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Preliminary DRAFT
Handout 7A*

**AGING TRANSPORT SYSTEMS
RULEMAKING ADVISORY COMMITTEE
(ATSRAC)**

AIRCRAFT WIRING SYSTEMS

**CURRICULUM AND LESSON
PLANS**

10-05-00

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AGING TRANSPORT SYSTEMS RULEMAKING ADVISORY COMMITTEE (ATSRAC)

OVERVIEW, BACKGROUND & CURRICULUM AND LESSON PLANS

OVERVIEW

This document gives a description of the background of ATSRAC and the individual Tasks that make up its mission. Each Task is responsible to deliver information relating to aging aircraft wiring systems and their condition. Task 5, the training supplier, has written the Curriculum and Lesson Plans that address the Task recommendations. The Curriculum and Lesson Plans are designed so that additional content can be added to the framework if new information comes available.

The Curriculum gives the outline of eight modules to be taught, including module titles, minimum times and section titles. It is the opinion of the author that the modules can be selectively taught depending on the experience of the students and can be integrated into airline/repair station training programs in a simple user-friendly way. It is based on the training "gaps" based on knowledge identified and developed from Tasks 1,3 and 4, and inputs from industry and airline sources during development. These include: ATSRAC and Task 5 team members, regulatory bodies, Boeing, FSBTI, Airbus Instructor seminars and FAR Pt 147 training schools. The curriculum can be adjusted for any model of airplane, student skill level and can be taught by any competent instructor with the requisite practical experience.

The Lesson Plan Modules come directly from the Curriculum and are split into sections. All sections are objective driven so that the student will have measurable skills. Each section is split into easily taught Sub-sections, so that the instructor can author Teaching Notes to suit his/her students and the airplane model worked upon. Strategies of teaching are discussed on the Lesson Plan to help the instructor give the most effective teaching.

Examinations will be given to the students. However the content and format are left to the Instructor's discretion, so they can be tailored to the student, specific airplane operation and circumstance.

BACKGROUND

The FAA has developed the Aging Non-Structured Systems Plan to address the recommendation of the White House Commission on Aviation Safety and Security (WHCSS) that states *In cooperation with airlines and manufactures, the FAA's Aging Aircraft program should be expanded to cover non-structural systems.*

In order to fully address the WHCSS recommendation on aging systems, and Aging Non-Structural Systems Study team was formed. This team, led by the Transport Airplane Directorate, conducted and inspection of systems in several aging airplanes and met with the FAA Principal Maintenance Inspectors who are tasked with oversight of major air carriers in order to make preliminary evaluation of the need for additional work to address the Commission's concerns. The team concluded that additional work is warranted and that industry involvement in this work is essential.

The FAA has chosen to address these recommendations through and Administrator's Advisory Committee (ATSRAC), determining this to be the most appropriated way to provide a forum for the parties involved in addressing the WHCSS recommendations.

The elements of the aging systems plan have been grouped into five major tasks, each incorporating one or more related elements of the plan. The individual task statements and deliverables are below.

Task 1:

Specific Task; Conduct and in-depth survey of the condition of aging transport fleet electrical systems and propose model-specific safety recommendations related to airplane systems that will eliminate or significantly reduce the hazards associated with the types of age-related degradation displayed by the fleet.

Deliverables; Identify significant wiring related concerns, determine whether there exists previous corrective actions and recommend to the committee the steps necessary to address these items of safety. Deliverable is a report to ATSRAC recommending mandated incorporation of existing corrective actions and the development of preventative measures

Task 2:

Specific Task; Conduct an in-depth review of electrical and non-electrical systems service documentation, including airworthiness directives with repetitive inspections, for opportunities to emphasize fleet incorporation or develop a system redesign.

Deliverables; Identify specific service bulletins, service letter, SRP's, ISAR's, and all-operator messages which require additional emphasis, including regulatory action, to prompt fleet incorporation. Identify Ads requiring repetitive inspections and recommend those for mandated final compliance modification. Both lists to be in the form of recommendation's to ASTF for review and onward transmittal to ATSRAC.

