

Chapter 16 Installing a Step

16.1 Introduction	16.1
16.2 Parts List	16.2
16.3 Construction Procedures	16.3
16.3.A Locating and Cutting a Hole in the Fuselage.	16.3
16.3.B Installing the Step	16.5

16.1 Introduction

In this chapter you will install the optional step in your ES. This process includes locating the position of the step in the fuselage, drilling a hole through the fuselage and securing the step in place.

Steps to Completion

- Locate and cut a hole in the fuselage and the wing fairing.
- Insert the sleeve and the step into the holes.
- Check the position of the step.
- Reinforce the step by bonding it in place with flox, prepreg panels and 2-BID layups.

Caution!

Make sure you carefully check the position of the step before you flox and bond it into place.

A Word about Sanding and Cleaning

The instructions in this chapter refer to preparing a surface or preparing a bonding area. When we recommend preparing a surface or a bonding area, we expect each of the following steps to be completed every time.

1. Sand the area using 40-grit sandpaper.
2. Vacuum all sanded areas.
3. Clean all sanded surfaces with Acetone.

16.2 Parts List

Step

Item	Part Number	QTY	Description
1)	3459-01	1	Step sleeve
2)	3459-02	1	Step sleeve
3)	AN3-16A	1	Bolt
4)	AN970-3	2	Area washers
5)	AN364-1032A	1	Nut
6)			Prepreg



16.3 Construction Procedures

16.3.A Locating and Cutting a Hole in the Fuselage

The step is mounted on the left side of the airplane aft of the 144.5 bulkhead, the same bulkhead the elevator torque tube is mounted to.

Use the following criteria to locate the hole in the fuselage.

- perpendicular to the center line
- properly oriented in the slipstream
- horizontal to the ground
- approximately 1" inboard of the wing fairing

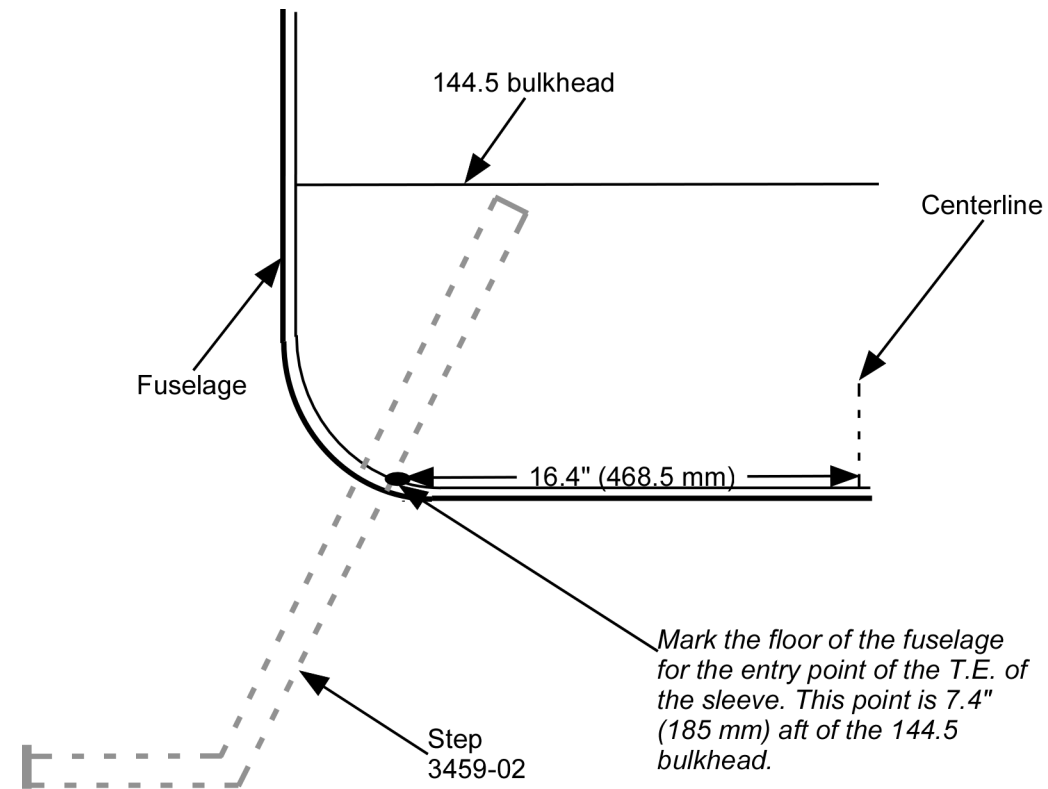
Note: Tolerance is 1/2" (12 mm).

