LIST OF CONTENTS

Servicing Notes

1. Eddy-Current equipment is sensitive and delicate, and is to be handled accordingly.
When not in use it is to be stored in a dry place, with batteries removed.

CNS TEST UNIT TYPE 600

2. Initial Setting Up Procedure

a. Switch to Battery Check and ensure meter indicates above Red line, if low, adjust preset control on right hand side of case. If after adjustment, meter indication is still low, change batteries. On mains supply, meter should indicate above Red line.

Note:

Where possible, equipment is to be operated by mains supply.

Where mains supply is being used continuously, remove batteries to prevent corrosion of battery compartment.

b. Set Controls as follows:

(1) Gain at zero.

(2) Balance A and B at 5. (Main scale divisions).

(3) Phase at 50.

(4) Frequency switch as applicable.

(5) Range switch as applicable.

c. Connect specified probe to test unit.

d. Switch to OP (Output).

e. Allow test unit and probe 10 minutes to stabilize.

3. Balancing Procedure

Note: Techniques will specify whether the following balancing procedure is to be carried out with probe on or off material.

a. Advance gain control until approximate full scale indication is indicated on meter.

b. Adjust balance controls A and B sequentially until needle is at, or near, zero.

c. Repeat a. and b. above, until with gain control at maximum, needle is at, and indication is at, or near, zero.

Continued overleaf

4. Initial Setting Up Procedure

a. Connect the Defectometer to a suitable a.c. supply.

b. Switch on and ensure Green indicator lights.

c. Select "DIFF", "NFE", "FE" or "AUST" as applicable.

d. Connect specified probe to set.

e. Allow 10 minutes for set to stabilize.

5. Balancing Procedure. Balancing may be carried out using one of two methods.

a. Method 1.

(1) With probe in air adjust "Zero Set" control to bring needle to zero.

(2) Place probe in or on material and adjust "Lift Off" control to bring needle to zero.

(3) Repeat (1) and (2) until needle stabilizes at zero with the probe on and off the material.

b. Method 2. Adjustments to the "Lift Off" and "Zero Set" controls, are carried out when the probes is in contact with the material.

(1) Place probe in or on material and adjust "Zero Set" control until needle is at zero.

(2) Remove probe and note direction from zero at which the needle comes to rest.

(3) Replace probe on material and adjust "Lift Off" control to move needle in same direction noted at (2).

(4) Adjust "Zero Set" control to bring needle to zero.

(5) Repeat (2), (3) and (4) until needle stabilizes at zero.

6. Sensitivity Setting. The sensitivity control is to be adjusted to give the required deflection from a given reference defect as specified in the technique to be used.

7. Adjusting Signal Lamp Response

a. Turn the recessed adjusting screw adjacent to the signal lamp fully clockwise.

b. Adjust "Zero Set" control to give signal response deflection specified in technique.

c. Turn adjusting screw until lamp just lights.

Continued

Servicing Notes (Contd)

7. d. Reset "Zero Set" control until needle is at zero.

e. Adjust "Zero Set" control slowly until lamp just lights and ensure needle deflection is as specified in technique re-adjusting if necessary.

f. Reset "Zero Set" control to obtain original balance state.

NOVALEC EDDY CURRENT METER TYPE 96, 96A AND 96C

8. Initial Setting Up Procedure

a. Connect specified probe to set.

b. Set sensitivity control to minimum (ie fully anti-clockwise).

c. Set Buzzer/Lamp control to minimum (ie fully anti-clockwise).

d. Set Buzzer switch to 'ON' position.

e. Move selector switch to 'Battery Test', if needle fails to indicate above battery marker, batteries are to be replaced.

f. Select NFE, FE, or AUST as applicable.

g. Allow two minutes to stabilize.

9. Balancing Procedure

a. Place probe in contact with specimen material.

b. Adjust 'Zero Set' control to bring needle to zero. (Note: Type 96C press zero button).

10. Sensitivity Setting. The sensitivity contro is to be adjusted to give the required deflection from a given reference defect as specified in the technique to be used.

11. Buzzer/Lamp Sensitivity

a. Place the probe on the reference block defect slot, as specified in the technique.

b. Adjust Buzzer/Lamp control until lamp just lights.

Note: The buzzer may now be switched to 'MUTE' if not required.

Continued overleaf

ALCOPROBE MK 2 PHASE SENSITIVE EDDY CURRENT METER

12. The Alcoprobe Mk 2 is a phase sensitive eddy current instrument which uses the phase relationship between the search and reference coils to perform such measurements as:

a. Metal thickness.

b. Metal conductivity.

c. Cladding thickness.

d. Non-metal thickness measurement.

13. In addition, an amplitude measuring facility is incorporated. This permits thickness measurement of non-metallic parts clad to metal base or with metal reflector placed at surface opposite probe.

14. A comprehensive alarm system is fitted, comprising:

a. Audio Alarm. When selected Audio Alarm indicates clockwise meter needle delfection of approximately 40 per cent. The Alarm will also sound if meter needle moves in an anti-clockwise direction.

b. Visual Indication. Two Light Emitting Diodes (LED) are incorporated in probe which enable user to discriminate between clockwise and anti-clockwise deviations from the meter zero point. The Red LED will light when meter needle has deflected by more than 40 per cent in clockwise direction. The Green light indicates an anti-clockwise movement which is representative of a deflection of approximately 20 per cent.

15. Controls. The function of the controls is as follows:

a. Frequency. Frequency is variable from 100 Hz to 100 kHz with fixed values at 0.5 MHz and 1 MHz. The frequency selected is a function of the frequency indicated multiplied by MULTIPLIER selection, ie 1.5 Hz selected on the frequency control in conjunction with the 1K push button on MULTIPLIER would give a frequency of: 1.5 multiplied by 1000 = 1500 Hz (1.5 kHz).

b. Power (Orange). ON/OFF push buttons controlling power from HP2/SP2 cells.

c. Battery Test (Blue). Indicates percentage battery voltage available. Reject at 80 per cent or below. Select power ON to check battery.

d. Mode P and A (Red). Selects Phase sensitive, function P, or Amplitude, function A.

e. Zero M and A (Yellow). Selects Manual M or Automatic A meter zeroing.

f. Alarm A and V (Green). Selects Audio Alarm A or Visual Alarm V. The alarms may be switched off entirely by setting both buttons in up position.

Continued

Servicing Notes (Contd)

16. Calibration Controls. A group of four 10 turn controls perform following functions:

a. Lift Off. Permits compensation of meter variation due to probe to sample spacing changes.

b. Sensitivity. Allows setting of the meter deflection to a pre-determined standard.

c. Zero Coarse and Fine. Provides coarse and fine control to allow balancing of meter indications.

17. Probes. There are 3 types of standard probe:

a. Green Probe - 16mm diameter, 600 Hz - 100 kHz.

b. Gold Probe - 17mm diameter, 1kHz - 100 kHz.

c. Red Probe - 29mm diameter, 250 Hz - 10 kHz.

A link is incorporated in probes which causes audio alarm to operate if cable is disconnected from equipment with power selected ON.

18. Instrument Calibration.

a. Controls.

(1) Power. Select ON.

(2) Battery Check. Reject if meter reading is below 80 per cent.

(3) Mode. Select P (Phase sensitive).

(4) Zero. Select M (Manual).

(5) Alarm. Both switches in UP position.

(6) Frequency. Select in accordance with relevant technique.

b. Method.

(1) Place probe on relevant section of test piece.

(2) Reduce the Sensitivity to between 0.5 and 1.0.

(3) Adjust Coarse Zero to position meter needle on scale.

Continued overleaf

18. Instrument Calibration. (Contd)

b. Method.

(4) Adjust for Lift Off compensation as follows:

(a) Tilt probe slightly (approximately 1mm).

(b) Note direction of meter travel.

(c) Place probe flat on material.

(d) Adjust Lift Off to make meter travel in opposite direction to that noted in (b).

(e) Repeat (a) to (d) inclusive until movement due to probe tilt has been minimised.

Note:

1. Adjust Coarse and Fine Zero controls throughout in order to keep meter pointer on scale.

2. It is imperative that 'LIFT OFF' compensation procedure is carried out correctly before commencement of any technique. Failure to do so will affect overall performance of equipment.

(5) Position meter needle at zero using Coarse and Fine Zero.

(6) Move probe to relevant section of test piece.

(7) Adjust Sensitivity to obtain meter defelction required by technique.

(8) Re-check Zero setting on relevant section of test piece. Adjust for Fine Zero as necessary.

(9) Re-check Sensitivity setting. Adjust as necessary.

(10) Repeat (8) and (9) until no further adjustment is necessary.

(11) Select Alarm function called for in technique.

Servicing Notes are to be complied with throughout the work detailed in this technique.

1. Technique. — Hunter/EDD/4A.

2. Component to be Examined. — Main undercarriage pivot fittings, Port and Starboard.

3. Area of Examination. — Inboard and outboard rear faces of pivot fittings. (Fig 1).

4. Purpose of Examination. — To detect gross cracking. See Additional Information Para 10a.

5. Equipment Required.

a. 4X/4507 Novalec Eddy Current Meter 96C, or
4X/4292 Novalec Eddy Current Meter 96.

b. 4X/4245 Probe Spade NFE.

c. 4X/4288 Standard Calibration Block NFE, or
4X/4455655 (4049) Standard Calibration Block NFE.

6. Preparation.

a. Aircraft. — Nil.

b. Component. — Ensure examination areas clean. (Fig 1).

7. Examination Procedure.

a. Instrument Calibration.

(1) Initial Setting. — Carry out initial setting up and balancing on equipment in accordance with Servicing Instructions.

(2) Sensitivity Setting. — Using sensitivity control calibrate equipment to give 80 per cent of full scale meter needle deflection from 1mm slot in standard calibration block.

(3) Instrument Warning Setting. — Adjust the buzzer/lamp to respond to a meter deflection of 80 per cent.

(Continued overleaf)

7. Examination Procedure (Contd).

b. Procedure. Probe scan areas shown in Fig 1, in vertical scans 1/16 in. apart, for Port and Starboard fittings.

c. Examination Standard. Defect indications above 80 per cent which are of measurable length render the component unserviceable. Flick indications of no length may be ignored.

8. Reporting Procedure. In accordance with AP 3158 Vol 2 (2nd Edition) Leaflet No C17 and relevant instructions.

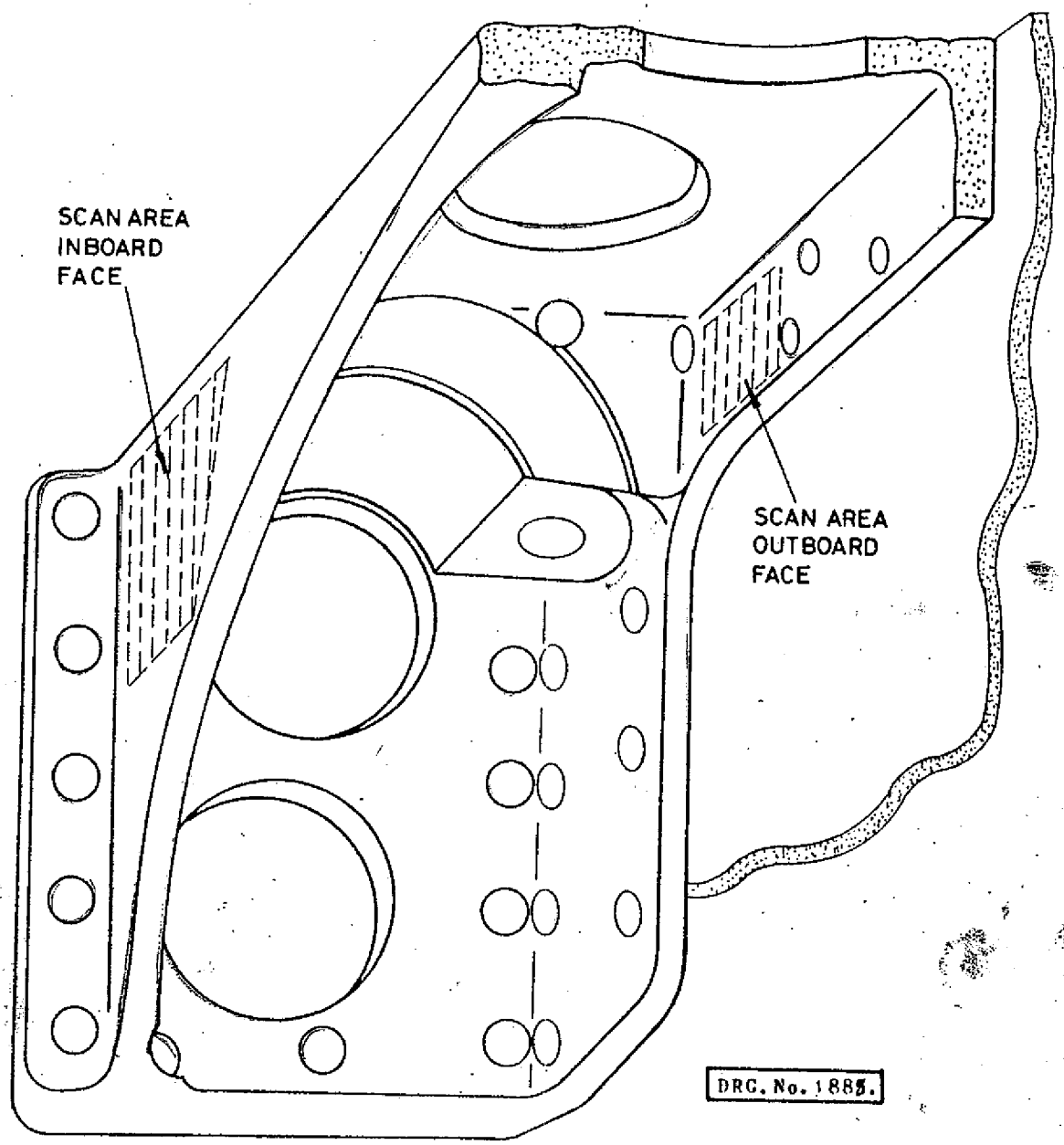
9. Estimated Technique Manhours. 1.

