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Aug 14, 2025

Department of Defense  
OFFICE OF PREPUBLICATION AND SECURITY REVIEW

# EWIS Intermittent Faults and O-Level Troubleshooting

Distribution A: For Public Release

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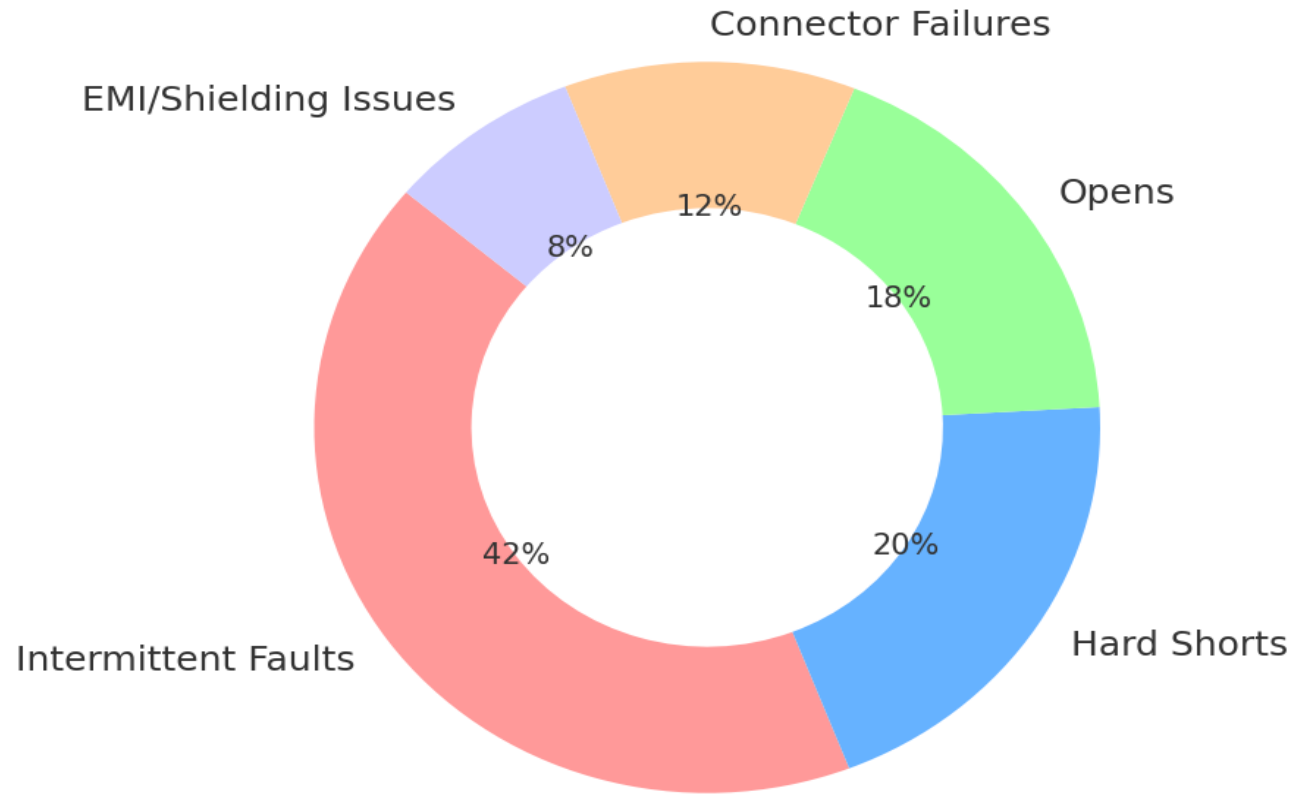
# Purpose & Scope

- Address cross-service challenges in detecting and resolving Electrical Wiring Interconnection System (EWIS) intermittent faults
- Focus on organizational-level (O-Level) troubleshooting limitations and repeat gripe trends
- Identify readiness impacts and opportunities to improve diagnostics, training, and policy
- Highlight current tools (e.g., WIFT, MEFI, AWTs) and capability gaps
- Support recommendations for JSWAG action and sustainment community alignment



# EWIS Fault Breakdown

Distribution of EWIS Fault Types Across Aircraft





# What Are Intermittent Faults?

- Non-persistent, repeatable or random wiring failures
- May include:
  - Loose or oxidized pins
  - Wire chafing or cracked insulation
  - Grounding and EMI degradation
- Often occur in vibration, humidity, or load-bearing environments
- Difficult to reproduce during I-Level or depot test due to transient nature





# O-Level Troubleshooting Challenges

- Most intermittent faults are not visible or persistent during operational checks
- Limited access to full aircraft harness runs and embedded wire bundles
- No dedicated O-Level wire diagnostic tools on many platforms
  - And when present, not used to full potential
- Heavy reliance on operational symptoms or BIT/BITE (often inconclusive)
- Troubleshooting is environment-dependent (e.g., vibration, moisture, EMI not replicable on ground)
- Results in repeat gripes, high NFF rates, and unnecessary removals

