Temporary Maintenance Instruction
TMI 139-544

Main rotor blade - Lap plate damage – Repair procedure

All AW139 Helicopters

The technical content of this document is approved under the authority of DOA nr. EASA.21J.005.

The present TMI will be evaluated for its introduction in the standard set of Technical Publication.
If no further notice is received, the present document expires on: July 12th, 2022.

2021-07-12

Introduction

This TMI provides the instructions to perform the bonding of an external Butt Strap as protection of the gap at the junction between the blade body and the tip cap, when the lap plate embedded under that junction is damaged.
The repair procedure that follows is applicable to:

- 3G6210A00131 - Main rotor blade
- 3G6210A00134 - Main rotor blade
- 4G6210A00132 - Main rotor blade (FIPS)

The content of this TMI will be endorsed within the Component repair and overhaul publication (CR&OP) at the earliest opportunity.

Main rotor blade - Lap plate damage

Repair procedure

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References

Table 1 References

Data module/Technical publication	Title
39-A-62-11-01-00A-37DA-C	Main rotor blade - Static balance
39-A-GF-05-00-00A-066A-A	Hammer (steel) M/R and T/R blades tapping insp. (GF-05-00) - Support equipment and tools data
39-A-ZZ-00-00-00A-066A-A	Local supply support equipment and tools - Support equipment and tools data
CSPP-A-60-50-01-00B-259A-C	Disassembled metal components (surface preparation for bonding) - Other procedure to protect surfaces

Preliminary requirements

Required Conditions

Table 2 Required conditions

Action/Condition	Data module/Technical publication
None	

Support Equipment

Table 3 Support Equipment

Name	Identification No.	Quantity
Hammer (steel)	GF-05-00	1
Vacuum bag set	Local supply	1
Heating lamp	Local supply	AR
Heating blanket (with thermocouple)	Local supply	1

Supplies

Table 4 Supplies

Name	Identification No.	Quantity
Solvent	C005	AR
Lint-free cloth	C011	AR
Abrasive paper	C016	AR
Abrasive paper	C017	AR
Adhesive	C057	AR
Aliphatic naphtha	C059	AR
Adhesive	C189	AR
Primer	C190	AR
Teflon tape	C223	AR
Abrasive paper	C419	AR
Abrasive paper	C420	AR
Peel ply	C325	AR

Spares

Table 5 Spares

Name	Identification No.	Quantity
Butt strap	3G6210Z00531	1

Safety conditions

WARNING

The materials that follow are dangerous. Before you do this procedure, make sure that you know all the safety precautions and first aid instructions for these materials:

- **Solvent (C005)**
- **Primer (C190)**
- **Adhesive (C057)**
- **Adhesive (C189) .**

Procedure

1 Put the main rotor blade (3, Fig 1) on an applicable work table.

2 Clean the “repair area”, between the blade erosion shield (1) and the tip cap erosion shield (2), with a clean Lint-free cloth (C011) and the Solvent (C005) or the Aliphatic naphtha (C059) . Let it dry for 30 minutes minimum at ambient temperature. Refer to Detail A of Fig 1 .

3 Make sure that the gap between the erosion shields is filled fully with the grey adhesive. If not, apply Adhesive (C057) with a non-metallic putty knife. Make sure that it flushes with the blade profile.

4 Let the adhesive cure at ambient temperature (approximately 22 thru 26 °C (72 thru 79 °F)) for a minimum of 24 hours for blade handling and for a minimum of 5 days for blade operation with firm contact pressure.

Note

To cure the adhesive, you can also use an Heating lamp (ZZ-00-00) . If you use an heating lamp, you must leave the adhesive to cure at a temperature of 60 thru 70 °C (140 thru 158 °F) for at least 120 minutes.

5 Protect from adhesive squeeze-out the boundary of the “repair area” on the blade with Teflon tape (C223) , upper side and lower side.

6 Precure the bonding surface on the erosion shields (see Detail A of Fig 2). Do as follows:

6.1 Lightly sand the bonding surface of the blade with Abrasive paper (C419) or Abrasive paper (C016) . Be careful to do only spanwise movements.

