



SERVICE INFORMATION LETTER

SERVICE INFORMATION LETTER NO. 0129
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DATE: November 12, 1982

SUBJECT: Minor Maintenance & Repair of Main & Tail Rotor Blades

MODEL: F-28A, 280, F-28C, 280C, F-28F & 280F Helicopters

EFFECTIVITY: As noted in text

REFERENCE: Enstrom Service Information Letter No. 0127

The main and tail rotor blades of the Enstrom helicopters are highly efficient bonded structural components, fabricated with high strength aluminum alloys. These components are highly stressed and it is vitally important that they be maintained with the utmost care and vigilance against any mechanical damage. Mechanical damage, such as nicks and scratches, may seem minimum but can create stress risers resulting in damaging fatigue cycles during continued operation of the components. The result of such damage in a critical location can culminate in a catastrophic failure if prompt maintenance and repair are not accomplished.

NOTE: Mechanical damage, no matter how minimal, breaks the protective coating on the blades, allowing corrosive action to be initiated. Therefore, prompt corrective action is imperative.

This Service Information Letter will detail the required inspection criteria to provide a preventive maintenance and repair procedure for field maintenance. These procedures should be used in conjunction with the regularly scheduled maintenance program as defined by Enstrom Service Information Letter No. 0127, for corrosion control. These combined preventive maintenance programs, if followed regularly, will assure the owner/operator of long and useful life of these components.

GENERAL DAILY INSPECTION

This daily inspection is to be considered in addition to the inspection requirement defined in Service Information Letter No. 0127, page 2, part (F).

- A. Inspect the main rotor blade, spar, skins, trim tabs, retention plates, drag link fittings, and root doublers for any mechanical damages such as nicks, scratches, dents and cracks. Inspect the blade tip rib, trim tab and drag link fittings for loose rivets. Reference Figure 1 for component definition.

B. Main Rotor Blade Spar

1. Rejection Criteria

- a. Nicks and scratches greater than the limits on Figure 2 are cause for rejection.
- b. Leading edge dents with smooth surfaces greater than the limits shown on Figures 3 and 4 are cause for rejection.
- c. Leading edge dents with sharp width to depth ratios (i.e., less than 3:1), or with torn, nicked, scratched or creased surfaces greater than the limits in Figure 5 are cause for rejection.

2. Repair Procedures

- a. Nicks and scratches within repairable limits should be polished out and blended smooth as shown in Figure 6.
- b. Sharp dents within the permissible limits shown in Figure 5 must be blended as noted in Figure 7.

C. Main Rotor Blade Skins

1. Rejection Criteria

- a. Punctures in the blade skin.
- b. Sharp dents with width to depth ratios of less than 3:1 and deeper than .020 inch, in which the metal has either been creased or the surface scratched or nicked, are cause for rejection.
- c. Dents which have resulted in permanent skin deformation greater than .060 inch in depth are cause for rejection.
- d. Trailing edge chordwise dents or nicks deeper than .20 inch are cause for rejection.
- e. Trailing edge flapwise kinks extending more than .20 inch chordwise are cause for rejection.

2. Trailing Edge Damage Repair Procedure

- a. Blend out nicks and kinks to a chordwise depth not exceeding .20 inch, on a circular arc with not less than a 2.00 inch radius (see Figure 8).

D. Main Rotor Blade Doublers

1. Polish out all nicks, scratches, and sharp dents not greater than .010 inch deep. Blend out smoothly to approximately .50 inch on each side of the damaged area. Any nicks, scratches or sharp dents in excess of those noted are cause for rejection.
2. Polish out all nicks, scratches and sharp dents oriented within $\pm 30^\circ$ of the span direction (see Figure 2) and not greater than .020 inch deep. Blend out smooth to approximately .50 inch on each side of the damaged area. Any nicks, scratches or sharp dents in excess of those noted are cause for rejection.
3. Smooth dents up to .020 inch deep are acceptable. Deeper dents are cause for rejection.
4. Cracks in any direction are cause for rejection.

E. Main Rotor Blade Retention Plates

1. Polish out all nicks, scratches and dents not greater than .050 inch in depth. Damaged area to be blended smooth over an approximate 2.00 inch diameter. Any nicks, scratches and dents in excess of those noted are cause for rejection.
2. Cracks in any direction are cause for rejection.

F. Main Rotor Blade Trim Tabs

1. Flatten dents or kinks and polish out scratches and nicks.
2. Drill out and replace loose rivets.

G. Main Rotor Blade Drag Link Fittings

1. Blend out nicks and scratches not deeper than .010 inch in depth. Any nicks or scratches in excess of those noted are cause for rejection.
2. Any cracks are cause for rejection.
3. Looser rivets are cause for rejection.

H. Main Rotor Blade Tip Rib

1. Cracks are cause for rejection.
2. Loose rivets can be replaced.

NOTE: For items A through H, refinish per paragraph J of this Service Information Letter after rework.

I. Tail Rotor Blades

Inspect the tail rotor blade, skins, abrasion strip, retention plates and root doublers for nicks, scratches, dents and cracks (see Figure 9). Check the tip rib for loose rivets and strike tab for damage.

1. Tail rotor blade skin

- a. Buff out all scratches not deep enough to penetrate the clad material.
- b. Polish out all deeper scratches to a depth not exceeding .010 inch. Blend smooth over an area 2.00 inches in diameter. Scratches deeper than noted are cause for rejection.
- c. Blend out nicks in the trailing edge to a depth (chordwise) not to exceed .100 inch, in a circular arc, not less than 1.00 inch in radius. (See Figure 10.) Any nicks in the trailing edge in excess of the noted depth are cause for rejection.
- d. Sharp dents exceeding .010 inch are cause for rejection.
- e. Smooth dents exceeding .025 inch are cause for rejection.
- f. Cracks in any direction are cause for rejection.

