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Headquarters
U. S. Army Aviation Systems Command
12th and Spruce Streets
St. Louis, Missouri 63166

Attention: AMSAV-PPYC

Via: U. S. Army Boeing Vertol Plant Activity

Subject: Contract DAAJ01-67-A-0001(M) - Delivery Order 0030

CH-47 Helicopter - Submittal of Flight Test Results on Triple Cargo Hook System (SRD 84R2)

Enclosures:
(1) Description of Aircraft System, Configuration, Test Conditions

(2) Summary of Test Configurations and Flight Test Results

(3) Functional Test Procedure - CH-47C Triple Hook System

(4) Photographs of Triple Hook Flight Test Program

1. In accordance with the requirements of the subject SRD the Contractor has completed the Flight Test Program of the Triple Cargo Hook System and the results are presented for AVSCOM's review and approval.

2. The objectives of the program were:

a) To verify the feasibility of carrying stable loads simultaneously on all three (3) cargo hooks.

b) To determine the optimum sling rigging arrangement for maximum forward speed and maneuver capability without damage to the loads or slings.

c) To identify any unusual helicopter or external load characteristics associated with the triple hook system.

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2. Continued ...

d) To establish recommendations for an allowable CH-47C flight envelope with triple hook loads.

e) To demonstrate a CH-47C flight envelope at the cg limits resulting from a 10,000 pound load on either the forward or aft hooks with no loads on the other two hooks.

3. The triple hook system was found to be excellent for transporting three or more separate stable single point loads to three (3) different locations. These loads can either be of the same type or mixed, such as, two fuel bags and one A-22 container. Successful demonstrations were also performed with loads up to 10,000 pounds on only the forward or aft hook. This means that operators may attach triple hook loads in any order and may deposite them in any sequence. The release system provided allows each of the loads to be unhooked independently of the other two.

4. Optimum sling configuration, among those tested, was the echelon rear ie, shortest sling on the forward hook, next longest on the center hook and the longest sling on the rear hook.

5. A forward flight envelope of 100 knots is considered acceptable for operational use. This is based on test evaluations up to 130 knots and thorough probes of the normal external load maneuver envelope, including steep angle descents.

6. In forward flight with three identical loads on the three hooks, lateral pendulum excursions of the center load often exceeded those of the forward and aft loads. This had no effect on the flight envelope and was not felt by the pilot. It was thought however, that the curved lateral beam installation which is unique to the center hook installation might be causing the oscillations. Tests with the curved beam locked in the center position showed no significant change in the excursions. All final evaluations were made with the normal curved beam and free swinging center hook.

7. During the tests with the A-22 containers it was noted that the cover flaps would blow loose on almost every flight even though particular care was taken to secure them. Grommets should be installed at the free corners of the flaps to provide a positive method of restraining them for high speed flight.

8. Based on the test results, the Contractor recommends the following:

8. Continued:

a) Airspeed should be limited to 100 knots. This is the maximum stable airspeed for level flight and all normal maneuvers.

b) Bank angles should be limited to 20°. At higher bank angles the loads tend to become unstable.

c) The optimum sling configuration is 8 ft. forward, 12 ft. mid, and 16 ft. aft. Operational configurations should adhere as closely as possible to these sling lengths except that the vertical spacing between loads should always be sufficient to prevent load to load contact in the event of one load swinging.

9. Since the tandem hook test program was conducted under SRD84R1, several design improvements were incorporated. These changes included adding teflon coated bushings, special finish bolts, and special lockwashers, in the attachment hardware to improve wear characteristics. At the completion of the triple hook test program under SRD 84R2, the cargo hook attaching hardware was disassembled and inspected for wear. The inspection revealed no significant wear and therefore judged satisfactory.

