Nomad
ALERT SERVICE BULLETIN

FLIGHT CONTROLS — AILERONS — INSPECTION AND INCORPORATION OF MOD N634

1. **PLANNING INFORMATION**

A. **Effectivity**

(1) Aircraft Affected

All N22 Series and N24 Series aircraft fitted with Ailerons PN 1/N-24-101 LH, PN 1/N-24-102 RH, PN 2/N-24-101 LH, PN 2/N-24-102 RH, PN 201/N-24-139 and PN 201/N-24-140 RH. Aircraft LS62, 119 and 159 to 165 are excepted.

(2) Spares Affected

All spare ailerons with the above part numbers.

B. **Reason**

(1) Several operators have reported buckling of the aileron leading edge skin which they believe has been the cause of a loss of aircraft control. Damage should not result if operating within Flight Manual limits but a temporary overspeed caused by wind gusts may result in aileron damage.

Any other damage to the aileron, such as ground handling damage, reduces its strength. This makes in-flight damage more likely to occur.

(2) In the time since Nomad was certified, the airworthiness standards applicable to flap strength have been varied. The current standards additionally require that strength be demonstrated to be adequate when flying at the flap extension speed and encountering a 25 feet per second head-on gust with flaps extended.

An aileron with Mod N634 will comply with the current certification standard.

(3) There have been no reported problems with the inboard flap so there is no requirement for strengthening of these components. However, Mod N634 has been introduced to new production inboard flaps for commonality reasons.

C. **Description**

(1) Part 1 — Inspection

Both LH and RH ailerons are inspected for skin buckling and other damage. Damaged ailerons are to be removed from the aircraft.

(2) Part 2 — Incorporation of Mod N634

All ailerons are to be strengthened by incorporating Mod N634.

Page No	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Rev No	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

D. **Compliance**

The requirements of this Service Bulletin are MANDATORY and the Australian CAA has stated that no extensions to the compliance times shown below will be given.

(1) Installed Ailerons

(a) Part 1 — Inspection

To be carried out within 10 hours TIS after receipt of this Service Bulletin.

(b) Part 2 — Incorporation of Mod N634

i. Damaged ailerons — Repair and incorporation of Mod N634 is to be carried out before refitting to aircraft.

ii. Undamaged ailerons — incorporate Mod N634 at the next 1800 hr (Major) service or before 31 December 1993, whichever occurs first.

(2) Spare Ailerons

Before fitting to aircraft but not later than 31 December 1993.

NOTE

Some aircraft will have this modification already incorporated and certified in the log book as Mod N634.

Be aware that Mod N634 adds 0.28lb or 0.13kg to the total weight of a balanced aileron. If the additional weight is likely to cause the aileron to exceed the limits contained in the table below, ASTA should be contacted for advice before proceeding with the modification.

Table 1 Aileron Weight Details

Aileron Paint Finish	Weight of Bob Weight		Weight of Mass Balance		Weight of Balanced Aileron	
	oz	kg	oz	kg	lb	kg
Two coats of polyurethane paint	19.75 +0.18 −0.00	0.56 +0.005 −0.000	68.78 +3.50 −1.75	1.95 +0.10 −0.05	21.83 +0.66 −0.66	9.9 +0.30 −0.30
Two coats of acrylic paint	As above	As above	64.2 +3.50 −1.75	1.82 +0.10 −0.05	20.9 +0.66 −0.66	9.48 +0.30 −0.30

The above Table of Aileron Weight supersedes that table shown in both the N22 and N24 Structural Repair Manual and will be the subject of a future SRM revision.

E. **Approval**

(1) The requirement detailed herein has been approved by a person authorised under Civil Aviation Regulation 35 and conforms to the type certification requirements.

(2) Pre-Certification implementation of this Service Bulletin is recorded in the Log Book as Mod N634B.

F. **Manpower**

(1) Part 1 — Inspection

Approximately 0.5 manhours.

(2) Part 2 — Incorporation of Mod N634

Approximately 16 manhours per aileron.

G. **Materials - Price and Availability**

Contact ASTA Defence Logistics for price and availability.

H. **Tooling - Price and Availability**

None.

I. **Weight and Balance**

Weigh and balance in accordance with Structural Repair Manual, Chap 57-50-21 to the weights and limitations in Table 1 of this Service Bulletin.

J. **References**

Maintenance Manual Chapters 20-30-00, 27-50-00 and 57-50-00

Structural Repair Manual Chapter 57-50-21

Service Bulletin NMD-51-1

K. **Publications Affected**

Maintenance Manual

Illustrated Parts Catalogue

Structural Repair Manual

2. **ACCOMPLISHMENT INSTRUCTIONS**

A. **Part 1 — Inspection**

(1) Inspect installed ailerons ailerons as follows:

(a) Extend flaps to the landing position (38°) (Ref MM Chap 27-50-00).

CAUTION

WITH THE FLAPS EXTENDED TAKE CARE TO AVOID FOULING THE FLAPS WHEN OPENING THE MAIN CABIN DOOR. ONLY THE REAR HALF OF THE DOOR CAN BE USED AND PARTICULAR CARE MUST BE TAKEN DURING WINDY OR GUSTY CONDITIONS.

(b) With the assistance of a straight edge, visually inspect the total upper and lower surfaces of LH and RH ailerons for signs of buckling. Pay particular attention to the skin directly above the spar.

(c) Visually inspect the leading edge skin outboard of WSTA 256 for vertical skin cracks.

(d) Feel for inter rivet skin buckling between WSTA 250 to WSTA 270 and WSTA 160 to WSTA 180 by lightly sliding a finger along the aileron upper skin directly above the spar flange. Pay particular attention to the area around WSTA 261.

(e) Fully retract flaps when inspection is complete (Ref MM Chap 27-50-00).

(2) Evidence of inter-rivet buckling in the leading edge skin above the spar flange or vertical skin cracks on the aileron leading edge near WSTA 261 indicate a flap/aileron overspeed and is cause for rejecting BOTH ailerons.

(3) Inspect spare ailerons in accordance with steps (1)(b) to (d).

