

Design Repair Approval Sheet

DRAS

Date: 17/07/2019

Issue: 0

Page: 2 of 15

Annex 1 – Reasons for Classification

CRITERIA	YES	NO	REMARKS
The repair has appreciable effect on <u>weight and balance</u> .	<input type="checkbox"/>	<input checked="" type="checkbox"/>	The repair scheme implementing the doubler reinforcement and the total weight is very small (1.185 kg or 0.046%) compared to aircraft's maximum permissible weight of 2600 kg. Aircraft CG will still be in its CG envelope. This scheme neither affect aircraft's operational characteristics nor powerplant operation.
The repair has appreciable effect on <u>structural performance</u> such as: <ul style="list-style-type: none"> o Fatigue / damage tolerance characteristics adversely affected, o Fatigue behaviour (if the new lifetime of the changed part is below the lifetime published for the original part), o Flutter and stiffness characteristics adversely affected. o Changes of materials, processes or manufacturing methods of <u>primary structural elements</u> or other critical parts 	<input type="checkbox"/>	<input checked="" type="checkbox"/>	The repair scheme does not involve any alteration to aircraft primary structure that may require fatigue evaluation.
The repair has appreciable effect on <u>performance</u> such as: <ul style="list-style-type: none"> o Approved performance adversely affected, o Flight envelope adversely affected, o Handling qualities adversely affected, 	<input type="checkbox"/>	<input checked="" type="checkbox"/>	No appreciable change on the Aircraft performance, flight envelope and any flight controls.
The repair has appreciable effect on <ul style="list-style-type: none"> o Aerodynamics o Load path and load sharing o Noise and emissions o Fire protection / resistance 	<input type="checkbox"/>	<input checked="" type="checkbox"/>	No appreciable effect on other Characteristics affecting the airworthiness of the aircraft.
The demonstration of compliance uses <u>methods or processes that have not been previously accepted as appropriate</u> for the nature of the repair (i.e. unusual material selection, heat treatment, material processes, jiggling diagrams etc)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	No new process or method introduced by this repair scheme.
The repair has appreciable effect on the Airworthiness Limitations section of the maintenance manual.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Airworthiness and Operating Limitations in Aircraft Flight Manual remains unchanged.
The repair has appreciable effect on the operation of the complete system (i.e. significant impact on critical function) and on system redundancy.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	The repair scheme does not contribute to noise increment or decrement and does not have appreciable effect on reliability.
The repair requires a permanent additional inspection to the approved maintenance programme.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	There is no permanent addition on inspection introduced into approved maintenance program
The repair constitutes the subject or impacts the content of an Airworthiness Directive	<input type="checkbox"/>	<input checked="" type="checkbox"/>	The repair does constitute the subject or impacts the content of an Airworthiness Directive
Means of compliance with certification rules are unusual	<input type="checkbox"/>	<input checked="" type="checkbox"/>	There is no unusual compliance use for this repair.
The extent of new substantiation data necessary to comply with the applicable airworthiness requirements and the degree to which the	<input type="checkbox"/>	<input checked="" type="checkbox"/>	No new substantiation data necessary to comply, to be reassessed and re-evaluated.

Design Repair Approval Sheet
DRAS

Date: 17/07/2019
 Issue: 0
 Page: 3 of 15

CRITERIA	YES	NO	REMARKS	
original substantiation data has to be re-assessed and re-evaluated is considerable.				
CONCLUSIONS	MAJOR		MINOR	
OTHER REMARKS				
As per repair classification checklist, it is concluded that the classification of this repair is minor change.				

Design Repair Approval Sheet
DRAS

Annex 2: Description of Damage

Corrosion beneath Rear structure stainless steel plates found during C inspection through which was conducted IAW MET 53-00-00-610- check - Corrosion under the stainless-steel Plate of the Rear Structure (with Removal) - Fuselage (see Figure 1 and Figure 2).

