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Preliminary Data From The ATA Fleet Survey



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FAA/DoD/NASA Conference on Aging Aircraft
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Preliminary Data From the ATA Fleet Survey

- Background
 - Air Transport Association (ATA) formed the Aging Systems Task Force (ASTF) in June, 1998
 - Key objectives included:
 - Define current airline best practices and share industry wide
 - Prepare/implement a specialized sample inspection of aircraft systems wiring over 20 years old
 - Collect data on inspection findings and in-service reports, share the data, and devise actions as required

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Preliminary Data From the ATA Fleet Survey

- Background (continued)
 - Aging Transport Systems Rulemaking Advisory Committee (ATSRAC) chartered January, 1999, in response to the FAA Aging Transport Non-Structural Systems Plan
 - Following tasks were assigned to ASTF:
 - Task 1A - Electrical Systems Inspections
 - Task 1B - Non-electrical Systems Inspections
 - Task 2B - Non-electrical Service History Review
 - Task 2D - Electrical Service History Review

Preliminary Data From the ATA Fleet Survey

- ASTF Structure
 - ASTF 40+ general members comprised of representatives from 14 airlines, FAA, OEM's, DoD, SAE, NADA and others
 - Created 8 Working Groups for the following models (all certificated >20 years ago): 727, 737, 747, DC-8, DC-9, DC-10, L-1011, A-300
 - Working Group members comprised of airline, FAA, and OEM specialists highly knowledgeable of a specific aircraft model

Preliminary Data From the ATA Fleet Survey

- Current Airline Best Practices
 - ATA Specification 117 - Wiring Maintenance Practices/Guidelines was released July 31, 1998, and made available to the general public via the ATA website or through ATA Publications
 - Spec 117 Video completed incorporating key principles from the written specification
 - Available through ATA for \$550 per copy with unlimited duplication rights within company/agency
 - Survey of ATA member airlines reveals widespread adoption of Spec 117 guidelines

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Preliminary Data From the ATA Fleet Survey

- Fleet Inspection Programs
 - ASTF developed guidelines for Working Groups to follow in preparing their inspection programs
 - Zone-by-zone review of potential or unforeseen problem areas, paying particular attention to:
 - Wiring and associated hardware only
 - Flight critical areas
 - Areas normally hidden from view
 - Areas in close proximity to flammable liquids and gases

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Preliminary Data From the ATA Fleet Survey

- Fleet Inspection Programs (continued)
 - High electric current draw areas
 - Aging caused by:
 - High vibration areas
 - Areas with harsh environments
 - Corrosion-prone areas
 - High maintenance traffic areas
 - Past service findings and inspection results

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Preliminary Data From the ATA Fleet Survey

- Fleet Inspection Programs (continued)
 - Inspection documents produced for each of the subject models except the A-300
 - All inspections are Detailed Visual (vs. General Visual from routine maintenance programs)
 - Aircraft undergoing routine heavy maintenance targeted for inspection
 - Working Group members nearly always present during inspections
 - All results reported on common form