10. In addition, electrical changes were made to correct the problem of simultaneous opening of both forward and aft hooks when the "aft hook only" mode was selected. During the triple hook flight testing under SRD 84R2, individual hook load releases were successfully conducted which demonstrated the adequacy of the electrical changes.

for W. P. Brown
Chief Project Engineer
Medium Lift Helicopter

cc: AMSAV-FKT (w/encl)
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DESCRIPTION OF AIRCRAFT SYSTEM, CONFIGURATION, AND TEST CONDITIONS

1.0 GENERAL

1.1 Testing was conducted at Millville, N. J. to determine the most stable sling configuration, utilizing U. S. Army A-22 containers and fuel bags filled with water (A-22, FSN 1670-242-9169, ballasted to 2000 pounds each; 500 gal water bags, FSN 8110-824-1444 ballasted to 4500 pounds each)

2.0 AIRCRAFT

The aircraft utilized was a CH-47C, Serial No. 68-15859, Tab B-571.

2.1 Configuration

The aircraft was a standard CH-47C with the following exception:

2.2 Two (2) Eastern Rotorcraft Cargo Hooks, P/N SP7108-3, were installed B/L-O Sta. 260 and 420. The fuselage was stiffened in the hook attachment area and universal joints were fitted to each hook. The aircraft was equipped with a Cruise Guide Indicating System and AFCS.

2.3 System Description

2.3.1 MODE SELECT POSITION - FWD

2.3.1.1 With the mode select switch in the FWD position only, the forward hook will release by operating the cargo release switches (pilot, copilot or hoist operator). The hoist operator must activate his cargo hook switch to ARM before his release switch will operate.

2.3.1.2 The forward hook is not subject to automatic release in this mode.

2.3.1.3 With circuit breakers pushed and power on the aircraft, the hook loaded lights will illuminate when the hooks are loaded.

2.3.1.4 Whenever the aircraft is above 60 knots IAS and the hooks are loaded and not in the AUTO RELEASE mode, the AUTO JET OFF caution light will illuminate.

2.3.2 MODE SELECT POSITION - MID

2.3.2.1 Same as FWD except MID hook is activated.

2.3.3 MODE SELECT POSITION - AFT

2.3.3.1 Same as FWD except AFT hook is the one activated.

2.3.4 MODE SELECT POSITION - OFF

2.3.4.1 None of the three hooks can be released either normally or automatically in this mode. Emergency release of all three hooks simultaneously is accomplished regardless of selector switch position.

2.3.5 MODE SELECT POSITION - AUTO

2.3.5.1 When the aircraft is above 60 knots IAS and either forward or aft hook is unloaded for 0.5 seconds or longer, both hooks will open.

2.3.5.2 The center hook is not operative in this mode. The fwd and aft hooks cannot be released normally in this mode.

2.3.5.3 Below 60 knots IAS, the Auto Jettison System is inoperative. Above 60 knots IAS, the Auto Jettison OFF caution light will illuminate if not in the Auto Release Mode with both hooks loaded.

2.3.6 MODE SELECT POSITION - MANUAL

2.3.6.1 The forward and aft hooks are not subject to automatic release in this mode.

2.3.6.2 The center hook is not operative in this mode.

2.3.6.3 The forward and aft hooks are released simultaneously by cargo release switches (Pilot, copilot or hoist operator). The hoist operator must activate his cargo hook switch to ARM before his release switch will operate.

2.3.6.4 The hook loaded lights will illuminate when hooks are loaded if power is on the aircraft and circuit breakers are pushed.

2.3.6.5 When the aircraft is above 60 knots IAS, hooks loaded, and not in the Auto Release Mode, the AUTO JET OFF caution light will illuminate.