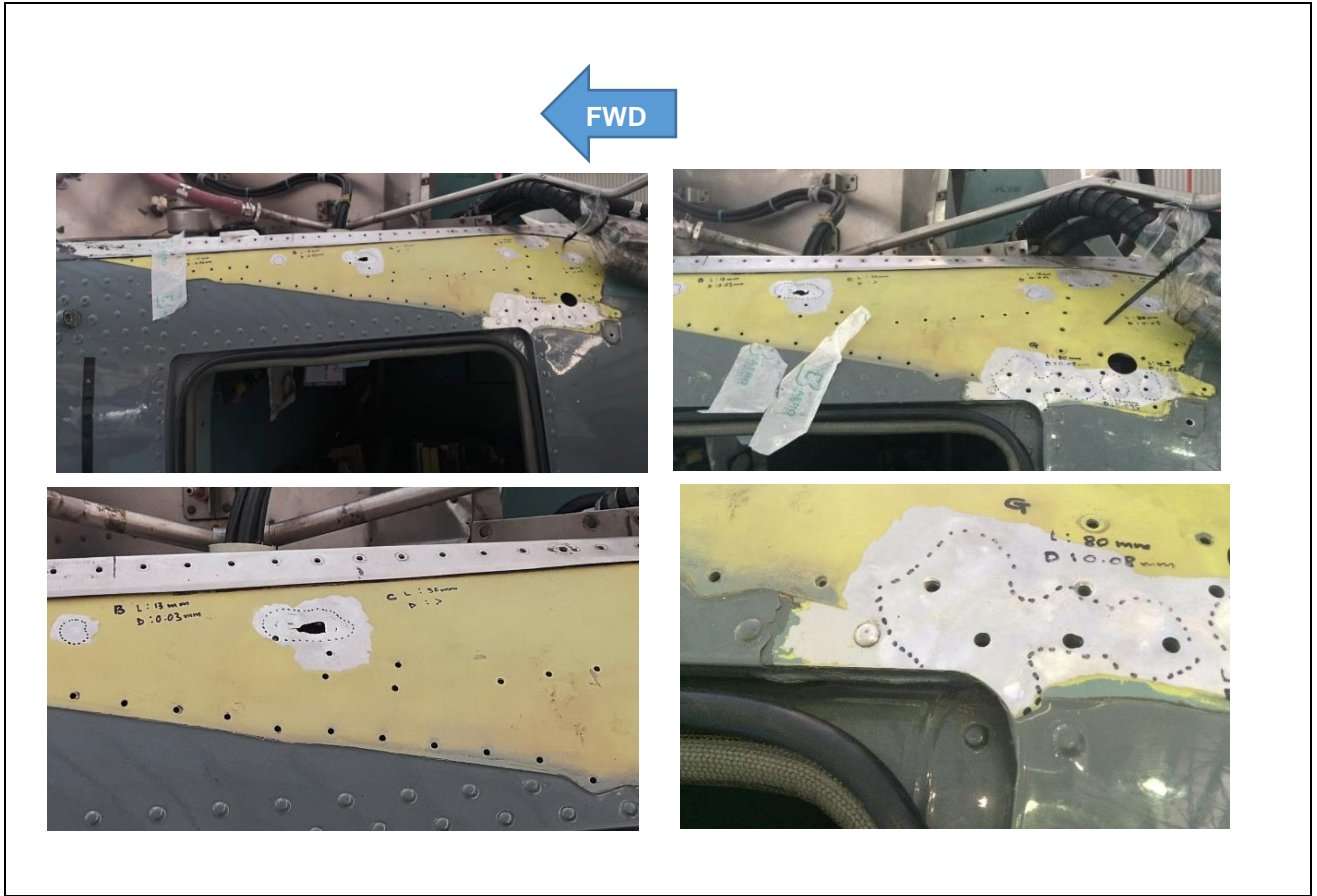
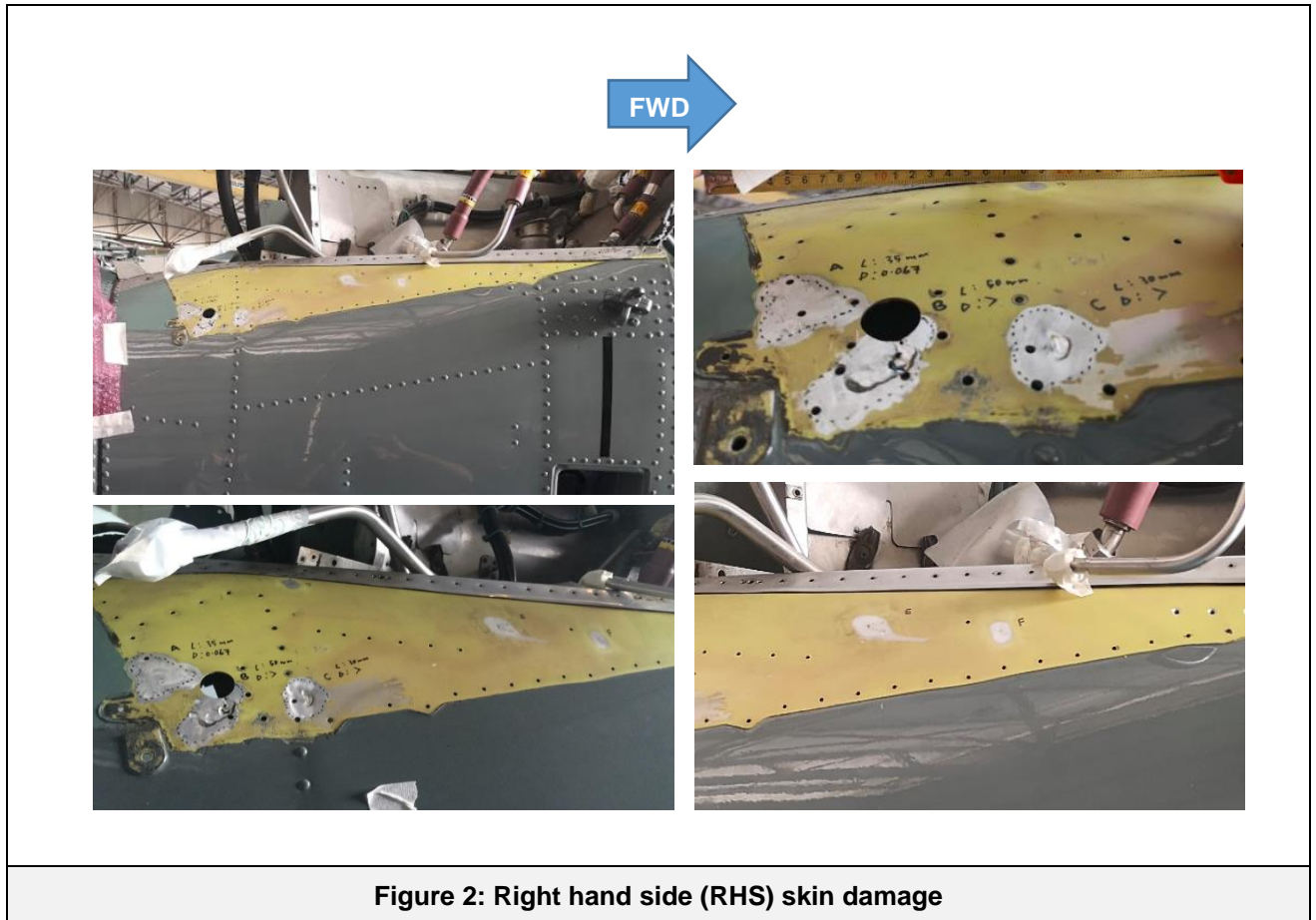