10. Additional Information. a. This technique has been developed to detect and monitor crack extremities which have propagated from the outboard rear face of the undercarriage pivot bore detected by Hunter/ULT/9.

b. The undercarriage pintle restricts free access to the outboard face scan area. (Fig 2).

c. Full access to the inboard faces of fittings on T Mk 7 aircraft is impaired by electrical cable looms which are NOT to be disturbed, as the cables are liable to have become brittle with age and may break.

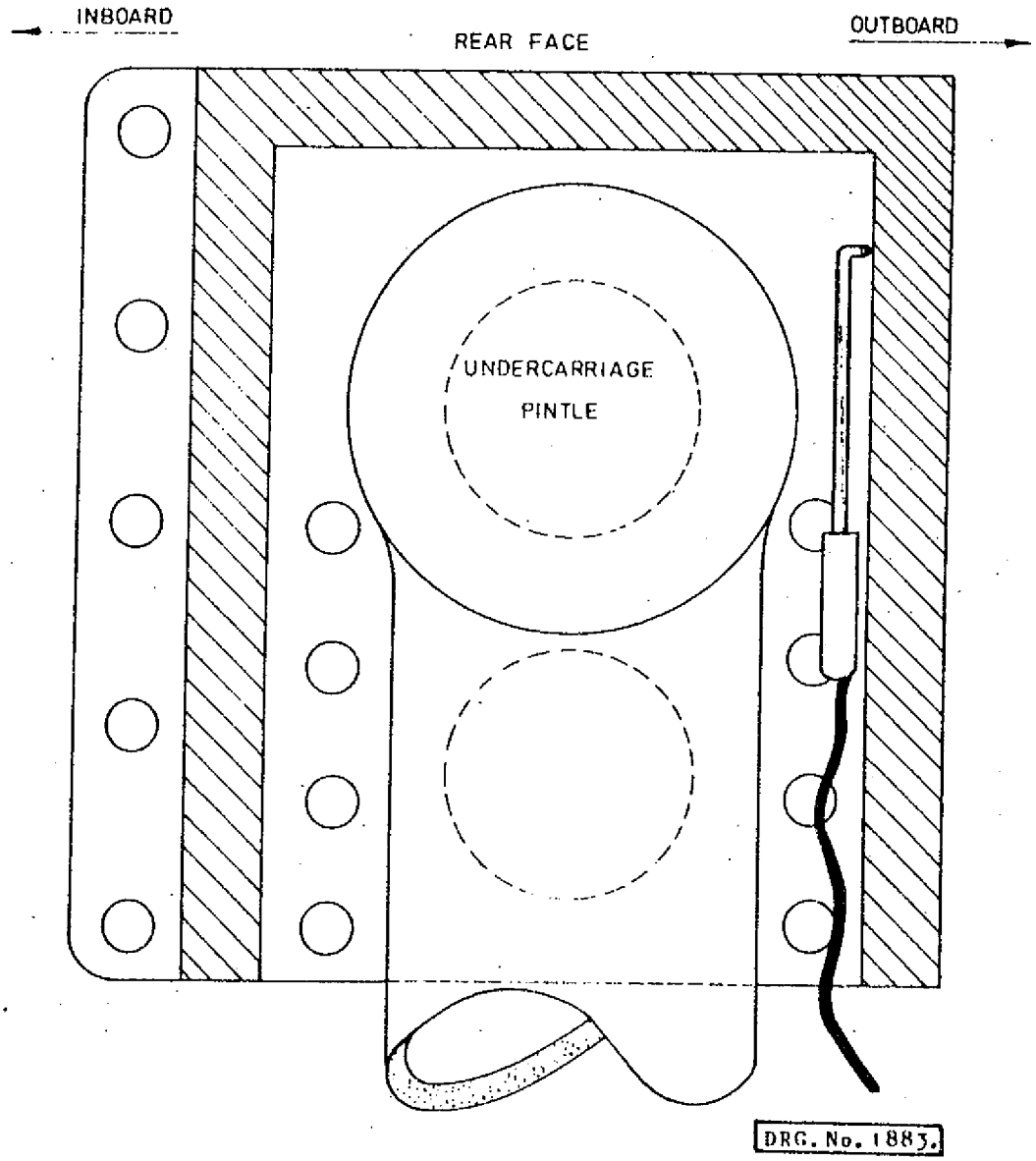
(Continued)



MAIN UNDERCARRIAGE PIVOT FITTING REAR FACE (PORT)

FIG 1

(Continued overleaf)



MAIN UNDERCARRIAGE PIVOT FITTING (PORT)

FIG 2

NTI

NTI/Hunter48/04/00

THIS TECHNIQUE MUST BE CARRIED OUT BY AN NDT TECHNICIAN.

1. Technique.
Hunter Eddy Current 48.

2. Component to be Examined.
Main undercarriage legs, port and starboard.

3. Area to be Examined.
Forward face of the main undercarriage leg immediately above lugs retaining the spigot coupling and pipes, (see Figs. 1 and 2).

4. Purpose of Examination.
To detect fatigue cracking.

5. Equipment Required.
Hocking Locator UF Flaw Detector.....4XE 2529554 (Old
Probe, right angle shielded, NFE, 2MHz.....4XE 2529614
(Old No. 4XE 187)
Alternative, Rt. angled shielded, NFE, 2MHz..4XE 2529561
(Old No. 4XE 128)
Calibration Block, 3 slot, NFE.....4XE 4657626
PTFE tape cutout / roll.....4XE 97 / 4XE 378

6. Preparation.
a. Ensure spigot and pipes have been removed to allow access to scan area.
b. Ensure that the scan area is clean and free from flaking paint.
c. Carry out a before use inspection of the Hocking Locator.

7. Examination Procedure.

a. Instrument Calibration.

(1). Initial Settings.
Frequency.....2MHz.
Metal.....Al,Mg.
Operating Mode.....Normal.
Alarm.....Continuous.
Alarm Level.....40%.

(2). Sensitivity Setting.
a. Connect the probe and lead to the test set, switch on and allow to stabilize.
b. Carry out the train procedure on the calibration block away from slots and edges.
c. Check for correct training.
d. Ensure the needle is at zero by depressing the zero button. Slide the probe tip onto the 0.2mm slot and set the gain control to give a meter deflection of 80%.
e. Recheck the sensitivity by moving the probe off, and back over the slot. If necessary readjust the gain control to achieve the 80% meter deflection.

(3). Alarm Level.
Ensure the alarm triggers at 40%.

continued

7.b. Procedure.

(1). Referring to Fig.2 place the probe at position 'X' on the port main undercarriage leg and carry out the train procedure.
(2). Check for correct training.
(3). To ensure training has not been carried out over a defect, move the probe approximately 5mm in the direction of scan and back again. If there is no meter deflection greater than 5% training has been carried out correctly.
(4). Zero the meter and carry out a tight, vertical, zig-zag scan pattern to cover the scan area shown in Fig.2.
(5). Repeat the scan on the starboard leg.

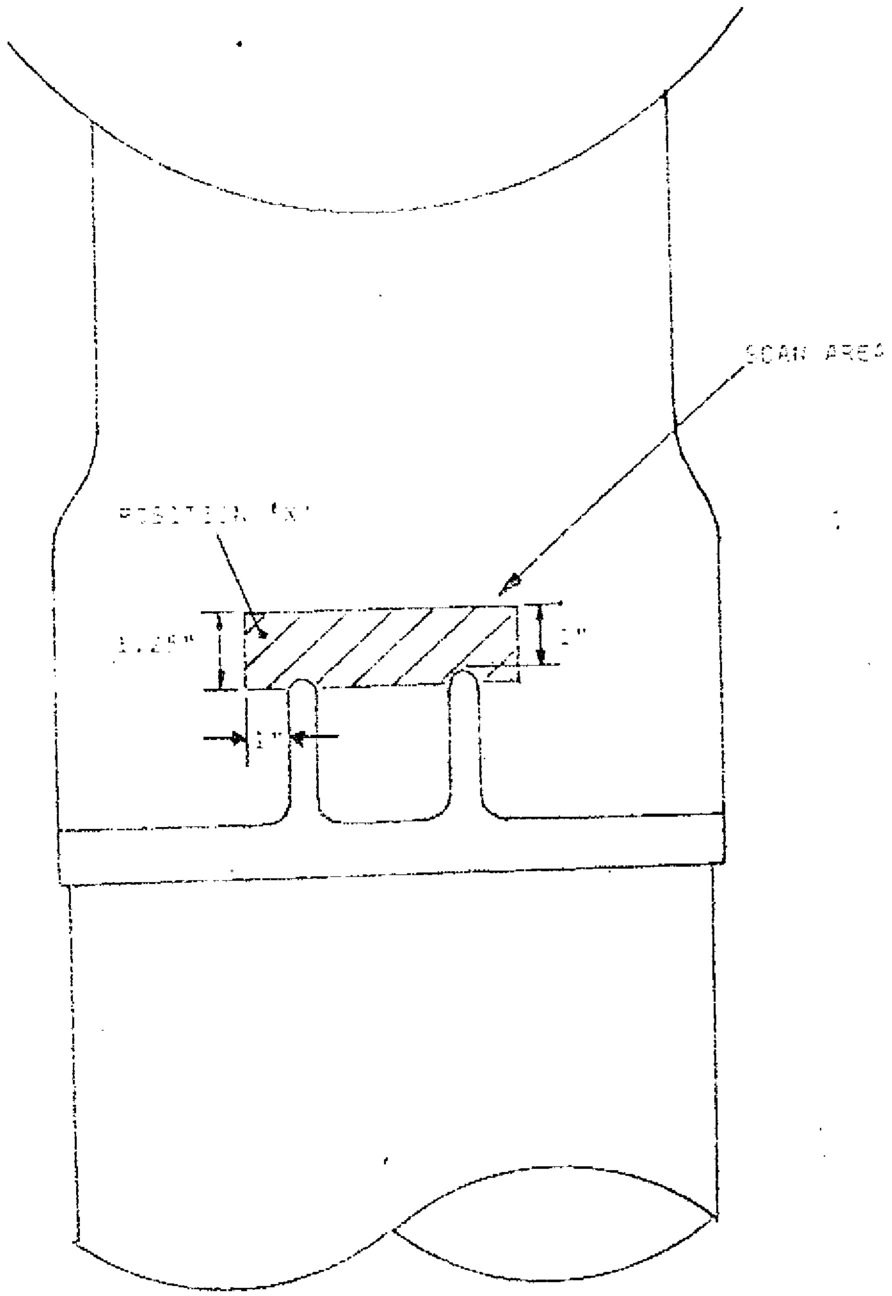
c. Examination Standard.
(1). Nil cracking permitted.
(2). Any indication that triggers the alarm and cannot be attributed to a geometric change or probe handling is to be considered a fault.
(3). If there is any doubt as to the presence of a crack, the paint finish must be removed and a dye penetrant inspection carried out.

8. Reporting Procedure.
In accordance with current servicing instructions.

9. Estimated NDT Technique Man Hours.
1 hour. examination only.

10. Additional Information.
a. Geometric changes may cause meter deflections of 50% but these will be more gradual than deflections caused by a defect. Zeroing may be necessary in these areas.
b. A full scale deflection may be shown in the vicinity of the top inner edges of the lugs.

