HTMG / HTMM / HTPT
(Helitorch Manager / Mixmaster / Parking Tender)
Helitorch Training

Instructor Guide

Prepared by the Interagency Aerial Ignition Group
Revised 2016

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HTMG/HTMM/HTPT
Helitorch Training
Revision History

Version	Description	Date
1.00	Original Materials	Date
1.10	Incorporate all Helitorch training curriculum into one instructor guide.	2016

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HTMG/HTMM/HTPT
Helitorch Training

Course Overview

What is the purpose of the course?
The purpose of this course is to provide you with a working knowledge of the various Helitorch equipment approved for use by the Interagency Aerial Ignition Guide.

Who are the intended participants?
Interagency personnel who utilize the helitorch for aerial ignition missions.

Course Prerequisites:

Prior to requesting enrollment in helitorch training, prospective students must complete the following pre-requisites:

Specific required training and qualifications can be found in the current Federal Wildland Qualifications Supplement to the NWCG PMS 310-1.
http://www.nwcg.gov/publications/310-1

REQUIRED PREREQUISITES FOR HELITORCH TRAINING:

National Incident Management System, An Introduction (IS-700)
Introduction to ICS (ICS-100)
Annual Fireline Safety Refresher (RT-130)
Aviation Transport of Hazardous Material (A-110); triennial requirement

Annual Helitorch Manager Refresher Training (RT-9012); is required annually after the initial training.

How is the course conducted?
Instructor-led delivery in classroom with hands-on demonstration of the skills identified in the position taskbooks for the various positions of helitorch operations.

What are the minimum instructor qualifications for the course?
This will vary based on agency specific requirements.

What is required to pass the course?
Include any specific requirements to pass the course, i.e. proficiency demonstrations, etc.

Logistical Information:

Recommended Class Size: 2 Min. 20 Max.

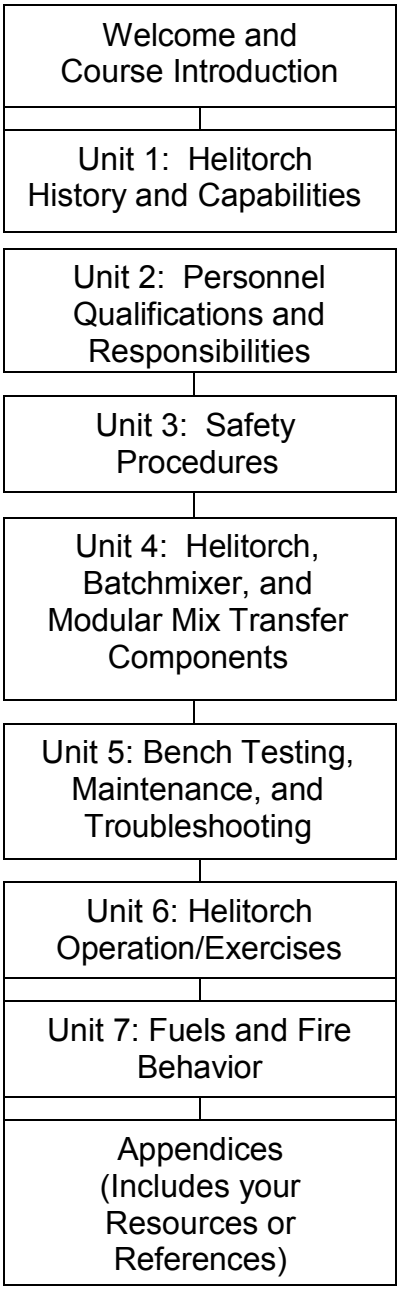
Length of Course: Approximately 4 - 6 hrs.

Supplies:

- Computer/laptop
- Projector
- Screen
- Speakers
- Course electronic presentation slides
- Student Roster
- OAS-111 Student Course Evaluations
- Hardcopy or electronic version of the Interagency Aerial Ignition Guide for each student
- Position Task Book for each student
- Helitorch equipment with tool kits
- Personal Protective Equipment for bench testing equipment
- Appropriate equipment as identified in the Interagency Aerial Ignition Guide for bench testing equipment (in addition to the required 40-B:C per pad, fire suppression requirements for helitorch operations provide a minimum of four extinguishers each rated 40-B:C, or two 3 gallon compressed air foam system extinguishers capable of using Class B foam, or a staffed 30 gallon class B foam capable system, or a staffed engine with Class B foam on site)
- Internet Connection (not mandatory, but useful) for video and resource files to demonstrate effective Helitorch Operations

HTMG/HTMM/HTPT Helitorch Training

Course Map



Est. Instruction Time: varied.	**Welcome and Course Introduction**
PPT – Title Slide to be inputted by instructor related to equipment on site. PPT – Introduction	Welcome the students to the course. Introduce yourself. Have participants introduce themselves. You could have them share some of the following information (as time allows): • Name • Where do you work? • Have you ever been involved in aerial ignition operations or used a helitorch before?
PPT – Course Purpose	**Course Purpose** This course is designed to provide you with a working knowledge of the various helitorch equipment approved for use by the Interagency Aerial Ignition Guide. **This instructor guide is designed to be used for the helitorch presentation, regardless of what is on site for inspection or field use. The slide presentation will vary based on which helitorch is being used and local modifications.**

PPT – Course Objectives	**Course Objectives** Introduce the Course Objectives. At the conclusion of this course, participants will be able to: 1. Identify the approved Helitorch systems for use as identified in the Interagency Aerial Ignition Guide. 2. Identify the Advantages and Disadvantages of the Helitorch in relation to the Plastic Sphere Dispenser (PSD). 3. Identify the personnel requirements/responsibilities and qualifications required to perform a Helitorch operation. 4. Identify training and recertification requirements for all Helitorch positions. 5. Identify the requirements for safely working with the hazardous materials involved with Helitorch operations to include: MSDS, Mixing Hazards, Static Bonding, Transportation, Fire Protection, and Spill response procedures. 6. Become familiar with Pre and Post operational briefings, and Communication requirements during Helitorch operations. 7. Understand Job Hazard Analysis/Risk Assessment, and appropriate checklists to be utilized. 8. Identify the parts and basic parts and mechanics of a helitorch, and associated maintenance with each Helitorch. 9. Demonstrate knowledge and perform a bench-test of the Helitorch, and trouble shoot problems. 10. Demonstrate knowledge to choose a Helitorch site and requirements to be on scene. 11. Identify the proper steps associated with hooking up the helitorch, mixing gel, and filling the helitorch. 12. Discuss pre burn reconnaissance and fire behavior associated with the helitorch. Explain that as you cover each module, the specific objectives for that module will be addressed.

