



TEXAS HISTORICAL COMMISSION

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Standard Operating Procedures and Safety Manual

M2-2 Flamethrower

National Museum of the Pacific War

2023

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Preface

The Texas Historical Commission (THC) Historic Sites Division permits Living History Programs to be developed and managed at several of its Historic Sites. These programs are made possible through the efforts of many dedicated individuals that help the THC fulfill its commitment to tell the *Real Stories of Real Places*. At sites related to military history, the demonstration of weapons of war are an essential educational tool. While most of these programs are offered at 19th Century frontier forts, the programs offered at the National Museum of the Pacific War (NMPW) use weapons and technologies from the middle 20th Century. This Standard Operating Procedures Manual addresses programming specific to the NMPW. THC's Site Manager/Museum Director, the Museum's Education Director and the Museum Experience Coordinator (MEC) provide program oversight and management. Together with the Additional Duty Safety Officer (ADSO) who provides safety oversight. A representative from the State Office of Risk Management (SORM) reviewed this safety plan and toured the Pacific Combat Zone (PCZ) with staff from the Historic Sites Division and the National Museum of the Pacific War (NMPW). All SORM suggestions have been incorporated in this plan.

Purpose and Scope

The goal of the Living History Program (LHP) is to educate the public about the service of the men and women at home and in the Pacific during WWII. A critical part of many presentations is the M2-2 Flamethrower. This weapon, unlike many others, cannot be adapted for blank firing and, if improperly handled, can represent a significant safety risk.

This Standard Operating Procedure (SOP) provides requirements for the operation, maintenance, inspection, and handling of the M2-2 Flamethrower. This SOP is a dynamic document. Submit any recommended modifications to the Museum Director for review, coordination, approval and implementation. The entire manual will be reviewed annually and updated as required.

Applicability and Distribution

This SOP applies to anyone operating, maintaining, handling, or participating in a presentation involving the M2-2 Flamethrower maintained by the Living History Program of the National Museum of the Pacific War. This SOP will be digitally or physically distributed to every participant in the LHP. Each individual will sign that they have received and reviewed a copy of the SOP. A copy of this signed verification will be kept on record by the MEC. These records will be held until superseded by the publishing of a more recent version of this document.

Cancellation

This SOP cancels all previous versions.

Karen Stevenson, Site/Museum Director

Introduction

Interpretive programs facilitate connection to “experiences” at places in which historical events are considered and provide excellent opportunities to attract and educate visitors in an entertaining environment.

Although the LHP at the NMPW are historically accurate in many ways, they do not constitute “historical reenactments.” The programming has been modified to meet the size of a specific reenactment area, the availability of equipment and trained personnel, and the ability to ensure a maximum standard of safety for participants and spectators alike.

The LHP is dependent upon its base of highly motivated volunteers. These dedicated volunteers make it possible for the museum to enhance its educational mission through the LHP. This SOP is designed to ensure a gold safety standard during living history programs featuring the M2-2 Flamethrower.

Although this SOP establishes safety policies and procedures for the M2-2 Flamethrower, every participant and management observer needs to make safety their top priority.

The standards contained in this document are the bare minimum and may not factor in environmental or situational hazards unique to a given performance.

It is the responsibility of any participant, volunteer or staff member observing an unsafe situation or action shall take immediate and appropriate action, to include stopping the program and/or training.

Failure to abide by the standards laid out in this SOP will be considered grounds for immediate expulsion from the LHP.

1. Flamethrower Safety Rules

The following rules must be followed at all times.

General:

- No individual shall touch or approach a flamethrower unless they have received and passed through the training program outlined in this SOP.
- All operators shall have received the complete operators training, as outlined in chapter 5 of this SOP to include the emergency procedures.

Authority:

- The MEC alone determines who is qualified to operate, instruct, maintain, or otherwise interact with the M2-2 flamethrower

Maintenance and Servicing:

- The flamethrower must have current hydrostatic, volumetric, and leak tests for the wand, fuel cells, and fully assembled unit as outlined in Chapter 2 of this SOP.
- The flamethrower shall never be serviced with gasoline or other volatile fuels. Only diesel shall be used when servicing.
- Pressure bottles shall be filled with nitrogen. No other gas shall be permitted, especially oxygen.

Demonstrations:

- The flamethrower shall only be brought into the proximity of the public after firing when the following conditions have been met:
 - The pressure buildup valve is closed
 - The safety gate valve is closed
 - The hose has been purged
 - Tank pressure is 0 PSI
- All non-essential personnel are to remain ten meters from the flamethrower operator when the unit is charging or charged.
- The impact area shall be devoid of overgrown vegetation or other fire hazards.
- Within 10 feet of the designated firing position:
 - There shall be a charged and operable water hose
 - There shall be a serviceable non-halon fire extinguisher
 - There shall be a serviceable burn kit

There shall be a second charged and operable water hose located within 25 feet of the firing position.

- The firing position shall be marked on the ground with paint or another suitable marker.
- Before firing, the team leader will review the safety protocol with the flamethrower operator and all other living history reenactors on the battlefield.
- The flamethrower operator shall not wear period boots. The boots worn by the operator shall have a minimum of ¼ inch of tread depth.
- The team leader will verify that the pre-firing checklist has been completed prior to firing.
- A safety spotter will verify that the firing area is clear from a position beyond and below the impact area. Upon verifying that the area is clear, they will shout “flamethrower”. If the area is not clear, they will initiate an abort.
- The team leader shall monitor the flamethrower pressure during unit charging.

Post Demonstration Recovery:

- The Flamethrower Safety Officer shall verify that the tanks and wand have been purged and bled after firing and before leaving the area of the command bunker. The operator shall not leave this area until the safety supervisor removes the gas cap, closes the safety gate valve, and vents the hose into the impact area.
- When disconnecting the hose from the tank unit, the safety gate valve must be cycled to ensure pressure has been diminished in the hose and must be in the closed position when the hose is disconnected. After removal, the end of the hose and cam lock must be properly capped.
- The Flamethrower Safety Officer shall wet down the impact area with a water hose post firing to ensure that all flames are extinguished.

2. Maintenance of the M2-2 Flamethrower

The M2-2 Flamethrower is a device that requires regular maintenance to ensure its safety and operability. This section offers a basic outline of those procedures. A full explanation of each task can be found in ***War Department Technical Manual 3-376A, PORTABLE FLAME THROWER M2-2, Revision May 16, 1944.***

Safety Rules:

- **Maintenance shall only be completed by qualified personnel as outlined in chapter seven of this SOP.**
- **All maintenance shall be documented on a weapon discrepancy documentation form.**
- **The M2-2 Flamethrower requires hydrostatic and volumetric testing every ten years.**
NEXT DUE: NOVEMBER 2031
- **When disconnecting the hose from the tank unit, the safety gate valve must be cycled to ensure pressure has been diminished in the hose and must be in the closed position when the hose is disconnected. After removal, the end of the hose and cam lock must be properly capped.**

Flamethrower Reliability

The maintenance schedule and standards established herein were developed and approved by Charles Hobson, the world's preeminent flamethrower expert. All components have been tested in accordance with (IAW) U.S. Government issued test equipment and according to War Department manuals. Both flamethrowers of the NMPW were rebuilt and tested by Mr. Hobson in 2021. Detailed reports with photos included are on file with the Museum Experience Coordinator, the Texas Historical Commission, and the Museum Director.

The flamethrowers of the NMPW have been completely rebuilt, regularly fired, and maintained to this high standard.

Annual Maintenance Procedures

Before the first demonstration of each calendar year, the following shall be accomplished:

1. Review all unit condition forms
2. Inspect outside of tanks for damage or rust
3. Inspect inside of tanks for rust
4. Inspect canvas and straps for damage, condition, and attachment.
5. Inspect hose for signs of leaks or abrasions
6. Inspect wand for damage or signs of leaks
7. Inspect cam lock gasket seal for damage, cracks, distortion, and serviceability: remove, clean, and replace as needed.
8. Inspect gas cap O-ring seals damage, cracks, distortion, and serviceability: remove, clean, and replace as needed
9. Remove pressure bottle and test pressure (*see Procedure: Test Pressure Bottle*)
10. Test regulator and pressure bottle for leaks (*see Procedure: Test Regulator*)
11. Inspect unit frame for corrosion, cracks, and damage. Tighten all frame bolts.

Procedure: Test Pressure Bottle

1. Remove pressure bottle from the tank group by opening the pressure tank clamp and disconnecting the pressure bottle's quick disconnect at the regulator tube.
2. Fill pressure bottle with nitrogen to 1,000 PSI IAW chapter 3 of this SOP.
3. Spray leak test solution on the following areas (see figure below) and observe for hissing, bubbles in the solution, or loss of bottle pressure.
 - a. Male Quick Connect
 - b. Flex Shaft connection
 - c. Check Valve

Figure 1: The pressure bottle being leak checked. Note the location of leak check spray on the Male Quick Connect, Flex Shaft Connection, and Check Valve.



Procedure: Test Regulator

Safety Note: A pressure regulator that is set higher or lower than the mandatory 250 PSI can result in serious injury or death of the operator and nearby personnel.