2. Tail rotor blade abrasion strip

- a. Polish out scratches to a depth not exceeding .005 inch. Blend smooth over an area 1.00 inch long and .50 inch wide (length parallel to span). Scratches in excess of depth as noted are cause for rejection.
- b. Dents not deeper than .040 inch are acceptable. Deeper dents are cause for rejection.
- c. Erosion penetration of the stainless steel is cause for rejection.
- d. Cracks in any direction or punctures are cause for rejection.

3. Tail rotor root doublers

- a. Polish out all nicks, scratches, and sharp dents not deeper than .010 inch. Blend smooth to approximately .50 inch on either side of the damaged area. Nicks, scratches, and sharp dents in excess of depth as noted are cause for rejection.
- b. Smooth dents not greater than .020 inch in depth are acceptable. Deeper dents are cause for rejection.

4. Tail rotor retention plates

- a. Polish out all nicks, scratches, and dents not deeper than .030 inch. Blend smooth over an area approximately 1.00 inch in diameter. Deeper nicks, scratches, or dents are cause for rejection.
- b. Cracks in any direction are cause for rejection.

5. Tail rotor blade tip rib

- a. Cracks are cause for rejection.
- b. Loose rivets may be replaced.
- c. Any damage to the strike tab is cause for removal and inspection of the entire tail rotor assembly per Enstrom Service Information Letter No. 0088 Rev. A.

NOTE: For items in paragraph I, items 1 through 5, refinish reworked areas per paragraph J of this Service Information Letter.

CAUTION: Reworking of minor damage as defined by this Service Information Letter may disturb the weight distribution and require rebalance (see Service Information Letter No. 0127, page 9, item 6).

J. Limited Refinishing Methods for In-Field Maintenance

These are considered as temporary refinishing procedures to inhibit the start of corrosion on areas of repair as defined by paragraphs A through I until permanent maintenance procedures can be accomplished at a proper facility.

1. Any areas of repair where the cover coat of the blade has been removed must be recoated by one of the following methods:
 - a. Minimum protection, application of aerosol corrosion inhibitors per MIL-C-16173D, MIL-C-23411, or MIL-C-85054, Type I.
 - b. Maximum protection, area should be washed and degreased with acetone or MEK, then a coating of corrosion inhibitor can be applied and allowed to dry for 30 minutes. This is then followed by a coat of epoxy primer (DeSoto 593X300 aerosol) and covered over with an acrylic aerosol paint.

NOTE: For helicopters operating over salt water or coastal regions, MIL-C-85054, Type I inhibitor is preferred.

- K. For complete refinishing of main and tail rotor blade assemblies see Service Information Letter No. 0127, page 8, paragraph L for full instructions.
- L. List of materials in order of preference for requirements of this Service Information Letter:

Primers

DeSoto #593X500 aerosol touch-up epoxy

Zinc chromate per MIL-D-6889, Type I, MIL-P-8585A

Corrosion Inhibitors

LPS #1 or #2 metal protector

MIL-C-1673D & MIL-C-23411

Crown #7540

MIL-C-1673D

WD-40

MIL-C-23411

Salt Water & Corrosion Inhibitors

CARE #1900

AMGUARD MIL-C-85054(AS), Type I

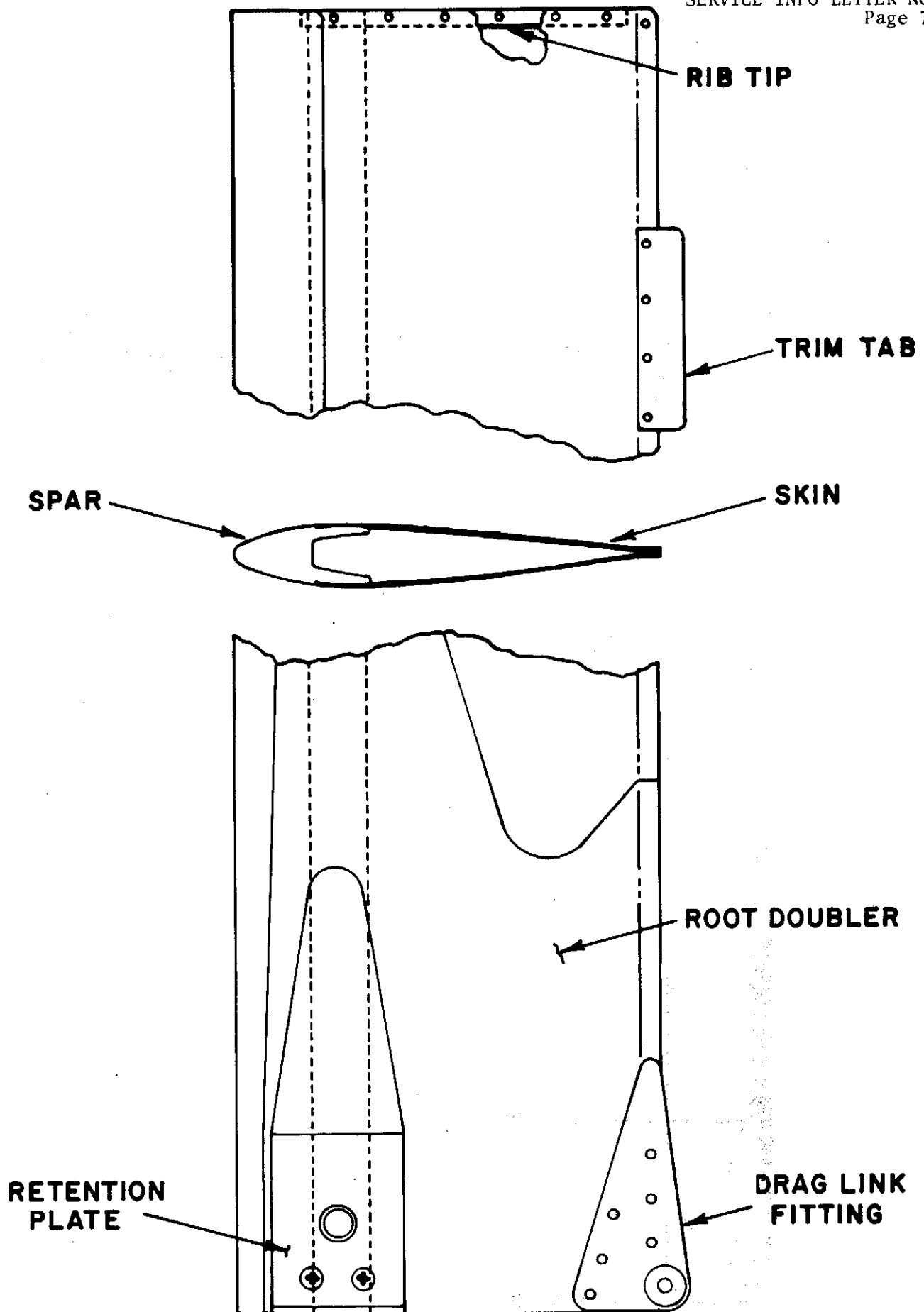
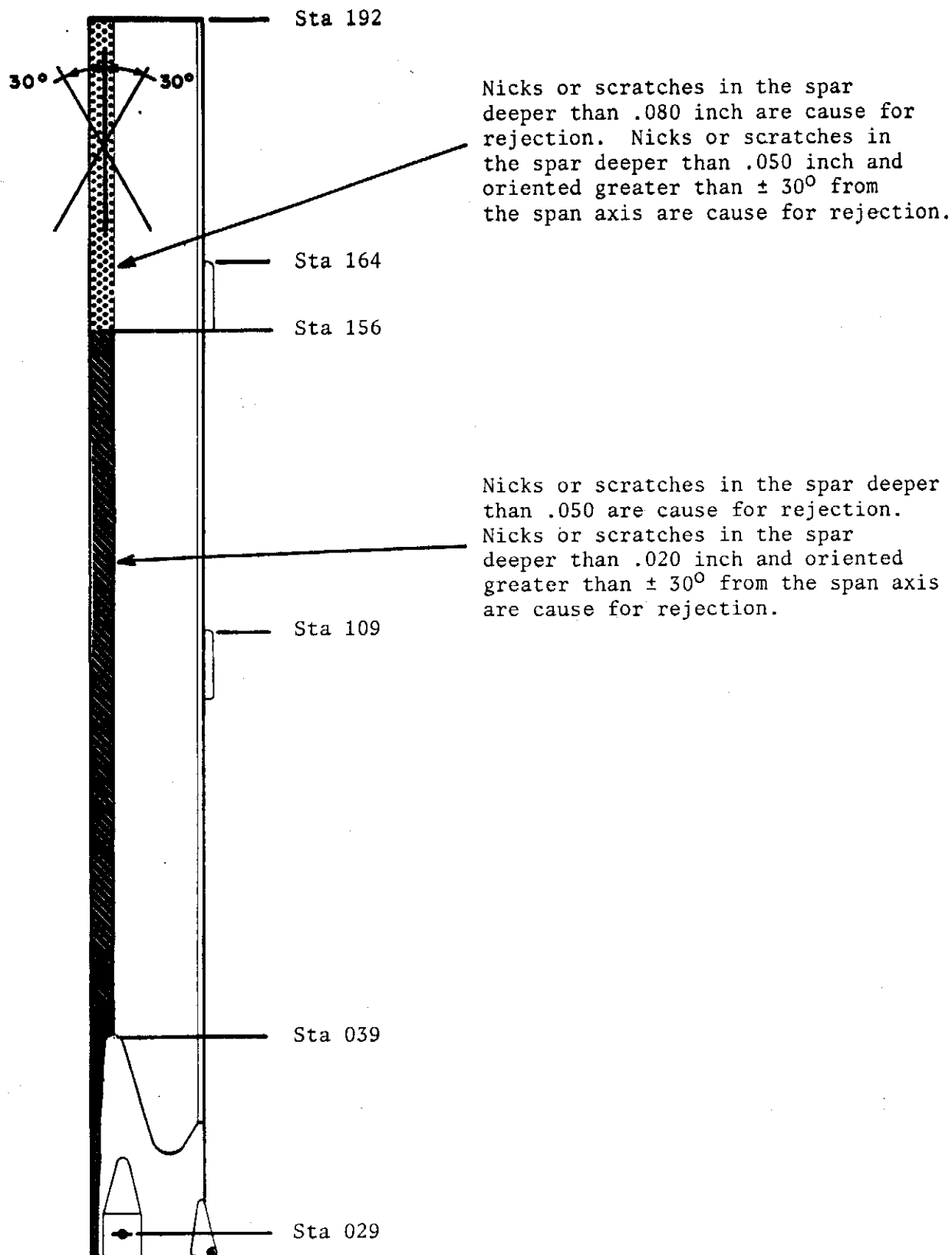