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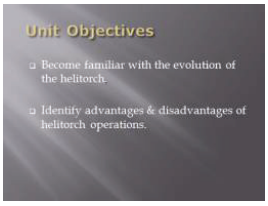
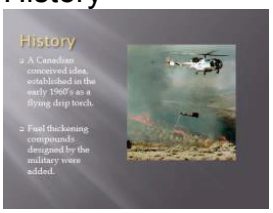
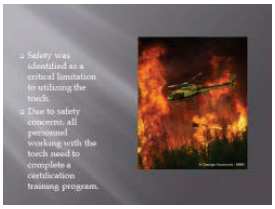
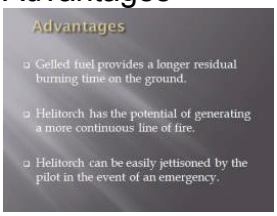
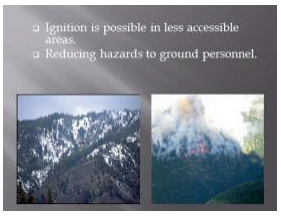
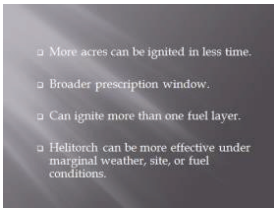
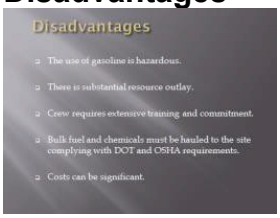
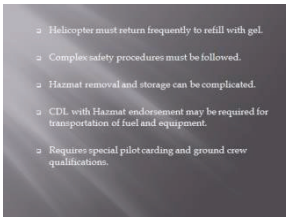
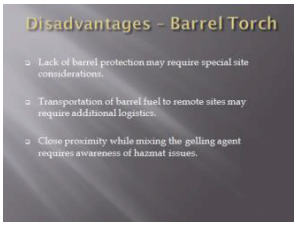
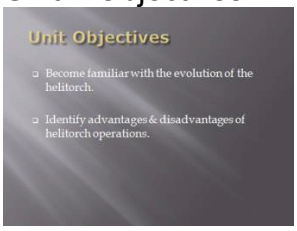
Est. Instruction Time: 30 min.	**Unit 1: Helitorch History and Capabilities**
PPT – Unit 1 Slide #1 	**Introduce the unit/topic:** The Helitorch, was developed in the 1960s by a Canadian conceived idea as a flying drip torch, to provide a method of igniting sparse or continuous fuels in a short time, on a large scale in remote areas. It is cost effective, environmentally acceptable, and allows for a more broad prescription window. The Helitorch is a gelled fuel aerial ignition device that is attached to a helicopter's external cargo hook. The ignition and fuel feed are controlled by the pilot through a simple electrical connector on the belly of the helicopter, usually the water bucket plug. The complete system is jettisonable by the pilot in case of emergency. Utilizing the Helitorch takes considerable planning, due to the amount of personnel needed, set up location, pilot carding and availability, and proper fuel service availability. The Helitorch may be used in any fuel type, and dependent upon conditions, results may vary from understory to stand replacement burns. This system is safe, efficient, and economical for users to burn with less risk to ground personnel in rugged terrain.
PPT – Objectives Slide #2 	**Objective(s):** After completing this module, participants should be able to: 1. Become familiar with the evolution of the Helitorch. 2. Identify advantages and disadvantages of the Helitorch. Key teaching points to accomplish module objectives: • Discuss the history of the Helitorch and review previous use of the Helitorch. • Discuss the advantages and disadvantages of utilizing the Helitorch.

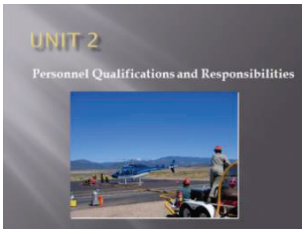
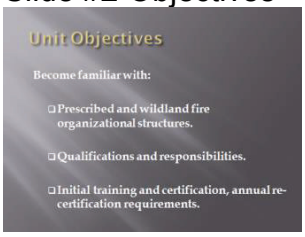
Slide #3 History 	Adding fuel-thickening compounds to raw fuel reduces the volatility and is therefore more manageable for dispersement. This increases the safety of handling the fuel, improves its drop characteristics, puts more fuel onto the ground (rather than burning off in the air), and increases residual burning time allowing the aircraft to be flown higher and faster than some other aerial ignition systems. Discuss History of the Helitorch on your local land management area. ○ Review previous seasons burns Fuel thickening compounds currently utilized are: ○ Allumagel (Powder) ○ Flash 21
Slide #4 	This aerial ignition device is a tool used in backfiring and burnout operations for wildfires and is also a mainstay to the prescribed fire arena for reduction of hazard fuels. It is a very effective tool but must be used by very skilled, qualified pilots and trained, qualified field personnel for a safe operation. Utilizing the Helitorch can be done safely if personnel are trained properly ○ Certification of positions are model specific.
Slide #5 	These are examples of some of the different Helitorches currently being utilized: ○ Upper Left- Norther Helitorch (Barrel Helitorch) ○ Upper Right-Simplex5400 ○ Lower Left-Fire Spec 2000 ○ Lower right-Isolair Helitorch What other Helitorches are approved: ➢ Refer to AIG Page I-I

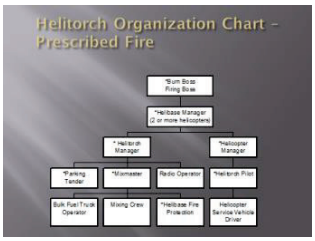
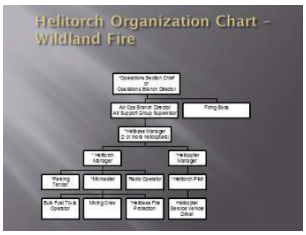
Slide #6 Advantages 	1. Sites where burn areas have sparse or patchy fuel distribution and high fuel moisture content, the pattern of fire laid down by the torch can provide a greater chance of ignition and under some conditions reduce emissions. 2. Gelled fuel provides longer residual burn time on the ground. o Why is this important in relation to meet burn objectives? 3. Helitorch has the potential of generating a more continuous line of fire. o Unlike the PSD, Jell will not roll down the hill. 4. Helitorch can be easily jettisoned by the pilot. o Discuss the importance of the preburn reconnaissance, and looking at alternate landing/jettison sites.
Slide #7 	5. Burning is possible in less accessible areas, reducing hazards to ground personnel. Where wildland fire burnout is the best option for safety and control, the helitorch can expedite the operation without compromising personnel safety.
Slide #8 	6. More acres can be ignited in less time. a. It can be cost effective b. Smoke constraints may be met. 7. Provides a broader prescription window. a. Fuels may be on the wetter side. b. Temperatures/RH may be higher. 8. It can ignite more than one fuel layer. a. It can burn ground material and aerial canopy with little ground litter. 9. Helitorch may be more effective under marginal weather, site conditions, or fuel conditions.
Slide #9 	9. Convection columns can develop quicker, increasing control of the fire. o Aided by proper pilot techniques. o Assistance on the ground may be needed to assist with blacklining to ensure control lines are secure.

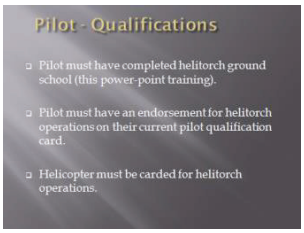
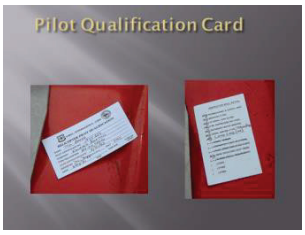
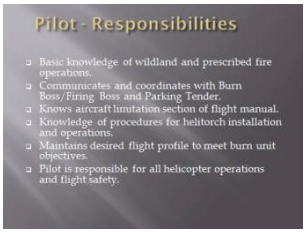
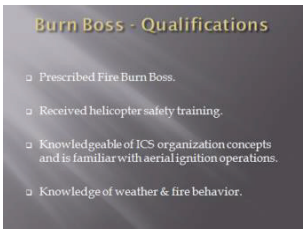
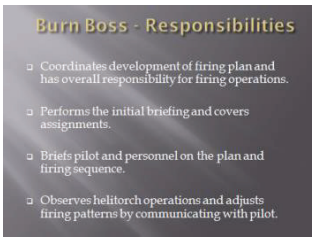
Slide #10 	1. Advantages of the Barrel Torch: o Can be transported inside helicopters, but this is rare. o Smaller area is required for set up and operation
Slide #11 	2. Photos of Barrel Torch: o Example would be the Northern Helitorch.

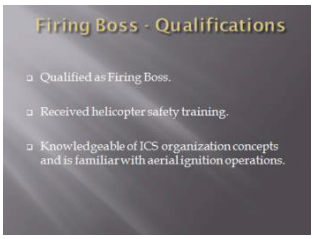
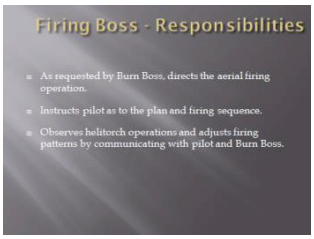
Slide #12 **Disadvantages** 	1. More logistics than PSD operation. 2. The use of gasoline is hazardous since it is highly flammable in its ungelled state. 3. There is substantial resource outlay: three-to five-person crew, with one or two vehicle and/or trailer units for most burning operations. 4. Crew requires extensive training and a commitment to the program for the duration of the burning season. 5. Bulk fuel and chemicals must be hauled to the site; the DOT and OSHA requirements must be known, understood, and complied with. 6. Operation requires considerable planning and setup time to organize the mixing/loading site and helipad. 7. Rigorous safety procedures must be followed. Hazmat removal and storage may be a problem. 8. It is easier to establish a convection column because of helitorch mass ignition; it is as easy to lose control of the column with a break in ignition. 9. Helitorch does not lend itself to under-burning operation. The burning fuel globules can ignite tree crowns. 10. Commercial driver's license (CDL) with HAZ-MAT endorsement maybe required for transportation of mixing equipment. 11. Requires special pilot and ground crew techniques in order to operate effectively.
Slide #13 	12. Pilot has to return frequently for refill on Helitorch. a. Consider site location in relation to Burn. b. Smoke considerations.