1. Remove the pressure regulator from the tank group by carefully loosening the nut at the bottom of the "T" fitting.
2. Install test gauge where pressure regulator had connected to the "T" fitting (see figure below).
3. Attach the pressure regulator to the freshly tested pressure bottle.
4. Confirm that the pressure bottle is serviced to 800-1200 PSI.
5. Turn the pressure tank valve to build up pressure
6. Spray leak test solution on the following areas (see figure below) and observe for hissing, bubbles in the solution, or loss of bottle pressure.
 - a. Quick Connect
 - b. All connecting points on the regulator assembly
7. Verify that test pressure on manifold is 250 PSI. If pressure is low or high, adjust the regulator IAW TM 3-376A, Revision May 16th, 1944.
8. Close the pressure tank valve
9. Remove pressure bottle from regulator assembly
10. Remove test gauge from regulator assembly
11. Reinstall regulator assembly by carefully tightening the nut below the "T" fitting.
12. Reinstall pressure bottle by connecting quick disconnect and closing the pressure tank clamp.



Figure 2: The regulator being leak checked. Note the location of leak check spray on the quick disconnect and fittings of the regulator assembly.

Pre-Show Maintenance Procedures

One week before each presentation, qualified personnel shall complete the following checklist and annotate in the unit condition forms and place the “Ready to Fire” (Appendix IV) tag on Pressure Gauge. The Flamethrower Operator and Team Leader shall re-inspect/verify the following and record that action on the Pre-Firing Checklist (Appendix I) before each firing:

1. Review all Unit Condition Forms
2. Inspect Tanks for Damage
3. Inspect Canvas and Straps for damage, condition and attachment.
4. Inspect Hose for Signs of Leaks or Abrasions
5. Inspect Wand for Damage or Signs of Leaks
6. Inspect Cam Lock Gasket and check for looseness
7. Inspect Gas Cap and pressure gauge O-ring Seals
8. Verify Nitrogen Pressure in Pressure Bottle is 1100-1200 PSI
9. Verify Two Gallons of Diesel Fuel have been serviced to the tank unit
10. Test Ignition system and visually verify flame
11. Verify that the operator’s boots have a minimum of ¼ inch of tread

Maintenance Documentation

All maintenance performed on the M2-2 flamethrower shall be recorded on the weapons discrepancy documentation forms located in Appendix III of this SOP.

These logs and Pre-Firing Checklists shall be maintained in perpetuity in both a physical file and a web based digital backup.

3. Servicing Procedure for the M2-2 Flamethrower

Safety Rules:

- **The flamethrower shall never be serviced with gasoline or other volatile fuels. Only diesel shall be used when servicing.**
 - **Pressure bottles shall be filled with nitrogen. No other gas shall be permitted, especially oxygen.**
1. Move the flamethrower to the designated filling station inside of the vehicle building.
 2. Verify the following:
 - a. The gate valve is in the closed position.
 - b. The hose and wand unit are not attached to the tank unit.
 - c. The tank unit plug is installed and locked.
 - d. The pressure tank valve is in the closed position.
 3. Attach the nitrogen servicing manifold to the nitrogen source
 4. Attach the manifold to the pressure bottle's fill valve.
 5. Open servicing manifold valve and fill the pressure bottle to 1,100 PSI.
 6. Close servicing manifold valve.
 7. Disconnect servicing manifold from the pressure bottle and nitrogen source. Re-install dust cap on pressure bottle fill valve.
 8. Open the fuel cap and remove the pressure gauge.
 9. Inspect fuel inside the designated servicing bottle for debris. **Do not use it if debris is present!**
 10. Inspect and clean the designated funnel, then service the tank unit with two gallons of diesel fuel.
 11. Using a flashlight, inspect the inside of the tanks for debris. **Presence of debris is a "NO GO" condition.**
 12. Remove funnel and clean excess fuel from the flamethrower unit and surrounding area.
 13. Secure gas cap and pressure gauge and close vents.
 14. Aiming the detached wand into a fuel receptacle, test the action of the rear trigger by aiming it into a bucket. Verify no pressure remains in the hose and drain excess diesel.

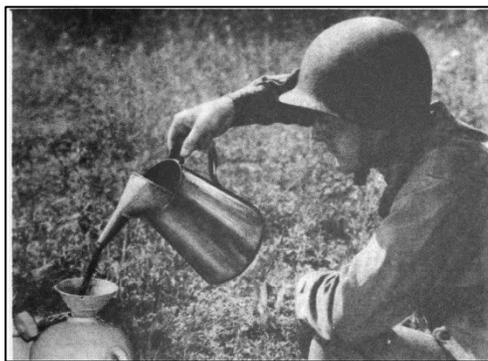
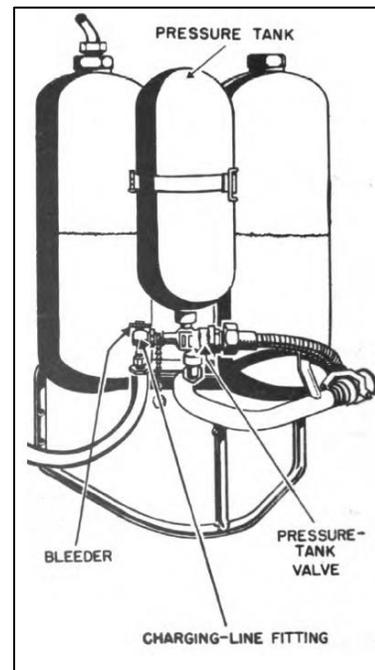


Figure 3 (Above): A GI services fuel into the M2-2 tank unit.

Figure 4 (Right): The tank unit during nitrogen servicing. Note the connection of the charging line fitting.



4. Operation of the M2-2 Flamethrower

Safety Rules:

- The flamethrower shall only be brought into the proximity of the public after firing when the following conditions have been met:
 - The pressure buildup valve is closed
 - The safety gate valve is closed
 - The hose has been purged
 - Tank pressure is 0 PSI
- All non-essential personnel are to remain ten meters from the flamethrower operator when the unit is charging or charged.
- The impact area shall be devoid of overgrown vegetation or other fire hazards.
- Within 10 feet of the designated firing position:
 - There shall be a charged and operable water hose
 - There shall be a serviceable non-halon fire extinguisher
 - There shall be a serviceable burn kit

There shall be a second charged and operable water hose located within 25 feet of the firing position.

- The firing position shall be marked on the ground with paint or another suitable marker.
- Before firing, the team leader will review the safety protocol with the flamethrower operator and all other living history reenactors on the battlefield.
- The flamethrower operator shall not wear period boots. The boots worn by the operator shall have a minimum of ¼ inch of tread depth.
- The team leader will verify that the pre-firing checklist has been completed prior to firing.
- A safety spotter will verify that the firing area is clear from a position beyond and below the impact area. Upon verifying that the area is clear, they will shout “flamethrower”. If the area is not clear, they will initiate an abort.
- The team leader shall monitor the flamethrower pressure during unit charging.
- The Flamethrower Safety Officer shall verify that the tanks and wand have been purged and bled after firing and before leaving the area of the command bunker. The operator shall not leave this area until the safety supervisor removes the gas cap, closes the safety gate valve, and vents the hose into the impact area.
- When disconnecting the hose from the tank unit, the safety gate valve must be cycled to ensure pressure has been diminished in the hose and must be in the closed position when the hose is disconnected. After removal, the end of the hose and cam lock must be properly capped.
- The Flamethrower Safety Officer shall wet down the impact area with a water hose post firing to ensure that all flames are extinguished.

Safe Holding Position

When the flamethrower is not pressurized, the Operator shall carry the wand in the manner pictured below:



Figure 5: The safe holding position. Note the position of the hands.

Flamethrower Operating Team

Operation of the M2-2 flamethrower is made safer by employing a team of personnel. In this section, their titles and responsibilities will be outlined. Operation may not take place without each of these personnel present.

Team Leader

- The Team Leader supervises the overall inspection, servicing, and operation of the flamethrower.
- The Team Leader shall be the MEC
- The Team Leader shall be current and qualified on all flamethrower training tasks listed in Appendix V of this SOP.
- The Team Leader shall sign the applicable portions of the Pre-Firing Checklist before the flamethrower is allowed into the demonstration area.
- The Team Leader shall accompany the flamethrower operator from the moment the unit is donned until depressurization begins. During this time, the Team Leader will monitor the unit, operator, and surroundings for safe conditions.
- The Team Leader has ultimate authority for the flamethrower and cannot be overridden in a determination that the unit, operator, or conditions merit an “abort” or “dump” sequence.
- The Team Leader shall be the only individual authorized to open the safety gate valve on a charged flamethrower.
- The Team Leader shall be the only individual authorized to give the command “Burn It!” during a presentation.

Flamethrower Safety Officer

- The Flamethrower Safety Officer assists the Team Leader with supervision of the overall inspection, servicing, and operation of the flamethrower.
- The Flamethrower Safety Officer may at any time make the determination that the unit, operator, or conditions merit an “abort” sequence.
- The Flamethrower Safety Officer shall assist the Operator in depressurizing the unit after the demonstration.
- The Flamethrower Safety Officer shall secure the flamethrower following depressurization.