Figure 1: Left hand side (LHS) skin damage

Design Repair Approval Sheet
DRAS



Design Repair Approval Sheet

DRAS

Date: 17/07/2019
Issue: 0
Page: 6 of 15

Annex 3: Description of Repair

PRELIMINARY WORKS:

1. Park the helicopter in hangar as per MTC 20-07-02-201.
2. Remove and/or open all cowlings, panels, doors and equipment as required for access to the various work areas.
3. General notes:
 - All the works, un-riveting, manufacturing, adjusting, cleaning, drilling, protection and so on, must be carried out IAW the MTC instructions.
 - To avoid all risks of cracks, make radius on every edge tooled.
 - The rivet's distribution of the assembly (distance and pitch), and all the works, must be carried out in compliance with the instructions of the MTC.
 - Rivet the part after coating the contact surfaces of the various parts with PR1771B2 and produce a sealant bead.
 - If necessary, for the removed rivets during the repair, use rivets with the next-larger diameter.
 - Protect the aluminium alloy parts with ALODINE 1200 + strontium chromate primer epoxy P05 before mounting.
 - Touch up the protection and final paint after riveting.

LH SKIN REPAIR

PROCEDURE:

1. Remove the stainless-steel (1) sheet IAW 53-00-00-610.
2. Mark and identify the position and type of the various rivets located around the steel plate (1).
3. Clean the surface area IAW MTC 20-04-01-402.
4. Sand to suppress entirely the corrosion on all affected areas.
5. Perform Non-destructive test (NDT) dye-penetrant normal procedure on the affected repair areas (IAW MTC-20-90-03-104). Dye-penetrant inspection visible with daylight.
6. Contact GAM AEO if extensive damage found. Proceed with next step if no extensive damage found
7. Place transparent perspex template on the skin and note all the existing rivet location.