Task 3:

Specific Task; Participate on industry teams as required. Determine if the existing maintenance and inspection criteria adequately address aging systems issues. Make recommendations if required for enhanced maintenance inspection criteria.

Deliverables; Support industry development of enhanced maintenance inspection criteria and development of an analytical approach to determining maintenance inspection tasking. Deliverable is a document maintenance/inspection analysis process (such as MSG-3) that can be applied uniformly to all aging transport category airplanes to determine inspection tasks (if any).

Task 4:

Specific Task; Review Standard Wiring Practice Manuals and related documentation to identify areas of improvement which will result in significant improved detection to prevent wore degradation from advanced aging, during regular or scheduled maintenance.

Deliverables; Recommend to the committee changes to SWPM and related documents and steps necessary to address them.

Task 5

Specific Task; Review air carrier and repair station training programs for non-structural systems inspection and repair to ensure that they adequately address aging wiring system components (wire, connectors, brackets, shielding, clamps, ground) and other non-structural systems. Incorporate the work of Tasks 1-4 as it applies to training.

Deliverables; Deliverable is a document containing a series of recommended detailed lesson plans covering recommended additional training for aging systems based on results of tasks 1,3 & 4. The lesson plans will be of sufficient detail to allow specific training material to be developed by airline/repair station of OEM training personnel, and integrated into their normal training programs.

WIRING SYSTEMS 10-05-00
CURRICULUM

Overview

This training is targeted to the airplane technician who will be performing inspections/repairs on structure and/or wiring systems. The person will be able to properly evaluate the wiring system and effectively use the manufacturers Chapter 20 Wiring System overhaul manual for that airplane. This shall include; wiring system condition, applicable repair schemes, wiring modifications and ancillary repairs to wiring systems and components. All of the above is to maintain wiring system quality and airworthiness in the airplane.

Objectives

Depending on the modules taught, the technician will have the following skills:

- A. Demonstrate the safe handling of airplane electrical systems, Line Replaceable Units (LRU's), tooling, troubleshooting procedures, and electrical measurement.
- B. Know the construction and navigation of the applicable airplane wiring system overhaul or wiring practices manual (i.e. Boeing, Airbus, Lockheed or McDonnell Douglas).
- C. Understand the General Visual Inspection procedures, zonal areas, and typical damage that can occur.
- D. Know the contamination sources, materials, cleaning and protection procedures.
- E. Demonstrate the correct identification of different wire types, their inspection criteria, and damage tolerance, repair and preventative maintenance procedures.
- F. Know the procedures to identify, inspect and find the correct repair for typical types of connectors found on the technician's airplane.
- G. Demonstrate the procedures to replacement of all parts for typical types of connectors found on the technician's airplane (i.e. Boeing, Airbus, Lockheed or McDonnell Douglas).
- H. Know the removal, testing and repair of LRU's and connectors.

Scope

The course is to be used by training providers for all airplane technicians at any stage on their careers. The technician can be trained to the appropriate level using the applicable modules, depending the technicians experience, work assignment and operators policy. The time stated for each module is a minimum.

MODULE A – INTRODUCTION: 3 hours

- 1. Safety practices
- 2. Electrostatic Discharge Sensitive (ESDS) Device handling and protection
- 3. Tools, special tools and equipment
- 4. Calibration/certification of instruments, tools, and equipment
- 5. Wiring checks using the Troubleshooting Procedures and Charts
- 6. Measurement and troubleshooting using meters.