FIGURE 1

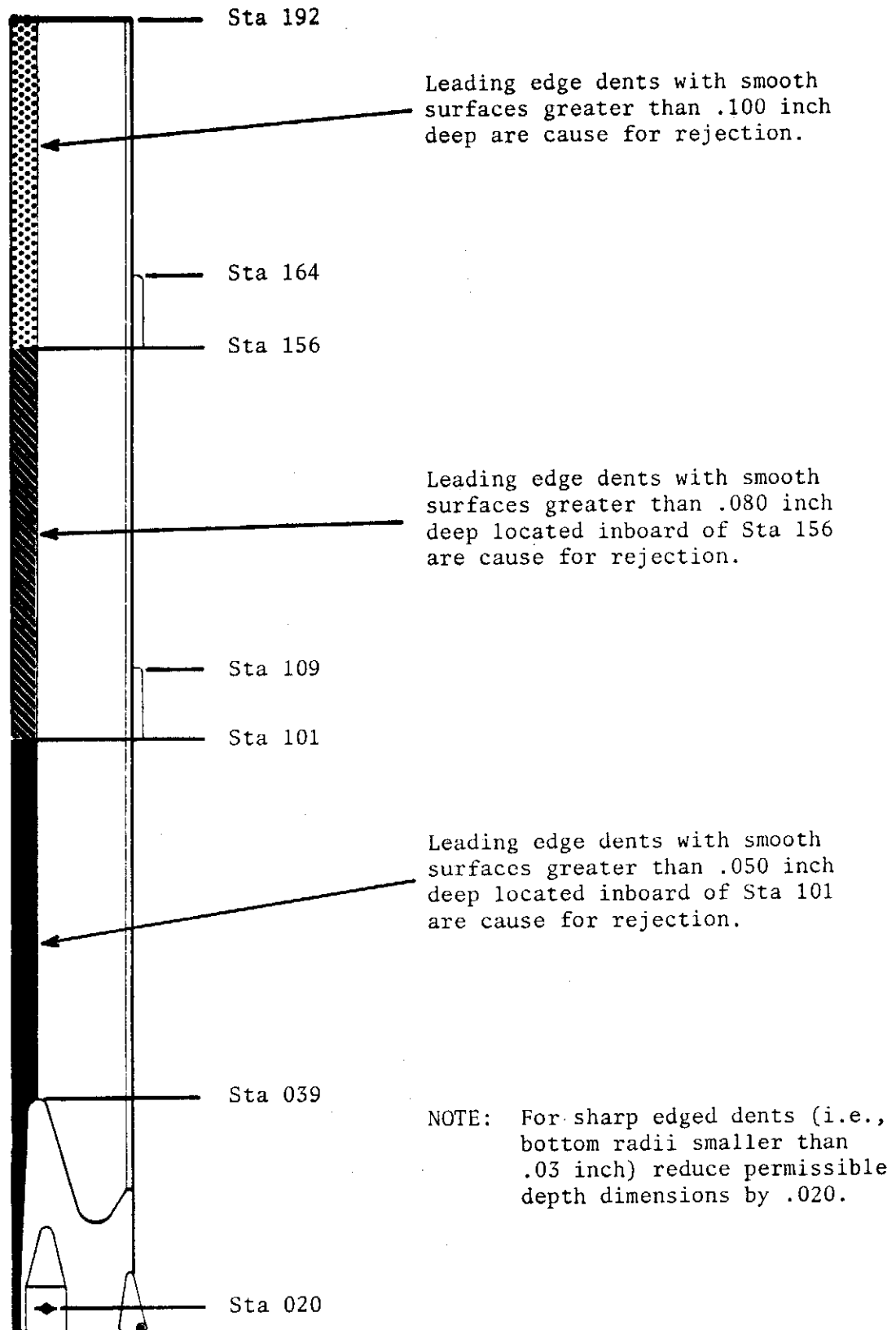
MAIN ROTOR BLADE ASSEMBLY

FIGURE 2
Spar Rejection Criteria -
Nicks and Scratches



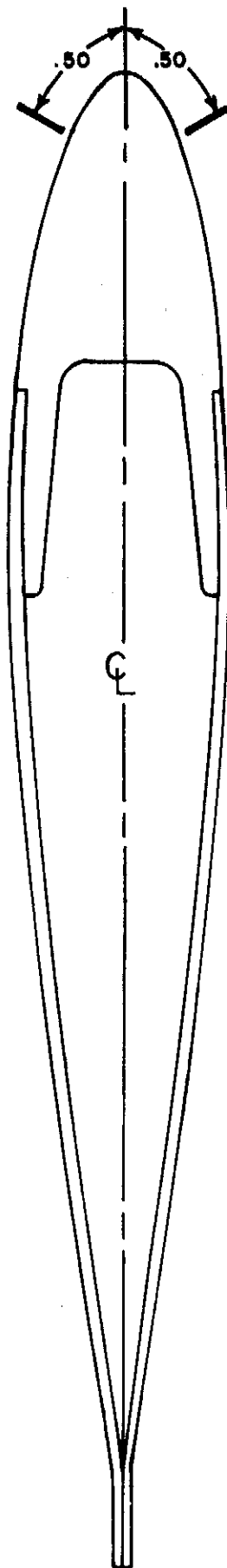
NOTE: 1. Nicks and scratches less than these limits must be repaired using approved procedure (see Figure 6).

