have been directly attributed to stress and overexertion. These data indicate that firefighters are regularly confronted with situations demanding levels of sustained physical effort often exceeding their physical working capacities, thus resulting in stress, overexertion, and heart attack.

As supported by the mortality statistics, cardiorespiratory fitness is well accepted as a critical requisite to the health, safety, and performance of firefighters in executing the duties of their job. In response to this, fire departments across the United States have implemented physical fitness programs, which include, among other things, a cardiorespiratory fitness assessment. While this type of an assessment provides information regarding a firefighter's cardiorespiratory fitness, it may not be a perfect indicator of whether a firefighter can perform firefighter-specific tasks. However, while a physical work performance evaluation can determine whether a firefighter can perform a determined set of critical essential firefighter tasks, it provides little insight regarding the cardiorespiratory capacity needed to perform them with reasonable safety. To better address this question effectively, it is important that when possible firefighters be physiologically evaluated while performing actual firefighter tasks or closely simulated tasks.

The Indianapolis (IN) Fire Department (IFD) joined forces with its International Association of Fire Fighters Local 416, Public Safety Medical Services (PSMS), and the Indiana University School of Medicine's Department of Family Medicine, Bowen Research Center to develop, validate, and physiologically evaluate a work performance evaluation for incumbent firefighters. In conjunction with its existing medical and fitness program, administered by PSMS, it is believed that a properly validated, job-relevant work performance evaluation for incumbent firefighters will further help protect the health and safety of incumbent firefighters while preserving the quality of protection it provides to the community.

## PURPOSE

The purpose of this study was twofold: to validate a job-specific physical work performance evaluation that represents the critical essential functions firefighters must be able to perform and to estimate the strength of the physiologic correlates associated with the successful completion of the evaluation. Results of the first phase of this study (the validation process) are presented in this article. Results of the second phase of the study (physiologic correlates) will be presented at a later date.

## METHODS

The methods used to validate this work performance evaluation have been modeled after the methods used by the International Association of Fire Fighters/International Association of Fire Chiefs

(IAFF/IAFC) Joint Labor Management Wellness Fitness Initiative in validating their Candidate Physical Ability Test. The following is a brief outline of the study methods, processes, and timelines.

## **Recruitment of Subjects**

The following eligibility criteria were established for participation in the validation of the work performance evaluation:

1. The firefighter must have been on full active duty status at the time of the study.
2. The firefighter must have been post-probationary employment status at the time of the study.
3. The firefighter must have completed a personal fitness evaluation (PFE) and medical examination within 12 months of study.
4. The firefighter must have passed test day resting biometrics (heart rate <100 bts/min. & blood pressure <160/100mm/hg).

The IFD Human Resources Department determined a pool of subjects who met the eligibility criteria. From this subject pool, 75 subjects were randomly selected from across all three shifts (24-A, 24-B, 27-C). IFD administration invited the subjects to participate; however, participation in the study was voluntary. The subject pool of 75 firefighters was evaluated for conformity with the demographic characteristics of the department. The subject pool closely resembled the demographic characteristics of the department as defined by age distribution, gender, and race.

## **Explanation of Study and Obtained Consent**

Subjects were informed of the purpose of the study in an initial invitation letter sent by the IFD Human Resources Department. Furthermore, all subjects were provided a participant consent form to read and sign, which detailed the purpose of the study, the procedures of the study, the inherent risks of participating in the study, and the confidentiality of subject data.

## **Pretest Measurements**

Height, weight, resting heart rate, resting blood pressure, body mass index, percent body fat, and lean body mass were measured prior to participation in the validation study of the work performance evaluation.

## **Description and Demonstration of Physical Work Performance Evaluation**

Subjects were asked to participate in a physical work performance evaluation that consisted of eight firefighter-specific tasks. On the day of their scheduled participation, each subject received a verbal explanation of the work performance evaluation while an IFD peer fitness trainer walked them through each station of the evaluation. These tasks were performed while wearing full personal protective equipment (PPE) and an SCBA tank. However, for the purposes of the study, in lieu of wearing an SCBA mask, a VMAX ST portable metabolic analyzer was worn on the chest and connected to a facemask worn by the subject, which enabled the collection and analysis of cardio respiratory data on each subject throughout the evaluation. The eight firefighter-specific tasks were as follows.

1 Personal Protective Equipment. This event allows the firefighter to safely don his complete issue of PPE (hood optional). The firefighter is to don a complete set of turnout gear, pants, boots, and coat; SCBA with face piece; and helmet (hood optional). The firefighter will move to a position that places him at the proper lifting point of his SCBA, lift and secure the SCBA, secure the face piece, and engage the second-stage regulator. Then, he signals ready for testing by raising either arm. (If the firefighter runs out of air during any event, he removes and stores the second-stage regulator and continues testing with ambient air; time will continue to run during this procedure.)



1

2 Ladder Carry, Raise, Extension. This event simulates the firefighter's ability to handle a 16-foot ground ladder and place and extend a 24-foot extension ladder. The firefighter performs a one-person lift and carries a 16-foot ground ladder from a marked starting position 75 feet to a marked ending position, and sets the ladder down. The firefighter then moves to the top rung of a 24-foot extension ladder, lifts the unhinged end from the ground, and walks it up until it is stationary against the wall.



2

3 Forcible Entry Simulation. This event simulates the critical task of using force to open a locked door or to breach a wall. The firefighter walks 75 feet to the forcible entry machine, picks up a 10-pound sledgehammer, and strikes the measuring device in the target area until the buzzer is activated.



3



4 High-Rise Pack Carry. This event simulates the firefighter's ability to carry a high-rise pack to an upper-story location. The firefighter walks 75 feet to this event to the marked area. The proctor places the high-rise pack over the top of the SCBA bottle. The firefighter walks with the high-rise pack 30 feet to the simulated stair platform. The firefighter then simulates climbing three floors by completely stepping up and down on the stair platform 30 times. The firefighter then carries the high-rise pack 30 feet back to the marked area; the proctor removes the high-rise pack.

5 Handline Advancement & Pull. This event simulates the critical task of advancing an uncharged hoseline and repositioning an uncharged handline. The firefighter walks 75 feet to the uncharged hoseline, picks up the nozzle, and advances the handline 75 feet to the marked position. He places the handline down and crawls back 50 feet, keeping one hand in constant contact with the hoseline. He then assumes a kneeling or sitting position and pulls back 50 feet of the hose.



6 Pike Pole Simulation. This event is designed to simulate the critical task of breaching and pulling down a ceiling to check for fire extension. The firefighter picks up a pike pole and walks 30 feet to the marked area and raises the pike pole 30 times. Both hands must be below the mark on the pike pole handle. A complete repetition consists of fully extending both arms upward and returning them to the starting position. After 30 complete repetitions, the firefighter returns to the starting point and places the pike pole in the marked area.



6

7 Equipment Carry. This event is designed to simulate the critical task of carrying equipment from a fire apparatus scene and returning the equipment to the apparatus. The firefighter walks to the marked area and carries the designated equipment 75 feet to the next marked area, sets the equipment down, lifts and carries the second item 75 feet back to the starting position, and sets the equipment down in the marked area. One-hand and two-hand carries with designated equipment are alternated. Tools are not to be dropped or thrown at any time.



7

8 Victim Rescue and Drag. This event simulates the critical task of removing a victim or an injured partner from a fire scene. The firefighter walks to the 165-lb. rescue dummy, lifts and moves the rescue dummy a distance of 75 feet, moves around the cone, returns to the starting position 75 feet away, and places the dummy in the marked area.

These events were performed in the above order in a continuous manner. Event 1 (PPE) was not a timed event. Timing of the evaluation began with the onset of event 2 (ladder carry, raise, extension) and concluded at the completion of event 8 (victim rescue and drag). Firefighters were instructed to perform tasks 2 through 8 at a rate of work (pace) they felt would reasonably be expected during an actual live fireground operation.

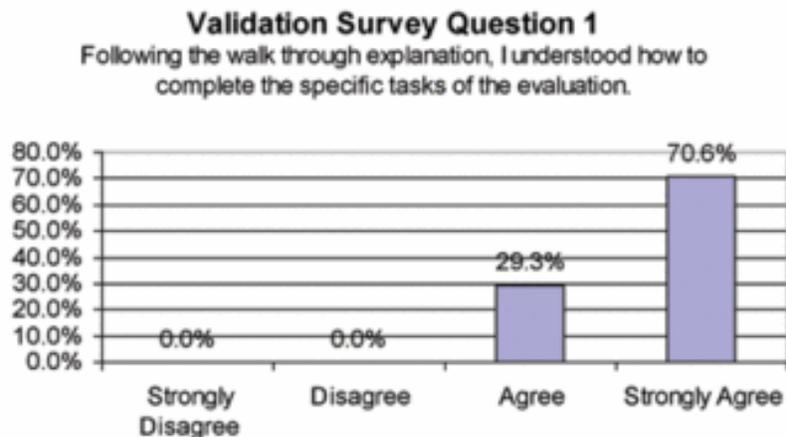


8

## Physiologic Monitoring and Data Collection

Cardio respiratory data were collected on each subject throughout the evaluation using a Sensormedics V-Max ST portable metabolic analyzer. Data were “marked” on the telemetry system of the metabolic analyzer at the conclusion of each task to identify individual time requirements for performing each task and to perform a metabolic analysis of each individual task as well as of the entire evaluation.

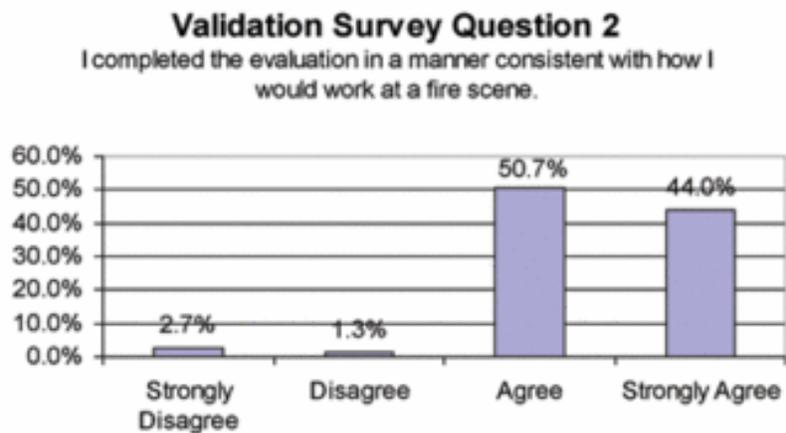
# Validation of a Physical Work Performance Evaluation for Incumbent Firefighters



All participants "agreed" or "strongly agreed" that they understood how to complete the WPE.

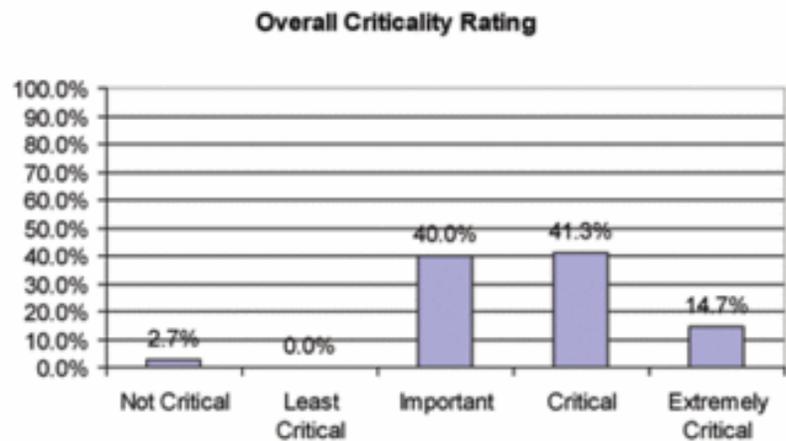
Figure 1

In addition, within two weeks of participating in the work performance evaluation, a maximal cardio respiratory assessment with gas analysis and 12-lead ECG was performed on all participants who met clinical eligibility criteria.



94.7% of participants completed the evaluation in a manner consistent with how they would work at a fire scene.

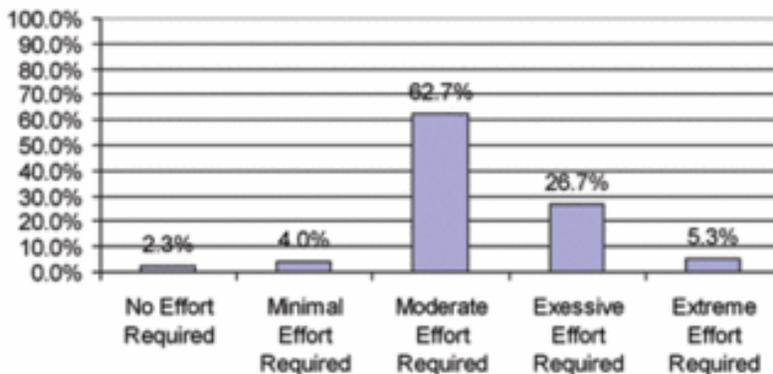
Figure 2



96.0% of participants rated the overall criticality of the tasks of the work performance evaluation as "important" to "extremely important."

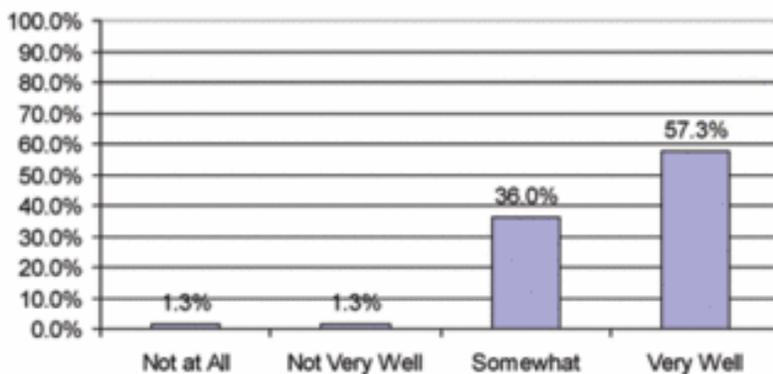
Figure 3

### Overall Physicality Rating



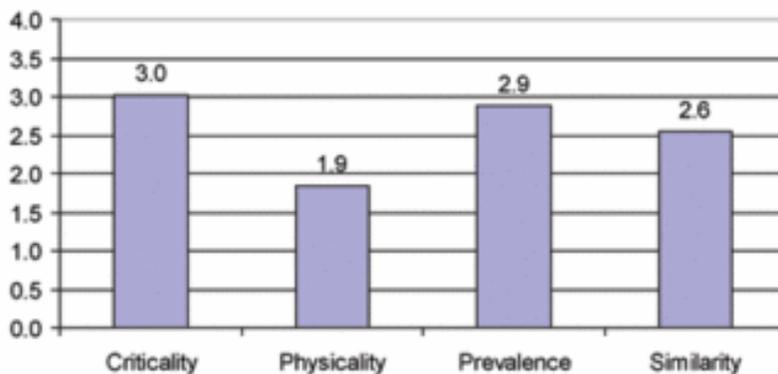
94.7% of participants rated the overall physicality of the tasks of the work performance evaluation as requiring "moderate" to "extreme effort."  
Figure 4

### Overall Similarity Rating



93.3% of participants rated overall how well the tasks of the WPE represented what occurs at a fire scene as "somewhat" to "very well."  
Figure 5

### Ladder Lift & Carry



Average Time to Completion of Task, 28 seconds  
Figure 6

## **Videotaping**

Each subject's performance was videotaped for the entirety of events 2 through 8 to be reviewed by a panel of experts at a later date.

## **Post-Test Measurements and Survey Completion**

Immediately following completion of the evaluation, firefighters went to a rehabilitation station, where post-test heart rate and blood pressure were monitored by a paramedic. While in rehabilitation, each firefighter completed a Work Performance Validation Survey. Subjects responded to questions regarding their understanding of how to complete the specific tasks of the evaluation and whether they performed the tasks in a manner consistent with live fireground operations. Each individual task was rated on a five-point Likert scale for criticality, physicality, prevalence, and similarity. The following definitions and descriptions were provided in the survey evaluation.

Criticality is the degree to which the task or set of tasks in question is considered critical to the performance of firefighting.

### **Criticality Rating**

- 0=Not critical (failure to perform results in no negative consequences)
- 1=Least Critical (failure to perform results in minimal negative consequences)
- 2=Important (beneficial for the successful performance of the job)
- 3=Critical (essential for the successful performance of the job)
- 4=Extremely Critical (failure to perform results in extreme negative consequences)

Physicality is the level of physical effort required to perform a specific task or set of tasks.

### **Physicality Rating**

- 0=No effort required (elicits no changes in heart rate, breathing rate, or overall feelings of fatigue; could continue indefinitely)
- 1=Minimal effort required (elicits minimal changes in heart rate, breathing rate, or overall feelings of fatigue; could continue for 1 hour or more)
- 2=Moderate effort required (elicits moderate changes in heart rate, breathing rate, and overall feelings of fatigue; could continue for 30 minutes or more)
- 3=Excessive effort required (elicits excessive changes in heart rate, breathing rate, and overall feelings of fatigue; could continue for 15 minutes or less)
- 4=Extreme effort required (elicits extreme changes in heart rate, breathing rate, and overall feelings of fatigue; could continue for 5 minutes or less)

Prevalence is the frequency with which the task or set of tasks is routinely performed at a fire scene.

## Prevalence Rating

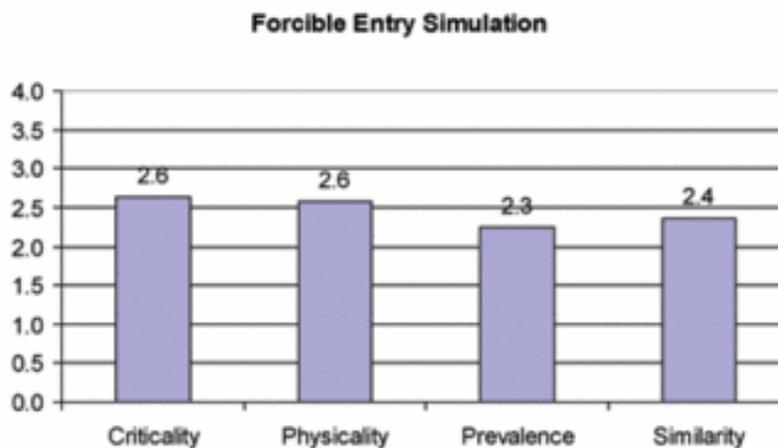
- 0=Never performed as a routine task at a fire scene
- 1=Seldom performed as a routine task at a fire scene
- 2=Occasionally performed as a routine task at a fire scene
- 3=Frequently performed as a routine task at a fire scene
- 4=Always performed as a routine task at a fire scene

Similarity is the degree to which the task or set of tasks performed in the physical work performance evaluation is the same as a task or set of tasks performed at a fire scene.

## Similarity Rating

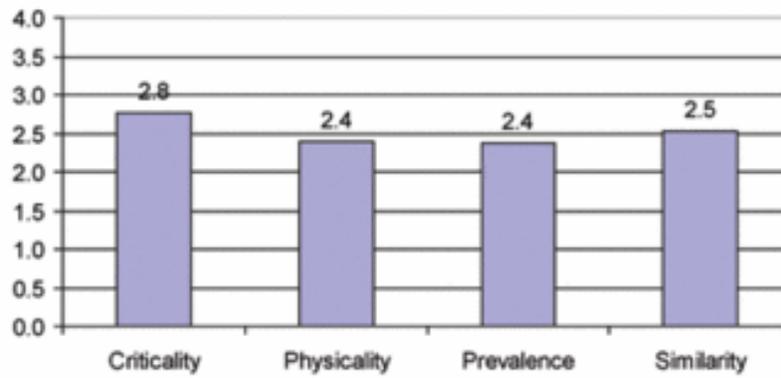
- 0=No similarity at all to what happens at a fire scene
- 1=Slightly similar to what happens at a fire scene
- 2=Somewhat similar to what happens at a fire scene
- 3=Highly similar to what happens at a fire scene
- 4=Exactly the same as what happens at a fire scene

The surveys were collected and summarized.



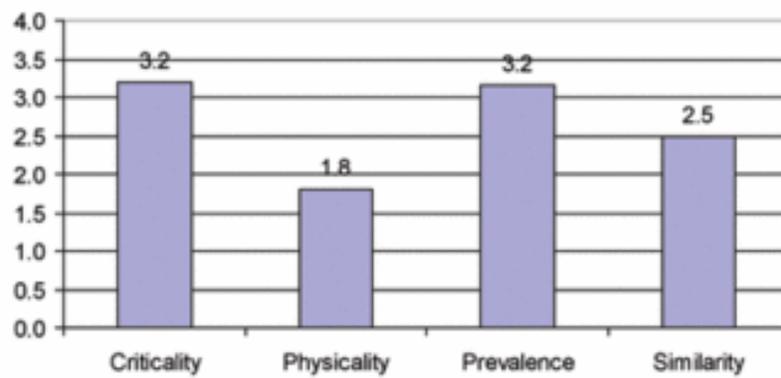
*Average Time to Completion of Task, 37 seconds*  
*Figure 7*

### High Rise Pack & Carry



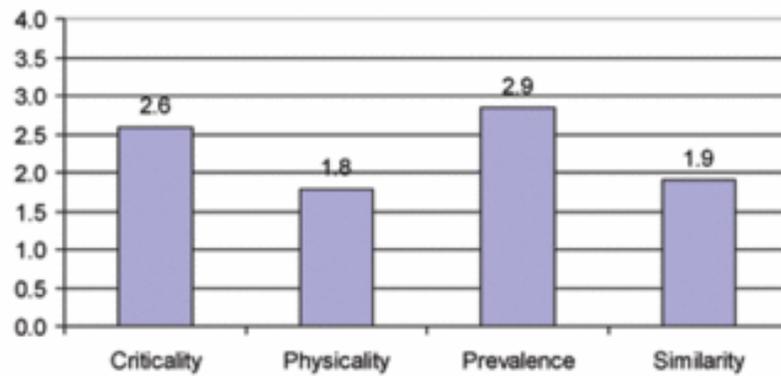
Average Time to Completion of Task, 1:46 seconds  
Figure 8

### Hand Line Advancement & Pull

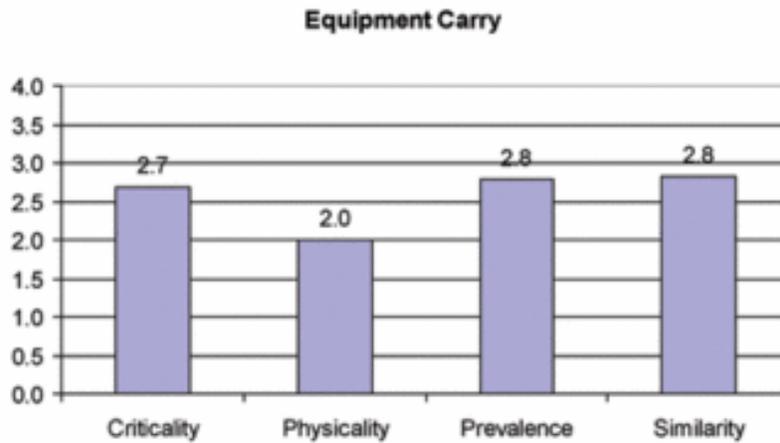


Average Time to Completion of Task, 1:22 seconds  
Figure 9

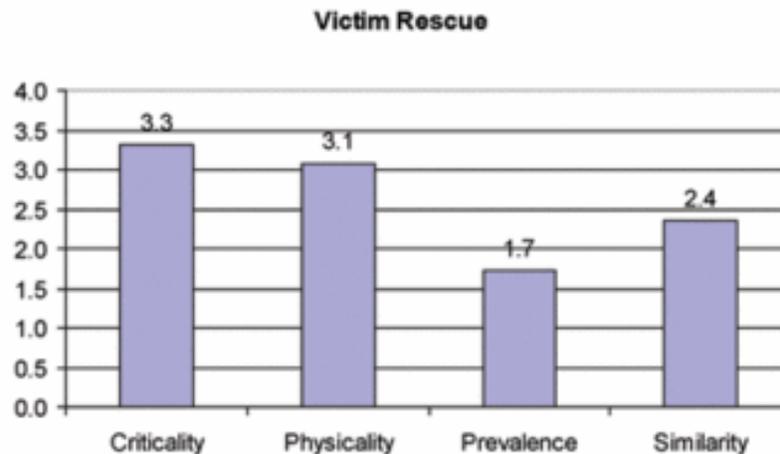
### Ceiling Pull Simulation



Average Time to Completion of Task, 1:03 seconds  
Figure 10



*Average Time to Completion of Task, 1:11 seconds  
Figure 11*



*Average Time to Completion of Task, 59 seconds  
Figure 12*

## Videotape Selection

The review panel selected videotapes for viewing based on the following criteria. Beginning with the median videotape, videotapes were selected in descending order of time approximately 30 seconds apart to and including the slowest tape of the group. Seven tapes were selected for viewing.

## Review Panel

A panel of IFD training officers served as content specialists and reviewed selected videotapes of firefighters performing the work performance evaluation. The officers were separated into three shift panels of approximately nine firefighters, each representing their respective shifts. The panels viewed and evaluated selected video tapings of IFD firefighters participating in the evaluation.

The panel members were instructed to provide their expert recommendation on determining a maximal acceptable time in which an incumbent firefighter should reasonably be able to complete the evaluation. After viewing each videotape, panel members rated each tape as “acceptable,” “marginally acceptable,” “marginally unacceptable,” or “unacceptable” based on the pace at which the firefighter completed the evaluation.

After all three shift panels viewed and rated the videotapes, their responses were analyzed to identify the first tape in the sequence of longer completion times for which a minority of the panel members

indicated the rate of work, or pace, was still acceptable to marginally acceptable. As a result, a time of 8:44 was established as the maximum time acceptable for successfully completing the work performance evaluation.

## **RESULTS**

The graphs above detail the results of the validation survey that all participating firefighters completed. Figures 1 through 5 provide an assessment of the work performance evaluation as a whole; figures 6 through 12 focus on each individual task of the evaluation.

The average time to complete the evaluation was 7:23 minutes. The maximal acceptable time established for successful completion of the evaluation based on the videotape ratings of the review panel was 8:44 minutes. Of the 75 participants in the validation phase, only seven (9.3%) completed the evaluation in more than 8:44 minutes.

## **CONCLUSION**

Firefighters determined this work performance evaluation to be a valid tool in evaluating an incumbent firefighter's ability to successfully perform the physically demanding essential functions of firefighting. The IFD and the IAFF Local 416 have agreed to incorporate this evaluation into their existing health and safety program. ■

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# **WPE PROCTOR COURSE SCRIPT**

***Read to Division Member as you are walking them towards the start area.***

- **The WPE will consist of 8 stations**
- **Move through the events continually and as safely as possible**
- **RUNNING IS NOT PERMITTED**
- **There will be 75 feet of 'walking rest' between each station**
- **If you run out of air, remove and secure your regulator, continue on ambient air**
- **Do you have any questions**

***Proctor notes:***

- **Ensure the SCBA bottle is full and charged.**
- **Record the starting air pressure from the ICM**
- **Ensure stopwatch is reset**
- **Instruct the Member to don full PPE**
- **When the Member signals ready, inspect Member to assure all PPE is in place and properly worn**
- **Instruct Member to engage regulator to face mask and begin when ready**
- **Start stopwatch when Member crosses yellow start line**

## **Event #1 Personal Protective Equipment**

- This event is not timed
- When you are instructed, begin donning your PPE and SCBA
- When you are finished dressing, signal by raising an arm
- When the Proctor is ready, you will be instructed to engage your first stage regulator.
- Time will start when you cross the yellow start line.
- Follow the orange line to the drill tower and the high rise pack event.

## **Event #2 High-rise pack carry**

- Pick up the high-rise pack and place it over your shoulder
- While climbing to the third floor your feet must touch every step
- Once you arrive on the 3<sup>rd</sup> floor landing touch the orange painted #3 on the wall
- Return down the stairs, touching every step
- Once you exit the drill tower, drop the high rise pack and follow the orange line

### **Event #3 Forcible entry simulation**

- Follow the orange line around the cone and proceed to the forcible entry simulator
- Once at the station pick up the sledge hammer and repeatedly strike the target until you hear the buzzer sound
- When finished, put down the sledge hammer and follow the white line towards the roof ladder

### **Event #4 Ladder carry, raise and lower**

- Pick up the roof ladder and carry it along the white dotted line toward the A/B corner of the drill tower.
- Place the roof ladder down inside the white painted box at the drill tower.
- Move to the extension ladder.
- Raise the ladder to the drill tower hand over hand and rung by rung not skipping any rungs.
- Once the ladder rests against the drill tower, lower the ladder back to the ground, hand over hand and rung by rung not skipping any rungs.
- Return to the roof ladder; pick it up and return it to its original position at the other end of the white line, placing it completely in the painted area.