2.3.7.0 MANUAL RELEASE SYSTEM

2.3.7.1 Forward and aft hooks can be opened manually by operating a cable release handle mounted in the rescue hatch.

2.4 METHOD OF OPERATION DURING THE TEST PROGRAM

2.4.1 Prior to hooking up a load the pilot placed the selector switch, on the overhead panel, to "MANUAL". The switch remained in the "Manual" until 60 kts of airspeed or greater was achieved and the "Auto Jettison Off" light had illuminated in the "Master Caution Panel." At this time, the pilot selected the "Automatic" mode. The switch remained in this position throughout the test. Returning to the field, decelerating below 60 kts the pilot selected manual. The load was released by the pilot, utilizing the normal release switch on the cyclic stick.

2.4.2 The normal, emergency and manual release systems were tested prior to flight.

2.4.3 The hook system can automatically jettison their loads if either of the non-production cargo hooks feel 200 lbs or less.

2.4.4 This automatic system will only function if the selector switch is in automatic.

Enclosure 1

2.5 SAS CONFIGURATION

2.5.1 A switch was provided in the cockpit that allowed the pilot to switch from AFCS (Automatic Flight Control System) to the "C" Configuration SAS and to the "B" Roll Configuration SAS. An additional switch was provided in the cockpit that allowed the pilot to disable the "roll stick pick off." The purpose of the switches was that in the event the load displayed unstable or neutral characteristics prior to reaching torque limit (maximum obtainable airspeed) in the AFCS Mode, the test point could be reevaluated in the "B" and "C" roll SAS and/or with the roll stick pick off disabled.

3.0 INSTRUMENTATION

3.1 The aircraft was not instrumented. Only pilot evaluation, observer comment and photographic coverage was obtained.

4.0 TEST CONDITIONS

4.1 The test conditions listed below were conducted between 2000-3000 ft. h_d

1. Climb 500 to 1500 ft/min
2. Straight and level flight
3. Pilot controlled lateral reversals
4. Pilot controlled yaw reversals
5. Turns 30° bank angles left or right per the TM55-1520-209-10 Operator's Manual
6. Sideslips, approximately 15° - left or right
9. Descent 600 ft/min to 1000 ft/min
10. Cyclic flare, deceleration to 60 knots
11. Longitudinal reversals

4.2 The test conditions were conducted in 10 knot increments, from 60 knots until torque limit. If, however, loads became unstable before torque limit, the airspeed was reduced to a level at which that particular load configuration exhibited stable characteristics.

4.3 The criteria for limiting maximum operating speed was neutral oscillation of the load, load to sling and load to load contact.

5.0 U. S. ARMY PARTICIPATION IN TRIPLE HOOK PROGRAM

U. S. Army UH-1 Helicopter was provided as the chase vehicle for this program. Motion pictures and still photographs were taken by Boeing from the chase vehicle to record load motions.

6.0 RECOMMENDATIONS/CONCLUSIONS

6.1 The optimum sling configuration determined during the test program is 8, 12' and 16' fwd to aft.

6.2 Bank angles should not exceed 20° due to the fact that at higher bank angles the loads become unstable.

6.3 Airspeed should be limited to 100 knots. This is the maximum stable airspeed for all maneuvers for the recommended sling configuration.

6.4 It is recommended that grommets be installed on the A22 containers on the flaps to better secure them. It was observed that in hover, due to rotor downwash, the flaps on the A22 containers were rooted loose.

6.5 During the previous flight test program under SRD84R1, the cargo hook attachment bolts became badly scored and galled. The attachment hardware was therefore changed to include teflon coated bushings, special finish bolts, and special lockwashers to improve wear characteristics. At the completion of the triple hook program, under SRD84R2 the cargo hook attaching hardware was disassembled and inspected for wear. The inspection revealed no significant wear and therefore judged satisfactory.

6.6 During single mode electrical load releases of the previous flight test program under SRD84R1, selection of an aft hook-only release resulted in simultaneous opening of both the forward and aft hooks. This problem, however, has since been corrected. Individual hook load releases were successfully conducted during the SRD84R2 Triple Hook Flight Test Program and demonstrated the adequacy of the electrical changes made since the previous test.

