TO: ALL HOLDERS OF REPAIR OF HIGH-STRENGTH STEEL LANDING GEAR PARTS
COMPONENT MAINTENANCE MANUAL 32-00-05

REVISION NO. 4 DATED JUL 01/05

HIGHLIGHTS

Pages which have been added or revised are outlined below together with the highlights of the revision. Remove and insert the affected pages as listed and enter the revision number and date on the Record of Revision Sheet.

CHAPTER/SECTION AND PAGE NO.	DESCRIPTION OF CHANGE
REPAIR-GEN 601-602,604-606, 608-611	Added clarifications and updated callouts.
REPAIR-GEN 602-603,605,607	Added procedures for HVOF-coated parts.

REPAIR OF HIGH-STRENGTH STEEL LANDING GEAR PARTS

NO ASSIGNED PART NUMBER

COMPONENT MAINTENANCE MANUAL

REVISION RECORD

- Retain this record in front of manual. On receipt of revision, insert revised pages in the manual, and enter revision number, date inserted and initial.

REVISION NUMBER	REVISION DATE	DATE FILED	BY	REVISION NUMBER	REVISION DATE	DATE FILED	BY

TEMPORARY REVISION AND SERVICE BULLETIN RECORD

BOEING SERVICE BULLETIN	BOEING TEMPORARY REVISION	OTHER DIRECTIVE	DATE OF INCORPORATION INTO MANUAL

PAGE	DATE	CODE
32-00-05		
TITLE PAGE		
1	NOV 01/92	01
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REVISION RECORD		
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REPAIR-GENERAL		
*601	JUL 01/05	01.1
*602	JUL 01/05	01.1
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REPAIR OF HIGH-STRENGTH STEEL LANDING GEAR PARTS

DESCRIPTION AND OPERATION

1. The procedures in this subject are for alloy steel landing gear parts heat-treated 180 ksi or above.

2. The data is general. It is not about specific parts or installations. Use this data as a guide to help you write minimum standards.

3. These procedures refer to the more general procedures in the Standard Overhaul Practices Manual (Chapter 20), document D6-51702. If the procedures in this subject do not agree with those in the Standard Overhaul Practices Manual, use the procedures in this subject.

4. These procedures start with parts which are removed from the airplane and disassembled for overhaul, but not yet put through shop processes such as stress relief, finish removal or material removal. Refer to the applicable overhaul instructions for details about specific repairs or refinish for a part. If the procedures in this subject do not agree with those in the overhaul instructions, use the procedures in the overhaul instructions.

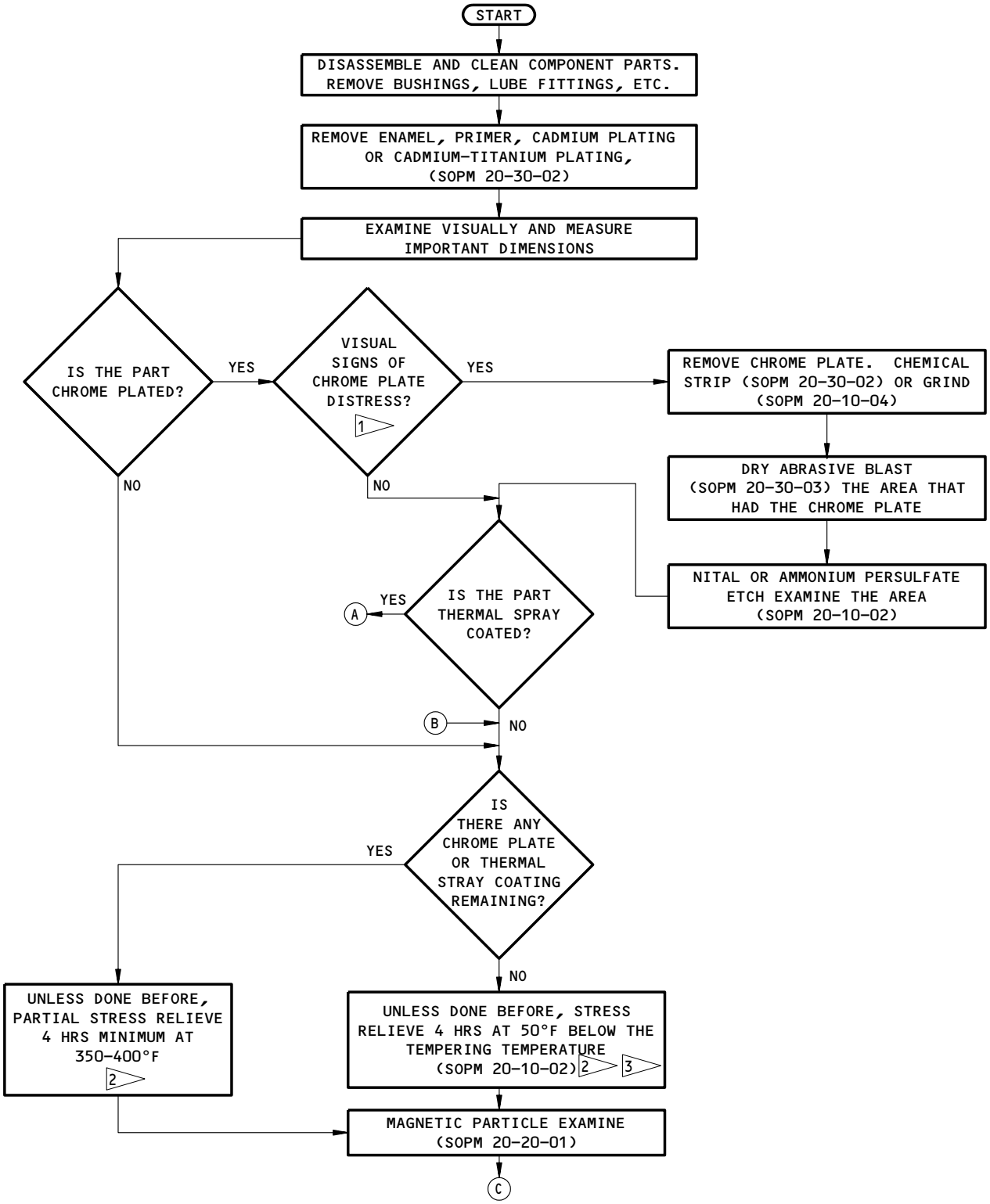
5. These procedures are typical for all parts. The repair instructions for the specific part will tell you when to use these procedures.