MODULE B – CHAPTER 20 STRUCTURE: 6 hours

- 1. Chapter 20 structure/overview
- 2. Chapter cross-reference Index
- 3. Important Data and Tables

MODULE C – INSPECTION: 3 hours

1. General Visual & Detailed Inspection (GVI) (DI) criteria and standards
2. Human factors in inspection
3. Zonal areas of inspection
4. Wiring system damage

MODULE D – HOUSEKEEPING: 3 hours

1. Airplane external contamination sources
2. Airplane internal contamination sources
3. Protection of equipment and wiring installations during airplane maintenance and repair
4. Plan before you start and clean as you go
5. Cleaning processes

MODULE E – WIRE: 8 hours

1. Identification, type and construction
2. Insulation qualities
3. Inspection criteria and standards of wire and wire bundles
4. Wire bundle installation practices
5. Typical damage and areas found (airplane specific)
6. Maintenance and repair procedures
7. Sleeving
8. Electrical bonding and grounds

MODULE F – CONNECTORS: 2 hours

1. General types and identification
2. Cautions and protections
3. Inspection procedures
4. Typical damage found
5. Repair procedures

MODULE G – CONNECTOR REPAIR (BOEING[#]): 8 hours

1. Cannon plug type round body connectors (e.g. 2020-61-11, 12 & 13)
2. ITT Cannon (type DPX, DPD, and DPA) connectors
3. Burndy Block (type F, G, and H) junction connectors
4. Burndy Block (type X, Y, and Z) junction connectors
5. ARINC 600 type connectors
6. Burndy Block (type S280W555-()) junction connectors
7. Wire Wrap (type S280U000 and S284U1147) connectors
8. MTCPQ Quick Disconnect connectors (flat pin contacts)
9. Radial EPX Style (BACC65AA & BACC65AB) (Spec. BAC 5162-72)

MODULE H – LINE REPLACEABLE UNITS (LRU): 3 hours

1. Removal and replacement techniques
2. Testing of LRU connectors
3. "No Fault Found"
4. Troubleshooting procedures.

**# Other airplane manufacturers have different connector manufacturers and part numbers.
See Module G, Appendix A, B, or C.**

**WIRING SYSTEMS LESSON PLAN
MODULE A: INTRODUCTION**

Overview

Module A lays the groundwork of safe effective maintenance and repair of the airplane wiring systems, without damage to the airplane or injury to the student. The Instructor may vary the depth and scope of the topics to be covered, depending on the type of airplane to be maintained and skills of the technicians.

Objectives

After this module is complete the technician will have the following skills:

1. Know the safety procedures of normal and non-normal maintenance procedures so the technician can protect him/herself and the airplane.
2. Recognize ESDS equipment and demonstrate standard anti-static procedures so that no damage occurs to that equipment.
3. Demonstrate the correct use of hand tools including specialized and automated tools and equipment.
4. Demonstrate the successful calibration of electrical measuring instruments, tools and equipment so that correct maintenance procedures may be carried out.
5. Know the process and procedures to successfully use the Troubleshooting Procedures and Charts of current airplane faults.
6. Demonstrate the correct use of electrical meters for measuring voltage, current, resistance, continuity, insulation and short to ground.

Strategies

Normal classroom lecture will be used for the majority of the training. The following strategies can be used instead, to expedite learning and are recommended to the instructor.

Electrostatic Discharge Sensitive (ESDS) Device handling and protection.....Video/Training Aids
Calibration/certification of instruments, tools, and equipment.....Company Policy
Wiring checks using the Troubleshooting Procedures and Charts.....Airplane manuals
Measurement and troubleshooting using meters.....Meters and circuits

MODULE A - INTRODUCTION:

1. Safety practices
 - a. Current is lethal - First aid
 - b. Applying power to the airplane
 - c. Isolating the circuit
 - d. Airplane warnings
 - e. Human Factors

2. Electrostatic Discharge Sensitive (ESDS) Device handling and protection
 - f. Sources of electrostatic discharge
 - g. Soft and hard failures
 - h. ESDS safety procedures
 - i. ESDS packing procedures

3. Tools, special tools and equipment

- j. General hand tools
- k. Specialized tools
- l. Automated tools and equipment