NOTE 1

The rigorous registration of the rivets will allow a mounting of the stainless steel sheet identical during reassembly

8. Apply Alodine (9) and chromate primer epoxy (10) on the corrosion affected areas.
9. Fabricate the DOUBLER 1 (1) & 2 (2) with Aluminium 2024-T3 thickness 1.2mm as per Appendix A.
10. Apply fabricated parts with Alodine 1200 (9) and chromate primer epoxy (10).
11. Deburr and remove all sharp edges.
12. Cut out the aft structure lateral skin IAW *Figure 1: LHS Repair Detail A*
13. Place transparent perspex template on the internal side of the cut-out hole.
14. Draw line as per the exact shape of the cut-out hole using marker. Trim transparent perspex template as per drawn line.

Design Repair Approval Sheet

DRAS

Date: 17/07/2019

Issue: 0

Page: 7 of 15

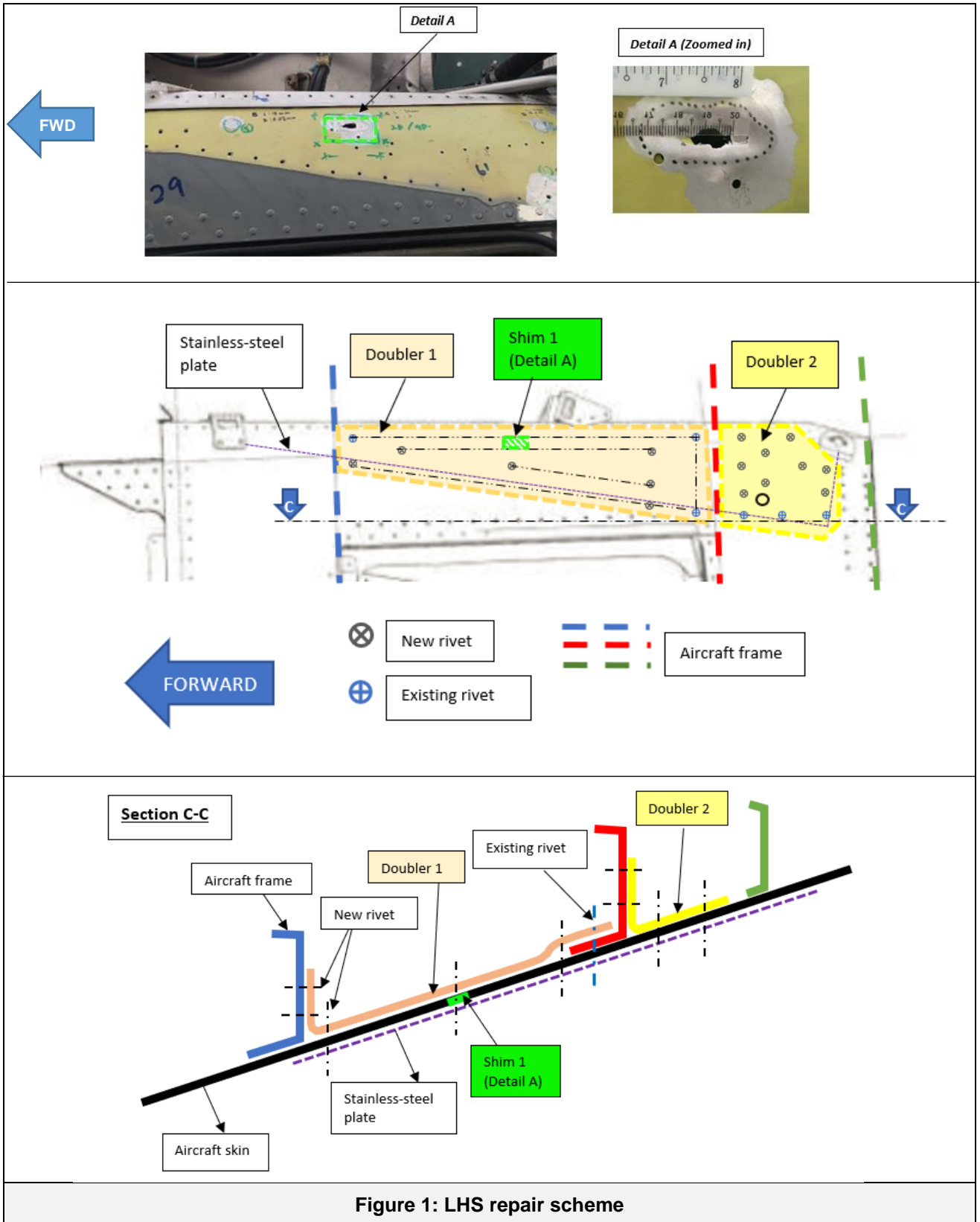
15. Perform NDT dye penetrant normal procedure on the cut-out (step 12) within 1 inch from the edge of cut-out area.
16. Fabricate the SHIM 1(3) following the trimmed transparent perspex template (step 14)
17. Position DOUBLER 1 (1) & 2 (2) on the internal side of the aft structure lateral skin, pre-drill and drill IAW existing rivets, then remove.
18. Mark and pre-drill on DOUBLER 1 (1), 2 (2) & SHIM 1 (3) all new additional holes IAW MTC 20-02-04-401.
19. Ensure the minimum edge distance of fastener (2D for protruding and 2.5D for countersunk) must be obligated.
20. Ensure the fastener must be spaced apart at least (4D for protruding and 5D for countersunk) must be obligated
21. Deburr DOUBLER 1 (1) & 2 (2) and aft structure lateral skin.
22. Position and fix DOUBLER 1 (1) & 2 (2) on internal side of the aft structure lateral skin , counter drill rivets holes, then remove,
23. Position and fix SHIM 1 (3) on top of the Doubler 1 (1), counter drill rivets holes, pre-drilled and then cleco or pin the shim to skin and the remove.
24. Fill up all the corroded reworked areas with DEVCON (8).
25. Position DOUBLER 1 (1) & 2 (2) on the internal side of the aft structure lateral skin and SHIM 1 (3) on top of the DOUBLER 1 (1)
26. Secure stainless-steel sheet and DOUBLER 1 (1), 2 (2) & SHIM 1 (3) on the structure with solid rivets mounted to the "PR1782B2 wet" (7) (same references as registered during its removal).

