

# AIR RESEARCH TECHNOLOGY INC. WINGX STOL

## SERVICE BULLETIN

Number SB-1-96 April 11, 1996

### SUBJECT :

Lower Main Spar Cap at Wing Station 100.00

\* Inspection and reinforcement, of the lower wing spar cap at the wing lift strut pick-up point at Station 100.00

### 1. PLANNING INFORMATION

#### A. Effectivity

\* All Cessna 180 and 182 series aircraft with authorised gross weights in excess of 3,000 Lbs. equipped with A.R.T. "WingExtensions" approved under STA SA93-136 or STC SA00276NY.

\* All Cessna 185 series aircraft equipped with A.R.T. "WingExtensions" approved under STA SA93-136 or STC SA00276NY.

#### B. Reason

Early model wings on the affected aircraft do not incorporate an angle stiffener at the spar splice at wing station 100.00. Static testing performed by A.R.T. has shown that these modified wings do not satisfy the applicable design requirements. The modification introduced by this Bulletin corrects this deficiency.

#### C. Description

This Bulletin consists of two parts. Part A consists of an inspection of the area along the lower main spar cap from Station 90 outboard to Station 110, in order to determine if the "*angle stiffener*" is present on the subject wing.

If the "*angle stiffener*" is installed, no further action is required.

Part B consists of installation of a reinforcing strap. If the "*angle stiffener*" is not present Part B must be accomplished.

#### D. Compliance

A.R.T. considers compliance with this Bulletin to be mandatory.

#### E. Approval

The design content conveyed by this service bulletin has been approved by a Design Approval Representative for Transport Canada.

#### F. Manpower

Approximately 8 man-hours will be required to accomplish this modification. This estimate is for direct labor performed by an experienced crew and it does not include set-up, planning, familiarization, cure time, part fabrication, tool acquisition or lost time.

#### G. Material - Price and Availability

A kit consisting of two(2) Stainless Straps (16" L. X 1" W . X 0.077" ) Type and specification : MIL-S-5059 AMS- 5518 H 301 1/2 HARD is available from Air Research Technology. Kits may be obtained by submitting a purchase order, specifying S/N# of WingExtension kit to A.R.T. Administration.

## H. Weight and Balance

Weight Change due to accomplishment of Part B is negligible.

### ————— ACCOMPLISHMENT INSTRUCTIONS —————

#### 1. Parts Required Per Aircraft

1. Service Bulletin Kit SB-1-96, consisting of:

<u>Part Number</u>	<u>Qty</u>	<u>Description</u>
SS-12-1-077	2	Stainless Steel Strap

2. The following materials are required for the completion of this service bulletin and are to be procured by the operator directly from industry sources.

<u>Part Number</u>	<u>Qty</u>	<u>Description</u>
CR3213-6-6	28	Universal Head CherryMAX Rivet
CR3213-6-7	2	Universal Head CherryMAX Rivet Epoxy Primer

### INSTRUCTIONS

#### PART A - Inspection

1) Open the inspection hole situated on the underside of the wing, aft of the spar, closest to where the strut connects to the wing. Using a flashlight and a mirror, by visual inspection, ascertain if the subject wing has the "*angle stiffener*" installed along the lower spar cap between Wing Station 90 and 110 (approximately).

Refer to Figures 1 and 2 to assist identification of the "*angle stiffener*".

2) Both wings, left and right must be inspected individually.

3) The installation of the Stainless Steel Strap 0.077" in accordance with Part B of this Bulletin is **MANDATORY** on wings which do not incorporate the "*angle stiffener*".

4) If the "*angle stiffener*" is present, do not install S/S straps. Make a log entry indicating that "ART Service Bulletin SB-1-96 Part A complied with, Part B is not applicable due to presence of angle stiffener in both wings".

#### PART B - Strap Installation

1) Installation may only be carried out in an approved sheet metal shop using recognized procedures and techniques. Workmanship must comply with AC43.13-1A.

2) On the underside of the wing, along the spar identify and mark the center of the rib at Wing Station 100.50 using a felt marker .

**NOTE:** Wing Station 100.50 is established by the outboard Web of the center rib at Wing Station 100.00

3) To provide room for installing the strap the strut must be removed at the wing junction. Cradle the wing securely and remove the strut connection where it joins to the main spar.

4) Carefully drill out and remove all existing rivets approximately. 8" inboard and 8" outboard of Wing Station 100.50.

**Caution do not to enlarge the drill holes beyond tolerance or severe spar damage may occur.**

5) Take the 16" Stainless Steel Strap 0.077" and precisely mark the center using a felt marker.

6) Slide the "s/s strap" under the leading edge wing skins and up against the underwing skin along the spar channel and then center the "s/s strap" at Wing Station 100.50.