REPAIR

1. Use the flow charts (Fig. 601, 602) as a guide when you repair steel landing gear parts.

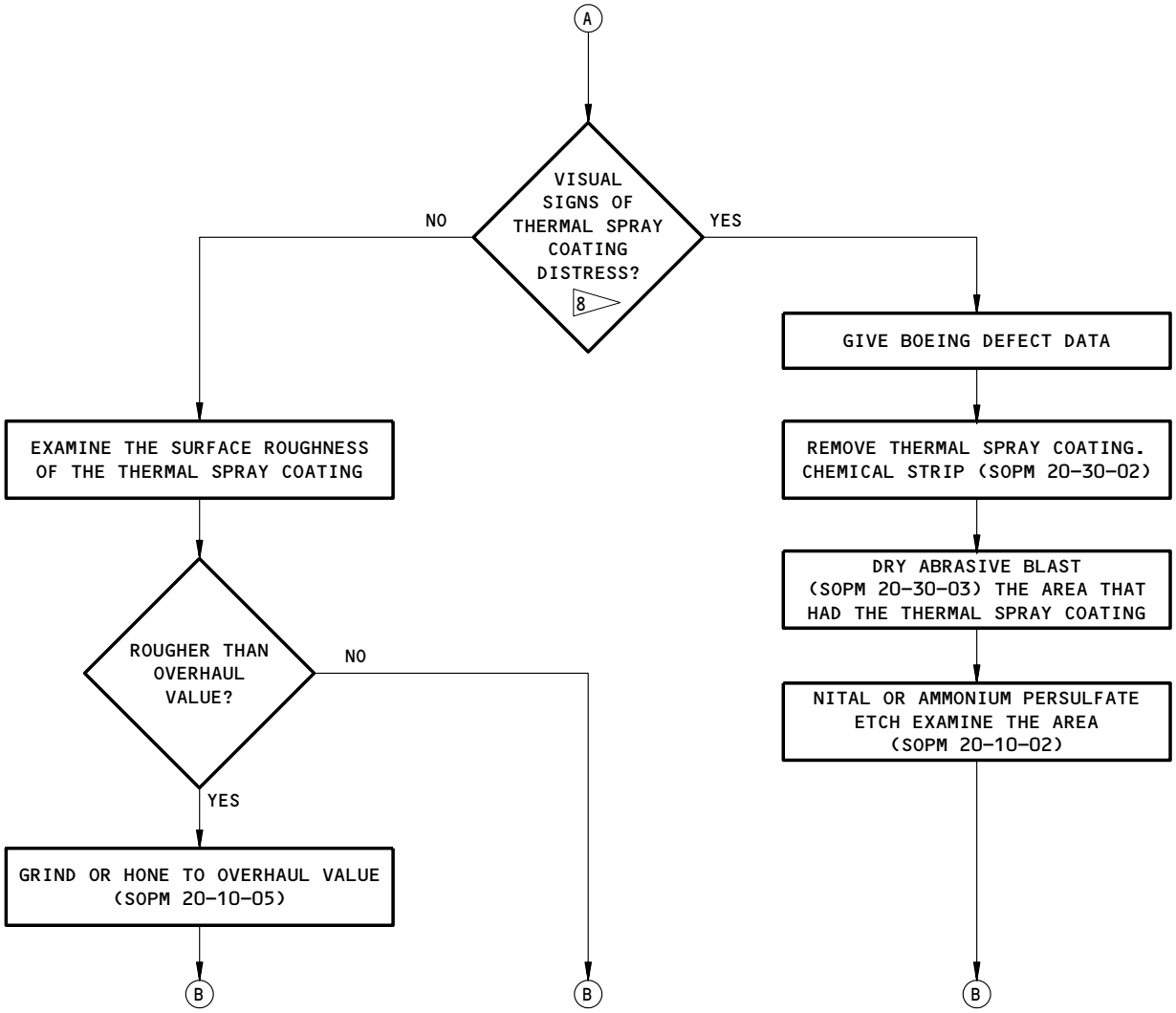
2. Refer to the following standard practices, as applicable:

20-10-02	Machining of Alloy Steel
20-10-03	Shot Peening
20-10-04	Grinding of Chrome Mated Parts
20-20-01	Magnetic Particle Inspection
20-20-02	Penetrant Methods of Inspection
20-30-02	Stripping of Protective Finishes
20-30-03	General Cleaning Procedures
20-41-01	Decoding Table for Boeing Finish Codes
20-42-01	Low Hydrogen Embrittlement Cadmium Plating
20-42-02	Low Hydrogen Embrittlement Cadmium-Titanium Alloy Plating
20-42-03	Hard Chrome Plating
20-42-05	Bright Cadmium Plating
20-42-09	Electrodeposited Nickel Plating
20-50-03	Bearing and Bushing Replacement



Basic Repair Procedure
Figure 601 (Sheet 1)

A14166



Basic Repair Procedure
Figure 601 (Sheet 2)

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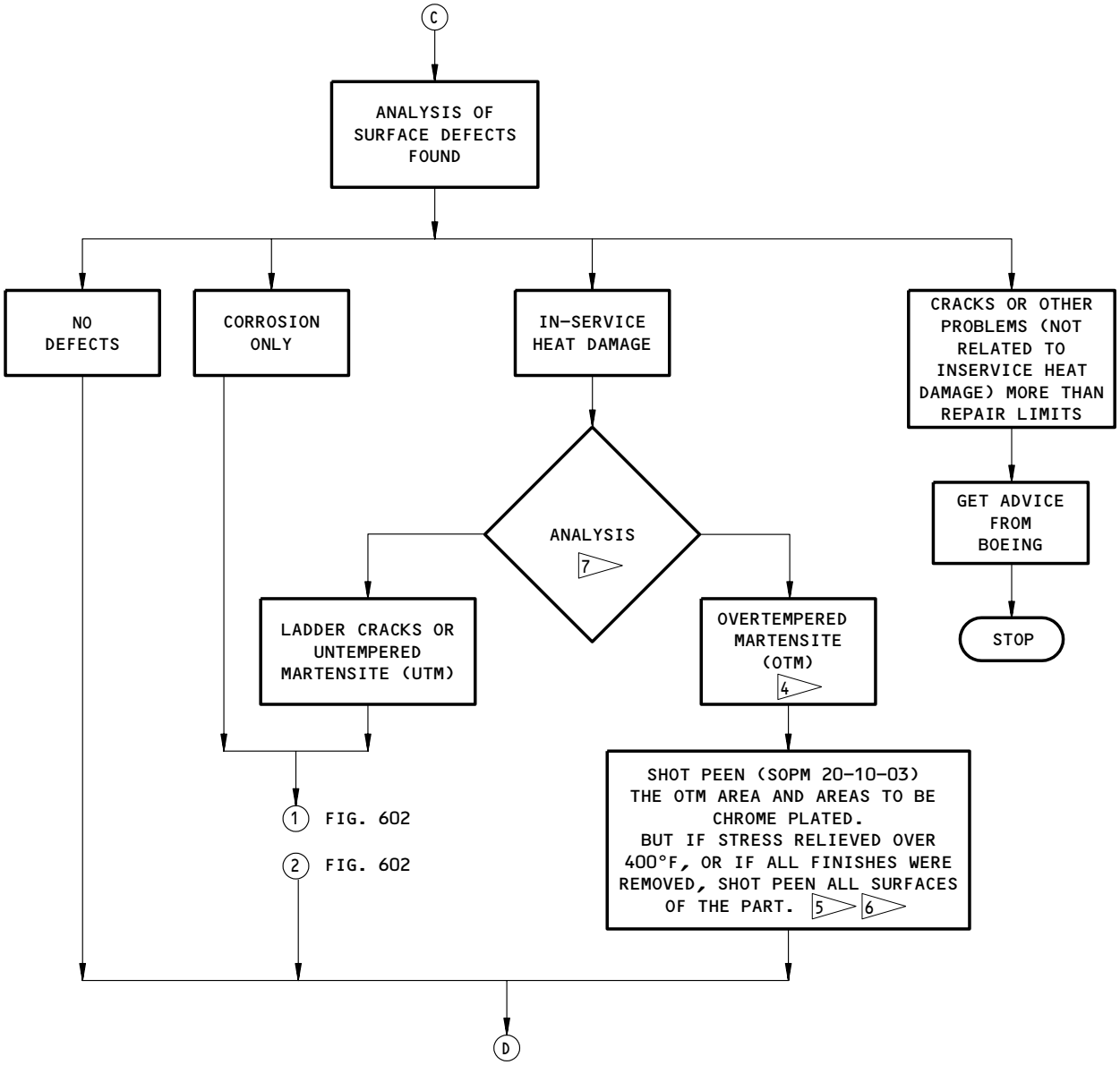