4. Calibration/certification of instruments, tools and equipment

- m. Tools requiring certification
- n. Determining certification requirements
- o. Typical problems

5. Wiring checks using the Troubleshooting Procedures and Charts

- p. Troubleshooting procedures manual (all chapters)
- q. Aircraft Maintenance Manual/ Illustrated Parts Catalog
- r. Wiring schematics / Troubleshooting graphics
- s. Wiring diagrams
- t. The process of troubleshooting
- u. Troubleshooting exercises

6. Measurement and troubleshooting using meters

- v. Voltage, current and resistance
- w. Continuity
- x. Insulation
- y. Short to ground.

WIRING SYSTEMS LESSON PLAN MODULE B: CHAPTER 20 STRUCTURE

Overview

Module B lays the groundwork for safe effective maintenance and repair of airplane wiring systems. The intent of this module is to teach the structure of the applicable Chapter 20, and how to use it in troubleshooting practices. The Instructor may vary the depth and scope of the topics to be covered, depending on the type of airplane to be maintained and skills of the technicians.

Objectives

After this module is complete the technician will have the following skills:

1. Know the applicable Sub-Chapters and Section to follow during normal and non-normal electrical maintenance procedures.
2. Demonstrate the use of the Cross-Reference Index so as to find specific material within each sub-chapter and section.
3. Demonstrate the use of the associated tables for replacement of wire, connectors and pins, and associated components, including approved replacements.

Strategies

Normal classroom lecture will be used for the majority of the training. The Chapter 20 Manual will be made available to the class so that hands-on exploration of the manual can be achieved.

MODULE B - CHAPTER 20 STRUCTURE (BOEING):

1. Chapter 20 structure/overview
 - a. Table of contents
 - b. Sub-Chapter titles
 - c. Section Structure
 - d. General procedures.
2. Chapter Cross-Reference Index
 - e. Cross-reference index – Alphanumeric
 - f. Cross-reference index – Standard Part number
 - g. Cross-reference index - Suppliers
3. Important Data and Tables
 - h. Contact crimp tools
 - i. Insulation removal tools
 - j. Materials
 - k. Wire type codes and part numbers
 - l. Connector types
 - m. Terminal types
 - n. Repair procedures

WIRING SYSTEMS LESSON PLAN MODULE C: INSPECTION

Overview

Module C lays the groundwork for safe effective maintenance and repair of airplane wiring systems, by teaching the skills of inspection so as to identify wiring system damage. The Instructor may vary the depth and scope of the topics to be covered, depending on the type of airplane to be maintained and skills of the technicians.

Objectives

After this module is complete the technician will have the following skills:

1. Know the General Visual Inspection criteria and standards so that the technician knows which tools are used to ensure inspection procedures and standards are achieved which leads to all defects being found.
2. Know the effects of fatigue and complacency during inspection and how to combat their effects.
3. Know the specific zonal inspection requirements related to system affiliation and environmental conditions.
4. Recognize typical wiring system damage, such as hot gas, fluid contamination, chafing and corrosion of wire, wire bundles and connector assemblies.

Strategies

Normal classroom lecture will be used for the majority of the training. ATA 117 video and color photos of actual wiring systems damage is recommended to show typical problems found on the airplane. Examples of discrepancies will be made available to the student.

MODULE C – INSPECTION

1. General Visual & Detailed Inspection (GVI) (DI) criteria and standards
 - a. Tools
 - b. Criteria/standards
 - c. Procedures of inspection

2. Human Factors in Inspection
 - d. Fatigue
 - e. Complacency

3. Zonal areas of inspection
 - e. Zonal areas of inspection
 - f. Zonal inspection procedures and standards

4. Wiring system damage
 - g. Swarf / FOD / metal shavings
 - h. Hot gas
 - i. Fluid contamination
 - j. Vibration/chafing
 - k. Corrosion

WIRING SYSTEMS LESSON PLAN MODULE D: HOUSEKEEPING

Overview

Module D lays the groundwork for safe effective maintenance and repair of airplane wiring systems by teaching housekeeping strategies. This will keep the wiring system free of contamination and if contamination is found, techniques on removal or cleaning. The Instructor may vary the depth and scope of the topics to be covered, depending on the type of airplane to be maintained and skills of the technicians.