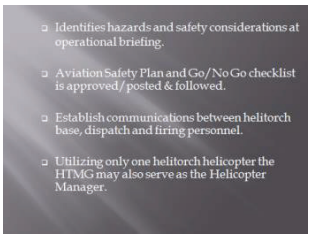
Slide #14 	Consider PSD for an understory burn. Fire Behavior can be controlled: o Discuss lighting pattern with Pilots o Current fuel moistures and conditions o Weather Forecasted
Slide #15 	Discuss what needs to be planned: o Location o Qualified Helitorch Crew o Helicopter and Pilot Carded o Fuel Truck - Ethanol Fuel is most widely available in filling stations, but will not gel the fuel properly, you **must use NON-ETHANOL FUEL** for proper gelling. o Burn Plan o PASP
Slide #16 	6. Other considerations?
Slide #17 	1. Avoid rocky landing areas, barrels can be punctured. 2. If no mechanized system to mix gel, additional personnel may be needed to move and assist with operation.
Slide #18 Unit 1 Objectives 	1. Discuss History of the use of the Helitorch on your unit and the future of the program. 2. Discuss alternate ignition methods.

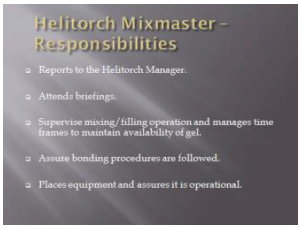
Est. Instruction Time: 30 min	**Unit 2:** **Personnel Qualifications and Responsibilities**
PPT – Unit 2 Slide #1 	**Introduce the unit/topic:** All individuals involved with a Helitorch operation must be qualified. Training is model specific per the Aerial Ignition Guide! This is a quality control issue and is your responsibility while performing in any position.
Slide #2 Objectives 	**Objective(s)** After completing this module, participants should be familiar with: ○ Prescribed and wildland fire organizational structures ○ Qualifications and responsibilities ○ Initial training and certification, annual re-certification requirements Key teaching points to accomplish module objectives: ○ Required positions for prescribed and wildland fire helitorch operations ○ How to become qualified ○ How to maintain your qualification

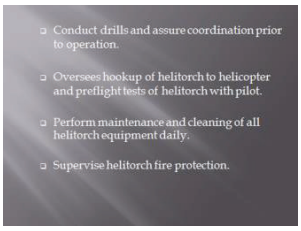
Slide #3 	Refer to Appendix B in the Interagency Aerial Ignition Guide Organization Charts for required positions in both wildland and prescribed fire helitorch organizations. Positions include: 1. Helitorch Manager 2. Helicopter Manager – may be collateral duty with helitorch manager, if using one helitorch helicopter 3. Mixmaster 4. Mixing Personnel - optional 5. Helitorch Parking Tender 6. Helitorch Base Radio Operator - optional 7. Pilot 8. Fire Protection Crew – as needed based on organization Discuss - Module configurations and Crew Resource Management needed for safe and efficient operations.
Slide #4 	Who can act in dual positions? ○ Refer to the Aerial ignition guide. HTMG may also serve as the HMGB. Consider utilizing HMGB trainee to assist with this. ○ In multiple aircraft situations an HEB2 required.
Slide #5 	Other items that should be considered or required during wildland fire Helitorch operation: 1. PASP 2. Discrete frequency for helitorch operation 3. Working location away from main helibase operation

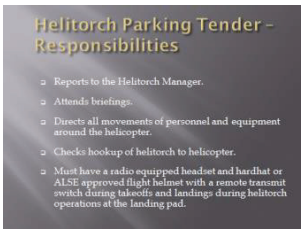
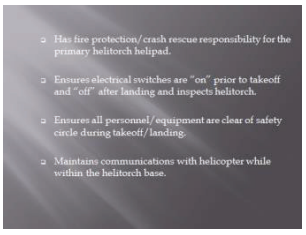
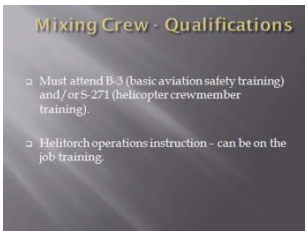
Slide #6 	There is a lack of Helitorch pilots nationally. One new option for carding is utilizing the water torch. In order to get carded through the water torch: 1. Carded 1 year PSD prior 2. Refer to the Pilot Training Standards
Slide #7 	Ensure Helitorch is on the pilot card. Some confusion could be if aerial ignition is marked and Torch is not specified. Contact helicopter inspector pilot.
Slide #8 	Ensure proper briefing from the agency is given to the pilot.
Slide #9 	Discuss your agencies policy on burn boss qualifications required: RXB1/RXB2?
Slide #10 	Helitorch Manager needs to assist the burn boss with: 1. Briefings 2. CRM 3. Communications o With the pilot o With the Helitorch operation (crew)

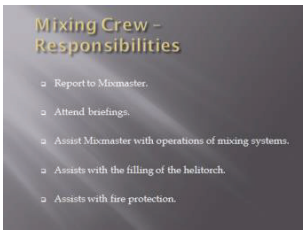
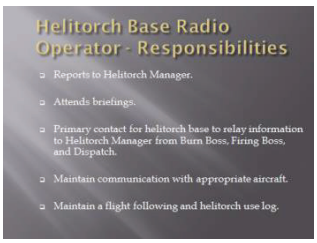
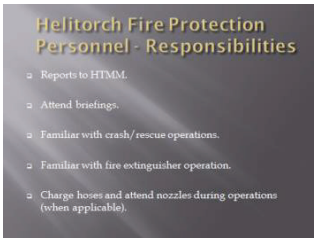
Slide #11 	The firing boss works directly for the burn boss.
Slide #12 	Discuss how an operation should successfully be coordinated with ground ignitors and Helitorch ignition, by the firing boss: 1. Maintain control of ground resources at all times 2. Ensure communications are being received 3. Ensure safety of ground personnel 4. Know the unit boundaries 5. Understand the prescribed fire prescription
Slide #13 	Refer to the most current Wildland Fire Qualifications Guide. Look for supplements as well. Courses Required: ○ IS-700 ○ ICS-100 ○ RT-130 ○ N9012 Helitorch Training ○ A-110 Physical fitness: ○ HTMG-None, HTMM-Light, HTPT-Moderate Be sure to reference your agency specific requirements. **To Become Qualified:** **1. HMGB Qualified** **2. HEB2 Trainee** **3. Qualified as HTMM** **4. Minimum 1 assignment to complete task book**