## **Event #5 Ceiling Breach**

- Return to the A/B corner of the drill tower following the white line
- Pick up the pike pole placing your hands below the tape markers
- The top hand must be below the top mark
- The bottom hand below the bottom mark
- Fully extend both arms upward
- The top hand must extend above the shoulder
- Return to the starting position with the lower hand below the waist
- You will complete 30 repetitions
- I will count out loud for you
- You are not permitted to switch hands once you begin
- When completed, set the pike pole on the ground in the marked area

## **Event #6 Hand line advancement**

- Follow the green line to the hose and nozzle positioned in the white painted box.
- Pick up the hose and drape the nozzle over your shoulder, follow the yellow line to the green painted finish mark.
- When you have completely crossed the green line place the nozzle down on the ground.
- Turn around and crawl back down the hose line on your hands and knees.
- Keep your left hand in contact with the hose during your crawl.
- When you reach the orange line, stand up and continue to walk to the white box.
- Once inside the white box, assume a kneeling position of one or two knees
- Pull the hose back to you until the nozzle is completely inside the white painted box.

## **Event #7 Tool Carry**

- Stand up and walk toward the two saws in the green painted box.
- Pick up one saw in each hand and follow the yellow line around the cone and back to your starting position.
- Upon you return, place the saws back inside the green box.
- Do not drop or throw the saws.

## **Event #8 Victim Rescue**

- Walk toward the rescue victim.
- Grasp the victim's shoulder harness placing one hand in each loop.
- Drag the rescue victim along the orange line, around the barrel, and back to the starting position.
- Time will stop when the rescue victim's feet completely cross the white line.

### **Proctor notes:**

- **Record remaining air pressure**
- **Record evaluation elapsed time**
- **Record course completion time of day.**

# 2013 Work Performance Evaluation

*Henrico County*

*Division of Fire*



## **Overview:**

The Henrico County Division of Fire Work Performance Evaluation (WPE) consists of 8 events designed to evaluate each sworn member's ability to physically perform the essential functions required to execute the duties of a firefighter.

The 8 evaluation events are:

1. Donning of PPE and SCBA (this event is not timed)
2. High-rise pack carry
3. Forcible entry simulation
4. Ladder carry & raise / lower
5. Hand line advancement / hand line pull
6. Pike pole simulation
7. Equipment carry
8. Victim rescue / drag

The events are continuous and the member is encouraged to pace themselves and move through the events safely at a work pace. The donning of the personal protective equipment (PPE) is not timed. The Proctor will ensure that all PPE is present, in place and properly worn, enabling the firefighters to perform the evolutions safely.

Events 2-8 of the WPE are timed events. Members are encouraged to move through the events continually and as safely as possible. **RUNNING IS NOT ALLOWED AT ANY TIME** during the evaluation procedure. Successful completion of the WPE is defined as meeting the pre and post vital signs criteria (contraindications) and completing all events in a continuous manor without experiencing any General Indications. Reference SOG HR-28 Work Performance Evaluation.

## Work Performance Evaluation (WPE) description of events:

### *Event 1: Personal Protective Equipment:*

This event allows the firefighter to safely don their complete issue of personal protective equipment.



The firefighter is to don a complete set of turnout gear; pants, boots, coat, SCBA with face piece, hood, firefighting gloves and helmet. The firefighter will move to a position that places them at a proper lifting point for their SCBA, lift and secure the SCBA; secure their face piece, and open their bottle. The member signals ready for evaluation by raising either arm. When directed, the firefighter shall engage the second stage regulator. (If the firefighter runs out of air during any event the firefighter will remove and store their second stage regulator and continue with ambient air. Time will continue to run during the procedure.)

***\*\*\*Time begins at Event 2 once the Firefighter steps across the line \*\*\****

### *Event 2: High Rise Pack Carry:*

This event simulates the firefighter's ability to carry a high-rise pack to an upper-story and return.



The firefighter walks to the marked event area. The firefighter picks up the high-rise pack (100' of 1 ¾ hose) and places it over a shoulder. The firefighter enters the drill tower with the high-rise pack. The firefighter then climbs three floors of the drill tower, touches the #3 on the 3<sup>rd</sup> floor stairwell landing and returns to the ground level, stepping on all steps both ascending and descending. The Firefighter carries the high-rise pack back to the marked area placing the high-rise pack on the ground in the marked area.

*Move to next event.*

### ***Event 3: Forcible Entry Simulator:***

This event simulates the critical task of using force to open a locked door or to breach a wall.



The firefighter walks 75 feet to a forcible entry machine, picks up an 8-pound sledgehammer and repeatedly strikes the measuring device in the target area until a buzzer is activated.

*Move to next event.*

### ***Event 4: Ladder Carry & Raise:***

This event simulates the firefighter's ability to carry a 16 foot ground ladder, and raise and lower a 24-foot extension ladder



The firefighter will perform a one-person lift and carry of a 16-foot ground ladder from a marked starting position for a distance of 75 feet to a marked ending position and sit the ladder down in the marked area. The firefighter then moves to the top rung of a 24 foot extension ladder, lifting the unhinged end from the ground, and walking it up rung by rung, touching every rung on the bottom section, until it is stationary against the wall. The firefighter then lowers the ladder, walking it down rung by rung, in a controlled manor to the ground. *Move to next event*

## ***Event 5: Hand Line Advancement and Pull:***

This event simulates the critical task of advancing an uncharged hand line and repositioning an uncharged hand line.

The firefighter walks 75 feet to the uncharged hand line, picks up the nozzle and advances the hand line 75 feet to the marked position. The firefighter places the hand line down and crawls back 50 feet, keeping one hand in constant contact with the hose line.



The firefighter then assumes a kneeling or sitting position and pulls back 50 feet of hose.



*Move to next event.*

## Event 6; Pike Pole Simulation:

This event is designed to simulate the critical task of breaching and pulling down a ceiling to check for fire extension.



The firefighter walks 75 feet to the marked area and picks up a 10' pike pole, raising and lowering the pike pole 30 times. The firefighter's top hand must be below the top mark, and the firefighter's bottom hand below the bottom mark on the pike pole handle. A complete repetition consists of fully extending both arms upward with the top hand extending above the shoulder, and returning to the starting position, with the lower hand below the waist. Switching hand position is not allowed after the first extension and lower. After 30 complete repetitions, the firefighter returns the pike pole to the marked area.

*Move to next event.*

## Event 7: Equipment Carry:

This event is designed to simulate the critical task of carrying equipment from a fire apparatus scene and returning the equipment to the apparatus.



The firefighter walks 75 feet to the equipment in the marked area. The firefighter then picks up and carries the equipment 75 feet, returning to the marked area and sitting the equipment down in the marked area. The equipment is not to be dropped or thrown at any time.

*Move to next event.*

## ***Event 8: Victim Rescue:***

This event simulates the critical task of removing a victim or injured partner from a fire scene.



The firefighter walks 75 feet to the 165 lb. rescue victim. The firefighter lifts and drags the rescue victim, utilizing the hand loops on the rescue harness. The firefighter will then drag the rescue victim around the barrel and return to the marked starting location, a distance of 75 feet. Time stops when the feet of the rescue victim completely cross the start / finish line.

**\*\*\* The WPE evaluation is complete; move to the rehabilitation area\*\*\***

**2013 WPE participant log**

Date      /      / 2013

Last name \_\_\_\_\_ First \_\_\_\_\_ MI \_\_\_\_\_

Location \_\_\_\_\_ Shift \_\_\_\_\_ Age \_\_\_\_\_ Gender - M / F

**Pre - vital signs**

**Proctor Assessing:** \_\_\_\_\_ **Signature** \_\_\_\_\_

Time	Pulse	Temperature	Notes
:			
:			
:			

Initial air cylinder, psi	
Final air cylinder, psi	
Air Usage, psi	

**Lead Proctor:** \_\_\_\_\_

WPE Event Completion Time (mm:ss) \_\_\_\_\_:\_\_\_\_\_

Course Completion Time of Day (hh:mm) \_\_\_\_\_:\_\_\_\_\_

Course Proctor: \_\_\_\_\_ **Signature** \_\_\_\_\_

**Post – vital signs**

**Proctor Assessing:** \_\_\_\_\_ **Signature** \_\_\_\_\_

Time	Pulse	Temperature	Notes
:			
:			
:			
:			
:			

Comments: \_\_\_\_\_

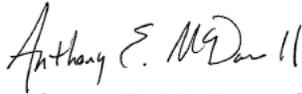
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**Division Members Signature:** \_\_\_\_\_

**County of Henrico  
Division of Fire**

By order of:



**Anthony E. McDowell  
Chief, Division of Fire**



**Title: HR-28  
Work Performance Evaluation**

**Effective Date: September 23, 2013**

**Rescinds: N/A**

**Background** The Henrico County Division of Fire recognizes the imperative that as fire service professionals each of us maintain a high standard of physical readiness in order to meet the inherent demands of providing the highest quality emergency services to the citizens we are sworn to serve, to our brother and sister firefighters, and to ourselves. As such, the Division of Fire has established a minimum level of acceptable performance of job-related tasks. The Henrico County Division of Fire Work Performance Evaluation (WPE) will evaluate each sworn member's ability to physically perform the essential functions required to execute the duties of a Firefighter. All sworn Division Members will be evaluated annually.

**Purpose** To define the guidelines used for Division of Fire members participating in the annual Work Performance Evaluation (WPE).

**WPE Overview** The WPE consists of 8 events designed to evaluate each sworn member's ability to physically perform the essential functions required to execute the duties of a Firefighter. The 8 evaluation events are:

1. Donning of PPE and SCBA (this event is not timed)
2. High rise pack carry
3. Forcible entry simulation
4. Ladder carry & raise / lower
5. Hand line advancement / Hand line pull
6. Pike pole simulation
7. Equipment carry
8. Victim rescue / drag

**Objectives** The Work Performance Evaluation (WPE) will be administered with the following objectives:

- Measure individual member ability to perform essential firefighting tasks
- Measure Division-wide firefighting task performance

### **Benchmark Goal Parameters**

- The benchmark goal of the WPE is completion of all events in less than or equal to 8 minutes and 44 seconds, with breathable air remaining in the SCBA cylinder. The inability to meet the benchmark goal will not result in the removal from duty. However, members who are unable to meet the benchmark goal are strongly encouraged to take advantage of all available fitness resources provided including Division of Fire Peer Fitness Trainers and/or Department of Human Resources Fitness and Wellness Division services.

## WPE Environmental and Site Procedures

The safety of Division members will be the top priority during the administration of the WPE. The strenuous nature of the WPE requires members to be monitored closely throughout the evaluation process.

The lead proctor will assess the current weather conditions utilizing [weatherbug.com](http://weatherbug.com) ; zip code (23060). Weather conditions will be assessed and recorded on the WPE Day log 30 minutes prior to beginning the WPE and every hour during the evaluation. Any suspension or termination of the WPE will be documented in the WPE Day log.

The WPE will not be administered when the following environmental conditions exist:

- Heat Index > 90F
- Sustained Wind >25mph
- Sustained Wind Chill < 32F
- Temperature < 32F
- Rain >0.5"/ hr.
- Lightning in the area (min. 30 minute delay following most recent thunder)
- Any other condition the Lead Proctor determines to present a potential for injury

The WPE will be administered collectively through the Safety & Wellness Section and the Training Section. All lead proctors will be certified Peer Fitness Trainers, and/or CPAT Proctors.

A fully equipped Henrico County Division of Fire ALS Provider (EMT-I or EMT-P) will be on scene for any medical emergency that might arise. The WPE Medic will be equipped with a standard compliment of BLS/ALS equipment and medications.

All members performing the evaluation will be given training materials prior to administration of the evaluation consisting of:

- Video of WPE
- Written description of WPE procedures
  - Description of each task to be performed
  - WPE benchmark
  - Acceptable performance techniques

## General Safety Guidelines

An assigned proctor will constantly monitor each member during the WPE. If the proctor determines that safety is compromised due to unsafe technique, the member attempting the WPE will be stopped and instructed in the proper technique. Time will continue to run during this period.

A WPE attempt shall be stopped for the following reasons:

- An injury or illness occurs during the WPE that may place the member at risk
- An environmental condition exists that may place the member at risk
- Any failure in WPE equipment or personal protective equipment that adversely affects member safety

## Equipment Failure / Unsafe Weather Conditions:

- The WPE attempt will be stopped if the proctor determines that unsafe weather conditions or equipment failure creates a safety issue
- The failure of WPE equipment or personal protective equipment that affects the WPE attempt of a member will invalidate that attempt if the lead proctor determines the equipment failure adversely affected the WPE attempt
- Following an assessment stoppage for unsafe weather conditions or equipment failure, the member will report to the rehabilitation area.
- Any member affected by an invalidated WPE attempt resulting from unsafe weather conditions or equipment failure will be reevaluated following a sufficient rest and recovery period to be determined by the lead proctor.

## Participation Criteria

- To participate in the WPE a member must be on full duty status

## Medical / Fitness Guidelines

- Throughout the WPE, a proctor will monitor each member for potential for injury or illness. If in the proctor's opinion any individual exhibits signs indicating they could be at risk for injury or illness the WPE shall be stopped
- General indications for terminating a WPE attempt include but are not limited to:
  - Onset of angina or angina-like symptoms
  - Signs of poor perfusion: lightheadedness, confusion, ataxia, pallor, cyanosis, nausea or cold and clammy skin
  - Unusual or severe shortness of breath
  - Physical or verbal manifestations of severe fatigue
  - Physical or verbal manifestations of injury
  - Acute myocardial infarction or suspicion of myocardial infarction.
  - Any chest pain or chest discomfort
  - Member request to stop
- Any member who experiences an injury or illness during the WPE will immediately notify the proctor and will be evaluated by the WPE medic
- The on duty District Chief will be notified by the lead proctor of any member removed from full duty for any reason (injury, illness, other)

Following an unsuccessful attempt of the WPE:

- Any member who experiences an injury or illness during or after the WPE ***may*** be transported to the closest appropriate medical facility at the discretion of the WPE medic, the member's supervisor, or at the request of the member
- Any member experiencing an injury during the WPE shall follow SOG HR-02 *Worker's Compensation/Injury Reporting*. The WPE Lead Proctor will complete the *Supervisor's Report of Injury*
- Any member experiencing an injury during the WPE will be placed on injury leave if the injury results in the member being removed from full duty status

## Rehabilitation

All personnel will undergo a post-WPE evaluation consistent with SOG EO-17, *Fire ground Rehabilitation* after completing the WPE. The rehab area will be an enclosed, climate controlled area offering seating, active and passive cooling or warming of participants as appropriate. The rehabilitation area will accommodate rehydration and seating areas. Members are not to wear any turnout gear in to the rehabilitation area

While in the rehabilitation area, vital signs will be assessed and documented as follows:

- The heart rate should be measured for 30 seconds as early as possible in the rest period. If a member's heart rate exceeds 110 beats per minute, an oral or earlobe temperature should be taken. If the member's temperature exceeds 100.6°F he/she will have a full set of vitals taken
- If the temperature is below 100.6° F and the heart rate remains above 110 beats per minute rehabilitation time should be increased.
- Blood pressures should be taken on all personnel who have a heart rate above 110 bpm and a temperature of 100.6F
- Additional assessment, such as ECG monitoring, may be performed at the discretion of the ALS provider

## Proctor Responsibilities

The lead proctor is responsible for ensuring that all guidelines are followed. The following guidelines will be applicable when the WPE is stopped as the result of an injury or illness (see General Indications) or if the member is unable to recover despite adequate rehabilitation:

Lead proctor responsibilities are as follows:

- Inform the member of the reason(s) for stopping the WPE
- The lead proctor shall confer with the WPE medic to assess the potential need for transportation to an appropriate medical facility
- Advise the member that they will not be able to finish the duty shift
- The lead proctor will ensure that the member is not allowed to ride any apparatus
- Ensure that the member is provided or seeks the required medical attention
- Ensure the member is provided transportation back to the member's duty location if appropriate, the Division of Fire will provide transportation to the member's duty location or an appropriate medical facility
- Workers compensation forms will be completed if appropriate or requested by the member
- Notify the on-duty District Chief of any significant events which occur during the WPE to include but are not limited to: injuries and/or illnesses requiring transport, any removal from full duty of any member, any refusal to participate in the WPE by any member

## Member Responsibilities

Once notified by the lead proctor of their inability to complete the WPE due to injury or illness, the member must comply with the following guidelines:

- The member must follow the instructions of the Division's representative at the evaluation facility
- The member may not travel back to their duty assignment or any other location on fire apparatus (Pumpers, Tankers, Trucks, Brush Units, Medics etc.)
- The notified member is immediately removed from full duty, and shall not respond to or participate in any work related or emergency operations
- The member must seek medical attention at the earliest available appointment. This medical attention may be in the form of seeing their own physician, or in the case of a work related injury, any approved Workers' Compensation facility/physician as listed on the Panel of Approved Physicians

## **Notification**

The lead proctor will email the Assistant Chief of Operations a scanned copy of the completed WPE Day log at the end of each day along with a scanned copy of WPE participant form(s) of any member who is unable to complete the WPE for any reason.

## **Fitness Evaluation Referral**

The Fire Chief or his designee will refer all Division members that are unable to complete the WPE for any reason to the Henrico County Fitness and Wellness Division for a voluntary physical fitness assessment. The Department of Human Resources Fitness and Wellness Division will conduct a thorough physical fitness assessment and make recommendations to the referred member. The Division of Fire pledges to fully support the recommendations of the Fitness and Wellness Division. This includes adjusting work location assignment as necessary to accommodate the recommended fitness and rehabilitation activities.

Physical fitness assessment objectives are to assess the five components of basic physical fitness to determine a baseline level of fitness. The five components are body composition, aerobic capacity, muscular strength, muscular endurance, and flexibility.

Physical fitness rehabilitation consists of building muscular strength/endurance, and cardiovascular health, and flexibility. The goals are to maximize job performance, provide fatigue countermeasures and injury prevention

- Cardiovascular fitness programming – during the course of rehabilitation, cardiovascular capacity will increase through the implementation of both moderate and vigorous intensity conditioning. Cross training is encouraged in order to mitigate overuse injuries and support muscle balance.
- Muscular Strength programming – focuses on developing the strength needed to accomplish work related tasks.
- Muscular Endurance programming – focuses on elongating muscle fibers, building muscular endurance, and preparing muscles for long duration tasks.

During the initial physical fitness conditioning stage, calisthenics are recommended in conjunction with the cardiovascular, muscular strength and endurance exercises.

- Flexibility programming - an important component of the physical fitness rehabilitation includes appropriate pre-exercise warm-up and a post exercise cool down and stretching regime.

## **Return to Full Duty**

Any member who suffers an injury or illness during the WPE that results in removal from full duty status must present a Physical Capabilities Form completed by their treating health care provider prior to returning to full duty. The member must notify their chain of command and turn in the completed form to their District / Battalion Chief prior to returning to full duty.

The member presenting a Physical Capabilities Form that indicates anything other than a release to Full Duty must notify their chain of command. The Physical Capabilities Form will be routed to the Assistant Chief of Operations.

The Division Member is responsible for completing and submitting all appropriate forms for Workers Compensation and FMLA. These forms should be completed and submitted in accordance with SOG HR-02 and County FMLA policy. The Division of Fire does **not** make the final determination regarding Workers Compensation.

County of Henrico  
Division of Fire

By order of:

  
Edwin W. Smith

Chief, Division of Fire



Title: EO-17

Fireground Rehabilitation

Effective Date: April 15, 2009

Rescinds: January 15, 2008

**PURPOSE:** To ensure that the physical and mental condition of members operating at the scene of an emergency or training exercise does not deteriorate to the point that affects the safety of each member or that jeopardizes the safety and integrity of the operation.<sup>i</sup>

**SCOPE:** This procedure should apply to all emergency operations and training exercises where strenuous physical activity or exposure to heat, cold, or other extreme conditions exists. Extra caution is necessary in conditions of high ambient temperatures as heat exhaustion and heat stroke are more likely to occur in these conditions.

**RESPONSIBILITIES:**

- a. **Incident Commander:** The IC should initiate the “rehab group” on all incidents that are projected to last more than one hour of continuous strenuous activity, and on any incident where there is the probability of prolonged exposure to heat, cold or other extreme weather conditions. The rehab group will provide medical evaluation with ongoing monitoring of vital signs, treatment, nourishment and re-hydration of firefighters and rescue personnel while on scene. Once the rehab group has been established the IC will provide the Rehab Officer with all resources needed to provide safe, comfortable rehab to our firefighters.
- b. **Training:** The lead instructor at training evolutions and physical agility testing should assure that adequate staffing is present to establish a rehab group.
- c. **Supervisors:** All supervisors should maintain an awareness of the condition of each member operating within their span of control and ensure that adequate steps are taken to provide for each member’s safety and health. The officer/acting firefighter should use the incident command system to request relief for his crew when needed.
- d. **Personnel:** Members of a company should advise their supervisor when they, or another member of their company, have become fatigued. Safety is the primary concern of **ALL** personnel while on any scene, be it emergency or training. Companies will report to rehab as a company and remain together throughout rehab, unless specifically reassigned by the Rehab Officer or the Incident Commander.

## **ESTABLISHING “REHAB”:**

- a. Responsibility:** The Incident Commander should establish a Rehabilitation Group when conditions indicate that rest and rehabilitation is needed for personnel operating at an incident scene or training evolution. A member will be placed in charge of the group and should be known as the Rehab Officer. The Rehab Officer will typically report to the Incident Commander or Logistics Officer on larger incidents.<sup>ii</sup>
- b. Location:** The location for “rehab” should be selected by the Rehab Officer unless previously designated by the Incident Commander or Logistics Officer. An ambulance or other suitable unit should be used as the hub of the rehab area utilizing equipment provided by the utility truck or Incident Support Unit. Accessible buildings should be used to complement the rehab unit when available, i.e. garages, businesses, etc. The Division utility truck operator (Utility 22) should not be used as the Rehab Officer except as a last resort due to the operator of that unit already having several labor-intensive responsibilities that are integral for safe fireground operations.
- c. Site Characteristics:**
1. Safety should be of primary concern. Rehab should be far enough away from the incident where all gear can be removed and the firefighter can relax without concern for safety.
  2. Rehab should be positioned so that personnel are not encouraged to wander back and forth when they are assigned to rehab.
  3. To provide protection from environmental elements when possible, climate controlled buildings or units should be utilized. Shade/cover is essential in direct sunlight or precipitation.
  4. Care should be taken to keep the rest area away from the exhaust of diesel engines.
  5. Access in and out for both personnel and EMS units should be considered when possible.
- d. Resources:** The Rehab Officer should secure all necessary resources required to adequately staff and supply the rehab group. Below is a suggested list of needed personnel and equipment to assure this function.
1. Personnel - generally two personnel, familiar with this SOG and the required documentation, will be needed to effectively staff the rehab group. These personnel must be certified as EMT-B or higher.
  2. Utility truck and/or Incident Support Unit
  3. Medical: all medical equipment that is needed should come from the ambulance, with any additional equipment coming from earlier arriving companies.
  4. The Salvation Army and American Red Cross are available and can be requested through the IC for any incidents of long duration. (90+ minute response times can be anticipated)
  5. The IC may request a GRTC or county school bus to provide shelter from the environment when there is no other structure readily available. (GRTC would be more capable of providing heated and cooled buses.)

## **GUIDELINES:**

- a. Extent of Rehab Group:** It will be at the discretion of the IC or Rehab Officer to decide on the extent that the rehab group is utilized. In cool weather it may not be necessary to set up all aspects for a single family “room and contents” type fire, where in extreme heat or cold it may be deemed essential. Full rehabilitation efforts are highly encouraged on all scenes when temperatures are above 85 degrees or below 30 degrees. Under these conditions some type of relief from weather conditions should be obtained when possible.

- b. Hydration:** A critical factor in prevention of heat injury is the maintenance of a proper fluid and electrolyte balance. Water must be replaced during exercise periods and at emergency incidents. During heat stress, firefighters should consume at least one quart of water per hour. The rehydration solution should be a 50/50 mixture of water and a commercially prepared activity beverage at about 40 degrees.<sup>iii</sup> Rehydration is important even during cold weather operations where, despite the outside temperature, heat stress may occur during firefighting or other strenuous activity when protective equipment is worn. Carbonated beverages, and those containing caffeine, should be avoided.
- c. Nourishment:** Food should be provided on extended incidents. The IC may authorize the purchase of food and drinks. Soup is preferred to sandwiches or burgers as it is digested much faster. Fruit such as apples, oranges and bananas may be provided when available. Fatty and or salty foods should be avoided if possible.
- d. Rest:** The “two bottle rule” should apply to all personnel. This rule states that firefighters who have worked for two full 30-minute rated bottles, or 45 minutes, should be assigned to the Rehabilitation Area for rest and evaluation.<sup>iv</sup> All firefighters should report to “rehab” as a crew after that crew has been active in strenuous activities on the scene for 45 minutes or after their second air bottle. In situations of moderate to low levels of activity having all firefighters report to “rehab” may not be needed. (i.e.: salvage and overhaul, cleanup, defensive firefighting, etc.) In these situations fluids and possibly food should be available to personnel. In all cases, the objective evaluation of a firefighter’s fatigue level should be the criteria for rehab time. Rest should not be less than ten minutes and will last until the firefighter is cleared by the Rehab Officer to return to the fire scene. Upon release from rehab the firefighters should report, as a crew, to either the “staging officer” or the “IC” which ever is appropriate for that incident.
- e. Medical Evaluation:**
1. The Rehab Officer should be an EMT at minimum and preferably be an ALS provider. It will be the responsibility of the Rehab Officer to assure that the firefighter has his/her vital signs and overall condition assessed. Treatment of any injuries or illnesses should be immediate and aggressive in nature. If the Rehab Officer, based on his/her assessment, questions the safety of releasing personnel for continued fireground activities he/she should notify the IC and/or the Safety Officer. This notification should be made face-to-face if practical. The Rehab Officer’s recommendations may include further rest, restricted activity, and/or removal from the fireground. Final authority to remove a firefighter from active duty should remain with the Incident Commander or his/her designee. Removal from active duty may be based on medical findings, injury, or exhaustion. In the event of a firefighter being “marked off duty” due to illness or injury he/she will be transported to a medical facility and must be cleared as per worker’s compensation protocol by a physician prior to returning to work.
  2. The following evaluation will be made for all personnel who meet the “two air bottle’ or “45 minute strenuous activity” rule. The heart rate should be measured for 30 seconds as early as possible in the rest period. If a member’s heart rate exceeds 110 beats per minute, an oral or earlobe temperatures should be taken. If the member’s temperature exceeds 100.6°F he/she should not be permitted to wear protective equipment while in rehab and will have a full set of vitals taken. If it is below 100.6° F and the heart rate remains above 110 beats per minute rehabilitation time should be increased. If the heart rate is less than 110 beats per minute the chance of heat stress is negligible.”<sup>v</sup> Blood pressures should be taken on all personnel who

have a heart rate above 110 bpm and a temperature of 100.6F. Additional assessment, such as ECG monitoring, may be performed at the discretion of the ALS provider.

3. Forms for documentation should be available and must be used to document everyone who entered rehab. This form should document, at a minimum, name, age, pulse rate on entry, pulse on release, all complaints of injury or illness and company number. **(Henrico County Division of Fire Emergency Incident Rehab Report)**

- f. **Accountability:** Companies should report to rehab as a unit and remain intact. The company officer is responsible for ensuring that his/her company remains in rehab until reassigned.

i [Federal Emergency Management Agency, United States Fire Administration, "Emergency Incident Rehabilitation" FA-114/July 1992, Section 1](#)

ii [Federal Emergency Management Agency, United States Fire Administration, "Emergency Incident Rehabilitation" FA-114/July 1992, Section 4-A](#)

iii [Rose, Larry, "Drink and Thrive a Study of On-scene Rehabilitation,"](#) STRATEGIC ANALYSIS OF FIRE DEPARTMENT OPERATIONS. September 1990. Pp.1-16.