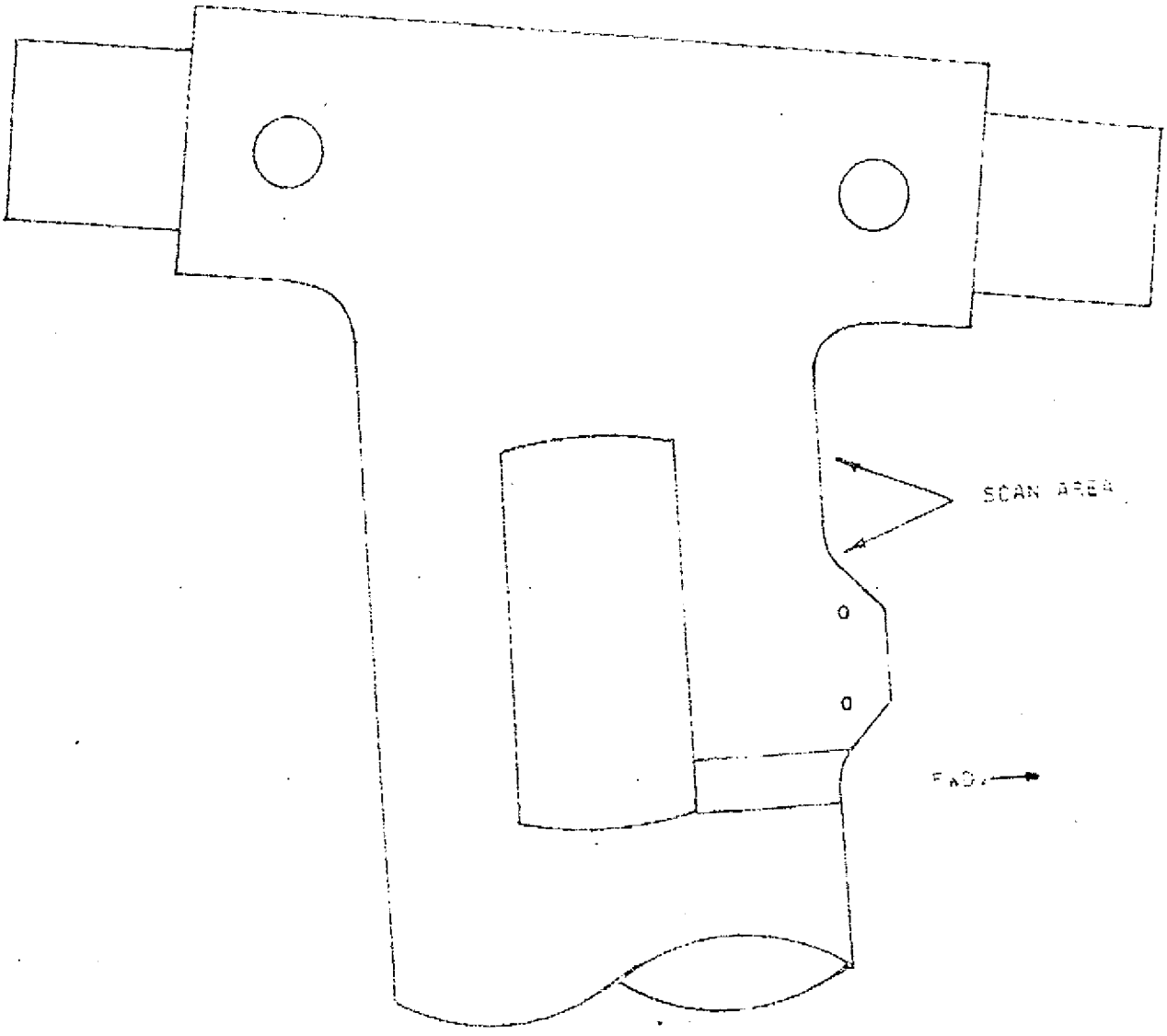
EDDY CURRENT TECHNIQUE [illegible]



MAIN UNDERCARRIAGE LEG

FIGURE 2

EDDY CURRENT TECHNIQUE 4B



MAIN UNDERCARRIAGE LEG

FIGURE 1

AP101B-1300-5G(N)
7 IL 1/90 2ND EDITION
PAGE 1 OF 4

NAVY

ADVANCE INFORMATION LEAFLET NO.1/90.

EDDY CURRENT TECHNIQUE NO.6A.

HUNTER ALL MARKS.

THIS TECHNIQUE MUST BE CARRIED OUT BY AN NDT TECHNICIAN.

1. Technique.
Hunter Eddy Current 6A.

2. Component to be Examined.
Main undercarriage legs, port and starboard.

3. Area to be Examined.
Radius and adjacent area below the larger of the two retraction jack attachment lugs.

4. Purpose of Examination.
To detect circumferential fatigue cracking originating in the radius below the larger of the undercarriage retraction jack attachment lugs.

5. Equipment Required.
Hocking Locator UH Flaw Detector.....4XE 2529554
Probe, right angle shield, NFE, 2MHz.....4XE 2529614
(Old No. 4XE 187)
Probe, right angle shield, NFE, 2MHz....4XE 2529561
(Old No. 4XE 128)
Calibration Block, 3 slot, NFE.....4XE 4657626
PTFE tape cutout / roll.....4XE 97 / 4XE 378

6. Preparation.
a. Ensure the scan area is clean and free from flaking paint.
b. Carry out a before use inspection of the Hocking Locator.
c. Ensure the undercarriage leg identification plate is not obscuring the scan areas.

7. Examination Procedure.

a. Instrument Calibration.
(1). Initial Settings.
Frequency.....2MHz.
Metal.....Al,Mg.
Operating Mode.....Zero Limit.
Alarm.....Continuous.
Alarm Level.....40%.

(2). Sensitivity Setting.
a. Connect the probe and lead to the set, switch on and allow to stabilize.
b. Carry out the train procedure on the calibration block away from slots and edges.
c. Check for correct training.
d. Ensure the needle is at zero by depressing the zero button. Slide the probe tip onto the 0.2mm slot and set the gain control to give a meter deflection of 80%.
e. Recheck the sensitivity by moving the probe off, and back over the slot. If necessary readjust the gain control to achieve the 80% meter deflection.

(3). Alarm Level.
Ensure the alarm triggers at 40%.

7.b. Procedure.

(1). Scan A.
a. Referring to Fig. 1, place the probe on the port undercarriage leg at position 'X' and carry out the train procedure.
b. Check for correct training.
c. To ensure training has not been carried out on a defect, move the probe approximately 5mm, if there is no meter deflection greater than 5% training has been carried out correctly.
d. Place the probe at position 'A' in the radius below the large retraction jack attachment lug, zero the [illegible] and carry out a tight zig-zag scan of the [illegible].

(2) B.
a. [illegible]rring to Fig. 1, place the probe at position [illegible], zero the meter and, using a tight vertical zig-zag scan pattern, scan the area 'B'.
b. To ensure complete coverage, overlap the scan pattern into scan area 'A'.

(3). Repeat scans 'A' and 'B' on the starboard leg.

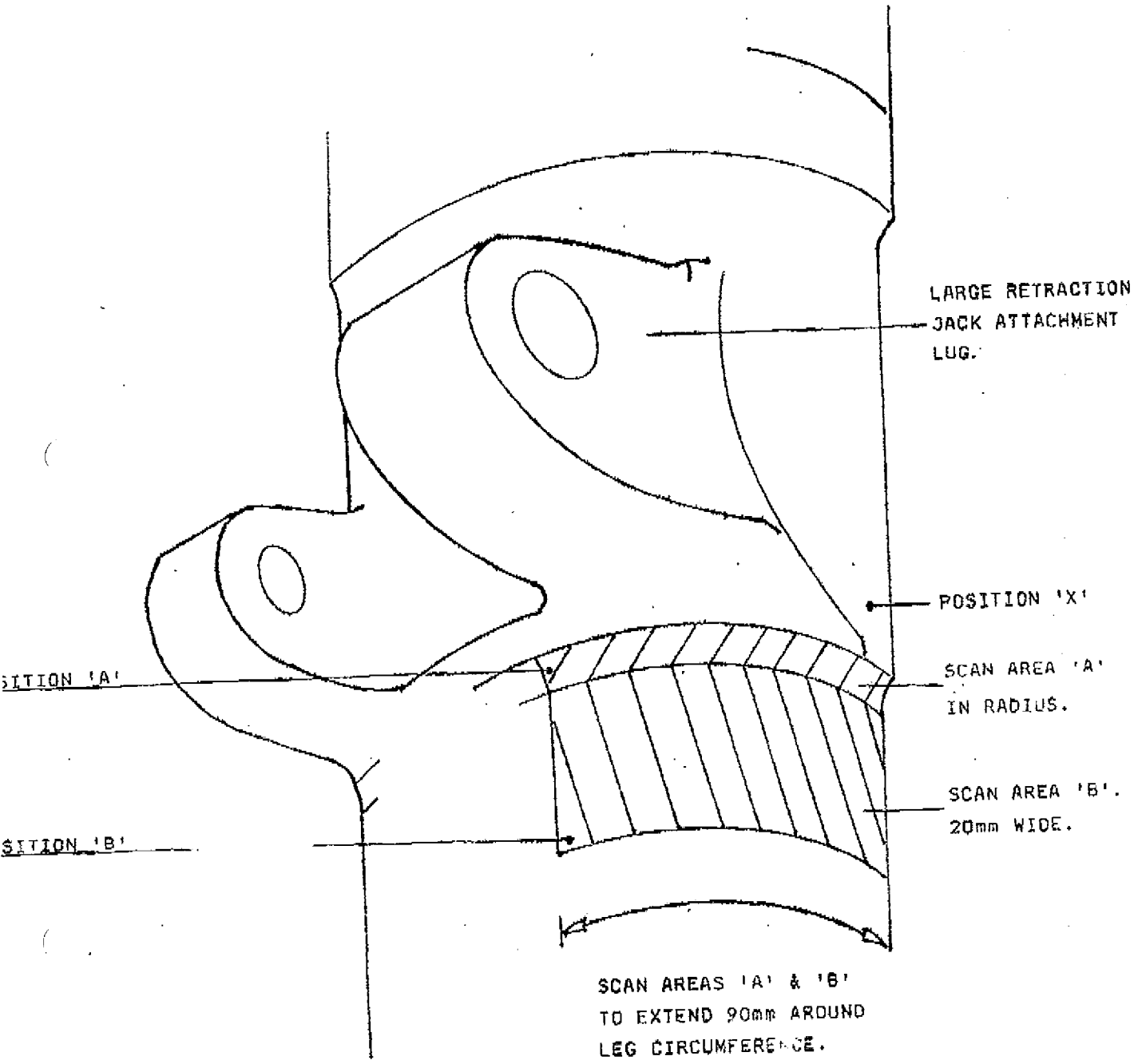
c. Examination Standard.
(1). Nil cracking permitted.
(2). Any indication that triggers the alarm and cannot be attributed to a geometric change or probe handling is to be considered a fault.
(3). If there is any doubt as to the presence of a crack, the paint finish must be removed and a dye penetrant inspection carried out.

8. Reporting Procedure.
In accordance with current servicing instructions.

9. Estimated NDT Technique Man Hours
1 hour, examination only.

10. Additional Information.
a. The depth of radius may vary between undercarriage legs.
b. When carrying out scan 'A' small meter deflections will occur as the probe moves towards the extremities of the radius.
c. If the probe is moved out of the radius large meter indications will occur.

EDDY CURRENT TECHNIQUE 6A



MAIN UNDERCARRAIGE LEG.

FIGURE 1.

Warnings, Cautions and Maintenance Notes are to be complied with throughout the work detailed in this technique.

1.	Technique	HUNTER/EDD/6B (Category A).
2.	Component to be Examined	Main undercarriage legs, port and starboard.
3.	Area of Examination	Forward face of the main undercarriage leg immediately above lugs retaining the spigot coupling and pipes (Fig. 1 and 2).
4.	Purpose of Examination	To detect fatigue cracking.
5.	Equipment Required	(i) Elotest B1 4XE/314. (ii) NFe Reference Standard 4XE/4657626. (iii) Shielded spade probe 2 MHz 4XE/2529614 (formerly 4XE/187).
6.	Preparation	
6.1	Aircraft.	(i) Ensure prepared in accordance with relevant maintenance instructions. (ii) Ensure spigot pipes have been removed to allow access to scan areas.
6.2	Component.	Ensure scan area clean and free from flaking paint.
7.	Examination Procedure	
7.1	Instrument Settings.	
	(a) Pre-use checks.	In accordance with AP 119A-20619-1 Chap 2.
	(b) Probe.	Connect probe 4XE/2529614.
	(c) Standard display.	Ensure not in timebase.
	(d) Frequency.	Set to `1.8 MHz'.
	(e) Pre-amplifier Bandwidth filter.	Set to `HF'.
	(f) Pre - amplifier Gain.	Carry out probe matching.
	(g) Instrument functions.	
	(i) Main Amplifier Filter.	Set to `LP' at ~~`50 Hz'~~ '8Hz'. Confirm Scan valid by trial on ref. block.

7. Examination Procedure (Cont)

7.1 Instrument Settings (Cont).

(g) Instrument functions (Cont).

(ii) Dot Position.	Set `Y to 0', `X to 0'.
(iii) Gate.	Set `Cross gate ON' Vertical level to `Full screen Left'. Horizontal level to `one main-scale division above centreline'.
(iv) Alarm.	Set to `Normal, with Trigger `ON'.
(h) Phase Angle.	Adjust so that lift off is indicated by a horizontal movement from right to left.
(i) Axis Spread.	Set `Y axis gain to 20 dB'. Set `X axis gain to 0 dB'.
(j) Sensitivity Setting.	Adjust instrument to two mainscale divisions, vertical movement from the 0.2 mm slot in the Reference Standard.
7.2 Procedure.	(i) Position probe in scan area (Fig. 2). (ii) Compensate. (iii) Ensure lift off is indicated by horizontal dot movement (minor phase angle adjustments may have to be made). (iv) Carry out tight vertical zigzag scans to cover the scan area. (v) Repeat on the opposite side of the aircraft.
7.3 Signal Interpretation.	All indications which trigger the alarm that cannot be attributed to edge, geometric, ferrous effect or probe handling is to be considered a fault.
7.4 Examination Standard.	Report all fault indications.
8. Reporting Procedure	In accordance with AP 100B-01 Order No. 0770 and current maintenance instructions.
9. Estimated Technique Manhours	1.
10. Additional Information	Nil.

