

N-9018 Engine Operator

Bureau of Indian Affairs Course Appendix

This appendix is to be utilized during the instruction of the N-9018 Engine Operator Course when BIA students are enrolled. This appendix contains information on BIA Model 52 Type 4 and 6 engines. There is also a BIA FEMPR for the Model 52 engines and PowerPoints that contain images of the Model 52 engines and components.

The BIA is creating a memo and are targeting a release of spring 2022. The memo will address the following:

1. Implementing an official BIA Engine Tire Replacement Policy
2. Require units and tribes to submit monthly engine utilization Reports or DI-120s to the Fire Fleet Centers
3. Utilization of the BIA Model 52 FEMPR
4. Utilization of Fire Equipment Deficiency, Major Repair or Improvement Reporting System
5. Utilization of the National BIA Wildfire Engine Survey <https://arcg.is/DGC98>

Introduction – No updates to content.

Unit 1A - Fire Engine Maintenance

Notes - The BIA Model 52 type-6 engines all have gas motors. Slides 30 – 40 contain high level information on gasoline motors and fuel.

1. Slide 30 – Introduction to gasoline section
2. Slide 31 – Gasoline fuel characteristics
3. Slide 32 – Gasoline fuel types
4. Slide 33 – Octane versus cetane
5. Slide 34 – Gasoline handling
6. Slide 35 – Cold weather
7. Slide 36 – Gasoline additives
8. Slide 37 – Ethanol Fuel versus Gas Pump Fuel
9. Slide 38 – Image of gas fuel systems
10. Slide 39 – Image of new Ford gas motors, 7.3 and 6.2
11. Slide 40 – M-52 Type-6 F-550 6.8L EFI V-10 ENGINE

Lesson 1B - Vehicle Inspections

Notes - Use BIA FEMPR for this unit

1. Slide 10 - Front of Model 52 and inspection notes
2. Slide 15 – M-52 Power Steering fluid location
3. Slide 19 – M-52 Transmission Fluid location
4. Slide 24 – The BIA follows the DOI tire replacement policy. BIA is in the process of creating a tire replacement policy and an upcoming memo will address.
5. Slide 31 – M-52 Coolant reservoir location
6. Slide 36/37 - M-52 Air filters
7. Slide 44 - Drivers side T6 and inspection notes

8. Slide 46/47 – M-52 undercarriage
9. Slide 52 - M-52 rear deck and inspection notes
10. Slide 54 – M-52 T4 Top deck
11. Slide 60 – M-52 single battery and notes
12. Slide 64 – M-52 Fuse Boxes and notes
13. Slide 77 – M-52 Fire extinguisher location
14. Slide 81/82 – Bottle jack pad
15. Slide 87 – M-52 Brake Fluid location
16. Slide 111 – M-52 Repair request form

Lesson 1C - Pump Inspections and Maintenance

Notes – Blue eagle symbols on PowerPoint images indicate Model 52 engine or component. Other images are BLM WCF equipment.

1. Slide 5 – M-52 Pump package image
2. Slide 6 – M-52 Water and foam tank images T4 and T6
3. Slide 7 – M-52 Water tank level images
4. Slide 8 – M-52 Valve images
5. Slide 10 – M-52 Valve images of all valves on M-52
6. Slide 15 – M-52 Pump oil filter
7. Slide 17 – M-52 Pump Fuel filter
8. Slide 19 – M-52 Pump air filter
9. Slide 20 – M-52 Primer
10. Slide 21 – M-52 Switches, throttle, and gauges
11. Slide 22 – M-52 Gauges and control panel
12. Slide 23 – M-52 Arrow points to water pressure shutdown switch, when set to automatic, the low-pressure switch is activated
13. Slide 24 – M-52 Live reel
14. Slide 25 – M-52 The strainer is a foot-valve and strainer style and is located at the bottom of the in-tank uptake. It cannot be seen in pictures.
15. Slide 27 – M-52 Pump exhaust

Unit 2 - Fleet Management

Notes - BIA utilizes GSA Fleet Charge Cards for engine fueling and repairs, tribes utilize credit cards. BIA is developing a Fire Equipment Deficiency, Major Repair, or Improvement Reporting System. This is required for repairs over \$1,000. The information reported will be used to help track deficiencies and make improvements to Bureau Wildland Fire Equipment. BIA does not currently use WCF engines. The BIA will begin transitioning equipment to WCF in the future.