7) The "s/s strap", when centered on Wing Station 100.50 at the spar channel splice will be completely hidden, because it is covered by the leading edge wing skins. When the correct position is established, accurately mark the drill hole positions on the "s/s strap", the existing L/E wing skin holes can be used as a guide. Then remove the "s/s strap".

#### IMPORTANT NOTE

A) The number of holes to be drilled may vary with different aircraft however (7) rivets on each side of the spar splice at Wing Station 100.50 is the minimum required in order to obtain the desired structural strength of the spar splice.

B) The hole positions, as marked may not align perfectly down the center of your "s/s strap". This is normal; however, a rivet edge distance of .375" must be maintained on the "s/s strap".

#### CAUTION

- Care must be taken while drilling in order to avoid contact with the strut attach fitting inside the wing.
- DO NOT SUBSTITUTE the universal head CherryMAX rivets or the Stainless Steel Strap. These parts are shear strength specific and critical to maintaining adequate strength in the wing spar splice. USE ONLY fasteners and materials supplied or referenced herein.
- If a stainless steel strap is damaged during installation, obtain a new strap from the manufacturer.

8) Using a drill press and a 3/32" bit, precisely drill out the holes as required. Refit as necessary along the lower spar cap, in order to assure an accurate fit.

9) Enlarge the drill holes in the "s/s strap" to #10, while verifying that the holes align precisely along the spar.

10) Deburr the Stainless Steel Strap and then position it over the leading edge wing skins and up against the underwing skin along the spar channel and center the strap at Wing Station 100.50 as in Step 5.

11) Through the entire thickness of the spar channel including all the skins, use (2) clecos of the correct size and secure the "s/s strap" tightly into position. Use the holes at each extremity of the "s/s strap".

12) Using the "s/s strap" as a guide, drill through the combined thickness along the spar using a #10 drill. Repeat this until all of the holes have been enlarged.

**Caution do not to enlarge the drill holes beyond tolerance or severe spar damage may occur.**

13) When all the holes have been drilled to the correct size, remove. **Deburr the strap but do not chamfer the rivet holes**. Clean out all the metal filings in and around the spar for preparation of final installation.

14) Prime the strap with two coats of epoxy primer and allow to dry, then permanently install using CR3213-6-6 universal head CherryMAX rivets. **DO NOT SUBSTITUTE**

**IMPORTANT NOTE:**

A) At Wing Station 100.25 "the leading edge lap joint", install (1) rivet No: CR3213-6-7 universal head CherryMAX rivet " DO NOT SUBSTITUTE ". This longer rivet will allow for the additional thickness at the joint due to leading edge skins overlapping at this point as well as the additional thickness of the center rib at this position.

B) Both extremities of the 16" S/S strap have been tapered for your convenience. The S/S strap should never be cut shorter. On occasion, due to the proximity of other rivets, the extremities of the s/s strap may cause undesirable stress on the underside wing leading edge skins. If this occurs, remove rivet(s) in affected area and reinstall using locally fabricated aluminum shims in order to create a more gentle taper at the extremity of the s/s strap.

15) Reinstall the strut to the wing, on occasion the tubular structure of the strut may touch one of the heads of the newly installed cherry max rivets preventing the strut fork to seat correctly. When this occurs it is permissible to smoothly file out that portion of the tubular strut to clear the rivet head.

16) Repeat instruction steps (1 thru 15) for both wings.

17) Complete maintenance release and make log entry stating "ART Service Bulletin SB-1-96 Part A - Inspection and Part B - Modification complied with in both wings".

18) Two (2) Stainless Steel Straps #SS-12-1-077 (16" x 1" x 0.077" ) positioned at Wing Station 92.00 to 108.00 Total Weight : 0.55 lbs. ARM : 35.3 in.