NOTE

Repairs are to be carried out concurrently with the incorporation of Mod N634. If any damage found is outside the limits laid down in the Structural Repair Manual the damaged components are to be replaced.

B. **Part 2 — Incorporation of Mod N634**

(1) Remove ailerons (Ref MM Chap 27-50-00).

NOTE

Mod N400 is a prerequisite for this repair (Mod N634) for all Ailerons PN 1/N-24-101 LH, PN 1/N-24-102 RH and PN 201/N-24-139 LH, PN 201/N-24-140 RH.

(2) Using string lines or a long straight edge, check the leading edge skin in three places (upper, middle and lower) for straightness.

NOTE

This check is also to be carried out on the trailing edge.

(3) Look from one end of the aileron with eyes level with the top or bottom surface of the trailing edge skin and check the structure for twist. Any variation to straightness should be recorded so that on completion of the modification a check can again be carried out to assess the condition of the modified aileron.

CAUTION

ANY TWISTING OR BENDING OF THE AILERON STRUCTURE AFTER THE INCORPORATION OF THE MODIFICATION COULD RESULT IN AN UNDESIRABLE AERODYNAMIC RESPONSE DURING FLIGHT.

(4) Prior to starting the repair, the aileron should be supported on the lower skins for the complete length of the aileron by laying it on a solid flat surface having suitable cutouts for the hinge plates and mass balance arm (Ref Figure 1).

(5) Remove all mass balance weights, bolts, nuts and washers and retain for later reassembly.

CAUTION

FAILURE TO REMOVE MASS BALANCE ARM WEIGHTS WILL RESULT IN EXCESSIVE FLEXIBILITY WHICH MAY RESULT IN AILERON DISTORTION AFTER RE-RIVETING AND REASSEMBLY.

(6) De-rivet and partially remove the upper leading edge skin and trailing edge skin to allow access to both sides of the aileron spar (Ref Figure 2).

NOTE

In order to maintain the correct rivet hole size when de-riveting the aileron skin, use a 3.2 mm drill and drill off only the rivet head. Using a pin punch and with minimum force punch the remainder of the rivet through.

There is no need to remove the rivets used to overlap the trailing edge skin sections.

At this stage, and as a precautionary measure, inspect the leading edge ribs at WSTA 172.75 and WSTA 259.60 for any distortion.

(7) Cut away shaded area of leading edge ribs PN 1A/N–24–107 and 1B/N–24–107 to match profile of hinge plate PN 1/N–24–108 (Ref Figures 3, 4,5and 6).

(8) Touch up bare metal surfaces using Alodine 1200 and then zinc chromate primer.

(9) Position reinforcing angle PN 1A/N–03–793 symmetrically about hinge plate to match the aileron contour at WSTA 172.75 and WSTA 259.60 and existing rivet holes in spar.

(10) Maintaining edge distance of 0.20 to 0.30 in, backdrill the reinforcing angle. Remove the angle and deburr all newly drilled holes. Vacuum all metal particles from inside the aileron.

(11) Wet assemble reinforcing angle PN 1A/N-03-793 using pigmented jointing compound (Ref MM Chap 20–30–00) and rivet to spar (Ref Figures 4, 5 and 6).

(12) Cross out part number and No 6 on Serial/Mod Plate SD254.

(13) Attach a new Serial Plate SD338 stamped with PN 3/N–24–101(LH) and PN 3/N–24–102(RH). Ensure the Serial Plate is marked with the Service Bulletin number ANMD–57–9 Rev 1 beside the part number either by stamping or with indelible ink.

NOTE

Ailerons PN 201/N–24–139 and PN 201/N–24–140 with Mod N387 carried out and reworked per SB NMD–51–1 and ANMD–57–9 Rev 1 are to be renumbered as shown in step (13) immediately above.

(14) Using a Barium Chromate jointing compound, wet assemble and rivet the leading edge and trailing edge to restore the aileron to its original condition (Ref Figures 7 and 8).

NOTE

To minimise the possibility of control surface distortion, it is advisable to start riveting mid span and working up and over the leading edge to each end of the aileron (Ref Figure 9).

Prior to the static balance, carry out another check for twisting and bowing as per steps (2) and (3) and if necessary, rework (seek assistance from Boeing Aircraft Systems – ASTA if subsequent rework cannot comply with this straightness check).

C. **Part 3 — Static Balance Check**

Aileron Balancing Fixture PN 1600-0003 (Ref SRM Chap 57-50-21 Fig 1)

(1) Ensure that all extraneous objects have been removed.

(2) Install the aileron assembly (without the balance weights), PN 1/N-24-50 into the balancing fixture.

NOTE

The aileron is mounted in an inverted position in the fixture.

(3) Suspend a bob weight (Ref Table 1) from the trailing edge of the aileron by a string taped to the uppermost surface and draped over the trailing edge.

CAUTION

AILERONS POST-MOD N56 ARE FITTED WITH A NON-MAGNETIC MASS BALANCE ASSEMBLY. ENSURE THAT ONLY THE CORRECT PARTS ARE USED WHEN BALANCING THE AILERON.

(4) Mount the mass balance weights including all bolts, nuts and washers.

(5) Ensure that aileron pivots freely in the fixture.

(6) Add mass balance plates (PN 1/N-24-119 Pre-Mod N56, PN 1/N-24-129 Post-Mod N56) equally on both sides of the mass balance arm until the aileron trailing edge rises slightly above the reference marker on the balancing fixture.

(7) Remove from the aileron, the mass balance weights, mass balance plates and attaching parts, and weigh and record their total weight. Check that the total mass balance weight complies with that for the respective paint finish listed in Table1.

(8) Using Barium Chromate jointing compound, wet assemble the balance plates and mass balance weights to the mass balance arm with bolts, washers and stiffnuts. Torque tighten the stiffnuts to between 30 and 40 lb in; wipe off excess jointing compound.

NOTE

When fitting the bolts, the bolt heads are to face inboard and packing washers placed under the heads of the bolts and stiffnuts as required to centralise the bolts within the mass balance assembly. The bolts used should be the shortest possible length (Ref IPC Chap 57) suitable for the number of balance plates required.

