

Test Project

Aircraft Maintenance

Module B: Metal Structure Fabrication/Repair

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MarkingScheme

| MODULE B – METAL STRUCTURE FABRICATION/REPAIR | MARKS |
|---|-----------|
| B1 – Calculation | 2.15 |
| B2 – Form part 1 | 0.8 |
| B3 – Form part 2 | 1.55 |
| B4 – Floating nuts part 2 | 1.6 |
| B5 – Form part 3 | 1.6 |
| B6 – Floating nuts part 3 | 1.6 |
| B7 – Anchor nuts part 3 | 2.2 |
| B8 – Assembly part 2 to part 1 | 2.6 |
| B9 – Assembly Part 3 to part 1 | 5.4 |
| B10 – Installation of electrical box | 0.15 |
| B11 – Organization/Safety | 0.2 |
| B12 – Area clean up | 0.15 |
| Total | 20 |

Competitor's Working Document

| | | |
|-------------------|---------|--------|
| NAME | (First) | (Last) |
| COUNTRY | | |
| START TIME | | |

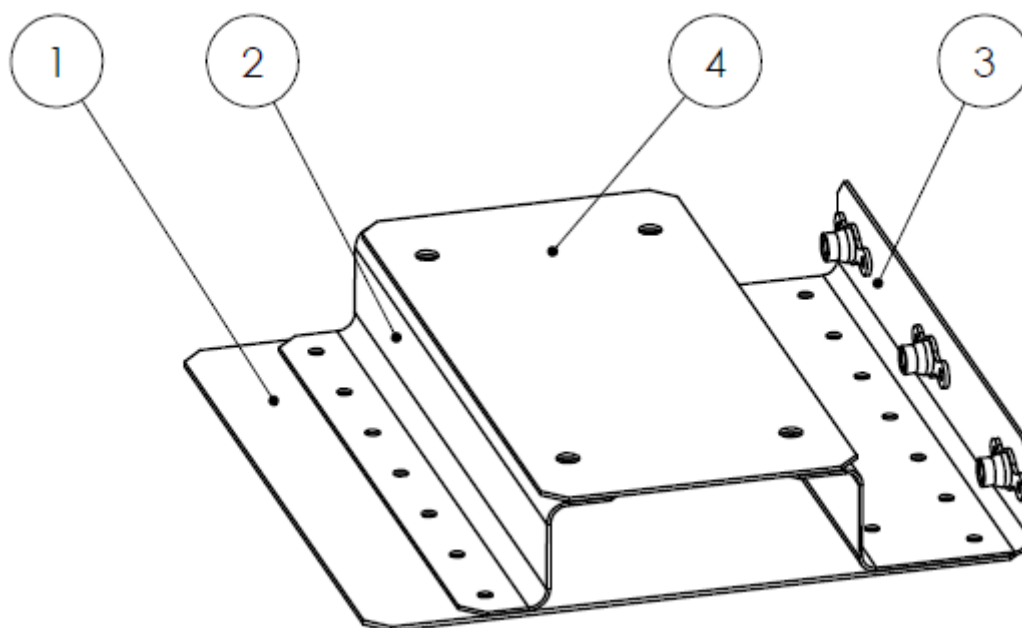
Objective

Assembly of an electrical box on 2 Z bend which themselves will be assembled by riveting on a support plate. In accordance with AC43-13

Time Allotted

4.5 hours

3D View of the Project



Description

- Part N°1 : Support plate in 2024 of thickness 0.040 inches
- Part N°2 : Z bend made of 2024 of 0.032 inches thickness, assembled on the part 1 by rivets MS20426AD 4-?? (You will determine the length) , carry out countersink on the part N°1 side. Use only hand tools (pneumatic rivet gun and bucking bar).
- Part N°3 : Z and U bend made of 2024 of thickness 0.032 inches, assembled on the part 1 by rivets MS20426AD4-?? (You will determine the length), carry out countersink on the side of the part N°1. The part N°3 will be positioned at the level of the part N°1 (flush) .Use only hand tools (pneumatic rivet gun and bucking bar).
- Part N°4 : Positioning plate made in 2024 thickness 0.040 inches. This part will be used to position the 2 Z bend in order to ensure the length of the holes of the electrical box. This part will be removed to position the electrical box.
- There are two types of anchor nuts. The diameter of the final holes on the anchor nut are:
 - 5.1 mm for the fixed ones
 - 6 mm for the floating ones
- Anchor nuts will be riveted with rivets MS20426 AD3- ??(You will determine the length).