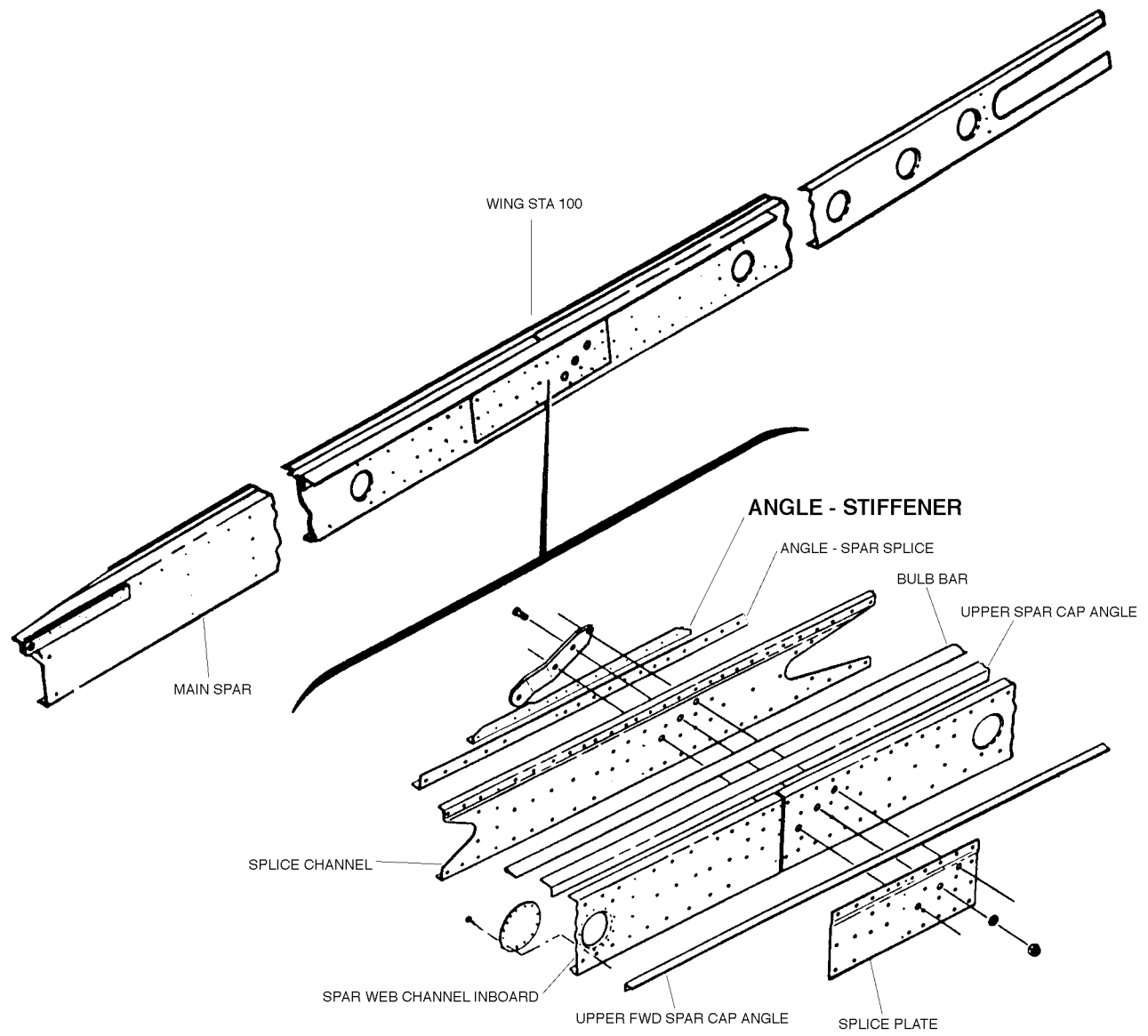
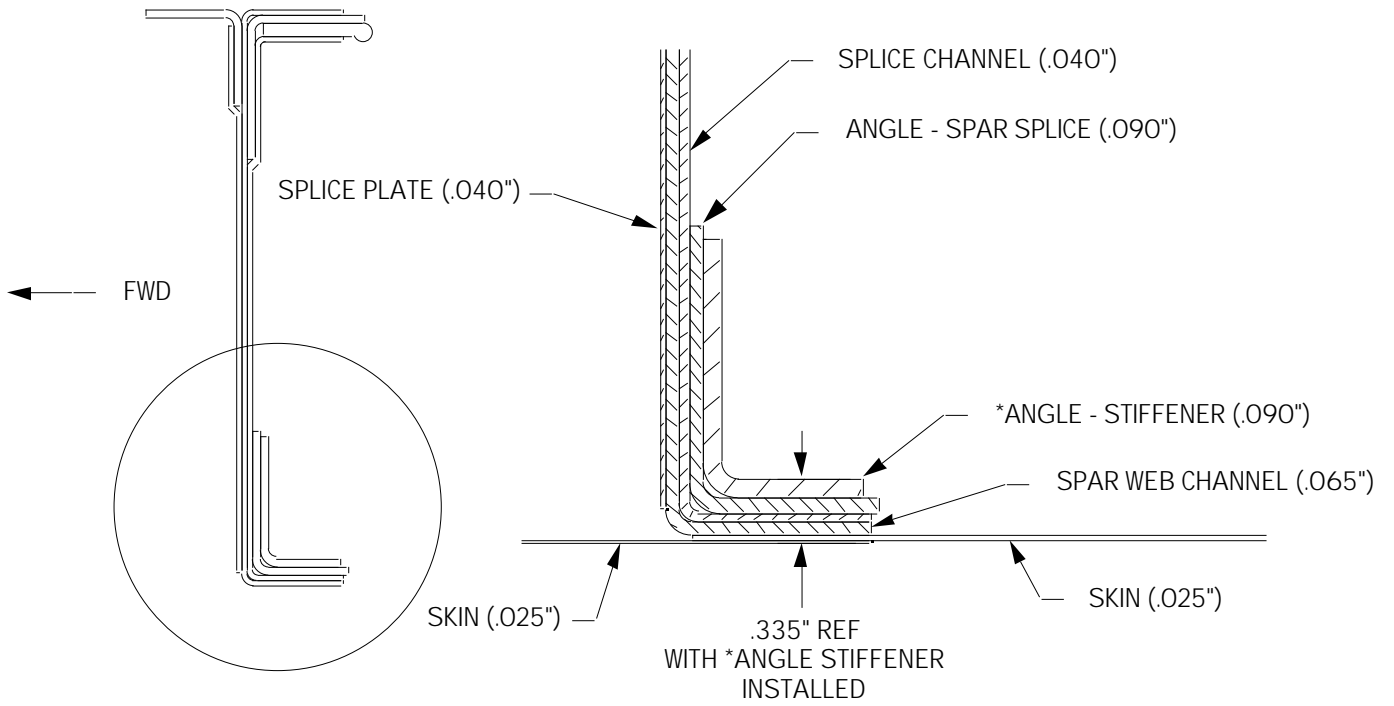
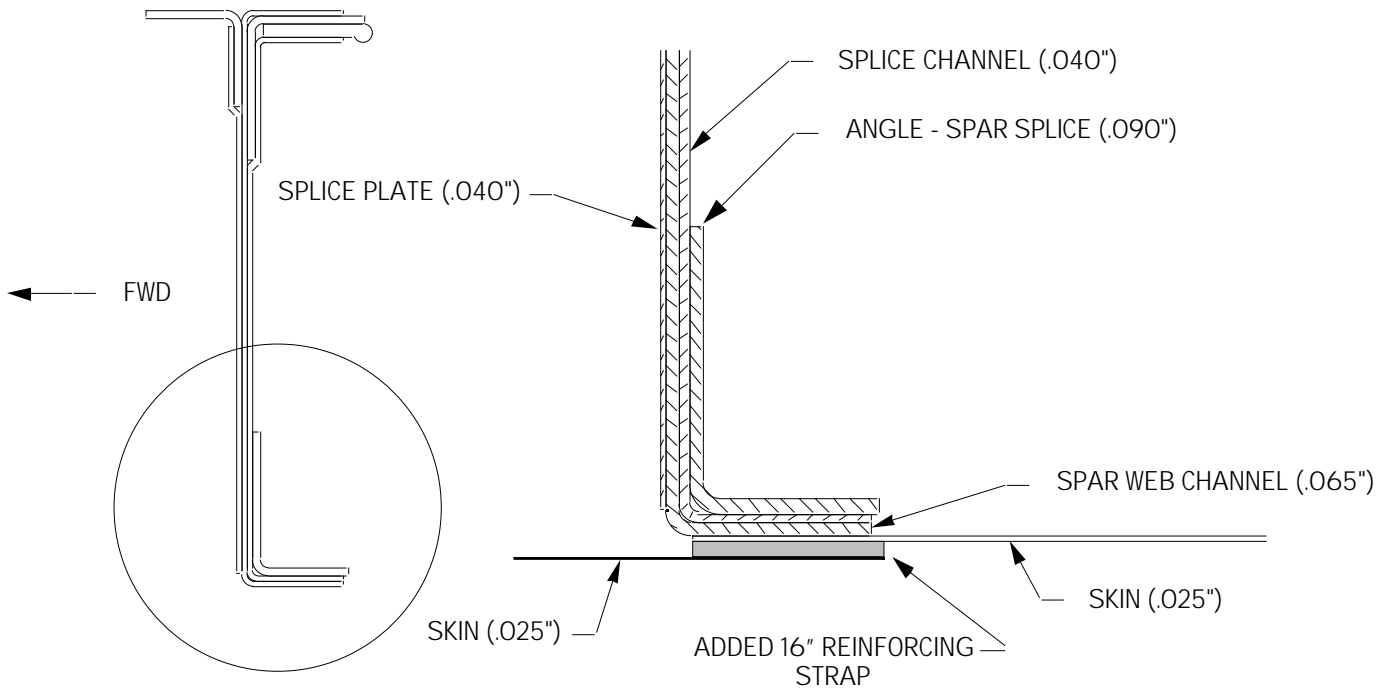


FIGURE 1 - Spar Construction Detail



**FIGURE 2 - Spar Section Detail**  
**WING STATION 100**  
**Wing with Angle Stiffener Installed**



**FIGURE 3 - Spar Section Detail**  
**Wing without Angle Stiffener Installed after Part B Modification**