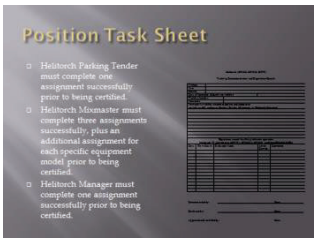
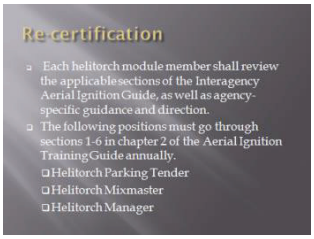
Slide #14 	**Document, Document, Document…** **Helitorch Manager** 1. Supervises and monitors the overall helitorch operations on the helibase. 2. Supervises all helitorch/helibase operation and assigns qualified personnel to positions and identifies trainees. 3. Ensures Aerial Ignition PASP and checklists are completed, approved, posted, and followed. 4. Maintains Helitorch Maintenance log and ensures proper cleanup of equipment prior to storage (reference maintenance in Appendix B). 5. Provides technical assistance to RXB 1/2 or FIRB on helibase location and operation. 6. Ensures all required equipment is on-site and operational. 7. Ensures communication link between helitorch base/helibase, dispatch, RXB 1/2 or FIRB/Operations Section Chief, and designated personnel is operational. 8. Conducts briefing and provides technical advice and information to involved parties. 9. Conducts and documents a risk assessment. Identifies hazards and safety requirements at operations briefing. 10. Ensures safety precautions have been completed prior to mixing. 11. Ensures that fire shelter is on board aircraft and accessible to the pilot, and that pilot is familiar with use.
Slide #15 	Discuss other duties a Helitorch Manager may be doing: ○ All the duties associated with HMGB ○ Planning ahead for change of mission: ❖ PSD operations if results not being met ❖ Initial attack ❖ Medevac

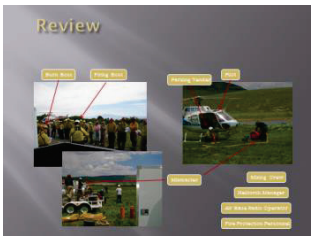
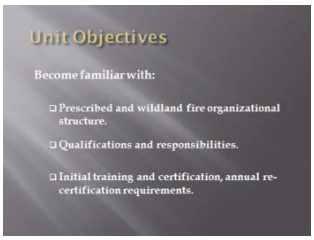
Slide #16 	Refer to the most current Wildland Fire Qualifications Guide. Look for supplements as well. Courses Required: ○ IS-700 ○ ICS-100 ○ RT-130 ○ N9012 Helitorch Training ○ A-110 Physical fitness: ○ HTMG-None, HTMM-Light, HTPT-Moderate Be sure to reference your agency specific requirements. **To Become Qualified:** **1. Minimum 3 successful assignments** **2. Completion of task book** **3. One additional assignment for model specific** **4. Qualified as a HECM**
Slide #17 	HTMM should be the subject matter expert with the system being utilized. This individual can make or break an operation. **Mixmaster** 1. Reports to the HTMG. 2. Attends Helibase briefings. 3. Supervises mixing/filling operation, manages time frames to maintain availability of gel, assuring bonding procedures are followed. 4. Determines quantities of fuel, gelling agent, etc., needed and manages time frames between mixing systems. 5. Oversees hookup of helitorch to helicopter and preflight tests of helitorch with pilot. 6. Supervises the helitorch fire protection organization. 7. Places equipment and ensures it is operational; conducts drills prior to operations to ensure mixing and filling operations are coordinated between all personnel. 8. Performs maintenance and cleaning of all helitorch equipment.

Slide #18 	The HTMM works directly with the HTPT and comes up with the plan of action on how the operation will work the most efficiently.
Slide #19 	Refer to the most current Wildland Fire Qualifications Guide. Look for supplements as well. Courses Required: ○ IS-700 ○ ICS-100 ○ RT-130 ○ N9012 Helitorch Training ○ A-110 Physical fitness: ○ HTMG-None, HTMM-Light, HTPT-Moderate Be sure to reference your agency specific requirements. **To Become Qualified:** **1. Qualified as a HECM** **2. Minimum of 1 successful assignment**

Slide #20 	Discuss within your unit who fills the helitorch, the HTPT or the HTMM. **Parking Tender** 1. Reports to the HTMG. 2. Attends briefings. 3. Directs all movements of personnel and equipment around the helicopter. 4. Checks hookup of helitorch to helicopter; accomplish checkout procedures. 5. Must have a radio equipped with headset and hardhat or ALSE approved flight helmet with a remote transmit switch during takeoffs and landings during helitorch operations at the landing pad. 6. Has fire protection/crash rescue responsibility for the primary helitorch helipad (staff fire extinguisher during all fueling, reloading/filling operations, and during takeoffs and landings, per IHOG). 7. Ensures electrical switches are “on” prior to takeoff and “off” after landing and inspects discharge valve, propane pressure, cam lock, drum hardware, and suspension cables prior to takeoff. 8. Ensures all personnel/equipment are clear of safety circle during takeoff/landing. 9. Maintains communications with helicopter while within the area of helitorch base, turns communication over to RXB 1/2 or FIRB /Operations Section Chief when helicopter departs helitorch base area.
Slide #21 	Cover these practices in your stations when instructor completes the units.
Slide #22 	This position is also referred to as the cotton boy. There is not an IQCS qualification for this. This is very beneficial during a busy operation.

Slide #23 	Qualified personnel within the Helitorch operation need to ensure they properly brief the mixing crew on their duties, and provide oversight since they are not required to have this training (N9012).
Slide #24 	For a simple operation discuss who will be assuming the responsibility of communications for the Helitorch operation. ○ Do not utilize the HTMM for this, they should not have a radio on them due to the potential hazard with the fueling process.
Slide #25 	The Helitorch Base Radio Operator (optional): 1. Reports to HTMG. 2. Attends Helibase briefings. 3. Receives orders from RXB 1/2 or FIRB /and relays to HTMG. 4. Maintains communication with appropriate aircraft. 5. Provides communication between HTMG, parking tender, Helicopter Pilot, RXB 1/2 or FIRB and dispatch and/or operations. 6. Maintains a flight following log.
Slide #26 	If utilizing Helitorch crew for this discuss responsibilities and what your actually going to do under certain circumstances: ○ Helitorch catches fire ○ Helicopter catches fire ○ Fire on the Helibase Have the same discussions if utilizing an engine for fire protection. If utilizing an engine ask the following questions: ○ Is there training with aircraft related incidents? ○ Are they carrying the proper foam capability?

Slide #27 	As an instructor how are you dealing with performing a live fire operation to be able to give full credit for this course? Options: 1. Do a live fire exercise 2. Do a completion memo that needs to be signed off once they do a live fire operation, to then officially become a trainee ○ This will need to be discussed within your agency
Slide #28 	Task sheets are no longer applicable. **Attach partially filled out task sheets to task books to show experience.** **Task books can be found at:** **www.nwcg.gov**
Slide #29 	**Course #9012 must be entered into IQCS.**
Side #30 	
Slide #31 	**Refer to the most current Federal Wildland Fire Qualifications Supplement.**