NOTE 2

The actual thickness to rivet may vary according to the stacking of single pieces, their number and their protection, it is allowed to replace the rivet by a rivet of the same standard but with a code length greater or less depending on the thickness real gauged during assembly

27. Touch up the protection and final paint after riveting IAW MTC 20-04-05-101.
28. Apply seal bead with PR 1782B2 (7) all around the stainless-steel sheet.
29. Install the stainless-steel sheet with CA1010 (11) on mating surfaces.
30. Perform bonding check on the doubler and skin of the aircraft IAW MTC 20-02-07-101.

Design Repair Approval Sheet
DRAS



Design Repair Approval Sheet

DRAS

Date: 17/07/2019

Issue: 0

Page: 9 of 15

RH SKIN REPAIR

PROCEDURE:

1. Remove the stainless-steel sheet (1) IAW 53-00-00-610
2. Mark and identify the position and type of the various rivets located around the steel plate (1).
3. Clean the surface area IAW MTC 20-04-01-402.
4. Sand to suppress entirely the corrosion on all affected areas.
5. Perform Non-destructive test (NDT) dye-penetrant normal procedure on the affected repair areas (IAW MTC-20-90-03-104). Dye-penetrant inspection visible with daylight.
6. Contact GAM AEO if extensive damage found. Proceed with next step if no extensive damage found
7. Place transparent perspex template on the skin and note all the existing rivet location.

NOTE 3

The rigorous registration of the rivets will allow a mounting of the stainless steel sheet identical during reassembly