Objectives

After this module is complete the technician will have the following skills:

1. Recognize external contamination and other damage due to external environmental conditions.
2. Know the airplane internal contamination sources, so that inspection processes can be effectively carried out and contamination damage easily recognized.
3. Know the procedures and processes to protect wiring systems during maintenance and repair.
4. Know the procedures to be followed when carrying out repairs on wiring systems in different parts of the airplane.
5. Know the process of cleaning wiring systems during maintenance and repair.

Strategies

Normal classroom lecture will be used for the majority of the training. ATA 117 video and color photos of actual wiring systems contamination are recommended to show typical problems found on the airplane. Aircraft Maintenance Manual procedures will be used.

MODULE D – HOUSEKEEPING

1. Airplane external contamination sources
 - a. De-ice fluids
 - b. Air erosion
 - c. Water and rain
 - d. Snow and ice

2. Airplane internal contamination sources
 - e. Hydraulic oils
 - f. Fuel
 - g. Engine and APU oil
 - h. Bleed air and hot areas
 - i. Galleys and toilets
 - j. Lint
 - k. Hazardous materials

3. Plan before you start and clean as you go
 - l. Have a plan / types of plan
 - m. No contamination
 - n. Keep cleaning

4. Protection during airplane maintenance and repair

- o. Recommended general maintenance protection procedures
- p. Recommended airframe repair protection procedures
- q. Recommended powerplant repair protection procedures

5. Cleaning Processes

- r. Fluid contamination
- s. Swarf
- t. Lint and dust
- u. De-ice fluid
- v. Environmental contamination

WIRING SYSTEMS LESSON PLAN MODULE E: WIRE

Overview

Module E lays the groundwork for safe effective maintenance and repair of airplane wiring systems by teaching wire selection and inspection strategies. The Instructor may vary the depth and scope of the topics to be covered, depending on the type of airplane to be maintained and skills of the technicians.

Objectives

After this module is complete the technician will have the following skills:

1. Demonstrate the procedure used to identify specific wire types using the airplane manuals.
2. Know from approved data different insulation types and their relative qualities.
3. Know the inspection criteria for wire and wire bundles.
4. Know the standard installation practices for wire and wire bundles.
5. Know typical damage that can be found (airplane specific).
6. Demonstrate the repair procedures for typical damage found on the student's type of airplane.
7. Demonstrate the procedures to fitting differing types of sleeving (airplane specific).
8. Demonstrate the correct installation practices for electrical bonds and grounds.

Strategies

Normal classroom lecture will be used for the majority of the training with hands-on practice for Section 6. Chapter 20 will be made available to the class so that hands-on use of the manual can be utilized so that wire identification, inspection, installation and repair procedures can be fully explored. Examples of wire discrepancies will be made available to the student.

MODULE E -- WIRE

1. Identification, type and construction
 - a. Wire type codes – alphanumeric
 - b. Wire type codes – specification or standard part number
 - c. Wire type codes – specified wire and alternate
 - d. Manufacturer identification

2. Insulation qualities
 - e. Types of insulation
 - f. Typical insulation damage
 - g. Carbon arcing

3. Inspection criteria and standards of wire
 - h. Inspection of individual wiring
 - i. Inspection of wire bundles

4. Wire bundle installation practices

- j. Routing
- k. Segregation rules
- l. Clearance
- m. Clamp inspection
- n. Clamp removal and fitting
- o. Conduit

5. Typical damage and areas found (airplane specific)

- p. Vibration
- q. Corrosion
- r. Contamination

6. Maintenance and repair procedures

- s. Approved repairs - Improper repairs
- t. Shielded wire repair
- u. Repair techniques
- v. Terminals and splices
- w. Preventative maintenance procedures

