

Mississippi Trainee Agility Test (MSTAT)

Final Report

Effective July 1, 2021

**Mississippi Fire Academy/Mississippi Fire Personnel Minimum Standards and
Certification Board**

Mississippi Trainee Agility Test (MSTAT)

Purpose

The MSTAT testing process will be utilized as a measurement tool to assess a firefighter trainee's ability to enter into the Basic Firefighter 1001 I-II at the Mississippi State Fire Academy in accordance with NFPA 1001, 1.3.8, 2019 edition.

Scope

To establish and maintain regional testing sites throughout Mississippi that will be responsible for administering the MSTAT test to a firefighter trainee's in a systematic process on a rotating schedule.

Selected Testing Sites

The MSCB's MSTAT committee has selected 7 fire departments or locations from around the state to participate in the MSTAT testing process. These sites are strategically selected locations to represent the entirety of the Mississippi state fire service. These sites included:

North Mississippi

- Tupelo FD
- Starkville FD

Central Mississippi

- Jackson FD
- MS State Fire Academy

South Mississippi

- Gulfport FD
- Biloxi/Ocean Springs FD

Note: Any fire department that has frontline personnel of 100 or more may, by application process, seek approval through MSCB to become a MSTAT testing site. In addition, if future demand dictates, other state fire departments may, by application process, seek approval through MSCB to become a MSTAT regional testing site. A MSTAT testing site request application will be provided on the MSFA website.

The MSTAT testing site schedule will be as follows:

- ❖ **A copy of a detailed schedule will be posted on the MSFA website upon approval**
- Starkville, Gulfport FD will schedule to conduct a MSTAT test on the first Wednesday of each odd month through the year.
- Tupelo, Jackson and Biloxi/Ocean Springs FD will schedule to conduct a MSTAT test on the first Wednesday of each even month throughout the year
- MSFA will function as a backfield/overflow MSTAT testing site and will offer to conduct a MSTAT test on the first Wednesday of each month of throughout the year

Minimum MSTAT Participant Requirements

Each scheduled MSTAT test must have a minimum of 10 trainee participants for the test to proceed as scheduled. This assurance will be confirmed through registration with MSFA no later than one (1) week/ 7 days prior to the administration of each MSTAT test. All MSTAT testing will be scheduled to begin no later than 0900 of the scheduled date unless otherwise adjusted by the MSTAT testing site coordinator.

Cancelation Protocols

Cancelation of a scheduled MSTAT test must be communicated to all participating agencies no later than 2 days prior to the scheduled test when possible. Cancelations with less than 2 days prior notice will be limited to the following circumstances: (1) Inclement weather that may pose a danger to testing officials and testing participants; (2) Major event/emergency that places the host department in a position that will not allow proper facilitation of the MSTAT test; and (3) If the scheduled MSTAT testing date falls on a major holiday. Note: if cancelation of a scheduled MSTAT test occurs, MSFA will schedule to host a make-up test as soon as possible following the cancelation.

Collection of MSTAT Testing Fees

A \$30 fee will be assessed to each firefighter trainee that participates in the MSTAT test. This fee will apply to each individual MSTAT testing participant for each attempt of the MSTAT test. All MSTAT testing fees will be paid to MSFA upon registration for the course by direct payment or a PO process through each participating agency.