Operator

- The Operator is responsible for safely handling, pressurizing, and firing the flamethrower during presentations.
- The Operator shall be current and qualified on all flamethrower training tasks with the exception of Flamethrower Instructor and Flamethrower Maintenance.
- The Operator shall sign the applicable portions of the Pre-Firing Checklist before the flamethrower is allowed into the demonstration area.
- The Operator shares ultimate authority for the flamethrower with the Team Leader and cannot be overridden in a determination that the unit, operator, or conditions merit an “abort” or “dump” sequence.

Safety Spotter

- The Safety Spotter is responsible for verifying that the firing area (see figure 5) is clear of individuals or animals from their designated vantage point.
- The Safety Spotter is the only individual authorized to give the command “Flamethrower” during a presentation.
- The Safety Spotter may at any time make the determination that range safety merits an “abort” sequence.

Emergency Procedures

After any of the following emergency procedures has occurred, the MEC shall submit a summary of the incident to the Museum Director for consideration. Use of the flamethrower shall not resume until factors contributing to the incident are identified and mitigated.

Abort

An “Abort” condition occurs any time that the safety conditions surrounding the firing of the flamethrower is unsatisfactory. This can occur due to the range, the operator, the flamethrower itself, or any other factor. Any member of the flamethrower team may call an “Abort” by simply shouting “Abort!”

Upon the command of abort, the following shall occur:

1. Upon hearing “Abort”, the operator will remain in position until the Team Leader has a firm grasp on the device and can remove it from their back.
2. The Operator shall hold the wand in their left hand and keep the wand pointed in a safe direction, away from personnel. The Operator shall remove their hands from both triggers.
3. If open, the Operator shall close the pressure build-up valve.
4. If open, the Team Leader shall close the safety gate valve.

5. The Team Leader shall move to remove the unit from the Operator's back, the Operator shall carefully set the wand on the ground facing away from personnel.
6. The Team Leader and Operator will quickly move away from the unit and direct other personnel to clear away at least 10 meters.
7. Once the situation has been assessed, and with the approval of the Team Leader, the Team Leader and Flamethrower Safety Officer will secure the Flamethrower.

Dump

The "Dump" condition occurs when the Operator or Team Leader believes that the life of the Operator or nearby personnel are in immediate danger. The Operator or Team Leader may call a "Dump" by simply shouting "Dump!"

Upon the command of dump, the following shall occur:

1. The Operator will release the wand.
2. The Operator will quickly pull upwards on the two quick releases located on the flamethrower "backpack straps" while simultaneously moving quickly away from the unit.
3. The Team Leader will standby to ensure that the operator gets free of the unit. In the case that the operator cannot get free, the Team Leader may assist the operator.
4. The Team Leader and Operator will quickly move away from the unit and direct other personnel to clear away at least 10 meters.
5. Once the situation has been assessed, and with the approval of the Team Leader, the Team Leader and Flamethrower Safety Officer will secure the Flamethrower.

Vegetation or Structure Fire

In the unlikely event that a vegetation or structure fire occurs during a demonstration, the following shall occur:

1. The Operator shall cease fire and move through the remainder of the firing sequence listed in the next section.
2. The Team Leader shall, using the charged water hose or non-halon fire extinguisher, extinguish the flames.
3. If flames persist under extinguishing efforts, the Flamethrower Safety Officer shall call 911 and request aid from the fire department.

Serious Burn Based Injury

In the unlikely event of a serious burn-based injury to the Operator or other personnel, the following shall occur:

1. The Safety Spotter shall call 911 and request aid.
2. The Team Leader shall secure the flamethrower by closing the charging valve and safety gate valve.
3. The Team Leader shall remove flamethrower from the immediate area.
4. The Flamethrower Safety Officer shall administer first aid to the injured party utilizing the burn kit.
5. All other personnel shall clear from the immediate area and help to usher spectators from the demonstration viewing area.

Flamethrower Firing Sequence

This Section shall detail the firing sequence for the M2-2 flamethrower. For the sake of simplicity, this section will be presented as if the flamethrower is being fired into the specially constructed "flamethrower bunker" housed on the Pacific Combat Zone of the NMPW.

The map below shows the locations in which the firing sequence takes place:

Figure 5: Locations of the flamethrower firing sequence and personnel. Note the red outlined area—the firing area, which must be free of personnel. Also note the triangular area in which flames will be fired.



Note: Firing may occur at other locations. In the event that the flamethrower is to be fired into another impact area, the MEC shall prepare a map of the firing area similar to the one above. The Museum Director, MEC, and Director of Education shall approve of the location before firing occurs.

Position #1:

At position #1 the following shall occur:

1. The Operator shall open the pressure valve, beginning to build pressure in the unit.
2. The Team Leader shall observe rising pressure on the pressure gauge.
3. The Operator and Team Leader shall observe the tank unit for abnormalities.
4. When satisfied with the normal operation of the unit, the Team Leader shall order "Advance!"
5. The Team Leader and Operator shall advance to position #2



Position #2:

At position #2 the following shall occur:

1. The Team Leader shall verify that the pressure gauge shows 250+/- 20 PSI.
2. The Team Leader shall open the safety gate valve.
3. The Team Leader, with hand still on the safety gate valve, will inspect the entire flamethrower for leaks.
4. If a leak is detected the Team Leader will initiate an "Abort".
5. When satisfied with the unit's condition, the Team Leader shall order "Burn It!"
6. The Team Leader and Operator shall advance to position #3.



Position #3:

At position #3 the following shall occur:

1. The Operator, while passing through position #3 on the way to position #4, will pull **ONLY** the forward ignition trigger to warm the tip of the wand unit, 5-10 seconds.
2. The Team Leader shall halt at position #3 until firing is complete.
3. The Safety Spotter will visually verify from their designated, safe location that no personnel have entered the firing area. The Safety Spotter will order "Flamethrower!" if the area is safe, and "Abort!" if the area is not safe.



Position #4:

At position #4 the following shall occur:

1. The Operator shall point the wand downrange, set their feet, and simultaneously pull the forward and aft triggers. The unit will provide roughly six seconds of fuel. The Operator will fire a one second burst to determine if wind or other factors are influencing unit operation. Then, the operator may fire at will.
 - a. **NOTE: The operator must pay special attention to aiming the flamethrower. Glancing the flame off of the bunker overhang could result in stray flames.**
2. When fuel is depleted, as evidenced by a loud hissing noise and nitrogen cloud, the Operator shall:
 - a. With wand pointing down range, close the pressure valve.
 - b. Return hands to the safe holding position on the wand.
3. The Operator shall move to position #5



Position #5:

At position #5 the following shall occur

1. The Operator shall place their back towards the window of the bunker, where the Flamethrower Safety Officer will reach through to open the vent valve on top of the fuel cap. The Operator shall not leave this location until venting has completed.
2. When Venting has completed, the Flamethrower Safety Officer will open the fuel cap fully, close the safety gate valve, and move to vent the hose into the impact area by instructing the operator to actuate the rear triggers ONLY.
3. The Flamethrower Safety Officer shall spray the impact area with water to ensure no flames are present.



5. Training Requirements

This chapter will outline the requirements for training on the M2-2 Flamethrower.

Safety Rules:

- **No individual shall touch or approach a flamethrower unless they have received and passed through the training program outlined in this SOP.**
- **All operators shall have received the complete operators training, as outlined in chapter 5 of this SOP to include the emergency procedures.**
- **The MEC alone determines who is qualified to operate, instruct, maintain, or otherwise interact with the M2-2 flamethrower**

Qualifications for Flamethrower Training Candidacy

The candidate:

- Must be able to safely carry 60 pounds on their back.
- Must not have a history of depression or untreated mental health issues.
- Must not be undergoing an adversely stressful event in their life
- Must pay attention to the instructor and training.
- Must demonstrate that they are physically fit, that they act with utmost care for safety while handling the unit and understand the function of the device.

An individual that fails to meet any of the above qualifications will not be allowed to fire the unit.

No individual may self-elect for flamethrower training. Candidates will be identified by the MEC.

It is essential that every candidate can operate the flamethrower safely. The instructor should know the candidate and be made aware of any medications, back problems, vision, balance, shortness of breath, etc. The instructor will observe and evaluate each candidate's demeanor and performance during training, preparation, program presentation and program recovery. Anyone that presents issues will be disqualified from training and operating the flamethrower until the issues are resolved.

Training Requirements for Operators

Individuals selected for training on the M2-2 Flamethrower will be vetted by the MEC for qualification. Only selected individuals shall be given an opportunity to train. The total number of qualified operators shall never be greater than four, in order to maintain an environment conducive to quality training.

Operator training shall take place in accordance with Appendix VII of this SOP. The training shall be conducted by a qualified instructor as listed in the next chapter. All training shall be conducted on a one-on-one basis.