FIGURE 3
Spar Rejection Criteria -
Smooth Dents at Leading Edge



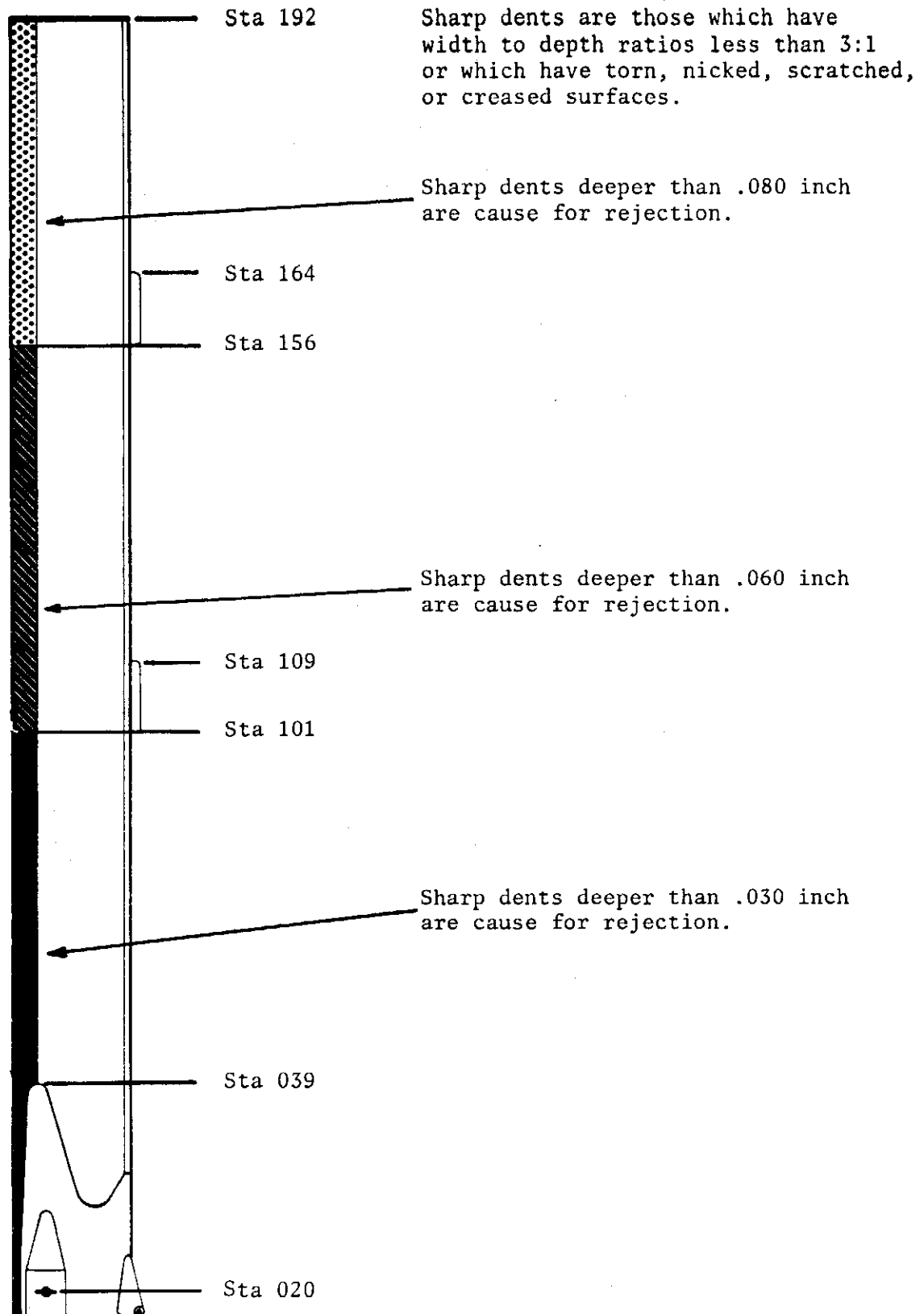
NOTE: 1. Leading edge is considered to be .5 inch above and below the nose, measured around the contour (see Figure 4).

FIGURE 4
Leading Edge Definition



MAIN ROTOR BLADE

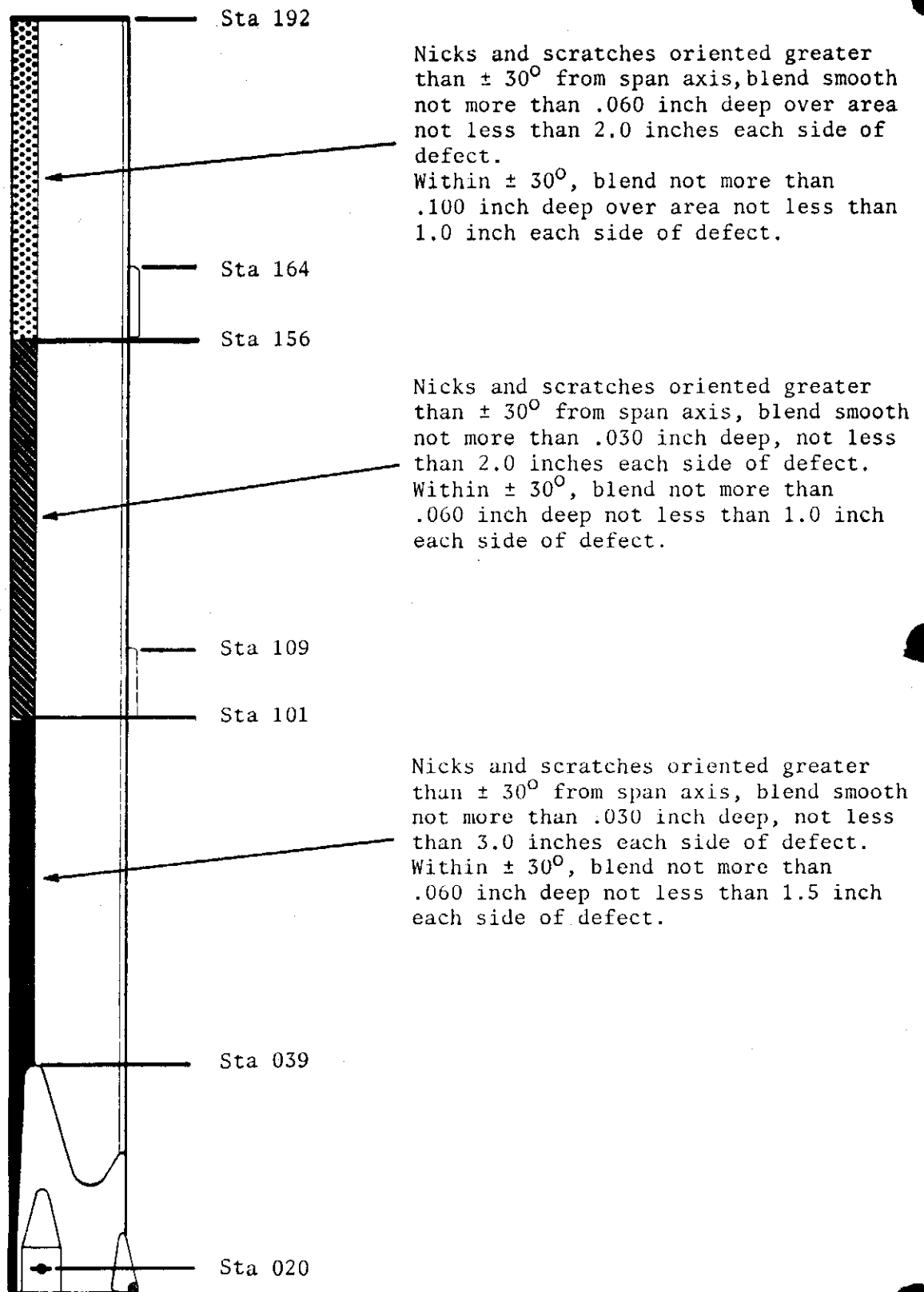
FIGURE 5.
Spar Rejection Criteria - Sharp Dents at Leading Edge