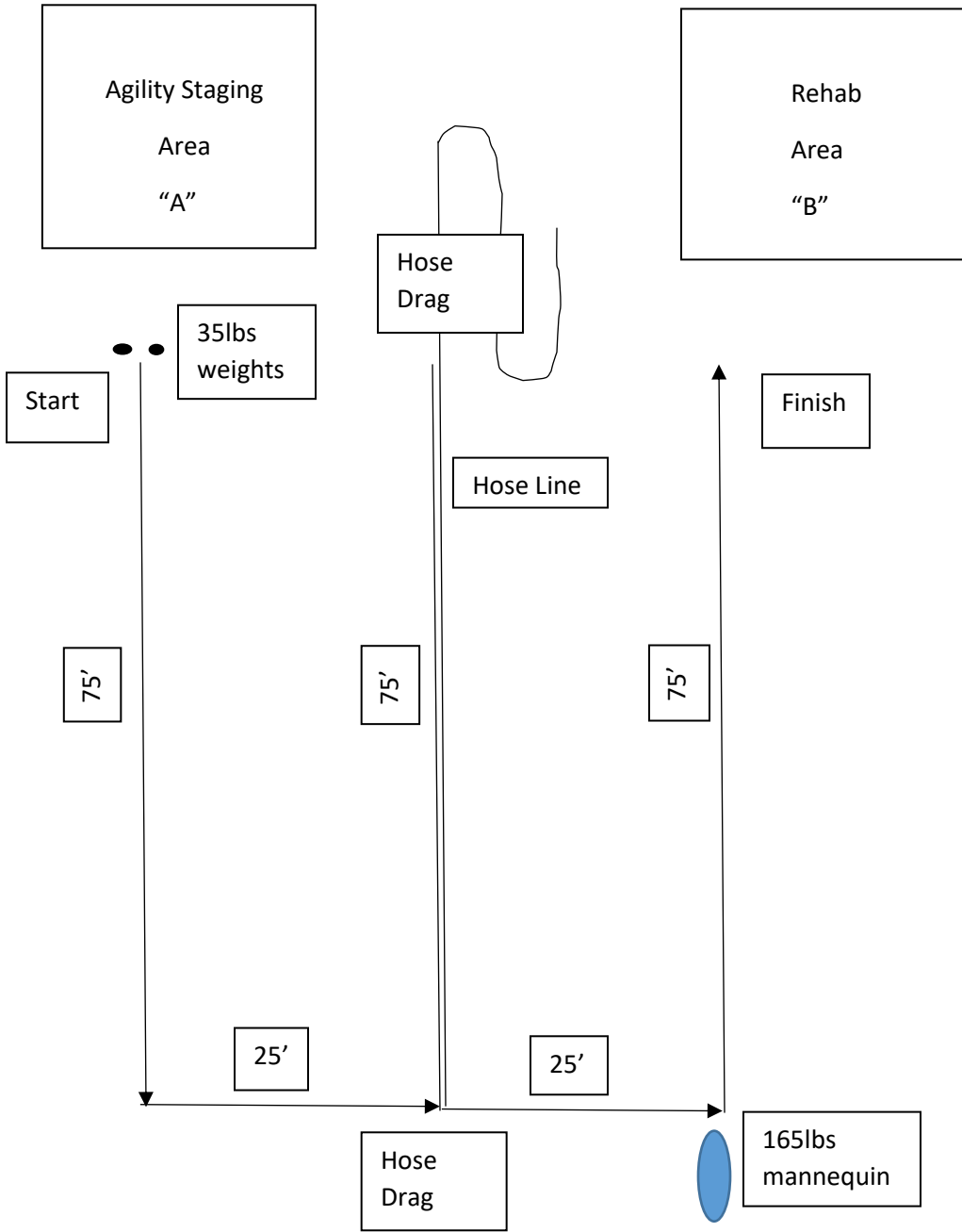
MSTAT Approval

The Minimum Standards and Certification Board (MSCB) will provide approval for all testing sites and future approval of testing sites that may or may not be added with future demand. Under the direction of the MSCB, the MS State Fire Academy will be responsible for coordinating the MSTAT testing throughout the state through designated MSTAT testing site coordinators

MSTAT Course

All MSTAT courses will be approved by MSCB. The MSTAT course used at each test site will meet the prescribed course layout approved by MSCB contained within this MSTAT course implementation document. All MSTAT testing equipment/supplies will be provided by each individual MSTAT regional testing site and all equipment will be readily and properly maintained to meet the specifications stated within this document.

Course Layout



MSTAT Testing Protocols

1.5 Mile Run Test

The 1.5 Mile Run Test requires the participants to run that distance in the quickest possible time. This test forms part of the Mississippi Trainee Agility Test (MSTAT). It is essentially the Cooper 1.5 mile run test.

Purpose: This test measures aerobic fitness and leg muscles endurance.

Equipment needed: 1.5 mile flat and hard running course, marker cones, (2) stopwatches, recording sheets.