Training Requirements for Instructors

Flamethrower instructors shall be staff members of the Admiral Nimitz Foundation vetted by the MEC and ADSO for reliability and suitability for their role. Instructors must be current on their training and have qualified to operate the M2-2 Flamethrower. There shall not be more than two qualified flamethrower instructors at any time.

Instructor training shall consist of a practical exam in which the candidate or re-qualifying instructor observes the individual conducting a flamethrower operator training session. If the qualified instructor approves of the training, the candidate or re-qualifying instructor shall be recorded as qualified.

Instructors conducting flamethrower training sessions shall use the instructor's guide, located in Appendix VII as their guide in training, paying special attention to the italicized text.

Training Documentation

Training on the M2-2 Flamethrower shall be documented on the flamethrower training log sheet located in Appendix V. This log shall be maintained virtually and physically by the MEC. The virtual version shall be backed up to the cloud. Logs of flamethrower training shall be kept in perpetuity.

Tasks on the flamethrower training record are listed in such a way that the first items are prerequisites for the following items. **An individual may not be trained on a task until they are certified on the task preceding it.**

Unlike many other training tasks, flamethrower certification of any type must be renewed each calendar year. During recertification, the individual will accomplish the entire flamethrower course as outlined above. **There shall be no exceptions to this rule.**

Appendix I—Pre-Firing Checklist

This Checklist is to be completed and signed before each demonstration of the flamethrower.

1. Review all Unit Condition Forms
2. Inspect Tanks for Damage
3. Inspect Canvas and Straps for damage, condition and attachment.
4. Inspect Hose for Signs of Leaks or Abrasions
5. Inspect Wand for Damage or Signs of Leaks
6. Inspect Cam Lock Gasket and check for looseness
7. Inspect Gas Cap and pressure gauge O-ring Seals
8. Verify Nitrogen Pressure in Pressure Bottle is 1100-1200 PSI
9. Verify Two Gallons of Diesel Fuel have been serviced to the tank unit
10. Test Ignition system and visually verify flame
11. Verify that the operator's boots have a minimum of ¼ inch of tread

Flamethrower Operator _____ Date _____

Team Leader _____ Date _____

Servicing Procedure IAW Chapter 3 of this SOP.

1. Move the flamethrower to the designated filling station inside of the vehicle building.
2. Verify the following:
 - a. The gate valve is in the closed position.
 - b. The hose and wand unit are not attached to the tank unit.
 - c. The tank unit plug is installed and locked.
 - d. The pressure tank valve is in the closed position.
3. Attach the nitrogen servicing manifold to the nitrogen source
4. Attach the manifold to the pressure bottle's fill valve.
5. Open servicing manifold valve and fill the pressure bottle to 1,100 PSI.
6. Close servicing manifold valve.
7. Disconnect servicing manifold from the pressure bottle and nitrogen source. Re-install dust cap on pressure bottle fill valve.
8. Open the fuel cap and remove the pressure gauge.
9. Inspect fuel inside the designated servicing bottle for debris. **Do not use it if debris is present!**
10. Inspect and clean the designated funnel, then service the tank unit with two gallons of diesel fuel.
11. Using a flashlight, inspect the inside of the tanks for debris. **Presence of debris is a "NO GO" condition.**
12. Remove funnel and clean excess fuel from the flamethrower unit and surrounding area.
13. Secure gas cap and pressure gauge and close vents.
14. Aiming the detached wand into a fuel receptacle, test the action of the rear trigger by aiming it into a bucket. Verify no pressure remains in the hose and drain excess diesel.

Flamethrower Operator _____ Date _____

Team Leader _____ Date _____

NOTES

Appendix II—Spare Parts List

The following parts will be on inventory for repair by qualified personnel.

Parts List

1. Gas cap O-rings
2. Cam lock gaskets
3. Pressure regulator
4. ASTM pressure relief valve
5. Canvas cord for lashing
6. Hanson 3000 quick connect
7. Dixon 1" cam loc assembly
8. Complete regulator assembly

Appendix III– Weapons Discrepancy Documentation Form

Symbol:	Date discovered:
Discovered By:	Parts ordered? Yes No
Parts expected by:	Time for repair:
Discrepancy:	
Notes:	
Corrected by:	Date:
Symbol:	Date discovered:
Discovered By:	Parts ordered? Yes No
Parts expected by:	Time for repair:
Discrepancy:	
Notes:	
Corrected by:	Date:

READY TO FIRE:

**PRE-FIRING CHECKLIST HAS BEEN
COMPLETED FOR THIS UNIT ON:**

DATE: _____

Appendix V—Flamethrower Training Certification

Flamethrower Training Record

Name of Trainee: _____

To certify, complete the fields in the table below. To de-certify, strike through initials in **red ink**.

TASK	Date Trained	Trainer Initials	Trainee Initials
SOP Review			
Flamethrower Safety Spotter			
Flamethrower Safety Officer			
Wand and Tank Familiarization			
Safe handling of the Wand			
Firing procedures			
Abort Procedures			
Dump procedures			
Servicing			
Practical firing			
Flamethrower instructor (STAFF ONLY)			
Flamethrower Maintenance (STAFF ONLY)			

Appendix VI– Flamethrower Operator Training Guide



Introduction

The goal of this course is to ensure maximal safety during the demonstration of a powerful and historic weapon. Close adherence to this training manual and the Flamethrower SOP is the only route by which this goal may be achieved. If the unit is operated correctly and safety rules are observed, the M2-2 Flamethrower is a powerful interpretive tool. **Failure to adhere to this training can result in the serious injury or death of the Operator or other personnel.**

This training program was developed in coordination with Charles Hobson, a preeminent flamethrower expert, who has used a similar program for nearly three decades to train over nine hundred operators. Through several thousand firings, the accident rate has been zero. This training mirrors aspects of over a century of international military experience with these weapons.

During a site visit in November 2021, additional safety practices and this expanded “operator training program” was formally incorporated into the NMPW’s LHP.

Qualifications for Firing

The candidate:

- Must be able to safely carry 60 pounds on their back.
- Must not have a history of depression or untreated mental health issues.
- Must not be undergoing an adversely stressful event in their life
- Must pay attention to the instructor and training.

- Must demonstrate that they are physically fit, that they act with utmost care for safety while handling the unit and understand the function of the device.

An individual that fails to meet any of the above qualifications will not be allowed to fire the unit.

Flamethrower Reliability

The flamethrower maintenance schedule and standards established at the NMPW were developed and approved by Charles Hobson. All components have been tested in accordance with (IAW) U.S. Government issued test equipment and according to War Department manuals. Both flamethrowers of the NMPW were rebuilt and tested by Mr. Hobson in 2021. Detailed reports with photos included are on file with the Museum Experience Coordinator, the Texas Historical Commission, and the Museum Director.

The flamethrowers of the NMPW have been completely rebuilt, regularly fired, and maintained to this high standard. Please ask your instructor for the maintenance records of the flamethrower. Review these records to your satisfaction.

Flamethrower Safety Rules

The following rules must be followed at all times.

General:

- No individual shall touch or approach a flamethrower unless they have received and passed through the training program outlined in this SOP.
- All operators shall have received the complete operators training, as outlined in chapter 5 of this SOP to include the emergency procedures.

Authority:

- The MEC alone determines who is qualified to operate, instruct, maintain, or otherwise interact with the M2-2 flamethrower

Maintenance and Servicing:

- The flamethrower must have current hydrostatic, volumetric, and leak tests for the wand, fuel cells, and fully assembled unit as outlined in Chapter 2 of this SOP.
- The flamethrower shall never be serviced with gasoline or other volatile fuels. Only diesel shall be used when servicing.
- Pressure bottles shall be filled with nitrogen. No other gas shall be permitted, especially oxygen.
- The flamethrower shall only be brought into the proximity of the public after firing when the following conditions have been met:
 - The pressure buildup valve is closed
 - The safety gate valve is closed
 - The hose has been purged
 - Tank pressure is 0 PSI
- All non-essential personnel are to remain ten meters from the flamethrower operator when the unit is charging or charged.
- The impact area shall be devoid of overgrown vegetation or other fire hazards.
- Within 10 feet of the designated firing position:
 - There shall be a charged and operable water hose
 - There shall be a serviceable non-halon fire extinguisher
 - There shall be a serviceable burn kit

There shall be a second charged and operable water hose located within 25 feet of the firing position.

- The firing position shall be marked on the ground with paint or another suitable marker.
- Before firing, the team leader will review the safety protocol with the flamethrower operator and all other living history reenactors on the battlefield.
- The flamethrower operator shall not wear period boots. The boots worn by the operator shall have a minimum of ¼ inch of tread depth.
- The team leader will verify that the pre-firing checklist has been completed prior to firing.
- A safety spotter will verify that the firing area is clear from a position beyond and below the impact area. Upon verifying that the area is clear, they will shout “flamethrower”. If the area is not clear, they will initiate an abort.
- The team leader shall monitor the flamethrower pressure during unit charging.

