



AEROSPACE INFORMATION REPORT

AIR1558**REV. B**

Issued 1978-10
Revised 1997-09
Reaffirmed 2005-02
Cancelled 2015-06

Superseded by ARP1558

Interface Protective Devices - Ground Equipment to Aircraft

RATIONALE

ARP1558 was unanimously approved by AGE-2, AGE-2C, and the Aerospace Council then published on 10/06/2014. Its Rationale underlines that "This ARP supersedes former AIR1558A ... in order to ensure aircraft protection against fuselage damage." The change of document status and contents was agreed because AIR1558A had become obsolete and its application would present a significant safety hazard to newer aircraft types with composite fuselages, dealt with in ARP1558 through state-of-the-art techniques.

Therefore, AIR1558A is hereby cancelled and superseded by ARP1558 for safety reasons.

CANCELLATION NOTICE

This document has been declared "CANCELLED" as of June 2015 and has been superseded by ARP1558. By this action, this document will remain listed in the Numerical Section of the Aerospace Standards Index noting that it is superseded by ARP1558. Cancelled specifications are available from SAE.

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Documents

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1. SCOPE:

The protective device hereinafter called a “fender” is intended to serve its purpose during normal aircraft servicing and prevent damage during docking contact rather than aggressive impact.

1.1 Purpose:

This SAE Aerospace Information Report (AIR) discusses damage to aircraft caused by ground equipment contact and suggests methods of protecting against that damage.

2. REFERENCES:

The following publications form a part of this specification to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order. Nothing in this specification, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

2.1 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

ARP1247 General Requirements for Aerospace Ground Support Equipment Motorized and Nonmotorized

2.2 ASTM Publications:

Available from ASTM, 100 Barr Harbor, West Conshohocken, PA 19428-2959.

ASTM D 412 Test Methods for Vulcanized Rubber and Thermoplastic Rubber and Thermoplastic Elastomers

3. GENERAL DISCUSSION, MATERIALS, AND APPLICATION:

3.1 Fenders General:

Most ground equipment damage to aircraft is described as skin punctures, dents, and abrasions in the fuselage areas adjacent to and below passenger, cargo, and galley doors. These loading and servicing areas are served by various types of servicing equipment. Most of these are equipped with rubber cylinders and/or other protective pads, positioned on the equipment at points normally in contact with, or in proximity to, the aircraft skin during servicing. Widely differing methods of installation and varying materials of these devices exist. Some of these have contributed directly to aircraft damage.

3.2 Operation General:

It is necessary also to examine the approach of vehicles and equipment to the aircraft fuselage. Some servicing positions are at points on the aircraft where the fuselage tapers. This tapering may cause the driver and signalman to misjudge the interface with the airplane. The contacting surface may then be jammed against the fuselage. Also, some positions may not permit the vehicle contact surfaces to be brought parallel to the fuselage. Care must be taken to keep fender contacting surfaces sufficiently away from the fuselage to prevent over-compression if the aircraft settles.

3.3 Application:

All ground equipment used in direct contact with or proximity to the aircraft should be fitted with nonmarring cushion devices known as "fenders". Any portion of the equipment which normally comes within 6 in (150 mm) of aircraft in normal operation should be so equipped.

3.4 Characteristics:

3.4.1 Fenders shall be functional in all environmental conditions as outlined in ARP1247.

3.4.2 Fenders must resist lubricants, fluids, and solvents used in aircraft servicing and maintenance.

3.4.3 Fender material shall be of a nonscuffing, nonmarring type material.

3.4.4 Tensile strength of fender material shall be a minimum of 1200 psi (8.27 MPa).

3.4.5 Fender tear strength shall be a minimum of 650 pli (1.14 kN/cm).

3.4.6 Fender hardness shall have a nominal rating (Shore-A) per Section 5.

3.4.7 Elongation rating of all fenders shall be a minimum of 65%.

4. DAMAGE CAUSES AND METHODS OF CONTROL:

4.1 Excessive Approach Speed:

Speed should be reduced appropriately when maneuvering near the aircraft. Docking speed of about 1 in/s (25 mm/s) should be initiated at approximately 18 in (457 mm) prior to contact with the working surface. Judgment/caution should be applied so as not to cause an aggressive contact with the aircraft (see 6.1.1).

4.2 Inadequate Coverage of Contact Area:

Fenders should not be too short, failing to cover the entire length of contact area or leaving sharp cutting ends exposed. Cylinders should wrap around or extend beyond ends at least 2 in (50 mm). Item 2B, Figure 1, depicts correct design.

4.3 Cylinder Thickness Not Adequate:

Large hexagonal head bolts may pierce the thin-walled (approximately .25 in (6 mm), Item 3, Figure 1) rubber cylinder and then contact the aircraft skin. At the ends the cylinders compress easiest, therefore the thin-walled cylinder is especially ineffective in preventing aircraft damage.

4.4 Incorrect Choice of Fender:

Consideration must be given to type of equipment and aircraft area contact. Some units have a sort of "pecking" action when braked and require fenders such as type "O" with greater compressibility.

4.5 Rubber Cylinder Deterioration:

Some rubber materials are subject to deterioration from environmental conditions. Aircraft fluid contact with unbuffered rubbers can cause deterioration. An environmentally induced breakdown in the structure of fender can result in deteriorated performance as a protective device.