Steps...

First you will locate a mark for drilling the hole for the step.

1. Set a straight beam across the fuselage in the following location:
 - parallel to the 144.5 bulkhead,
 - 7.4" (185 mm) aft of the 144.5 bulkhead.
2. Drop two plumb bobs from the beam and into the fuselage. Measure 7.4" (185 mm) aft of the top of the 144.5 bulkhead to the string.
3. Measure the distance across the fuselage at the beam. Divide this number by 2 to get the center line.
For example, if your fuselage is 37.5" (937 mm) across the calculation will be:
$$37.5 \div 2 = 18.75$$
4. Drop a plumb bob at the distance calculated in the previous step and mark the location on the floor of the fuselage.
This mark identifies the center line on the inside of the fuselage.
5. From the center line mark set another plumb bob at 16.4" (410 mm) outboard from the center line.
This mark is the entry point for the T.E. of the step sleeve.

Figure 16.3.A.1 Cross-section of fuselage looking forward



Steps...

Now you need to locate a mark to use as a guide for the drilling. When you hold the drill on this mark, it will drill the holes using the correct angle.

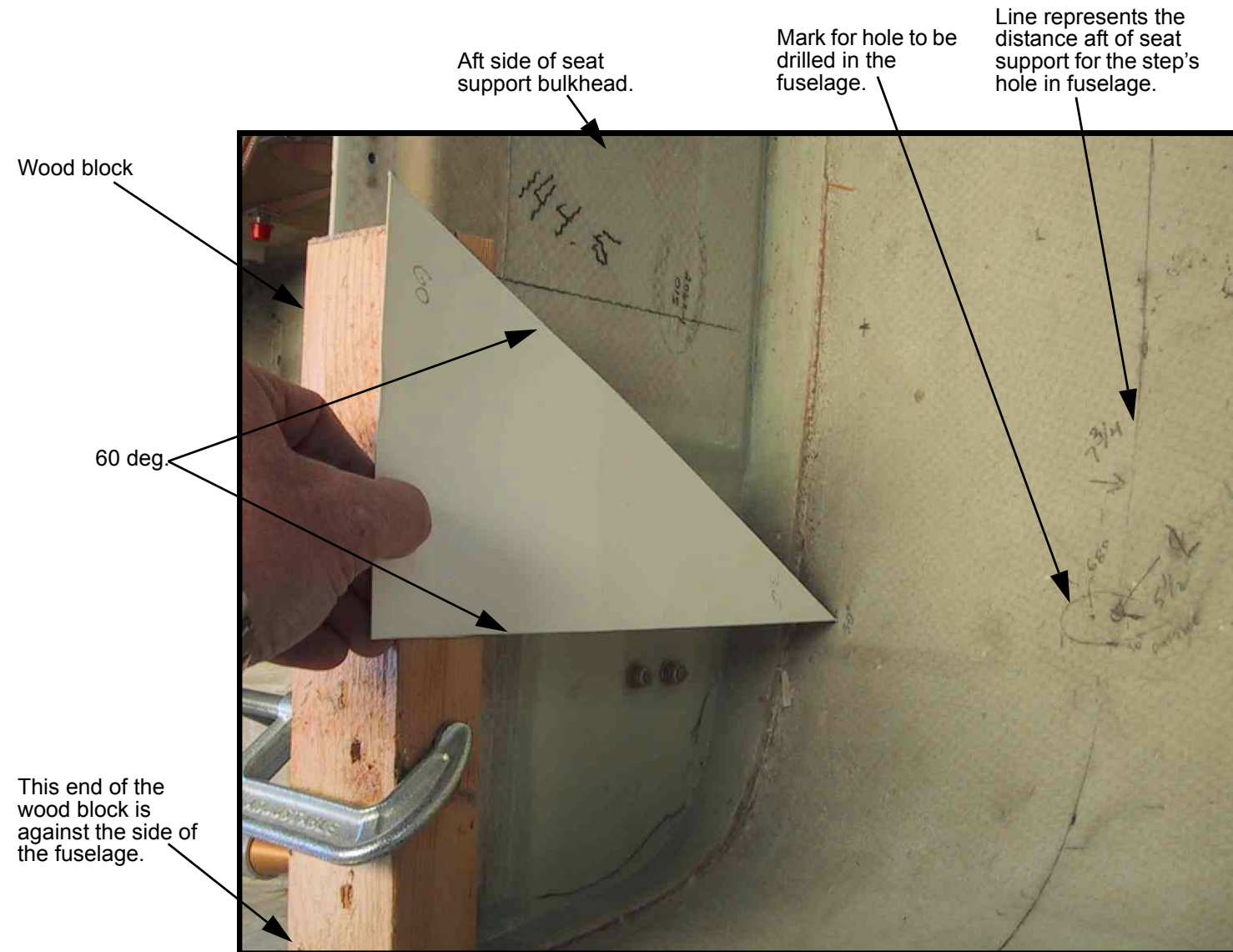
1. Set a straight beam across the fuselage in the following location:
 - parallel to the 144.5 bulkhead,
 - 5.2" (130 mm) aft of the 144.5 bulkhead.
2. Measure the distance across the fuselage at the beam. Divide this number by 2 to get the center line.
For example, if your fuselage is 38.2" (955 mm) across the calculation will be:

$$38.2 \div 2 = 19.1$$

3. Drop a plumb bob at the distance calculated in the previous step and mark the location on the floor of the fuselage.
4. From the center line mark set another plumb bob at 7.25" (181 mm) outboard from the center line. Use this point to align your drill bit with the mark on the floor.
5. Drill a small hole through the fuselage and the wing fairing. Recheck the position of the hole.
6. Make a pattern of the cross section of the leg portion of the step.
7. Place the T.E. of the pattern on the drilled hole. The L.E. of the pattern should be toward the front of the plane.
8. Enlarge the hole in the floor until the step sleeve can be inserted into the hole.
9. Insert the pattern into the hole and use a marker to outline the cross section on the inside of the wing fairing.
It may be necessary to make the hole in the fuselage slightly larger than the sleeve in order to fit the pattern and the marker.
10. Enlarge the hole in the wing fairing.

Tip: The pattern should be at approximately a 60° angle when it is placed in the two holes.

Figure 16.3.A.2 Positioning the step in the fuselage



16.3.B Installing the Step

Steps...

1. Insert the step (3459-02) into the sleeve (3459-01).
2. Insert the sleeve end of the step up through the hole in the fuselage.

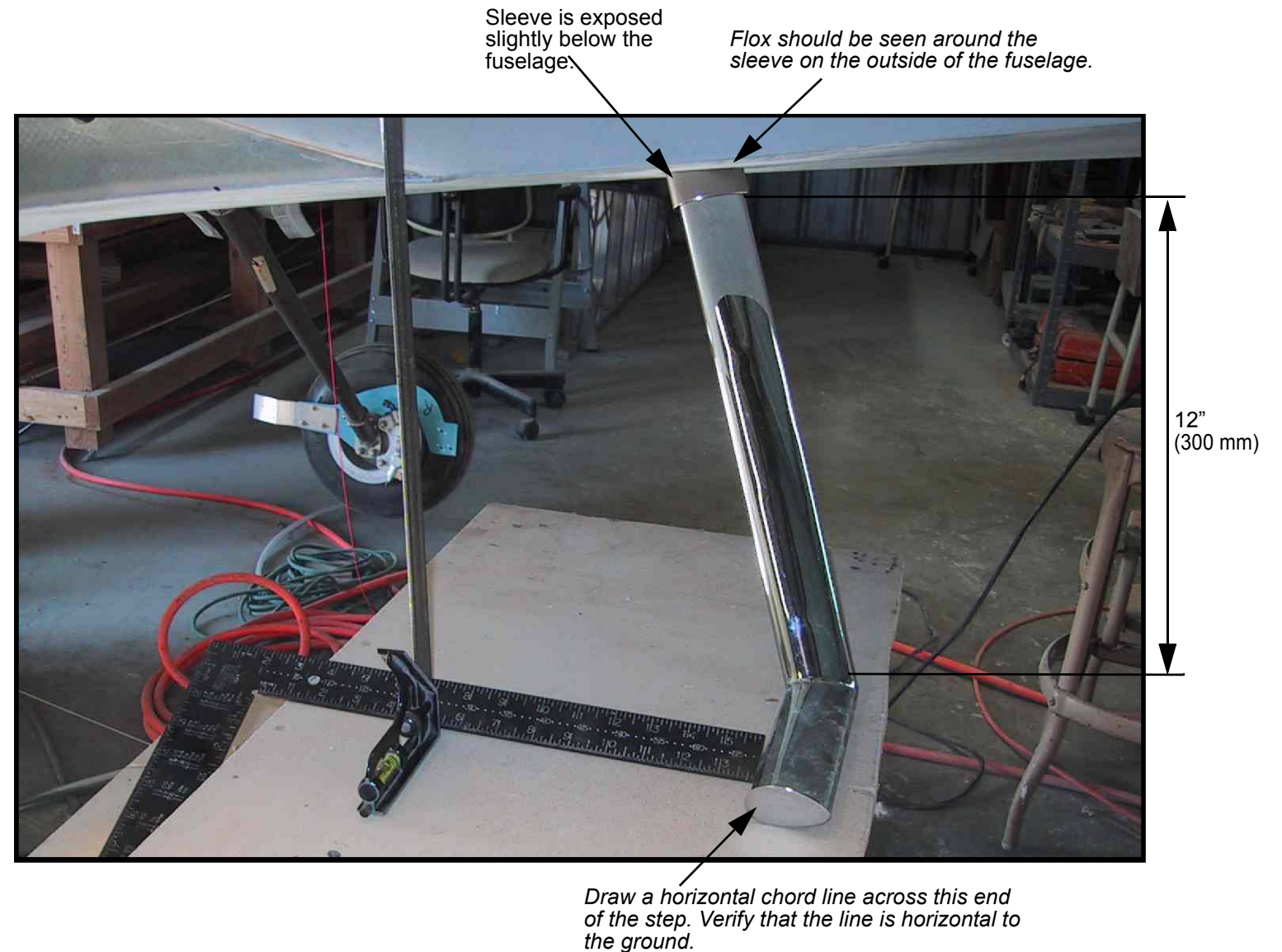
Tip: Set up a level table under the fuselage so the step can rest on it. With the table, you can make the horizontal part of the step perpendicular to the fuselage, horizontal to the slipstream and horizontal to the ground. Because the sleeve is removed and reinstalled several times during the process, the outline of the step should be marked on the table and the position of the table should be marked on the floor.

Tip: The table will need to be approximately 24" high assuming that the fuselage is resting on its gear.

3. Draw a cord line on the outboard end of the step. Make sure this line is horizontal to the ground.
4. Set a small level on the step and make the horizontal section of step level. Your step is now properly positioned.
5. Pull the sleeve up until its circumference is slightly exposed below the fuselage. Mark the bottom outline of the fuselage on the sleeve.