6.7 During standard aircraft maneuvers, and under the most heavily loaded condition (including forward load only and aft load only), the Cruise Guide Indicator reflected no unacceptable high stress situations.

THE BOEING COMPANY

DATE	FLIGHT NO.	CREW	TEST ALT HP	SHIPS IAS/ KTS	CONFIGURATION LOAD/SLING	COMMENTS
4/3/74	X-17 T.O.G.W. 30617 C.G. 4.4"Aft	Nelson Mecklin Wenograd Hartman	1500-3000' H_p	60 to 110 Kts	Three A22 Containers carrying 455 gal. water filled drums, weighed 6060#. Sling lengths were 8', 12', 16'	Loads were stable until 100 knots. Climbs until torque limit and descents were judged stable. At bank angles greater than 20° there occurred load to sling contact. On sideslips at 110 knots there was some load to load contact. At 110 knots the center load exhibited neutral lateral oscillation. Also at 110 knots the center and aft loads wrapped around each other. Mission was aborted at this point. On decelerations to hover, loads untangled. It is recommended that maximum operating speed be 100 knots for all maneuvers.
4/3/74	X-18 T.O.G.W. 43,517 C.G. 4.7"Aft	Nelson Mecklin Wenograd Hartman	1500-3000' Hp	60 to 130 Kts	Three (3) Fuel Bags filled with water. Each bag weighed 4500 lbs. Sling lengths 8', 12', 16' Forward to Aft	At 125 knots, level flight, neutral oscillations on the center hook were observed. The complete set of maneuvers was run at 110 kts. All loads were stable except for a small twisting action on the center hook at this airspeed. Also at bank angles greater than 20° large neutral oscillations on center hook occurred.
4/3/74	X-19 T.O.G.W. 36,017 C.G. 4.4" Aft	Nelson Mecklin Wenograd Hartman	1500-3000' Hp	60 to 110 Kts	Three (3) A22 Containers with center hook locked in mid position of beam. Same sling configuration as X-17	In order to try and reduce neutral lateral oscillations on center hook, the hook was locked in the mid position of the beam so that it prevented lateral travel on beam. Load to sling contact occurred at 120 knots. Center load also had tendency to twist. The program was run at 110 knots. In general, there was no significant improvement noted with center hook locked in mid position.
4/4/74	X-20 T.O.G.W. 36,017 C.G. 4.4" Aft	Nelson Mecklin Hartman Wenograd	1500-3000' Hp	70 to 90 Kts	Three (3) A22 Containers with sling configuration of 16', 12', 8' Forward to Aft Center hook not locked out for remainder of flights	In this configuration the forward load has a tendency to ride under the mid load since the sling on forward load is longer. Contact between forward sling and mid load was observed on climbs, 500'/min rate of descent (60 knots), 1000'/min rate of descent and on right hand turns. The maximum speed obtained was 90 knots. It is recommended that 70 knots airspeed and 20° bank angle be the maximum airspeed and bank angle for this configuration.
4/4/74	X-21 T.O.G.W. 43,517 C.G. 4.7" Aft	Nelson Mecklin Hartman Wenograd	1500-3000' Hp	60 to 90 Kts	Three (3) Fuel Bags with same sling configuration as X-20	At 70 knots, loads were stable for all maneuvers. At 90 knots for 1,000'/min rate of climb and 20° bank angle there was load to sling contact, forward to mid. During the entire flight the center load flew left sideslip. 90 knots was maximum forward speed investigated.