6.2 Remove sanding residuals with a dry Lint-free cloth (C011) .

6.3 Wipe clean with a soft Lint-free cloth (C011) moist with Solvent (C005) or Aliphatic naphtha (C059) . Let it dry in the air for at least 30 minutes.

6.4 Apply a uniform layer of Primer (C190) , at ambient temperature, on the bonding surface of the blade as shown in Detail A of Fig 2 .

6.5 Let the primer cure at ambient temperature for at least 2 hours.

Note

You must apply the adhesive within 24 hours from primer application.

6.6 Remove the backing film and apply one layer of Adhesive (C189) on the primed surface of the blade as shown in Detail A of Fig 2 .

6.7 Cover the adhesive with one layer of Peel ply (C325) .

6.8 Seal a Vacuum bag set (ZZ-00-00) , equipped with a Heating blanket (with thermocouple) (ZZ-00-00) , and apply a pressure of 0,6 - 0,8 kg/cm^2 (8.5 - 11.4 lbf/in^2).

6.9 Cure the adhesive at a temperature of 104 - 110 °C (219 - 230 °F) for a minimum of 120 minutes.

6.10 After curing, remove the vacuum bag set and the Peel Ply from the bonding surface.

6.11 Examine the layer of red adhesive:

- If the adhesive layer is damaged and the underlying metal surface becomes visible, remove it fully with the Abrasive paper (C420) or Abrasive paper (C016) and repeat the application. Be careful to do only spanwise movements.
- If the adhesive layer is fully intact, continue with Step 7.

7 Locally make a repair butt strap (see Fig 3) as given in this step, or get a new Butt strap (3G6210Z00531) (already treated for bonding) and go to Step 8.

7.1 Make a repair butt strap as follows (see Fig 3):

- Material: CRESS 301 1/2 Hard (AMS5518N) metal sheet
- Thickness: 0,3 mm
- Dimensions: 30 mm (1.8 in) spanwise and chordwise (both bottom and top sides)
- Fillet radius: 5 mm (0.20 in).

7.2 Make sure that the repair butt strap agrees with the blade profile.

7.3 Prepare the repair butt strap for bonding as written in DM CSPP-A-60-50-01-00B-259A-C.

7.4 Remove the backing film and apply one layer of Adhesive (C189) on the inner surface (bonding surface) of the repair butt strap.

7.5 Cover the adhesive with one layer of Peel ply (C325) .

7.6 Prepare and apply the Vacuum bag set (ZZ-00-00) for the autoclave.

7.7 Put the part into an autoclave and cure as follows:

- Temperature: 125 - 135 °C
- Pressure: 2,6 - 3,6 kg/cm^2
- Time: 90 minutes minimum
- Heating rate: 0,5 to 5 °C per minute
- Cooling rate: 5 °C per minute maximum.

7.8 After the curing process, remove the part from the autoclave and remove the vacuum bag.

7.9 Remove the Peel-Ply from the bonding surface and examine the layer of red adhesive:

- If the adhesive layer is damaged and the underlying metal surface becomes visible, remove it fully with the Abrasive paper (C420) or Abrasive paper (C016) and repeat the application.
- If the adhesive layer is fully intact, continue with Step 8.

8 Prepare the bonding surface of the new butt strap and of the blade (precured adhesive) (see Fig 2). Do as follows:

Note 1

You must bond the new butt strap to the blade within 72 hours from cleaning by abrasion.

Note 2

Be very careful not to fully remove the layer of red adhesive, otherwise the part must be retreated.

8.1 Remove the peel-ply from the new butt strap and examine for possible excess of precured adhesive on the boundary. If you find unwanted adhesive, remove it with Abrasive paper (C016) .

8.2 Lightly sand the precured adhesive on the blade and on the internal surface of the new butt strap with Abrasive paper (C420) , or with finer grit, as preparation for bonding. Be careful not to fully remove the layer of red adhesive.

8.3 Remove sanding residuals with a dry Lint-free cloth (C011) .

8.4 Wipe clean with a soft Lint-free cloth (C011) moist with Solvent (C005) or Aliphatic naphtha (C059) . Let it dry in the air for at least 30 minutes.

