

EMERGENCY TROUBLESHOOTING TOOLKIT

For Airport Ground Systems Technicians

*Field-tested solutions from 50 years of combined military & FAA
experience*



LIGHTING SYSTEM EMERGENCIES

RUNWAY EDGE LIGHT FAILURES

IMMEDIATE ASSESSMENT

- ☐ Check runway length affected: _____ feet
- ☐ **Note pattern:** ☐ Random ☐ Circuit ☐ Complete failure
- ☐ **Weather conditions:** _____
- ☐ Aircraft operations impact: ☐ None ☐ Limited ☐ Critical

STEP-BY-STEP TROUBLESHOOTING

Step 1: Control Room Check (2 minutes)

- ☐ Verify control settings and intensity levels
- ☐ Check circuit breaker positions
- ☐ Review any recent control changes or maintenance
- ☐ Test remote control functionality

Step 2: Isolation Transformer Check (5 minutes)

- ☐ Locate primary isolation transformer for affected circuit
- ☐ Check for proper input voltage: _____ volts
- ☐ **Measure output voltage:** _____ volts
- ☐ Look for signs of overheating or damage
- ☐ Check transformer connections for corrosion

Step 3: Series Circuit Analysis (10 minutes)

- ☐ Calculate expected current: _____ amps
- ☐ **Measure actual current:** _____ amps
- ☐ If no current: Check for an open circuit (broken cable or fixture)
- ☐ If low current: Check for high resistance (corrosion, loose connections)
- ☐ If high current: Check for short circuit or reduced load

COMMON QUICK FIXES

- **Loose connections:** Tighten and apply dielectric grease
- **Corroded contacts:** Clean with contact cleaner and steel wool
- **Failed fixture:** Bypass temporarily with a jumper cable
- **Wet splice:** Apply a temporary waterproof covering

EMERGENCY WORKAROUNDS

- **Partial failure:** Increase intensity on working circuits
- **Complete failure:** Activate portable lighting if available
- **Critical operations:** Coordinate runway closure procedures

SAFETY NOTES

- ⚠ Always de-energize circuits before making connections
- ⚠ Use lockout/tagout procedures
- ⚠ Test voltage before and after work

APPROACH LIGHT SYSTEM FAILURES

IMMEDIATE ASSESSMENT

☐ System type: ☐ ALSF-1 ☐ ALSF-2 ☐ MALSR ☐ ODALS ☐ Other: _

☐ Components affected: ☐ Lead-in ☐ Cross-bar ☐ Threshold ☐

Sequenced flashers

☐ Visibility conditions: _____

STEP-BY-STEP TROUBLESHOOTING

Step 1: Control System Check (3 minutes)

☐ Verify proper control settings

☐ Check sequencer operation (if applicable)

☐ Test manual override capabilities

☐ Review recent programming changes

Step 2: Power Distribution Check (5 minutes)

☐ Check the main breaker panel for the affected system

☐ Verify proper voltage at distribution point: _____ volts

☐ Check for proper grounding

☐ Inspect for signs of moisture or corrosion

Step 3: Component Testing (15 minutes)

☐ Test individual light circuits working outward from threshold

☐ Check cable integrity at splice points

☐ Verify proper lamp types and orientations

☐ Test flasher sequences and timing

COMMON ISSUES & SOLUTIONS

- **Sequencer malfunction:** Switch to steady burn mode
- **Cable damage:** Use a temporary bypass cable
- **Multiple lamp failures:** Check for voltage irregularities
- **Flasher timing off:** Reset sequencer or replace flasher unit

NAVIGATION AID EMERGENCIES

ILS LOCALIZER ISSUES

IMMEDIATE ASSESSMENT

- ☐ System status: ☐ Off-air ☐ Degraded signal ☐ False guidance
- ☐ Approach category affected: ☐ Cat I ☐ Cat II ☐ Cat III
- ☐ Weather minimums: _____
- ☐ Air traffic impact: _____

STEP-BY-STEP TROUBLESHOOTING

Step 1: Monitor Position Check (2 minutes)

- ☐ Check course deviation on the monitor
- ☐ Verify proper signal strength readings
- ☐ Review any alarm conditions
- ☐ Check monitor calibration date: _____

Step 2: Transmitter Status (5 minutes)

- ☐ Verify transmitter output power: _____ watts
- ☐ Check for proper frequency: _____ MHz
- ☐ Monitor for signal stability
- ☐ Check cooling system operation

Step 3: Antenna System Check (10 minutes)

- ☐ Visually inspect antenna array for damage
- ☐ Check for ice or debris accumulation
- ☐ Verify proper antenna positioning
- ☐ Test switching between arrays (if dual)

CRITICAL ACTIONS

- **Signal degradation:** Reduce the approach category or take off-air
- **False guidance:** Immediately shut down and issue NOTAM
- **Monitor failure:** Coordinate immediate maintenance response
- **Weather impact:** Consider temporary limitations

EMERGENCY CONTACTS

- ATC Facility: _____
- Flight Inspection: _____
- Maintenance Supervisor: _____

GLIDESLOPE MALFUNCTIONS

IMMEDIATE ASSESSMENT

- ☐ Glideslope angle affected: Normal _____ degrees
- ☐ Signal characteristics: ☐ No signal ☐ Irregular ☐ False
- ☐ Decision height impact: _____

STEP-BY-STEP TROUBLESHOOTING

Step 1: Signal Quality Check (3 minutes)