Slide #32 	
Slide #33 	**Questions?**

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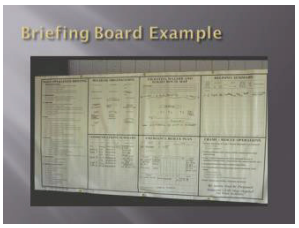
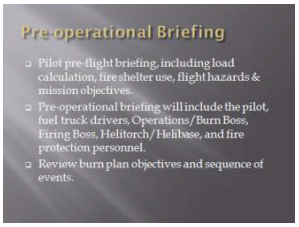
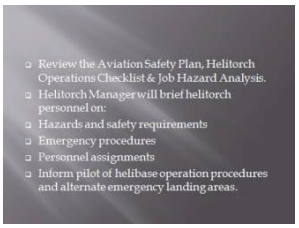
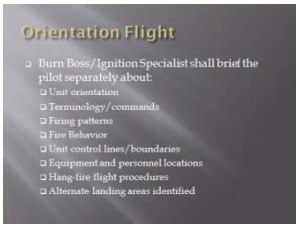
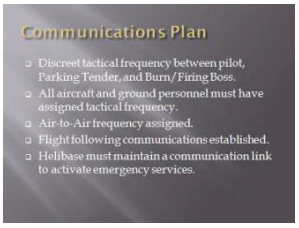
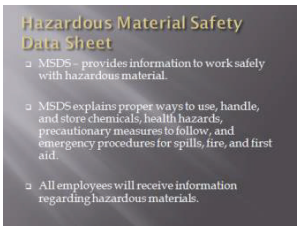
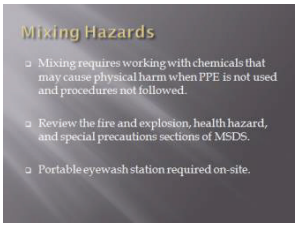
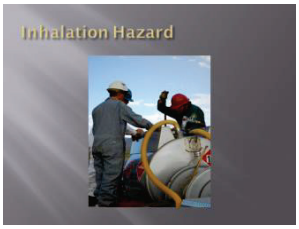
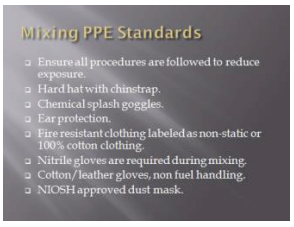
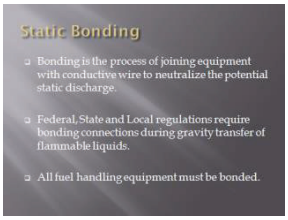
Est. Instruction Time: 30 min	**Unit 3: Safety Procedures**
PPT Unit 3 Slide #1 	**Introduce the unit/topic:** Helitorch operations can have a significant cost savings, and reduce the risk to ground personnel. Risk is transferred to the Helitorch module and the pilot performing the operation. It is our job to ensure safe practices and procedures are followed to limit exposure and reduce the potential for an accident to occur.
Slide #2 	**Objective(s)** After completing this module, participants should be familiar with: 1. Briefings – pre-operational and post operational 2. Communications 3. Hazardous Material Safety Data Sheets 4. Mixing hazards and PPE standards 5. Static Bonding Procedures 6. Hazardous materials transportation 7. Spill response procedures
Slide #3 	**Objectives Continued** 8. Job Hazard Analysis/Risk Assessments 9. Operational Safety, Go/No Go and Equipment checklists 10. Fire Protection 11. Emergency Contingency Plans
Slide #4 	Typically there are multiple briefings: 1. Agency Administrator 2. Personnel involved with the burn (the operational briefing) 3. Helibase briefing It is important that you have the helibase briefing separate from the other briefings.

Slide #5 	Briefing board may be utilized. Important to cover if operating out of a helibase with multiple aircraft.
Slide #6 	Pre-operational briefing should be led by the HTMG and the Burn Boss.
Slide #7 	Review each element of the briefing in the presentation.
Slide #8 	Determine if Burn Boss/Firing Boss will be dropped off at an alternate location to observe operations: ○ If landings will occur during this flight, ensure HMGB is onboard aircraft to approve sites identified.
Slide #9 	Discrete frequency recommended if working out of a helibase with multiple aircraft. Test all frequencies prior to commencing operations.

Slide #10 	**This is policy per the Aerial ignition guide.**
Slide #11 	Users should consult the specific product manufacturer's site for the current version of specific MSDS information.
Slide #12 	Dependent on which mixing agent is being utilized PPE standards may vary. Eye wash stations shall have a flow of 15 minutes. The American National Standards institute (ANSI) outlines what a 15 minute continuous flow is. **NO SMOKING** and **NO CELL PHONES OR RADIO** signs to be posted. o Ensure this is briefed on and include the vapor removal outlets.
Slide #13 	You should be wearing an approved dusk mask: o When dispensing or handling **powdered** gelling agent
Slide #14 	This is to ensure your health and safety for the future. For Mixing crew clothing: o Clothing labeled as non-static o 100% cotton Clothing must be labeled with Nomex IIIA, or 2% Carbon Core, or 3% Conductive Fiber

Slide #15



Discuss how and why we test for continuity.

CAUTION: Before testing helitorch with the helicopter, disconnect pear link from the aircraft cargo hook. Failure to follow this procedure can result in damage to the helicopter wiring if polarity is incorrect.

After the helitorch has been bench tested, it shall be tested with the helicopter while both are on the ground. At this point it is essential that you have conducted a pre-operational briefing with the pilot and crew. This briefing must include communications, any identified hazards, and associated mitigations, aircraft performance, and emergency procedures.

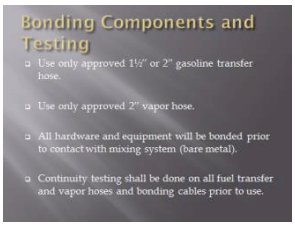
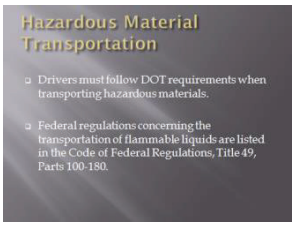
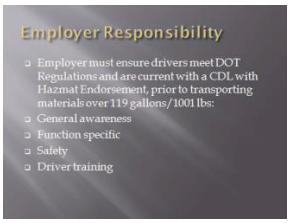
Ensure the desired nozzle tip is installed on the helitorch, that there are no cables over the skids, and have a fire extinguisher staffed with a trained person.

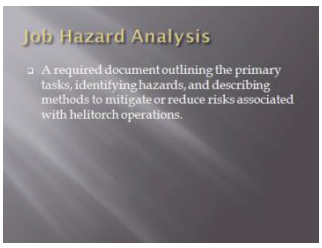
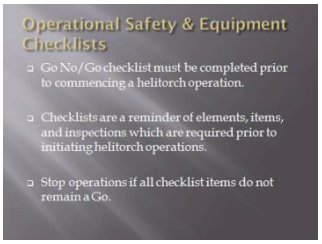
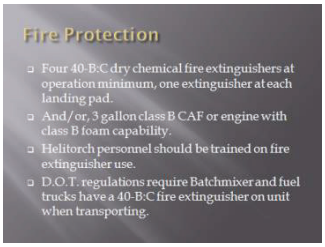
A. **Ignition Test**

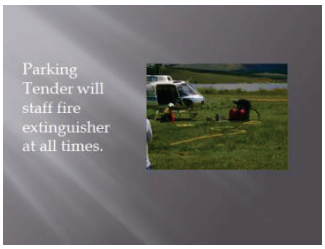
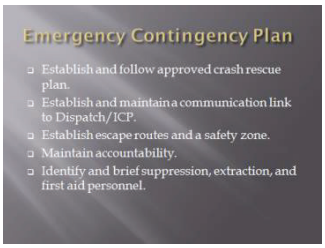
1. Ensure the pump switch is off and turn the ignitor switch on.
2. Have pilot activate the helitorch control switch to test for proper ignition.
3. Have pilot release helitorch control switch and turn ignitor switch off.

B. **Pump Test**

1. Check dry break connection and open hose valve.
2. Insure ignition switch is off and turn pump switch on.
3. Have pilot activate the helitorch control switch after having placed fuel catch vessel under fuel nozzle. Gelled fuel should flow through the nozzle tip. At this time all lines should be bled to insure fuel flow. If you hear the motor turning and no fuel flows, check for clogging, vapor lock, or polarity reversal. If the polarity is reversed, simply reverse the input wires or use a “backward wired pigtail.” When polarity is correct, reconnect pear link to the aircraft cargo hook.
4. Check that the positive shutoff valve does not allow fuel to leak from the nozzle and that it operates freely.
5. Make sure both switches are off.
6. The torch is ready for operation.

Slide #16 	**Refer to Appendix F in the Aerial Ignition Guide.**
Slide #17 	Discuss all components that need to be bonded: 1. Fuel truck to Mix System 2. Mix Transfer between barrels 3. Mix System to helitorch
Slide #18 	Demonstrate or discuss how to use a continuity tester.
Slide #19 	Drivers must know what the DOT hauling and regulations associated with the equipment are. **Transportation of barrels:** o Must be DOT approved and meet the STANDARDS and GUIDELINES. Must be located in a protected area on the vehicle and securely fastened to prevent moving within the vehicle in case of accident or rollover. o Must contain less than 1 gallon of residual fuel. o Must comply with local and state Highway Patrol Hazmat regulations.
Slide #20 	If there is potential to backhaul HAZMAT back from a burn, be prepared to properly adhere to DOT regulations. Loads greater than 119 gallons or 1000 pounds automatically require a commercial driver's license with a hazardous materials endorsement, and extensive drivers training which may include the requirement for a tank endorsement.