8. Apply Alodine (9) and chromate primer epoxy (10) on the corrosion affected areas.
9. Fabricate the DOUBLER 3 (4) & 4 (5) with Aluminum 2024-T3 thickness 1.2 mm as per Appendix B
10. Apply fabricated parts with Alodine 1200 (9) and chromate primer epoxy (10).
11. Deburr and remove all sharp edges.
12. Cut out the aft structure lateral skin IAW *Figure 2: RHS Repair Detail B*
13. Place transparent perspex template on the internal side of the cut-out hole.
14. Draw line as per the exact shape of the cut-out hole using marker. Trim transparent perspex template as per drawn line.
15. Perform NDT dye penetrant normal procedure on the cut-out (step 12) within 1 inch from the edge of cut-out area.
16. Fabricate the SHIM 2(6) following the trimmed transparent perspex template (step 14)
17. Position DOUBLER 3 (4) & 4 (5) on the internal side of the aft structure lateral skin, pre-drill and drill IAW existing rivets, then remove.
18. Mark and pre-drill on DOUBLER 3 (4), 4 (5) & SHIM 2 (6) all new additional holes IAW MTC 20-02-04-401.
19. Ensure the minimum edge distance of fastener (2D for protruding and 2.5D for countersunk) must be obligated.
20. Ensure the fastener must be spaced apart at least (4D for protruding and 5D for countersunk) must be obligated.
21. Deburr DOUBLER 3 (4) & 4 (5) and aft structure lateral skin.
22. Position and fix DOUBLER 3 (4) & 4 (5) on internal side of the aft structure lateral skin, counter drill all rivets holes, then remove, pre-drilled and then cleco or pin the shim to skin.
23. Position and fix SHIM 2 (6) on top of the DOUBLER 3 (4) & DOUBLER 4 (5), counter drill rivets holes, then remove.
24. Fill up all the reworked areas with DEVCON (8).
25. Position DOUBLER 3 (4) & 4 (5) on the internal side of the aft structure lateral skin and SHIM 2 (6) on the top of the DOUBLER 3 (4) & DOUBLER 4 (5) .
26. Secure stainless-steel sheet and DOUBLER 3 (4), 4 (5) & SHIM 2 (6) on the structure with solid rivets mounted to the "PR 1782B2 wet"(7) (same references as registered during its removal)