Pre-test: Explain the test procedures to the trainees. Prepare forms and record basic information such as age, height, body weight, gender, test conditions.

Administrators: In order to facilitate this test in a safe and efficient manner, the following administrators shall be utilized.

- 1- Lead Proctor (test administer),
- 3- Observers

The lead proctor is responsible for measuring and marking out the course. In addition, the lead proctor will explain the test procedures to the trainees, prepare forms, record basic trainee information, keep times of trainees during test, and record results. The three observers will stage at positions along the course to ensure integrity of the test, and safety of the trainees. One of the three observers will also keep times of trainees during test to back up the lead proctor.

Procedure: The aim of this test is to complete the 1.5 mile course in the shortest possible time. At the start, all the trainees will line up behind the starting line. On the command “go” the clock will start, and the trainees will begin running at their own pace. Although walking is authorized, it is strongly discouraged. As each trainee completes the 1.5 mile run, they will walk slowly to the agility staging area (**designated area “A” on the course layout**).

Scoring: The total time for each trainee to compete the 1.5-mile run is recorded.

Comments: During the 1.5 mile run, it is critical to have some type of medical emergency plan. Dangerous climate conditions such as hot/humid weather should be avoided and water or other fluids should be made available upon completion of the assessment.

Agility Staging Area

Upon successful completion of the 1.5-mile run, the trainee will walk slowly to the agility staging area (**designated area “A” on the course layout**). Once the last trainee reaches the agility staging area, the 10-minute rehabilitation time will begin for all trainees in the agility staging area. There needs to be an observer at this area to direct trainees, keep track of the time, and help organize preparation for the next segment of the MSTAT. In addition, during this time, the lead proctor will explain the agility test procedures to the trainees.

At the conclusion of the 10-minute rehabilitation period, each MSTAT testing participant will then proceed, once instructed and in order of their preselected groups, to the job performance section of the MSTAT test. The observer at the agility staging area will begin to direct students to don a preapproved 50lbs weighted vest, a preapproved helmet and gloves, and prepare to advance to the agility course.

Equipment Carry

Purpose: This test measures aerobic capacity, upper body muscular strength and endurance, grip endurance, and balance.

Equipment needed: 2- 35 lb dumbbells / kettlebells, marker cones, (2) stopwatches, recording sheets.

Pre-test: Explain the test procedures to the trainees.

Administrators: In order to facilitate this test in a safe and efficient manner, the following administrators shall be utilized.

1-Lead Proctor (test administer),

1-Observer

The lead proctor is responsible for measuring and marking out the course. In addition, the lead proctor will explain the test procedures to the trainees, prepare forms, record basic trainee information, keep times of trainees during test, and record results. The observer will stage at positions along the 75' line to ensure integrity of the test, and safety of the trainee. In addition, the observer will keep the time of the trainee for the event.

Procedure: The aim of this test is to complete the Farmers Carry Event in the shortest possible time. At the start, each trainees will line up behind the starting line. On the command "go", the clock will start, and the trainee must pick up two 35lb kettlebells, one in each hand, and carry them a total of 75' past a marked finish line. Once the trainee crosses the finish line, the two 35 lb kettle bells must be returned to the ground in a controlled manner.

Scoring: The total time to compete the event is noted by the observer and provided to the lead proctor at the conclusion of the trainees test.

Hose Pull

Purpose: This test measures aerobic capacity, upper back muscular strength and endurance, grip strength and endurance, and anaerobic endurance.

Equipment needed: 150' of 1.75" double jacket fire hose with a demarcation line at the 75-foot mark, marker cones, (2) stopwatches, recording sheets.

Pre-test: Explain the test procedures to the trainees.

Administrators: In order to facilitate this test in a safe and efficient manner, the following administrators shall be utilized.

1-Lead Proctor (test administer),

2 to 3-Observers

The lead proctor is responsible for measuring and marking out the course. In addition, the lead proctor will explain the test procedures to the trainees, prepare forms, record basic trainee information, keep times of trainees during test, and record results. The observer will stage at position/s designated along the 75' line to ensure integrity of the test, and safety of the trainee. In addition, the observer will keep the time of the trainee for the event. The observers at this event will also ensure the hose line is reset for the next trainee.