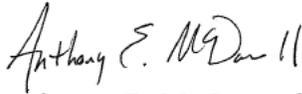
iv [Federal Emergency Management Agency, United States Fire Administration, "Emergency Incident Rehabilitation" FA-114/July 1992, Section 5-d](#)

v [Federal Emergency Management Agency, United States Fire Administration, "Emergency Incident Rehabilitation" FA-114/July 1992, Section 5-f-2.](#)

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**County of Henrico  
Division of Fire**

By order of:



**Anthony E. McDowell  
Chief, Division of Fire**



**Title: TR-07**  
Weather conditions Affecting Training Exercises

**Effective Date: September 1, 2013**

**Rescinds: TR-07 June 1, 2003**

**Purpose:**

To establish criteria for weather conditions that will negatively impact personnel and equipment. The County experiences weather conditions that cause the Division of Fire to cease evaluation and training evolutions in the outdoors.

**Procedure:**

Common sense must be a part of any consideration when training exercises are being conducted. Below are general considerations established for cold weather and hot weather conditions while the Training Section or individual district companies are involved in outdoor training evolutions.

**Cold Weather**

- Outside temperature is below 32 degrees F.
- Wind Chill below 32 degrees F.
- Sustained Wind > 25mph
- Rain >0.5"/hr.
- Lightning in the area (min. 30 minute delay following most recent thunder)
- Existing snow, ice is already present on the ground where training is to be conducted.
- Anytime a cold related injury occurs, training shall be terminated by the lead instructor.
- Instructor to student ratio shall be determined by Lead Instructor.
- To ensure Firefighter safety and survival, the following positions must be in place for all training conducted in the outdoor environment:
  1. Lead Instructor
  2. EMS/REHAB Officer(s)

**Note: It is realized that certain types of outdoor training will have other positions that need to be filled; these will be the minimum to ensure that this procedure is followed.**

**Note: Refer to EO-17.**

## Hot Weather

- Outside Heat Index is above 90 degrees F.
- Sustained Wind > 25mph
- Rain >0.5"/hr.
- Lightning in the area (min. 30 minute delay following most recent thunder)
- Anytime a heat related injury occurs, training shall be terminated by the lead instructor.
  
- REMOVED MAX GEAR TEMP
- Instructor to student ratio shall be determined by Lead Instructor.
- To ensure Firefighter safety and survival, the following positions must be in place for all training conducted in the outdoor environment:
  1. Lead Instructor
  2. EMS/REHAB Officer(s)

Note: It is realized that certain types of outdoor training will have other positions that need to be filled. These positions will be the minimum to ensure that this procedure is followed.

**When the Training Staff is conducting the training exercise, it is the responsibility of the Training Captain or his designee to monitor weather conditions. The Training Section will then place calls to affected Battalion Chief(s) to cancel training for their companies.**

Again, it must be stated that common sense must be a part of the cancellation of any types of training. The Lead Instructor of the evolution will evaluate and monitor current and future weather conditions.

Weatherbug.com currently provides real time weather conditions.  
The zip code for the Fire Training Drill Grounds is 23060

Please refer to SOG EO-17 to establish necessary rehabilitation during training evolutions.



COMMONWEALTH OF VIRGINIA

# COUNTY OF HENRICO

## Division Of Fire

*An Internationally Accredited Fire Service Agency*



September 23, 2013

Dear FF Smith,

The Division of Fire recently conducted a Work Performance Evaluation (WPE) of each sworn member. The purpose of the WPE is to evaluate each member's ability to complete a series of job-specific tasks, and to determine Division-wide performance of essential fire ground skills. The WPE serves an important component in helping to protect the health and safety of our members and the public we are sworn to serve.

It has come to my attention that you were unable to complete the WPE. The Division of Fire is committed to your health and well-being. Therefore, I am strongly recommending that you schedule an appointment with the Department of Human Resources Fitness and Wellness Division. The staff of the Fitness and Wellness Division will conduct an assessment of your overall fitness level, and will develop recommendations targeted at improving your ability to function on the emergency scene.

The Division of Fire pledges to fully support the recommendations of the Fitness and Wellness Division. This includes adjusting work hours as necessary in order to accommodate the recommended wellness, fitness, and/or rehabilitation activities.

Please understand that you are not required to take advantage of this unique resource. However, I ask that you view this as an opportunity to renew and recommit yourself to your own personal health and safety.

If you are interested in moving forward to improve your health and well-being please contact the Fitness and Wellness Division at 501-7559.

Regards,

Anthony E. McDowell  
Fire Chief

Station #	N		WPE completion time (minutes)		Air consumption (psi)
Station 1	29		06:40		921
Station 2	21		07:37		1028
Station 3	23		07:06		968
Station 4	16		07:55		1091
Station 5	23		07:26		971
Station 6	31		06:40		945
Station 7	19		07:19		1005
Station 8	13		07:19		1048
Station 9	18		07:00		1022
Station 10	25		06:54		946
Station 11	18		07:09		906
Station 12	32		06:54		973
Station 13	31		07:08		994
Station 14	17		08:24		1029
Station 15	15		08:10		1080
Station 16	18		08:13		1029
Station 17	10		07:27		926
Station 18	22		08:07		1045
Station 21	23		06:55		1018
Station 22	36		07:10		1016

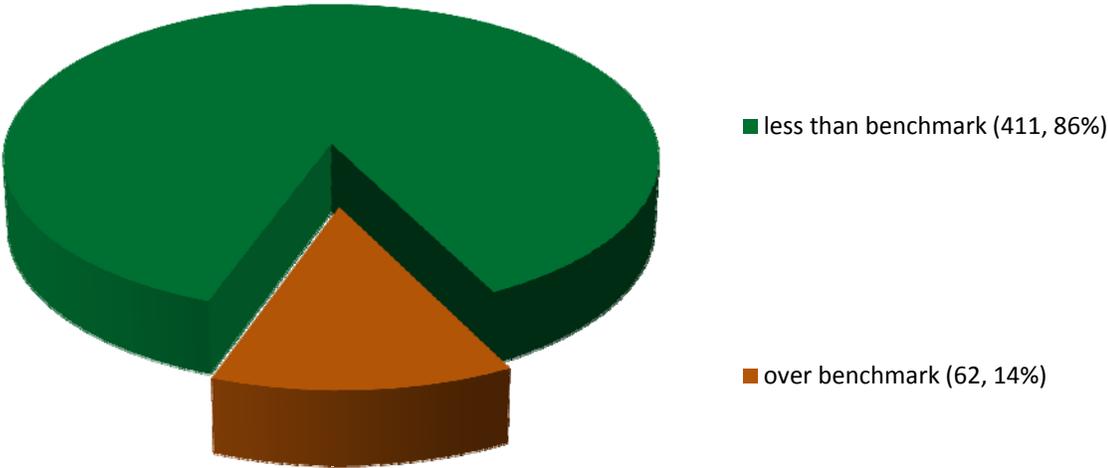
Shift

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C	n=147		07:08		1105
D	n=6		09:15		1257
E	n=3		07:27		963
F	n=6		09:19		1097
Admin	n=33		07:15		994

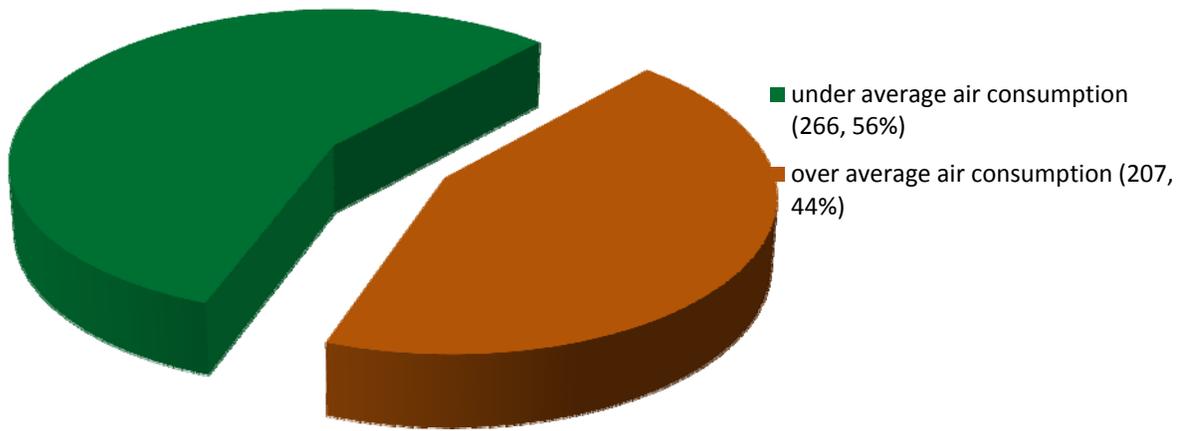
Battalion 1 - West			07:19		1001
Battalion 2 - East			07:38		1018
Battalion 3 - North			07:13		978

# HFD WPE Benchmark Time

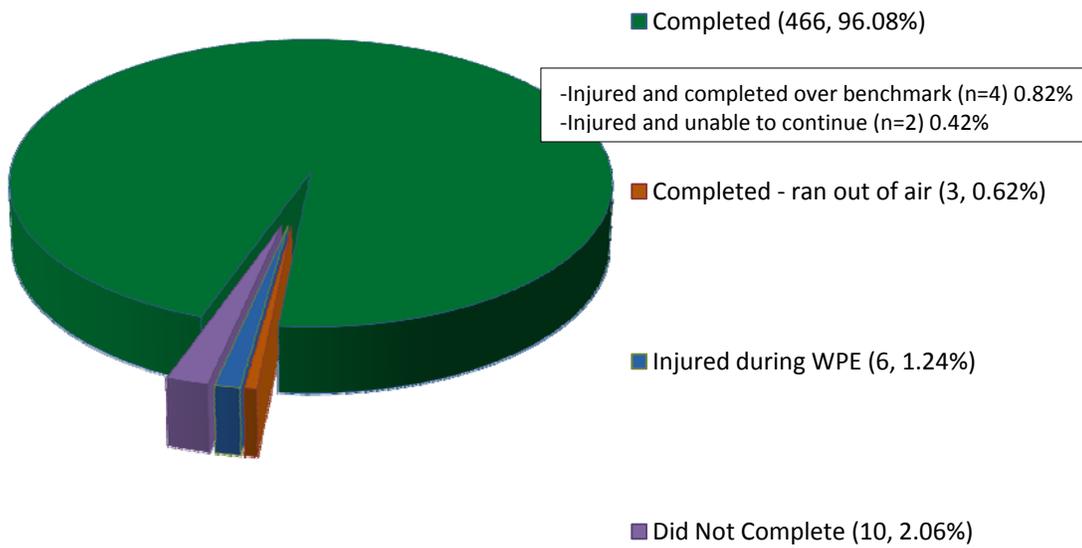
8:44



## HFD WPE Air Consumption Average 994 PSI



## HFD WPE Course Completion



## WPE completion time

## Air consumption

By age group:

(minutes)

(psi)

Age group	n	WPE completion time (minutes)	Air consumption (psi)
Age 20-25	n=2	362.50	06:02
Age 26-30	n=65	386.65	06:26
Age 31-35	n=89	398.54	06:38
Age 36-40	n=86	424.70	07:04
Age 41-45	n=104	445.84	07:25
Age 46-50	n=79	480.24	08:00
Age 51-55	n=30	496.57	08:16
Age 56-60	n=12	570.38	09:30
Age 61 and above	n=6	555.17	09:15

By years of service:

Years of service	n	WPE completion time (minutes)	Air consumption (psi)
1-5	n=101	391.45	06:31
6-10	n=137	417.96	06:57
11-15	n=111	446.79	07:26
16-20	n=44	476.84	07:56
21-25	n=56	481.47	08:01
26-30	n=20	526.65	08:46
>30	n=4	596.00	09:56

## Pre Pulse

## Post Pulse

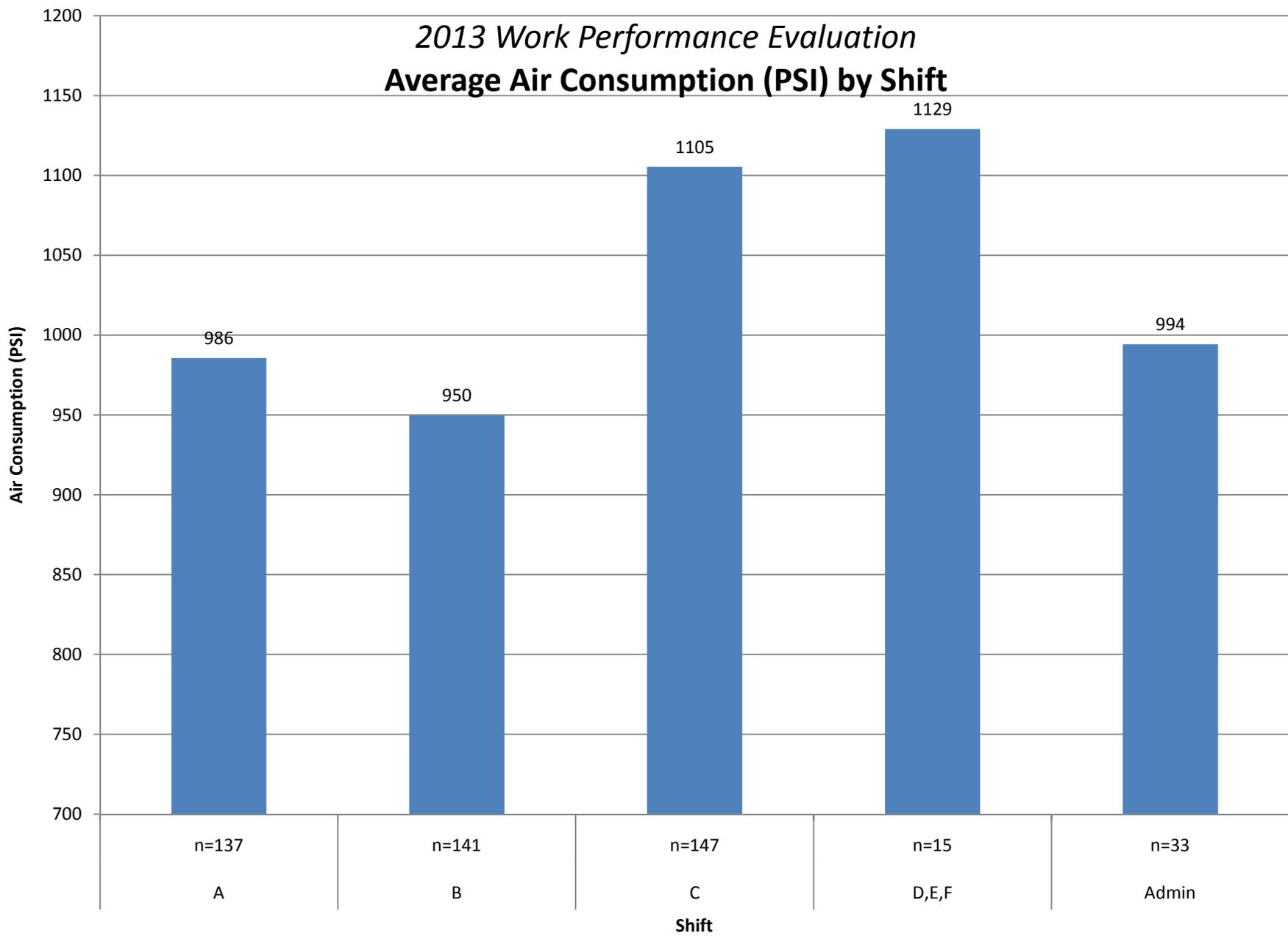
By age group:

Age group	n	WPE completion time (minutes)	Pre Pulse (psi)	Post Pulse (psi)
Age 20-25	n=2	362.50	90	117
Age 26-30	n=65	386.65	81	122
Age 31-35	n=89	398.54	85	125
Age 36-40	n=86	424.70	86	121
Age 41-45	n=104	445.84	88	123
Age 46-50	n=79	480.24	83	120
Age 51-55	n=30	496.57	86	116
Age 56-60	n=12	567.38	82	118
Age 61 and above	n=6	555.17	90	118

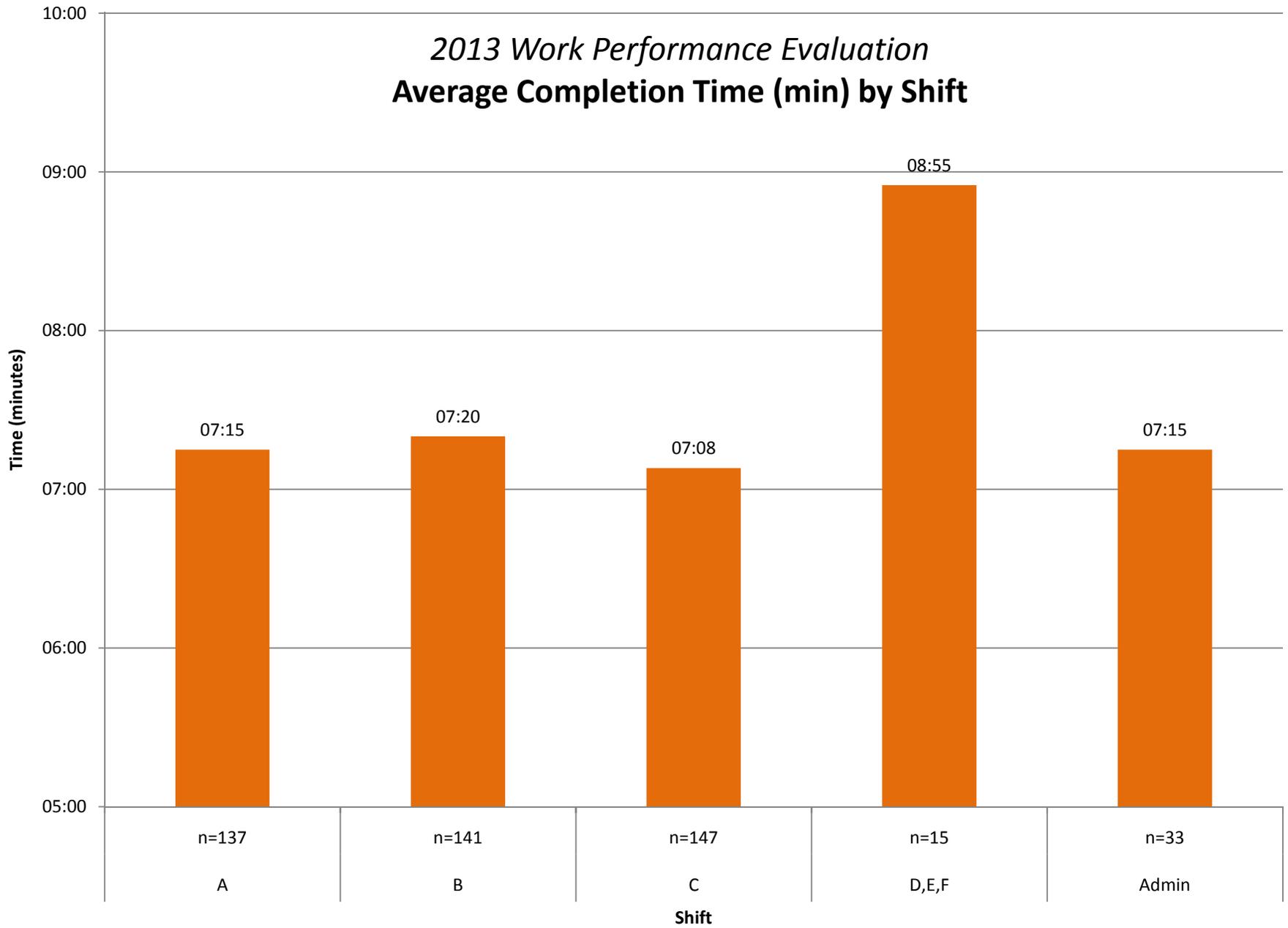
By years of service:

Years of service	n	WPE completion time (minutes)	Pre Pulse (psi)	Post Pulse (psi)
1-5	n=101	391.45	82	122
6-10	n=137	417.96	86	122
11-15	n=111	446.79	88	124
16-20	n=44	476.84	87	119
21-25	n=56	481.47	81	118
26-30	n=20	526.65	86	119
>30	n=4	596.00	76	116

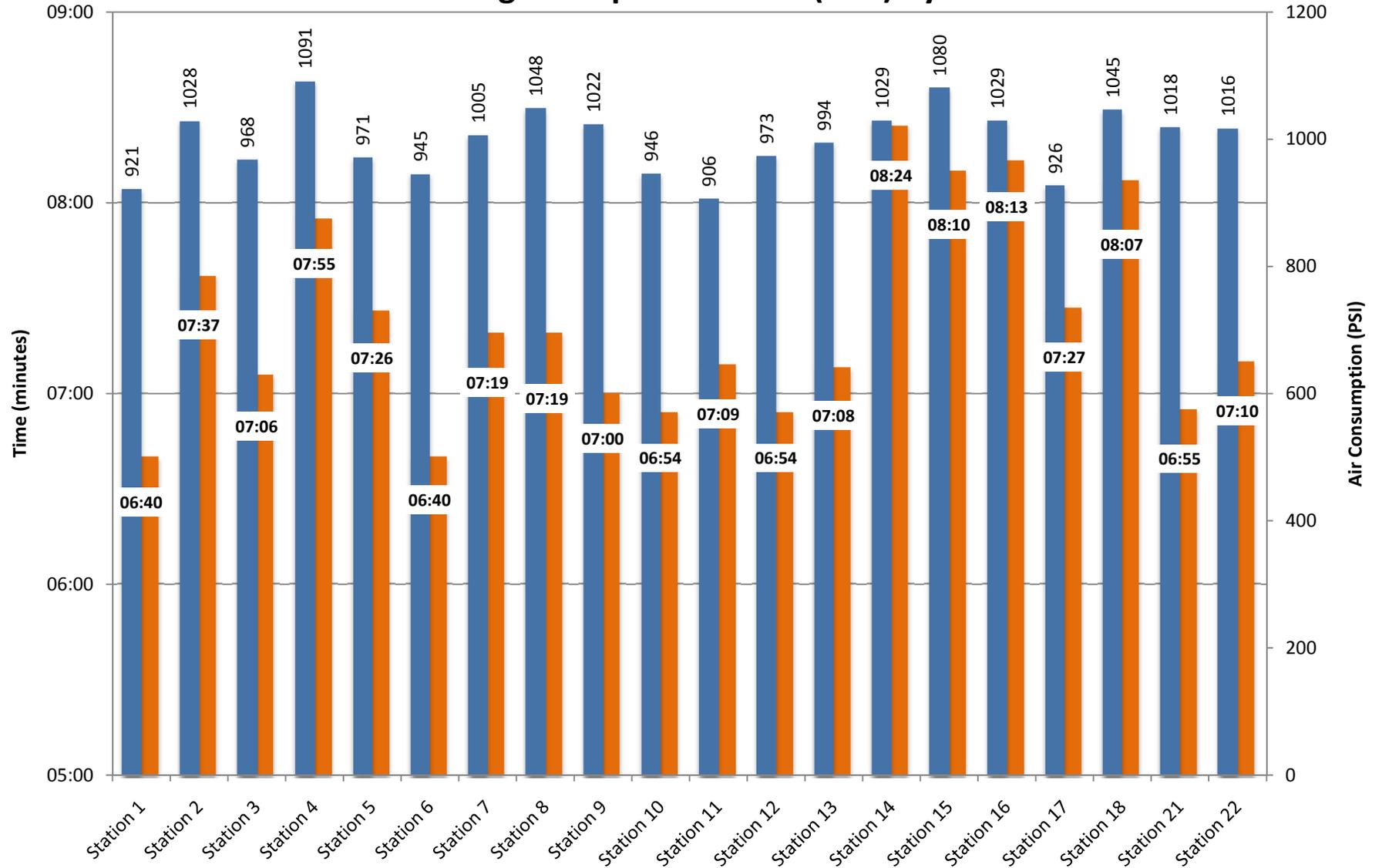
*2013 Work Performance Evaluation*  
**Average Air Consumption (PSI) by Shift**



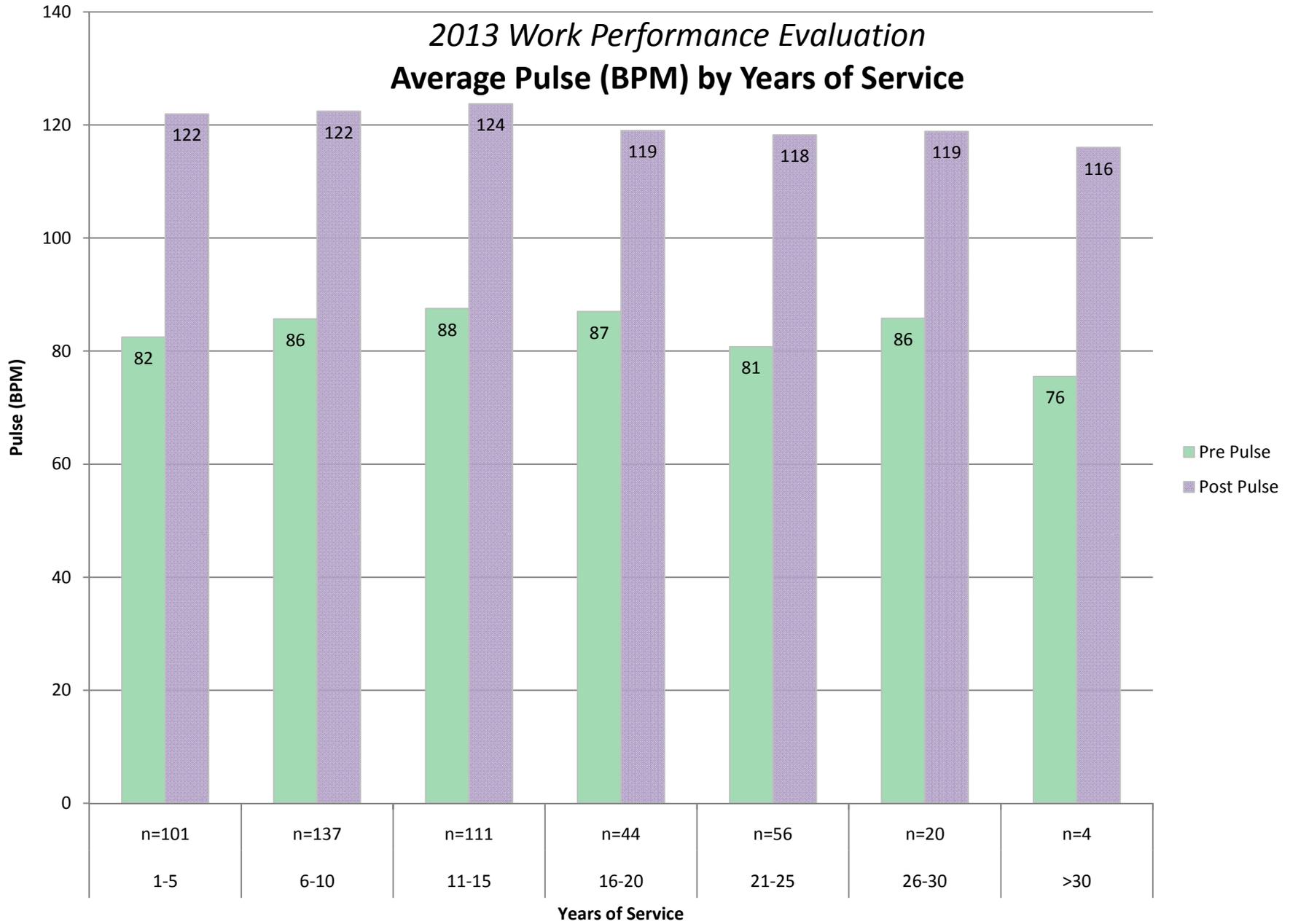
*2013 Work Performance Evaluation*  
**Average Completion Time (min) by Shift**



