# Maintenance Seminar Learner Outcomes

## Day 1 (Tuesday)

### Series Circuit Theory/Constant Current Regulator

At the completion of this module, the learner should be able to:

- Identify Specifications used by various organizations (FAA/Military/ICAO) for airfield lighting products.
- Recognize the key performance parameters required of an FAA Constant Current Regulator (CCR).
- Comprehend the operational theory of airfield series circuits.
- Recognize how a series circuit isolation transformer operates.
- Recognize the various wattages, input voltages, and options for CCRs.
- Identify the methods used to optimize power factor and efficiency for Thyristor (SCR) CCRs.
- Accurately calculate the actual CCR load using a calculator, given the load for various series circuit components.
- Identify series circuit lighting issues and how to reduce the risk of lightning failure.
- Recognize the electrical protection features in a CCR.
- Identify the operational theory and advantages /disadvantages of Ferroresonant and Thyristor (SCR) CCR architectures.
- Describe the method used to operate a CCR in remote control.
- Identify the circuit parameters that an L-827 or L-829 CCR monitors.
- Identify the advantages and disadvantages of oil-cooled vs. air-cooled CCR architectures.
- Recognize how CCRs are calibrated.
- Identify recommended preventative maintenance procedures for CCRs.

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## Series Circuit Components

At the completion of this module, the learner should be able to:

- Identify how various styles of series plug cutouts operate.
- Recognize how to manually check the insulation resistance of a series circuit.
- Identify the various types of L-830/L-831 isolation transformers.
- Identify how to apply L-830/L-831 isolation transformers.
- Recognize the electrical changes that occur when a series circuit lamp fails.
- Identify how a Film Disc Cutout is used.

## L-847 Circuit Selector Switch

At the completion of this module, the learner should be able to:

- Identify each option that is available for an L-847 Circuit Selector Switch.
- Determine the external wiring design requirements for an L-847.
- Recognize the correct operation sequence that occurs when an L-847 is switching circuits.
- Accurately evaluate the maximum combined load that can be present on L-847 outputs.
- Recognize the operational requirements for a reverse L-847.
- Recognize common methods to implement spare CCRs.
- Describe L-847 troubleshooting steps.

## L-854 Air-to-Ground Radio Control

At the completion of this module, the learner should be able to:

- Identify how a pilot operates an air-to-ground Radio Control.
- Recognize the electrical operational parameters for Radio Control.
- Identify specific manufacturers' controls and indicators.
- Explain how a Radio Control is electrically connected to external equipment.

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# Day 2 (Wednesday)

## L-849 Runway End Identifier Lights (REIL)

At the completion of this module, the learner should be able to:

- Define the operational characteristics of unidirectional REILs.
- Define the installation requirements for unidirectional REILs.
- Define the aiming requirements for unidirectional REILs.
- Identify the various methods to power unidirectional REILs.
- Recognize the options that are available for unidirectional REILs.
- Restate the general electrical operation theory for either series circuit powered or voltage powered ADB L-849 A, C or E REILs.
- Explain how either a series circuit powered or voltage powered REIL is electrically connected to external equipment.

## LED Fixtures

At the completion of this module, the learner should be able to:

- Identify the FAA requirements for LED fixtures.
- Recognize how a LED fixture operates in an airfield series circuit application.
- Identify the airfield lighting LED fixtures that are available today.
- Recognize the load variations LED fixtures impose on the power supply.
- Evaluate the most efficient isolation transformer size to use with LED fixtures.
- Identify the parameters used in LED Return on Investment (ROI) calculations.
- Recognize methods used to heat various LED fixtures.
- Recognize the electrical operation issues when LED fixture heaters are present on a series circuit.
- Evaluate LED fixture parameters that affect the longevity of the fixture.
- Define the method used to substitute an LED fixture for and existing incandescent fixture.

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## L-858 Signs

At the completion of this module, the learner should be able to:

- Identify the different types of L-858 signs.
- Recognize how each type of L-858 sign is applied on the airfield.
- Recognize the FAA performance requirements for L-858 signs.
- Evaluate the best method to power a sign given the available electrical infrastructure.
- Recognize the frangibility requirements for L-858 signs.
- Identify the methods used to adjust sign light source current.