FORM 46289 (12/69)

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DATE	FLIGHT NO.	CREW	TEST ALT HP	SHIPS IAS/ KTS	CONFIGURATION LOAD/SLING	COMMENTS
4/5/74	X-22 T.O.G.W. 36,017 C.G. 4.4"Aft	Nelson Mecklin Hartman Wenograd	1500-3000' H_p	60-85	Three (3) A22 Containers with sling lengths of 12', 20', 12' forward to aft.	The maneuvers were done at 70 knots.At this airspeed there was load to sling contact mid to aft. At 85 knots the contact continued between mid and aft loads, however, the contact was much harder. At this airspeed the loads swing out of phase. The forward and aft swung in the same direction while the mid swung in the opposite direction.
4/8/74	X-23 T.O.G.W. 43,517 C.G. 4.7" Aft	Nelson Mecklin Hartman Wenograd	1500-3000' H_p	60-70	Three (3) Fuel Bags with sling configuration as X-22	At 70 knots with 500'/min rate of climb there was considerable load to sling contact between forward to center. 70 knots was maximum speed attained. In general, this configuration judged unacceptable.
4/10/74	X-24 T.O.G.W. 36,017 C.G. 4.4" Aft	Nelson Meihofer Hartman Wenograd	1500-3000' H_p	60 to 90	Three (3) A22 Containers with sling lengths of 20', 16', 20' forward to aft.	At transition (0-60 kts) there was load to load contact between the forward and mid loads. At 70 kts, 1000'/min rate of climb, there was light contact, load to load, between forward and mid. At 70 kts, 1500'/min rate of climb, there was load to load contact between mid and aft loads. At 90 kts, the loads were judged unstable due to the fact that they were about to wrap around each other. This configuration was considered not acceptable due to the constant load to load contact at low airspeed.
4/10/74	X-25 T.O.G.W. 38,557 C.G. .8" Fwd	Nelson Meihofer Hartman Wenograd	1500-3000' H_p	60 - 110	Fuel Bag (Fwd), Two (2) A22 Containers mid and aft. Sling lengths are 8', 12', 16' forward to aft.	At 1700'/min rate of climb (70 knots) the center load has tendency to wind up. At 80 kts there was load to sling contact between the center and aft. At 110 knots the mid and aft loads showed a tendency to wrap around each other, but they did not. Turns were judged satisfactory at 80 and 100 knots. It is recommended that 100 knots be the maximum operating airspeed for all maneuvers and that bank angles not exceed 20°.
4/10/74	X-26 T.O.G.W. 41,037 C.G. .6" Fwd	Nelson Meihofer Hartman Wenograd	1500-3000' H_p	60 to 110	Two (2) Fuel Bags (fwd and mid) and A22 (aft). Sling lengths same as X-25.	At 80 knots with a 30° R/H turn there was load to load contact forward to mid. The maximum speed obtained for this flight was 110 knots. At this airspeed there was load to load contact between the forward and mid loads. At the same airspeed the aft load began building up longitudinal motion and the center load showed a tendency to wind up. It was determined that 100 knots airspeed and 20° bank angle are the safe operating envelope for this configuration

FORM 46269 (12/69)