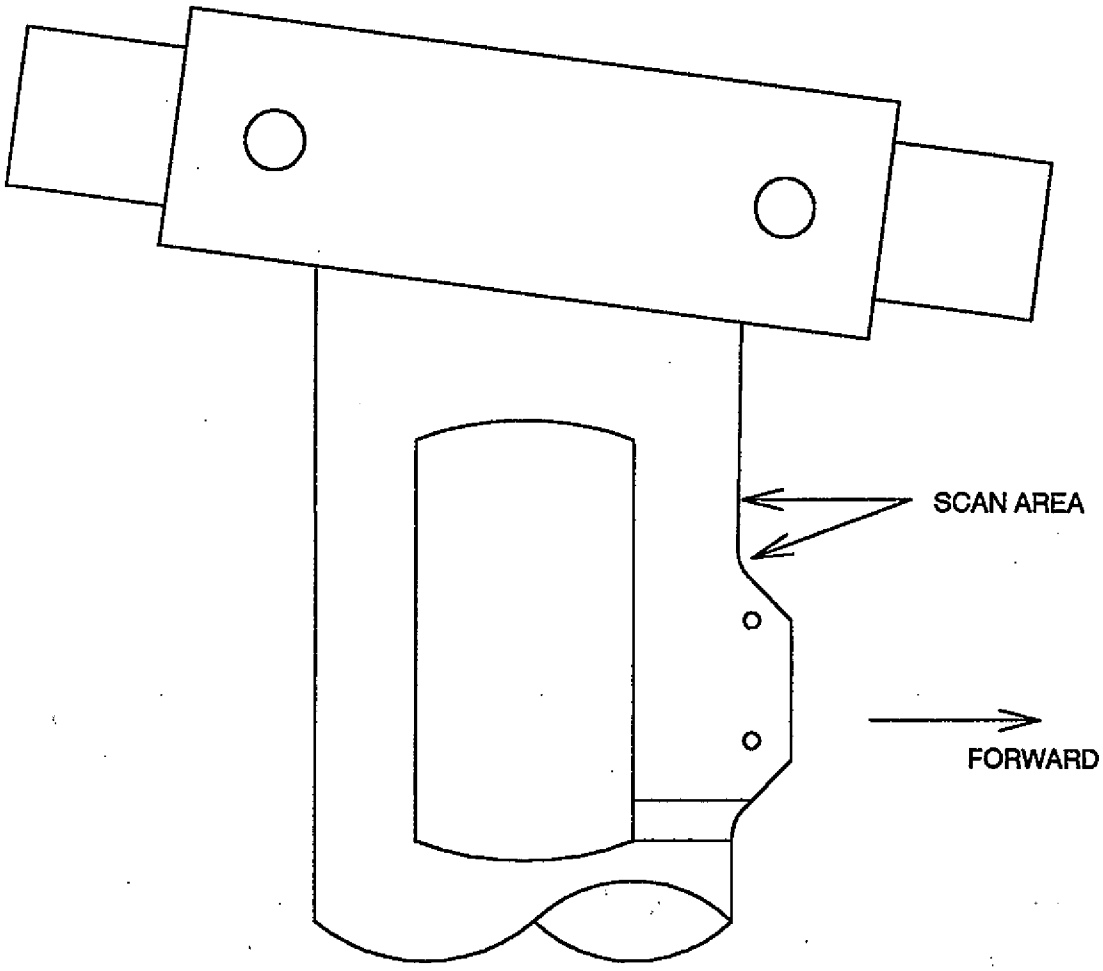


Fig. 1 Main undercarriage leg

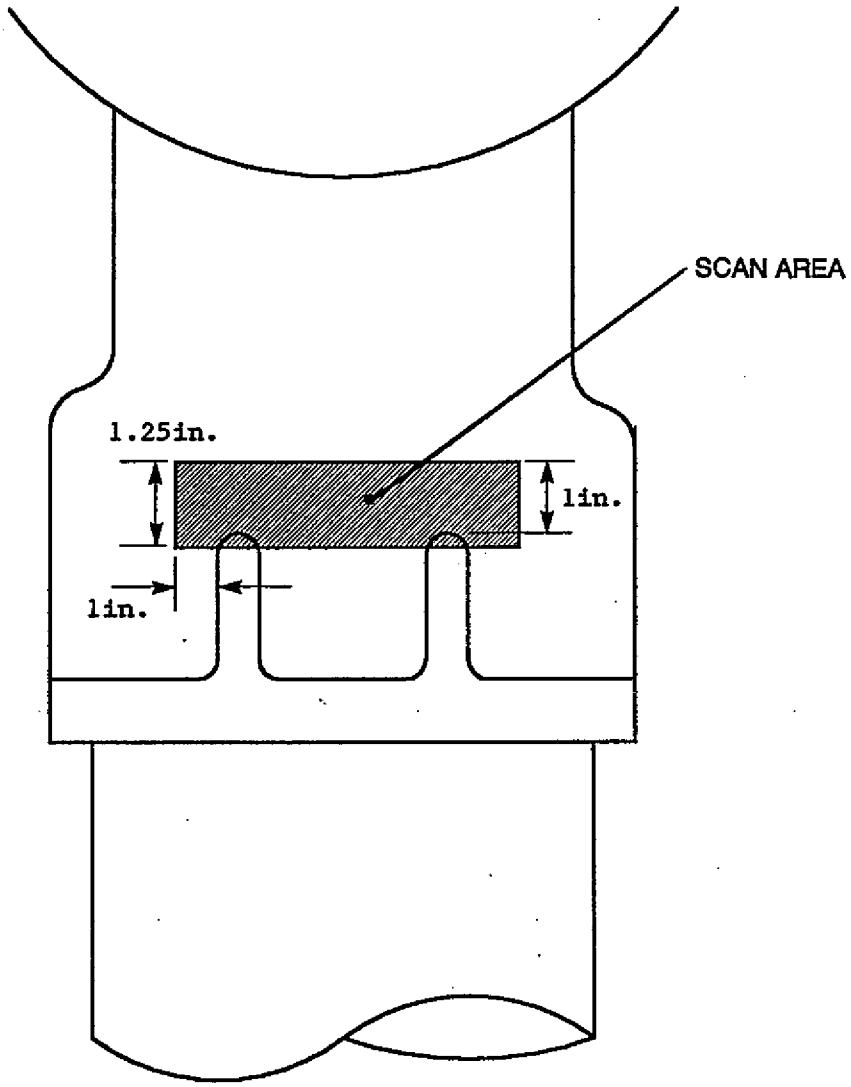


Fig. 2 Scan area

Servicing Notes are to be complied with throughout the work detailed in this technique.

1.	Technique.	Hunter/Edd/7.
2.	Component to be Examined.	Mainplane upper skin, Port and Starboard.
3.	Area of Examination.	Between Ribs S and outer aileron hinge rib, forward line of rivets attaching skin to rear spar (see Fig 1).
4.	Purpose of Examination.	Detection of inter rivet cracks (See Fig 2).
5.	Equipment Required.	a. 4X/4507 Novalec Eddy Current Meter 96C. or 4X/4292 Novalec Eddy Current Meter 96. b. 4X/4245 Probe Spade NFE. or 4X/4287 Probe Standard NFE. c. 4X/4288 Standard Calibration Block NFE.
6.	Preparation.	
	a. Aircraft.	Nil.
	b. Component.	Nil.
7.	Examination Procedure.	
	a. Instrument Calibration.	
	(1) Initial Setting.	Carry out initial setting up and balancing procedures on equipment in accordance with Servicing Notes.
	(2) Sensitivity Setting.	Using sensitivity control calibrate equipment to give a deflection of 8 on meter scale from 0.5 mm slot in standard calibration block.
	(3) Instrument Warning Setting.	Adjust the buzzer/lamp to respond to a meter deflection of 8.

Continued overleaf

7. Examination Procedure (Contd)

b. Procedure.

(1) Position probe on mainplane skin forward of area of examination and balance equipment.

(2) Move probe to examination area.

(3) Scan in zigzag pattern between rivets keeping probe approximately 1/8 inch from rivet heads (see Additional Information para 10 and Fig 3).

c. Examination Standard. Any triggering of the warning device which cannot be attributed to revet effect is to be interpreted as indication of a defect.

8. Reporting Procedure. In accordance with AP 3158 Vol 2 (2nd Edition) Leaflet No. C17 and relevant instruction.

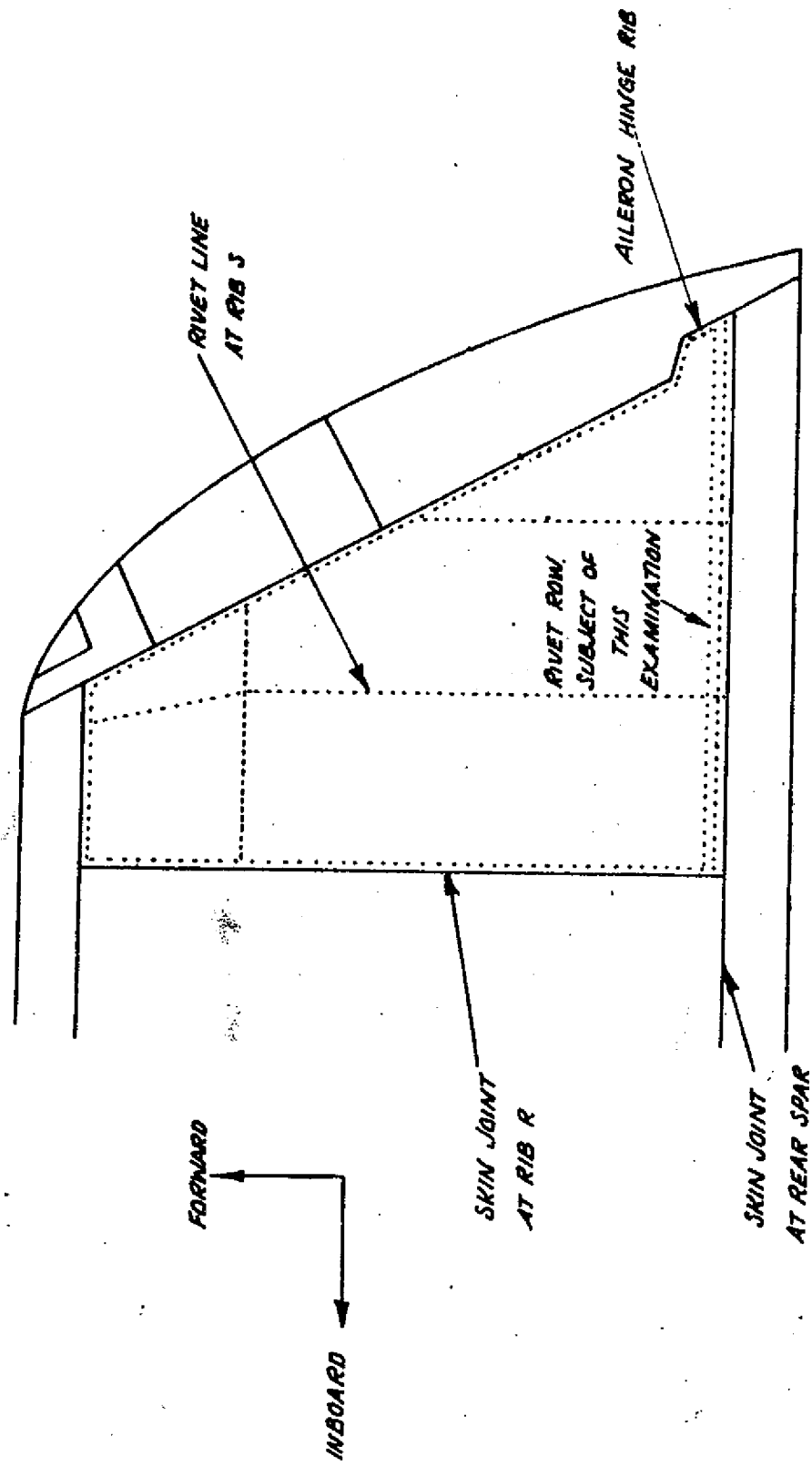
9. Estimated Technique Manhours. 1/2.

10. Additional Information.

a. Close proximity to rivets will produce spurious defect indications.

b. Poor surface finish may require paint removal.

Continued



UPPER SURFACE STARBOARD OUTER MAINPLANE SHOWN

DRG. No. 1210.