NOTE: 1. Sharp dents less than these limits must be repaired using approved procedure (see Figure 7).

FIGURE 6

Spar Repair Criteria - Nicks & Scratches



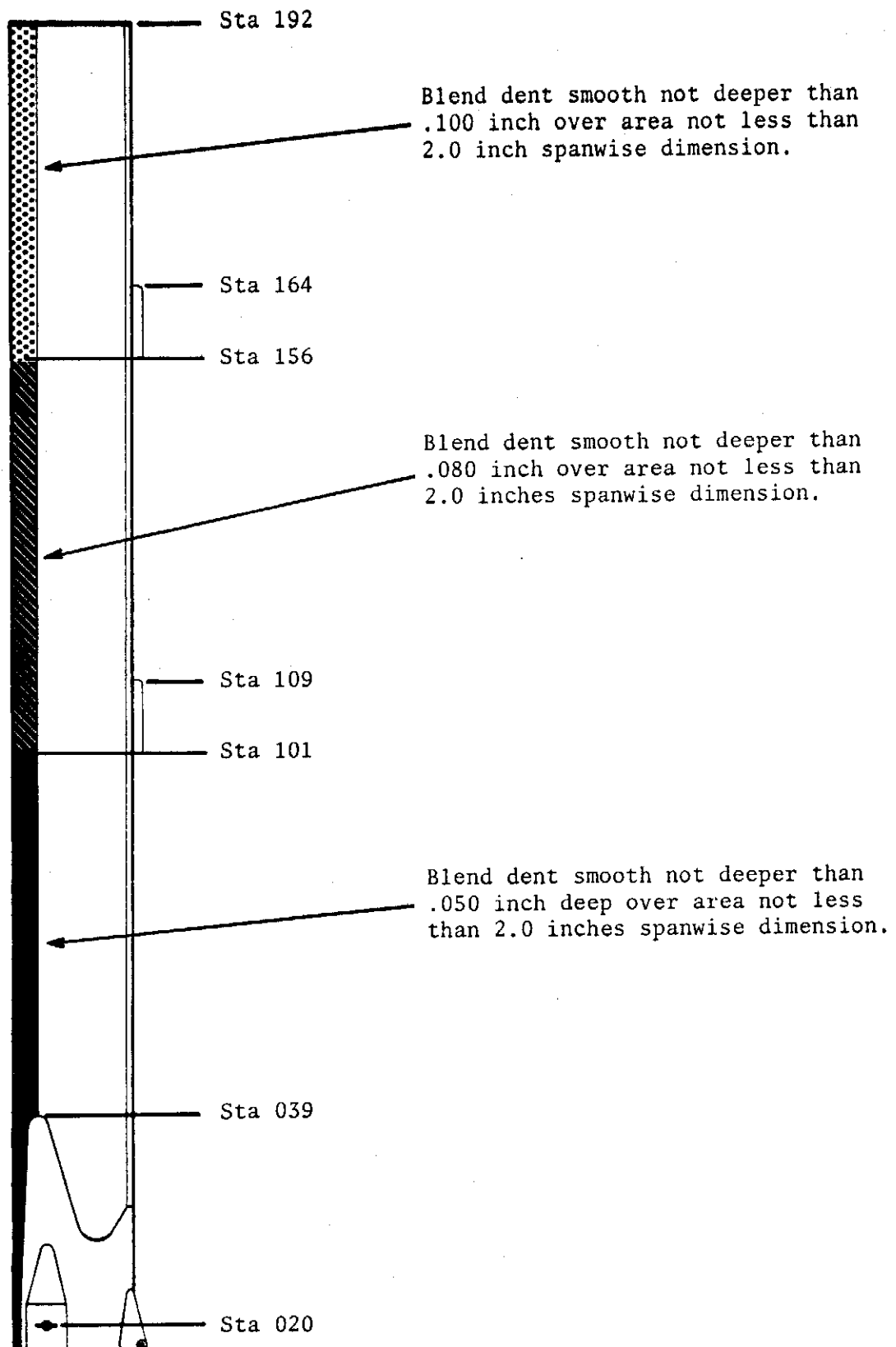
- NOTES:
1. Repairs exceeding these depths are cause for rejection.
 2. Excessive material removal will affect track and balance.
 3. Measure depth of material removed from Enstrom contour template

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FIGURE 7.

Spare Repair Criteria - Sharp Dents at Leading Edge



- NOTES: 1. Material removal beyond these depths is cause for rejection.
2. Excessive disruption of leading edge contour will affect track.