Preliminary Data From the ATA Fleet Survey

| PTT/CYCLES | AIRCRAFT WIRING INSTALLATION/CONDITION REPORT FORM | | | | | | | | | | | | | |
|---|--|--|--|--|---|---|------------------------|--|--|--|--|------------------|--|--|
| | AREA/ZONE | | | | | | | | | | | PAGE OF | | |
| | CONNECTORS | | | TERMINATIONS | | | INSTALLATION (GENERAL) | | | | | WIRING CONDITION | | |
| 1) ENTER AREA/ZONE BEING EVALUATED IN SPACE PROVIDED. 2) USE SEPARATE FORM FOR EACH AREA/ZONE, USE ADDITIONAL FORMS AS REQUIRED. 3) CHECK CONDITION NOTED, USE "OTHER" FOR ANY CONDITION(S) NOT LISTED. DESCRIBE CONDITION. 4) ENTER SYSTEM OR COMPONENT INFORMATION IF AVAILABLE. | INSERT DAMAGE/DETERIORATION CONTACT ARcing/FRETTING MISSING DUMMY CONTACTS/SEAL PLUGS MISSING/DAMAGED BACKSHELLS CONNECTOR BACKSHELL STRAIN RELIEF LOOSE OR WORN BANJETS OTHER | INADEQUATE DRIP LOOP(S) CORRECT HARDWARE BUILDUP/TORQUE HEAT DAMAGE/CORROSION OTHER | INADEQUATE CLEARANCE TO STRUCTURE MISSING/DETERIORATED PRESSURE SEALS SLEEVE/CONDUITS CONDITION BEND RADIUS (10X WIRE BUNDLE DIA.) CLAMP CONDITION/SIZING/PACING | DEBRIS ACCUMULATIONS ON WIRE BUNDLES MISSING/DETERIORATED GROMMETS SIGNIFICANT DUST AND LINT BUILDUP T-STRIP CONDITION/HARDWARE BUILDUP EXCESSIVE SLACK/SAG BETWEEN CLAMPS | PREVIOUS REPAIRS/CONDITION OF HEAT/VIBRATION DAMAGE INDIRECT DAMAGE (HYD. PNEU LEAKS) | CRACKED/ABRADED INSULATION BROKEN SHIELD/CONDUCTORS EXPOSED CONDUCTORS/SHIELD FLUID/CHEMICAL CONTAMINATION CORROSION OTHER | | | | | | | | |
| | AREA/SYS COMPONENT | | | | | | | | | | | | | |
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Preliminary Data From the ATA Fleet Survey

- Fleet Inspection Programs (continued)
 - 71 aircraft inspected to date:
 - 8 727's completed, program ongoing
 - 4 737's completed, program ongoing
 - 7 747's completed, *program done*
 - 15 DC-8's completed, *program done*
 - 15 DC-9's completed, *program done*
 - 13 DC-10's completed, *program done*
 - 0 L-1011's completed, program ongoing
 - 9 A-300's completed, *program done*

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Preliminary Data From the ATA Fleet Survey

- Fleet Inspection Programs (continued)
 - Preliminary results:
 - Averaged 30-40 manhours per aircraft for inspections (does not include open or close up time)
 - Averaged 4-5 discrepancies per model type which require further investigation
 - Airworthiness Concerns Coordination process will be used as appropriate
 - All discrepancies investigated will be reported to ASTF for oversight by August 1, 1999

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Preliminary Data From the ATA Fleet Survey

- Fleet Inspection Programs (continued)
 - *No immediate airworthiness issues or concerns found*
 - Summary conclusions and recommendations will be available by October ATSRAC meeting

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Preliminary Data From the ATA Fleet Survey

- Service History Review
 - OEM's requested to perform keyword search of service information to identify documents which describe potential aging systems problems
 - Keywords included:
 - arc, arced, arcing, arcs, black, blackened, burn, burned, burns, burnt, burndy, cannon, chafe, chafed, chafes, chafing, connector, electric, electrical, electronic, fire, flash, flashed, ground, intermittent, intermittently, open, resistance, shield, shielded, shielding, shields, short, shorted, shorting, smoke, smoked, smoking, spark, sparked, sparking, sparks, splice, strip, terminal, thermal, track, wire

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Preliminary Data From the ATA Fleet Survey

- Service History Review (continued)
 - Documents satisfying keyword search are reviewed by applicable Working Group for possible service action (including Service Bulletin issuance or upgrade of status)
 - ECD November 30, 1999

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Preliminary Data From the ATA Fleet Survey

- Follow-on Activities (continued)
 - Created an Intrusive Inspection Subcommittee
 - Determine if there is damage in electrical systems that is going undetected by even detailed visual inspections
 - Application or wire type specific inspections, rather than model specific inspections
 - Substantial effort being made to cover major wire types (including Kapton polyimide)

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Preliminary Data From the ATA Fleet Survey

- Follow-on Actions (continued)
 - ASTF looking at airline failure reporting methodology
 - Deferred non-electrical systems inspections until conclusion of electrical systems inspections and service history review (ECD December 31, 1999)

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Preliminary Data From the ATA Fleet Survey

- Conclusions
 - Fleet survey revealed no immediate airworthiness issues
 - Significant improvements in training and knowledge sharing have been made
 - More intrusive inspections and further research required to resolve nagging questions regarding wire service life, latent failures, and airline failure reporting programs