7. Sleeving

- x. Identification sleeves
- y. Shrink sleeves
- z. Screen braid grounding crimp sleeves

8. Electrical bonding and grounds

- aa. Inspection standards
- bb. Lightning strikes

WIRING SYSTEMS LESSON PLAN MODULE F: CONNECTORS

Overview

Module F lays the groundwork for safe effective maintenance and repair of airplane wiring systems by teaching the identification, inspection and repair of connectors found on the airplane. The Instructor may vary the depth and scope of the topics to be covered, depending on the type of airplane to be maintained and skills of the technicians.

Objectives

After this module is complete the technician will have the following skills:

1. Know the general types and positive identification of connectors (airplane specific).
2. Know the various safety procedures, cautions and warnings prior to inspection.
3. Know the relevant inspection procedures for each type of connector so that any internal or external damage can be found.
4. Recognize typical external and internal damage to the connector.
5. Demonstrate where to find the relevant repair schemes from Ch. 20 for connector repair.

Strategies

Normal classroom lecture will be used for the majority of the training. The Chapter 20 Manual will be made available to the class so that hands-on use of the manual can be utilized. Connector identification, inspection and repair procedures will be fully explored. Photographs of typical external damage and internal damage will be made available to show problems on the airplane.

MODULE F – CONNECTORS

1. General types and identification
 - a. Part number identification
 - b. Reference tables
 - c. Specific connector chapters

2. Cautions and protections
 - d. Safety precautions
 - e. Maintenance precautions

3. Inspection procedures
 - f. Installed inspection criteria
 - g. Removed inspection criteria

4. Typical damage found
 - h. Exterior damage
 - i. Internal damage

5. Repair process

- j. Finding the correct section
- k. Finding the correct part
- l. Finding the correct tooling
- m. Confirming the correct repair

WIRING SYSTEMS LESSON PLAN MODULE G: CONNECTOR REPAIR (BOEING)

Overview

Module G lays the groundwork for safe effective maintenance and repair of airplane wiring systems. This module is primarily a hands-on class, emphasizing the repair and replacement of connector parts found on the airplane. This list is an example of connectors for Boeing airplanes, and can be adjusted to suit training requirements. The Instructor may vary the depth and scope of the topics to be covered, depending on the type of airplane to be maintained and skills of the technicians.

NOTE:

Appendix A, B & C is a list of other manufacturer connectors. These can replace the Boeing connectors as required.

Objective

After this module is complete the technician will have the following skills:

1. Demonstrate the replacement of components on Cannon type connectors.
2. Demonstrate the replacement of components on ITT Cannon type connectors.
3. Demonstrate the replacement of components on Burndy Block F, G and H connectors.
4. Demonstrate the replacement of components on Burndy Block X, Y and Z connectors.
5. Demonstrate the replacement of components on ARINC 600 connectors.
6. Demonstrate the replacement of components on S280W555 Burndy Block F, G and H connectors.
7. Demonstrate the fitting and use of wire wrap tooling on S280U000 and S2804U1147 connectors.
8. Demonstrate the replacement of components on MTCPQ flat pin connectors.
9. Demonstrate the replacement of components on Radiall EPX Style connectors.

Strategies

This class is primarily a hands-on class to give the student motor skills in the repair of connectors from their airplane. The Chapter 20 Manual and the appropriate connectors will be made available to the class so repair procedures can be fully explored. Photographs of typical internal conditions and external damage should be made available. It is recommended that **MODULE F: CONNECTORS** should precede this module.