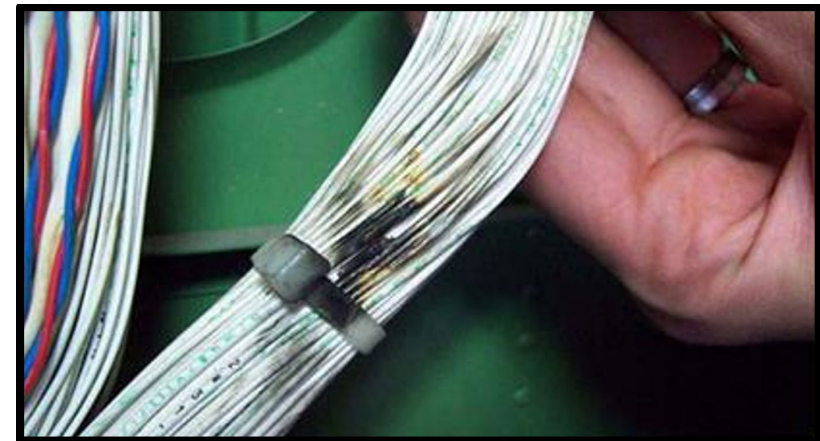




# Common EWIS Intermittent Fault Modes



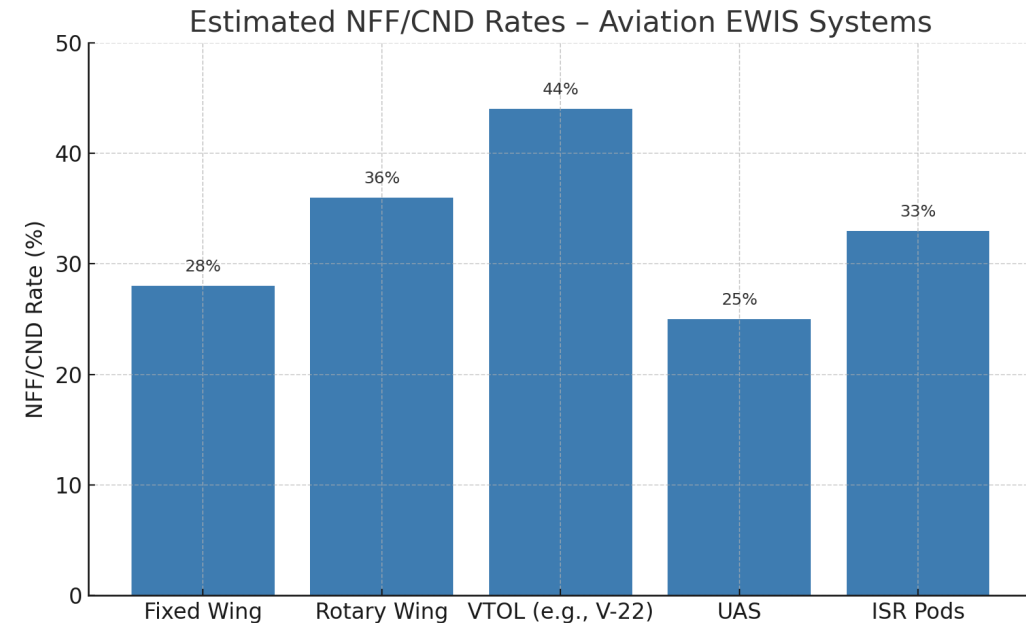
- Wire chafing through insulation (abrasion against structure or components)
- Cracked insulation under flex or bend stress
- Intermittent opens at connector pins, backshells, or terminals
- Ground reference degradation or EMI susceptibility
- Faults triggered only during in-flight conditions (G-loads, hydraulic vibration)





# Impact on Readiness & Cost

- Intermittent EWIS faults are major contributors to:
  - High NFF (No Fault Found) rates
  - Repeat MAFs and unresolved gripes
  - Premature component removals
  - Aircraft downtime and mission aborts
- Air Force/Army/Navy trend data shows:
  - Up to 45% of wire-related turn-ins test good at depot
  - 10–25% of repeat gripes trace to undiagnosed wire issues
- Readiness degradation due to unresolved root causes





# Current Tools Available – EWIS Diagnostics

- V-22 WIFT (Wire Intermittent Fault Tester)
  - LEHV TDR + SSTDR + HiPot in one portable tester
- MEFI (Marine Expeditionary Fault Isolator) – USMC
  - Tactical-use device for ground and airframe wiring
- AWTS (Automated Wire Test Set) – primarily depot use, high-resolution fault locator
- Multimeter – useful for basic continuity, but lacks intermittent fault sensitivity
- MegOhmmeter – high voltage insulation integrity testing, often misapplied as fault locator
- Tools often not embedded in routine O-Level troubleshooting flow
- Need for integration into standard maintenance procedures





# Diagnostic Capability Gaps – EWIS

- O-Level technicians lack platform-wide EWIS fault isolation tools
- Limited use of SSTDR, arc fault detection, or EMI-sensitive diagnostics
- Tools exist but are not fielded to all squadrons or embedded in NATOPS/IMA practices
- BIT/BITE often fail to capture transient faults or crosstalk/degradation
- No centralized feedback loop for systemic EWIS faults (repeat removals go untracked)
- Intermittent ground faults, arc faults, and shield issues difficult to replicate



# Recommendations for JSWAG Consideration



- Incorporate EWIS diagnostic training in O-Level pipeline (rate and platform-specific)
- Field portable SSTDR/arc fault test tools across all platforms with known risk
- Track NFF/FDI/CND events tied to wiring faults for trend and readiness impact
- Include EWIS fault detection in NATOPS / NAMP MRCs where applicable
- Standardize tool evaluation and fleet deployment (e.g., WIFT, MEFI)
- Establish cross-platform working group to consolidate EWIS fault data and tooling gaps



# Questions/ Discussions