CAUTION

Always handle the butt strap and the blade with clean dry gloves to prevent contamination of the bonding surfaces.

8.5 Protect from adhesive squeeze-out the external surface of the new butt strap with Teflon tape (C223) , upper side and lower side.

9 Apply the epoxy paste Adhesive (C057) on the bonding surface of the blade and on the whole inner surface of the butt strap with a non-metallic putty knife.

10 Install the butt strap in its correct position on the erosion shields (centered at STA 6299.5) and push it to full limit (see Fig 2).

11 Fix the butt strap to the blade with Teflon tape (C223) .

12 Let the adhesive cure at ambient temperature (approximately 22 thru 26 °C (72 thru 79 °F)) for a minimum of 24 hours for blade handling and for a minimum of 5 days for blade operation with firm contact pressure.

Note

To cure the adhesive, you can also use an infrared lamp. If you use an infrared lamp, you must leave the adhesive to cure at a temperature of 60 thru 70 °C (140 thru 158 °F) for at least 120 minutes.

13 After curing, remove the Teflon tape from the blade.

14 Examine for correct positioning of the butt strap on the blade and for presence of homogeneous adhesive squeeze-out. This shows that the bonding is completed correctly.

15 If necessary, blend the unwanted adhesive all around the butt strap with Abrasive paper (C016) or Abrasive paper (C017) . Leave a bead of adhesive.