THE BOEING COMPANY

DATE	FLIGHT NO.	CREW	TEST ALT HP	SHIPS IAS/ KTS	CONFIGURATION LOAD/SLING	COMMENTS
4/10/74	X-27 T.O.G.W. 41,037 C.G. 9.1" Aft	Nelson Meihofer Hartman Wenograd	1500- 3000' Hp	0-60	One (1) A22 Container (forward) and two (2) fuel bags (mid and aft) with same sling length as X-26	At transition, 0 - 60 knots, the forward load rode the mid load the entire way. The loads rode right on top of each other. This mixed load configuration was judged completely unacceptable with the test sling configuration.
4/10/74	X-28 T.O.G.W. 34,517 C.G. 15.2" Aft	Nelson Meihofer Hartman Wenograd	1500- 3000' Hp	60 - 110	One (1) Fuel Bag aft with sling length of 16'	Load was completely stable for all conditions of flight to 110 knots. At this airspeed there was longitudinal motion observed on the aft hook. The set of maneuvers was run at 100 knots and load response was considered acceptable.
4/10/74	X-29 T.O.G.W. 38,557 C.G. 9.6"Aft	Nelson Meihofer Hartman Wenograd	1500- 3000' Hp	60-80	Two (2) A22 Containers (forward and mid) and one (1) fuel bag aft. Same sling lengths as X-27	In transition (0 - 60 kts) there was load to load contact between the mid and aft loads. At 80 knots airspeed the mid and aft loads rode side by side the entire time. This load/sling configuration was judged unsatisfactory.
4/10/74	X-30 T.O.G.W. 39,017 C.G. 13.2"Fwd	Nelson Meihofer Hartman Wenograd	1500- 3000' Hp	60-120	Two (2) Fuel Bags Fwd sling lengths 8'	The load was stable for all flight conditions until 120 knots. At 120 knots there was a slight longitudinal motion in level flight.
4/12/74	X-34 T.O.G.W. 46,317 C.G. 2.8"Aft	Nelson Meihofer Hartman Wenograd	1500- 3000' Hp	60-120	Two (2) Fuel Bags fwd and two (2) Fuel Bags aft. Both sling lengths were 8'	Maximum airspeed reached was 120 knots. Loads were completely stable for all flight conditions for airspeed of 120 knots and below. This configuration judged completely acceptable.
4/12/74	X-35 T.O.G.W. 37,317 C.G. 18.4" Aft	Nelson Santa Maria Hartman	1500- 3000' Hp	0-60	Two (2) Fuel Bags on aft hook	Upon completion of X-34 the forward load was released and X-35 was flown with two fuel bags on the aft hook. However, after approximately three minutes of flight the forward transmission chip light illuminated. The aircraft was then returned to the airport for landing.
4/17/74	X-36 T.O.G.W. 30,017 C.G. 4.1"Aft	Nelson Santa Maria Hartman	1500- 3000' Hp	N/A	No Loads	Check flight for new transmission.

FORM 46255 (12/68)

SHEET

THE BOEING COMPANY

DATE	FLIGHT NO.	CREW	TEST ALT HP	SHIPS IAS/ KTS	CONFIGURATION LOAD/SLING	COMMENTS
4/17/74	X-37 T.O.G.W. 37,317 C.G.18.4"A	Nelson Santa Maria Hartman	1500-3000' H_p	60-130	Two (2) Fuel Bags aft with sling length of 8'	This load sling configuration was acceptable for all flight conditions up to 130 knots.

FORM 46289 (12 68)

SHEET

ENCLOSURE (3)

FUNCTIONAL TEST - CH-47C TANDEM HOOK SYSTEM

I. Equipment Required

A. Two 200# weights for attaching to hooks.
B. Two aircraft jacks for jacking up rear wheels.
C. 3 phase, 400 hz, 20KVA or greater ground power cart.
D. Simpson Model 260 multimeter or equivalent.
E. MB-1 tester for airspeed.

II. Preparation for testing

A. Aircraft to be moved to flight ramp.
B. 200# weight to be attached to each hook.
C. Aircraft to be jacked up in the rear sufficiently for weights to clear ground.
D. Attach MB-1 Pitot tester to left pitot tube.

III. Test

A. Connect ground power cart to A/C receptacle.

1. APU may be started as substitute for ground power cart.

B. Activate power source to A/C.

1. Check power source output for 115Vac.

C. Set Mode Release switch to OFF.
D. Activate circuit breakers - cargo hook control and cargo hook emergency in overhead panel, cargo hook auto jettison in AC circuit breaker box, cargo hook release power in DC circuit breaker box.

1. Check that hook loaded lights are illuminated.
2. Press the reset button on the AUTO Jettison Box.

a. Check that all BITE indicators are re-set (all black).