Procedure: The aim of this test is to complete the Hose Pull Event in the shortest possible time. Once the trainee returns the 35 lb kettlebells to the ground at the Equipment Carry Event, he / she will follow the directed path to the starting position of the Hose Pull Event. At the starting line, the trainee will kneel, placing at least one knee on the ground within a designated area. The trainee will then begin to pull the hose line toward them in a hand over hand fashion until the hose line's 75-foot mark is across the starting line.

Scoring: The total time to compete the event is noted by the observer and provided to the lead proctor at the conclusion of the trainees test.

Victim Drag

Purpose: This test measures aerobic capacity, upper and lower body muscular strength and endurance, and anaerobic endurance.

Equipment needed: 165 lb mannequin, marker cones, (2) stopwatches, recording sheets.

Pre-test: Explain the test procedures to the trainees.

Administrators: In order to facilitate this test in a safe and efficient manner, the following administrators shall be utilized.

1-Lead Proctor (test administer),

1-Observer

The lead proctor is responsible for measuring and marking out the course. In addition, the lead proctor will explain the test procedures to the trainees, prepare forms, record basic trainee information, keep times of trainees during test, and record results. The observer will stage at positions along the 75' line to ensure integrity of the test, and safety of the trainee. In addition, the observer will keep the time of the trainee for the event.

Procedure: The aim of this test is to complete the Victim Drag Event in the shortest possible time. Once the trainee pulls the 75-foot mark past the starting line at the hose pull event, he / she will follow the directed path to the starting position of the Victim Drag Event. At the starting line, the trainee will bend at the knees and grab the mannequin by the handles on the harness. The trainee will drag the mannequin 75-feet. Once the mannequin's feet are past the marked

finish line, the trainees' test is complete. (Lead Proctor stops stopwatch and records total time of the test)

Scoring: The total time to complete the event is noted by the observer and provided to the lead proctor at the conclusion of the trainees test.

Rehab Area

As trainees complete the agility test, they will be directed to return to the Agility Staging Area to remove the 50lb weighted vest, helmet, and gloves. They will then proceed to the Rehab Area (**designated area "B" on the course layout**). They will be required to remain in the Rehab Area for 10 minutes. At the end of the 10 minute period the trainee will be free to leave.

MSTAT Equipment Checklist

- **35lb dumbbells / kettlebells X 2**
- **150-feet of 1.75" double jacket fire hose**
- **165lb mannequin (Rescue Randy) with chest straps**
- **50lb weighted vests**
- **Helmets**
- **Gloves**
- **Stopwatches**
- **Traffic cones**
- **Water coolers**
- **Disposable Cups**
- **Clipboards**
- **MSTAT Fire Fighter Assessment Sheet (record testing results)**
- **MSFA roll sheets**
- **Sanitation wipes**
- **E-Z UP canopies for Agility Staging Area and Rehab Area (optional)**
- **Tables for required equipment for test and water coolers**
- **Chairs**

MSTAT Course Completion

A successful attempt of the MSTAT test will be determined by the completion time of the 1.5 mile run which has been established by the MSCB to be 14:00 minutes or less. Upon a successful completion of the 1.5 mile run the trainee will move to the agility staging area to prepare for the job performance portion of the MSTAT test. If the trainee fails to meet the required time for the 1.5 mile run, the trainee will not be allowed to participate in the job performance portion of MSTAT and must reapply to MSFA to be eligible to retake the MSTAT test.

A successful attempt of job performance portion of the MSTAT test will be determined by a completion time of 90 seconds or less. Upon completion the trainee will move to the designated agility staging area to remove all MSTAT testing gear and then the trainee will move to the designated rehab staging area of the course to recuperate and obtain his/her test results. The trainee test results will then be passed on to the MSTAT testing site coordinator for completion of documentation. The MSTAT testing

site coordinator will be responsible for collecting all trainee documentation and transmitting that documentation to MSFA for addition to the trainee registration file.