Basic Repair Procedure
Figure 601 (Sheet 3)

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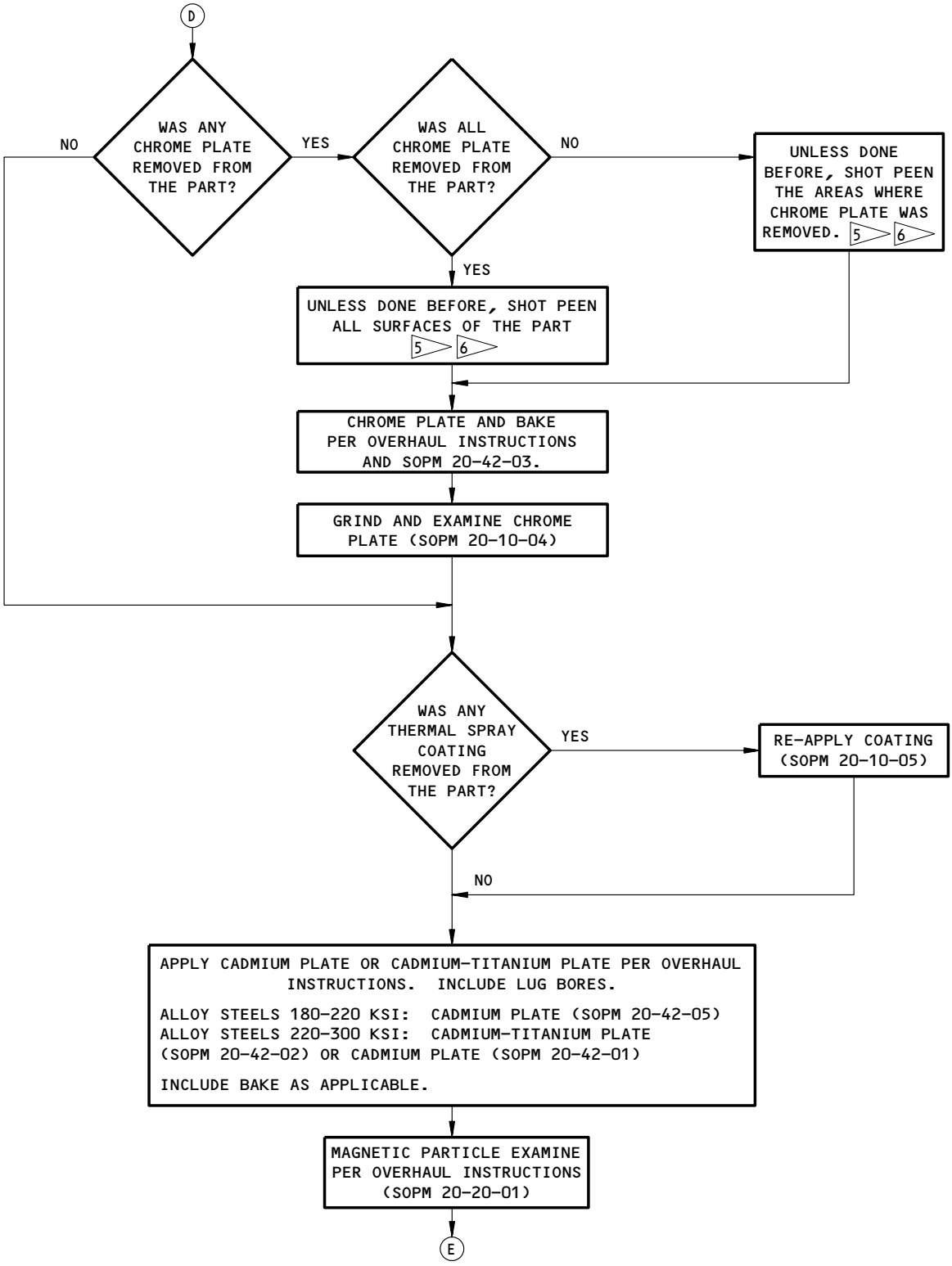
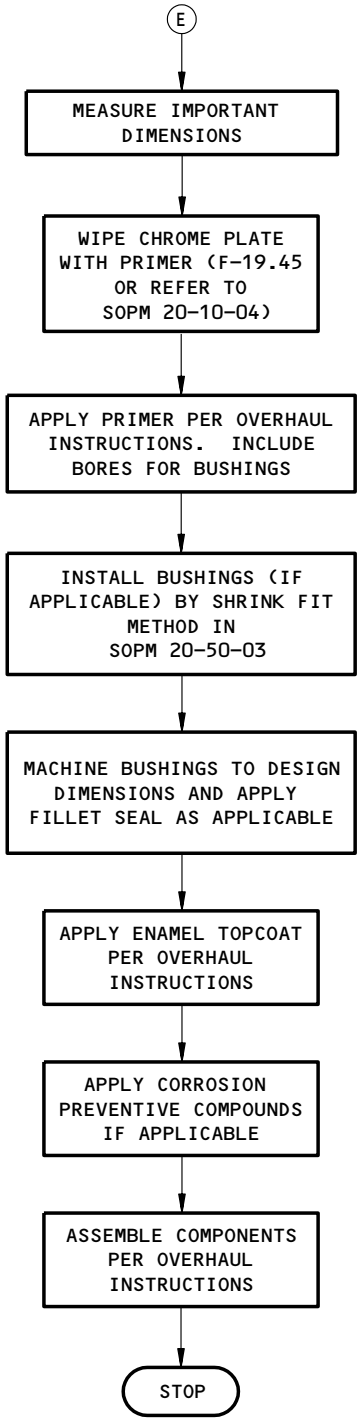