Fig. 1

Continued overleaf

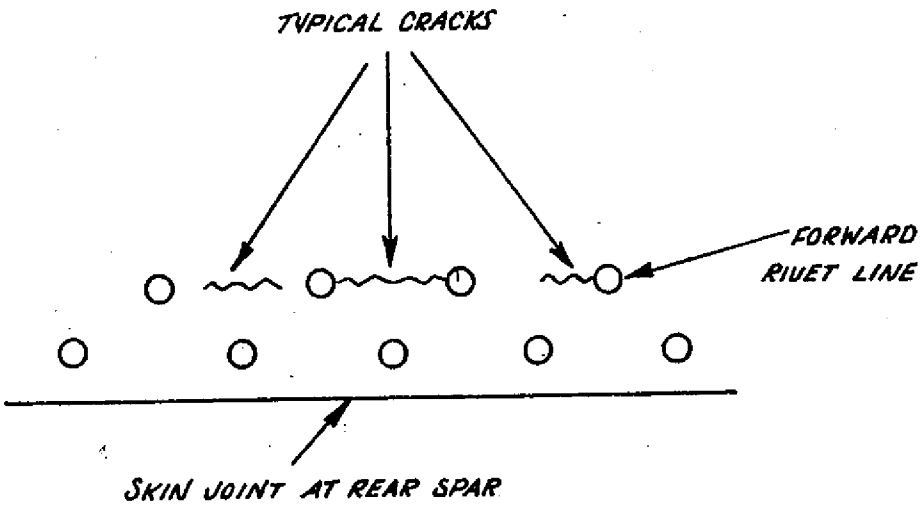


Fig. 2

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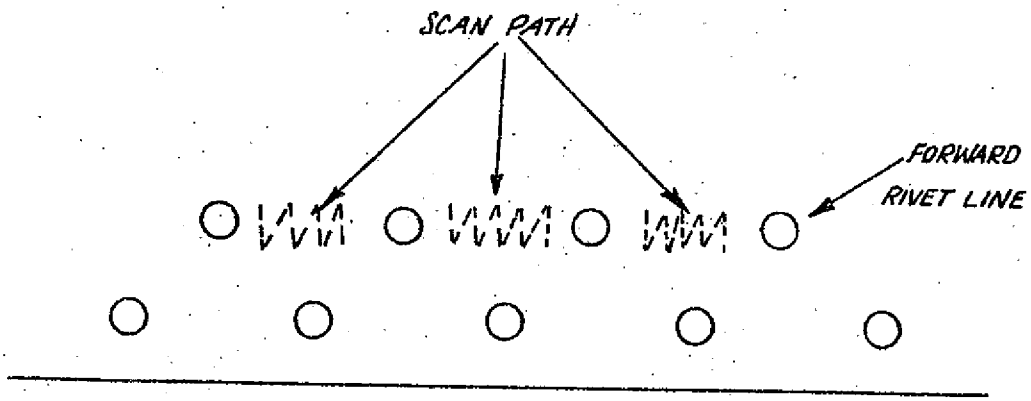


Fig. 3

DRG. No. 413.

NAML FORM 102

NAVAL AIRCRAFT MATERIALS LABORATORY

TELEPHONE: PORTSMOUTH DOCKYARD
EXT 45251: HEAD OF VIBRATION CONTROL
45197: HEAD OF STRUCTURAL MATERIALS AND CORROSION PROTECTION.
45351: VA TEAM
44954: NDT TEAM

NAML
RNAY FLEETLANDS
GOSPORT
HANTS
PO12 2AW

VIBRATION ANALYSIS/NON DESTRUCTIVE TESTING TECHNIQUE.

1. ~~VIBRATION ANALYSIS~~ / NDT TECHNIQUE / NAML / HUNTER / EDDY CURRENT / 7 IS ENCLOSED.

2. THE TECHNIQUE SHOULD BE FILED IN THE RELEVANT SECTION OF THE AIRCRAFT TOPIC 50.

3 THE TECHNIQUE IS FOR ADVANCED INFORMATION ONLY PENDING FORMAL AMENDMENT ACTION.

PM Powell

FOR OFFICER IN CHARGE NAML.

ENCLOSURE:

1 NDT TECHNIQUE / NAML / HUNTER / EDDY CURRENT / 7

THIS TECHNIQUE IS BE CARRIED OUT BY A TECHNICIAN

1. Technique.
HUNTER EDDY CURRENT 7

2. Component to be Examined.
L.P. Turbine blade.

3. Area to be Examined.
Leading edge of blade.

4. Purpose of Examination.
To detect cracking.

Equipment Required.
a) Novalec 96c.....4X 4507
b) Probe, Spade.....4XE 0047
c) Calibration block.....4XE 99

6. Preparation.
Jet pipe to be removed.

7. Examination Procedure.

a. 1. Initial Settings.
Set to Aus.
Carry out initial setting up and balancing procedure on equipment in accordance with servicing notes.

2. Sensitivity Setting.
Calibrate equipment to give 80% full scale deflection from 1.0mm slot on calibration block. Set alarm to 80%.

b. Procedure.
Scan 1.
1. Place probe at point A on the convex side of blade (0.125" from leading edge, 2.75" from shroud) zero equipment.
2. Scan leading edge of blade outboard to shroud.
3. Scan around radius. Where blade joins shroud, rotate probe to keep it at 90 degrees to radius.
4. Carry out scan 1 on every blade.

Note: If there is a defect indication on Scan 1 continue on to Scan 2.

Scan 2.
1. Place probe at point B (0.25" from trailing edge and half way round radius where blade joins shroud). zero equipment.
2. Scan in a straight line to leading edge of blade keeping probe in the radius.

c. Examination Standard.
Any indication not attributable to edge, mass effect or probe handling is to be considered a defect.Nil cracking permitted.

8. Reporting Procedure.
In accordance with current servicing instructions.

9. Estimated NDT Technique Man Hours.
One hour.

10. Additional Information.
Nil.

TECHNIQUE EDDY CURRENT 7

L.P. TURBINE BLADE

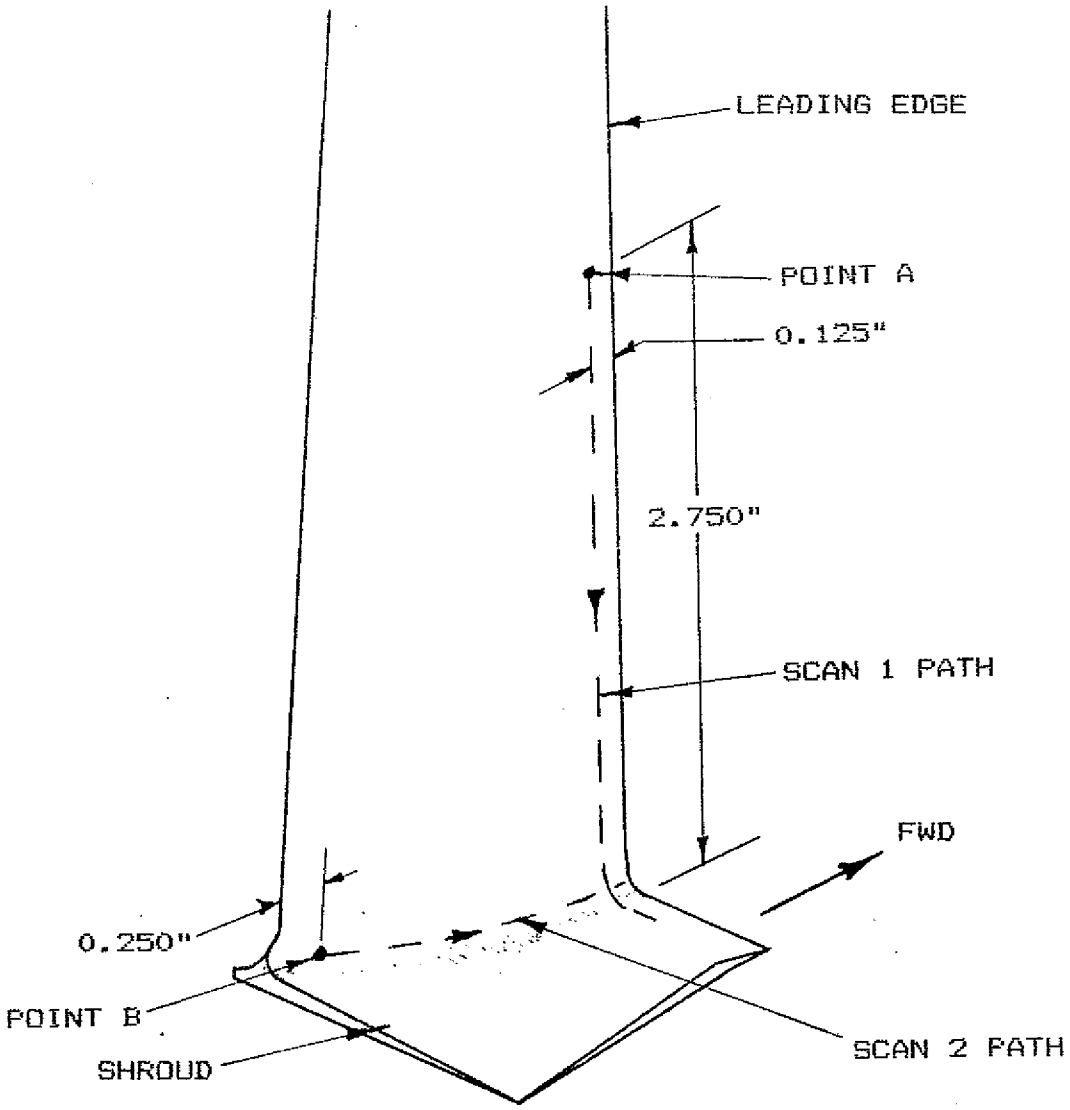


FIGURE 1

NTI

NTI/HUNTER/04/90

THIS TECHNIQUE MUST BE CARRIED OUT BY AN NDI TECHNICIAN.

1. Technique.
Hunter Eddy Current 8.

2. Component to be Examined.
Main under carriage legs, port and starboard.

3. Area to be Examined.
Radius and adjacent areas above the two retraction jack attachment lugs.

4. Purpose of Examination.
To detect circumferential fatigue cracking originating in the radius above the larger of the two undercarriage retraction jack attachment lugs.

5. Equipment Required.
Hocking Locator UH Flaw Detector.....4XE 2529554 ✓
Probe, right angled shielded, NFE, 2MHz.....4XE 2529614
(Old No. 4XE 197) ✓
Alternative, Rt. angled shield, NFE, 2MHz...4XE 2529561
(Old No. 4XE 128) ✓
Calibration Block, 3 slot, NFE.....4XE 4657626 ✓
PTFE tape cutout , roll.....4XE 97 / 4XE 378 ✓

6. Preparation.
a. Ensure that the small upper undercarriage door fairing has been disconnected from its operating rod at the lower linkage. Access to the scan areas is obtained by hinging the door upwards.
b. Ensure that the scan area is clean and free from flaking paint.
c. Carry out a before use inspection of the Hocking Locator.

7. Examination Procedure.

a. Instrument Calibration.

(1). Initial Settings.
Frequency.....2MHz.
Metal.....Al,Mg.
Operating Mode.....Zero Limit.
Alarm.....Continuous.
Alarm Level.....40%.

(2). Sensitivity Settings.
a. Connect the probe and lead to the test set, switch on and allow to stabilize.
b. Carry out the train procedure on the calibration block away from slots and edges.
c. Check for correct training.
d. Ensure the needle is at zero by depressing the zero button. Slide the probe tip onto the 0.2mm slot and set the gain control to give a meter deflection of 80%.
e. Recheck the sensitivity by moving the probe off, and back over the slot. If necessary readjust the gain control to achieve the 80% meter deflection.

continued

Hunter Eddy Current Technique 8. (continued)

7.a. (3). Alarm Level.
Ensure the alarm triggers at 40%.

7.b. Procedure.

(1). Scan A.
a. Referring to Fig. 1, place the probe at position 'A' on the starboard main undercarriage leg and carry out the train procedure.
b. Check for correct training.
c. To ensure training has not been carried out on a defect, move the probe approximately 5mm in the direction of scan, if there is no meter deflection greater than 5% training has been carried out correctly.
d. Zero the meter by depressing the zero button and using a tight, vertical, zig-zag scan pattern, scan the area 'A'.

(2). Scan B.
a. Referring to Fig. 1, place the probe at position 'B' and zero the meter.
b. In accordance with the dimensions given in Fig 1., scan the radius and the area below using a tight, vertical, zig-zag scan pattern.

(3). Scan C.
a. Referring to Fig. 1, place the probe at position 'C' in the center of the radius above the large retraction jack attachment lug and zero the meter.
b. Carry out a tight, vertical, zig-zag scan of the attachment lug radius.
c. In accordance with the dimensions given in Fig. 1, continue the scan around the leg into the smaller radius of the leg body.
d. A meter deflection of approximately 45% may occur where the radius reduces between the retraction jack attachment lug and the leg body.
Re-zero at this point before continuing the scan.
e. If difficulties are experience see para. 10.

(4). Repeat scans 'A', 'B' and 'C' on the port leg.

7.c. Examination Standard.
(1). Nil cracking permitted.
(2). Any indication that triggers the alarm and cannot be attributed to a geometric change or probe handling is to be considered a fault.
(3). If there is any doubt as to the presence of a crack, the paint finish must be removed and a dye penetrant inspection carried out.

8. Reporting Procedure.
In accordance with current servicing instructions.

continued

Hunter Eddy Current Technique 8. (continued)

9. Estimated NDT Technique Man Hours.
One hour, examination only.

10. Additional Information.

a. Scan B.

(1). The depth of radius may vary between undercarriage legs.

(2). As the extremities of the radius are scanned, small meter deflections will occur.