## 2013 Work Performance Evaluation Average Completion Time (min) by Station

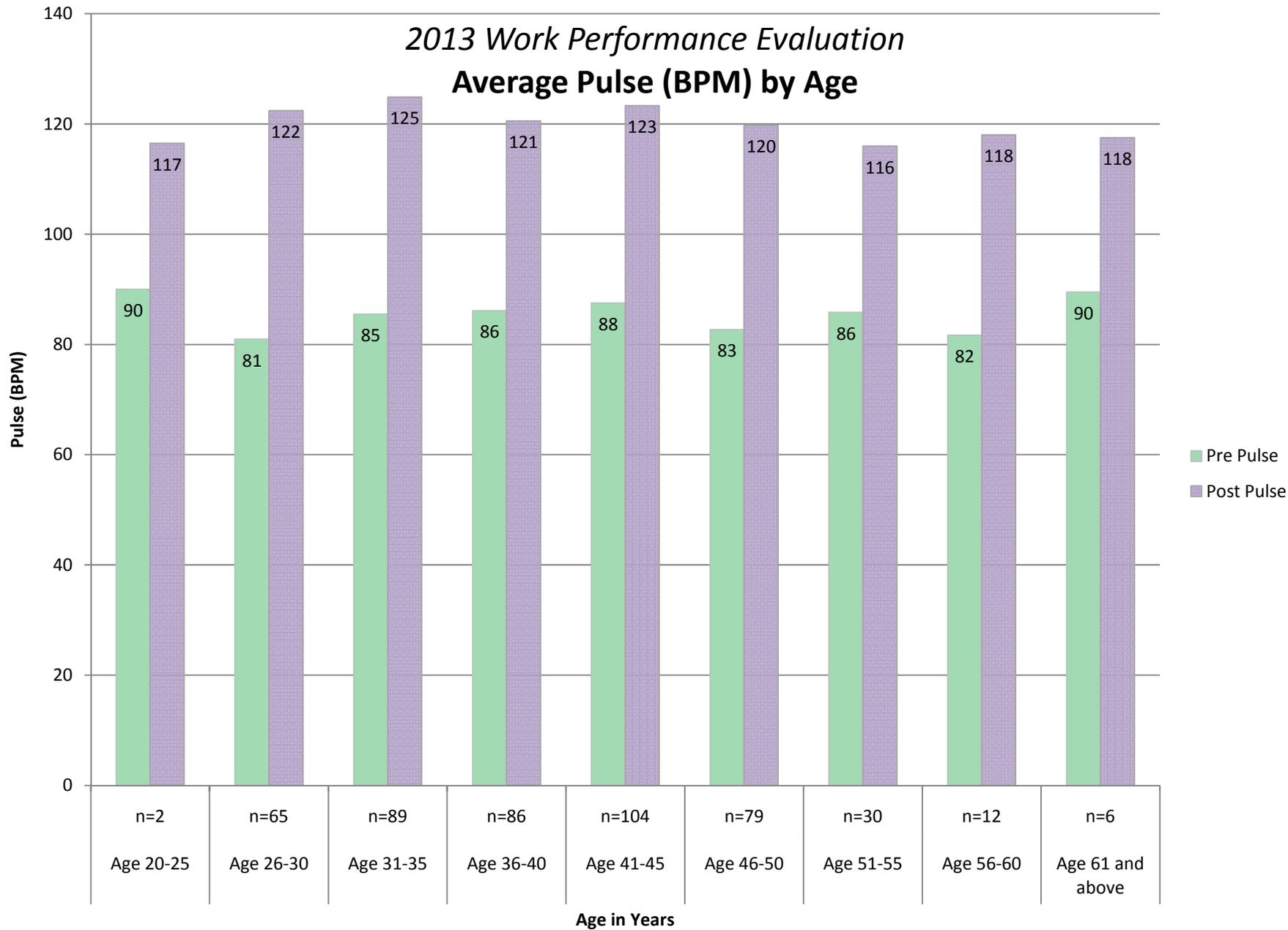


*2013 Work Performance Evaluation*  
**Average Pulse (BPM) by Years of Service**

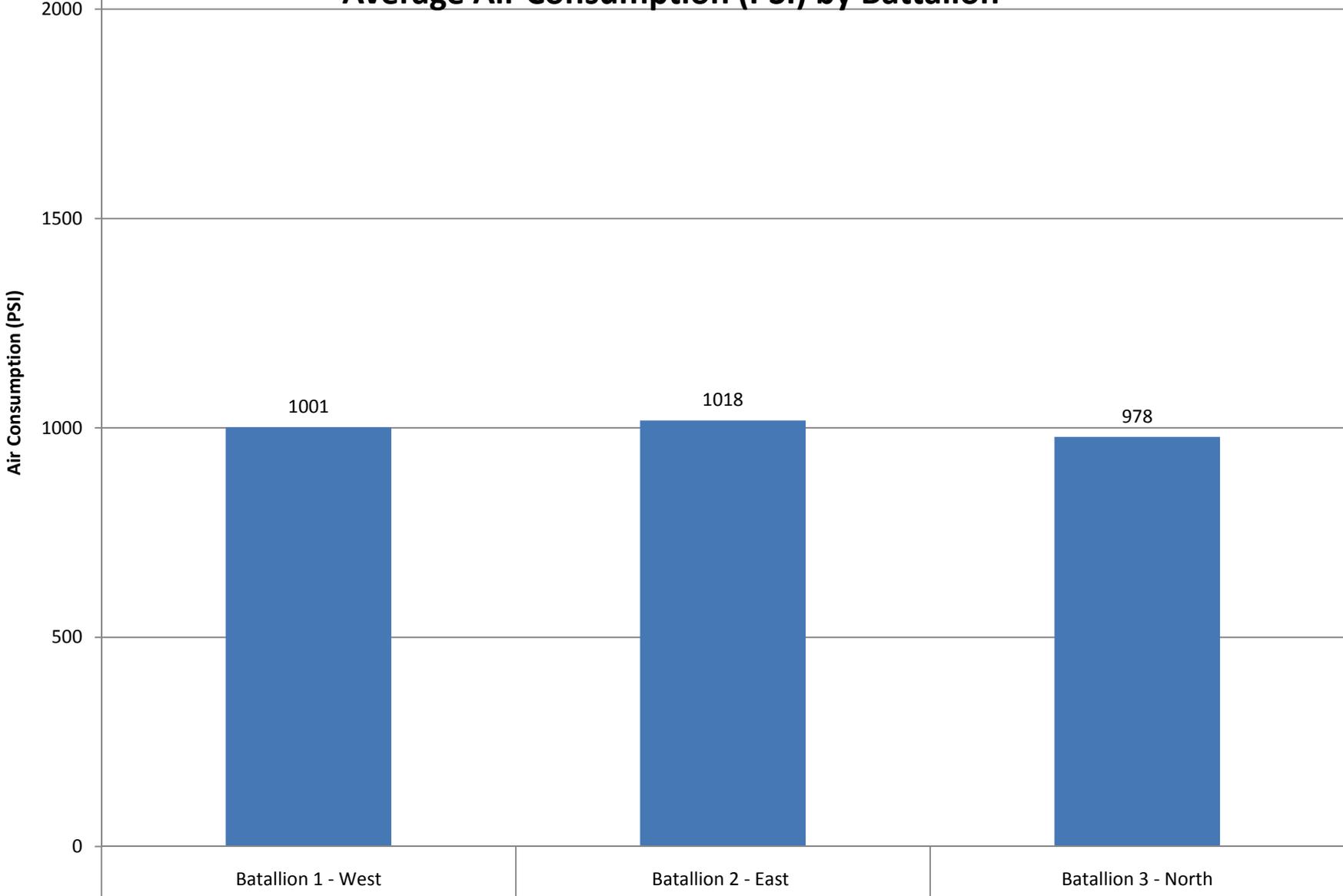


# 2013 Work Performance Evaluation

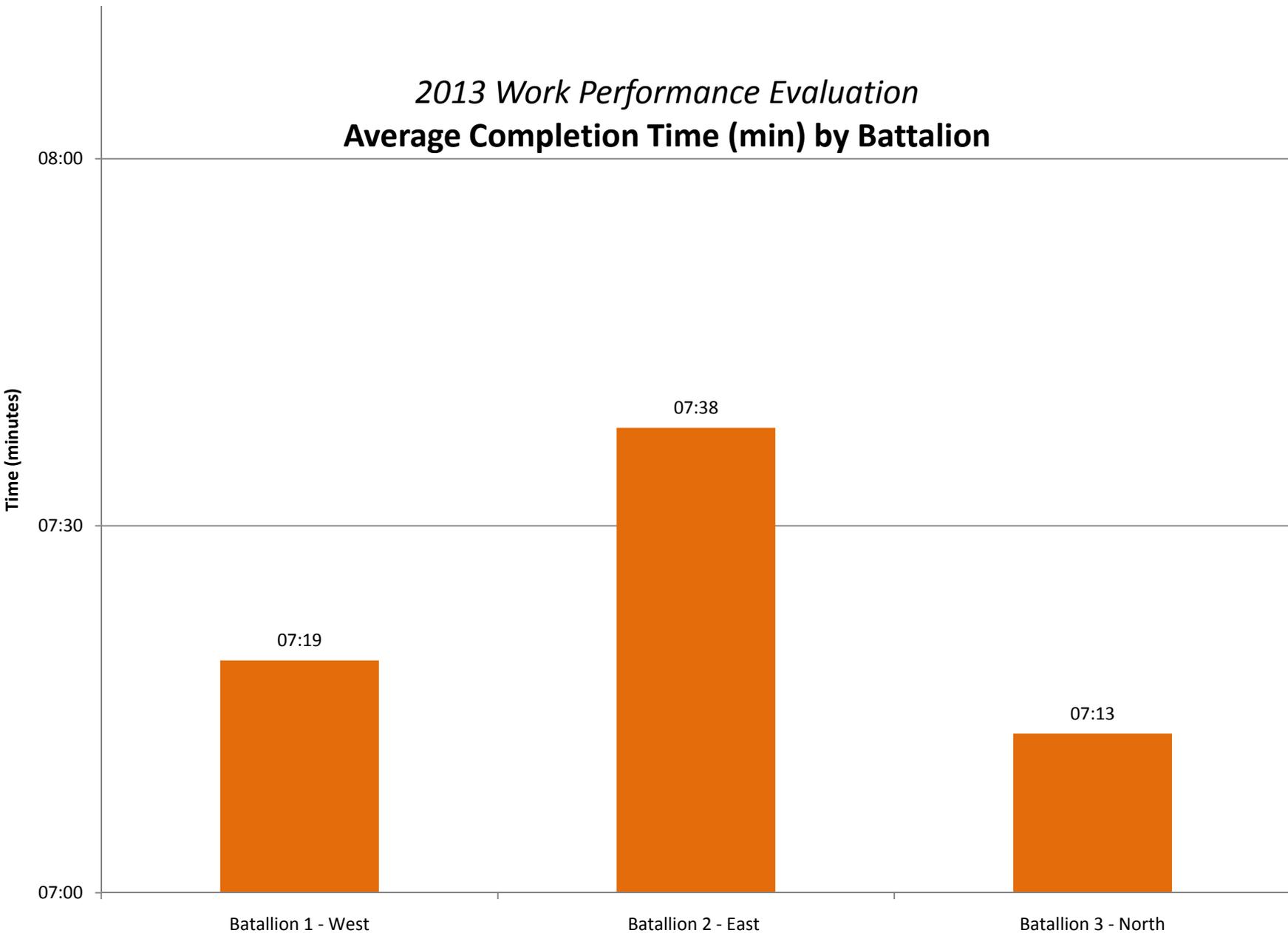
## Average Pulse (BPM) by Age



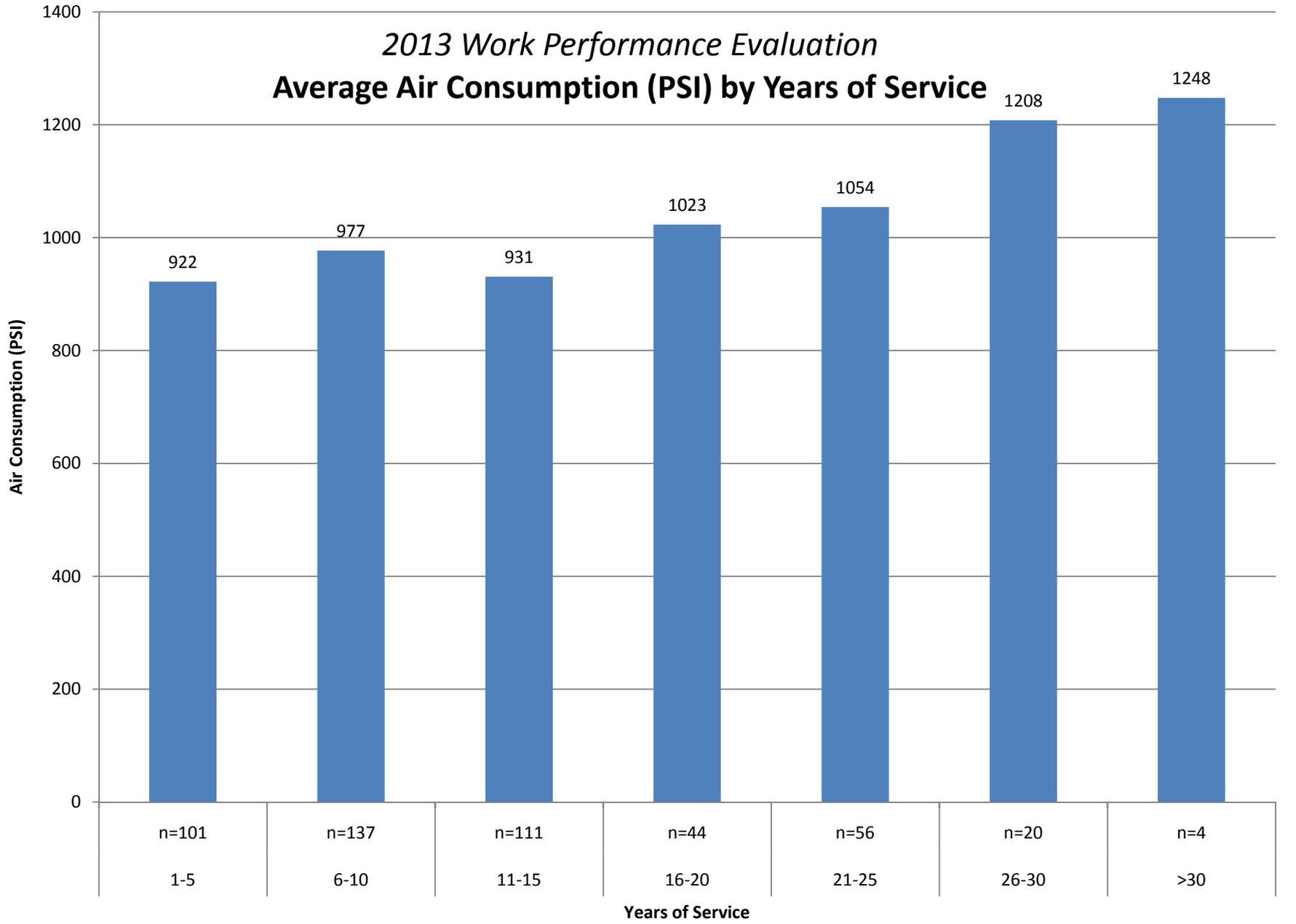
*2013 Work Performance Evaluation*  
**Average Air Consumption (PSI) by Battalion**



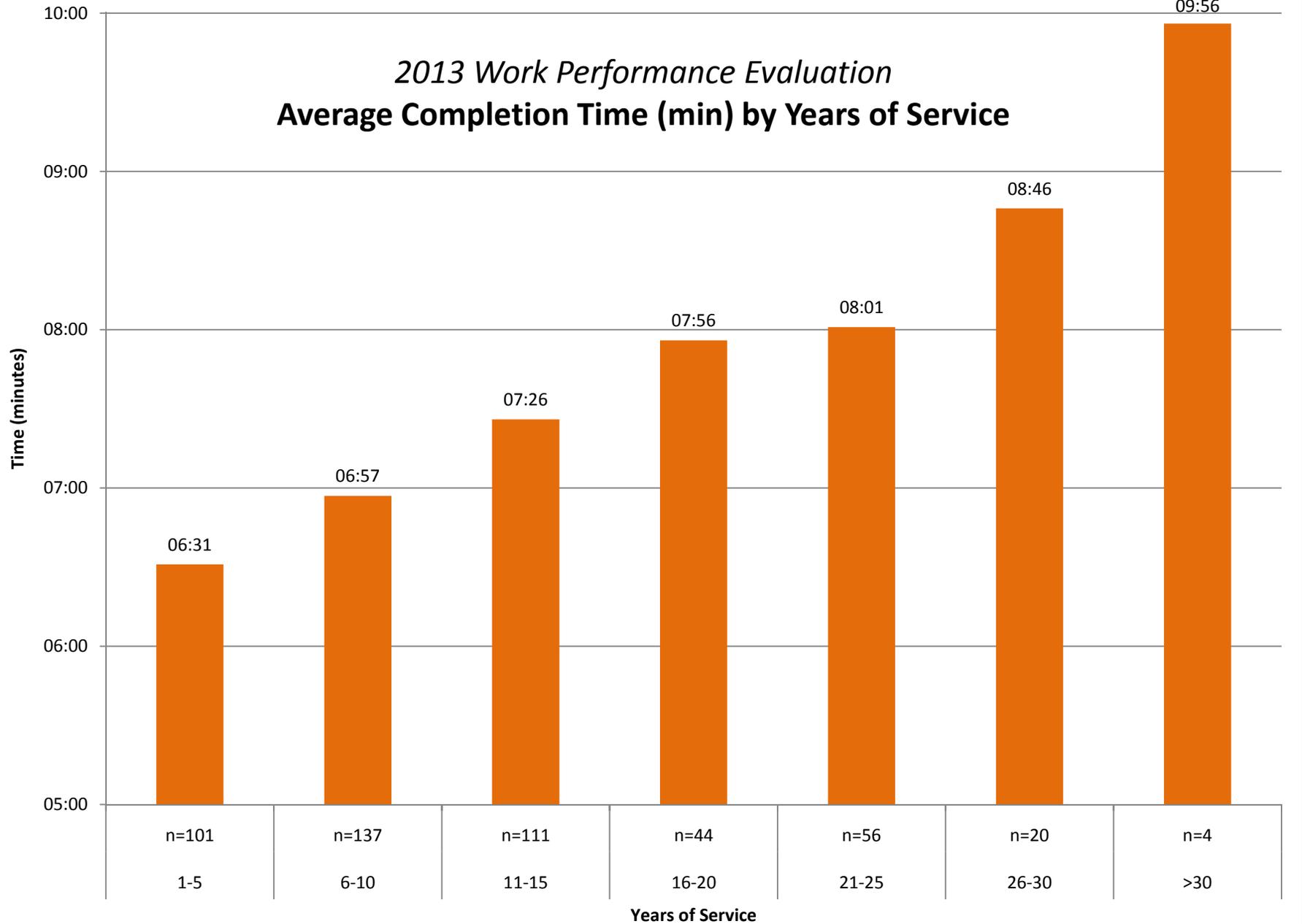
*2013 Work Performance Evaluation*  
**Average Completion Time (min) by Battalion**



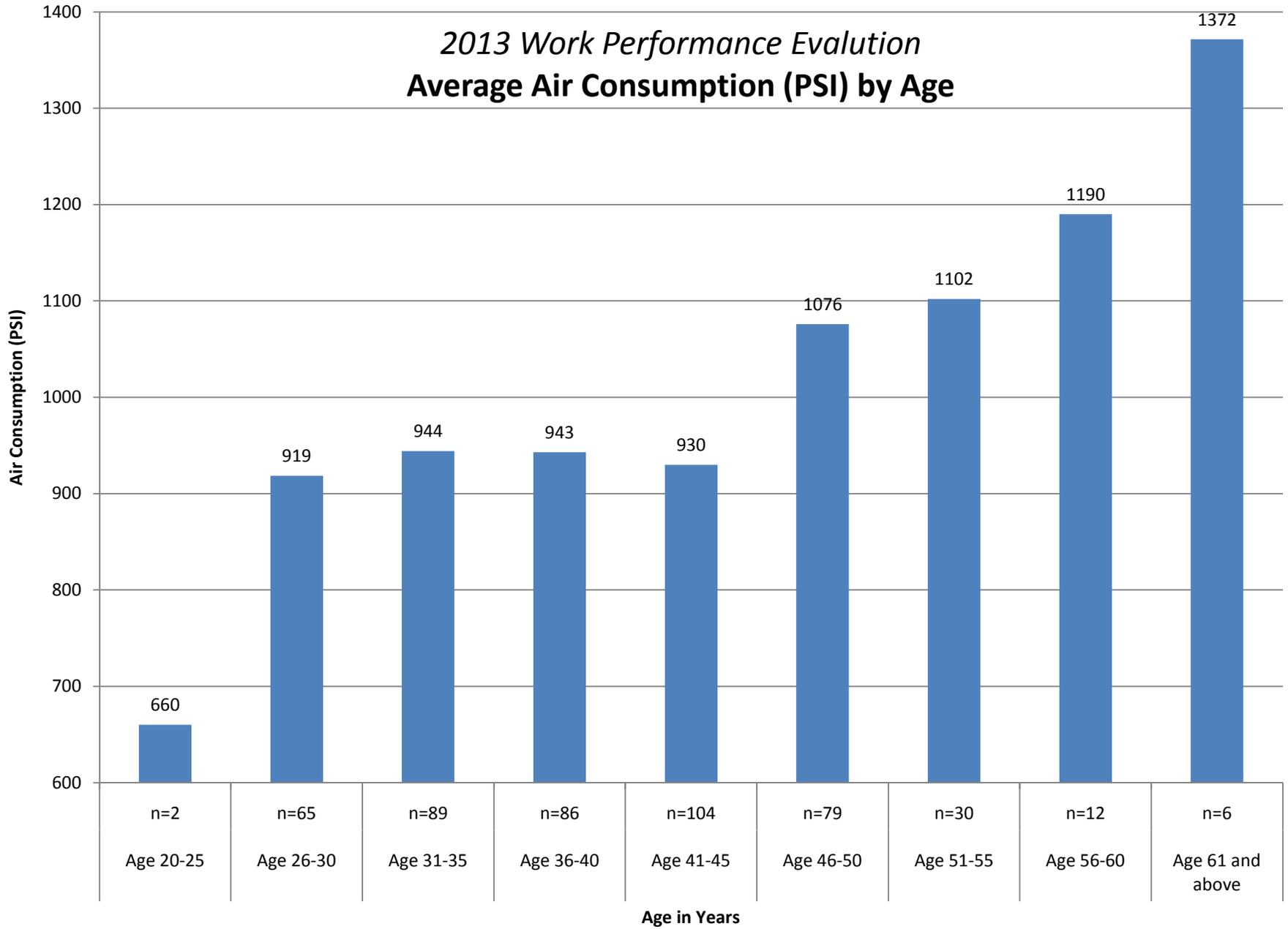
*2013 Work Performance Evaluation*  
**Average Air Consumption (PSI) by Years of Service**



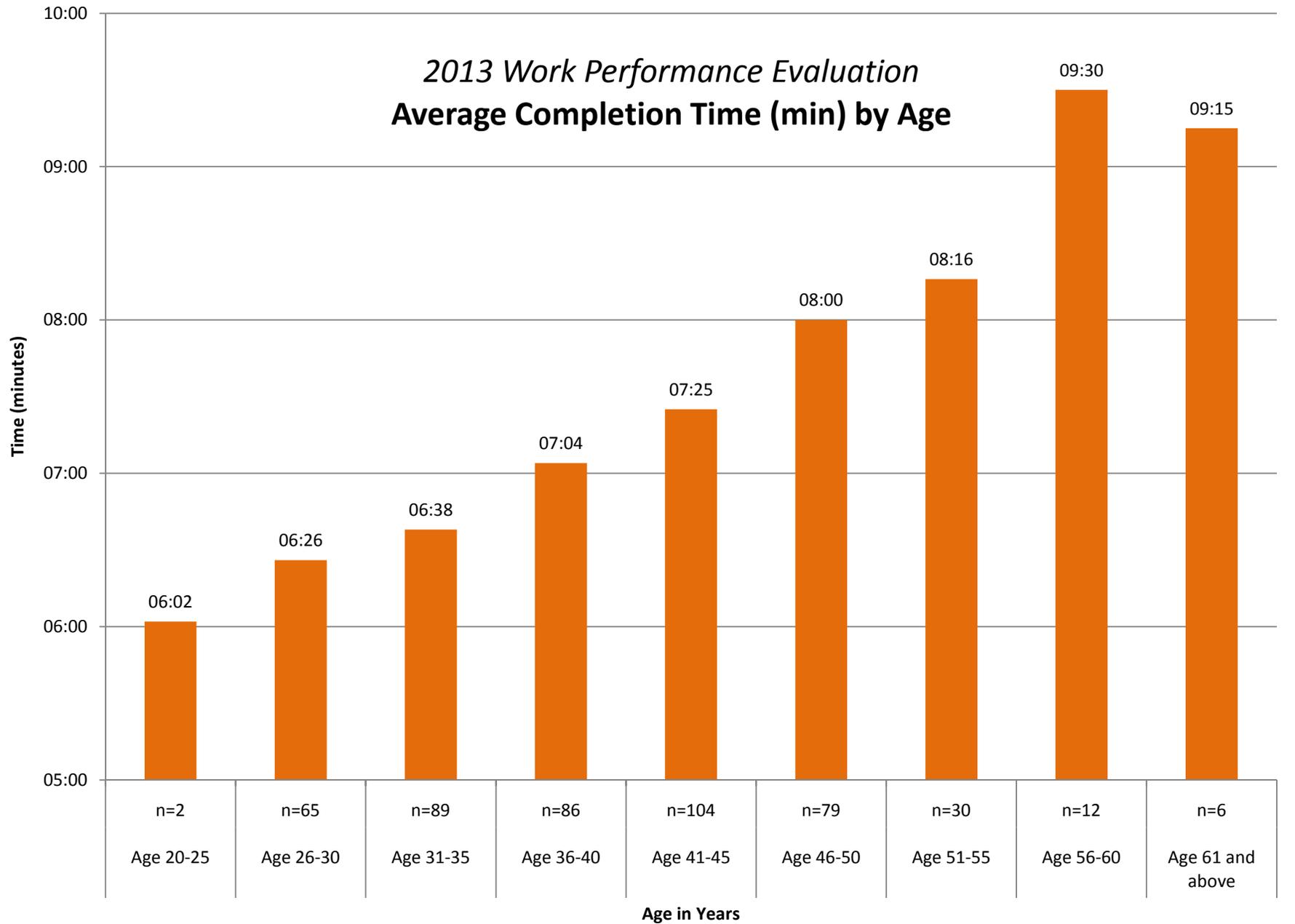
*2013 Work Performance Evaluation*  
**Average Completion Time (min) by Years of Service**



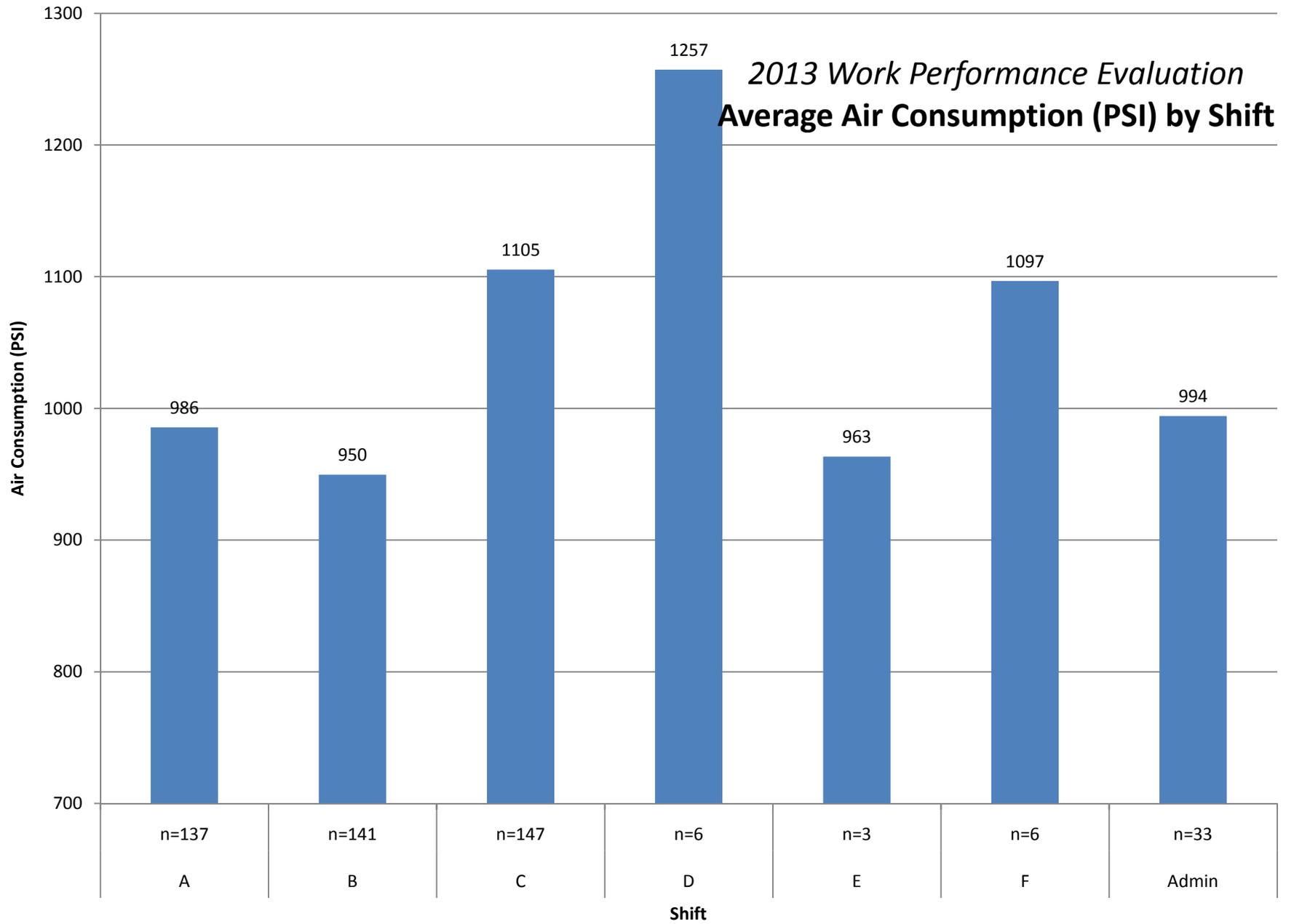
*2013 Work Performance Evaluation*  
**Average Air Consumption (PSI) by Age**