Basic Repair Procedure
Figure 601 (Sheet 4)

A14211



Basic Repair Procedure
Figure 601 (Sheet 5)

A14227

1 SIGNS OF CHROME PLATE DISTRESS INCLUDE LADDER CRACKS, MATERIAL OR BRONZE TRANSFER, DARKENED STREAKS, PLATING WHICH IS SMEARED, CHIPPED, CRACKED, FLAKED, A DIFFERENT COLOR, OR GONE. VISUALLY EXAMINE THE PLATED SURFACES WITH LIGHT AT AN ANGLE, BUT DO NOT USE MAGNIFICATION. LOOK AT THE SURFACES FROM DIFFERENT ANGLES. YOU CAN ALSO FIND CRACKS IN THE PLATING WITH THE SHARP POINT OF A DENTAL EXPLORER.

2 SET THE FURNACE TEMPERATURE TO STAY IN THE SPECIFIED RANGE. START THE TIMER WHEN ALL THE THERMOCOUPLES ARE BACK INTO THE SPECIFIED TEMPERATURE RANGE AFTER YOU PUT THE PARTS INTO THE FURNACE.

3 AS AN ALTERNATIVE, PARTIAL STRESS RELIEVE 4 HRS AT 350-400°F. 2

4 FOR STRESS ANALYSIS ONLY, MAKE THE ASSUMPTION THAT THE ETCHED AREA THAT INDICATES OTM IS 0.010 INCH DEEP AND DOES NOT SUPPORT LOADS. THIS ASSUMPTION WILL HELP YOU FIND OUT IF THE DEFECTS ARE MORE THAN THE REPAIR LIMITS IN THE OVERHAUL INSTRUCTIONS. (IF THEY ARE, BOEING APPROVAL OF THE REPAIR IS NECESSARY.) OVERTEMPERED MATERIAL CAN STAY ON FLAT OR LIGHTLY ROUNDED SURFACES, SUCH AS THE ID OR OD OF LANDING GEAR CYLINDERS. OVERTEMPERED MATERIAL MUST BE REMOVED PER FIG. 602 IF THE OTM EXTENDS INTO AN EDGE, CHAMFER, CORNER, RADIUS, FILLET, OR HOLE, OR IF IT IS MADE DURING MACHINING, GRINDING, OR OTHER OVERHAUL OPERATIONS.

5 IF THE SHOT HAS CADMIUM CONTAMINATION, CLEAN THE SHOT PEENED SURFACES AFTER THE PEEN AND BEFORE YOU PLATE. USE ABRASIVE GRIT BLAST OR AMMONIUM NITRATE.