(9) Remove the bob weight from the aileron trailing edge then remove the aileron from the balancing fixture, and weigh the aileron as removed from the fixture. The balanced aileron weight must comply with that for the respective paint finish listed in Table 1.

(10) Record all weights.

D. **Part 4 — Static Balance Check**

Locally Manufactured Static Balance Tool (Ref ANMD-57-9 Rev 1 Fig 7)

(1) Manufacture two balance tools as described in Figure 10.

(2) Stand both tools upright on a flat surface and suspend the aileron in an inverted position from the single strap fixed to each of the tools.

NOTE

Ensure that all extraneous objects have been removed.

(3) Ensure the horizontal level of the tools at the position indicated (Ref Figure 10) prior to beginning the balance procedure by packing under either leg.

(4) Carry out a balance check in accordance with Part 3 step (3) to (10).

3. **MATERIALS INFORMATION**

Parts required per aileron.

New Part No.	Qty	Description	Old Part No.	Instruction
Parts to be obtained from ASTA Defence				
1AZ/N-24-107	2	Angle, Reinforcing		Add
1A/N-03-793	2	Angle, Reinforcing		Alternative
SD338	1	Plate, Serial		Add
Parts to be obtained from own stock or local source				
MS20600AD4W1	370	Rivet		
CR3223-4-1	370	Rivet		Alternative
CR3213-4-1	370	Rivet		Alternative
MS20600AD4W2	2	Rivet		
CR3223-4-2	2	Rivet		Alternative
CR3213-4-2	2	Rivet		Alternative
MS20470AD4-6	4	Rivet		
CR3213-4-3	4	Rivet		Alternative
CR3253-4-3	4	Rivet		Alternative
CR3223-4-3	4	Rivet		Alternative
MS20600MP4W3	4	Rivet		Alternative
MS20600M4W3	4	Rivet		Alternative
MS20470AD4-5	23	Rivet		
CR3523-4-2	23	Rivet		Alternative
MS20600MP4W2	23	Rivet		Alternative
MS20600M4W2	23	Rivet		Alternative

NOTE

For alternative fasteners CR3213 protective treat stem of fastener with Barium Chromate jointing compound (Ref MM Chap 20-30-00)

4. **SPECIAL TOOLS AND EQUIPMENT**

(1) Aileron Balancing Fixture (Ref SRM Chap 57-50-21 Fig 1)

(2) Aileron Balancing Tool (Ref Fig 10) — local manufacture

5. **RECORDING ACTION**

Record compliance with Service Bulletin ANMD-57-9 Rev 1 in the Airframe Log Book.

