

# LESSON PLAN

## R41 GENERATOR/ELECTRICAL SYSTEM AND LIGHT TOWER OPERATION

**Lesson Description:** The driver operator/firefighter will be shown the proper procedures for operating the PTO driven Generator/Electrical System and Will-burt "Night Scan" Light Tower used on Rescue 41. The driver operator/firefighter will then demonstrate the proper procedures to put this equipment into operation and also to return the Rescue to a ready to respond status.

### Lesson Outline:

#### Classroom

1. Introduction
2. Equipment Location
3. Safety Precautions
4. Generator/Electrical System Operation
5. Light Tower Operation

#### Practical Skills

1. Generator/Electrical System Operation
2. Light Tower Operation

**Objectives:** Given equipment information and Rescue 41 apparatus, the driver operator/firefighter shall demonstrate with 100% proficiency the safe operation of the generator/electrical system and the light tower.

### Introduction

Rescue 41 is a 2004 Pierce Sabre chassis with an Encore rescue body. This vehicle is equipped with a PTO driven 25KW Onan generator and a 6,000 watt Will-Burt light tower.

The generator is capable of delivery 100 amps of electrical power at 220 volts. The generator delivers power to a 100 amp, 24 circuit breaker panel. The circuits used are labeled accordingly. Floodlights that require the generator operating can be switched on and off from the apparatus cab.

The light tower consists of 4-1500 watt halogen light fixtures that rise to a height 15ft above the roof of the rescue. The light tower operates from a maximum air supply pressure of 20psi that is supplied from the apparatus air system. The light tower can be rotated in both directions and also tilted up and down. The light tower is operated from a control module mounted remotely from the light tower itself. The control module is located in an apparatus compartment.

## **Equipment Location:**

1. The generator is mounted between the frame rails underneath the apparatus. The generator is driven by a Power Take Off (PTO) from the vehicles transmission.
2. The circuit breaker panel is located in a driver's side compartment located above the rear wheels.
3. The generator monitoring panel is located in the same compartment as the breaker panel.
4. The switches for engaging the PTO and operating exterior lighting are located in the apparatus cab.
5. The light tower is located on the roof of the rescue in the forward most location on the body behind the cab.
6. The light tower control module is located in a driver's side compartment above the rear wheels. Same compartment as the breaker panel.

## **Safety Precautions:**

1. As with any energized electrical equipment, safety is of utmost importance.
2. Ensure that the electrical power or individual equipment cords are not cut or frayed.
3. Ensure that the electrical equipment operating from the electrical system is in good working order.
4. Before engaging the generator PTO, ensure that all flood light switches in the apparatus cab are turned to the off position.
5. Before disengaging the generator PTO, ensure that all flood light switches are turned to the off position.
6. Circuit breakers not needed should be left in the off position.
7. Remember that the light tower rises above the roof or the rescue 15ft.
8. Before operating the light tower ensure that the area is clear of power lines. For power lines below 50,000 volts you must maintain at least 10ft of clearance. Most residential areas have power lines under 50,000 volts.
9. Before operating the light tower, ensure that in the travel area of the light tower there are no trees that may impede the travel of the light tower.
10. Before moving the apparatus make sure that the light tower is in the stowed position before moving the apparatus.

## **Generator/Electrical System Operation:**

1. There are several interlocks that must be satisfied before the generator PTO can be engaged. The parking brake must be set; The vehicle transmission must be in the neutral position; The engine must be a normal idle speed (no high idle).
2. Upon arrival at the location, set the parking brake and place the transmission into the neutral position and verify that the engine is at normal idle speed.
3. Locate the exterior lighting switches and ensure they are in the off position.
4. Locate the generator PTO switch and engage the PTO.
5. Wait about 5 seconds before turning on any electrically operated equipment.
6. Verify by the generator operations panel that the generator is operating at the correct frequency (60Hz) and voltage (240).

7. At this time you can turn on the desired exterior flood lights by operating the switches located in the apparatus cab. Turn on 1 switch at a time and wait a couple of seconds before turning on the next. This allows the engine and generator to stabilize before turning on the next electrical load.
8. Turn on any other needed circuit breakers on the circuit breaker panel.
9. To turn off generator shut off all unnecessary circuit breakers, then shut off all exterior flood lights.
10. Disengage the generator PTO.

### **Light Tower Operations:**

1. Ensure that the area where the light tower is being used is clear of power lines and trees.
2. Ensure that the generator is operating.
3. Locate the light tower control module and remove from holder extending the cord so the operation of the tower can be monitored from the ground.
4. To raise the light tower, with the control module in hand, locate the **MAST UP/Down** switch and move to the **UP** position. Continue to hold the **UP** switch until the mast is raised to its full height. The light tower will not operate unless the light tower mast is in the fully raised position.
5. Once the light tower mast the other switches may be used. The Pan Right rotates the light tower right; Pan Left rotates the light tower left. The Tilt Up tilts the lights towards the up position; Tilt down tilts the lights towards the down position.
6. You have the option of turning on all of the lights or just half of the lights by switching the appropriate switches.
7. To lower the light tower, with the control module in hand, locate the **MAST UP/DOWN** switch and move to the **DOWN** position. Continue to hold the **DOWN** switch. The light tower will retract and lower itself to its stowed position. The lights will automatically return to their correct position for storage.
8. If power is lost to the light tower mast, it must be lowered manually. You need to refer to the instructions for lowering the light tower mast manually.
9. When the light tower is raised there is an indicator light located on the dash of the vehicle indicating the light tower is out of its stowed position.
10. Additionally if the parking brake is released and the light tower is not in its stowed position the red light located in the cab will flash along with an audible alarm indicating either an open compartment door or the light tower is out of its stowed position. If this occurs you must correct the problem before moving the apparatus.

### **Practical Evolutions:**

1. Park the rescue and properly put into operation the vehicle generator and electrical system.
2. Properly raise, operate and return the light tower to its proper stowed position.