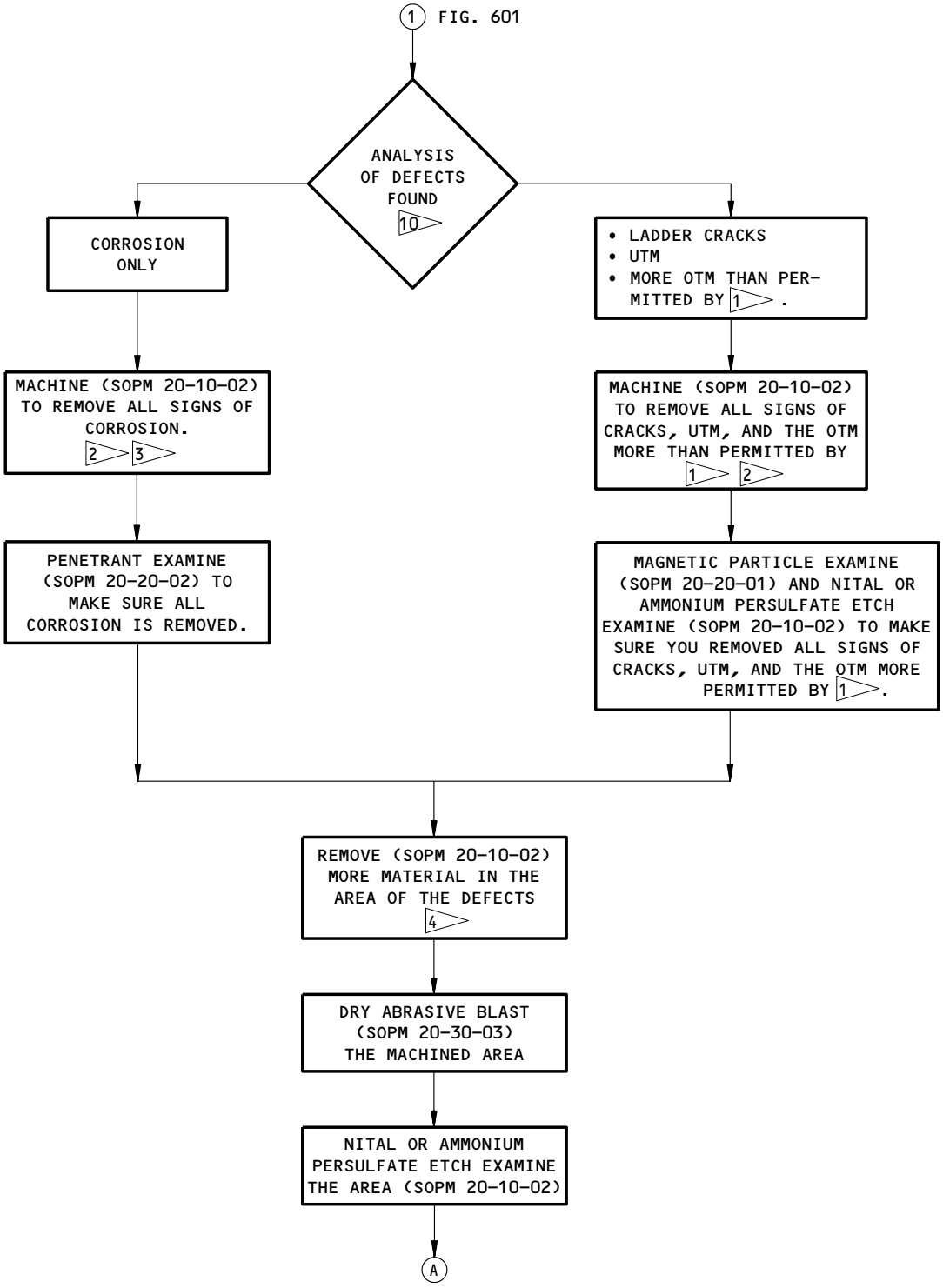
6 FOR AREAS NOT TO BE SHOT PEENED, REFER TO APPLICABLE OVERHAUL INSTRUCTIONS.

7 REFER TO SOPM 20-10-02 FOR DESCRIPTIONS OF OVERTEMPERED AND UNTEMPERED MARTENSITE.

8 VISUALLY EXAMINE THE THERMAL STRAY COATING WITH UNAIDED EYES FOR LADDER CRACKS, SPALLING, PULL-OUTS, CRACKS, CHIPS, FLAKES, LIFTING, COLOR CHANGES BECAUSE OF HEAT, OR OTHER DEFECTS. IF YOU THINK THERE ARE DEFECTS, EXAMINE WITH A MINIMUM OF 10X MAGNIFICATION. YOU CAN USE A DENTAL PICK TO HELP FIND DEFECTS. YOU CAN ALSO USE LOW SENSITIVITY FLUORESCENT PENETRANT EXAMINATION (SOPM 20-20-02) TO EXAMINE LARGE PARTS FOR AREAS TO BE VISUALLY EXAMINED.