Slide #21 	**In the event of a spill, scene safety is #1 priority.**
Slide #22 	Review this during your briefing and have all participants sign the JHA.
Slide #23 	What are all the checklists to be completed? Information may be contained in the IAP, Prescribed fire plan, or PASP and may be utilized in lieu of the following Forms: 1. Go/No Go 2. Helitorch Inspection 3. Helitorch Mix System checklist 4. Project Aviation Safety plan 5. Job Hazard Analysis 6. Organization chart 7. Aviation Risk Management Tools-reference IHOJ Appendix J 8. Position task books
Slide #24 	Discuss the proper utilization of fire protection equipment. Train employees on how to use equipment.

Slide #25 	Trimax extinguishers can be effective, but are limited in mobility and need additional inspections.
Slide #26 	Have additional fire extinguisher strategically placed around your mixing system. Discuss when to use them and when to walk away.
Slide #27 	Train for the “What if Event!”
Slide #28 	**Questions?**
Slide #29 	

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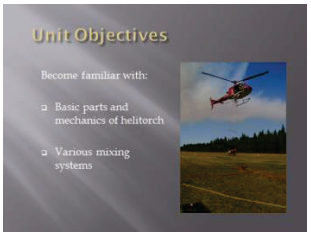
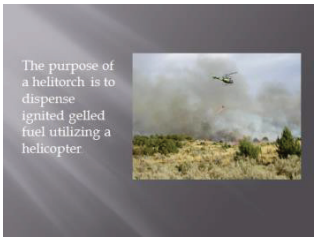
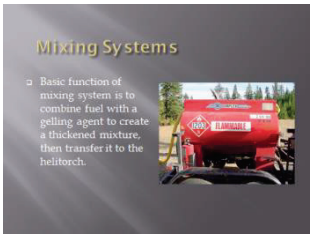
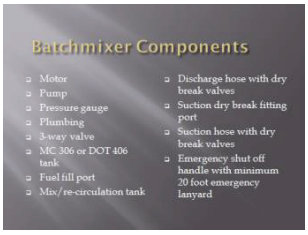
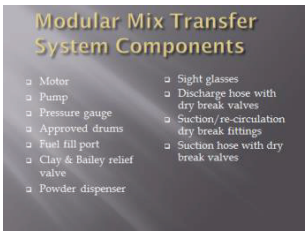
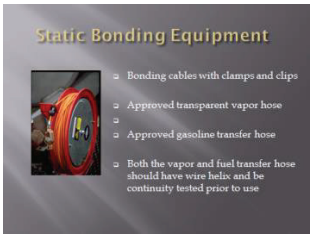
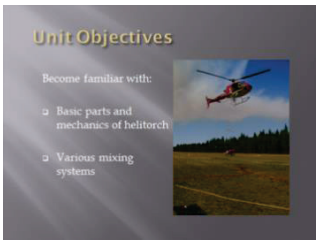
Est Instructor Time: 45 Min.	**Unit 4: Helitorch, Batchmixer, and Modular Mix Transfer Components**
PPT Unit 4 Slide #1 	**Introduce the unit/topic:** All aerial ignition systems must meet Occupational Safety and Health Administration (OSHA), Department of Transportation (DOT) requirement, and National Fire Protection (NFPA) standards, as well as the required safety modifications outlined in the Aerial Ignition Guide Appendix D, E, and F. Refer to Chapter I in the Aerial Ignition Guide for: 1. Approved systems 2. Agency manufactured or modified devices 3. Manufacturer modifications 4. Aerial ignition systems approval process
Slide #2 	Discuss what mixing system and Helitorch(s), you will be training on. Training and certification is model specific
Slide #3 	**Gel may be mixed by using the following products:** • FIRETROL Firegel (also known as Sure Fire) • FIRETROLPetro Gel • Flash 21 • Halliburton MO85 and MO86 Only gelling agents with a current MSDS sheet are approved for use.
Slide #4 	What are the approved Helitorches? • Simplex Model 5400 • Fire Spec 2000 • Isolair • Western Helicraft • Northern • T &T • MTDC Helitorch(to be approved in 2016)

Slide #5 	All Helitorch systems have similar parts as listed in this Slide. Inspection of these parts prior to each use are important to success. Refer to Helitorch inspection Checklist (Appendix E).
Slide #6 	**Simplex 5400** • Propane assist • Large frame system • Frame protects system • May have 24 volt pump or belt driven pump • Mix gel with mixing system **Isolair** • Propane assist • Tip folds up • Mix Gel with mixing system
Slide #7 	**Fire Spec 2000** • Electrical ignition • Tip Folds up • 24 volt pump • More exposed • Mix Gel with mixing system **Barrel Torch (Western, Norther, T&T)** • Propane assist • Assembled on site • Utilized in remote locations • Mix Gel manually
Slide #8 Same as Slide #7	
Slide #9 	**Two types:** 1. Batchmixer 2. Mix Transfer

Slide #10 	Discuss the advantages and disadvantages of: • Capable of mixing 4 barrels Still does have ability to mix one at a time • Hazmat/CDL requirements
Slide #11 	Tank must be inspected annually. Refer to Appendix E for Batchmixer inspection.
Slide #12 	Does not need annual DOT inspection. Usually stored in enclosed trailer. If enough equipment is available could support 2 operations.
Slide #13 	Refer to Appendix E for Mix Transfer checklist.
Slide #14 	There are many variations of transfer pumps: • The pump, in picture shown, has the ability of not disconnecting the hose from the bottom of the barrel (suction) to mix another barrel.

Slide #15 	Dusk masks are for a one time use, and a new one should be used daily.
Slide #16 	Extra fuel for mixing/transfer pump. Have enough mixing agent/powder for duration of the operation.
Slide #17 	Discuss and explain how to utilize/change out parts for minor maintenance.
Slide #18 	Non-ferrous tools are utilized due to Non-sparking. Many metals are non-ferrous: • Aluminum, Copper, Lead, Nickel, Tin, Titanium, Zinc, Brass
Slide #19 	All items that have fuel or transfer fuel needs to be bonded.

Slide #20 	Portable eye wash station with a 15 minute continuous flow: • Should be filled immediately once on site
Slide #21 	**If time permits, show class your equipment.**