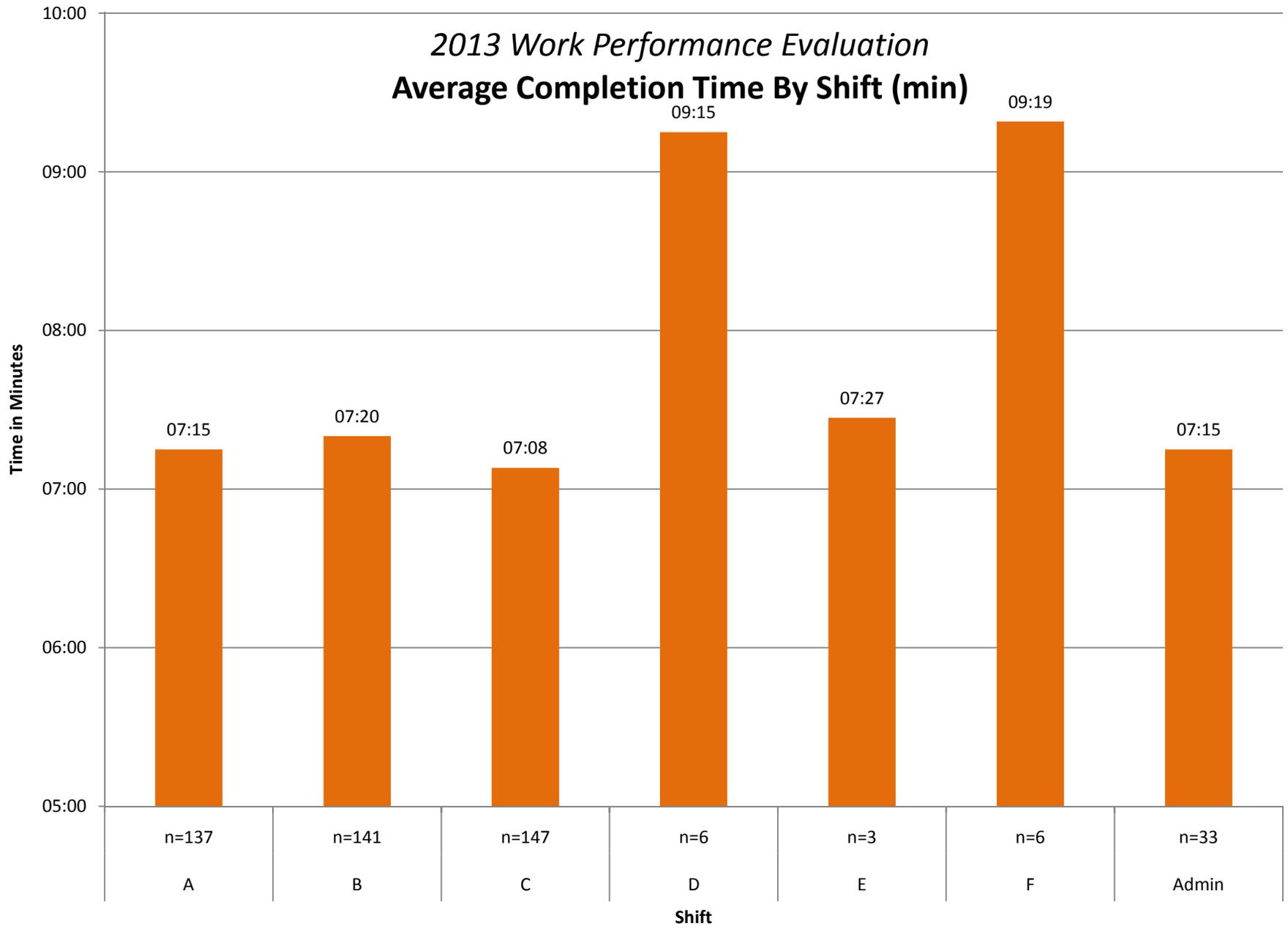
*2013 Work Performance Evaluation*  
**Average Completion Time (min) by Age**



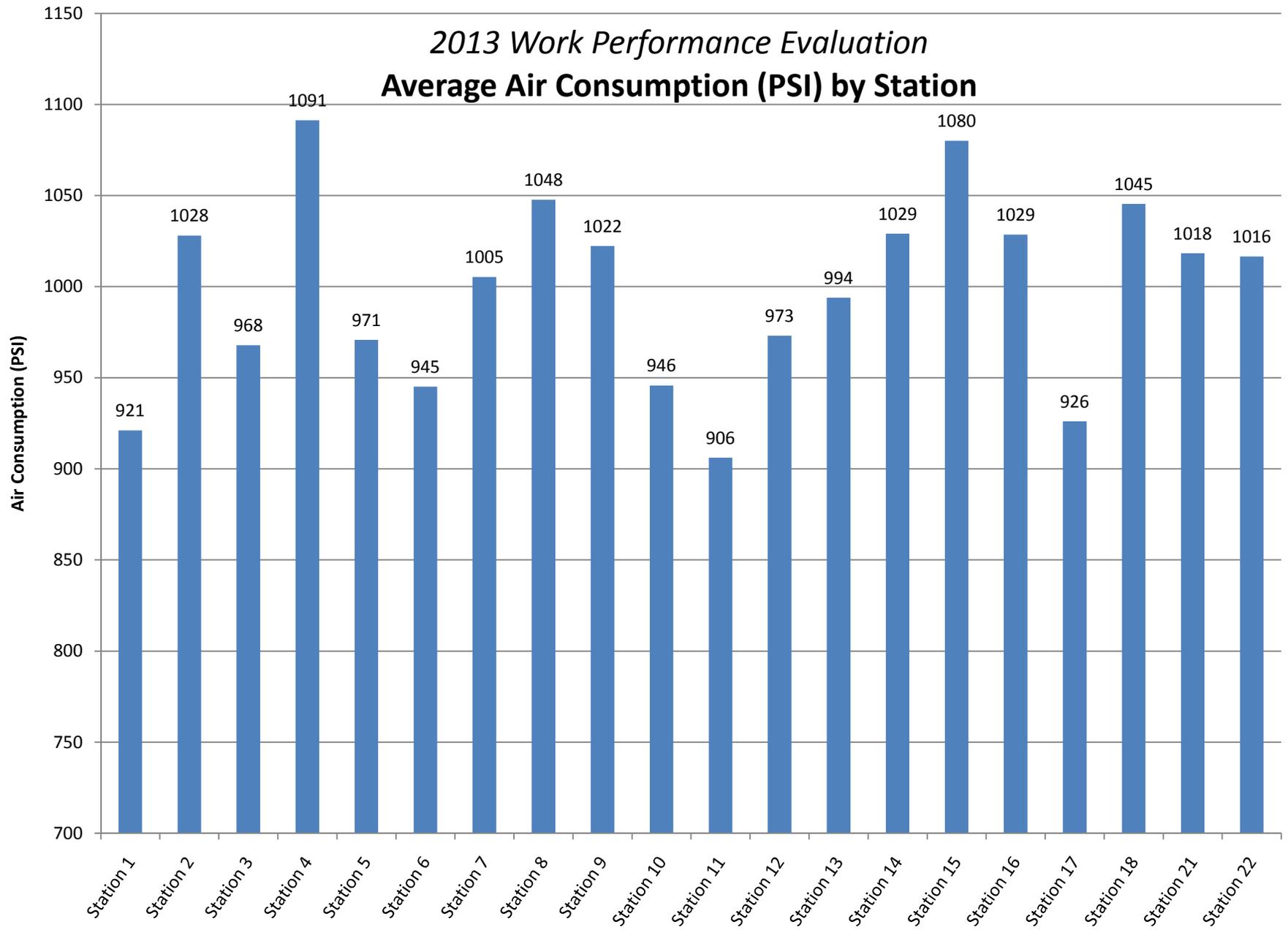
*2013 Work Performance Evaluation*  
**Average Air Consumption (PSI) by Shift**



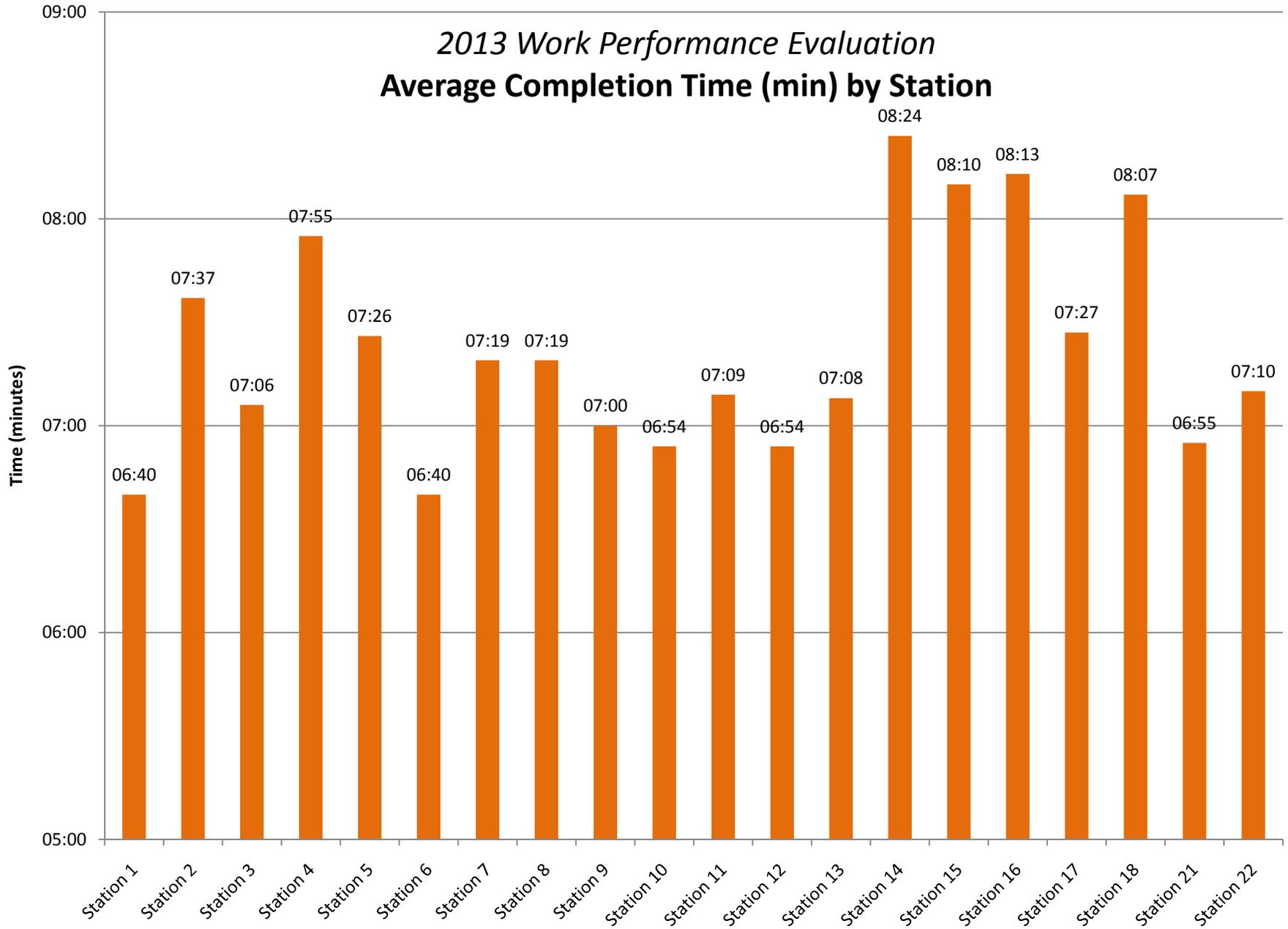
*2013 Work Performance Evaluation*  
**Average Completion Time By Shift (min)**



*2013 Work Performance Evaluation*  
**Average Air Consumption (PSI) by Station**



*2013 Work Performance Evaluation*  
**Average Completion Time (min) by Station**

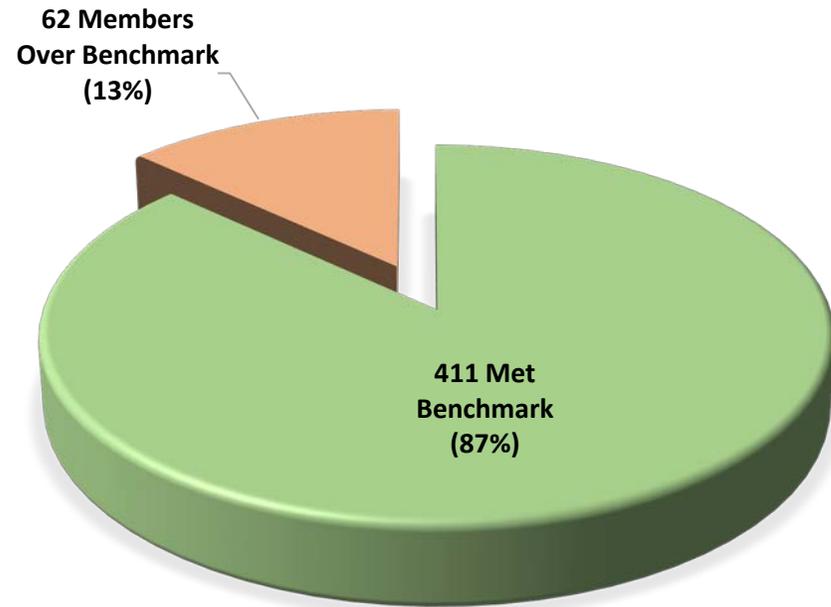


# Henrico County Division of Fire Work Performance Evaluation 2014



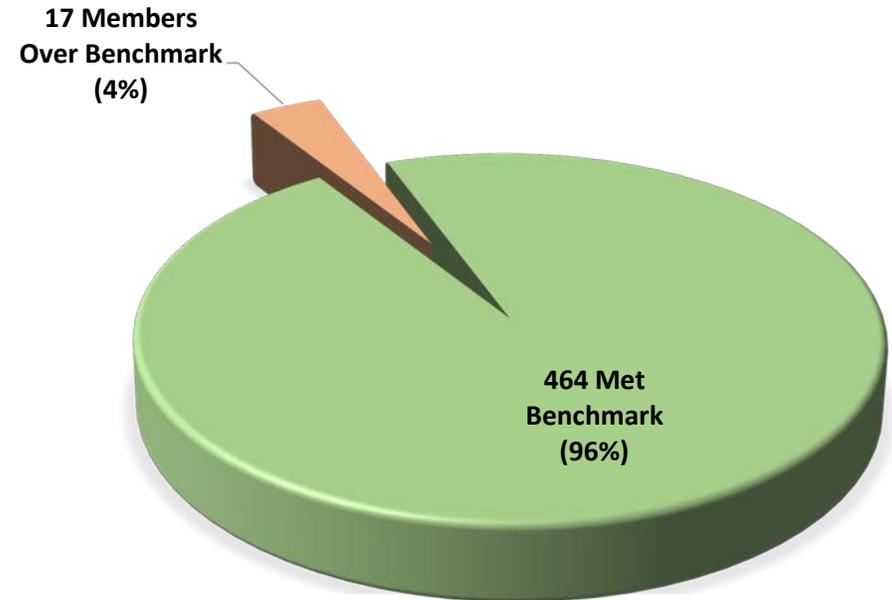
# WPE Benchmark

**2013**



\* 473 Attempted WPE

**2014**

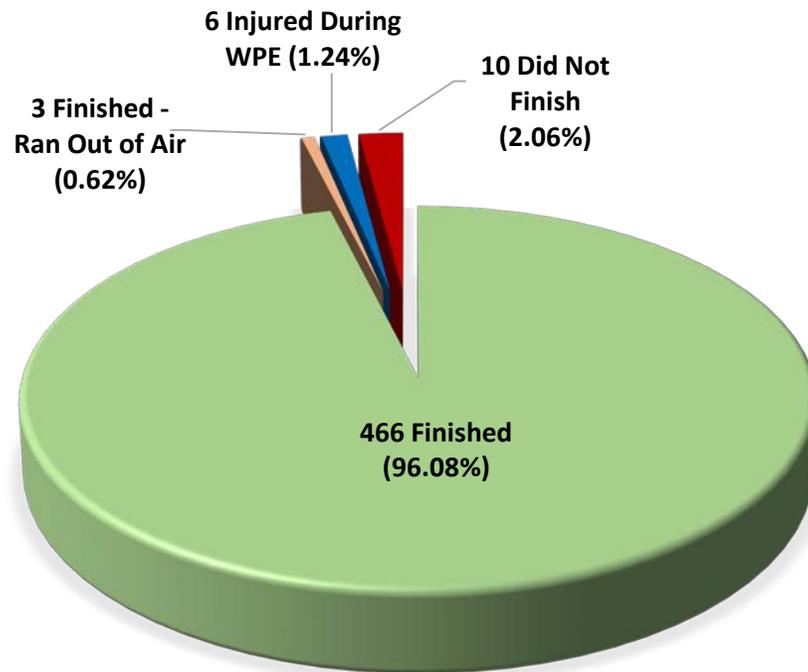


\* 481 Attempted WPE

\* Benchmark Time ≤ 08:44 Min

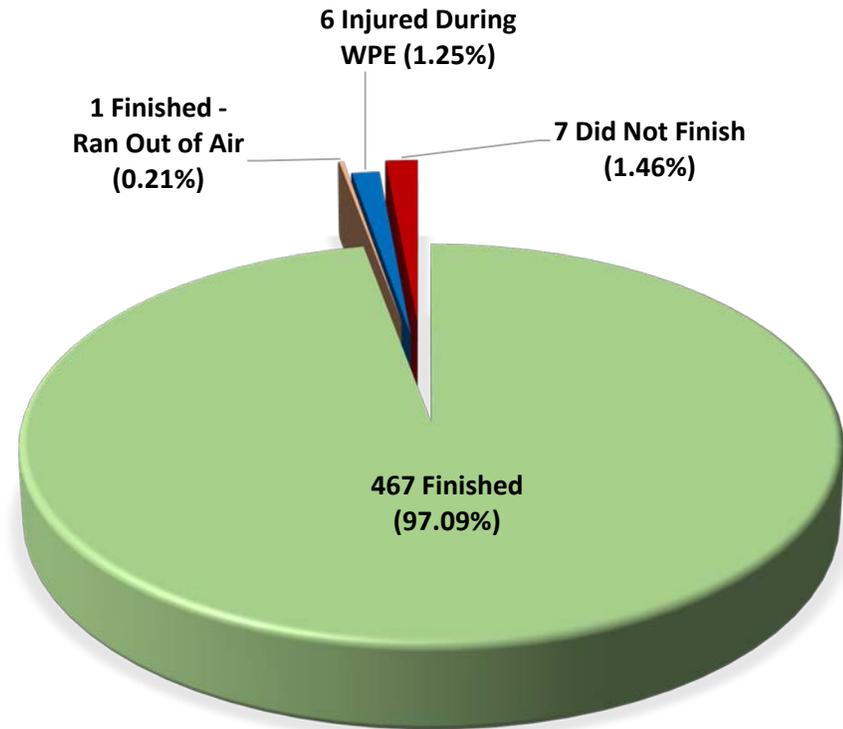
# WPE Course Attempts

## 2013



\* Out of 6 Injured : 4 Finished (over benchmark) - 0.82%  
2 Did Not Finish - 0.42%

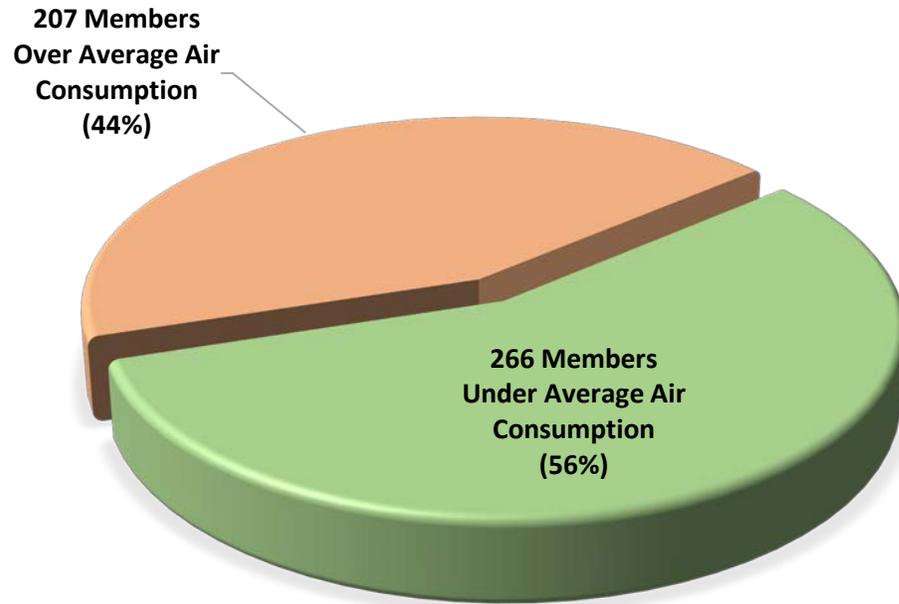
## 2014



\* 2 Finished over benchmark

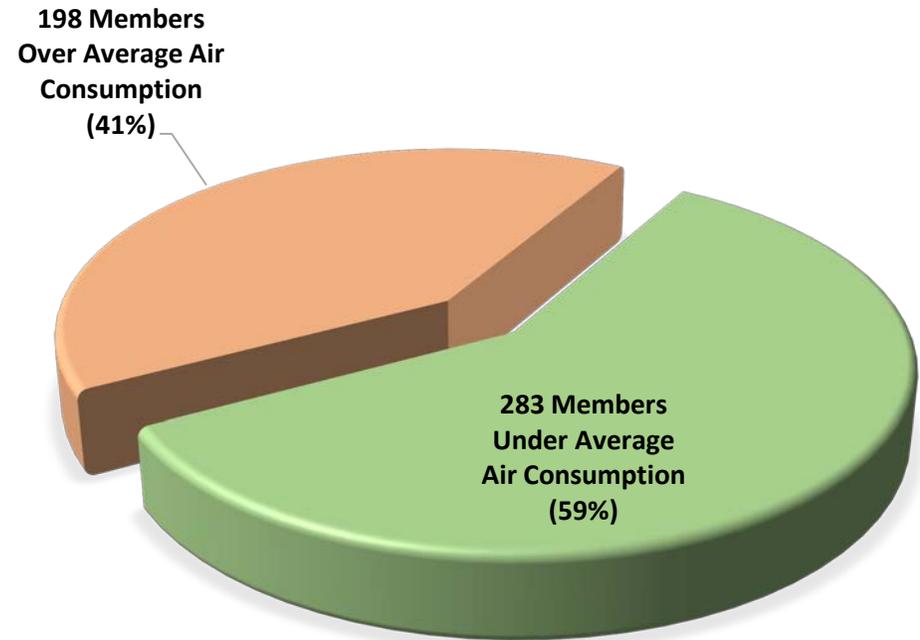
# WPE Air Consumption

**2013**



\* Avg Air Consumption 994 PSI

**2014**



\* Avg Air Consumption 1047 PSI

### Average By Age Group

Age	2013 Count	2014 Count	2013 WPE Completion Time (minutes)	2014 WPE Completion Time (minutes)	2013 Air Consumption (PSI)	2014 Air Consumption (PSI)
Age 20-25	n = 2	n = 7	06:02	05:36	660	931
Age 26-30	n = 65	n = 48	06:26	05:47	919	1008
Age 31-35	n = 89	n = 90	06:38	06:03	944	1022
Age 36-40	n = 86	n = 91	07:04	06:28	943	1021
Age 41-45	n = 104	n = 108	07:25	06:42	930	1027
Age 46-50	n = 79	n = 80	08:00	06:52	1076	1100
Age 51-55	n = 30	n = 42	08:16	07:39	1102	1119
Age 56-60	n = 12	n = 12	09:30	08:09	1190	1158
Age 61 and above	n = 6	n = 3	09:15	08:02	1372	1050

### Average By Years of Service

Yrs of Service	2013 Count	2014 Count	2013 WPE Completion Time (minutes)	2014 WPE Completion Time (minutes)	2013 Air Consumption (PSI)	2014 Air Consumption (PSI)
1-5	n = 101	n = 86	06:31	05:50	922	995
6-10	n = 137	n = 138	06:57	06:17	977	1046
11-15	n = 111	n = 122	07:26	06:44	931	1034
16-20	n = 44	n = 55	07:56	06:50	1023	1042
21-25	n = 56	n = 41	08:01	07:13	1054	1094
26-30	n = 20	n = 35	08:46	07:36	1208	1139
>30	n = 4	n = 4	09:56	08:35	1248	1203

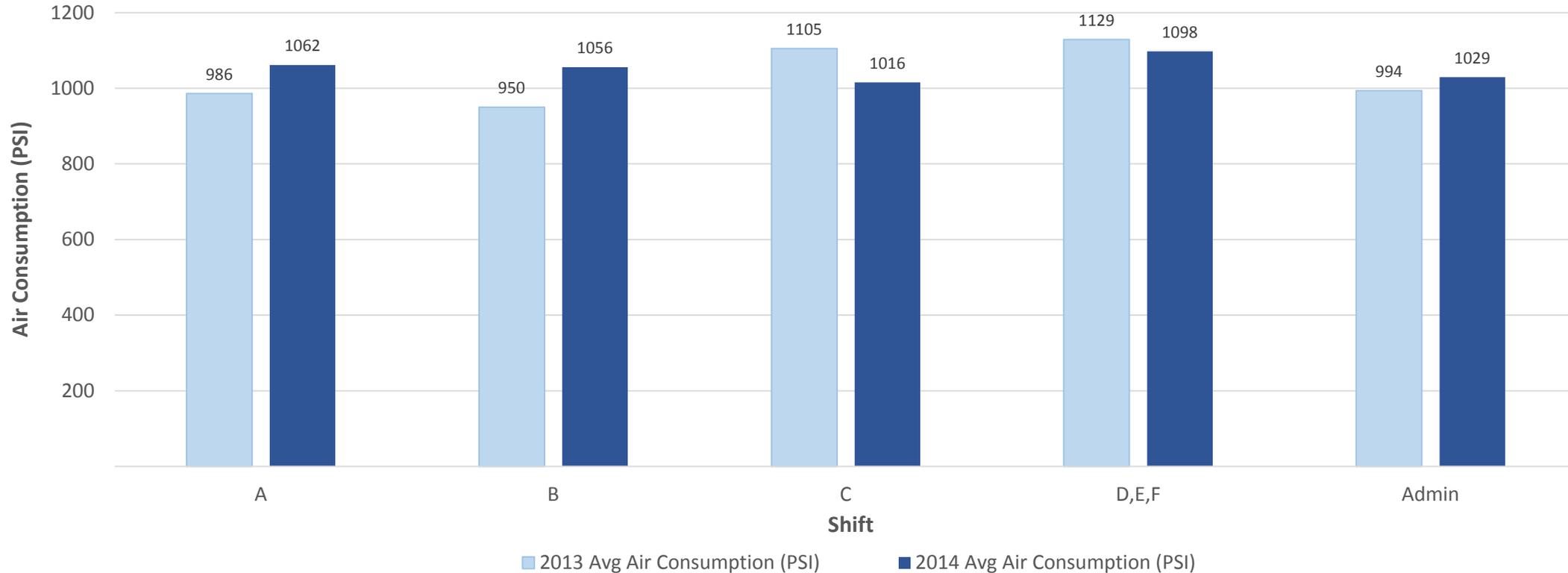
### Average By Age Group

Age	2013 Count	2013 Pre Pulse	2013 Post Pulse	2014 Count	2014 Pre Pulse	2014 Post Pulse
Age 20-25	n = 2	90	117	n = 7	86	138
Age 26-30	n = 65	81	122	n = 48	80	129
Age 31-35	n = 89	85	125	n = 90	81	126
Age 36-40	n = 86	86	121	n = 91	83	125
Age 41-45	n = 104	88	123	n = 108	84	125
Age 46-50	n = 79	83	120	n = 80	83	121
Age 51-55	n = 30	86	116	n = 42	82	120
Age 56-60	n = 12	82	118	n = 12	80	122
Age 61 and above	n = 6	90	118	n = 3	83	119