E. Bring MB-1 Pitot Tester to 70 knots IAS.

1. Check that Auto Jet off caution light illuminates

F. Decrease MB-1 Tester to 50 knots IAS.

1. Check that auto jet off caution light extinguishes.

G. Increase MB-1 Tester to 70 knots IAS.

1. Check that auto jet off caution light illuminates.

H. Set Mode Select Switch to AUTO

1. Check that auto jet off caution light extinguishes.

I. Relieve load on Fwd Hook

1. Check that Fwd Hook loaded light extinguishes.
2. Check that both hooks release.
3. Check that both hook loaded lights extinguish.
4. Check that fwd hook no load BITE indicator is illuminating on Auto Jettison Box.
5. Check that both red lights on Auto Jettison Box illuminate.
6. Check that auto jet off caution light illuminates.

J. Set Mode Select Sw to OFF

1. Check that auto jet off caution light extinguishes.
2. Reload 200# weights on both hooks.
3. Press reset button on Auto Jettison Box.

   a. Check that all Bite Indicators are all reset.
   b. Check that hook loaded lights are illuminated.

K. Set Mode Select Switch to Fwd.

1. Check that no hooks activated during this transition.
2. Press Pilots Cyclic grip cargo hook release switch.

   a. Check that Fwd Hook released and NO other.
   b. Check that Fwd Hook loaded light extinguished.
   c. Reload 200# weight on Fwd hook.

3. Repeat 2a, 2b, & 2c, except press copilots Release Switch.
4. Repeat 2a, 2b, and 2c except press hoist operator's release switch after "arm" switch is operated.
5. Press "arm" switch to "reset".

L. Set Mode Select Switch to Aft.

1. Check that no hooks activated during this transition.
2. Press pilots cyclic grip cargo hook release switch.

   a. Check that AFT hook released and NO other.
   b. Check that AFT Hook loaded light extinguished.
   c. Reload 200# weight on AFT hook.

3. Repeat 2a, 2b, and 2c except press Co-pilots Release Switch.
4. Repeat 2a, 2b, and 2c except press hoist operators release switch after "arm" switch is operated.
5. Press "arm" switch to "reset".

M. Set Mode Select Switch to MAN.

1. Check that no hooks activated during this transition.
2. Press pilots cyclic grip cargo hook release switch.

   a. Check that both Fwd and Aft Hooks released.
   b. Check that both hook loaded lights extinguished.
   c. Reload 200# weights on each hook.

3. Repeat 2a, 2b and 2c except press Co-pilots Release Switch.
4. Repeat 2a and 2b except press hoist operator's release switch after "arm" switch is operated.
5. Press "arm" switch to "reset".

N. The center hook can be tested using existing procedures provided the mode select switch is in the "MID" position.
O. Set Mode Select Switch to AUTO.

1. Check that both hook loaded lights are extinguished.
2. Press the reset button on the Auto Jettison Box.

a. Check that all BITE indicators are reset (all black).

P. Set Test Select Switch on the Auto Jettison Box to Fwd No Load.

1. Press test inject. switch for 1 sec.

a. Check fwd no load BITE indicator trip (1/2 black 1/2 white)
b. Check both red relay lamps illuminate.

2. Reset BITE indicators by pressing reset button.

Q. Set Test Select Switch on the Auto Jettison Box to Aft No Load.

1. Press test inject. switch for 1 sec.

a. Check Aft No load BITE indicator trip.
b. Check both red relay lamps illuminate.

2. Reset Bite indicators by pressing reset button.

R. Press and release "Emergency Release" Switch.

1. Check that Fwd and Aft hooks released.
2. Check that Mid Hook released, if hook is connected.
3. Pull "Cargo Hook Emerg" circuit breaker.
4. Reset Auto Jettison Box BITE indicators by pressing reset button on Auto Jet Box.
5. Recharge Mid Hook air cylinder, if hook was connected.