MODULE G – CONNECTOR REPAIR (BOEING)

1. Cannon Plug Type Round Body Connectors (e.g. 2020-61-11, 12 & 13)
 - a. Disassembly
 - b. Back-shell maintenance
 - c. Pin extract and insert
 - d. Crimping pins
 - e. Assembly and strain relief

2. ITT Cannon (type DPX, DPD, and DPA) Connectors
 - f. Disassembly
 - g. Back-shell maintenance
 - h. Pin extract and insert
 - i. Crimping pins
 - j. Assembly and strain relief

3. Burndy Block (type F, G, and H) Junction Connectors
 - k. Disassembly
 - l. Back-shell maintenance
 - m. Pin extract and insert
 - n. Crimping pins
 - o. Assembly and strain relief

4. Burndy Block (type X, Y, and Z) Junction Connectors
 - p. Disassembly
 - q. Back-shell maintenance
 - r. Pin extract and insert
 - s. Crimping pins
 - t. Assembly and strain relief

5. ARINC 600 Type Connectors
 - u. Disassembly
 - v. Maintenance
 - w. Sealing
 - x. Assembly

6. Burndy Block (type S280W555-()) Junction Connectors
 - y. Disassembly
 - z. Back-shell maintenance
 - aa. Pin extract and insert
 - bb. Assembly and strain relief

7. Wire Wrap (type S280U000 and S284U1147) Connectors
 - cc. Tooling
 - dd. Wire wrap removal
 - ee. Wrapping terminals
 - ff. Inspection

8. MTCPQ Quick Disconnect Connectors (flat pin contacts)
 - gg. Disassembly
 - hh. Back-shell maintenance
 - ii. Pin extract and insert
 - jj. Assembly and strain relief

9. Radial EPX Style (BACC65AA & BACC65AB) (Spec. BAC 5162-72)
 - kk. Disassembly
 - ll. Back-shell maintenance
 - mm. Pin extract and insert
 - nn. Assembly and strain relief

APPENDIX A:
Airbus

APPENDIX B:
Lockheed

APPENDIX C
McDonnell Douglas

TO BE INCLUDED

1. NAS 1599 Connector
2. MIL-C-26482
3. MIL-C-26500 Plug Connectors
4. MIL-C-83723
5. MIL-C-38999
6. TYPE PR EN2997
7. TYPE EN3545
8. DPX Series Connectors
9. Rectangular Connectors
10. Pressure Seals
11. MIL-C-5015 Connectors
12. ARINC 600 Connectors
13. Miscellaneous Circular and
14. Rectangular connectors.

WIRING SYSTEMS LESSON PLAN MODULE H: LINE REPLACEABLE UNITS (LRU's)

Overview

Module G lays the groundwork for safe effective maintenance and repair of airplane wiring systems by teaching the techniques of LRU removal and repair, including BITE. The Instructor may vary the depth and scope of the topics to be covered, depending on the type of airplane to be maintained and skills of the technicians.

Objective

After this module is complete the technician will have the following skills:

1. Know the removal and replacement techniques so that no damage will occur to the LRU or airplane connector.
2. Know the procedures, including correct tooling that are used to test connectors and airplane wiring
3. Know re-occurring problems causing "No Fault Found" on removed LRU's.
4. Demonstrate the use of the applicable Troubleshooting Procedures Manual to resolve current system faults.

Strategies

This module is lecture and hands-on practice to give the student motor skills in the replacement of LRU's and the maintenance and repair of their respective rack connectors. The Chapter 20 Manual, together with examples of rack equipment will be made available so that hands on use of the manual can be utilized together with connector inspection and repair procedure practice.

MODULE H – LINE REPLACEABLE UNITS (LRU)

1. Removal and replacement techniques
 - a. ESDS protection
 - b. Different retention devices
 - c. Certification considerations (CAT 2/CAT3 Landing)
 - d. LRU re-racking procedures

2. Testing of LRU connectors
 - e. Tooling requirements
 - f. Typical test procedures and techniques
 - g. Typical damage found

3. "No Fault Found"
 - h. Company "No Fault Found " data
 - i. Manufacturer fleet data

4. Troubleshooting procedures
 - j. Built in test equipment (BITE)
 - k. The process of repair
 - l. Repair procedures.