### Average By Years of Service

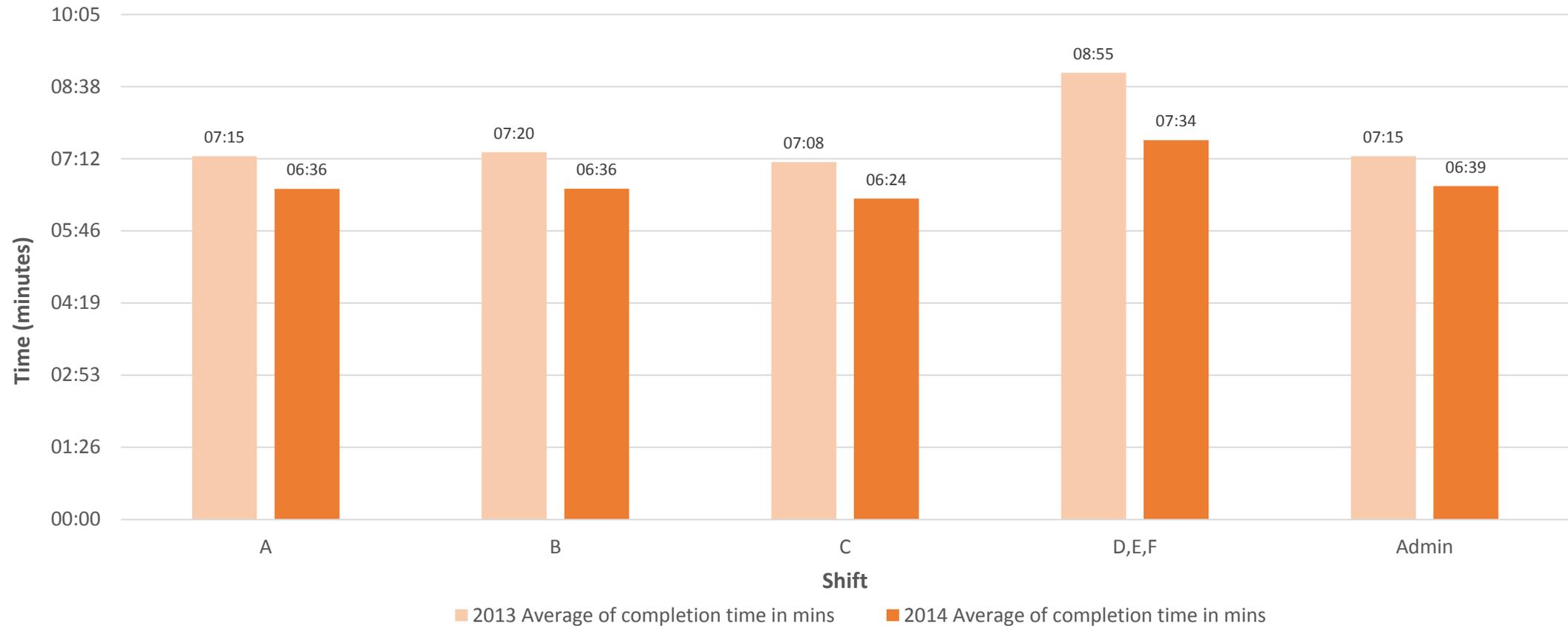
Yrs of Service	2013 Count	2013 Pre Pulse	2013 Post Pulse	2014 Count	2014 Pre Pulse	2014 Post Pulse
1-5	n = 101	82	122	n = 86	81	128
6-10	n = 137	86	122	n = 138	81	124
11-15	n = 111	88	124	n = 122	85	126
16-20	n = 44	87	119	n = 55	85	123
21-25	n = 56	81	118	n = 41	79	118
26-30	n = 20	86	119	n = 35	82	121
>30	n = 4	76	116	n = 4	74	125

# Average Air Consumption Comparison (PSI) by Shift



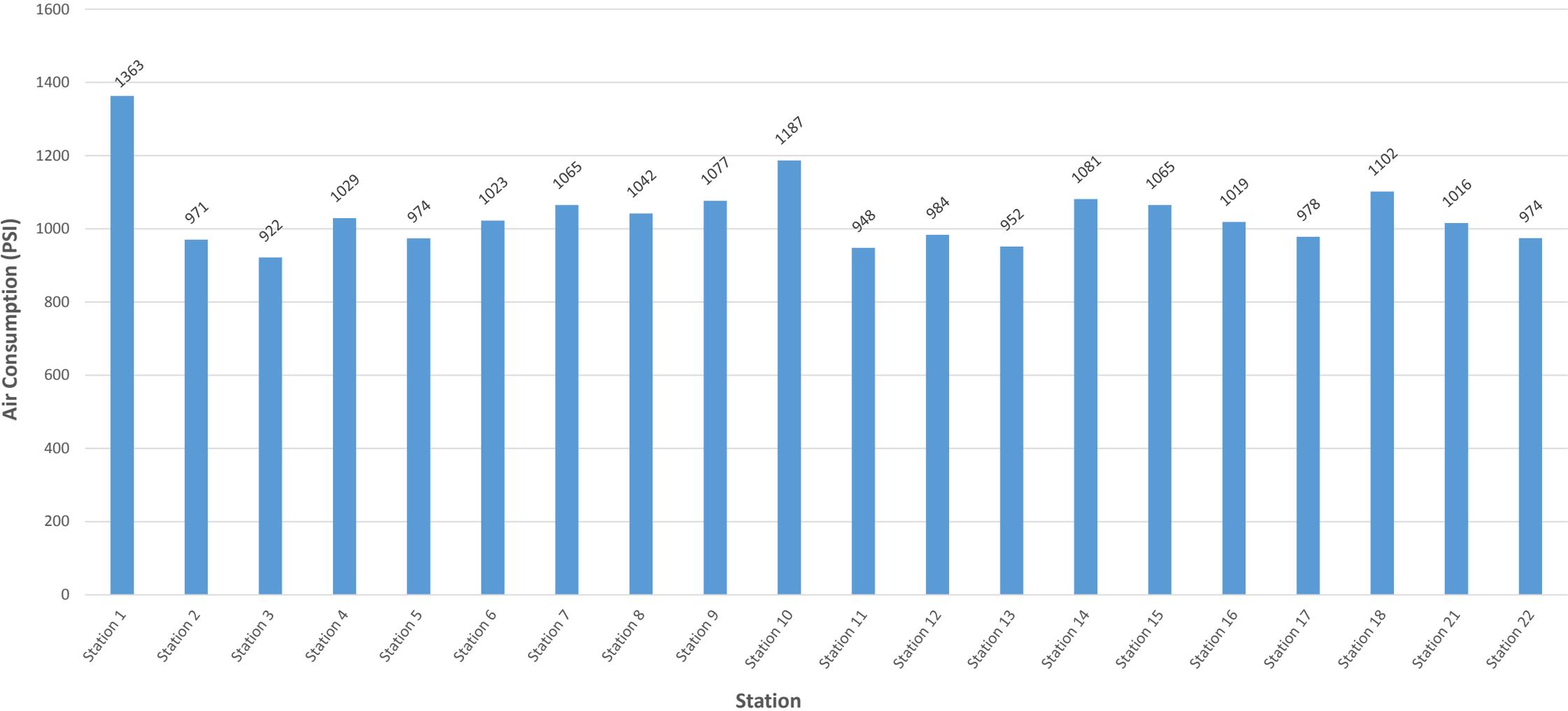
2013 Count	n = 137	n = 141	n = 148	n = 15	n = 33
2014 Count	n = 145	n = 146	n = 142	n = 17	n = 31

# Average Completion Time (min) by Shift

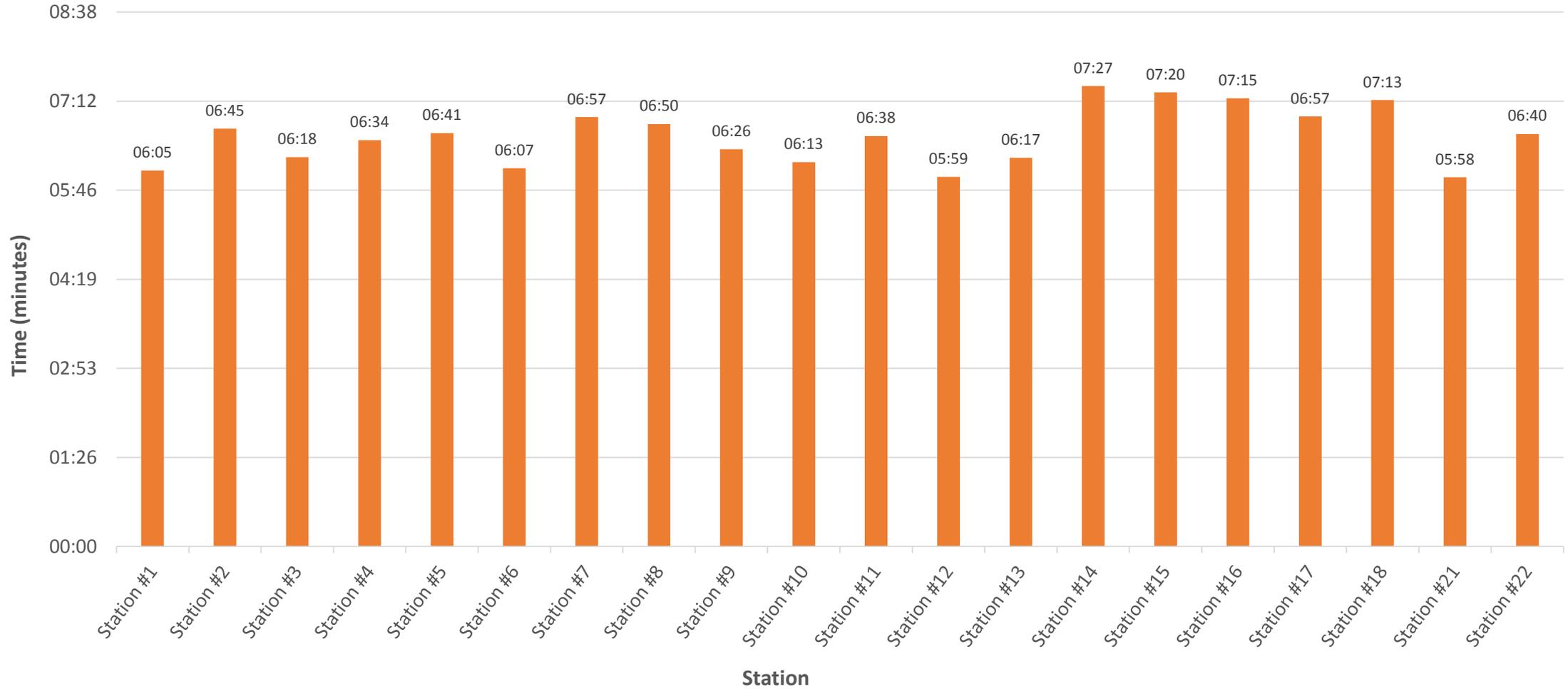


2013 Count	n = 137	n = 141	n = 148	n = 15	n = 33
2014 Count	n = 145	n = 146	n = 142	n = 17	n = 31

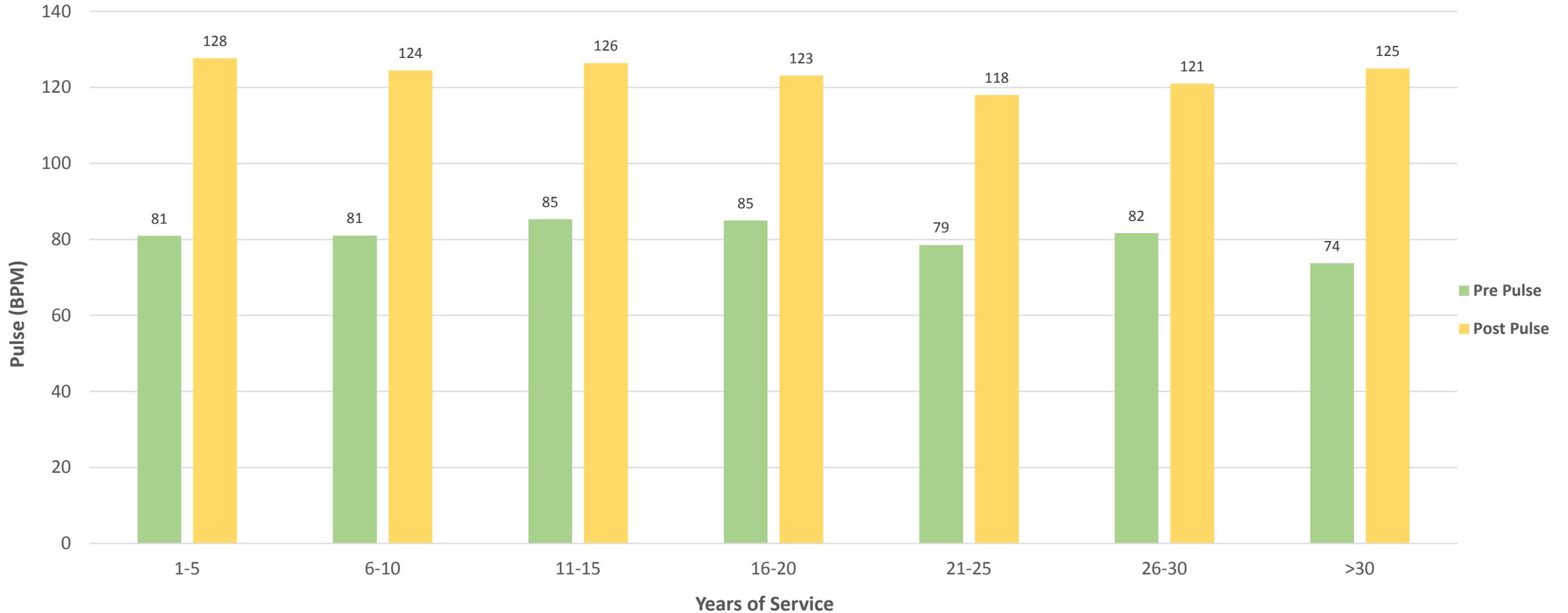
# Average Air Consumption (PSI) by Station



# Average Completion Time (min) by Station

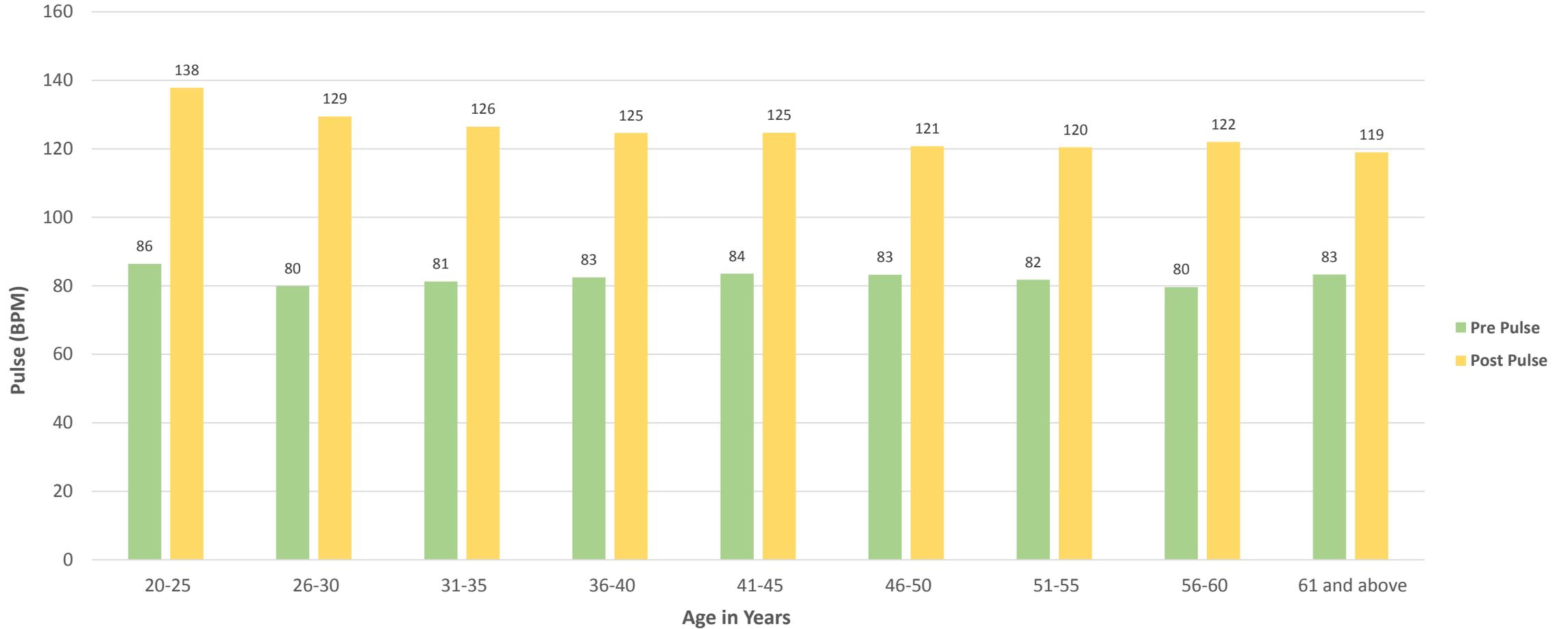


# Average Pulse (BPM) by Years of Service



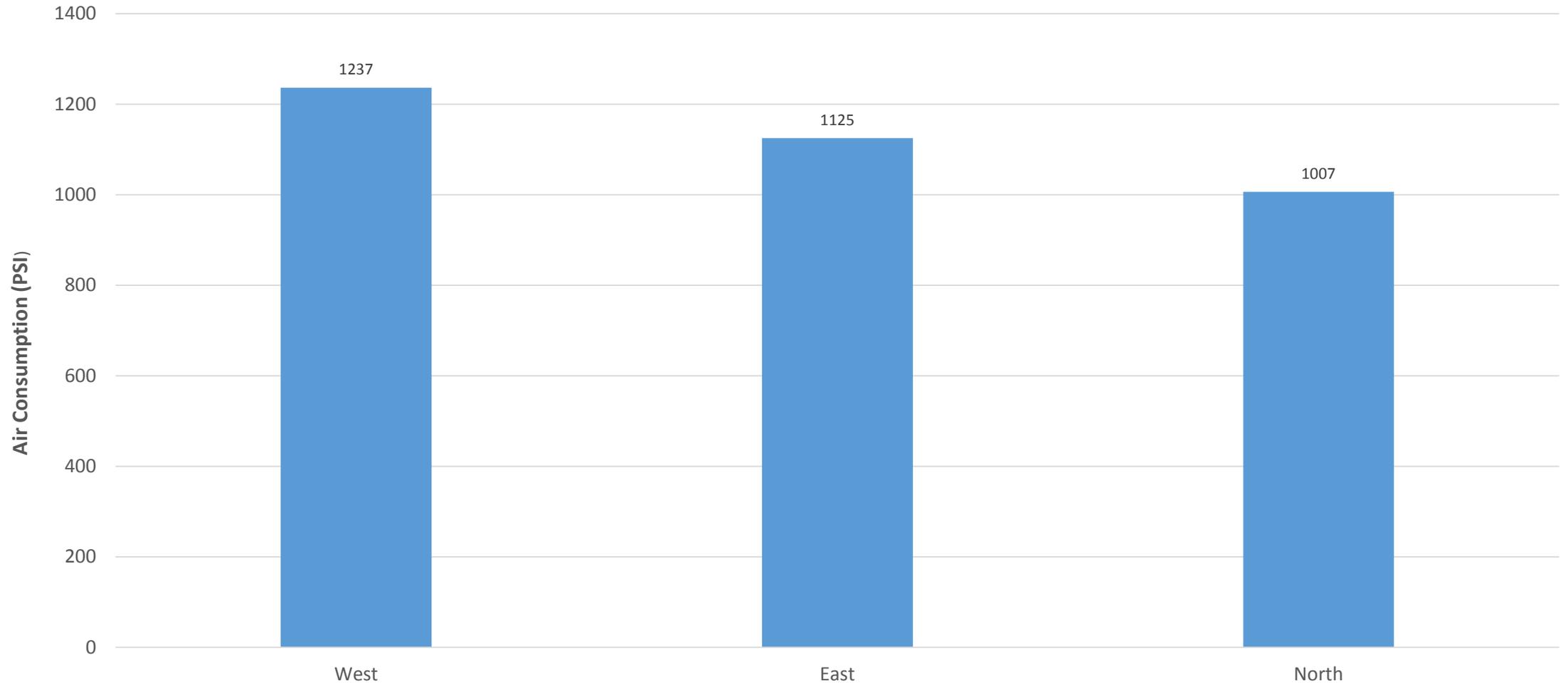
Count	n = 86	n = 138	n = 122	n = 55	n = 41	n = 35	n = 4
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# Average Pulse (BPM) by Age

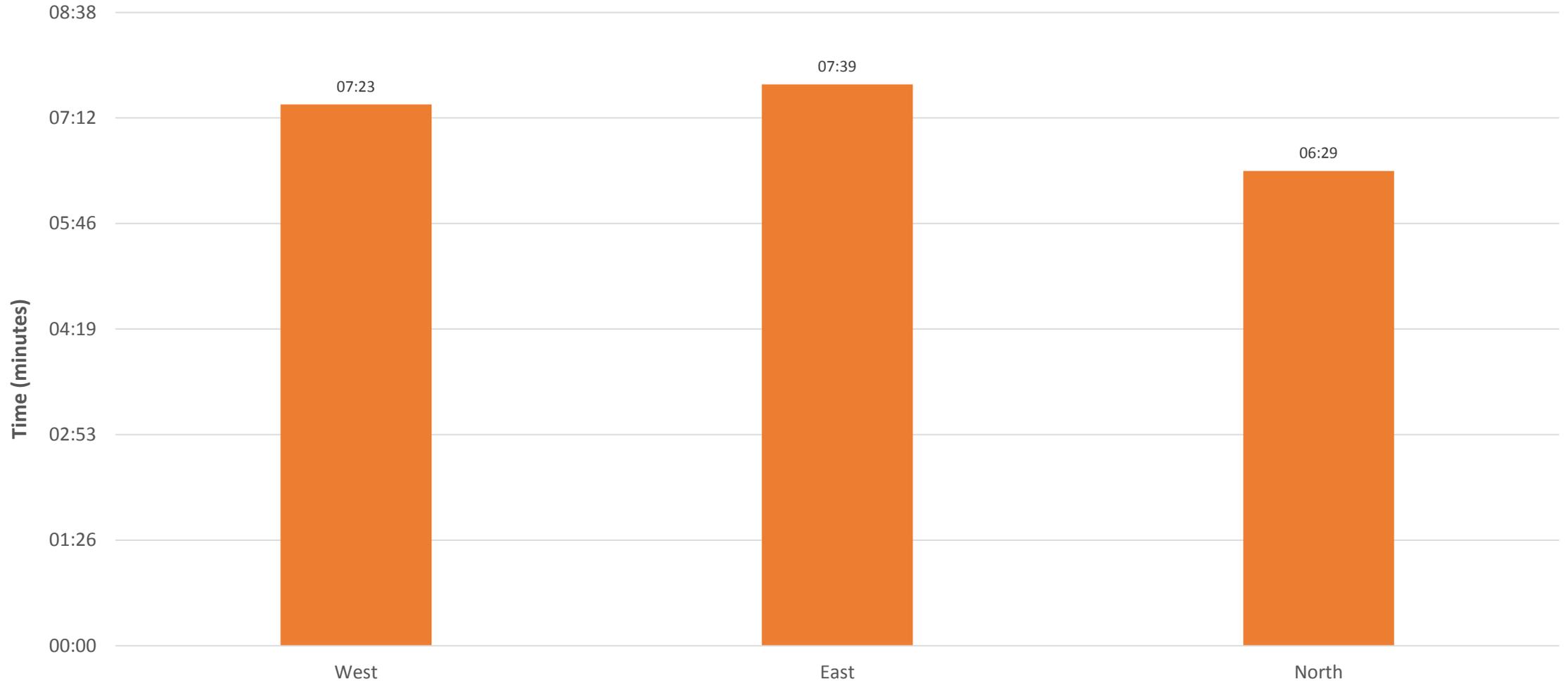


Count	n = 7	n = 48	n = 90	n = 91	n = 108	n = 80	n = 42	n = 12	n = 3
-------	-------	--------	--------	--------	---------	--------	--------	--------	-------

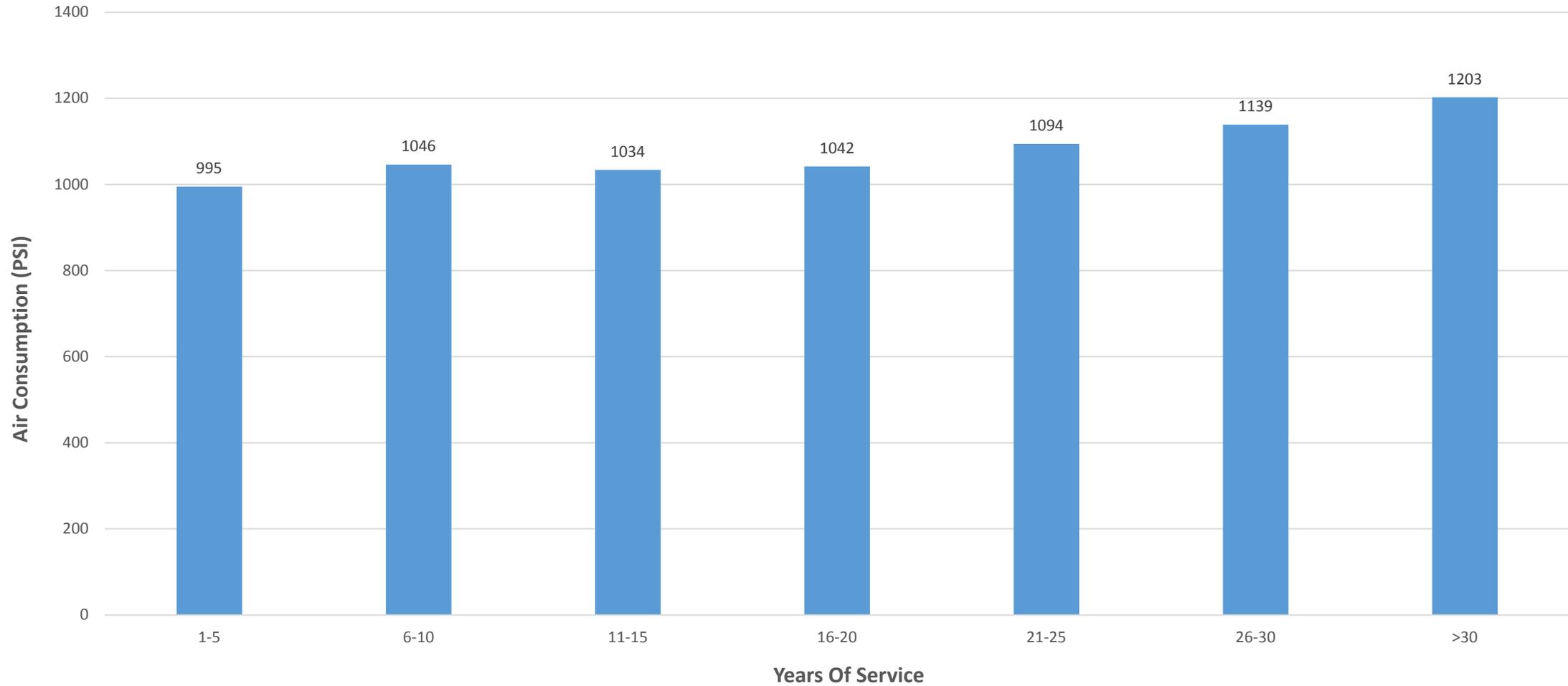
# Average Air Consumption (PSI) by Battalion