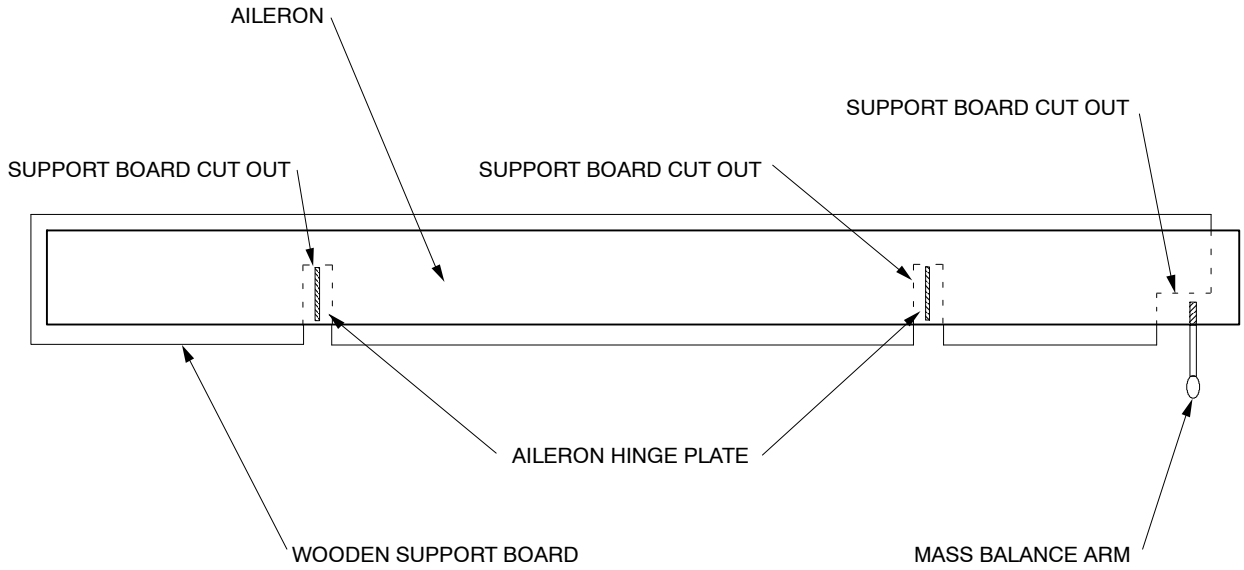


Figure 1 Aileron Support Board

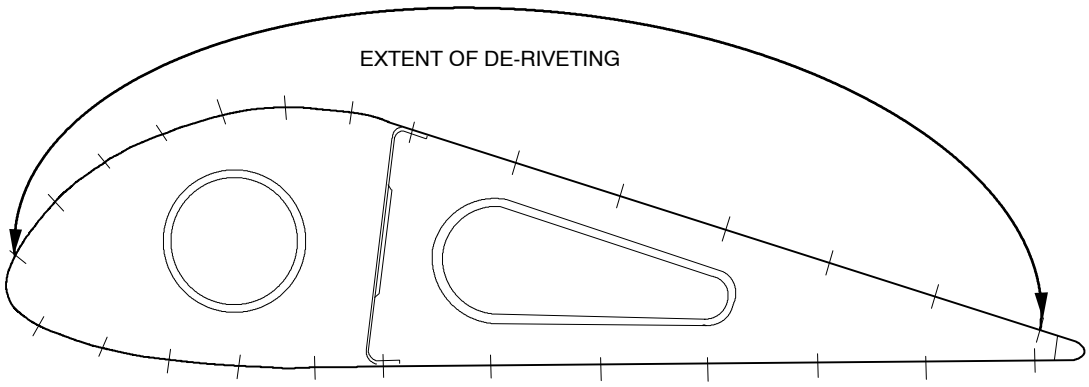


Figure 2 Extent of Aileron De-riveting

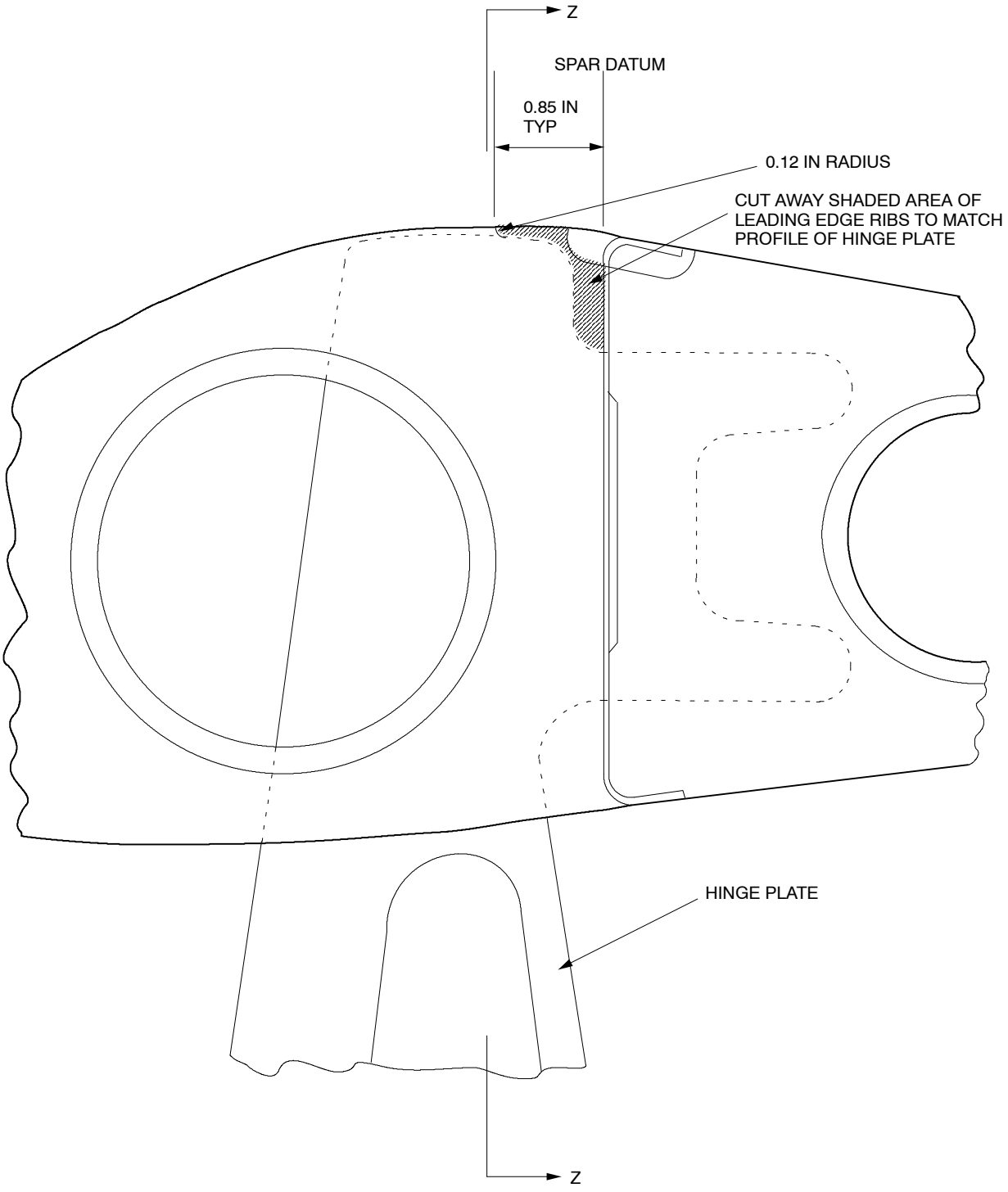