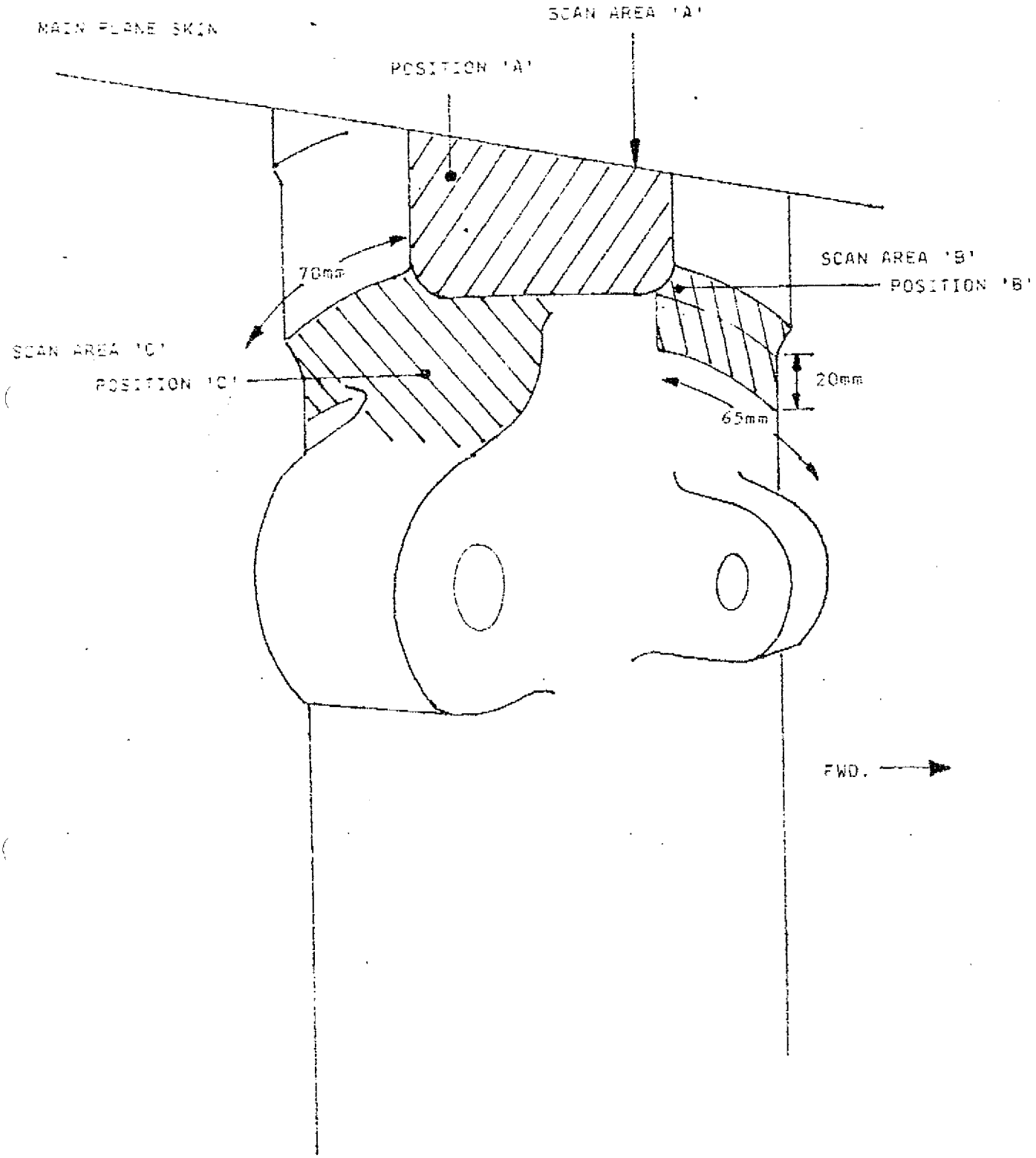
b. Scan C.

(1). On some legs, the geometry of the radius above the large retraction jack attachment lug may vary to such an extent that the resulting large meter swings make the scan difficult. In such cases the alarm level should be increased to 50% and the radius scanned in several segments; upper, middle, and lower. Care must be taken to ensure that the scans overlap.

(2). If the variation in geometry is extreme, the meter swings will be so great as to render the technique unreliable. Under these circumstances a dye penetrant inspection must be carried out.

.....

EDDY CURRENT TECHNIQUE 8.



MAIN UNDERCARRIAGE LEG.

FIGURE 1.

Warnings, Cautions and Maintenance Notes are to be complied with throughout the work detailed in this technique.

1.	Technique	HUNTER/EDD/9A (Category A).
2.	Component to be Examined	Main undercarriage legs, port and starboard.
3.	Area of Examination	The radius and adjacent area below the larger retraction jack attachment lug (Fig. 1).
4.	Purpose of Examination	To detect circumferential fatigue cracking.
5.	Equipment Required	(i) Elotest B1 4XE/314. (ii) NFe Reference Standard 4XE/4657626. (iii) Shielded spade probe 2 MHz 4XE/2529614 (formerly 4XE/187).
6.	Preparation	
6.1	Aircraft.	Ensure the undercarriage leg mod plate is removed, if it intrudes into the scan area.
6.2	Component.	Ensure examination area (Fig. 2) is clean and smooth (remove paint if necessary).
7.	Examination Procedure	
7.1	Instrument Settings.	
	(a) Pre-use checks.	In accordance with AP 119A-20619-1 Chap 2.
	(b) Probe.	Connect probe 4XE/2529614.
	(c) Standard display.	Ensure not in timebase.
	(d) Frequency.	Set to `1.8 MHz'.
	(e) Pre-amplifier Bandwidth filter.	Set to `HF'.
	(f) Pre - amplifier Gain.	Carry out probe matching.
	(g) Instrument functions.	
	(i) Main Amplifier Filter.	Set to `LP' at ~~`50 Hz'~~ 8Hz. Check Scan rate on block.
	(ii) Dot Position.	Set `Y to 0', `X to 0'.

7. Examination Procedure (Cont)

7.1 Instrument Settings (Cont).

(g) Instrument functions (Cont).

(iii) Gate.	Set `Cross gate ON' Vertical level to `Full screen Left'. Horizontal level to `one main-scale division above centreline'.
(iv) Alarm.	Set to `Normal' with Trigger `ON'.
(h) Phase Angle.	Adjust so that lift off is indicated by a horizontal movement from right to left.
(i) Axis Spread.	Set `Y axis gain to 20 dB'. Set `X axis gain to 0 dB'.
(j) Sensitivity Setting.	Adjust instrument to two mainscale divisions, vertical movement from the 0.2 mm slot in the Reference Standard.

7.2 Procedure.

Scan A.

(i) Place the probe in scan area `A' (Fig. 2).
(ii) Compensate.
(iii) Ensure lift off is indicated by horizontal dot movement (minor phase angle adjustments may have to be made).
(iv) Carry out a vertical zigzag scan of 1 mm pitch to cover the full scan area (Fig. 2).

Scan B.

(i) Place the probe in scan area `B' (Fig. 2).
(ii) Compensate.
(iii) Ensure lift off is indicated by horizontal dot movement (minor phase angle adjustments may have to be made).
(iv) Carry out a vertical zigzag scan of 1 mm pitch to cover the full scan area (Fig. 2).

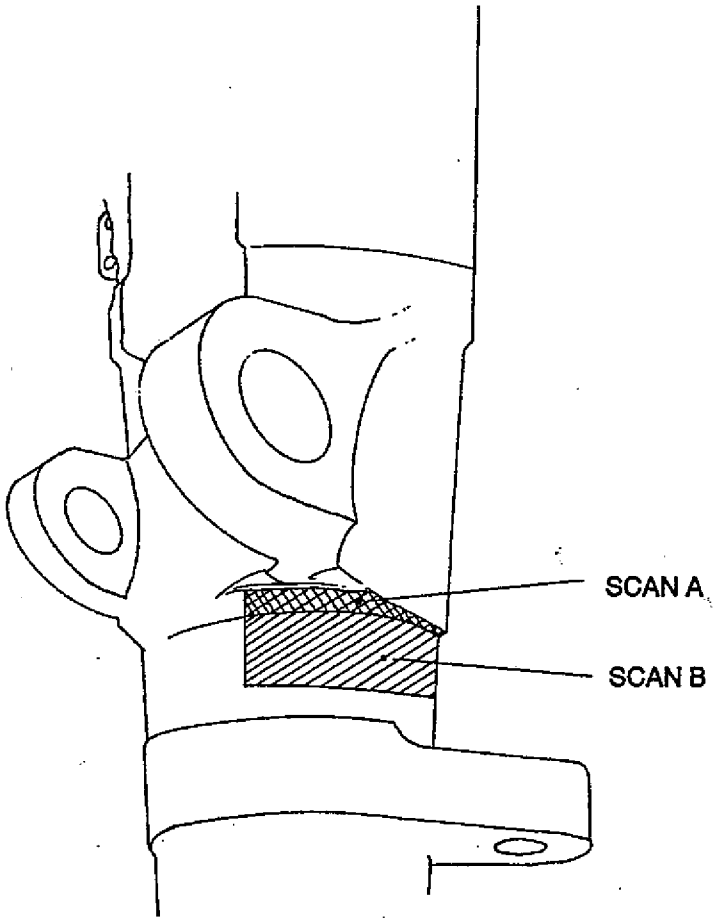
Note Ensure Scan `B' overlaps scan `A' where they adjoin.

(vi) Repeat scans `A' and `B' on the opposite side of the aircraft.

7.3 Signal Interpretation. Any indication not attributable to probe handling, edge, geometric or ferrous effect is to be considered a fault.

7.4 Examination Standard. All fault indications are to be reported.

8.	Reporting Procedure	In accordance with AP 100B-01 Order No. 0770 and relevant maintenance instructions.
9.	Estimated Technique Manhours	1.
10.	Additional Information	Nil.



SCAN AREAS TO EXTEND 90 mm
AROUND LEG CIRCUMFERENCE

SCAN B TO BE 20 mm
WIDE

Fig. 1 Scan areas

Servicing Notes are to be complied with throughout the work detailed in this technique.

1. Technique. (Category A) — Hunter/EDD/11.

2. Component to be Examined. — Main undercarriage hydraulic jack.

3. Area of Examination. — Intersection of main bore with hole for indicator assembly.

4. Purpose of Examination. — To detect stress corrosion cracking in the area of indicator hole.

5. Equipment Required.
   - a. 4X/2070437 Eddy Current Test Set 96c.
   - b. 4X/4657614 Probe Spade NFE.
   - c. 4X/4288 Standard Calibration Block NFE.

6. Preparation.
   - a. Aircraft. — Ensure component removed from aircraft.
   - b. Component. — Ensure component dismantled to give access to internal bore.

7. Examination Procedure.
   - a. Instrument Calibration.
     - (1) Initial Setting. — Carry out initial setting up and balancing procedures on equipment in accordance with Servicing Notes.
     - (2) Sensitivity Setting. — Using sensitivity control calibrate equipment to give 80 per cent of full scale meter deflection from 0.5mm slot in standard calibration block.
     - (3) Instrument Warning Setting. — Render inoperative.

Continued overleaf

7. Examination Procedure. (Contd)

b. Procedure.

1. Place probe at Position A (Fig 1 refers) and balance equipment.

2. Place probe at Position B (Fig 1 refers) and carefully scan area as shown.

3. Place probe at Position C (Fig 1 refers) and carefully scan area as shown.

c. Examination Standard.

Any indication which cannot be attributed to edge, mass or geometry is to be regarded as a defect and reported. See also Additional Information, para 10.

8. Reporting Procedure.

In accordance with AP 3158 Vol 2 (2nd Edition) Leaflet C17 and current servicing instructions.

9. Estimated Technique Manhours.

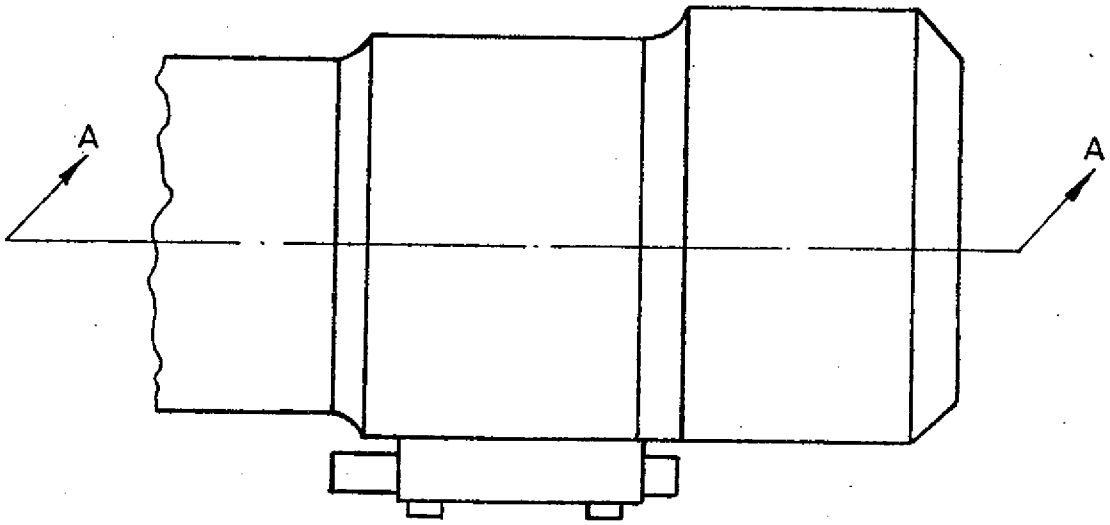
1/2.