# Average Completion Time (min) by Battalion

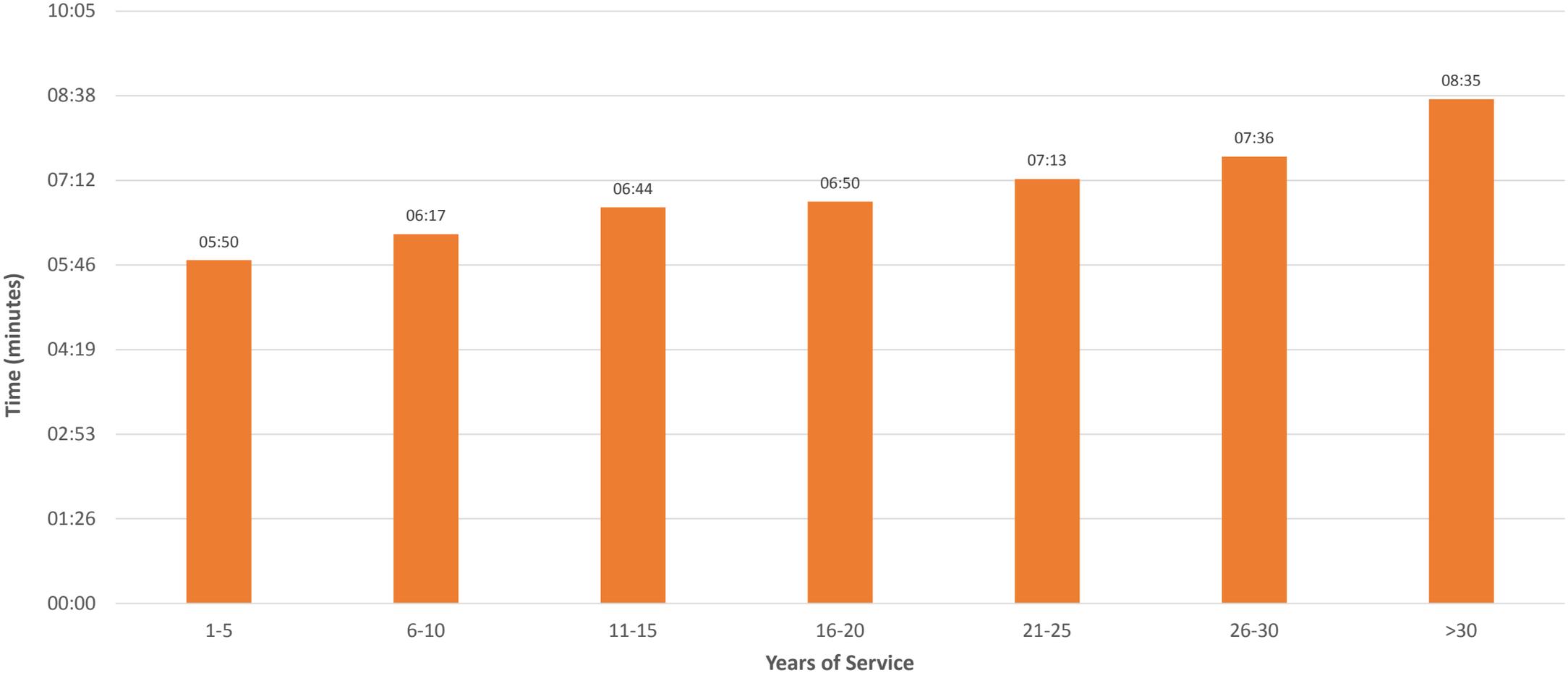


# Average Air Consumption (PSI) by Years of Service



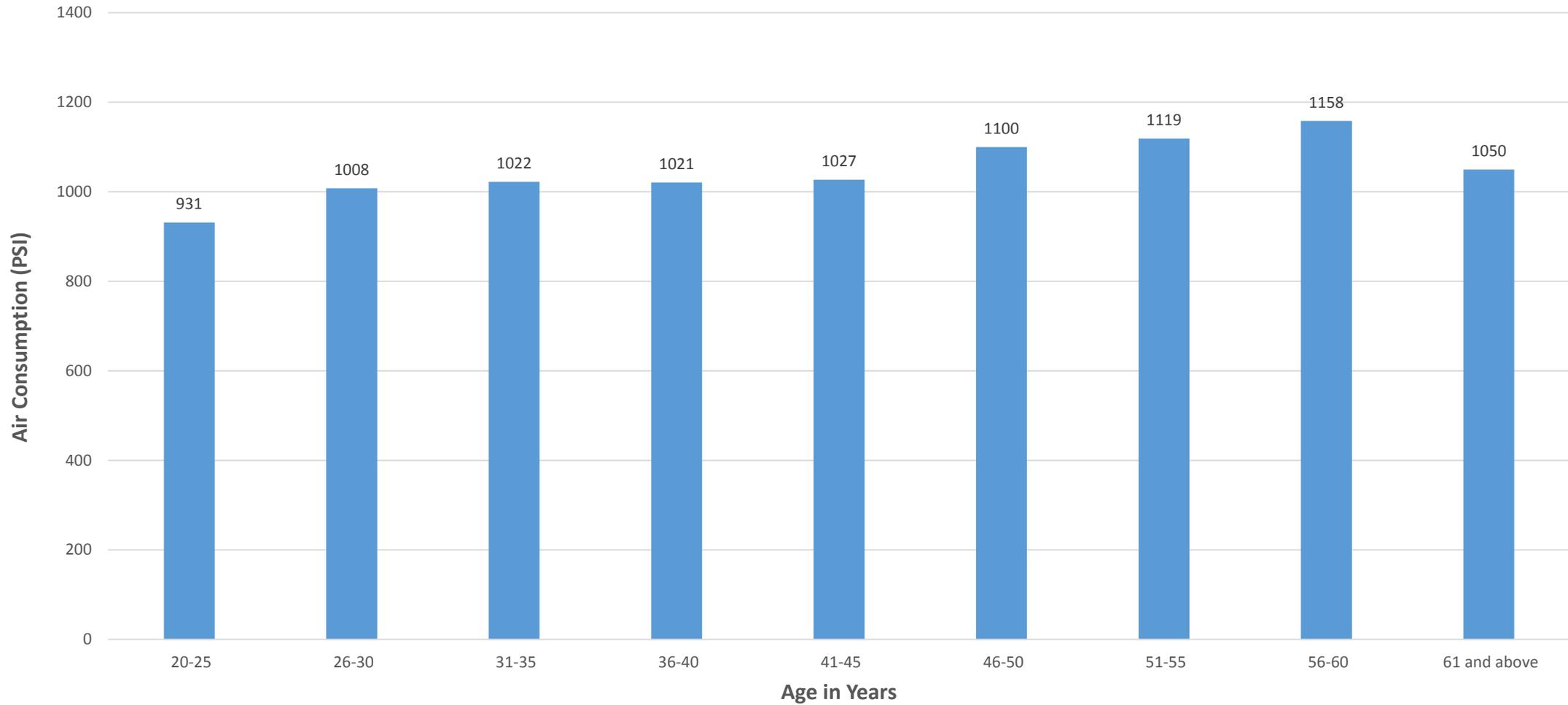
Count	n = 86	n = 138	n = 122	n = 55	n = 41	n = 35	n = 4
-------	--------	---------	---------	--------	--------	--------	-------

# Average Completion Time (min) by Years of Service



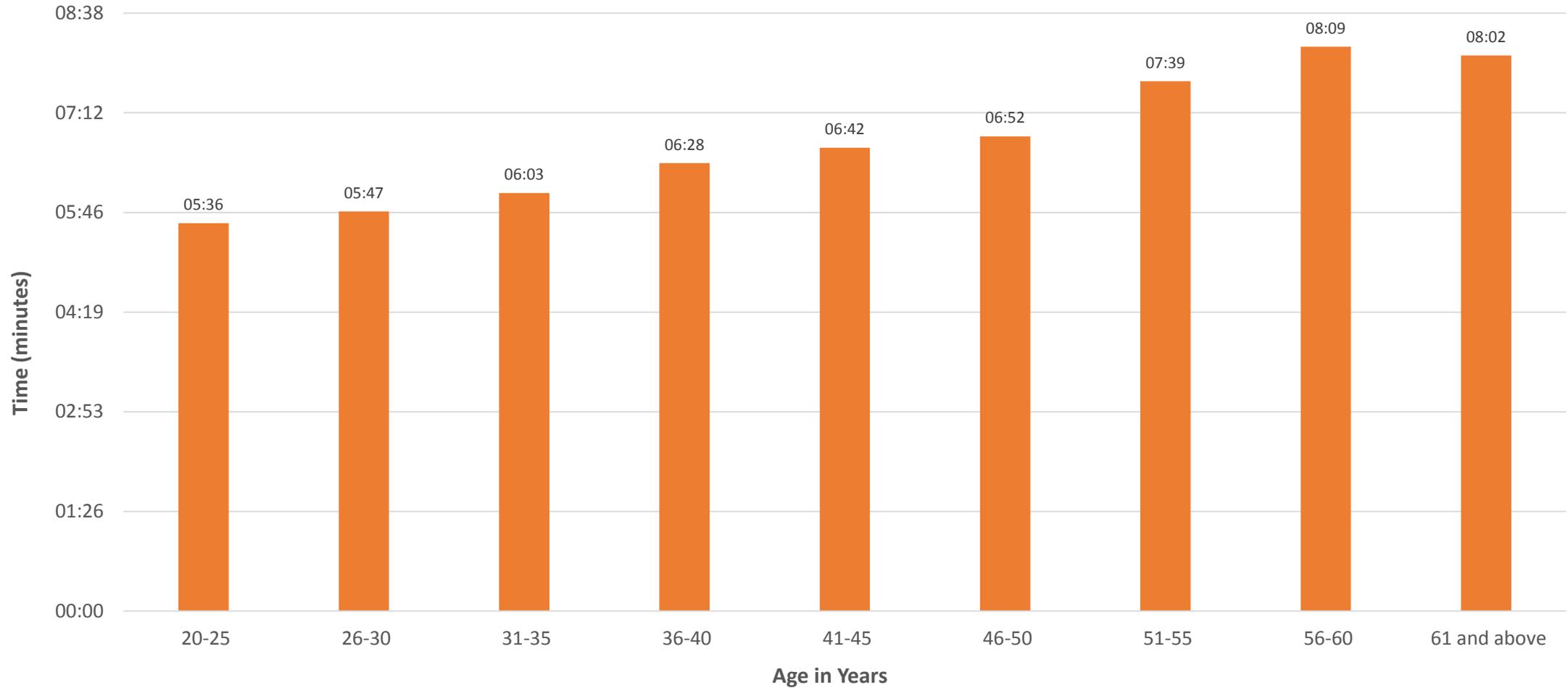
Count	n = 86	n = 138	n = 122	n = 55	n = 41	n = 35	n = 4
-------	--------	---------	---------	--------	--------	--------	-------

# Average Air Consumption (PSI) by Age



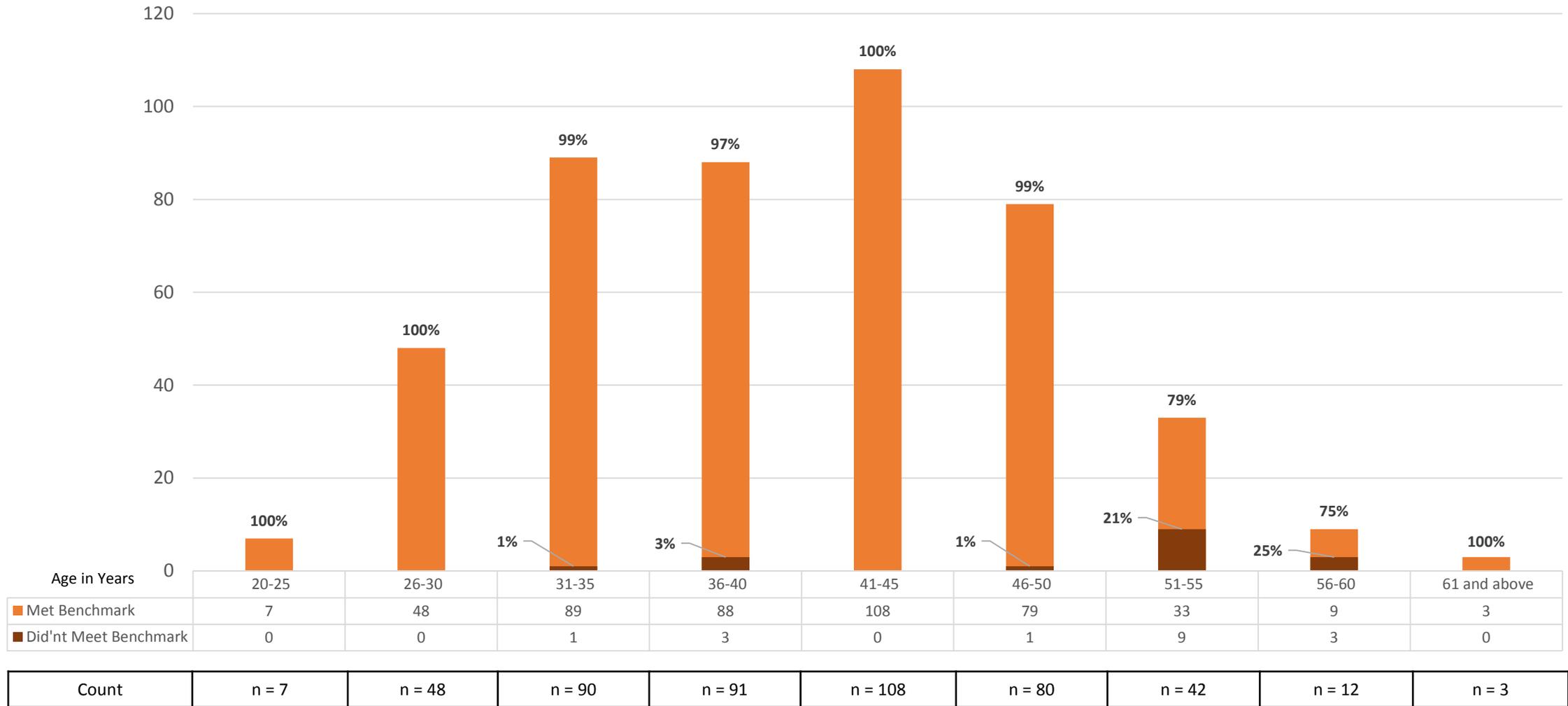
Count	n = 7	n = 48	n = 90	n = 91	n = 108	n = 80	n = 42	n = 12	n = 3
-------	-------	--------	--------	--------	---------	--------	--------	--------	-------

# Average Completion Time (min) by Age



Count	n = 7	n = 48	n = 90	n = 91	n = 108	n = 80	n = 42	n = 12	n = 3
-------	-------	--------	--------	--------	---------	--------	--------	--------	-------

# Benchmark Achieved by Age Group



\* Benchmark Time ≤ 08:44 Min

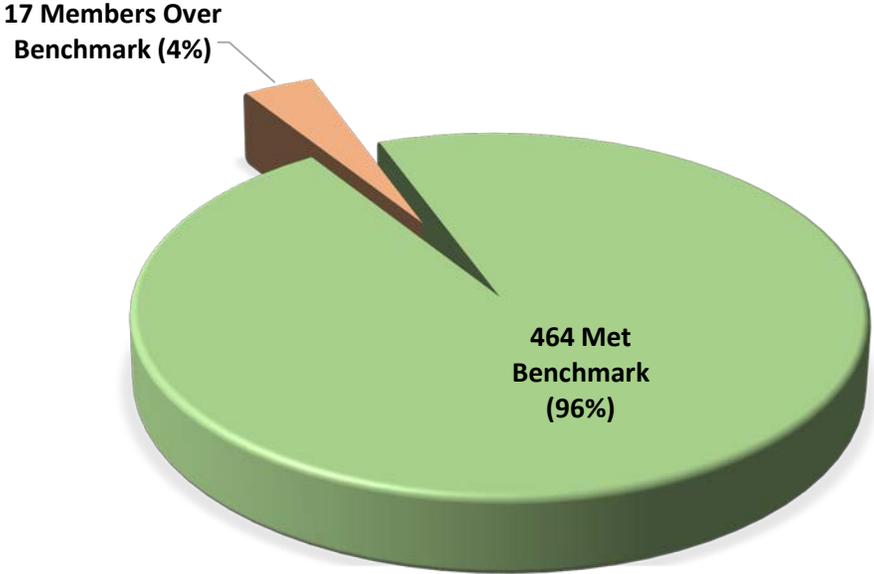
# Henrico County Division of Fire Work Performance Evaluation 2015



# WPE Benchmark

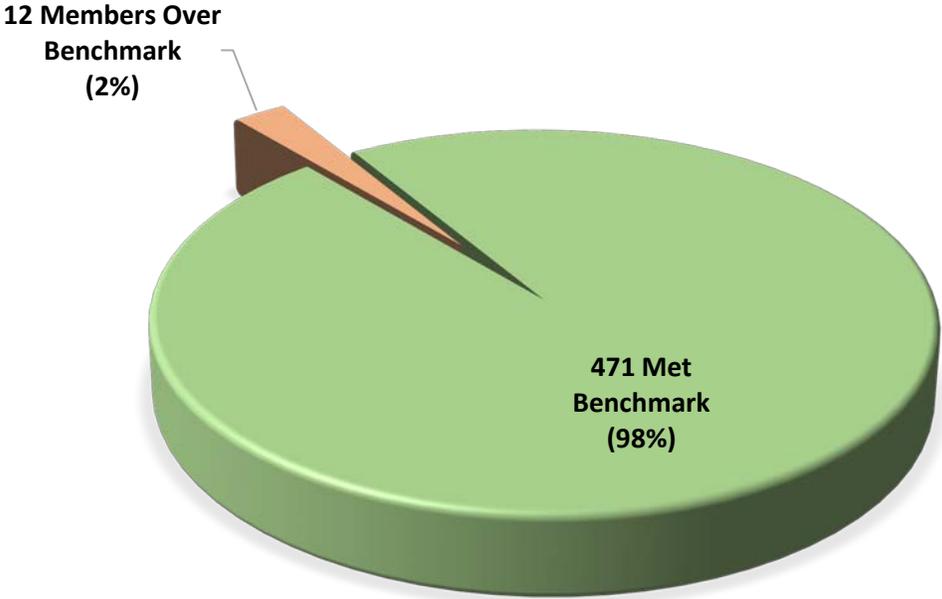
(Met Benchmark/Didn't Meet Benchmark)

2014



\* 481 Attempted WPE

2015



\* 483 Attempted WPE

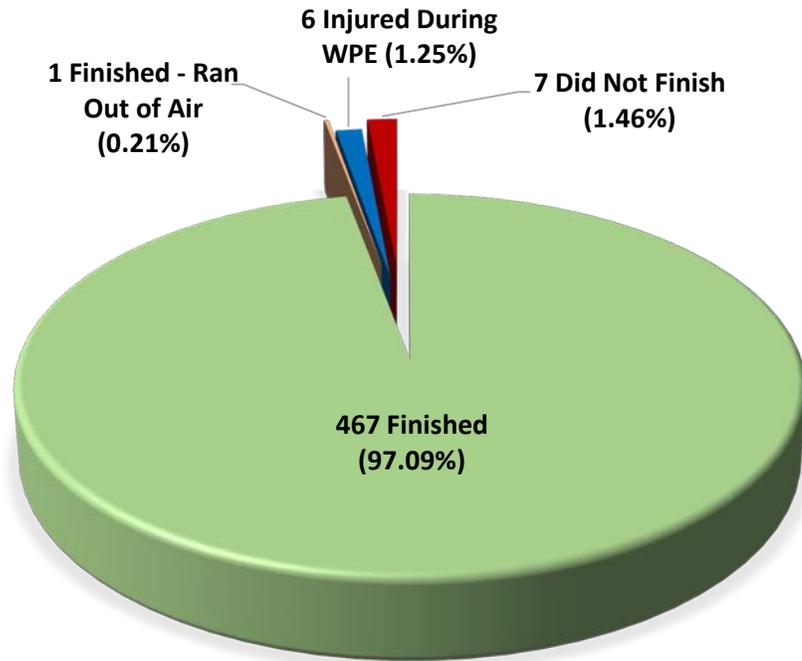
\* Out of 12 Over Benchmark : 8 Finished OBM  
: 4 Did not finish

\* Benchmark Time ≤ 08:44 Min

# WPE Course Attempts

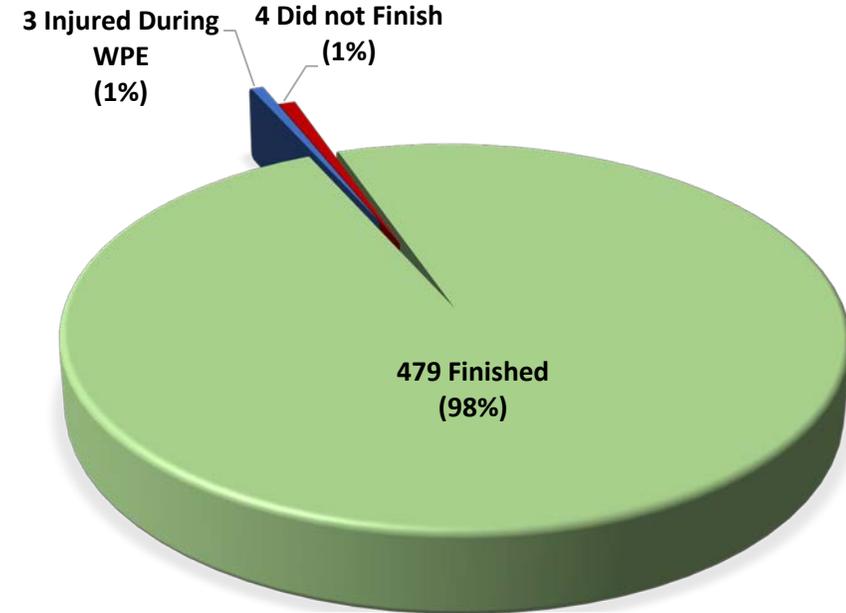
(Cross the Finish Line/Didn't Cross the Finish Line)

**2014**



\* Out of 467 Finished : 2 Finished over benchmark

**2015**



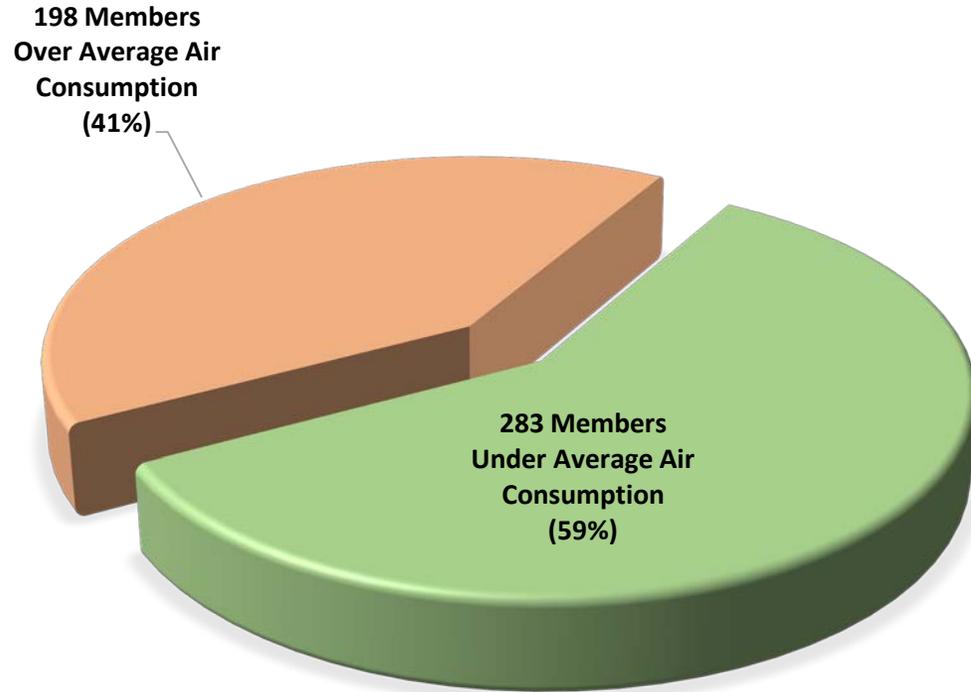
\* Out of 479 Finished : 8 Finished Over Benchmark

\* Out of 8 Finished OBM : 1 Attempted Twice with 2nd Successful Attempt  
 : 2 Attempted Twice Unsuccessfully  
 : 5 Attempted Once Unsuccessfully

\* Out of 3 Injured : 1 Finished Unsuccessfully OBM  
 : 1 Finished Successfully  
 : 1 Did not Finish

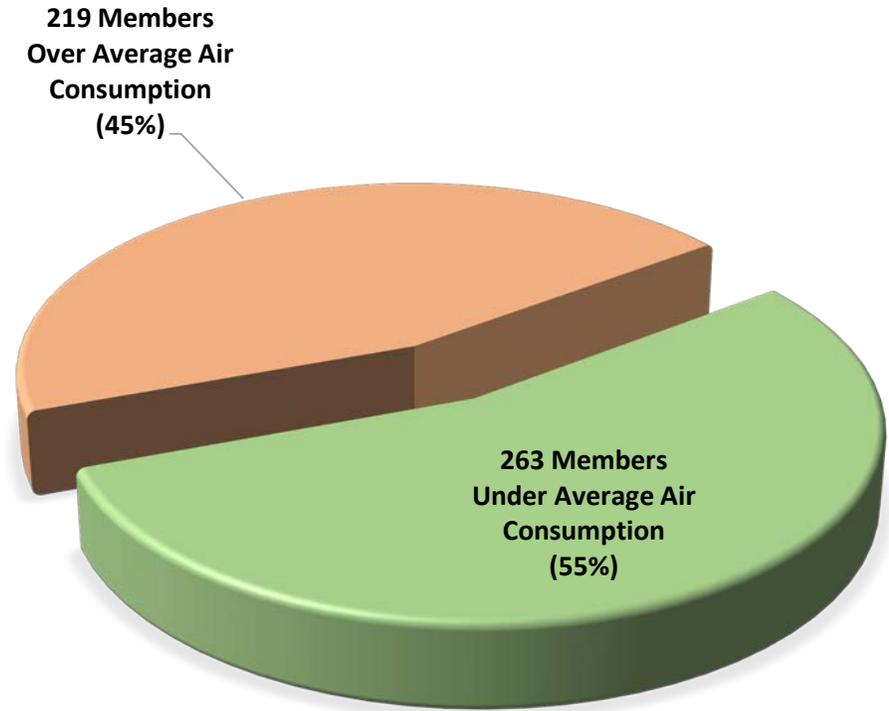
# WPE Air Consumption

## 2014



\* Avg Air Consumption 1047 PSI

## 2015



\* Avg Air Consumption 939 PSI

\* 4 Did not finish

\* 3 Members Attempted twice

### Average Air Consumption by Age Group

Age	2014 Count	2014 Avg Air Consumption (PSI)	2015 Count	2015 Avg Air Consumption (PSI)
Age 20-25	n = 7	931	n = 10	803
Age 26-30	n = 48	1008	n = 35	844
Age 31-35	n = 90	1022	n = 99	893
Age 36-40	n = 91	1021	n = 90	911
Age 41-45	n = 108	1027	n = 108	954
Age 46-50	n = 80	1100	n = 82	996
Age 51-55	n = 42	1119	n = 45	1007
Age 56-60	n = 12	1158	n = 11	1078
Age 61 and above	n = 3	1050	n = 2	1320

### Average Air Consumption by Years of Service

Yrs of Service	2014 Count	2014 Avg Air Consumption (PSI)	2015 Count	2015 Avg Air Consumption (PSI)
1-5	n = 86	995	n = 81	852
6-10	n = 138	1046	n = 118	918
11-15	n = 122	1034	n = 153	947
16-20	n = 55	1042	n = 54	957
21-25	n = 41	1094	n = 45	1013
26-30	n = 35	1139	n = 26	1030
>30	n = 4	1203	n = 5	1244