MSTAT Testing Preparation Guide

Attached is a MSTAT preparation guide that will assist potential firefighter trainee's in preparing to take the MSTAT test. These guidelines are simply an aid in preparing a trainee for the test and do not guarantee a successful attempt of the MSTAT test. As with any exercise program, each individual trainee preparing to take the MSTAT test should follow a physician's recommendation to his/her ability to participate in the MSTAT testing process.

WARNING: Before starting any new exercise program please check with your doctor and clear any exercise regimen with them before beginning. Individual results are not guaranteed and may vary.

MISSISSIPPI TRAINEE AGILITY TEST

Preparation Training Guide

Fire Fighter Study

A number of firefighters were studied, and Davis and Sharkey found that “the lowest possible aerobic fitness core was 33.5 ml kg min, a level attainable by the average male in the 60 to 69 age group and the average female in the 40 to 49 age group.” (Hard Work (2008) Davis and Sharkey, p 56). “The VO 2 Max is a meaningful criterion for critical firefighting tasks, wildland or structural. Cutoff scores should reflect a level consistent with performance, not the minimum score demonstrated by unfit, overweight employees. Recruits with a VO 2 Max of 33.5 would struggle to perform demanding tasks and fail as age diminishes their already compromised capacity.” (Davis and Sharkey, p56). In order to test a Firefighter’s physical ability to perform in full PPE a test was created that mimics the essential job functions of a Firefighter on the fire-ground. This is a criterion task test. In other words, it has stations that must be completed in succession, all while wearing a 50lb vest that simulates the weight of structural firefighting gear.

Events

1.5-mile run: Test run times are used to correlate a trainee’s time to a VO2 Max figure. The VO2 Max is a good measurement of cardiovascular endurance. This data has been used in studies to correlate the cardio fitness levels of a firefighter to the performance of their duties. The 14 minute time limit is used during the 1.5 mile run and correlates the VO2 max of the candidate receiving an average score of approximately 38.

- A 1.5mile run must be completed in **14:00 minutes or less.**
- Tips for Training
 - Build endurance with long runs.
 - Even though your goal is to run a short distance quickly, it helps you to run longer distances more slowly. If you can run 3 to 5 miles easily, you'll be able to kick up your speed on a 1.5-mile run.
 - Start with one longer run per week of 3 miles at a conversational pace, meaning you could hold a conversation while running without gasping for air. Add on a half mile every other week until you can run 4 or 5 miles easily. Then, work on slowly increasing your pace until you're able to run the entire distance at a moderate intensity.
 - Train with Speed-work
 - Choose a mostly flat running surface or run at a neutral incline on the treadmill to start. Warm up for 5 to 10 minutes at an easy jogging pace. Then, up your speed to a fast run or sprint for 2 minutes, or as long as you can sustain the pace.

Recover at an easy jogging pace for as long as you sprinted. Repeat for a total of 6 rounds, then cool down for five to 10 minutes.

- Choose a distance of 100, 200, or 400 meters and run that distance at 70%-75% max speed with 1-2 minute rest period between runs for 6-10 rounds. Over time (4-6 weeks), decrease the rest period between rounds.
- Do easy Runs
 - Long runs and speed work put a lot of stress on the body. Running too much, too fast can break the body down and actually slow you down. Alternate long runs and speed work with shorter, easier runs for active recovery.
 - Every workout, warm up at an easy pace for 5 minutes, then stop and do some dynamic stretches, such as leg swings and butt kicks, to prime your muscles for action.
 - After every run, do longer held stretches for your calves, hamstrings, quadriceps and glutes.
- Work on Core Strength
 - Having a strong core not only can help you get faster, but also protect you from injuries. Several days a week, do core exercises such as planks, bridges and curl-ups.
- Take Rest Days
 - More is not better when you're training for speed. Take two days off from running each week. On one day, either rest or cross-train with rowing, cycling, yoga or swimming. On the other day, do nothing at all.

Job Performance Circuit

Comprised of three continuous events to be finished within a time of 90 seconds or less while wearing a 50lb weighted vest.

Equipment Carry- Trainee must pick up a pair of 35lb dumbbells or kettlebells, one in each hand, and carry them to a set point for a total of 75ft.