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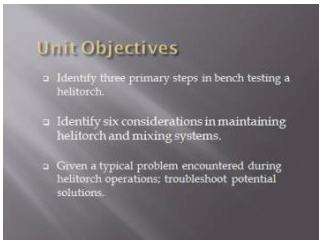
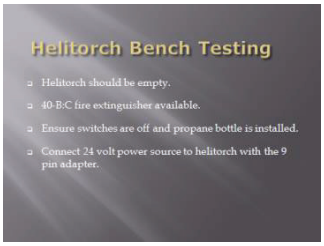
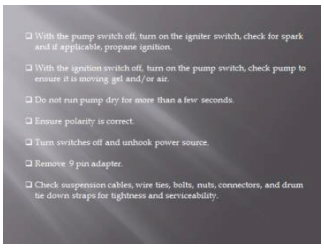
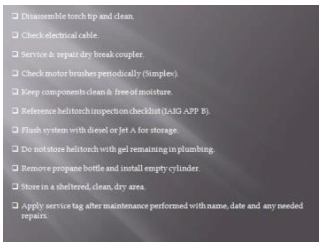
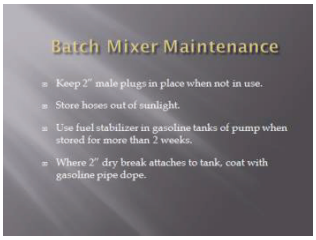
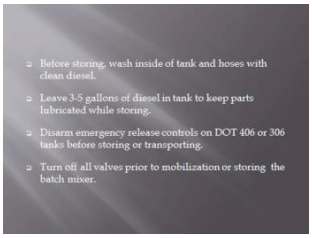
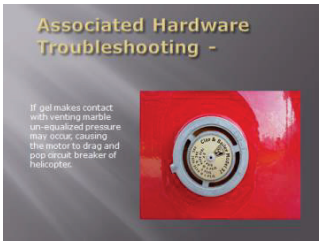
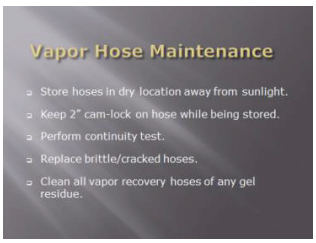
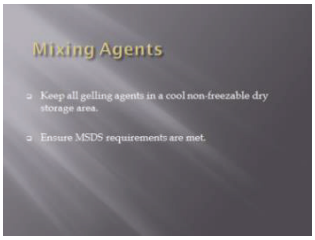
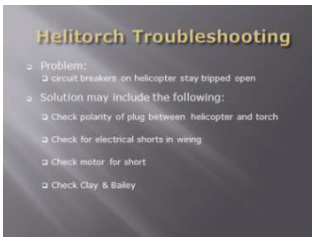
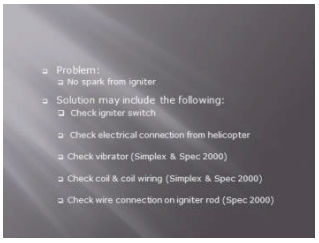
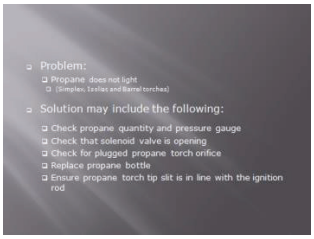
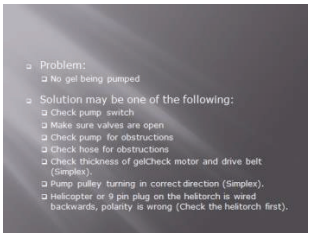
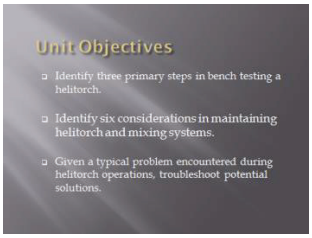
Est. Instructor Time: 30 min	**Unit 5: Bench Testing, Maintenance, and Troubleshooting**
Slide #1 	**Introduce the Unit/Topic.** Being familiar with your Helitorch prior to operations is important for if/when issues arise. Helitorches that are kept clean and maintained will avoid operational delays.
Slide #2 	**Instructor:** • This unit may be taught either using power point, or all hands on adhering to objectives being met.
Slide #3 	Bench testing is required prior to operation, and may be done multiple times throughout an operation if problems arise such as: • Gelled Fuel dispenses during operation with no ignition • Gelled fuel does not dispense
Slide #4 	**During Bench testing ensure:** 1. Fire Extinguisher is readily available 2. Remember what position does the bench testing? • Typically HTPT
Slide #5 	Following correct procedures is very important to ensure safety.

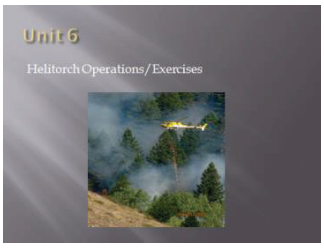
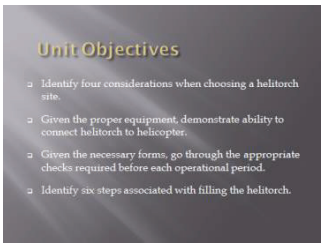
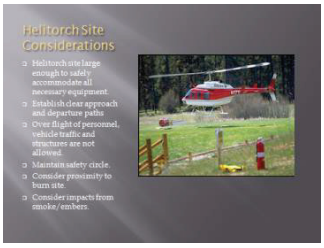
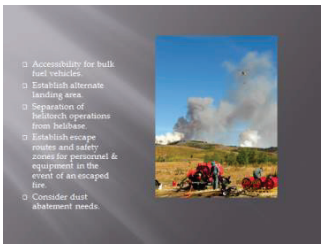
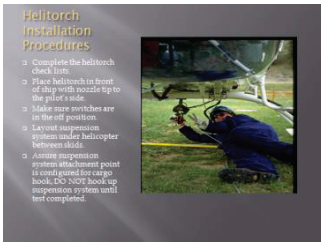
Slide #6 	Discuss the importance of maintenance and how to properly store equipment.
Slide #7 	Disassemble torch tip and clean: • Use non-ferrous tools • Use steel wool to clean Check Electrical cable: • Check for breaks or hard bends in cord • Check plug-in for cracks or bent prongs Service and repair dry break: • Clean off any residual gel • Ensure valve works properly Check motor brushes periodically: • Only on the 24 volt pump Keep components clean and free of moisture: • Proper storage, in a clean dry area Reference helitorch inspection checklist: • Good to do post and pre-season prior to sending into the field Flush system with diesel or Jet A for storage: • Not required to do a flush, gel acts as a sealant, but the powder mixing agent could thicken and cause future issues. • A mixed flash 21 will store over winter • Suggest adding a little diesel or Jet A into system to break down gel Do not store helitorch with gel remaining in plumbing: • Add either diesel or Jet A into the system to break down gel Remove propane bottle and install empty cylinder: • Have a designated bottle labeled “EMPTY” to install Store in a sheltered clean dry area: • Either indoors, or a moisture free environment • Flash 21 should not be frozen, but will work if it has been froze Apply Service tag after maintenance performed: • System should have a log book that stays with system

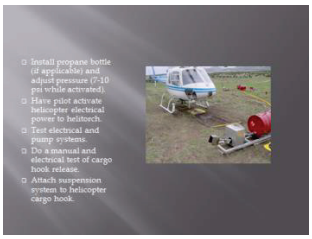
Slide #8 	Typically requires CDL to transport system to and from locations: • Refer to state DOT requirements
Slide #9 	Trailer or Truck typically dedicated to the system.
Slide #10 	
Slide #11 	Store batchmixer in a secure location: • To prevent vandalism • To limit exposure to animals Store in a well ventilated area.
Slide #12 	Systems are typically stored/housed in a enclosed trailer. The best maintenance is using the system yearly.

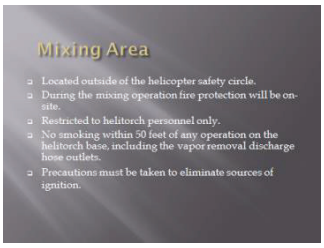
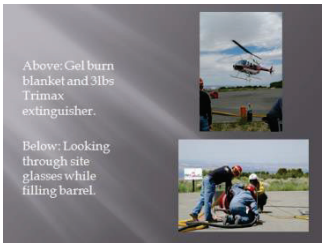
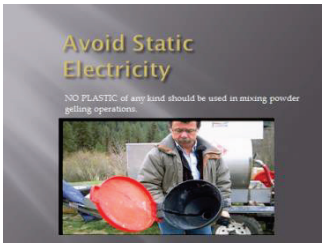
Slide #13 	If gel is left in the barrel, suggest breaking it down with diesel or Jet A. Have extra parts available to be able to do field maintenance if needed.
Slide #14 	The venting marble in the Clay & Bailey should move freely. The purpose of the Clay & Bailey is to allow venting of the barrel. If it is not working properly: 1. Replace with one that works properly 2. Clean venting marble with cloth material and gasoline
Slide #15 	When removing the Clay & Bailey: • Wear proper PPE • If pump is running be aware of splash potential • Ensure valve is properly seated before operations resume
Slide #16 	If Gel/Fuel enters vapor hose cleaning is very difficult 1. Dispose of Gel/Fuel properly by putting it back into the tank or approved canisters 2. Flush hose out with water 3. Let air dry before use Expect hoses to break down shortly after gel/fuel enters hose.
Slide #17 	Use only approved mixing agents: • FIRETROL Firegel (also known as Sure Fire) • FIRETROL Petro Gel • Flash 21 • Halliburton MO85 and MO86 Once mixing agent is introduced into mixing system, utilize same agent for best results. If agents are switched' flush system completely.