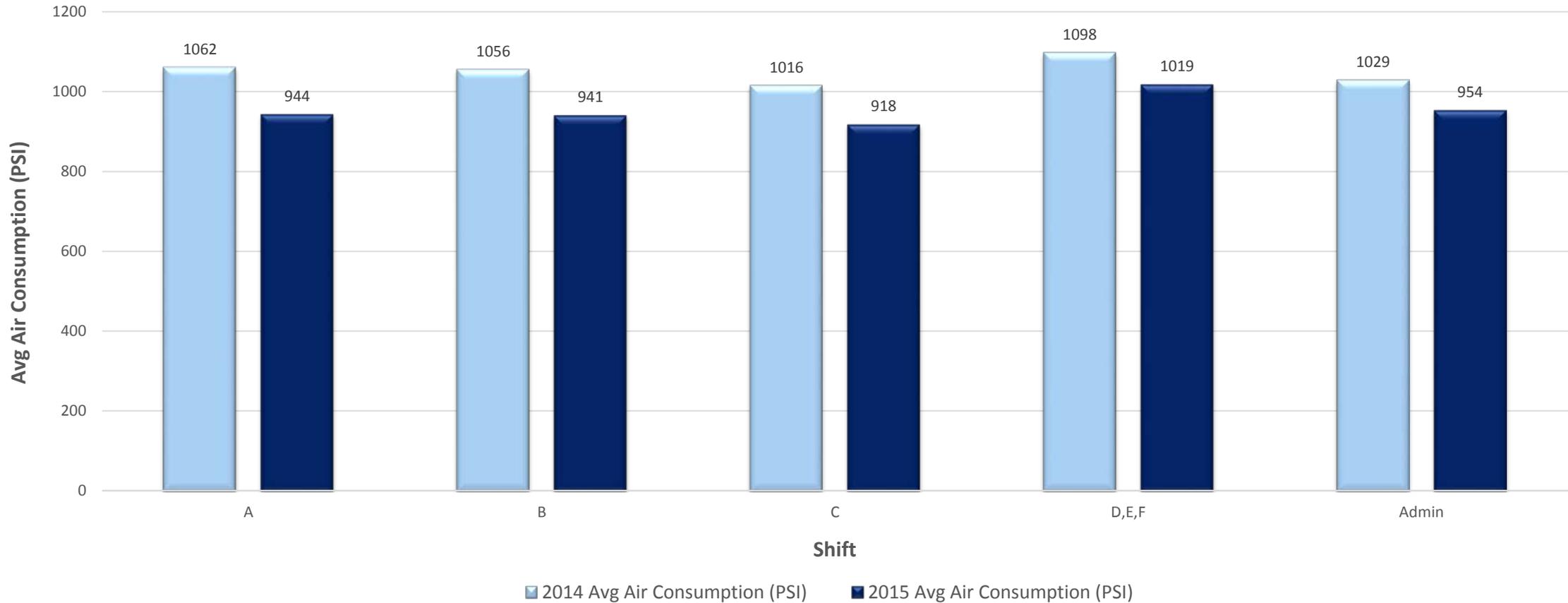
### Average Pre Pulse and Post Pulse by Age Group

Age	2014 Count	2014 Avg Pre Pulse	2014 Avg Post Pulse	2015 Count	2015 Avg Pre Pulse	2015 Avg Post Pulse
Age 20-25	n = 7	86	138	n = 10	88	113
Age 26-30	n = 48	80	129	n = 35	80	113
Age 31-35	n = 90	81	126	n = 98	81	119
Age 36-40	n = 91	83	125	n = 90	81	118
Age 41-45	n = 108	84	125	n = 107	85	107
Age 46-50	n = 80	83	121	n = 82	82	117
Age 51-55	n = 42	82	120	n = 47	86	118
Age 56-60	n = 12	80	122	n = 11	87	115
Age 61 and above	n = 3	83	119	n = 3	86	131

### Average Pre Pulse and Post Pulse by Years of Service

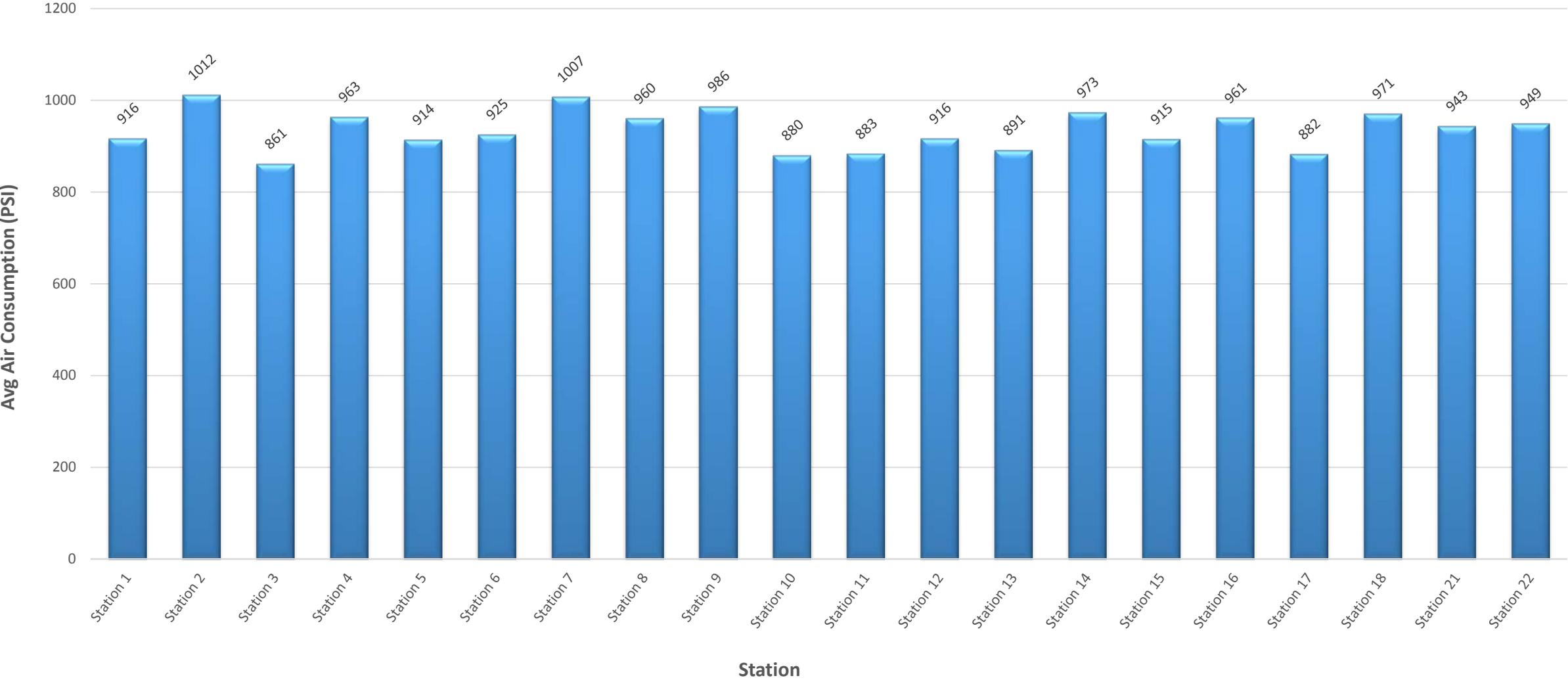
Yrs of Service	2014 Count	2014 Avg Pre Pulse	2014 Avg Post Pulse	2015 Count	2015 Avg Pre Pulse	2015 Avg Post Pulse
1-5	n = 86	81	128	n = 81	80	114
6-10	n = 138	81	124	n = 117	83	118
11-15	n = 122	85	126	n = 151	84	120
16-20	n = 55	85	123	n = 54	83	118
21-25	n = 41	79	118	n = 47	82	116
26-30	n = 35	82	121	n = 28	83	119
>30	n = 4	74	125	n = 5	82	118

# Average Air Consumption Comparison (PSI) by Shift

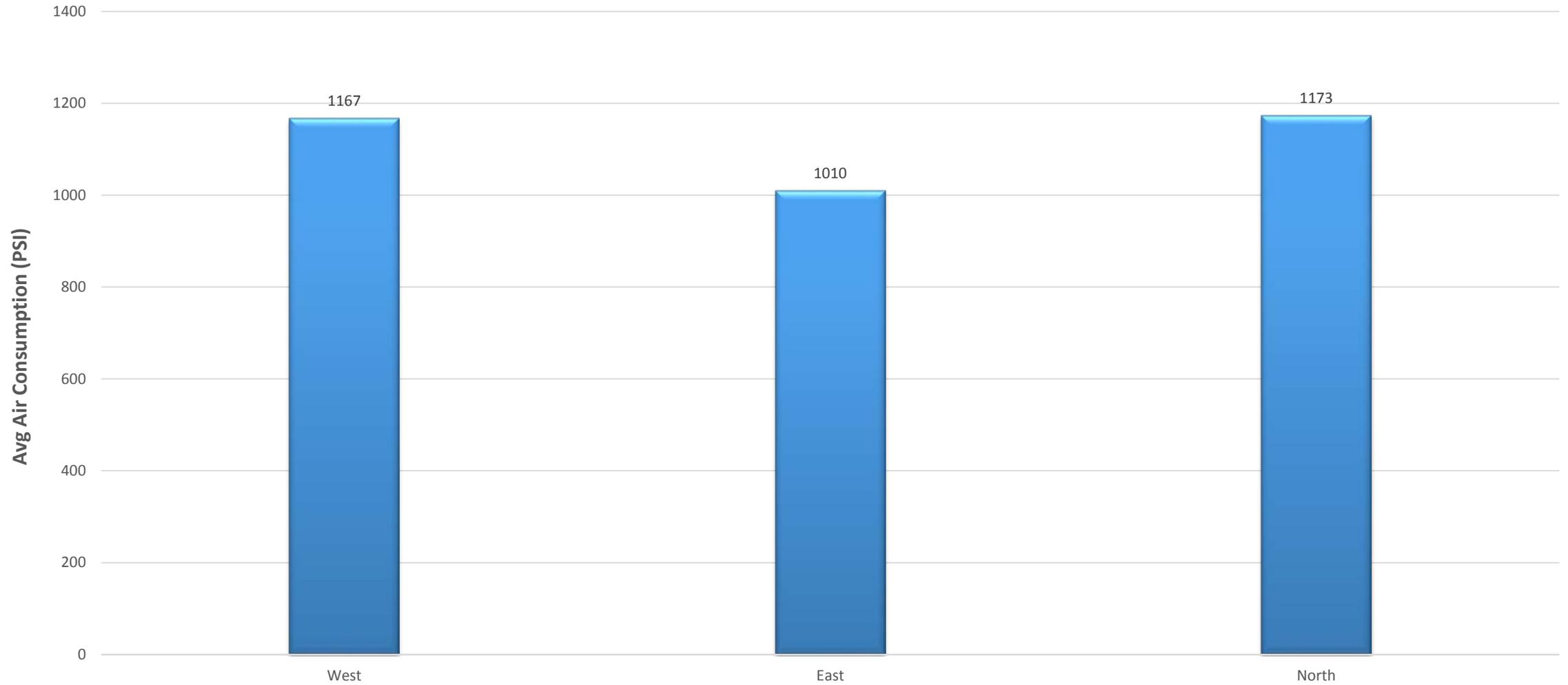


2014 Count	n = 145	n = 146	n = 142	n = 17	n = 31
2015 Count	n = 139	n = 144	n = 146	n = 16	n = 37

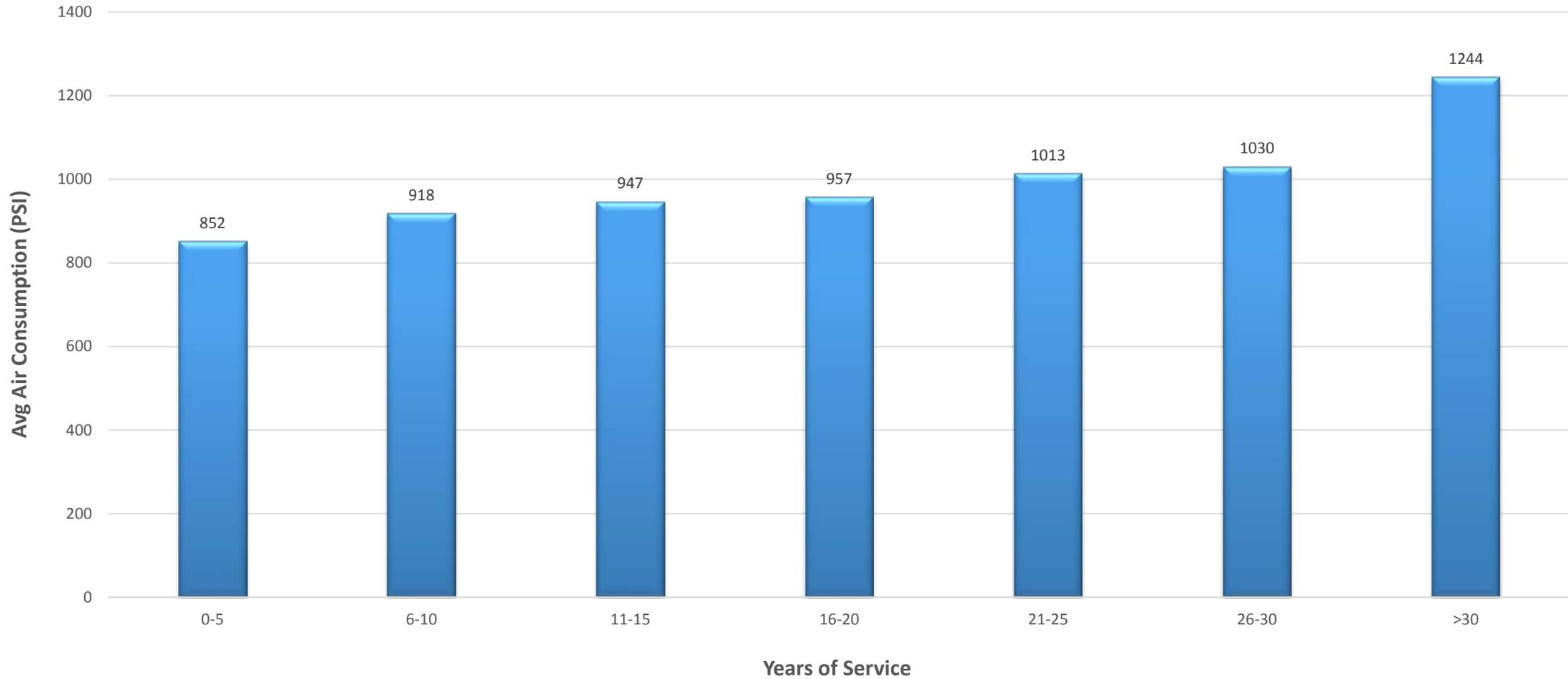
# Average Air Consumption (PSI) by Station



# Average Air Consumption (PSI) by Battalion

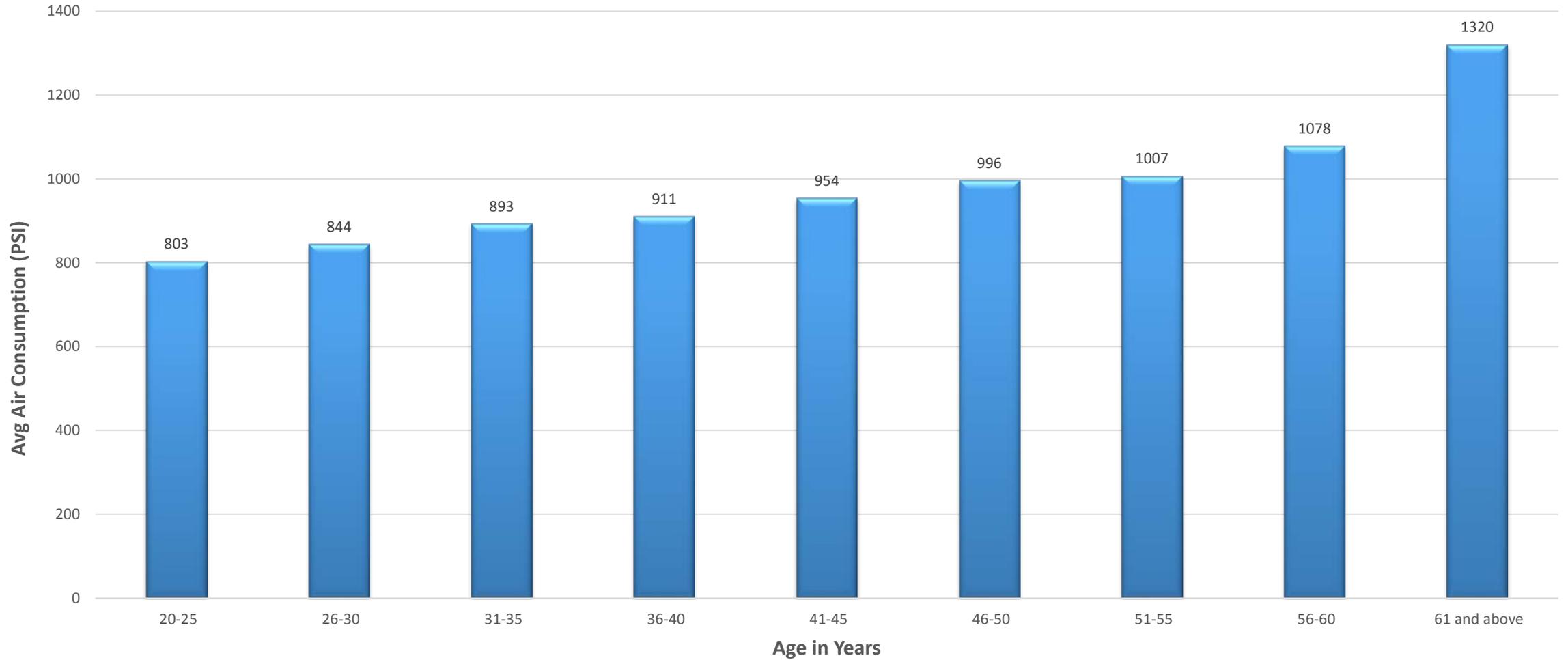


# Average Air Consumption (PSI) by Years of Service



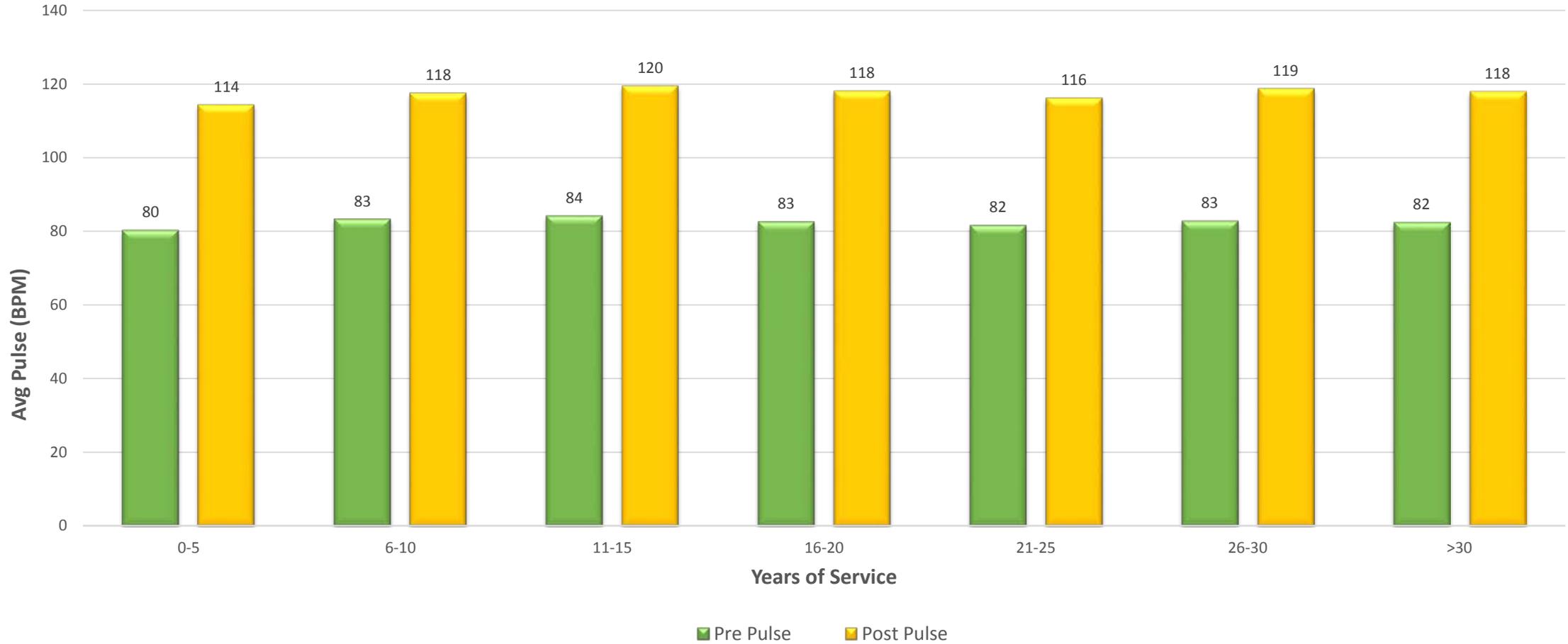
Count	n = 81	n = 118	n = 153	n = 54	n = 45	n = 26	n = 5
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# Average Air Consumption (PSI) by Age



Count	n = 7	n = 48	n = 90	n = 91	n = 108	n = 80	n = 42	n = 12	n = 3
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# Average Pulse (BPM) by Years of Service

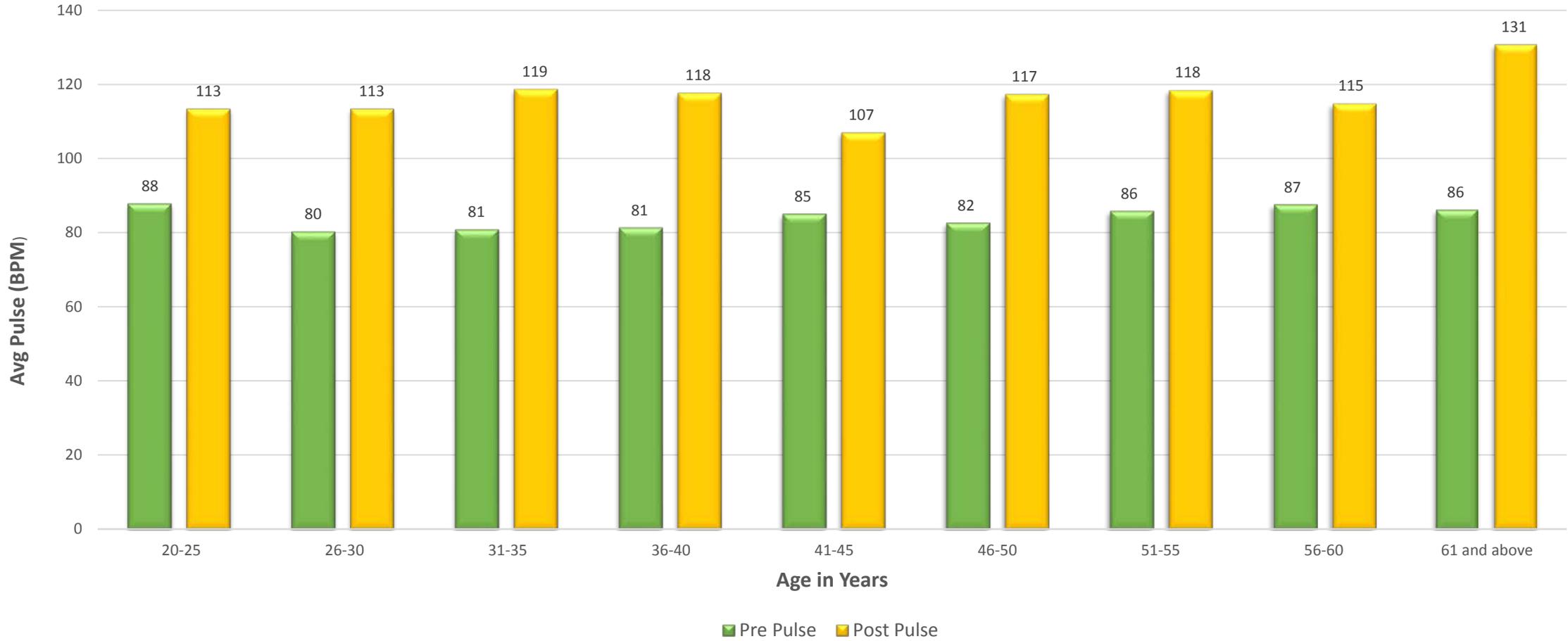


Count	n = 81	n = 117	n = 151	n = 54	n = 47	n = 28	n = 5
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\* PrePulse1 Data missing for 2 personnel

\* PostPulse5Min Data missing for 1 personnel

# Average Pulse (BPM) by Age

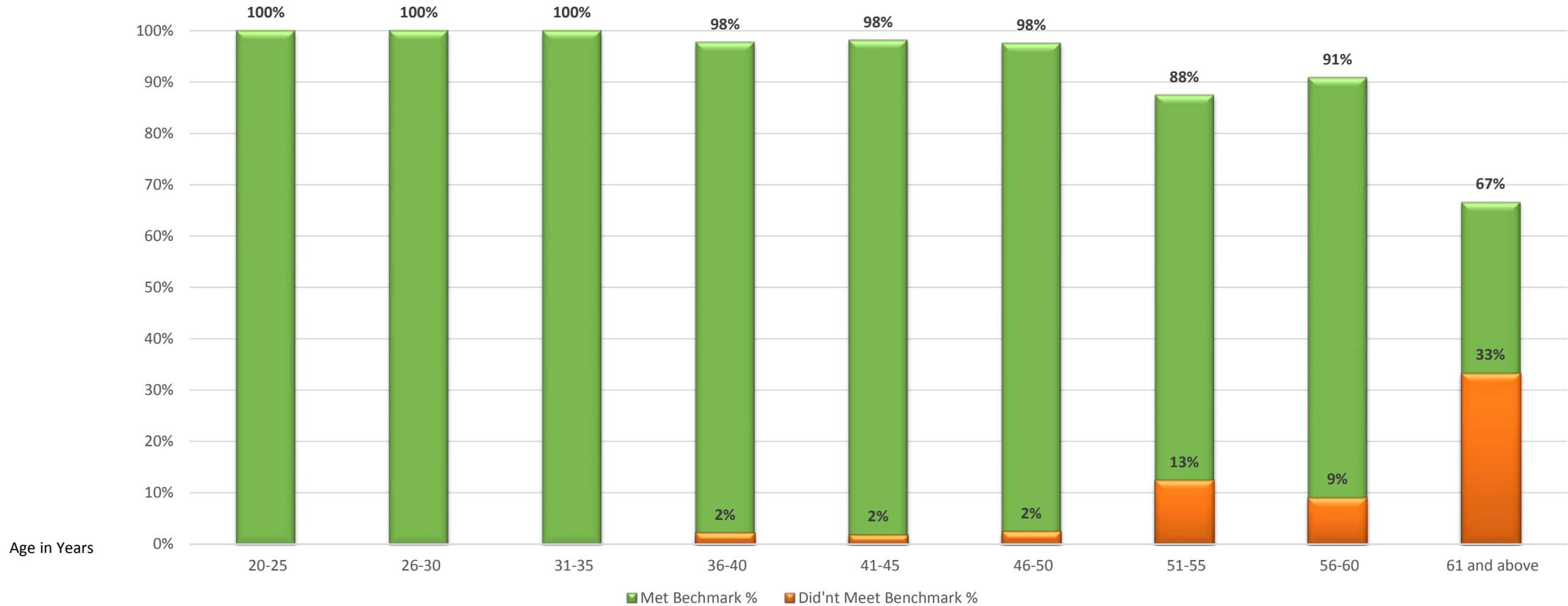


Count	n = 7	n = 48	n = 90	n = 91	n = 108	n = 80	n = 42	n = 12	n = 3
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\* PrePulse1 Data missing for 2 personnel

\*PostPulse5Min Data missing for 1 personnel

# Benchmark Achieved by Age Group



Met Benchmark	10	35	99	88	106	80	42	10	2
Didn't Meet Benchmark	0	0	0	2	2	2	6	1	1
Count	n = 10	n = 35	n = 99	n = 90	n = 108	n = 82	n = 48	n = 11	n = 3

**\* Benchmark Time ≤ 08:44 Min**

**\* Out of 14 Didn't Meet Benchmark : 8 Finished but Didn't Meet Benchmark  
 : 2 Attempted Twice and Didn't Meet Benchmark  
 : 4 Did not finish**

**2014 and 2015 Average Air Consumption and Average Post WPE Pulse Rate Results**

