Chapter 3-1-3

ABRASIVE BLASTING METHOD OF CORROSION REMOVAL

CONTENTS

Introduction

1 Abrasive blasting (AB) is a corrosion removal process in which small, hard particles are shot at high speed against a corroded area from a gun powered by compressed air. The abrasive particles impinge on the corroded area and shatter the relatively brittle corrosion products. Several materials including glass beads, aluminium oxide and chopped steel wire can be used as a blasting medium. However, for aircraft structures, only glass beads and aluminium oxide are to be used.

2 In addition to removing corrosion products, glass bead blasting has a light peening effect on the surface of the parent metal. Often peening is beneficial: the surface layers are left in a state of compression, making the metal more resistant to stress corrosion and fatigue. Although peening of the surface material can be detrimental if corrosion products are trapped and cracks hidden. Aluminium oxide does not tend to trap corrosion products owing to the sharper profile of the particles, but the peening effect is not as great as that of glass beads. Ideally, corrosion should be removed using aluminium oxide and the surface lightly blasted using glass beads to introduce compression. Only glass beads, size 75 microns (Vacu bead size L) and aluminium oxide, size 80/120 or 120/150 are to be used.

Note...

On magnesium alloy structures, the only permitted abrasive is glass bead.

Abrasive blasting equipment

3 Descriptions, servicing schedules and methods of operation of Vacu-Blast AB equipment are given in AP 119G-0129-1. Only the Vacu-Blast Junior Mk 2 AE/LA, modified as described in AP 119G-0129-1, and the Special Vacu-Beadster may be used to remove corrosion from aircraft structures.

Operating consideration

Safety precautions

4 There are special AB precautions in addition to the normal safety

precautions prescribed in the appropriate aircraft Safety and Servicing Notes. Failure to comply with these may result in injury to personnel or damage to aircraft structures or systems. Because AB can be dangerous, its use is restricted to authorised personnel.

Fire/explosion risk

5 Fine dry particles of some metals, notably titanium and magnesium, can form explosive mixtures in air and can ignite spontaneously. Operators are to be briefed on the precautionary measures, as part of their training.

Operator safety

6 The health risk to operators is small. All debris and beads are recovered by the equipment, and spillage past the gun brush is normally rare. Operators are to wear protective goggles and a face mask as precautions against accidental spillage during blasting. The blast gun is not to be removed from the work surface until blasting has completely stopped. The noise generated is not ordinarily sufficient to require operators to wear ear defenders but these must be worn when AB is done in confined spaces. Spilled abrasive is to be picked up immediately after spillage, as it can make floors and aircraft upper surfaces slippery and highly dangerous.

Electrical safety

7 Because static electricity can build up in the hoses, the machine is to be bonded to the aircraft, and the aircraft is to be correctly earthed.

Surface preparation and paint removal

8 AB will not remove sound polyurethane or epoxy paint from an aircraft structure, but it will remove paint that does not properly adhere. Although surface corrosion is unlikely to occur under sound polyurethane paint, some paint surrounding a corroded area must first be stripped with the aid of paint stripper. Corroded areas to be blasted must then be degreased, cleaned and dried to prevent contamination and clogging of the beads.

Dwell times

9 The normal method of using the blasting gun is to make smooth, steady traverses across the work surface. Corrosion products and a little parent metal will be removed by the blast at a rate inversely proportional to the speed of movement. More material will be removed from a spot at which the gun is allowed to stop or dwell. The dwell time must be as short as possible consistent with the complete removal of corrosion products and must not exceed 30 seconds.

Minimum sheet metal thickness

10 If excessive air pressure is used thin unsupported skins may be distorted. The normal technique is to start blasting at a low pressure, and increase the pressure until corrosion product removal is effective, while watching the skin for signs of damage. The operator is to examine the work surface frequently, using a small hand magnifier, to check the effectiveness of corrosion product removal and the surface finish. If this procedure is followed, there is no minimum limit on the skin thickness that may be blasted.

Aircraft contamination

11 In addition to considerations of dwell time and minimum sheet thickness covered in para 9 and 10, other precautions are required to prevent damage to aircraft structures and systems. Abrasives that are contaminated or have been

used on ferrous metal surfaces are not to be used subsequently on non-ferrous structures. Adjacent steel components or skin are to be masked, unless the reclaim unit is fitted with an effective magnetic separator. Aircraft apertures (such as vents, intakes and drain holes) and system components are to be masked to prevent ingress of abrasive. Although abrasives of the approved size are not a serious FOD hazard, they can cause damage to mechanisms similar to that caused by sand.