Figure 3 Aileron Leading Edge Rib Rework

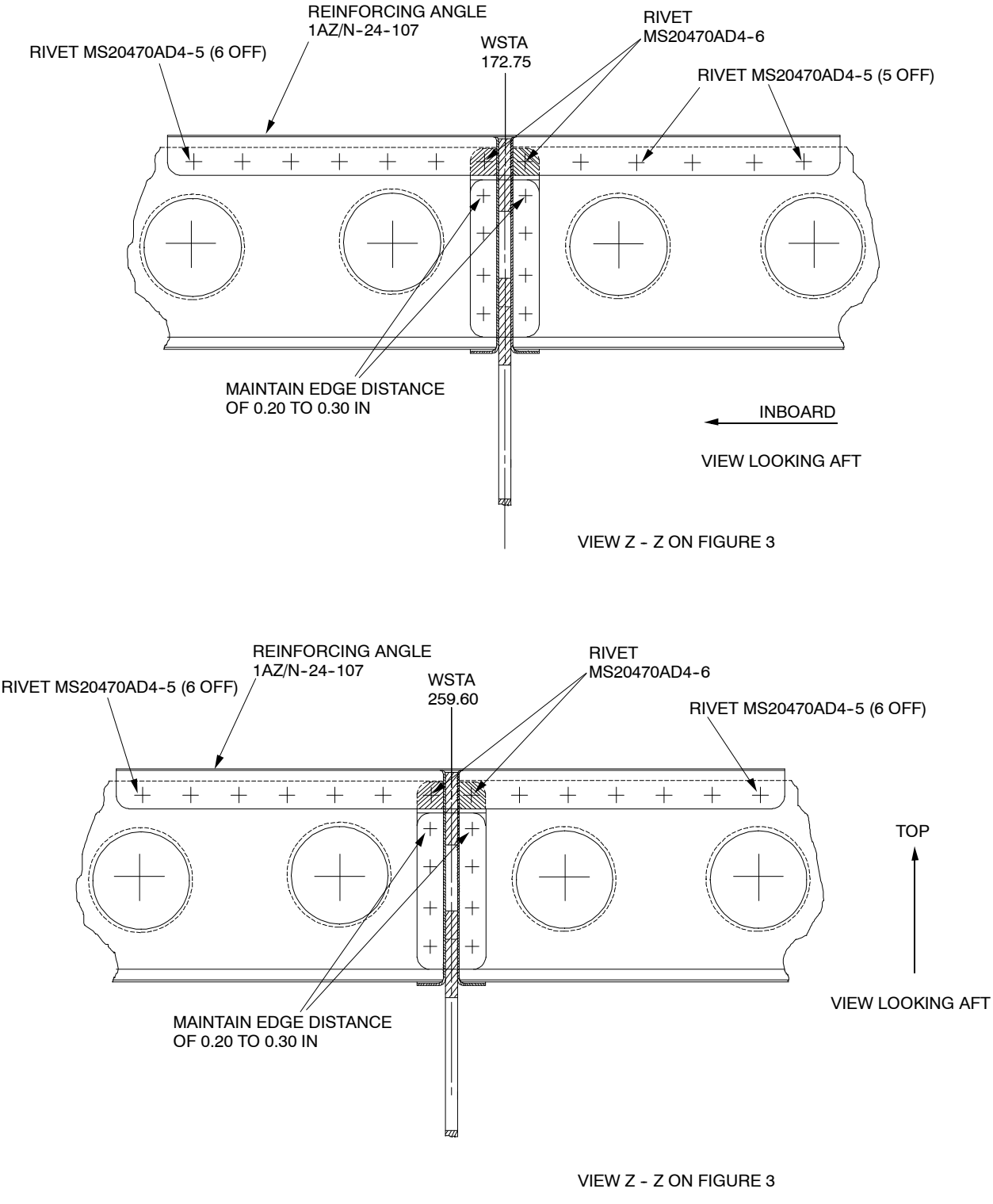


Figure 4 Reinforcing Angle — Installation LH Aileron

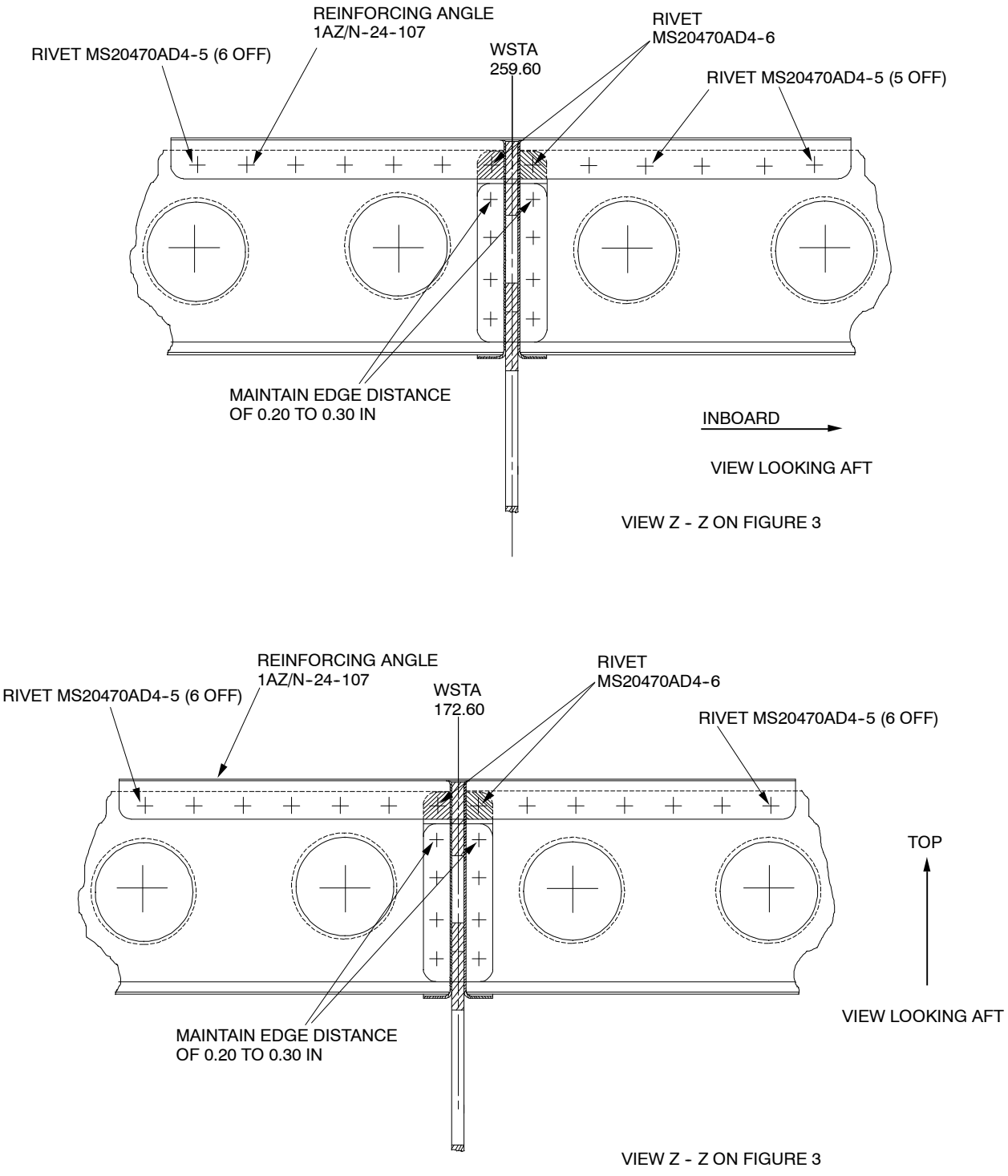


Figure 5 Reinforcing Angle — Installation RH Aileron