- Tips for Training
 - Farmer's Walk Variations
 - Zercher Carry- To perform a Zercher carry, take a barbell out of a rack by positioning it in the crook of your arms. Brace your core before you lift and keep your torso upright throughout the move. Walk either for a set distance or for time – 40 seconds will provide a good challenge.
 - Kettlebell Carries- While this may not call upon as much core strength, it acts as an excellent precursor for progression. Kettlebells are also great for grip strength.
 - One-Arm Carry- A tricky test of core strength, the one-arm farmer's walk is the natural progression from the standard two-arm version. One-arm lifts are also a great way to iron out any muscular imbalances.
 - Inverted Kettlebell Carry- Holding a single kettlebell in one arm upside down by its handle, brace your core and keep a neutral spine. This move activates the

rotator cuff muscles like no other carry, and the rotator cuffs are crucial for shoulder mobility and range of motion.

- Grip Strength Work
 - **Dumbbell head grab**- Put a dumbbell on its end and pick it up by the head. Could anything replicate a pickle jar more? Be careful with this exercise if the dumbbell is too big, as the thumb can easily be strained if it's stretched too far. Hold for time (~30 seconds) or go for heavier weight.
 - **Farmer's walks**- Grab a pair of heavy dumbbells (heavy for you) and walk around! Don't have space to walk? Just stand there! 30 seconds minimum!
 - **Plate curls**- A wrist strengthener that works the biceps too! Anything past 25 lbs becomes insanely hard. ~10 repetitions. Watch the face!!
 - **Plate pinches**- If you've got a pair of smooth metal plates, you can sandwich them together with the smooth side out. You can also use thick bumper plates. Pick them up with one or two hands and hold for time (~30 seconds) or go for heavier weight.

Hose Drag- Trainee must drop to one knee and pull a 1.75" hose a total of 75ft using the hand over hand method.

- Tips for Training
 - **Weighted Sled Pulls/Weighted Plate Pulls/Rope Pulls**- Attach a 1 ½ to 2- inch rope to the sled.
 - Place the appropriate weight onto the sled (25-35lbs). Hold the other end of the stretched rope as far from the sled as possible. Face the sled, straddle the rope and grip it tightly. Start from an athletic stance with the hips and knees bent, head and shoulders up, back flat and legs shoulder-width apart or wider to ensure a stable base. Set the abs and pull the sled toward your belly button with a hand-over-hand action until the sled is up close to you and you're out of rope. Start with five sets of 75-foot pulls if you have the room. Reduce the length of the pull by 10-feet for each 10% increase in weight.
 - This can also be simulated by simply connecting 2-3 sections of 1.75" or 2" uncharged hose lines together, completely stretching the hose in a straight line, then kneeling to one knee, and pulling the hose hand over hand until all the hose is in a bundle. It would benefit the candidate to redo this exercise multiple times (6-10) and increase your speed over 3-4 weeks.

Dummy Drag- Trainee must grasp a 165lb mannequin by the harness handles, located at the shoulders and drag it for a total of 75ft.

- Tips for Training
 - If your department has access to a weighted Rescue Manikin, multiple dummy drags of 25', 50', 75' and 100' will aid in building a strong foundation for this skill. **Be sure to bend at the knees while keeping your back as straight (flat back) as possible and lift with your legs and not your back. Start with a weight that your body can handle and build up over time.**

- Front Rack and or Traditional Back Squats- Find a comfortable weight that you can easily squat for 12-15 reps.; be sure to record your weight and reps. This will be your baseline or foundational weight to build from. Build up, over time, to a weight that matches or exceeds the weight of the rescue manikin for 3 sets of 8-10 reps.
 - Example: Back Squats or Front Squat regiment:
 - Week 1: 3-5 sets 95lbs @ 12-15 reps
 - Week 2: 3-5 sets 115lbs @ 12-15 reps
 - Week 3: 3-5 sets 135lbs @ 10-12 reps

- **Object Carry**- Carry any heavy object (human dummy, partner, sandbag, fire hose, heavy ropes, etc.)

- **Lateral Drags**- Drag any heavy object sideways (human dummy, partner, sandbag, fire hose, heavy ropes, etc.)

- Barbell Squats

- Straight Leg Deadlifts

- Deadlifts

- Walking Lunges