Post Demonstration Recovery:

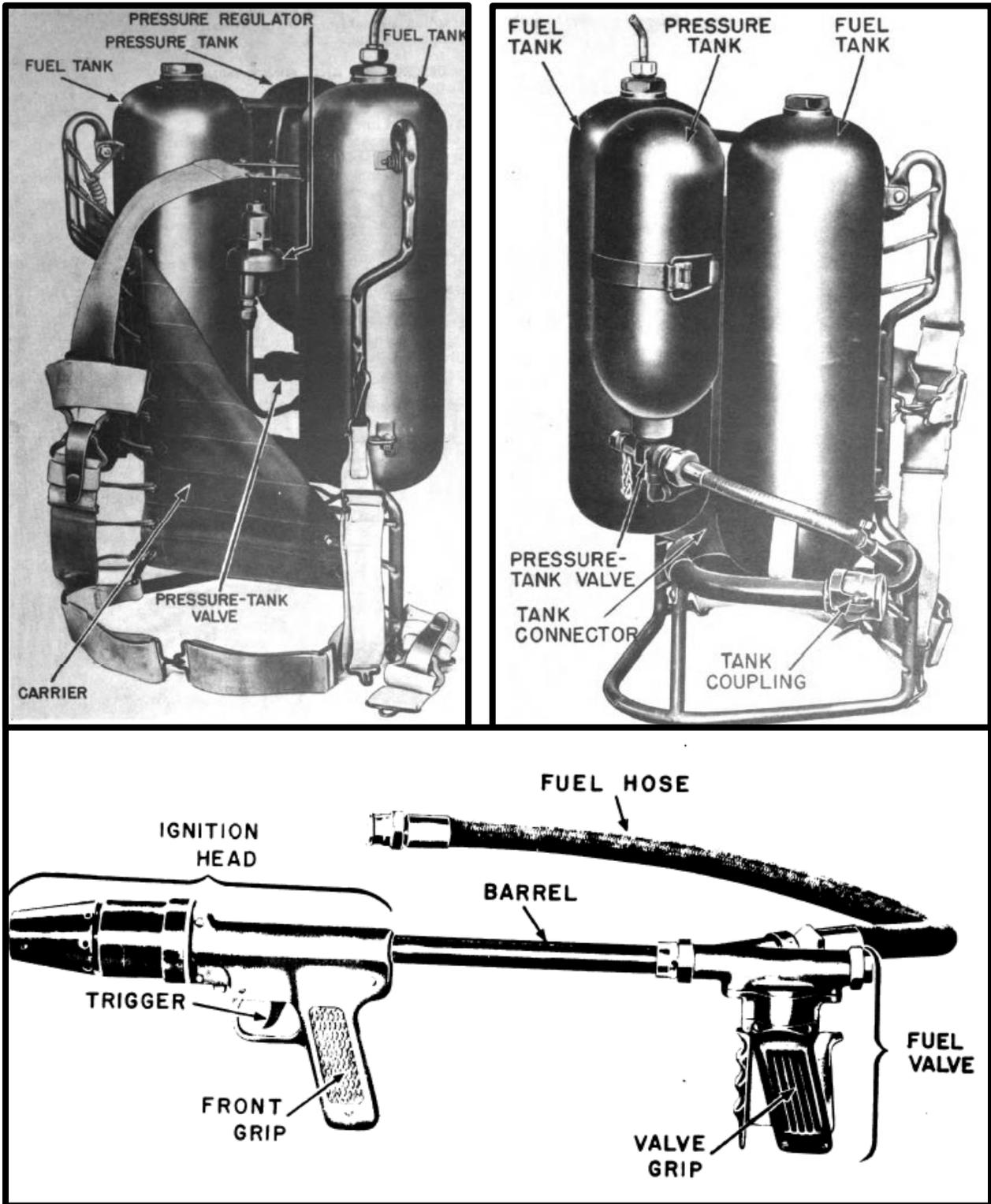
- The Flamethrower Safety Officer shall verify that the tanks and wand have been purged and bled after firing and before leaving the area of the command bunker. The operator shall not leave this area until the

safety supervisor removes the gas cap, closes the safety gate valve, and vents the hose into the impact area.

- When disconnecting the hose from the tank unit, the safety gate valve must be cycled to ensure pressure has been diminished in the hose and must be in the closed position when the hose is disconnected. After removal, the end of the hose and cam lock must be properly capped.

The Flamethrower Safety Officer shall wet down the impact area with a water hose post firing to ensure that all flames are extinguished.

The M2-2 Flamethrower Unit



Wand Familiarization

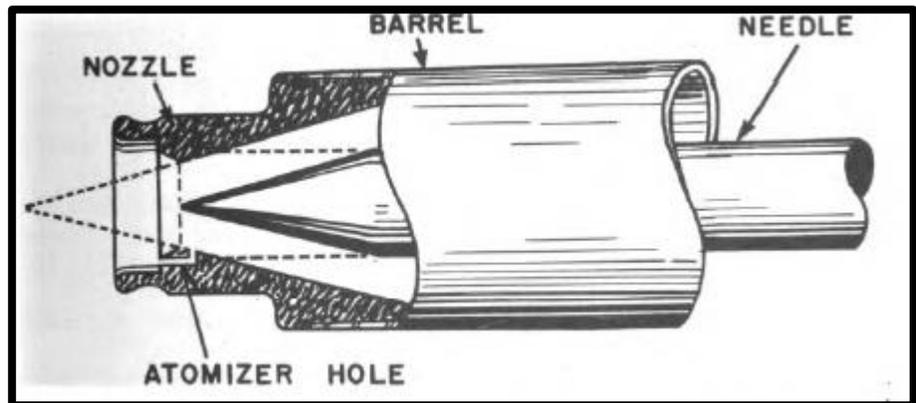
Safe Holding Position:

When the unit is not charged, the wand shall be carried in the position noted below. Pay special attention to the position of the operator's hands. They are not on either of the triggers.



Wand Function:

Firing the M2-2 flamethrower requires coordination between both triggers and considerable grip strength. During firing, failure to fully depress the rear trigger will result in the needle remaining partially within the nozzle (see figure). **This will cause the flame to not project as far and expose you to considerable heat.**





Note in the image above that the stream coming from the nozzle is tight and projects the flame away from the operator. In the Image below, one can see that the nozzle is not fully opened, and the flame is much closer to the operator, presenting a hazard.



Emergency Procedures

Abort

An “Abort” condition occurs any time that the safety conditions surrounding the firing of the flamethrower is unsatisfactory. This can occur due to the range, the operator, the flamethrower itself, or any other factor. Any member of the flamethrower team may call an “Abort” by simply shouting “Abort!”

Upon the command of abort, the following shall occur:

1. Upon hearing “Abort”, the operator will remain in position until the Team Leader has a firm grasp on the device and can remove it from their back.
2. The Operator shall hold the wand in their left hand and keep the wand pointed in a safe direction, away from personnel. The Operator shall remove their hands from both triggers.
3. If open, the Operator shall close the pressure build-up valve.
4. If open, the Team Leader shall close the safety gate valve.
5. The Team Leader shall move to remove the unit from the Operator’s back, the Operator shall carefully set the wand on the ground facing away from personnel.
6. The Team Leader and Operator will quickly move away from the unit and direct other personnel to clear away at least 10 meters.
7. Once the situation has been assessed, and with the approval of the Team Leader, the Team Leader and Flamethrower Safety Officer will secure the Flamethrower.

Dump

The “Dump” condition occurs when the Operator or Team Leader believes that the life of the Operator or nearby personnel are in immediate danger. The Operator or Team Leader may call a “Dump” by simply shouting “Dump!”

Upon the command of dump, the following shall occur:

1. The Operator will release the wand.
2. The Operator will quickly pull upwards on the two quick releases located on the flamethrower “backpack straps” while simultaneously moving quickly away from the unit.
3. The Team Leader will standby to ensure that the operator gets free of the unit. In the case that the operator cannot get free, the Team Leader may assist the operator.
4. The Team Leader and Operator will quickly move away from the unit and direct other personnel to clear away at least 10 meters.
5. Once the situation has been assessed, and with the approval of the Team Leader, the Team Leader and Flamethrower Safety Officer will secure the Flamethrower.

Vegetation or Structure Fire

In the unlikely event that a vegetation or structure fire occurs during a demonstration, the following shall occur:

1. The Operator shall cease fire and move through the remainder of the firing sequence
2. The Team Leader shall, using the charged water hose or non-halon fire extinguisher, extinguish the flames.
3. If flames persist under extinguishing efforts, the Flamethrower Safety Officer shall call 911 and request aid from the fire department.

Serious Burn Based Injury

In the unlikely event of a serious burn-based injury to the Operator or other personnel, the following shall occur:

1. The Safety Spotter shall call 911 and request aid.
2. The Team Leader shall secure the flamethrower by closing the charging valve and safety gate valve.
3. The Team Leader shall remove flamethrower from the immediate area.
4. The Flamethrower Safety Officer shall administer first aid to the injured party utilizing the burn kit.
5. All other personnel shall clear from the immediate area and help to usher spectators from the demonstration viewing area.