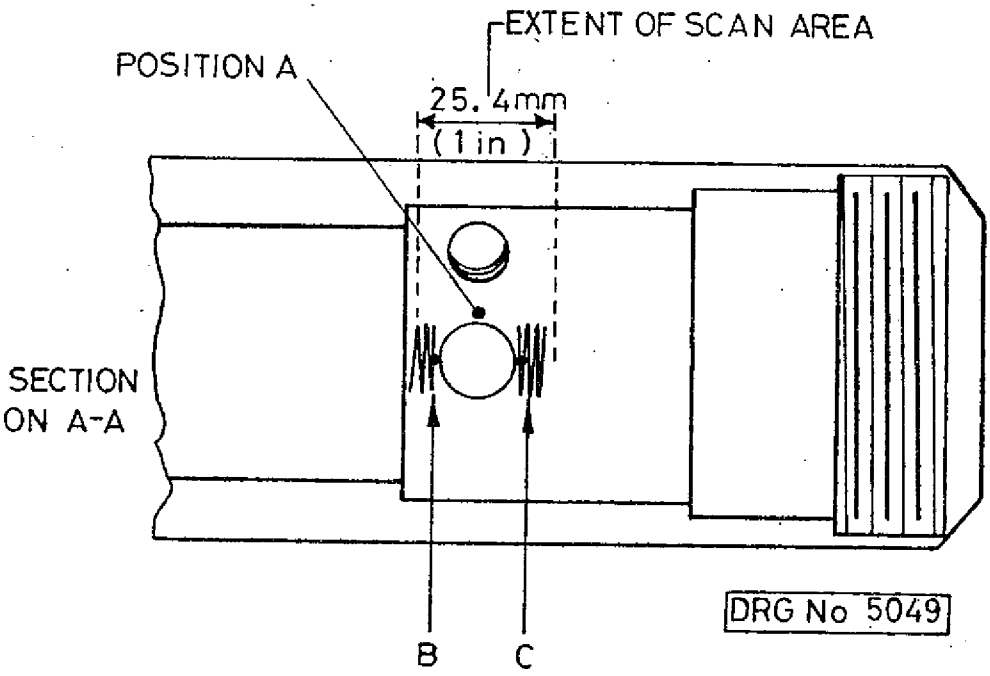
10. Additional Information.

a. Scanning in excess of limits shown in Fig. 1 may produce an indication from the internal change of section.

b. This technique is complementary to Hunter/ULT/10.

Continued





SHOWING SCAN AREA INSIDE JACK BODY

Fig.1

Warnings, Cautions and Maintenance Notes are to be complied with throughout the work detailed in this technique.

1.	Technique	HUNTER/EDD/12A (Category A).
2.	Component to be Examined	Avon Mk 12201 engine, LP turbine.
3.	Area of Examination	Outboard 60 mm (2.4 inches) of the leading edge of each blade (71 off) (Fig 1).
4.	Purpose of Examination	To detect cracks.
5.	Equipment Required	(i) Elotest B1 4XE/314. (ii) Ballast 4XE/2529680. (iii) Adaptor 4XE/2576509. (iv) Special probe 2 MHz 4XE/8460136. (v) Nimonic 90 Reference Standard 4XE/2140294. (vi) Probe lead 4XE/7714562. (vii) PTFE tape 4XE/97.
6.	Preparation	
6.1	Aircraft.	Ensure prepared in accordance with the relevant maintenance instructions.
6.2	Component.	Nil.
7.	Examination Procedure	
7.1	Instrument Settings.	
	(a) Pre-use checks.	AP 119A-20619-1 Chap. 2.
	(b) Probe.	Connect probe 4XE/8460136.
	(c) Standard display.	Ensure not in timebase.
	(d) Frequency.	Set to `1.8 MHz'.
	(e) Pre-amplifier Bandwidth filter.	Set to `HF'.
	(f) Pre-amplifier Gain.	Carry out probe matching.
	(g) Instrument functions.	
	(i) Main Amplifier Filter.	Set to `LP' at `20 Hz'.
	(ii) Dot Position.	Set `Y to 0', `X to -43'.
	(iii) Gate.	Set set to `OFF'.
	(iv) Alarm.	Set to `OFF'.

7. Examination Procedure (Cont)

7.1 Instrument Settings (Cont).

(h) Phase Angle.	Place probe on Reference Standard, adjust so that lift-off is indicated by a horizontal movement from right to left.
(i) Axis Spread.	Set 'Y axis gain to 15 dB'. Set 'X axis gain to 0 dB'.
(j) Sensitivity Setting.	Adjust instrument to 2 mainscale divisions, vertical movement from the 0.5 mm slot on the Reference Standard.

7.2 Procedure.

(i) Place the probe in scan area (Fig. 1).
(ii) Compensate.
(iii) Ensure lift-off is indicated by horizontal dot movement (minor phase angle adjustments may have to be made).
(iv) Carry out a single scan on leading edge of blade from 60 mm inboard to the outer shroud (Fig. 1) paying particular attention to radiused area (see Additional Information Para 10).
(v) Repeat operations (i) to (iv) on remaining blades.

7.3 Signal Interpretation. Any indication not attributable to probe handling, edge or geometric effect is to be considered a fault.

7.4 Examination Standard. All fault indications are to be reported.

8. Reporting Procedure. In accordance with AP 100B-01 Order No. 0770 and relevant maintenance instructions.

9. Estimated Technique Manhours. 1.

10. Additional Information

(i) Faults are expected in the leading edge to outer shroud radius.
(ii) Due to the close proximity of the ferrite to the blade leading edge, great care must be taken to ensure the probe head remains perpendicular to the leading edge throughout the scan. If this angle changes the ferrite will move away from edge of blade and faults may not be detected.

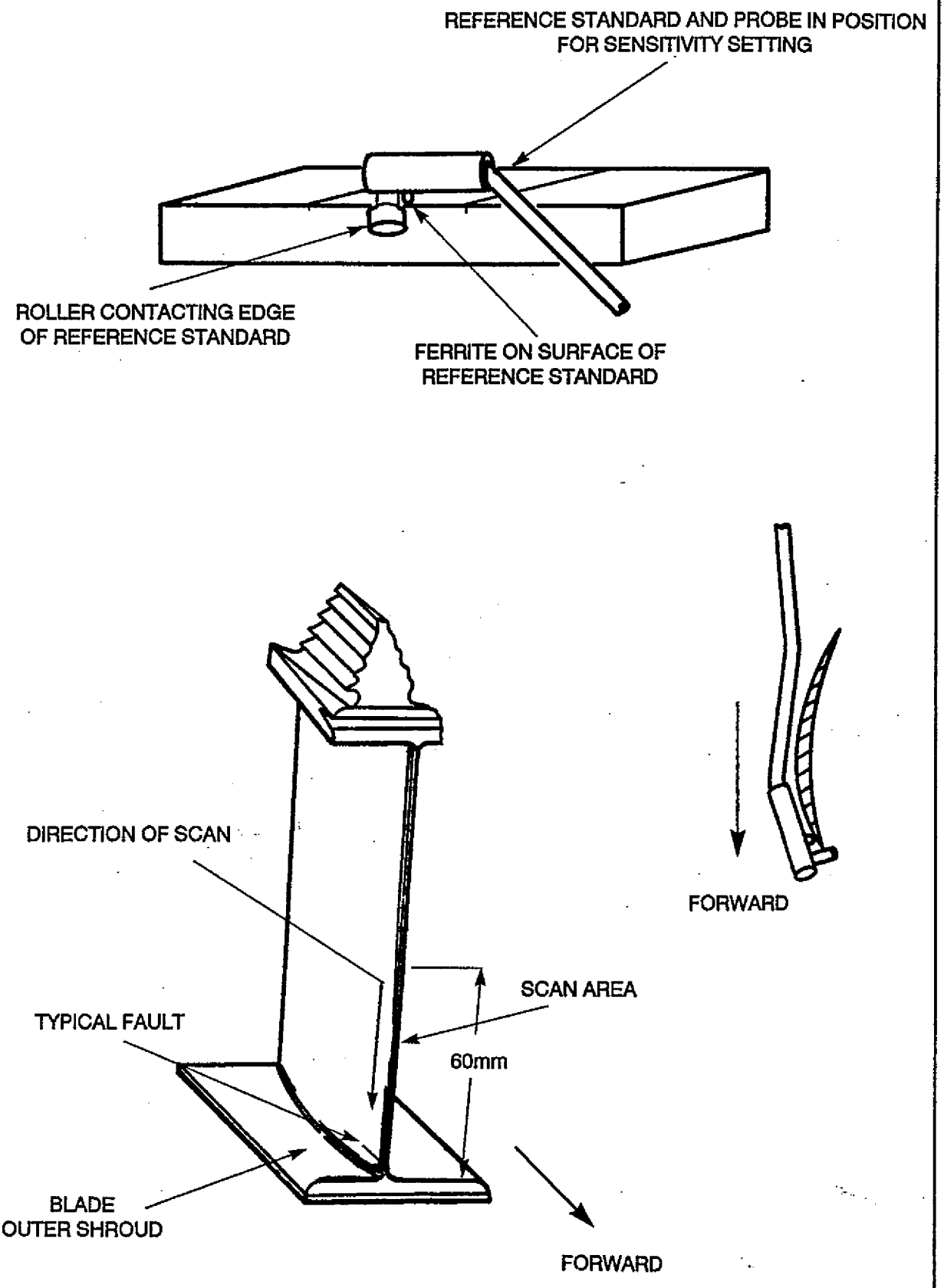


Fig. 1 Scan area and probe position for sensitivity setting.

Warnings, Cautions and Maintenance Notes are to be complied with throughout the work detailed in this technique.

1.	Technique	HUNTER/EDD/13 (Category A).
2.	Component to be Examined	Fuselage frame 18A and 18B (Fig. 1).
3.	Area of Examination	Heel of frames and around bolt holes.
4.	Purpose of Examination	To detect cracks along heel radii, radially from holes and circumferentially around top of holes.
5.	Equipment Required	(i) Hocking Locator UH1 4XE/2529554. or Hocking Locator UHB 4XE/466. (ii) NFe Reference Standard. 4XE/4657626. (iii Shielded spade probe 2 MHz 4XE/2529651 or 4XE/2529652 or 4XE/2529654 or 4XE/2529661.
6.	Preparation	
6.1	Aircraft.	Ensure prepared in accordance with relevant maintenance instructions.
6.2	Component.	Ensure scan area is clean and free from flaking paint and frame joint bolts are removed (Fig. 1).
7.	Examination Procedure	
7.1	Instrument Settings.	
	(a) Initial Setting.	Set up in accordance with AP 119A-20617-1.
	(b) Operating Mode.	Set to `ZERO LIMIT'.
	(c) Alarm.	Set to `CONT'.
	(d) Frequency.	Set to `2 MHz'.
	(e) Metal Selector.	Set to `Al.Mg'.
	(f) Sensitivity Setting.	(i) Set up in accordance with AP 119A-20617-1 Chap.2. (ii) Adjust instrument to attain 80 per cent of full scale deflection from 0.5 mm slot in the Reference Standard.
	(g) Instrument Warning.	Set alarm to operate at 80 per cent of full scale deflection.

7. Examination Procedure (Cont)

7.2 Procedure.

(i) Gain access to frame 18 by entry to the rear of the nosewheel.

NOTE: By facing aft and looking upwards, frame 18A and 18B are approximately 3 in. forward of the aft wall of the bay attached to the upper skin.

(ii) Position selected probe in scan area of frame 18A and train equipment (Fig. 1).

(iii) Check train.

(iv) Position probe at extremity of frame heel scan area, zero equipment and carry out a scan along the radius with the probe normal to the apex of the radius (Fig. 1).

(v) With probe tip as close to a bolt hole as possible, zero equipment and carry out a complete circumferential scan of the hole (Fig. 1).

(vi) Repeat circumferential scans at 2 mm intervals until frame radius is encountered.

(vii) Repeat operations (v) and (vi) on remaining four bolt holes in scan area (Fig. 1).

(viii) Repeat operations (ii) to (vii) on frame 18B (Fig. 1).