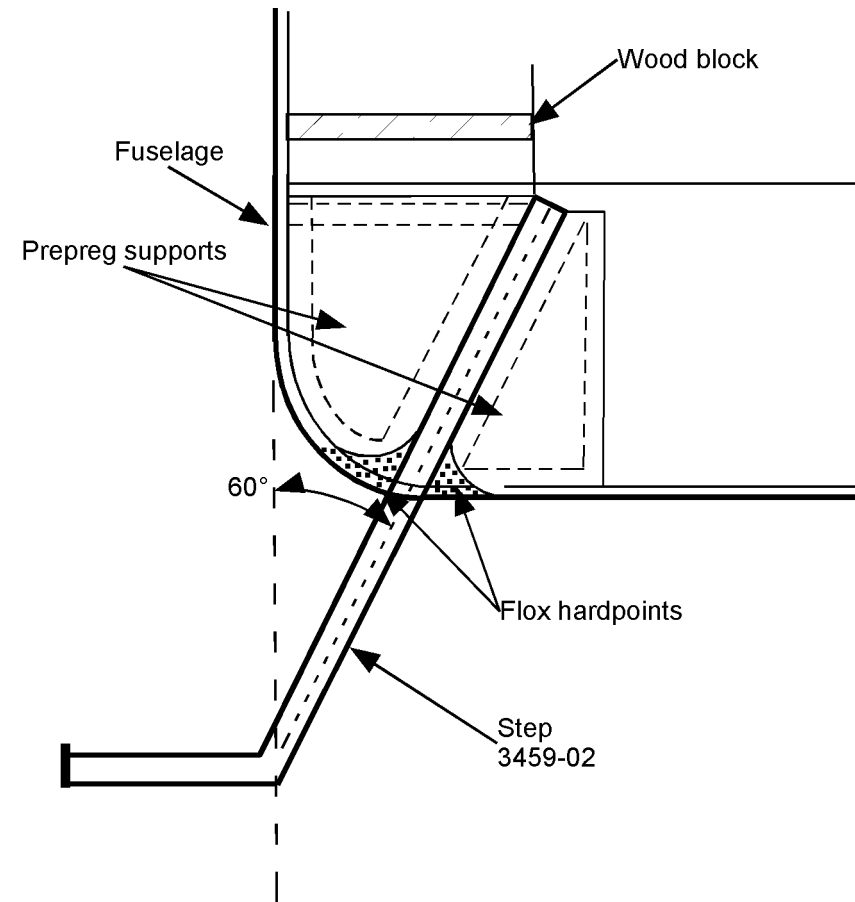
Tip: You may want to make a U shaped support for the sleeve. The sleeve will try to slide down through the hole, so an upside down U shaped support can be clamped to the sleeve and set on the fuselage floor for support.

Figure 16.3.B.1 Step is in position and resting on a table



6. Inject thick flox around the sleeve to fill the opening. Flox should be seen at the bottom of the fuselage and should be filled around the sleeve.
Let this set up until tacky and then insert the sleeve and step and finish filling the space around the sleeve with flox. Do all of this when it is cool using slow hardener.
7. Cut three 2-core-2 prepreg panels for each of the locations in Figure 16.3.B.3 and following these guidelines:
 - Panels one and three connect to the sleeve at the point of maximum thickness.
 - The height of the panels should be approximately one width of prepreg shorter than the seat surface.
8. Prepare all surfaces for adding the three panels.

Figure 16.3.B.2 Cross section of flox hardpoints and prepreg supports



9. Attach the first piece of prepreg to the forward side of the step sleeve and the aft side of the seat support.
10. Wrap 2-BID down the side of the prepreg and all the way around the step sleeve.
11. Add the other two prepreg panels using 2-BID on each side where they connect to the fuselage, step sleeve and seat support.
The two bid can be omitted where prepreg panel three meets the seat support.
12. Dab some flox onto each side of the step sleeve and shape it so that the area washers will sit flat and parallel to each other on either side of the sleeve.
13. Using the washers as a template, drill a hole through the flow, step sleeve and step.
The step height should be configured so that the top end of the step meets the top end of the sleeve when bolted in place.
14. Insert a bolt (AN3-16A) through an area washer (AN970-3), the hole you just drilled, followed by another washer and secure with a nut (AN364-1032A).

Tip: A cover can be made for the top of the prepreg panels and the exposed openings.

Figure 16.3.B.3 Prepreg panels and 2-BID wrap for step sleeve