Flamethrower Firing Sequence

The map below shows the locations in which the firing sequence generally takes place:

Figure 5: Locations of the flamethrower firing sequence and personnel. Note the red outlined area—the firing area, which must be free of personnel. Also note the triangular area in which flames will be fired.



Position #1:

At position #1 the following shall occur:

6. The Operator shall open the pressure valve, beginning to build pressure in the unit.
7. The Team Leader shall observe rising pressure on the pressure gauge.
8. The Operator and Team Leader shall observe the tank unit for abnormalities.
9. When satisfied with the normal operation of the unit, the Team Leader shall order "Advance!"
10. The Team Leader and Operator shall advance to position #2.



Position #2:

At position #2 the following shall occur:

1. The Team Leader shall verify that the pressure gauge shows 250+/- 20 PSI.
2. The Team Leader shall open the safety gate valve.
3. The Team Leader, with hand still on the safety gate valve, will inspect the entire flamethrower for leaks.
4. If a leak is detected the Team Leader will initiate an "Abort".
5. When satisfied with the unit's condition, the Team Leader shall order "Burn It!"
6. The Team Leader and Operator shall advance to position #3.



Position #3:

At position #3 the following shall occur:

1. The Operator, while passing through position #3 on the way to position #4, will pull **ONLY** the forward ignition trigger to warm the tip of the wand unit, 5-10 seconds.
2. The Team Leader shall halt at position #3 until firing is complete.
3. The Safety Spotter will visually verify from their designated, safe location that no personnel have entered the firing area. The Safety Spotter will order "Flamethrower!" if the area is safe, and "Abort!" if the area is not safe.



Position #4:

At position #4 the following shall occur:

4. The Operator shall point the wand downrange, set their feet, and simultaneously pull the forward and aft triggers. The unit will provide roughly six seconds of fuel. The Operator will fire a one second burst to determine if wind or other factors are influencing unit operation. Then, the operator may fire at will.
 - a. **NOTE: The operator must pay special attention to aiming the flamethrower. Glancing the flame off of the bunker overhang could result in stray flames.**
5. When fuel is depleted, as evidenced by a loud hissing noise and nitrogen cloud, the Operator shall:
 - a. With wand pointing down range, close the pressure valve.
 - b. Return hands to the safe holding position on the wand.
6. The Operator shall move to position #5



Position #5:

At position #5 the following shall occur

4. The Operator shall place their back towards the window of the bunker, where the Flamethrower Safety Officer will reach through to open the vent valve on top of the fuel cap. The Operator shall not leave this location until venting has completed.
5. When Venting has completed, the Flamethrower Safety Officer will open the fuel cap fully, close the safety gate valve, and move to vent the hose into the impact area by instructing the operator to actuate the rear triggers ONLY.
6. The Flamethrower Safety Officer shall spray the impact area with water to ensure no flames are present.



Appendix VII– Flamethrower Instructor Guide

Message to Student Instructor:

During the Second World War, flamethrower operators in the U.S. Military would receive nearly a year of training on their weapons before engaging with the enemy. For civilian operators at the NMPW, this is, of course, an untenable training schedule. The training program contained within this manual strikes a compromise, straying away from combat and tactical considerations, while putting emphasis on safe operation and handling of the unit.

With close attention to training, observation of the safety rules, and proper maintenance on the flamethrower, the Operator represents the most serious potential for an accident. Therefore, the more complete the training, the less chance for accidents. You, as the instructor, have a great impact on the overall safety of the demonstration and should take your responsibilities very seriously.

This training program was developed in coordination with Charles Hobson, who has used a similar program for nearly three decades to train over nine hundred operators. Through several thousand firings, the accident rate has been zero.

To maintain this standard of safety excellence, the instructor must be prepared to speak frankly and directly with their students. If the student is not paying attention, is careless, or simply doesn't understand the functioning of a flamethrower, then they should not be allowed to fire. Put the "Fear of God" in them and they will pay attention. **If you are not convinced that the student can fire safely, then they will not fire.**

This coursebook is designed as a guideline for training. While all the material in this book must be covered, it is acceptable to add additional training as deemed appropriate. To ensure continued improvement of the training program, you should ask students about ways to improve on the training after the course's completion.

Text in black is in the student's guide, italicized text is instructor's notes. Add or expand on these instructions dependent on the training situation and your student's learning style or ability. As time or interests permits, go into greater depth.



Introduction

The goal of this course is to ensure maximal safety during the demonstration of a powerful and historic weapon. Close adherence to this training manual and the Flamethrower SOP is the only route by which this goal may be achieved. If the unit is operated correctly and safety rules are observed, the M2-2 Flamethrower is a powerful interpretive tool. **Failure to adhere to this training can result in the serious injury or death of the Operator or other personnel.**

This training program was developed in coordination with Charles Hobson, a preeminent flamethrower expert, who has used a similar program for nearly three decades to train over nine hundred operators. Through several thousand firings, the accident rate has been zero. This training mirrors aspects of over a century of international military experience with these weapons.

During a site visit in November 2021, additional safety practices and this expanded “operator training program” was formally incorporated into the NMPW’s LHP.

Instructor: Enforce the importance of rules adherence. Ensure that the student has a healthy respect for the power of the flamethrower and understands that they can operate the unit confidently if following the safety rules.

Qualifications for Firing

The candidate:

- Must be able to safely carry 60 pounds on their back.
- Must not have a history of depression or untreated mental health issues.
- Must not be undergoing an adversely stressful event in their life
- Must pay attention to the instructor and training.
- Must demonstrate that they are physically fit, that they act with utmost care for safety while handling the unit and understand the function of the device.

An individual that fails to meet any of the above qualifications will not be allowed to fire the unit.

***Instructor:** It is essential that every candidate can operate the flamethrower safely. The instructor should know the candidate and be made aware of any medications, back problems, vision, balance, shortness of breath, etc. The instructor will observe and evaluate each candidate's demeanor and performance during training, preparation, program presentation and program recovery. Anyone that presents issues will be disqualified from training and operating the flamethrower until the issues are resolved.*

Do not assume that your student is being honest about their condition. Carefully observe each student during training and do not hesitate to disqualify a student for any reason.

Flamethrower Reliability

The flamethrower maintenance schedule and standards established at the NMPW were developed and approved by Charles Hobson. All components have been tested in accordance with (IAW) U.S. Government issued test equipment and according to War Department manuals. Both flamethrowers of the NMPW were rebuilt and tested by Mr. Hobson in 2021. Detailed reports with photos included are on file with the Museum Experience Coordinator, the Texas Historical Commission, and the Museum Director.

The flamethrowers of the NMPW have been completely rebuilt, regularly fired, and maintained to this high standard. Please ask your instructor for the maintenance records of the flamethrower. Review these records to your satisfaction.

***Instructor:** Allow the student an opportunity to review the maintenance records for the flamethrower including the hydrostatic test reports. Here, your aim should be to instill confidence in the student that the device they are going to handle has been properly maintained and is safe for them to operate.*

Flamethrower Safety Rules

The following rules must be followed at all times.

General:

- No individual shall touch or approach a flamethrower unless they have received and passed through the training program outlined in this SOP.
- All operators shall have received the complete operators training, as outlined in chapter 5 of this SOP to include the emergency procedures.

Authority:

- The MEC alone determines who is qualified to operate, instruct, maintain, or otherwise interact with the M2-2 flamethrower

Maintenance and Servicing:

- The flamethrower must have current hydrostatic, volumetric, and leak tests for the wand, fuel cells, and fully assembled unit as outlined in Chapter 2 of this SOP.
- The flamethrower shall never be serviced with gasoline or other volatile fuels. Only diesel shall be used when servicing.
- Pressure bottles shall be filled with nitrogen. No other gas shall be permitted, especially oxygen.

Demonstrations:

- The flamethrower shall only be brought into the proximity of the public after firing when the following conditions have been met:
 - The pressure buildup valve is closed
 - The safety gate valve is closed
 - The hose has been purged
 - Tank pressure is 0 PSI
 - All non-essential personnel are to remain ten meters from the flamethrower operator when the unit is charging or charged.
 - The impact area shall be devoid of overgrown vegetation or other fire hazards.
 - Within 10 feet of the designated firing position:
 - There shall be a charged and operable water hose
 - There shall be a serviceable non-halon fire extinguisher
 - There shall be a serviceable burn kit
- There shall be a second charged and operable water hose located within 25 feet of the firing position.
- The firing position shall be marked on the ground with paint or another suitable marker.
 - Before firing, the team leader will review the safety protocol with the flamethrower operator and all other living history reenactors on the battlefield.
 - The flamethrower operator shall not wear period boots. The boots worn by the operator shall have a minimum of ¼ inch of tread depth.
 - The team leader will verify that the pre-firing checklist has been completed prior to firing.
 - A safety spotter will verify that the firing area is clear from a position beyond and below the impact area. Upon verifying that the area is clear, they will shout “flamethrower”. If the area is not clear, they will initiate an abort.
 - The team leader shall monitor the flamethrower pressure during unit charging.