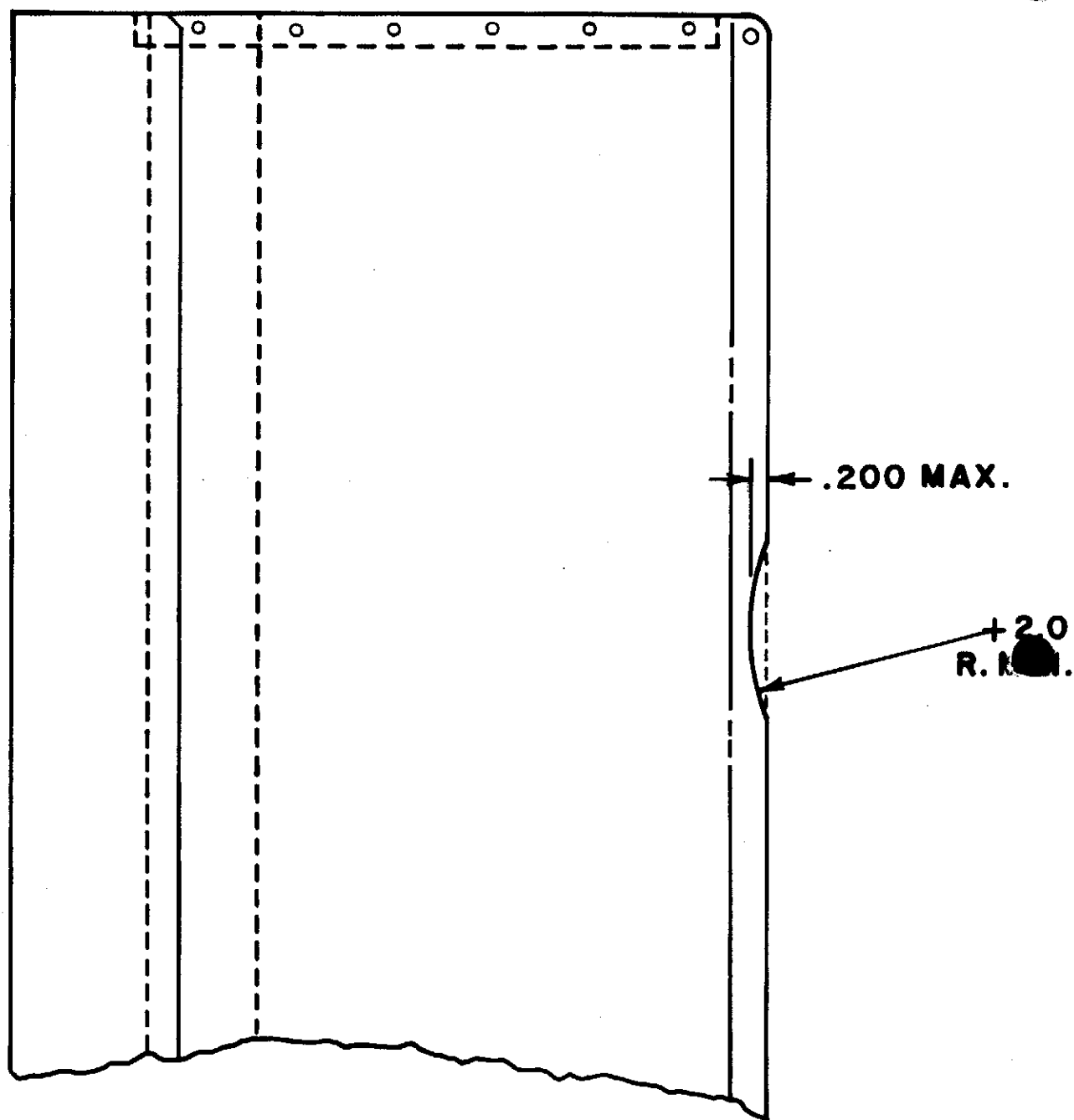


FIGURE 8
TRAILING EDGE DAMAGE REMOVAL
(MAIN ROTOR BLADE)