16 Do a tap inspection with the Hammer (steel) (GF-05-00) for correct bonding. No unbondings are permitted.

17 Record on blade log card the installation of repair butt strap.

Requirements after job completion

1 Do the static balance of the main rotor blade. Refer to 39-A-62-11-01-00A-37DA-C

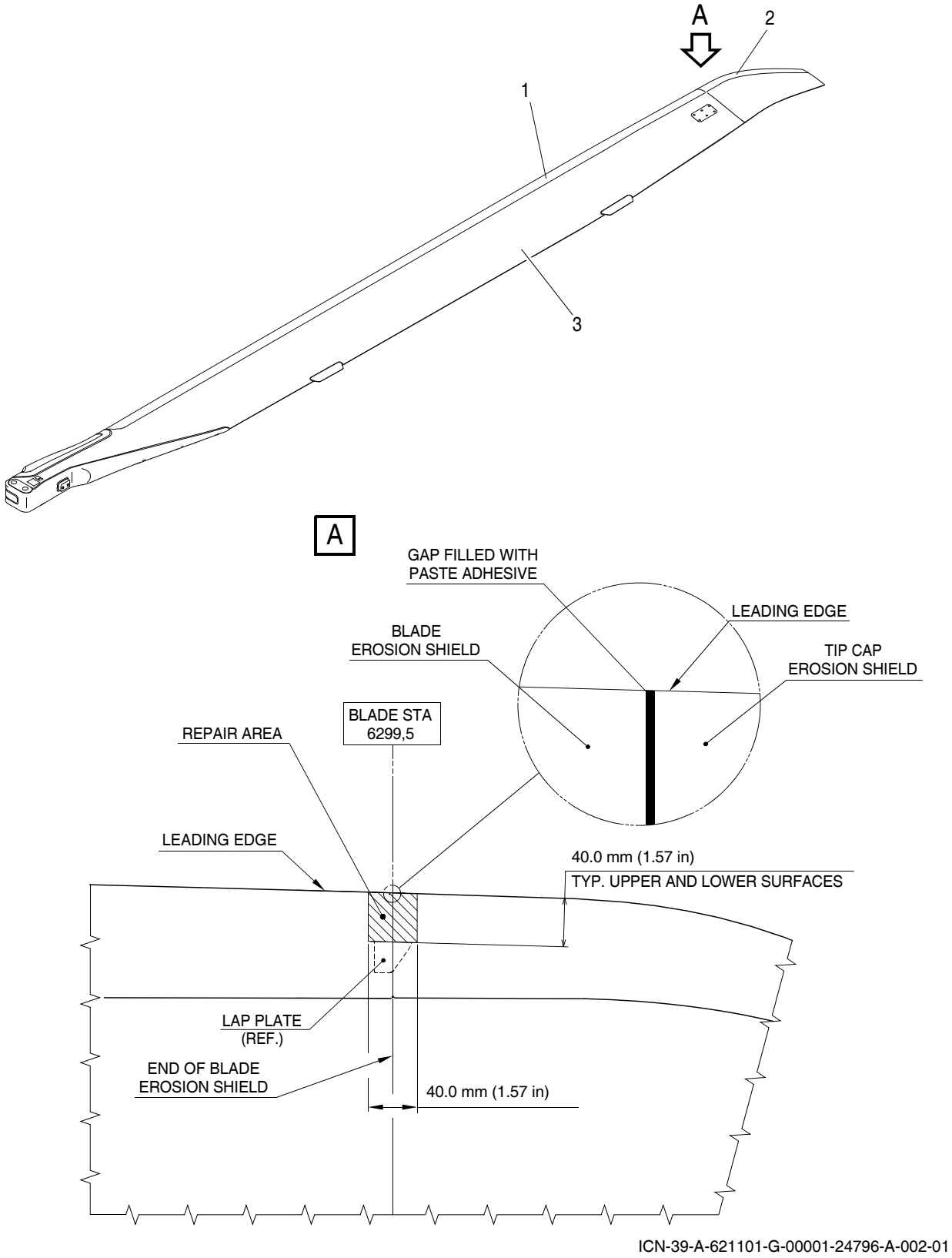