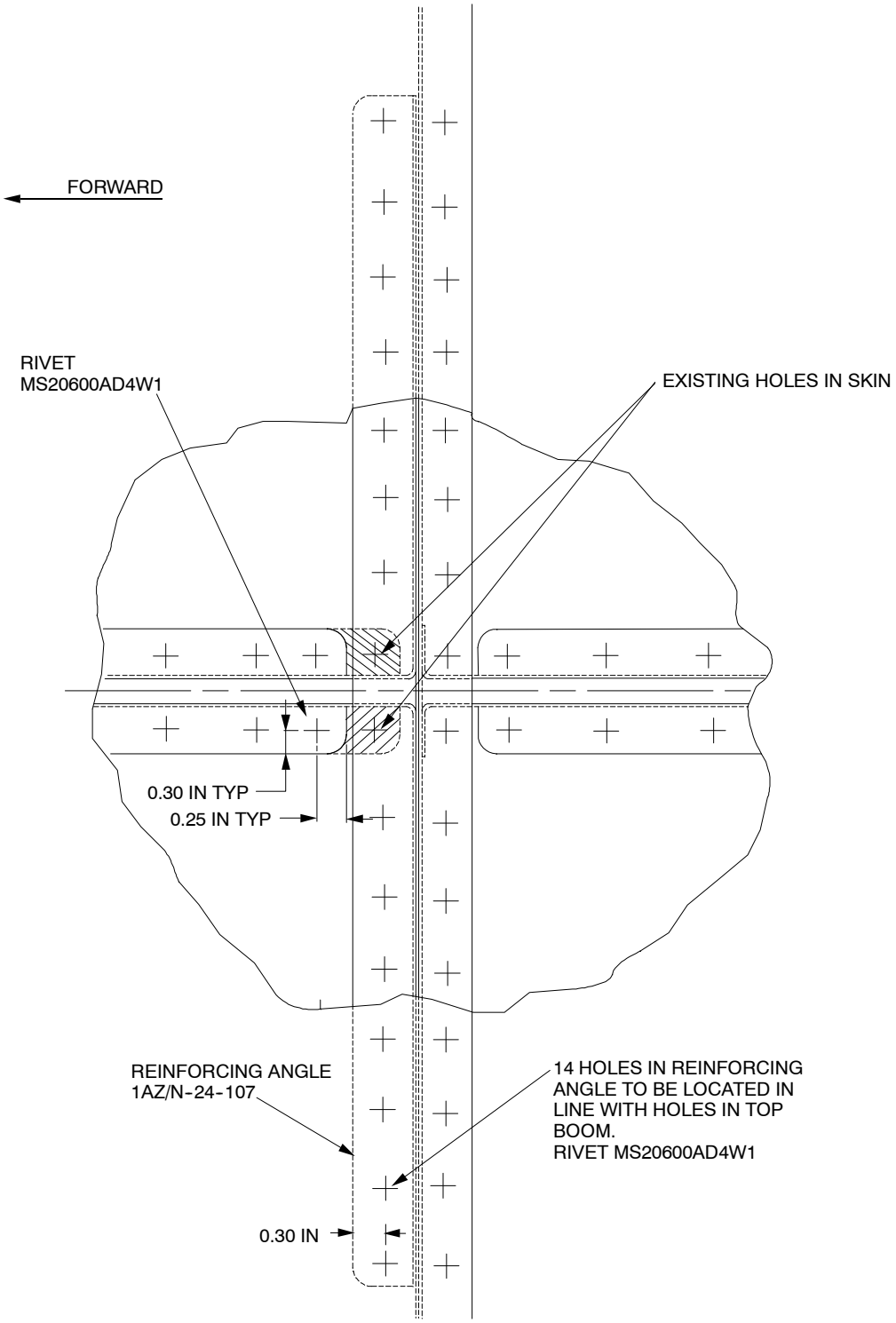


Figure 6 Reinforcing Angle Installation — Plan View

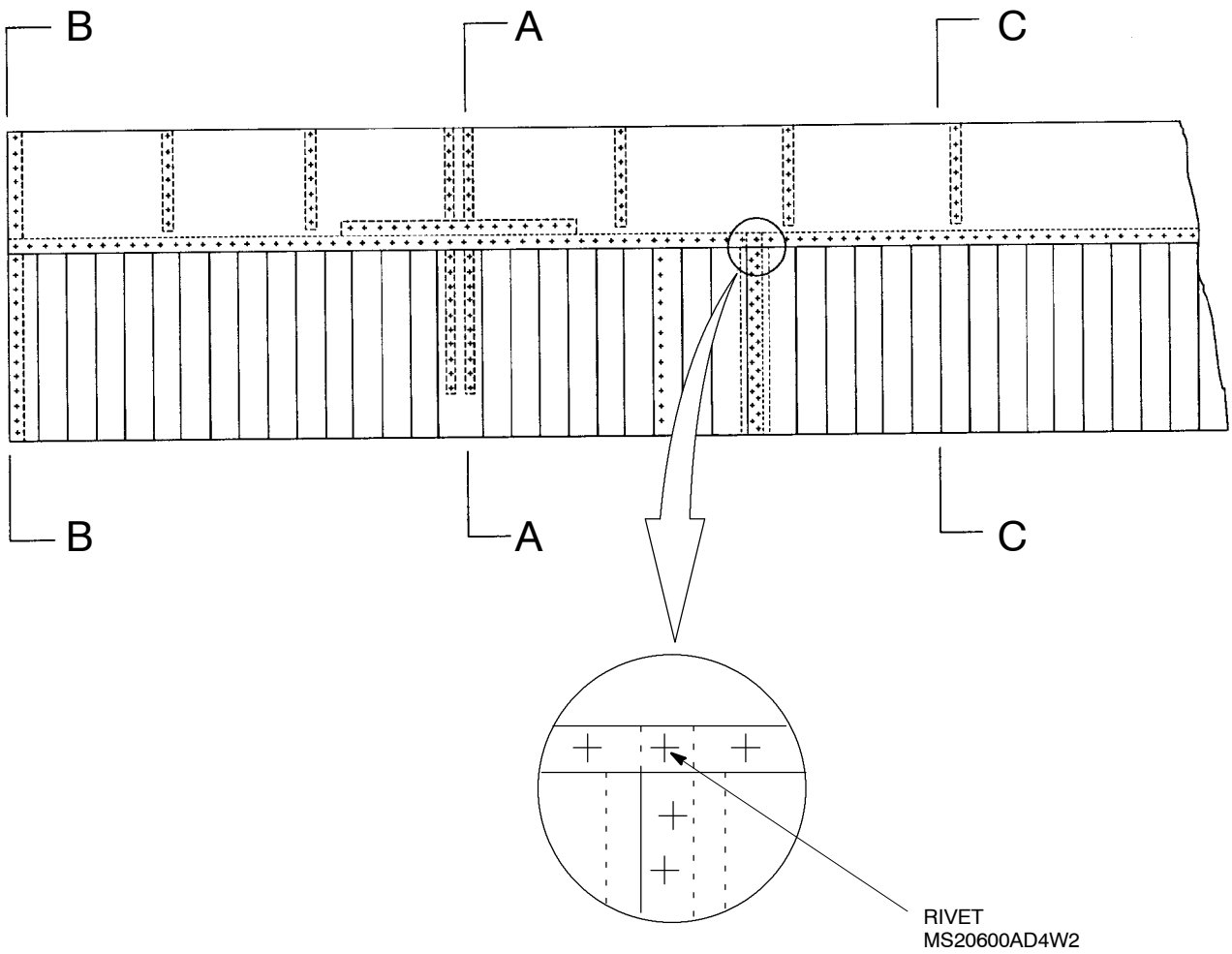


Figure 7 Aileron Rivet Scheme — Plan View

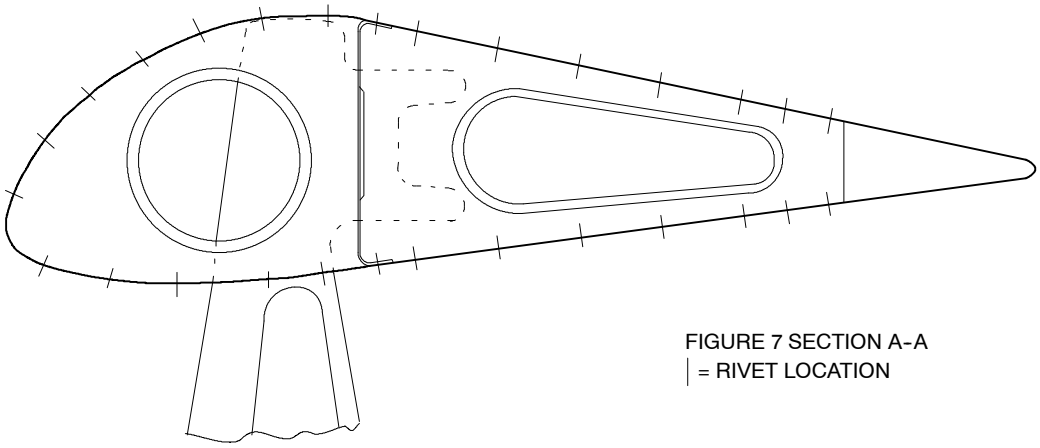