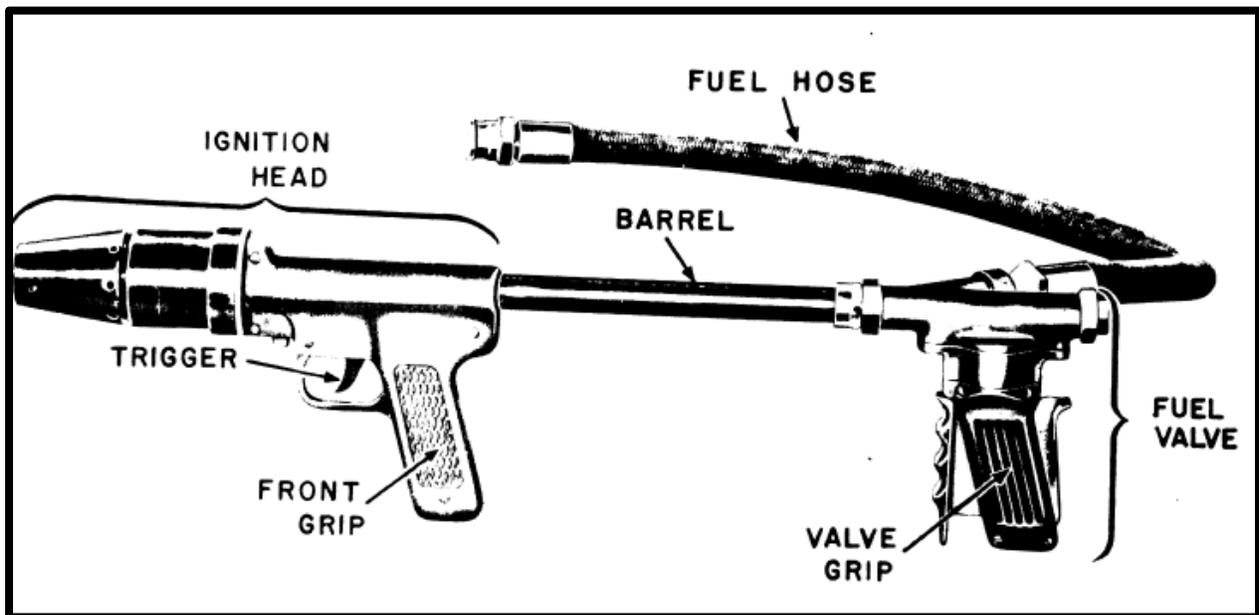
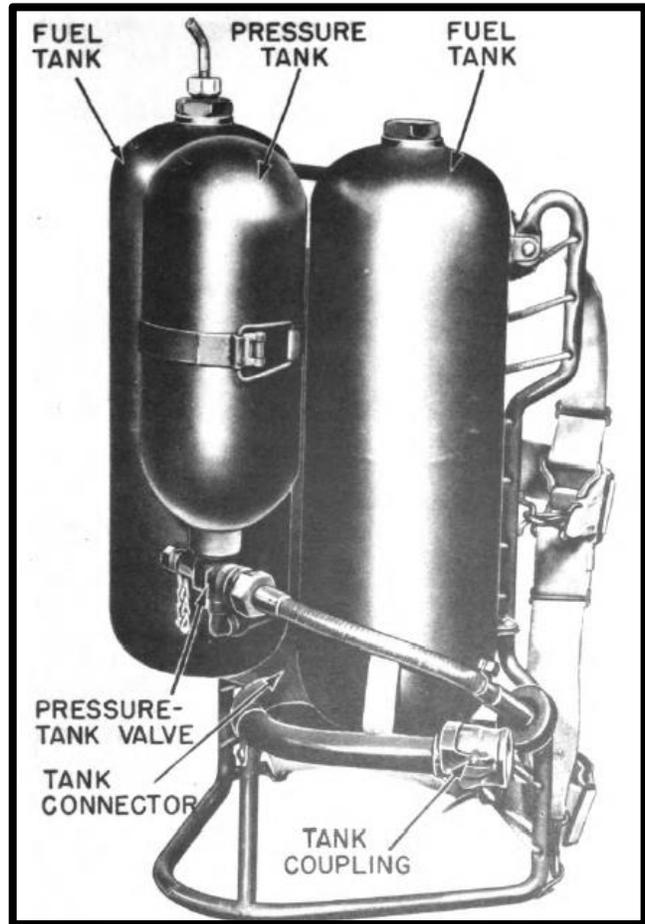
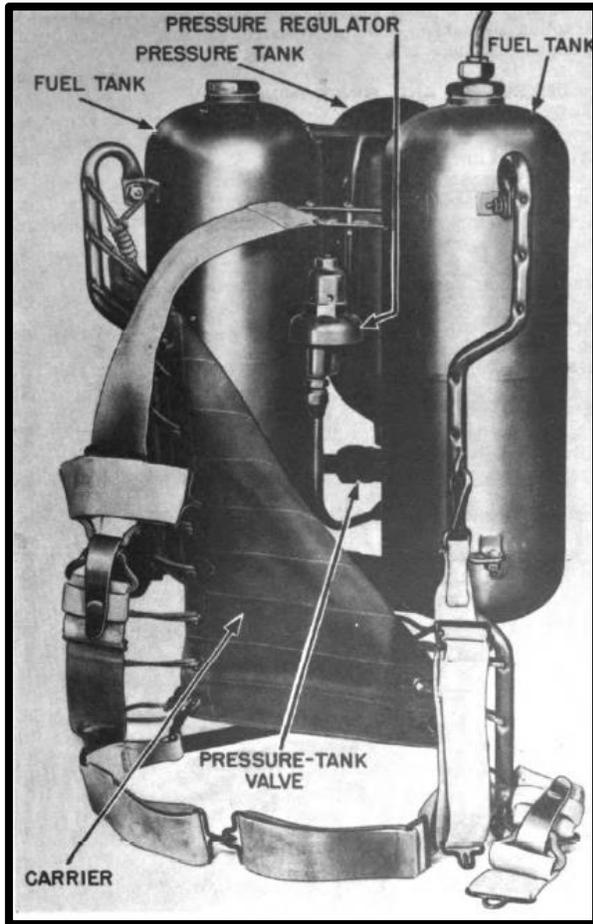
Post Demonstration Recovery:

- The Flamethrower Safety Officer shall verify that the tanks and wand have been purged and bled after firing and before leaving the area of the command bunker. The operator shall not leave this area until the safety supervisor removes the gas cap, closes the safety gate valve, and vents the hose into the impact area.
- When disconnecting the hose from the tank unit, the safety gate valve must be cycled to ensure pressure has been diminished in the hose and must be in the closed position when the hose is disconnected. After removal, the end of the hose and cam lock must be properly capped.
- The Flamethrower Safety Officer shall wet down the impact area with a water hose post firing to ensure that all flames are extinguished.

***Instructor:** Read the “Safety Rules” above aloud. Review each item and quiz students to ensure understanding—encourage students to ask questions.*

Students who fail to exhibit adequate comprehension of these rules shall not be allowed to go further in the training program.

The M2-2 Flamethrower Unit



Instructor: Explain the function of each component of the flamethrower. Discuss the correct nomenclature for each component. Be sure to mention regulator pressure being set to 250PSI. Explain how a higher or lower pressure could harm the operator or surrounding personnel. Have the student operate the various valves and triggers on the unserviced unit to become accustomed to their feel.

Wand Familiarization

Safe Holding Position:

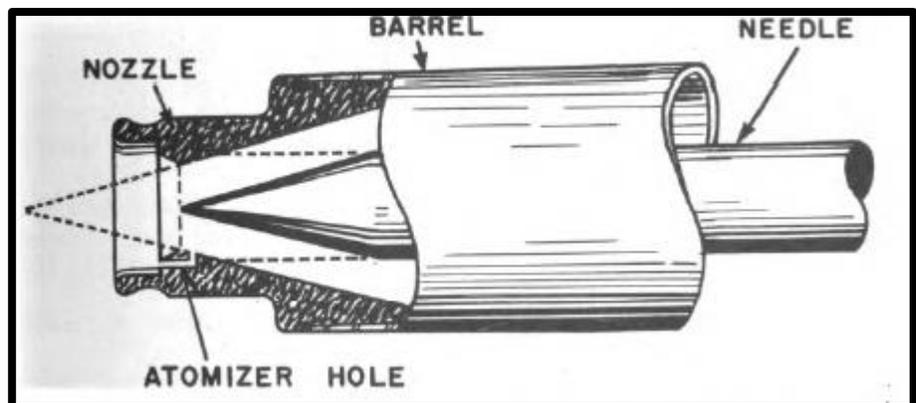
When the unit is not charged, the wand shall be carried in the position noted below. Pay special attention to the position of the operator's hands. They are not on either of the triggers.

Instructor: Model the safe holding position. Have each student model the position as well. Be sure to note that when the unit is pressurized, the wand should always be pointed "downrange" and away from personnel. Explain that the wand should never be pointed up or down while pressurized but held level.