- ☐ Monitor glideslope deviation readings
- ☐ Check signal strength and clarity
- ☐ Verify proper modulation depth
- ☐ Review monitor alarm status

Step 2: Transmitter Verification (5 minutes)

- ☐ Check transmitter power output: _____ watts
- ☐ Verify frequency accuracy: _____ MHz
- ☐ Monitor temperature and cooling
- ☐ Check for proper signal switching

Step 3: Antenna Inspection (10 minutes)

- ☐ Check antenna array for physical damage
- ☐ Verify proper height above ground: _____ feet
- ☐ Look for obstruction in the signal path
- ☐ Check reflector positioning and condition

RAPID RESPONSE ACTIONS

- **Unstable signal:** Increase monitoring frequency
- **No signal:** Coordinate approach procedure changes
- **False guidance:** Immediate shutdown required
- **Antenna damage:** Assess repair time vs. operational impact

ELECTRICAL SYSTEM EMERGENCIES

POWER DISTRIBUTION FAILURES

IMMEDIATE ASSESSMENT

- ☐ Affected systems: ☐ Lighting ☐ Navigation ☐ Communications ☐ All
- ☐ Backup power status: ☐ Available ☐ Running ☐ Failed
- ☐ Load affected: _ % of total
- ☐ Critical operations impact: _____

STEP-BY-STEP TROUBLESHOOTING

Step 1: Main Distribution Check (2 minutes)

- ☐ Check utility power availability
- ☐ Verify main breaker status
- ☐ Check for proper voltage levels: L1 _____ L2 _____ L3 _____
- ☐ Look for signs of overheating or damage

Step 2: Transfer Switch Operation (5 minutes)

- ☐ Test automatic transfer switch operation
- ☐ Verify proper sensing voltage levels
- ☐ Check manual transfer capability
- ☐ Review transfer switch exercise logs

Step 3: Load Analysis (10 minutes)

- ☐ Identify critical vs. non-critical loads
- ☐ Calculate current load demand: _____ amps
- ☐ Check for load balancing issues
- ☐ Verify proper protective device sizing

EMERGENCY LOAD SHEDDING PRIORITY

1. **Maintain:** Runway edge lights, ILS, and communication
2. **Reduce:** Taxiway lighting intensity, non-critical areas
3. **Shed:** Approach lights, threshold lights, building loads
4. **Emergency:** Portable lighting, minimal ILS operation

GENERATOR SYSTEM FAILURES

IMMEDIATE ASSESSMENT

- ☐ Generator status: ☐ Won't start ☐ Running rough ☐ Overheating ☐ Low power
- ☐ Fuel level: _____ % (**Hours remaining:** _____)
- ☐ Load being carried: _____ kW (**Capacity:** _____ kW)
- ☐ Environmental conditions: _____

STEP-BY-STEP TROUBLESHOOTING

Step 1: Basic Systems Check (3 minutes)

- ☐ Verify fuel supply and pressure
- ☐ Check engine oil level and pressure
- ☐ Monitor coolant temperature
- ☐ Check battery voltage: _____ volts

Step 2: Control System Check (5 minutes)

- ☐ Test start/stop controls
- ☐ Verify proper control voltage
- ☐ Check for fault codes or alarms
- ☐ Test emergency stop functionality

Step 3: Output Verification (7 minutes)

- ☐ Measure generator voltage: L1 _____ L2 _____ L3 _____
- ☐ **Check frequency:** _____ Hz
- ☐ Monitor load balance between phases
- ☐ Verify proper grounding

COMMON GENERATOR ISSUES

- **Won't start:** Check fuel, battery, and control fuses
- **Low voltage:** Check load, engine RPM, voltage regulator
- **Overheating:** Check coolant, air filter, load level
- **Rough running:** Check fuel quality, air filter, maintenance schedule

EMERGENCY PROCEDURES

- **Overload:** Shed non-critical loads immediately
- **Fuel shortage:** Coordinate emergency fuel delivery
- **Total failure:** Implement manual lighting procedures
- **Cooling failure:** Reduce load and prepare for shutdown

EMERGENCY CONTACT TEMPLATES

NOTIFICATION CHECKLIST

IMMEDIATE NOTIFICATIONS (Within 5 minutes)

☐ Airport Operations Center: _____

☐ **Air Traffic Control:** _____

☐ Maintenance Supervisor: _____

REGULATORY NOTIFICATIONS (As Required)

☐ FAA Airport District Office: _____

☐ **FAA Flight Standards:** _____

☐ NOTAM Office: _____

COORDINATION CONTACTS

☐ Utility Company: _____

☐ **Generator Service:** _____

☐ Emergency Lighting Supplier: _____

INCIDENT DOCUMENTATION

Equipment: _____ **Time:** _____ **Duration:** _____

Problem Description:

Actions Taken:

Current Status: ☐ Repaired ☐ Temporary Fix ☐ Still Down

Follow-up Required: _____

Reported by: _____ **Time:** _____



USAGE INSTRUCTIONS

Emergency Priorities:

1. **Life Safety** - Ensure personnel and aircraft safety first
2. **Assess Impact** - Determine operational effects quickly
3. **Communicate** - Notify all affected parties immediately
4. **Troubleshoot** - Follow systematic procedures
5. **Document** - Record all actions for follow-up

Field Use Tips:

- Keep this toolkit in your emergency response kit
- Update contact numbers regularly
- Practice procedures during routine maintenance
- Coordinate with operations before making changes

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