FIGURE 7 SECTION A-A
| = RIVET LOCATION

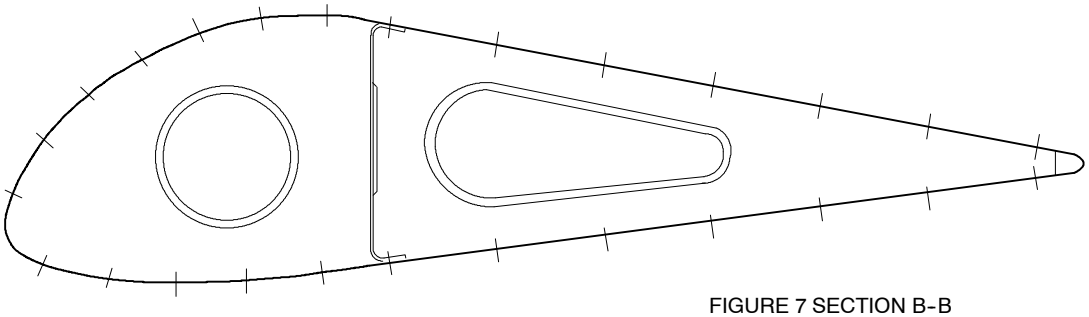


FIGURE 7 SECTION B-B
| = RIVET LOCATION

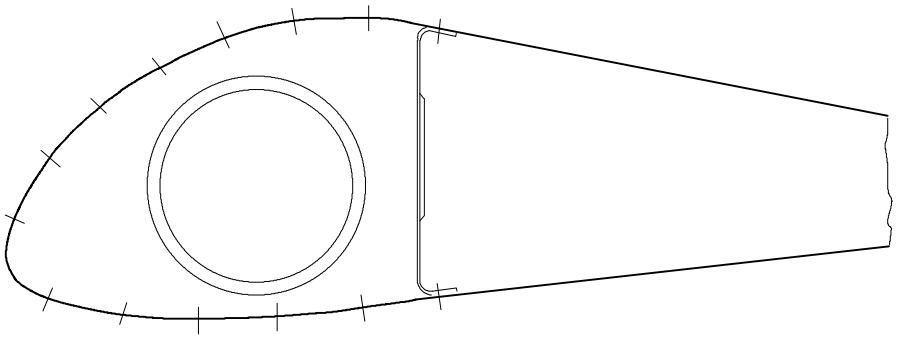
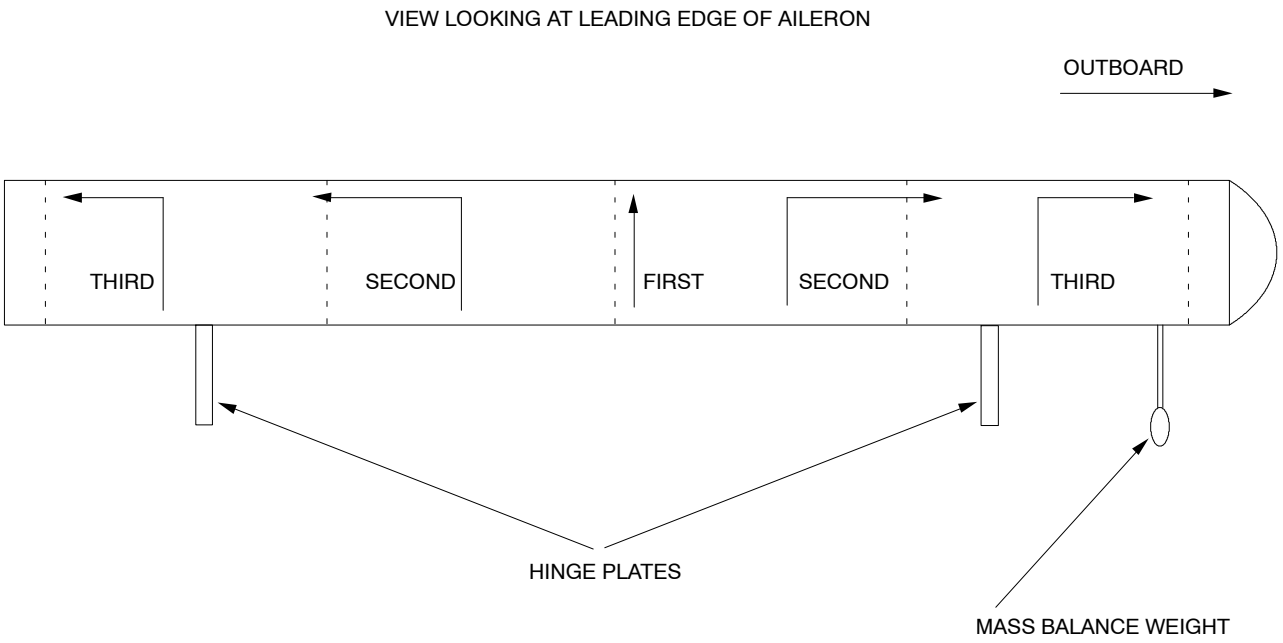