1. Slide 14-16 – BIA fleet card use requirements.
2. Slide 27 – Notes added - BIA is developing a Fire Equipment Deficiency, Major Repair or Improvement Reporting System. This is required for repairs over \$1,000. The information reported will be used to help track deficiencies and make improvements to Bureau Wildland Fire Equipment.
3. Slide 31 – BIA DI-120
4. Slide 43-47 – BIA Model 52 Center information
5. Slide 49 – BIA Recall Information

Unit 3 - Fire Engine Driving

Lesson 3A - Driving Policy and Procedures

Notes – BIA requires Defensive Driving add to correct slide

1. Slide 9 – Notes - BIA uses the Motor Vehicle Operators License and Driving Record GSA Form 3607 or the BIA Incidental Operator* Motor Vehicle Operator's Certification
2. Slide 11 - 25 IAM Chapter 4 is the official BIA driving policy, updated in April 2020. This sets the duty day limitations for one driver at 8 hours. This is also in the 2022 Red Book.
3. Slide 22 - Additional driver walk around option using two people
4. Slide 28 - Tailgate Safety Sessions as a component of discussing the risk assessment

Lesson 3B - Basic Driving Skills

1. Slide 31 – BIA M-52 needs radio fuse pulled before jump starting
2. Slide 32 – Portable Battery Jump Starter will work for BIA M-52 engines

UNIT 4 – Water Handling Operations

LESSON 4A – Water and Hose Hydraulics No updates needed

LESSON 4B – Water Sources and Pumping Operations

Notes - BIA does not have an aquatic invasive species policy in place.

1. Slide 68 – M-52 Pump panel
2. Slide 70 – M-52 Tank to pump valve #1
3. Slide 72 – M-52 Pump to tank valve #2
4. Slide 74 – M-52 Pump to discharge valve #4
5. Slide 76 – M-52 Primer
6. Slide 78 - M-52 Bypass/recirculation valve #17. Image is view from the top down.
7. Slide 81 – M-52 Overboard draft #8
8. Slide 83 – M-52 Strainer Information
9. Slide 85 – M-52 Dri-Fill/_gravity tank drain
10. Slide 87 – M-52 Engine protection information: valve #5
11. Slide 88-89 – M-52 Exhaust primer information

LESSON 4C – Foam and Foam Proportioning Systems

Notes – BIA **Model 52 engines only use the Cascade Foam-Flo proportioner**. If an ENOP is unfamiliar with the Foam-Flo they can get foam into the tank. PowerPoint slides 16-19 have descriptions in notes.

1. Slide 15 – M-52 Cascade Foam-Flo proportioner
2. Slide 16 – M-52 Cascade Foam-Flo proportioner control panel in off position. Proportioner is graduated from Off to E. A is the lowest setting, E is the highest. Adjust to nozzle operators desired foam output. A Foam Flo will not automatically adjust for pressure or volume, the ENOP must do this manually.
3. Slide 17 – M-52 Foam tank on/off valve
4. Slide 18 – M-52 Foam proportioner inlet valve

5. Slide 19 – M-52 Foam proportioner description of how it operated. View is top down.
 - a. Most BIA M-52's discharge into a single Overboard Pipe. If this pipe is plumbed to part of the system that can uptake water into the pump head (common on BIA Model 52's) and the Recirculation Valve is open (#17), you will pump foam into the tank. This is a common issue and can lead to all sorts of problems. One of the discharge valves needs to be cracked open in order prevent foam from going the into the water tank. Review the foam valving on all BIA M-52's and correct as needed. View is top of Foam Pro.

Unit 4C Foam exercise for Model 52 engines with the Cascade Foam-Flo proportioner

Model 52 Foam-Flo Exercise

Students will operate the Foam-Flo proportioner without placing foam in the tank.

Students remove residual foam from M-52 hydraulic system.

Students will shut down the foam system.

1. Start pump.
2. Close Recirc (#17)
3. Close Primer (#6, if open)
4. Close Pump to Tank if open (#2)
5. Close Hose Reel if desired (#4)
6. Open valve on foam tank
7. Open valve on Y attached to Foam-Flow
8. Crack open overboard discharge (#3).
9. Make sure metering valve is closed on Foam-Flo.

Please see Model 11923F Factory Instructions below.

Factory Instructions

When pump is running at operating pressure and the nozzle is open, open the metering valve to the desired setting.

When foam appears at the nozzle, the metering valve can be adjusted to obtain the desired foam consistency. Once the operator becomes experienced, the setting can be determined by observing the foam quality and set the metering valve accordingly.

Shut Down and Flush

1. Close valve on foam tank, then close valve on Y at Foam-Flo.
2. Open all #3 valves (and #4 if hose-real is used.)
3. When system is free of foam (no longer flowing), close valves. Shut down pump. Check tank for the presence of foam. If tank is clear proceed.
4. Open #17, open #1. Engine is fire ready. You may now flow straight water.