STANDARD OVERHAUL PRACTICES MANUAL

INSTALLATION OF CASTABLE NON-METAL SHIMS

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STANDARD OVERHAUL PRACTICES MANUAL

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To: All holders of INSTALLATION OF CASTABLE NON-METAL SHIMS 20-50-15.

Attached is the current revision to this STANDARD OVERHAUL PRACTICES MANUAL

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Location of Change	Description of Change
	NO HIGHLIGHTS

STANDARD OVERHAUL PRACTICES MANUAL

Subject/Page	Date	Subject/Page	Date	Subject/Page	Date
TITLE PAGE					
O 1	Jul 01/2009				
2	BLANK				
20-50-15 TRANSMITTAL LETTER					
O 1	Jul 01/2009				
2	BLANK				
20-50-15 HIGHLIGHTS					
O 1	Jul 01/2009				
2	BLANK				
20-50-15 EFFECTIVE PAGES					
1	Jul 01/2009				
2	BLANK				
20-50-15 CONTENTS					
1	Nov 01/2006				
2	BLANK				
20-50-15 REVISION RECORD					
1	Jul 01/2005				
2	Jul 01/2005				
20-50-15 RECORD OF TEMPORARY REVISIONS					
1	Jul 01/2005				
2	Jul 01/2005				
20-50-15 INTRODUCTION					
1	Jul 01/2005				
2	BLANK				
20-50-15 SUBJECT					
1	Jul 01/2005				
2	Nov 01/2006				
3	Nov 01/2006				
4	Mar 01/2007				

A = Added, R = Revised, D = Deleted, O = Overflow

TABLE OF CONTENTS

All revisions to this manual will be accompanied by transmittal sheet bearing the revision number. Enter the revision number in numerical order, together with the revision date, the date filed and the initials of the person filing.

Revision		Filed	
Number	Date	Date	Initials

Revision		Filed	
Number	Date	Date	Initials

Revision		Filed	
Number	Date	Date	Initials

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Temporary Revision		Inserted		Removed	
Number	Date	Date	Initials	Date	Initials

Temporary Revision		Inserted		Removed	
Date	Initials	Number	Date	Date	Initials

Temporary Revision		Inserted		Removed	
Number	Date	Date	Initials	Date	Initials

Temporary Revision		Inserted		Removed	
Date	Initials	Number	Date	Date	Initials

INTRODUCTION

1. General

A. The instructions in this manual tell how to do standard shop procedures during maintenance functions from simple checks and replacement to complete shop-type repair.

B. This manual is divided into separate sections:

(1) Title Page

(2) Transmittal Letter

(3) Highlights

(4) Effective Pages

(5) Contents

(6) Revision Record

(7) Record of Temporary Revisions

(8) Introduction

(9) Procedures

C. Refer to SOPM 20-00-00 for a definition of standard industry practices, vendor names and addresses, and an explanation of the True Position Dimensioning symbols used.

D. The data is general. It is not about all situations or specific installations. Use it as a guide to help you write minimum standards.

E. If the component overhaul instructions are different from the data in this subject, use the component overhaul instructions.

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STANDARD OVERHAUL PRACTICES MANUAL

INSTALLATION OF CASTABLE NON-METALLIC SHIMS

1. INTRODUCTION

A. This data in this subject comes from Boeing Process Document D042T613. The airline has or can get a copy of this document.

B. The data is general. It is not about all situations or specific installations. Use it as a guide to help you write minimum standards.

C. Refer to SOPM 20-00-00 for a list of all the vendor names and addresses.

2. SCOPE

A. This subject tells how to make and install castable non-metallic shims. The overhaul instructions will tell you when to use these procedures.

B. If the overhaul instructions are different from those in this subject, use the overhaul instructions.

3. MATERIALS

NOTE: Unless specified, equivalent substitutes must not be used without Boeing approval.

