The Engineering Society For Advancing Mobility Land Sea Air and Space®
INTERNATIONAL
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AEROSPACE INFORMATION REPORT

SAE AIR1557

REV. A

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High and Extended Vibration Environment

CANCELLATION NOTICE

This document has been declared "CANCELLED" as of February 2002. By this action, this document will remain listed in the Numerical Section of the Aerospace Standards Index.

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1. PURPOSE:

This Aerospace Information Report (AIR) documents the vibration areas and vibration spectrum needed in determining electrical connector selection for typical jet aircraft.

2. SCOPE:

This AIR defines aircraft vibration areas, the vibration spectrum for those areas and a coupling mechanism recommendation for circular electrical connectors.

3. GENERAL:

(Shock, Vibration, and Environmental Capabilities)

3.1 The selection of connector coupling type, i.e., bayonet, screw thread, etc., must be based on the location in which the connector will be installed in the aircraft. Special consideration must be given to connectors located in the special wind and moisture problem (SWAMP) areas. The vibration levels in these areas are known to exceed the standard connector vibration spectrum used for connector qualification. Experience has shown that standard bayonet type connectors may not withstand the vibration environment prevalent in the SWAMP areas.

3.2 Fig. 1 illustrates the typical vibration areas of an aircraft. This figure shows that three distinct categories of vibration environment exist.

Zone 1 - Standard vibration area, generally defined as the pressurized area in the aircraft.

Zone 2 - High and extended vibration (SWAMP) area, generally defined as the unpressurized area (excluding engine areas) in the aircraft.

Zone 3 - Undefined (SWAMP) vibration area, generally defined as the engine areas.

3.3 Fig. 2 defines the vibration levels expected for Zone 1 and Zone 2 areas. Connectors located in Zones 1 and 2 should meet the specification performance requirements when tested in accordance with MIL-STD-1344A, Method 2005.1, Test Condition V, using the vibration envelope shown in Fig. 2 as the test spectrum.

4. CONNECTOR SELECTION:

Knowing the connector location and the use of Figure 1 the designer can select the connector coupling type based on the following guidelines:

Zone1 Standard Connector Vibration Area

Standard electrical connectors with bayonet, threaded, or other suitable coupling device can be used in this area. The standard bayonet connector would be preferred in this area.

4. (Continued):

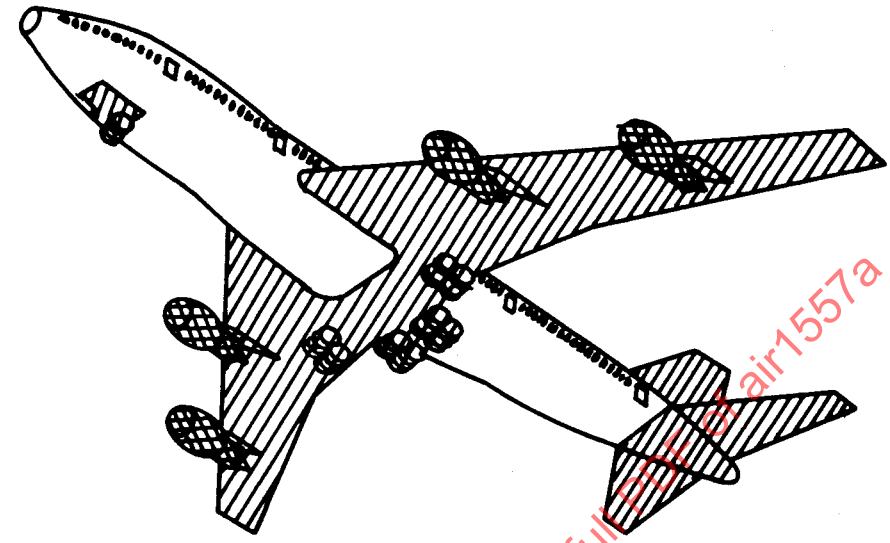
Zone 2 High and Extended Vibration (SWAMP) Area

Electrical Connectors with screw thread, improved bayonet, or other qualified coupling device can be used in this area. The screw thread connector is preferred for new equipment design. The improved bayonet connector is recommended for existing designed equipment using bayonet style coupling device.

Zone 3 Undefined Connector Vibration (SWAMP) Area

This area is undefined because of the variations in engine thrust and installation configuration. However, it is strongly recommended that only screw threaded coupling connectors be used that will meet engine vibration requirements. If the vibration requirements are not known, the connector should meet, as a minimum, the vibration requirements specified in paragraph 3.3 for Zone 2.

PREPARED BY
SAE SUBCOMMITTEE AE-8C1, CONNECTORS OF
COMMITTEE AE-8, AEROSPACE ELECTRICAL/ELECTRONIC DISTRIBUTION SYSTEMS



ZONE 1 STANDARD VIBRATION AREA
ZONE 2 HIGH & EXTENDED VIBRATION SWAMP AREA
ZONE 3 UNDEFINED SWAMP VIBRATION AREA

FIGURE 1