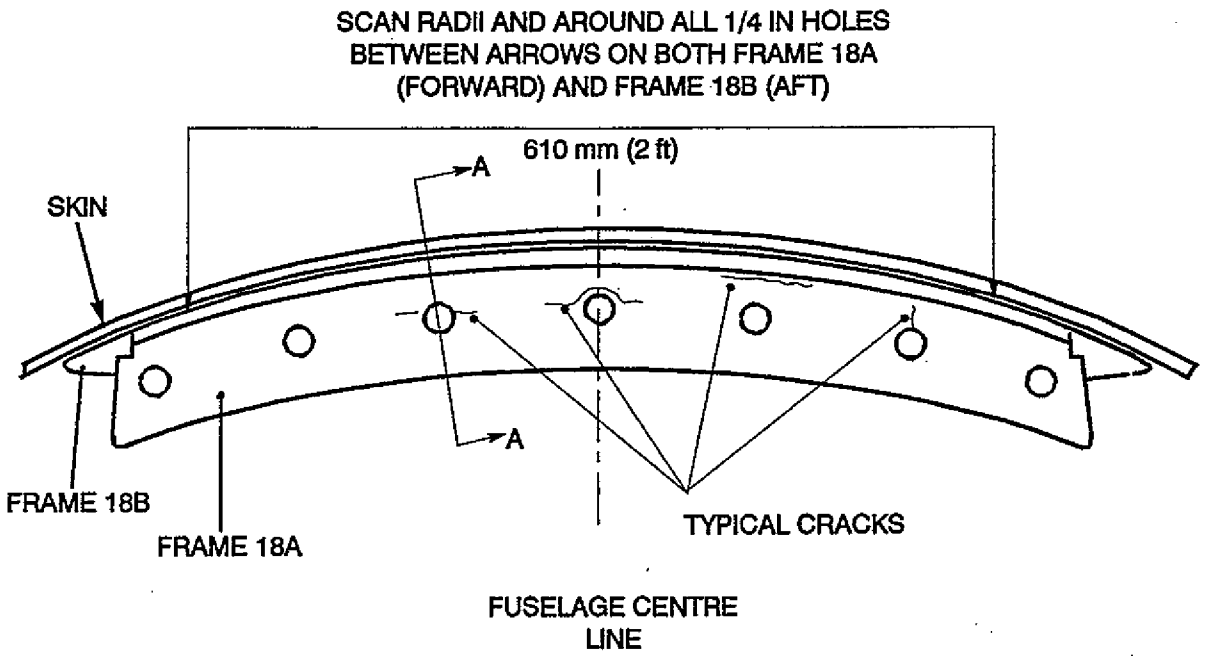
7.3 Fault Interpretation. Any indication which triggers the alarm that cannot be attributed to edge, geometric, ferrous effect or probe handling is to be considered a fault.

7.4 Examination Standard. Report all fault indications, stating their position, length, direction and total length of cracking in each frame.

8. Reporting Procedure. In accordance with AP 100B-01 Order No. 0770 and relevant maintenance instructions.

9. Estimated Technique Manhours. 1.5.

10. Additional Information. To scan frame 18B a mirror and light source will be required.



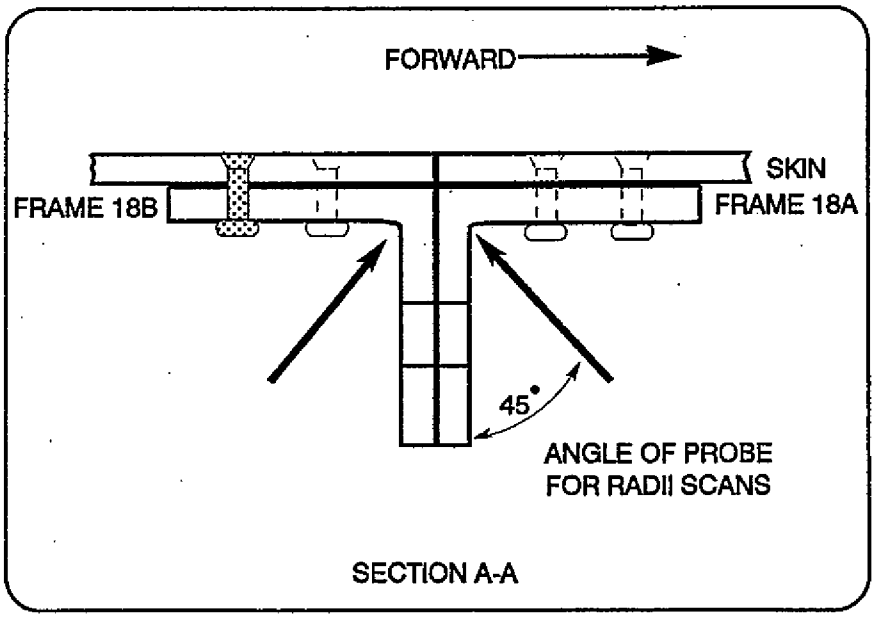


Fig. 1 Frame 18A and 18B, view facing aft, showing scan areas

NON-DESTRUCTIVE
TESTING TECHNIQUE

CSDE/HUNTER/EDD/14A

CSDE/HUNTER/EDD/14A

Prepared by
Central Servicing Development Establishment
ROYAL AIR FORCE

INTRODUCTION

NON-DESTRUCTIVE TESTING TECHNIQUE

Ultrasonics, Eddy Currents and Magnetics

Notice to Users

This technique has been devised and published by the Central Servicing Development Establishment (CSDE) to support aircraft maintenance operations. It is to be withdrawn from use on receipt of the appropriate amendment to the Aircraft/Equipment Topic 5G.

1. Before commencing any Ultrasonics, Eddy Current or Magnetic Particle technique the Safety Precautions and Maintenance Notes contained in the relevant equipment AP119A are to be read and complied with.

2. Aircraft Safety and Maintenance Notes contained in the Topic 5G of the aircraft Maintenance Schedule are to be complied with throughout all work detailed.

3. This technique is not subject to amendment action. Any changes necessary will be incorporated into a newly issued technique bearing the same number with a suffix letter. Appropriate maintenance instructions may not identify the latest technique in use, however a later suffix letter automatically supercedes previous Topic 5G or CSDE issues.

4. Reports on unsatisfactory features within this technique should be addressed to the Aircraft Integrity Monitoring Squadron (AIMS) at the CSDE.

5. This is a Category 'A' technique and is to be carried out by Q-A-NDT qualified tradesmen.

EDD/14A(1)
(1 to 3)

NON-DESTRUCTIVE TEST SCHEDULE
EDDY CURRENT TECHNIQUES
HUNTER ALL MARKS

Warnings, Cautions and Maintenance Notes are to be complied with throughout the work detailed in this technique.

1.	Technique	HUNTER/EDD/14A (Category A).
2.	Component to be Examined	Main undercarriage legs, port and starboard.
3.	Area of Examination	The radius and adjacent areas above the retraction jack attachment lugs (Fig. 1).
4.	Purpose of Examination	To detect circumferential fatigue cracks.
5.	Equipment Required	(i) Elotest B1 4XE/314. (ii) NFe Reference Standard 4XE/4657626. (iii) Shielded spade probe 2 MHz 4XE/2529614 (formerly 4XE/187).
6.	Preparation	
6.1	Aircraft.	Ensure undercarriage upper fairing door is disconnected.
6.2	Component.	Ensure examination area (Fig. 1) is clean and smooth (remove paint if necessary).
7.	Examination Procedure	
7.1	Instrument Setting.	
	(a) Pre-use checks.	In accordance with AP 119A-20619-1 Chap. 2.
	(b) Probe.	Connect probe 4XE/2529614.
	(c) Standard display.	Ensure not in timebase.
	(d) Frequency.	Set to `1.8 MHz'.
	(e) Pre-amplifier Bandwidth filter.	Set to `HF'.
	(f) Pre - amplifier Gain.	Carry out probe matching.
	(g) Instrument functions.	
	(i) Main Amplifier Filter.	Set to `LP' at ~~`50 Hz'~~ 8 Hz. Check scan rate on reg block.
	(ii) Dot Position.	Set `Y to 0', `X to 0'.
	(iii) Gate.	Set `Cross gate ON' Vertical level to `Full screen Left'. Horizontal level to `one main-scale division above centreline'.

Continued

7. Examination Procedure (cont)

7.1 Instrument Settings (cont).

(g) Instrument functions (cont).

(iv) Alarm. — Set to `Normal, with Trigger `ON'.

(h) Phase Angle. — Adjust so that lift off is indicated by a horizontal movement from right to left.

(i) Axis Spread. — Set `Y axis gain to 20 dB'.
Set `X axis gain to 0 dB'.

(j) Sensitivity Setting. — Adjust instrument to two mainscale divisions, vertical movement from the 0.2 mm slot in the Reference Standard.

7.2 Procedure.

Scan A.
- (i) Position probe in scan area A (Fig. 1).
- (ii) Compensate.
- (iii) Ensure lift off is indicated by horizontal dot movement (minor phase angle adjustments may have to be made).
- (iv) Carry out a vertical zigzag scan of 1 mm pitch to cover the full scan area (Fig. 1) as far as access permits.

Scan B.
- (i) Position probe in scan area B (Fig. 1).
- (ii) Compensate.
- (iii) Ensure lift off is indicated by horizontal dot movement (minor phase angle adjustments may have to be made).
- (iv) Carry out a vertical zigzag scan of 1 mm pitch to cover the full scan area (Fig. 1).

Scan C.
- (i) Position probe in scan area C (Fig. 1).
- (ii) Compensate.
- (iii) Ensure lift off is indicated by horizontal dot movement (minor phase angle adjustments may have to be made).
- (iv) Carry out a vertical zigzag scan of 1 mm pitch to cover the full scan area (Fig. 1).
- (vi) Repeat scans `A', `B' and `C' on the opposite side of the aircraft.

7.3 Signal Interpretation. — All indications that triggers the alarm that cannot be attributed to probe handling, edge, geometric or ferrous effect is to be considered a fault.

7.4 Examination Standard. — All fault indications are to be reported.

NON-DESTRUCTIVE TEST SCHEDULE
EDDY CURRENT TECHNIQUES
HUNTER ALL MARKS

8.	Reporting Procedure	In accordance with AP 100B-01 Order No. 0770 and relevant maintenance instructions.
9.	Estimated Technique Manhours	1.0
10.	Additional Information	Edd/14A increases the scan area of Scan A. This was due to fault indications being found by DRA Farnborough outside existing scan area.

Prepared by:
Chief Technician J C Urquhart

M WELBURN
Squadron Leader
for Officer Commanding

CSDE
28 February 1994

Continued

EDD/14A (3)

NON-DESTRUCTIVE TEST SCHEDULE
EDDY-CURRENT TECHNIQUES
HUNTER ALL MARKS

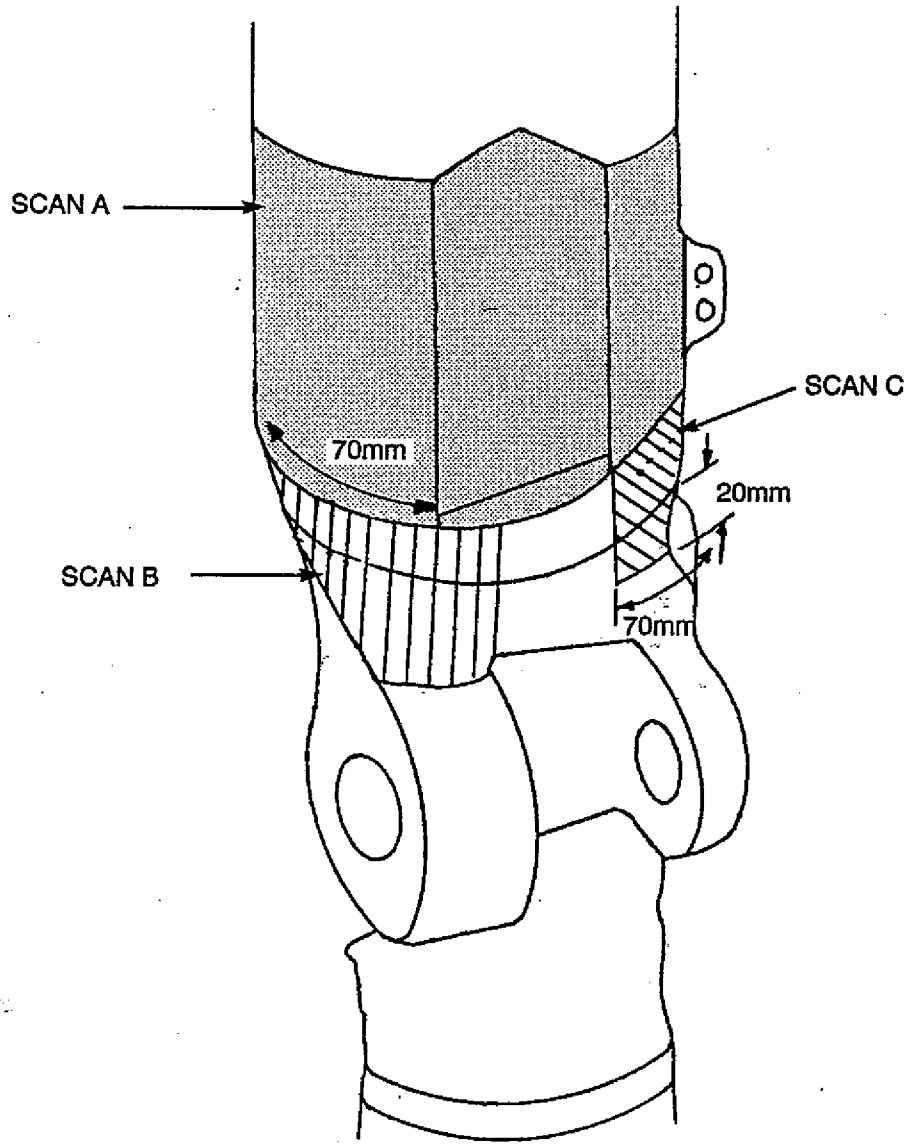


Fig. 1 Scan areas (STBD SHOWN).