Fig 1 Lap plate damage - Repair area

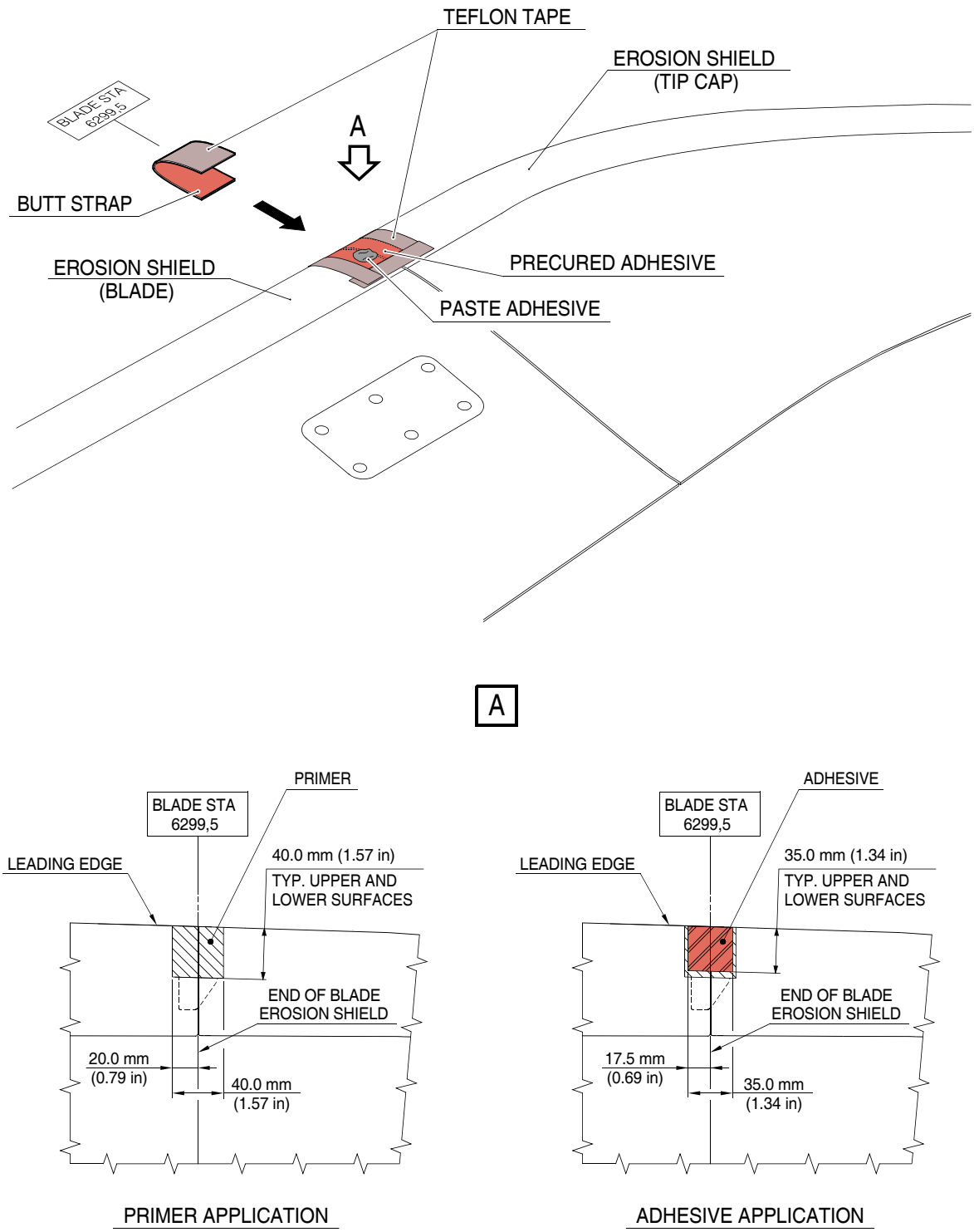

Fig 2 Lap plate damage - Butt strap installation

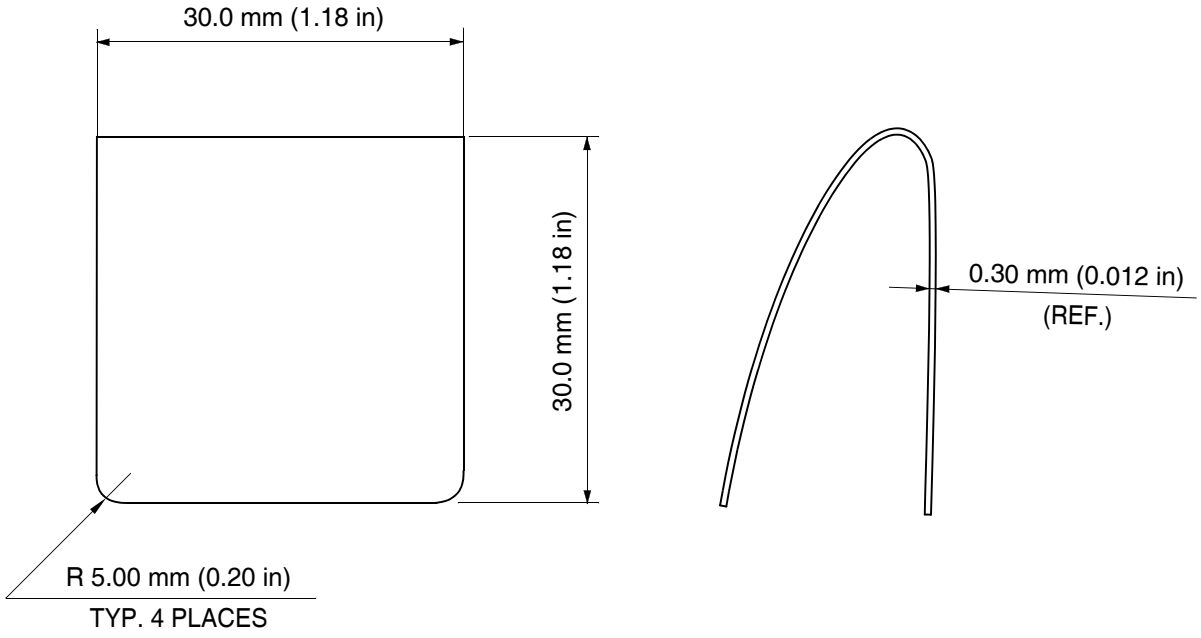

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Fig 3 Lap plate damage - Dimensions of the locally made butt strap

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