A. Adhesive – Hysol Adhesive EA934NA, Part A and Part B, V33564

B. Methyl Ethyl Ketone (MEK) – TT-M-261 (Ref SOPM 20-60-01)

C. Methyl Isobutyl Ketone (MIBK) – TT-M-268 (Ref SOPM 20-60-01)

D. Masking Tape – Source optional (Ref SOPM 20-60-04)

E. Mold Release Agent – Garan 225 (Ref SOPM 20-60-04)

F. Mold Release Agent - Frekote 1711 (Ref SOPM 20-60-04)

G. Cheesecloth – Source optional

H. Milled Glass Fibers – 1/32 or 1/16 inch length, cationic binder, V45255, or equivalent

I. Phenolic sheets – MIL-P-15035

J. Series 88 solvents (Ref SOPM 20-30-88)

K. Series 91 solvents (Ref SOPM 20-30-91)

4. PREPARATION OF SURFACES TO BE SHIMMED

A. Composite Surfaces

(1) Mark off the areas to be shimmed.

(2) Apply masking tape around to be shimmed to let unwanted adhesive be squeezed out on the masking tape and not on the surfaces of the parts. Give the area protection from contamination until the shim is applied.

(3) With sandpaper, 150 grit or finer, remove the finishes from the surface to be shimmed. Do not go into the fibers or Tedlar bondable film on the inner surface.

NOTE: Most composite parts have a bondable film layer (Tedlar) on the inner surface. This layer must not be removed, grit or sandblasted. Adhesive must be applied directly over the bondable film.

(4) Clean the film or the sanded surface with a Series 91 solvent (Ref SOPM 20-30-91) with clean, oil-free cheesecloth.

B. Metal Surfaces

(1) Mark off the areas to be shimmed.

(2) Apply masking tape around the area to be shimmed, as in Paragraph 4.A.(2) above.

(3) Do not remove the finishes from the mating metal surface which will touch the shim.

(4) Clean surface to be shimmed with a Series 88 solvent (Ref SOPM 20-30-88) with clean, oil-free cheesecloth.

CAUTION: DO NOT LET MOLD RELEASE AGENT TOUCH MATERIALS OR PARTS WHICH COULD BE LATER PAINTED OR BONDED.

(5) Apply mold release agent to metal fitting surface to be shimmed. Spray it on, or wipe it on with clean cheesecloth. This agent will let you remove the shim later, if necessary.

5. MIXING AND PREPARING OF ADHESIVE

A. Mixing

(1) Thoroughly mix 98-102 parts by weight of part A (resin) and 32.5 - 33.5 parts by weight of part B (hardener).

(2) Weigh 12-24 parts by weight of milled glass fibers.

(3) Gradually add glass fibers to mixture of Paragraph 5.A.(1) and mix fully. Continue to mix until the glass fibers are fully mixed with the adhesive.

(4) If foam or air occurs in the mixture, vacuum de-aerating is recommended to minimize voids. Use a vacuum of 25 inches Hg until the foam diminishes. Release vacuum periodically to collapse the foam.

B. Pot Life and Storage

(1) Pot life of mixture (part A and B blended) is a minimum of 30 minutes when mixed per Paragraph 5.A.(1).

(2) After mixture is blended with glass fibers, it can be stored at temperature below -20°F for not more than 15 days. Material premixed and stored in this condition must be thawed at room temperature before you use it.

(3) Individual unmixed components of adhesive (part A and part B) must be stored in clean, airtight containers at room temperature (40-80°F). When stored in this condition, the shelf life of the individual unmixed components is a minimum of 90 days from the date of shipment from the supplier.

6. SHIMMING PROCESS

NOTE: If overhaul instructions do not specify any shimming process in particular, either Class 1 or Class 2 processes may be used.

A. Class 1 Process – Curing pressure applied by clamp-up or tooling fixtures.

(1) Before you apply the adhesive to the faying surfaces, temporarily put the mating surfaces together with clamps. Measure the gaps between the parts, by any method of measurement which will give a true gap reading.