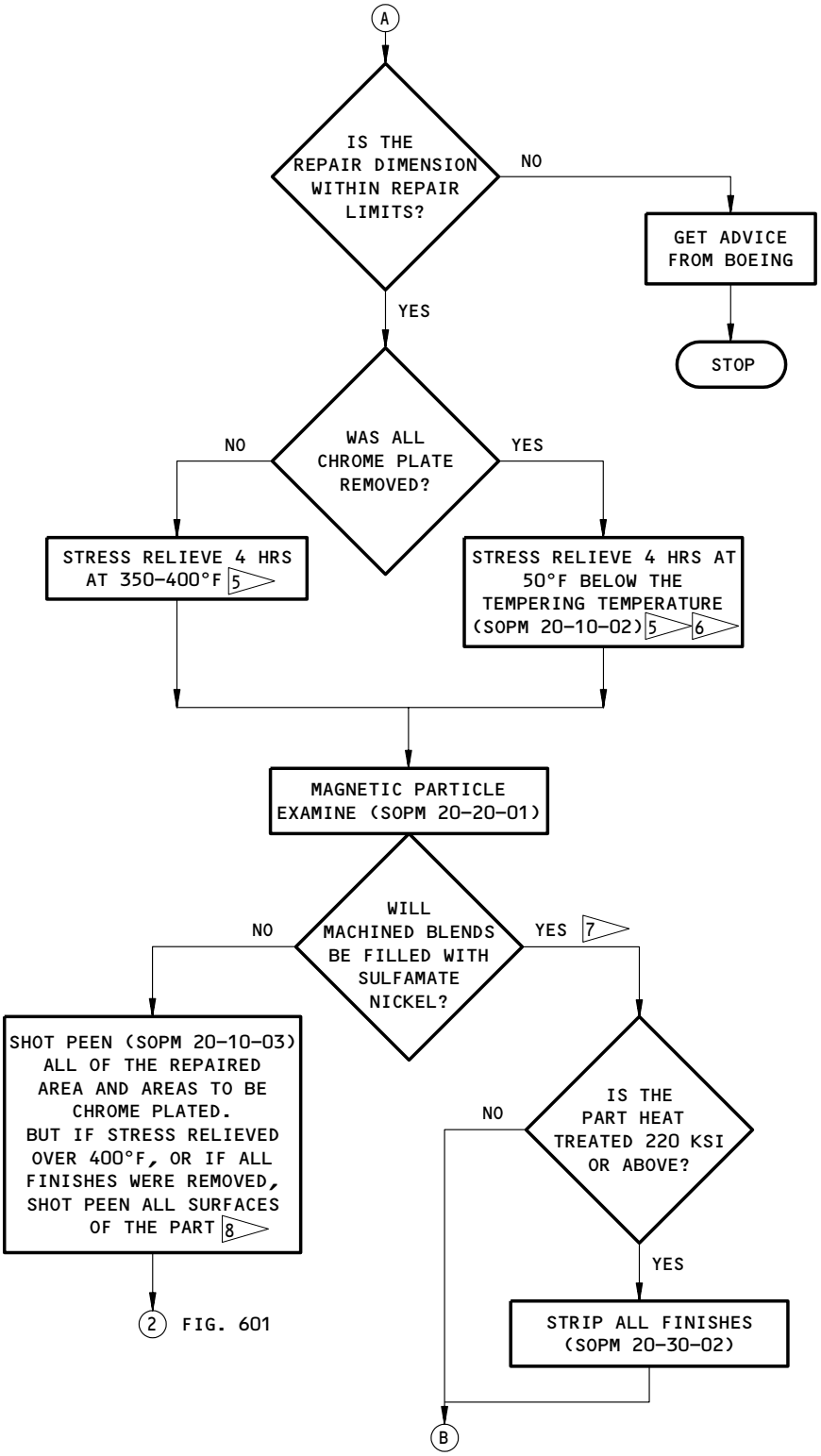
Basic Repair Procedure
Figure 601 (Sheet 6)

A14234



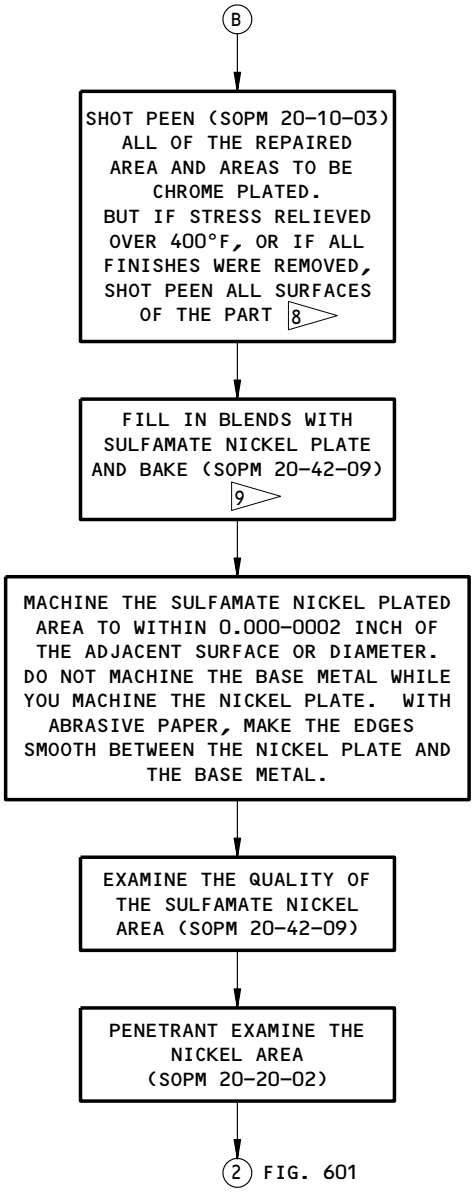
Removal of Corrosion or In-Service Heat Damage
Figure 602 (Sheet 1)