FIGURE 7 SECTION C-C
| = RIVET LOCATION

Figure 8 Aileron Rivet Scheme Sections



TO MINIMISE DISTORTION, START RIVETING MID SPAN AND WORK UP AND OVER THE LEADING EDGE TO EACH END OF THE AILERON.

Figure 9 Aileron Riveting Sequence

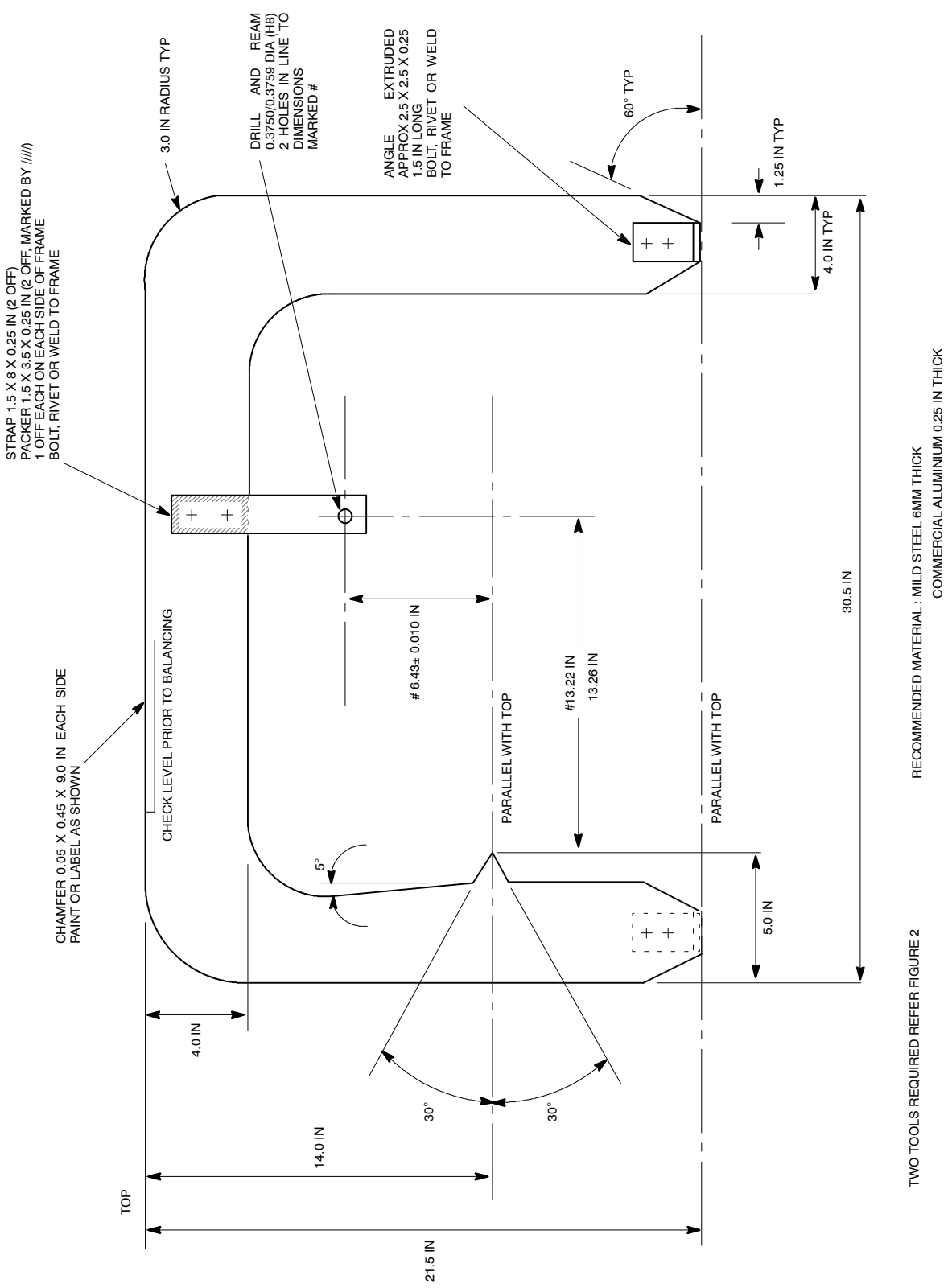


Figure 10 Aileron Static Balancing Tool — Local Manufacture