4.6 Method of Installation:

Of even greater importance than thickness or condition in the effectiveness of these protective devices is the manner in which they are installed (Figure 2).

4.6.1 The ends of the rubber cylinder must extend beyond the steel strap or channel. Item 5A, Figure 1, depicts incorrect design.

4.6.2 The steel strap or channel can penetrate the end walls of the rubber cylinder. The strap is generally affixed to vehicle by large, damage inducing hexagonal head bolts. Channel iron itself also has a cutting edge (see Item 5B, Figure 1). These hazards must be taken into account.

BASIC FENDER INSTALLATION

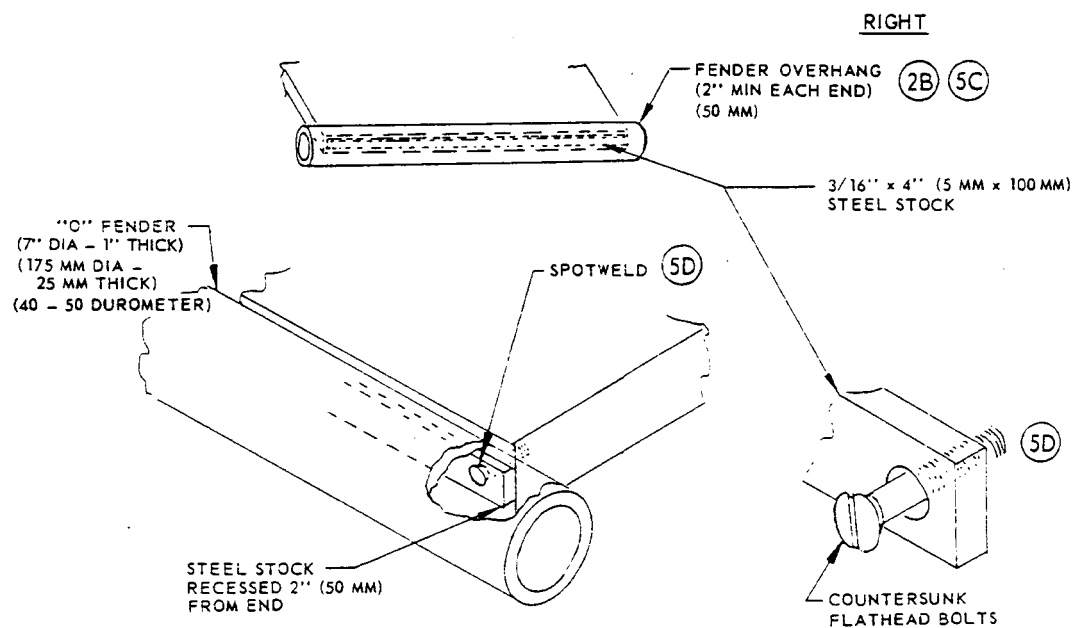
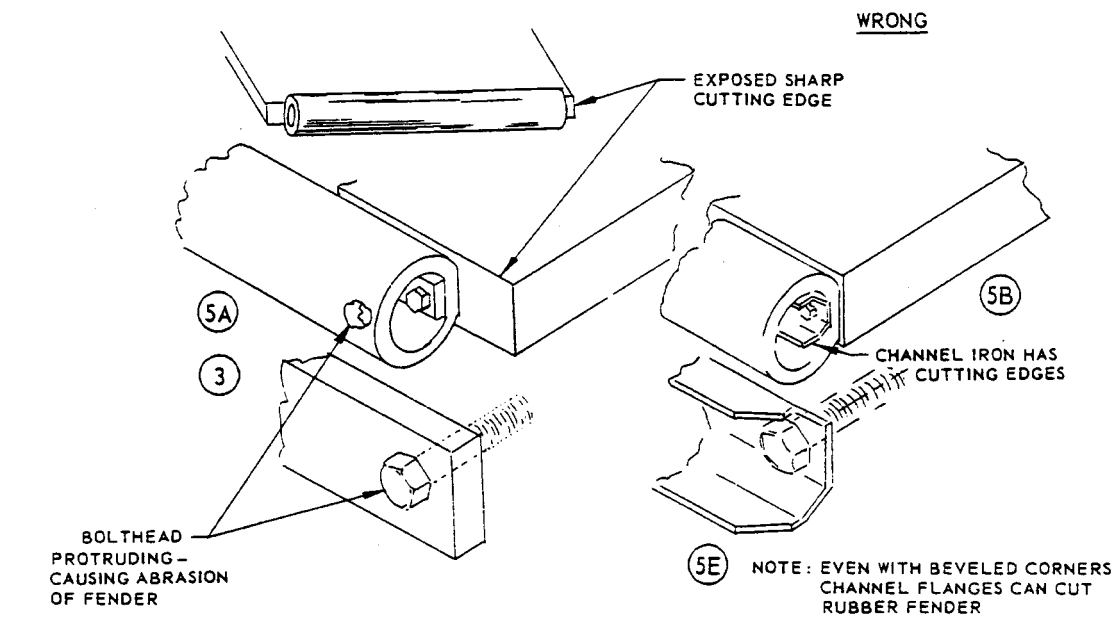


FIGURE 1 - Basic Fender Installation