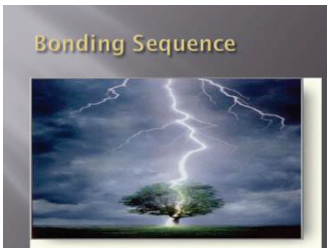
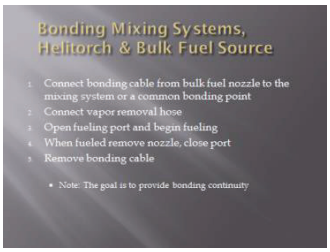
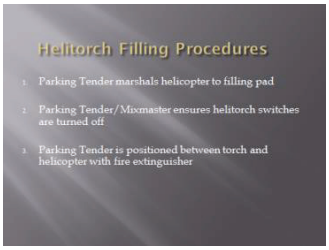
Slide #18 	Ensure aircraft vendor personnel are involved with a problem like this. The mechanic can be a good resource.
Slide #19 	After all testing is complete don't forget to hook up the pear link, and perform hook checks #1 and #2.
Slide #20 	**Instructor:** Consider having a helitorch or pictures to be able to point out specific parts to the class.
Slide #21 	**Quiz:** How many barrels will run off 1 propane tank? • 3 – change bottle out after 3 full barrels. Propane bottles are way cheaper than flight time and unnecessary exposure
Slide #22 	

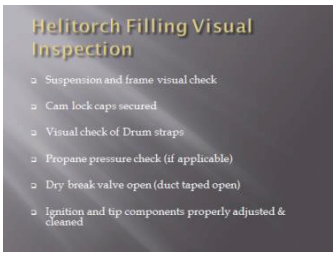
Slide #23 	Have a student discuss what he/she would do. Discuss other problems you have encountered and share with the class.
Slide #24 	

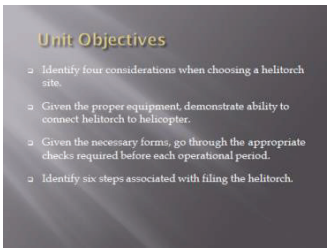
Est. Instructor Time: 45 min	**Unit 6: Helitorch Operations/Exercises**
Slide #1 	**Introduce the Module/Topic** Being familiar with your equipment is essential to an efficient operation. Having a module that is competent and capable of operating equipment is a must to ensure a safe and reliable aerial ignition operation.
Slide #2 	**Instructor:** This unit may be taught by utilizing the power point or **refer to Appendix A for stations that meet the unit objectives**, or create your own stations adhering to unit objectives.
Slide #3 	Pre planning is key when selecting a mixing site: • Consider Land use agreements Helispot size needs to be larger than the minimums: • 75 feet is the IHOG standard for a type 3
Slide #4 	Bridge Limitations for bulk fuel vehicle. Separation of helitorch operation from helibase: • Consider utilizing additional frequency
Slide #5 	Hookup of the Helitorch is the responsibility of the HTPT: • Don't forget the hook checks #1 and #2 (after the Helitorch tests are complete in preparation for hookup to the aircraft).

Slide #6 	During this step the Helitorch switches should all be in the off position. Ensure Helitorch tip is on the pilot side of the aircraft.
Slide #7 	**Which test is completed first? The Ignition or pump?** Ignition is tested first, if pump is tested first residual gel may be on the tip and hang fire will be present during ignition test causing a fire.
Slide # 8 	**Let's review the entire process:** (Steps listed in order) 1. Complete Helitorch Checklist 2. Place Helitorch in front of aircraft 3. Layout suspension cables 4. Ensure Helitorch is in the off position 5. Hookup electrical to aircraft 6. Ensure propane is on and bottle is full 7. Test electrical (turn on switch and have pilot activate) 8. Turn off electrical 9. Test pump (turn on switch have pilot activate switch): ○ Have rubber bucket under the tip with splash guard in place ○ Check gel consistency and show to pilot 10. Hookup up pear link when the pilot says it ok to do so
Slide #9 	Discuss good mixing site locations.

Slide #10 	Not required for any Helitorch personnel to go on recon unless: • Helispots will be identified, HMGB must be onboard, and all personnel must be in flight helmets first time into helispot • Pertinent to the mission
Slide #11 	Utilize trainees whenever possible for the future of the program: • Highly recommended trainees have class prior to task book initiation
Slide #12 	All Helitorch personnel are responsible for monitoring the mixing area and non-essential personnel.
Slide #13 	
Slide #14 	Other precautions: • No radios/cell phones with mixing personnel • Proper PPE • Use non-ferrous wrenches

Slide #15 	
Slide #16 	Bond mix transfer barrels to each other.
Slide #17 	**No bonding cables, NO GO!**
Slide #18 	Note: Have a pad marker for the Helicopter pilot to land the Helitorch each time to ensure hoses will reach the Helitorch.
Slide #19 	Have a process. Start at one end of the Helitorch and work your way to the other end. Then reverse operation after fill is complete.

Slide #20 	**Discussion:** Who is currently running the pump at the mix transfer or batchmixer?
Slide #21 	**Remember:** If applicable switch propane bottle out every 3 barrels.
Slide #22 	**Two approved types:** 1. Mix Transfer 2. Batchmixer
Slide #23 	Both systems can operate smooth if personnel are trained and equipment is maintained.
Slide #24 	If an incident occurs, results could be catastrophic!

Slide #25	**Questions?**
	

APPENDIX A:
Example of Stations to be utilized in Lieu of Unit 6

STATION #1 Bench Testing/Helitorch Hookup/Checklists-

Required Equipment: 2 helitorch's (Torches that you are utilizing at your unit), 1 helicopter simulator (or power box), propane if required, helitorch checklist, bucket with splash guard, 1 maintenance kit, Aerial Ignition Guide/Burn Binder.

Bench Testing

- Basic Bench Testing

Forms

- Discuss Appropriate Forms to be used:
  - Helitorch inspection etc.
  - Ref. Burn Binder Or AIG guide for forms

Helitorch Hookup

- Visually inspect helitorch for abnormalities
- Complete helitorch checklist:
  - During checklist procedure remove cover, disassemble tip, and any other components that would help with your inspection procedures

Helitorch#2 (positioned in front of helicopter)

- Have group position helitorch for hook up
- Deploy suspension cables
- Insert propane bottle if applicable
- Plug electrical into aircraft (not pear link)
- Perform electrical and pump test
- Hook pear link to helicopter and discuss different types of cargo hooks
- Disconnect and package helitorch for next group

STATION #2 BATCHMIXER

Required Equipment: 1 FireCon Batchmixer and additional equipment, 1 Helitorch, and Associated CAF Fire Extinguishers.

Batchmixer

- Discuss mixing site
- Set up mixing equipment with additional equipment i.e. fuel truck
- Discuss HAZ/MAT containment
- Describe filling, mixing and connections prior to operation
- Attach ventilation, filling, and bonding cables for transfer to helitorch
- Discuss communications and emergency procedures:
  - Hand signals
  - Radio communication
  - Fuel spill
  - Crash Rescue
- Discuss troubleshooting for helitorch and mixing system

Forms/RX plans

- Cover required positions and responsibilities. Utilize:
  - Helitorch organization chart for Prescribed Fire
  - AIG personnel responsibilities Page IV-3
- Cover Prescribed fire communication plan

STATION #3- MIX TRANSFER SYSTEM/ MIXING PRODUCTS

Required Equipment: 1 complete Mix Transfer system, 1 Helitorch, Associated Fire Extinguishers, Spill containment, PPE, and maintenance kits. Flash 21.

Mix Transfer Mixing Site

- Discuss mixing site
- Set up mixing equipment with additional equipment
- Discuss HAZMAT containment area

Forms

- Hand-out and Cover Inspection Form

Operation

- Describe filling, mixing and connections prior to operation
- Attach ventilation, filling, and bonding cables for transfer to helitorch
- Discuss communications and emergency procedures:
  - Hand signals
  - Radio communication
  - Fuel spill
  - Crash rescue
- Discuss Troubleshooting for helitorch and mixing system
- Discuss differences in pumps

Mixing Products

- Discuss Mixing Ratio's and process
- Hazards associated and with product

EXTINGUISHERS

- Discuss inspection and maintenance:
  - Check pressure valve "O" ring's
  - Inspection Dates:
    - Static pressure inspection date
    - Inspection Tag and date
  - Inspect pressure gauge
  - Inspect and discuss all other components
- Discuss Filling Procedures for CAF
- Discuss P.A.S.S.