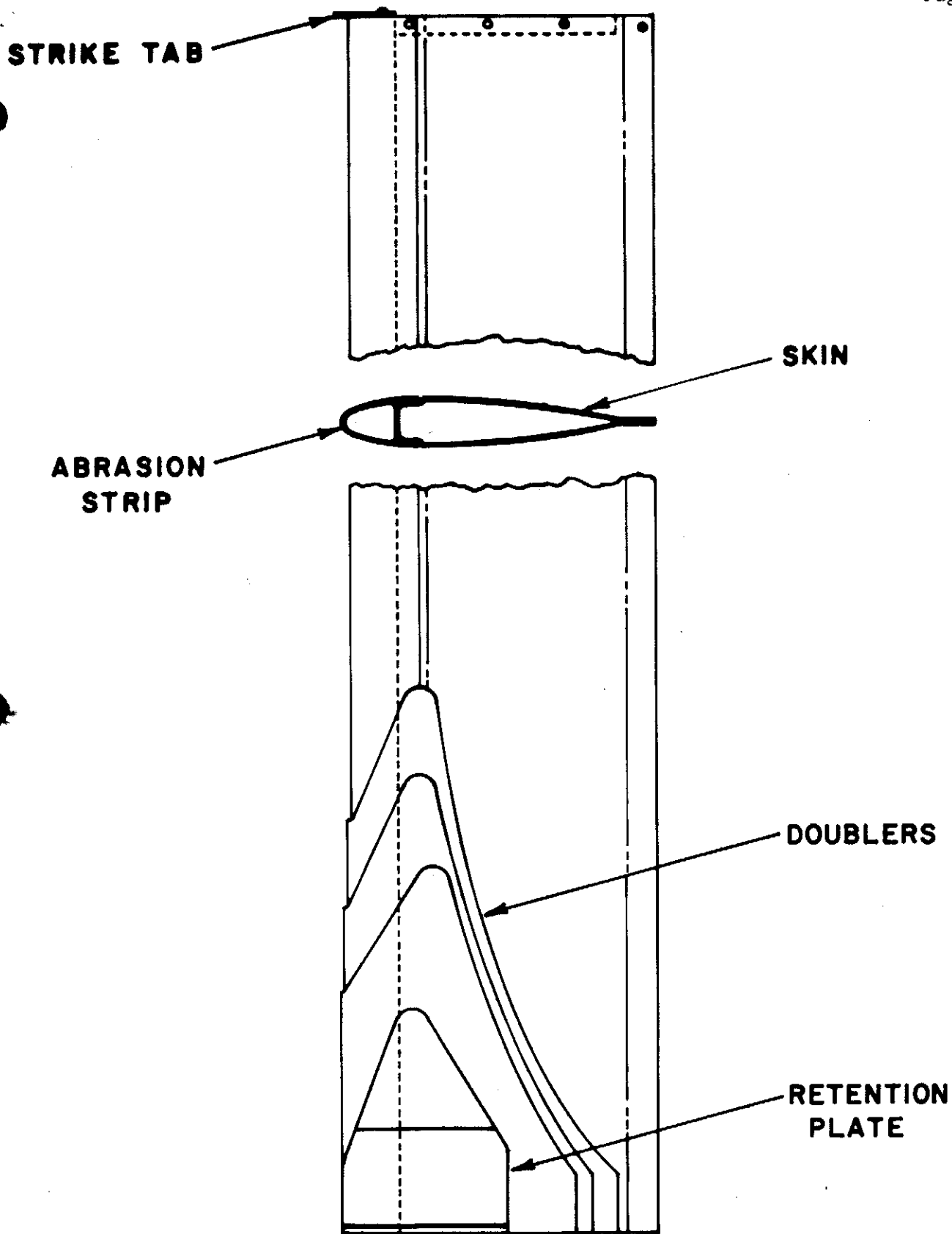


FIGURE 9
BLADE ASSEMBLY
(TAIL ROTOR)

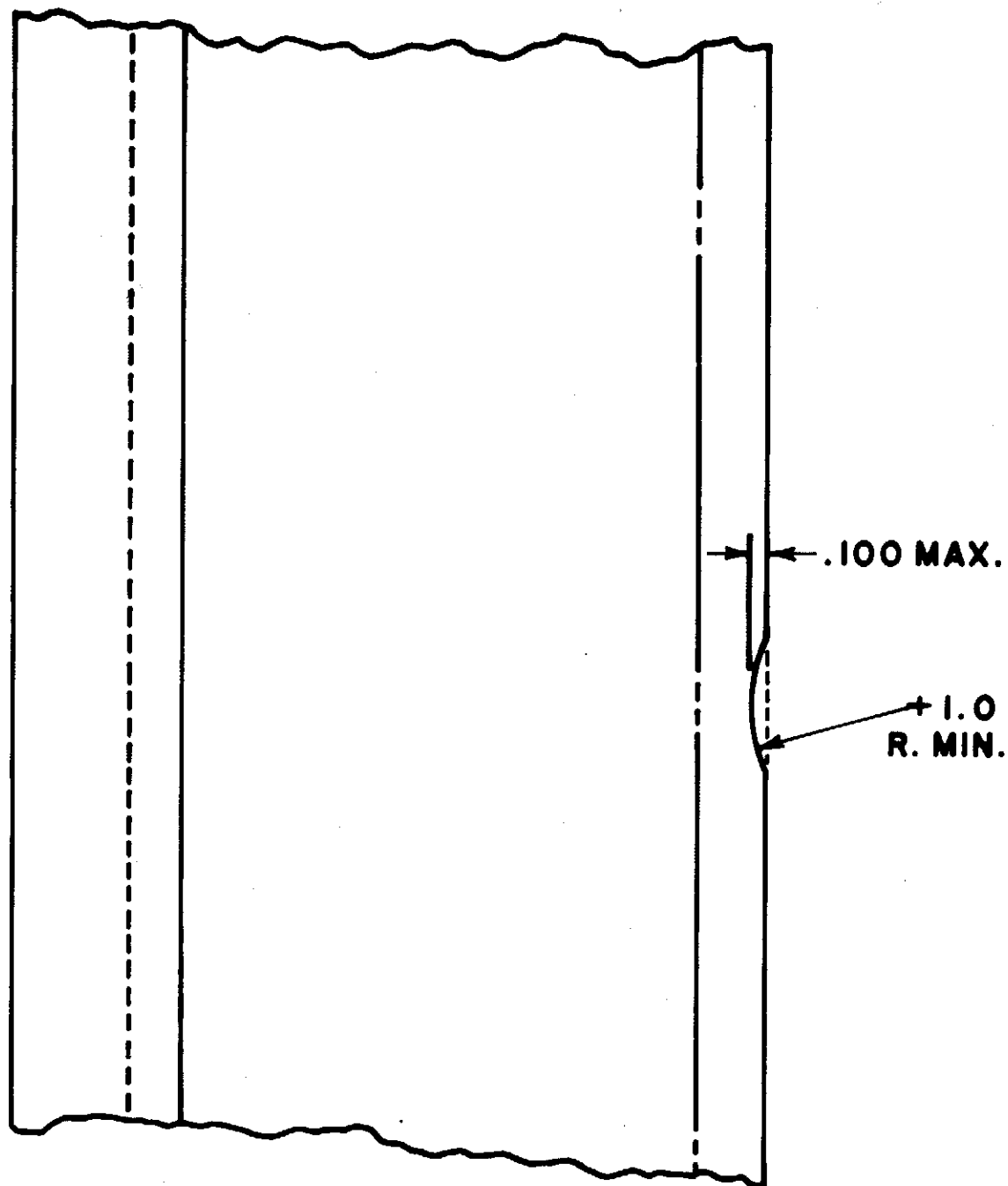


FIGURE 10
TRAILING EDGE DAMAGE REMOVAL
(TAIL ROTOR)