Note: use only pneumatic squeeze plier

Process

Materials

- Each contestant will receive the following:
- Sheet Metal Tool Kit
- Drawing (see attached drawing)
- One 250 mm x 250 mm piece of 2024 x 0.040 inches aluminium
- One 250 mm x 250 mm piece of 2024 x 0.032 inches aluminium
- Anchor nuts $\varnothing 5 \times 3$
- Floating nut plate $\varnothing 5 \times 4$
- Screw $\varnothing 5 \times 7$
- A selection of MS20426 AD rivets of various lengths
- Anchor Nut Fixing Jig
- Pneumatic squeeze plier

Tolerance

- General tolerance ± 0.5 mm
- Countersink rivet head smoothness $-0/+0.2$ mm

Steps

1. Calculate the dimensions for flat layout. (Calculations to be made in this file, see below)
2. Determine required rivets length
3. Form Part 1,2,3: make the assembly shown in the drawing in accordance with Standard Practices
4. Complete the self-check card.
5. Install the electrical box in place of the part
6. Hand the assembly to expert for checking.

Assembly drawing

See separately supplied drawing

Empirical Formula part 2

Bend Allowance (BA) = $[(0.01743 \times BR) + (0.0078 \times MT)] \times \text{Degree of Bend (90}^\circ\text{)}$

BR = Bend Radius

MT = Metal Thickness

Bend Allowance Calculation: (Part 2) Correct to three decimal places

Flat Layout Calculations part 2

Flat Layout Calculation: (Part 2) Correct to three decimal places

Empirical Formula part 3

Bend Allowance (BA) = $[(0.01743 \times BR) + (0.0078 \times MT)] \times \text{Degree of Bend } (90^\circ)$

BR = Bend Radius

MT = Metal Thickness

Bend Allowance Calculation: (Part 3) Correct to three decimal places

Flat Layout Calculations part 3

Flat Layout Calculation: (Part 3) Correct to three decimal places

Rivet Length

Calculation of rivets length part 2/part 1 and part 3/part1:

.....

.....

.....

Calculation of shop head rivet (to check)

H=

Ø=

Calculation of rivets length anchor nut /part 3:

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.....

.....

Calculation of shop head rivet (to check)

H=

Ø=

Calculation of rivets length floating nut plate/part 2 and 3:

.....

.....

.....

Calculation of shop head rivet (to check)

H=

Ø=

Self Check Card (NOTE:Personal Reference ONLY NO Marks)

| DESCRIPTION | VALUE RAISED |
|------------------------------------|--|
| Part 1 | |
| 150 ±0.5 | |
| 150 ±0.5 | |
| Chamfer 45° | |
| Part 2 | |
| Grain direction/Material Selection | |
| 150 ±0.5 | |
| 19.5 ±0.5 | |
| 19.3 ±0.5 | |
| 25 ±0.5 | |
| Chamfer 45 ° | |
| Bend radius | |
| Floating nuts part 2 | |
| 20 ±0.5 | |
| 9 ±0.5 | |
| 4.330 inches (±0.5mm) | |
| Rivet head smoothness (+0.2 / 0) | (indicate the correct number of rivet) |
| Shop head rivet | (indicate the correct number of rivet) |
| Part 3 | |
| Grain direction/Material Selection | |
| 150 ±0.5 | |
| 25 ±0.5 | |
| 39.3±0.5 | |
| 25 ±0.5 | |

| | |
|--------------|--|
| 19.5±0.5 | |
| Chamfer 45 ° | |
| Bend radius | |

| Floating nuts part 3 | |
|--|--|
| 20 ±0.5 | |
| 9 ±0.5 | |
| 4.330 inches (±0.5mm) | |
| Rivet head smoothness (+0.2 / 0) | (indicate the correct number of rivet) |
| Shop head rivet | (indicate the correct number of rivet) |
| Anchor nuts part 3 | |
| 14 ±0.5 | |
| 61 ±0.5 | |
| 11±0.5 | |
| Rivet head smoothness (+0.2 / 0) | (indicate the correct number of rivet) |
| Shop head rivet | (indicate the correct number of rivet) |
| Assembly of part3 /part1 | |
| Rivet spacing distance :22 ±0.5 | |
| Edge and first rivet distance : 9 ±0.5 | |
| Rivet head smoothness (+0.2 / 0) | (indicate the correct number of rivet) |
| Shop head rivet | (indicate the correct number of rivet) |
| Part 3 flush to part 1 (±0.5) | |
| Assembly of part2 /part1 | |
| Edge and first rivet distance : 9 ±0.5 | |
| Rivet spacing distance :22 ±0.5 | |
| Rivet head smoothness (+0.2 / 0) | (indicate the correct number of rivet) |

| | |
|--|--|
| Shop head rivet | (indicate the correct number of rivet) |
| Can the electrical box be mounted | |
| YES | NO |