Wand Function:

Firing the M2-2 flamethrower requires coordination between both triggers and considerable grip strength. During firing, failure to fully depress the rear trigger will result in the needle remaining partially within the nozzle (see figure). **This will cause the flame to not project as far and expose you to considerable heat.**





Note in the image above that the stream coming from the nozzle is tight and projects the flame away from the operator. In the Image below, one can see that the nozzle is not fully opened, and the flame is much closer to the operator, presenting a hazard.



Instructor: Have students model proper activation of the triggers while the wand is disconnected from the tank group. Ensure that they are fully depressing the fuel valve trigger.

Emergency Procedures

Abort

An “Abort” condition occurs any time that the safety conditions surrounding the firing of the flamethrower is unsatisfactory. This can occur due to the range, the operator, the flamethrower itself, or any other factor. Any member of the flamethrower team may call an “Abort” by simply shouting “Abort!”

Upon the command of abort, the following shall occur:

8. Upon hearing “Abort”, the operator will remain in position until the Team Leader has a firm grasp on the device and can remove it from their back.
9. The Operator shall hold the wand in their left hand and keep the wand pointed in a safe direction, away from personnel. The Operator shall remove their hands from both triggers.
10. If open, the Operator shall close the pressure build-up valve.
11. If open, the Team Leader shall close the safety gate valve.
12. The Team Leader shall move to remove the unit from the Operator’s back, the Operator shall carefully set the wand on the ground facing away from personnel.
13. The Team Leader and Operator will quickly move away from the unit and direct other personnel to clear away at least 10 meters.
14. Once the situation has been assessed, and with the approval of the Team Leader, the Team Leader and Flamethrower Safety Officer will secure the Flamethrower.

Dump

The “Dump” condition occurs when the Operator or Team Leader believes that the life of the Operator or nearby personnel are in immediate danger. The Operator or Team Leader may call a “Dump” by simply shouting “Dump!”

Upon the command of dump, the following shall occur:

6. The Operator will release the wand.
7. The Operator will quickly pull upwards on the two quick releases located on the flamethrower “backpack straps” while simultaneously moving quickly away from the unit.
8. The Team Leader will standby to ensure that the operator gets free of the unit. In the case that the operator cannot get free, the Team Leader may assist the operator.
9. The Team Leader and Operator will quickly move away from the unit and direct other personnel to clear away at least 10 meters.
10. Once the situation has been assessed, and with the approval of the Team Leader, the Team Leader and Flamethrower Safety Officer will secure the Flamethrower.

Vegetation or Structure Fire

In the unlikely event that a vegetation or structure fire occurs during a demonstration, the following shall occur:

4. The Operator shall cease fire and move through the remainder of the firing sequence
5. The Team Leader shall, using the charged water hose or non-halon fire extinguisher, extinguish the flames.
6. If flames persist under extinguishing efforts, the Flamethrower Safety Officer shall call 911 and request aid from the fire department.

Serious Burn Based Injury

In the unlikely event of a serious burn-based injury to the Operator or other personnel, the following shall occur:

6. The Safety Spotter shall call 911 and request aid.
7. The Team Leader shall secure the flamethrower by closing the charging valve and safety gate valve.
8. The Team Leader shall remove flamethrower from the immediate area.
9. The Flamethrower Safety Officer shall administer first aid to the injured party utilizing the burn kit.
10. All other personnel shall clear from the immediate area and help to usher spectators from the demonstration viewing area.

Instructor: Explain the roles of the flamethrower team. Then, walk through each scenario with the student explaining each step. Then, have the student demonstrate each step for each procedure. For “dump” have two personnel hold the unit as the student activates the quick releases. Use this as a test, ***students who fail to demonstrate understanding of these procedures will not be allowed to fire.***

During this time, explain the two ways that a student may injure or kill themselves with the flamethrower: losing control of the front grip, or firing at the ground/too close to the target.

Flamethrower Firing Sequence

The map below shows the locations in which the firing sequence generally takes place:

Figure 5: Locations of the flamethrower firing sequence and personnel. Note the red outlined area—the firing area, which must be free of personnel. Also note the triangular area in which flames will be fired.



Position #1:

At position #1 the following shall occur:

11. The Operator shall open the pressure valve, beginning to build pressure in the unit.
12. The Team Leader shall observe rising pressure on the pressure gauge.
13. The Operator and Team Leader shall observe the tank unit for abnormalities.
14. When satisfied with the normal operation of the unit, the Team Leader shall order "Advance!"
15. The Team Leader and Operator shall advance to position #2.



Position #2:

At position #2 the following shall occur:

7. The Team Leader shall verify that the pressure gauge shows 250+/- 20 PSI.
8. The Team Leader shall open the safety gate valve.
9. The Team Leader, with hand still on the safety gate valve, will inspect the entire flamethrower for leaks.
10. If a leak is detected the Team Leader will initiate an "Abort".
11. When satisfied with the unit's condition, the Team Leader shall order "Burn It!"
12. The Team Leader and Operator shall advance to position #3.



Position #3:

At position #3 the following shall occur:

4. The Operator, while passing through position #3 on the way to position #4, will pull **ONLY** the forward ignition trigger to warm the tip of the wand unit, 5-10 seconds.
5. The Team Leader shall halt at position #3 until firing is complete.
6. The Safety Spotter will visually verify from their designated, safe location that no personnel have entered the firing area. The Safety Spotter will order "Flamethrower!" if the area is safe, and "Abort!" if the area is not safe.



Position #4:

At position #4 the following shall occur:

7. The Operator shall point the wand downrange, set their feet, and simultaneously pull the forward and aft triggers. The unit will provide roughly six seconds of fuel. The Operator will fire a one second burst to determine if wind or other factors are influencing unit operation. Then, the operator may fire at will.
 - a. **NOTE: The operator must pay special attention to aiming the flamethrower. Glancing the flame off of the bunker overhang could result in stray flames.**
8. When fuel is depleted, as evidenced by a loud hissing noise and nitrogen cloud, the Operator shall:
 - a. With wand pointing down range, close the pressure valve.
 - b. Return hands to the safe holding position on the wand.
9. The Operator shall move to position #5



Position #5:

At position #5 the following shall occur

7. The Operator shall place their back towards the window of the bunker, where the Flamethrower Safety Officer will reach through to open the vent valve on top of the fuel cap. The Operator shall not leave this location until venting has completed.
8. When Venting has completed, the Flamethrower Safety Officer will open the fuel cap fully, close the safety gate valve, and move to vent the hose into the impact area by instructing the operator to actuate the rear triggers ONLY.
9. The Flamethrower Safety Officer shall spray the impact area with water to ensure no flames are present.



Instructor: You will perform a minimum of three “walkthroughs” of the firing sequence with the student.

During the first walkthrough, you will stop at each point and explain the five positions and actions to be performed at each.

During the second walkthrough, the student will, while carrying an unserviced flamethrower, walk through the five positions and explain what actions will be taken at each position. Carefully observe the student for physical ability at this time.

*During the third walkthrough, the student will, while carrying a serviced flamethrower and walk through the five positions, performing each of their duties. During this walkthrough, a practical demonstration of firing the flamethrower will be performed. **Do not allow a student to fire unless you are comfortable that they are competent.***

Appendix VIII—Hired Consultant

In order to ensure the safety of flamethrower operators and bystanders, the Admiral Nimitz Foundation hired Charles Hobson, a nationally recognized flamethrower expert who has authored the quintessential guide to flamethrower safety. Mr. Hobson has been training individuals on the operation, inspection, and maintenance of M2-2 flamethrowers for over 28 years. At the time of this SOP's publishing, he has supervised over nine hundred firings with an accident rate of zero.

Mr. Hobson's connection with the Nimitz Foundation goes back to 1995 and includes multiple training sessions and maintenance projects at the museum.

A portfolio of Mr. Hobson's work can be found at theflamethrowerexpert.com.

The standards laid out in this SOP are part of a program first envisioned by Mr. Hobson in 1993. Since then, the program has been built upon and improved constantly. Because of this, Mr. Hobson calculates his rate of accidents to be one in one million and a half. This vastly outstrips the record of flamethrower operators during WWII, who face a rate of one in forty thousand.

The contents of this SOP have been reviewed and approved by Mr. Hobson with the input of the operators and instructors participating the four-day training. Those operating, maintaining, servicing, or watching when the M2-2 flamethrower is demonstrated can rest assured that their safety has been taken seriously. By following this SOP, the M2-2 flamethrower may be operated within well established and acceptable safety standards.

The original forms submitted by Mr. Hobson are maintained in the offices of the MEC, ADSO, and Museum Director.

Appendix IX– Volunteer Confirmation of Receipt and Understanding

Living History Program – National Museum of the Pacific War

I _____ (Print name legibly), a volunteer for the Living History Program at the Pacific Combat Zone for the National Museum of the Pacific War have received, read, and understand the *Standard Operating Procedures M2-2 Flamethrower*. By familiarizing myself with this SOP, I will, to the best of my ability, comply with all policies and procedures set forth in this document. I am aware that if I do not follow any procedure or policy outlined in this document, I may be terminated as a volunteer participant.

Signature: _____

Date: _____