## L-880/L-881 Precision Approach Path Indicator (PAPI)

At the completion of this module, the learner should be able to:

- Define the visual presentation differences between L-880 and L-881 PAPI systems.
- Recognize the primary difference between PAPI and VASI systems.
- Evaluate the most appropriate FAA Style PAPI system given the power source available.
- Accurately identify those components in an ADB PAPI that can be field replaced without needing to realign the light units.
- Reiterate the operational methods to prevent dew/frost on PAPI light units at turn on.
- Identify the intensity selection methods for each FAA Style of PAPI system.
- Detail the correct PAPI dimensional installation requirements.
- Accurately calculate the distance a PAPI system is located from the threshold, given the ILS glide slope angle and category of aircraft that will land at the airport.
- Define the purpose and operation of a PAPI tilt switch.
- Explain how either a voltage driven or current driven PAPI is electrically connected to external equipment.

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### Airfield Circuit Splicing

At the completion of this module, the learner should be able to:

- Identify the best methods to minimize corona in a high voltage splice.
- Discuss the recommended crimp methods/tools for both an L-823 primary and L-823 secondary wire-pin interface.
- Analyze the advantages/disadvantages for different methods of applying heatshrink to L-823 connectors.
- Evaluate the best method to heat heatshrink tubing.

### Series Circuit Troubleshooting

At the completion of this module, the learner should be able to:

- Recognize basic safety precautions when working on airfield electrical equipment.
- Identify the recommended insulation resistance value for both old and new series circuits.
- Identify the techniques used to monitor series circuit insulation resistance.
- Identify various design issues associated with troubleshooting series circuit faults.

## Day 3 (Thursday)

### Elevated Lights

At the completion of this module, the learner should be able to:

- Identify the different families of elevated airfield lights defined in FAA Advisory Circulars.
- Recognize the different applications for each family of elevated lights.
- Define each elevated fixture that must be toed-in for proper installation.

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## In-pavement Fixtures

At the completion of this module, the learner should be able to:

- Identify the differences in FAA Type and Style in-pavement fixtures.
- Identify which in-pavement fixtures require toeing.
- Identify options for lowest wattage or fewest spare parts in taxiway centerline applications.
- Restate the recommended methods to minimize the risk of overstressed or loose in-pavement bolts.
- Recognize some key corrective maintenance procedures for in-pavement fixtures, including the proper procedures to prevent water leakage after a lamp is replaced.

## Runway Guard Lights including:

- **L-804 Elevated Runway Guard Lights**
- **L-852G In-pavement Runway Guard Lights**

At the completion of this module, the learner should be able to:

- Identify the operating characteristics of elevated and in-pavement Runway Guard Light (RGL) fixtures.
- Identify the components in an unmonitored elevated or in-pavement RGL, how they operate, and how they are installed.
- Describe the modifications needed to change an unmonitored RGL light bar to a monitored RGL light bar.
- Recognize the different scenarios that can cause in-pavement RGL fixtures to fail (Off, Steady On or out of synchronization).

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### ALSF and MALSR Approach Lighting (Optional)

At the completion of this module, the learner should be able to:

- Identify the different requirements for ALSF systems in Category I, II and III.
- Identify the lighting layout for SSALR mode and when it can be activated.
- Identify the lighting layout differences between ALSF and MALSR systems.
- Recognize the equipment that is specified to be supplied for ALSF and MALSR systems.
- Recognize the differences in power sources for the steady burning lights in ALSF and MALSR systems.
- Recognize the function of each electrical subsystem in both ALSF and MALSR systems.
- Recognize the cause of different maintenance alarms in ALSF systems.
- Determine the external wiring design requirements for both ALSF and MALSR systems.

## Day 4 (Friday – Optional Testing)

- Airfield Ground Lighting - Certified Airfield Professional (AGL-CAP) certification testing (3 Contact Hours)

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