(2) Make sure that all gaps agree with the overhaul instructions before the adhesive is applied.

(3) Prepare surfaces to be shimmed per Paragraph 4.

(4) Prepare adhesive per Paragraph 5.

(5) Apply a thin layer (approximately 0.15 inch thick, with more at the center for resin squeeze-out) of mixed adhesive to faying surface of one of the mating parts.

(6) Join the faying surface of the other metal fitting with the faying surface of the part with adhesive.

(7) Apply clamping pressure at the bondline within the 30-minute pot life of adhesive. Pressure must be sufficient to keep the specified gap limits, as measured in Paragraph 6.A.(1) and Paragraph 6.A.(2) preceding, after the adhesive is cured.

(8) Make a check of the clamping pressure within 30 minutes after you first applied the pressure. By this time, the unwanted adhesive will be squeezed out at the bondline. Tighten the clamps as necessary to keep the gap of the overhaul instructions and be sure that contact exists of high spots stay in contact.

(9) Clean up unwanted adhesive that squeezes out at the bondline, with cheesecloth wet with MIBK or MEK. Wipe the off solvent with a clean dry cheesecloth. Do not wait too long to clean, because the adhesive becomes more difficult to remove as it sets.

(10) Cure the adhesive as shown in Table 1. Keep the clamping pressure on the shim until cure is complete.

(11) Do not drill holes through the adhesive shim, as to install bolts, until the shim is set at room temperature for a minimum of 12 hours.

B. Class 2 Process – Curing pressure applied by pulling torque on bolts. (Lets you use the hole location callout to make installation easier)

(1) Drill a bolt hole (1/32 inch smaller than the bolt specified by the repair manual parts list) at each fastener location in each metal fitting and composite part to be shimmed. Hole size and condition must meet requirements of overhaul instructions by the time shim installation is completed. Make sure that holes in each part are properly aligned.

(2) Assemble the parts and install bolts in each hole.

(3) Measure the gaps between the parts at each bolt location, by any method of measurement which will give a true gap reading.

(4) Make sure that all gaps agree with the overhaul instructions before the adhesive is applied.

(5) Prepare surfaces to be shimmed per Paragraph 4.

(6) Apply mold release agent to the bolts to make them easier to remove after the adhesive is cured.

(7) Prepare adhesive per Paragraph 5.

(8) Apply a thin layer (approximately 0.15 inch thick, with more at the center for resin squeeze-out) of mixed adhesive to faying surface of one of the mating parts.

(9) Assemble the parts and install undersize bolts. Tighten the nuts on the bolts within the 30-minute pot life of the adhesive. Torque on bolts must be sufficient to keep the specified gap limits as measured in Paragraph 6.B.(3) and Paragraph 6.B.(4) preceding, after adhesive is cured.

(10) Make a check of the torque on the bolts within 30 minutes after you first applied the torque. At this time, nuts can be tightened as necessary to keep the gap conditions specified per overhaul instructions and to be sure that high spots stay in contact between mating surfaces.

(11) Clean up unwanted adhesive that squeezes out at the bondline, with cheesecloth wet with MIBK or MEK. Wipe off the solvent with a dry clean cheesecloth. Do not wait too long to clean because the adhesive becomes more difficult to remove as it sets.

(12) Cure the adhesive as shown in Table 1. Keep the pressure on the joint with the bolts in each hole until the adhesive is cured.

(13) Remove the undersize bolts. Drill the holes to the size as given in the overhaul instructions. Then install fasteners as necessary. As each undersize bolt is removed, install the specified fasteners at that location before you remove the next bolt.

Table 1: EA934NA Adhesive Cure Temperature vs. Time

CURE TEMPERATURE (DEGREES F)	CURE TIME (HOURS)
160 *[1]	10
150	13
140	17
130	20
120	24
110	32
100	42
90	60
80	96

*[1] CAUTION: DO NOT GO HOTTER THAN 170°F CURE TEMPERATURE AT ANY TIME.