A14248



Removal of Corrosion or In-Service Heat Damage
Figure 602 (Sheet 2)

A14271



Removal of Corrosion or In-Service Heat Damage
Figure 602 (Sheet 3)

A14290

1. FOR STRESS ANALYSIS ONLY, MAKE THE ASSUMPTION THAT THE ETCHED AREA THAT INDICATES OTM IS 0.010 INCH DEEP AND DOES NOT SUPPORT LOADS. THIS ASSUMPTION WILL HELP YOU FIND OUT IF THE DEFECTS ARE MORE THAN THE REPAIR LIMITS IN THE OVERHAUL INSTRUCTIONS. (IF THEY ARE, BOEING APPROVAL OF THE REPAIR IS NECESSARY). OVERTEMPERED MATERIAL CAN STAY ON FLAT OR LIGHTLY ROUNDED SURFACES, SUCH AS THE ID OR OD OF LANDING GEAR CYLINDERS. OVERTEMPERED MATERIAL MUST BE REMOVED IF THE OTM EXTENDS INTO AN EDGE, CHAMFER, CORNER, RADIUS, FILLET OR HOLE, OR IF IT WAS MADE DURING MANUFACTURE.
2. FOR APPROVED REPAIRS AND LIMITS, REFER TO APPLICABLE OVERHAUL INSTRUCTIONS. MATERIAL REMOVAL MUST INCLUDE ALLOWANCE FOR INSURANCE CUTS PER 4.
3. REMOVAL OF LIGHT CORROSION WITH HAND HELD TOOLS WITHOUT POWER (ABRASIVE CLOTH, FILES, ETC.) IS ACCEPTABLE IF ALL ACTIVE CORROSION IS REMOVED AND THE TASK IS COMPLETED WITH THE CORRECT SURFACE FINISH.
4. WE HIGHLY RECOMMEND THAT YOU REMOVE 0.003-0.005 INCH MORE MATERIAL FROM A SURFACE WHERE KNOWN HEAT DAMAGE, CRACKS, OR CORROSION WAS REMOVED. BUT BEFORE YOU DO THIS, MAKE SURE THE REPAIR WILL NOT BE MORE THAN THE LIMIT IN THE OVERHAUL INSTRUCTIONS. (IF THEY WILL BE, BOEING APPROVAL WILL BE NECESSARY BEFORE YOU CAN REPAIR THE PART).
5. SET THE FURNACE TEMPERATURE TO STAY IN THE SPECIFIED RANGE. START THE TIMER WHEN ALL THE THERMO-COUPLES ARE BACK INTO THE SPECIFIED TEMPERATURE RANGE AFTER YOU PUT THE PARTS INTO THE FURNACE.
6. AS AN ALTERNATIVE, PARTIAL STRESS RELIEVE 4 HRS AT 350-400°F. 5
7. SULFAMATE NICKEL PLATE (SOPM 20-42-09) CAN BE USED TO BUILD UP SURFACES WHERE MATERIAL WAS LOCALLY REMOVED MORE THAN THE DESIGN DIMENSIONS. THE THICKNESS OF THE NICKEL AREA IS LIMITED ONLY BY THE AMOUNT OF BASE METAL THAT CAN BE REMOVED AND KEEP THE PART STRUCTURALLY ACCEPTABLE. IF THIS NICKEL REPAIR IS NOT IN THE APPLICABLE OVERHAUL INSTRUCTIONS, GET APPROVAL FROM BOEING STRUCTURES ENGINEERING. IMPORTANT FACTORS ARE LOCATION, EFFECT ON FATIGUE, BEARING STRESSES IN THE REPAIRED AREA, AND SUFFICIENT HYDROGEN BAKE-OUT PATH.
8. FOR AREAS NOT TO BE SHOT PEENED, REFER TO APPLICABLE OVERHAUL INSTRUCTIONS.
9. BLENDS CAN BE FILLED WITH CHROME PLATE IF THE SURFACE WAS CHROME PLATED AND THE TOTAL DEPTH OF PLATING REQUIRED TO GET BACK TO DESIGN DIMENSION IS NOT MORE THAN 0.015 INCH.
10. REFER TO SOPM 20-10-02 FOR DESCRIPTION OF OVERTEMPERED AND UNTEMPERED MARTENSITE.

Removal of Corrosion or In-Service Heat Damage
Figure 602 (Sheet 4)