Design Repair Approval Sheet

DRAS

Date: 17/07/2019

Issue: 0

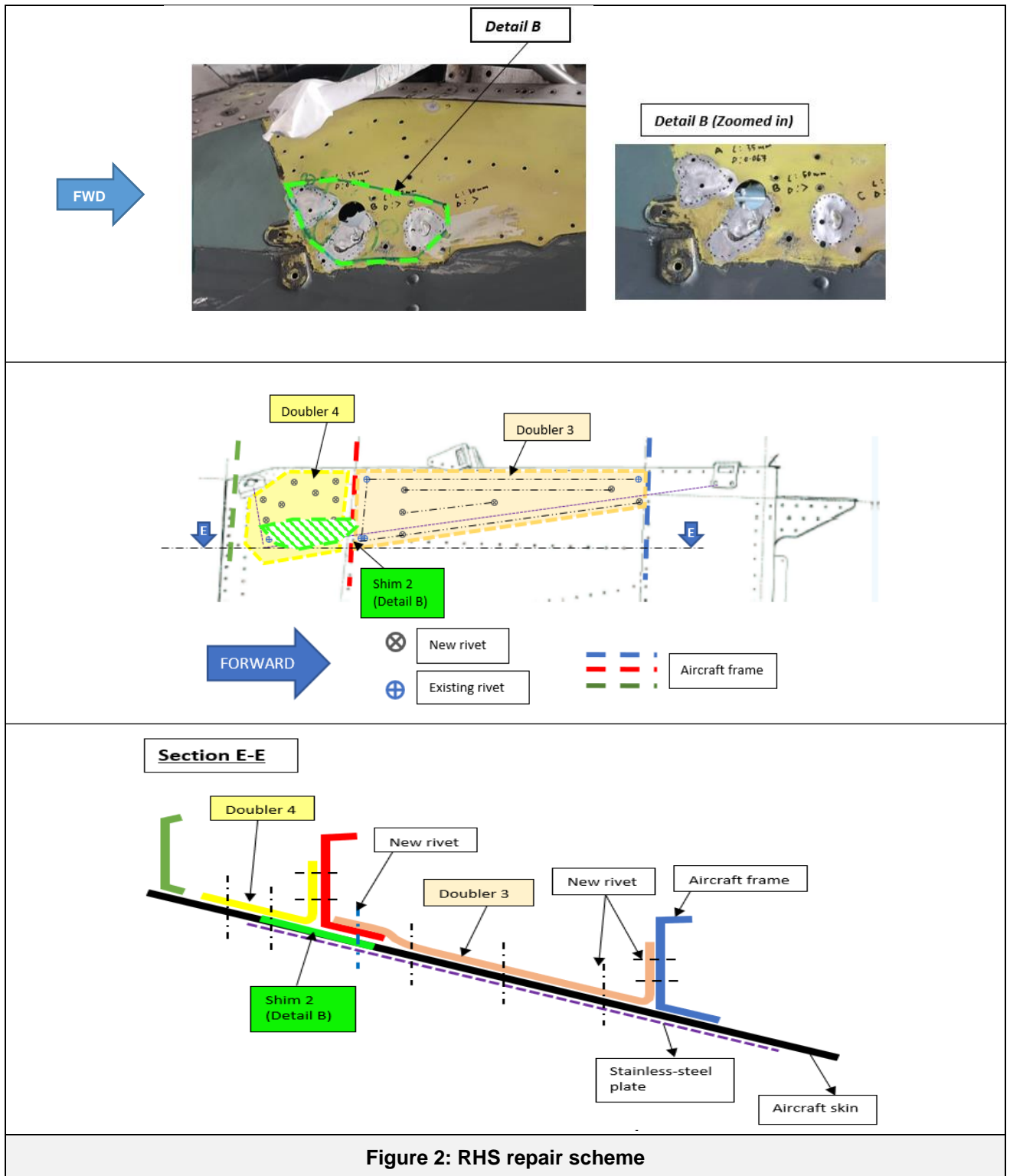
Page: 10 of 15

NOTE 4

The actual thickness to rivet may vary according to the stacking of single pieces, their number and their protection, it is allowed to replace the rivet by a rivet of the same standard but with a code length greater or less depending on the thickness real gauged during assembly

27. Touch up the protection and final paint after riveting IAW MTC 20-04-05-101.
28. Apply seal bead with PR 1782B2 (7) all around the stainless-steel sheet.
29. Install the stainless-steel sheet with CA1010 (11) on mating surfaces,
30. Perform bonding check on the doubler and the skin of the aircraft IAW MTC 20-02-07-101.

Design Repair Approval Sheet
DRAS



Design Repair Approval Sheet

DRAS

Date: 17/07/2019

Issue: 0

Page: 12 of 15

REFERENCE

Standard Practice Manual (SPM = MTC)

MET 53.00.00.610	Check – Corrosion under steel plate of the rear structure (with removal)
MTC-20-90-03-104	Detection by dye penetrant inspection
MTC 20.02.04.401	Installation Of Rivets - Pitches And Edge Distance
MTC 20.02.04.402	Installation Of Rivets - Retrofitting And Repair
MTC 20.02.04.601	General Riveting Acceptance Requirements
MTC 20.03.01.101	General Repair Instructions: General
MTC 20.03.01.102	General Repair Instructions: Unriveting Principle
MTC 20.03.02.101	Replacement Of Rivets: General
MTC 20.03.02.401	Installation Of Normal Rivets
MTC 20.05.01.102	General Methods For Applying Sealing Compounds
MTC 20.02.07.101	Electrical bonding

MATERIAL:

NO	DESCRIPTION	MATERIAL	QTY	UNIT
Figure 1 (LHS repair scheme)				
1	Doubler 1	Aluminum Sheet 2024-T3 thickness 1.2 MM	1	PC
2	Doubler 2	Aluminum Sheet 2024-T3 thickness 1.2 MM	1	PC
3	Shim 1	Aluminum Sheet 2024-T3 thickness 1.0 MM	1	PC
Figure 2 (RHS repair scheme)				
4	Doubler 3	Aluminum Sheet 2024-T3 thickness 1.2 MM	1	PCS
5	Doubler 4	Aluminum Sheet 2024-T3 thickness 1.2 MM	1	PCS
6	Shim 2	Aluminum Sheet 2024-T3 thickness 1.0 MM	1	PCS
Consumable Materials				
7	Mastic	PR1782B2	AR	-
8	Devcon - F	CM 6047	AR	-
9	Alodine	1200	AR	-
10	Chromate Primer Epoxy	Strontium Chromate, MIL-P-23377 or equivalent	AR	-
11	Mastinox	CA1010	AR	-
Rivets References For Stainless Steel Sheet Mount				
12	Round Head Solid Rivets	21215TB3208	100	EACH
13	Round Head Solid Rivets	21215TB4008	100	EACH
14	Countersunk Solid Rivets	21217TB3208	100	EACH
15	Countersunk Blind Rivets	NAS1921C04-03	100	EACH
16	Round Head Blind Rivets	NAS1919C04-02	100	EACH
17	Round Head Blind Rivets	NAS1919C05-02	100	EACH

Design Repair Approval Sheet

DRAS

Date: 17/07/2019

Issue: 0

Page: 13 of 15

RECOMMENDED INSPECTION:

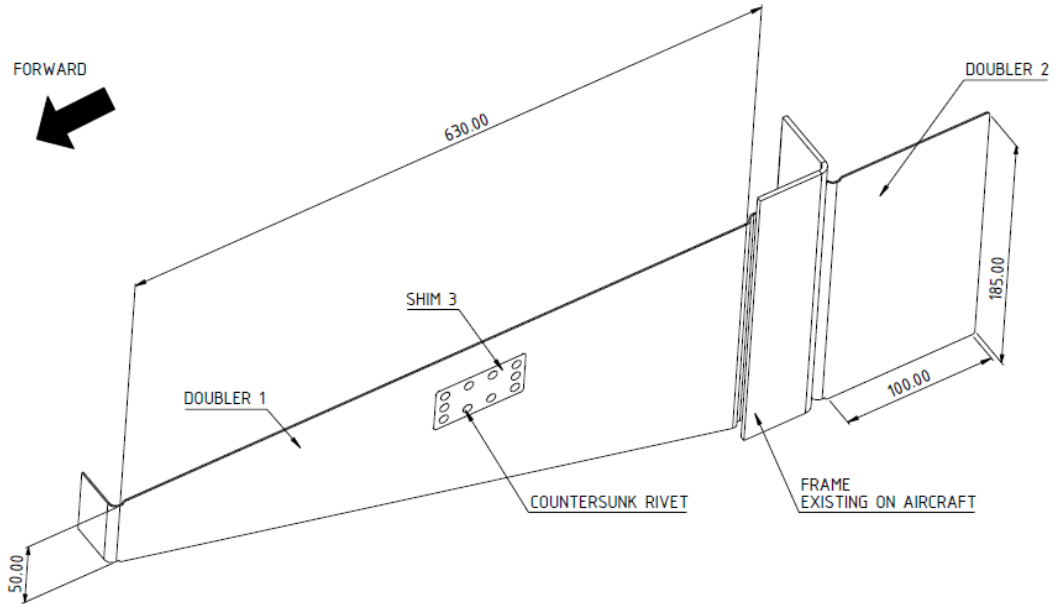
ITEM	MAINTENANCE ACTION	INTERVAL
Rivet / Fasteners	Inspect each rivet/fastener: <ol style="list-style-type: none"> 1. Security of attachment 2. Condition of Smokey rivet <ul style="list-style-type: none"> • Visual check the repair area for signs of cracks and corrosion • Visual check all the rivet/fastener are free of damage and not wear out 	First 50 FH, and then every 150 FH until 600 FH
Sealant	Inspect sealant on the repair area <ol style="list-style-type: none"> 1. Condition of the sealant <ul style="list-style-type: none"> • Visual check on the sealant and ensure is in good condition no leak found on the repair area. 	First 50 FH, and then every 150 FH until 600 FH

Design Repair Approval Sheet
DRAS

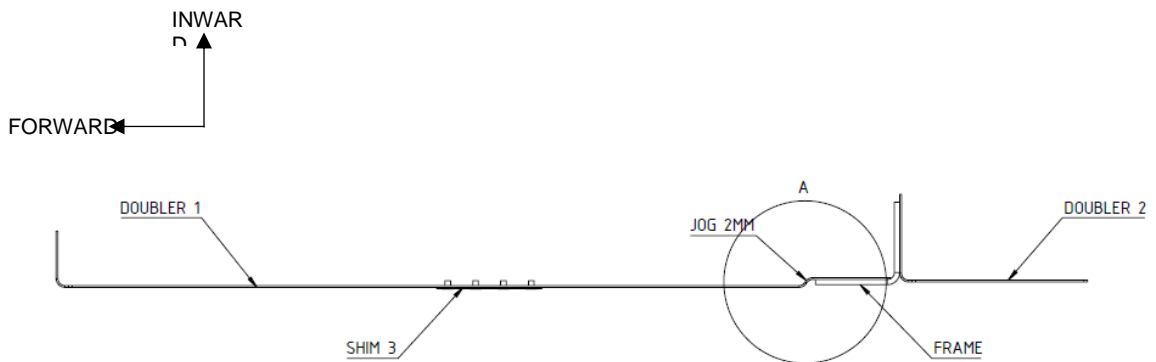
Date: 17/07/2019
 Issue: 0
 Page: 14 of 15

APPENDIX A

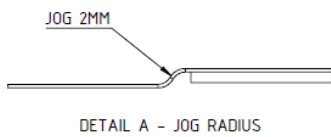
LH Skin Repair Scheme



LH SKIN REPAIR
 ISO VIEW



LH SKIN REPAIR
 TOP VIEW



DETAIL A - JOG RADIUS

Design Repair Approval Sheet
DRAS

Date: 17/07/2019
 Issue: 0
 Page: 15 of 15

APPENDIX B

RH Skin Repair Scheme