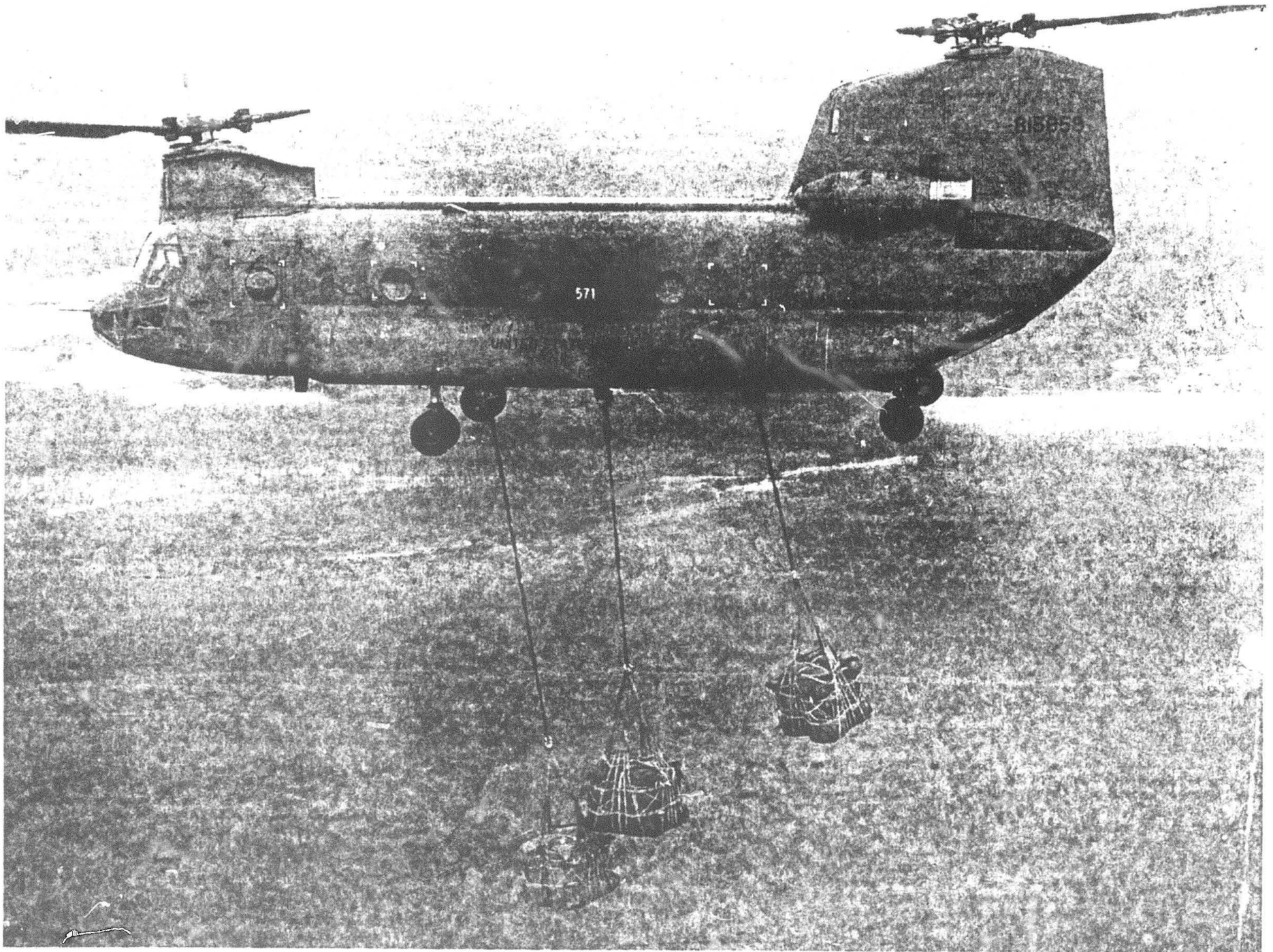
S. Pull remaining circuit breakers activated in Step D.
T. Set Mode Select Switch to off.
U. Disconnect External Power.
V. Test Complete.

ENCLOSURE (4)

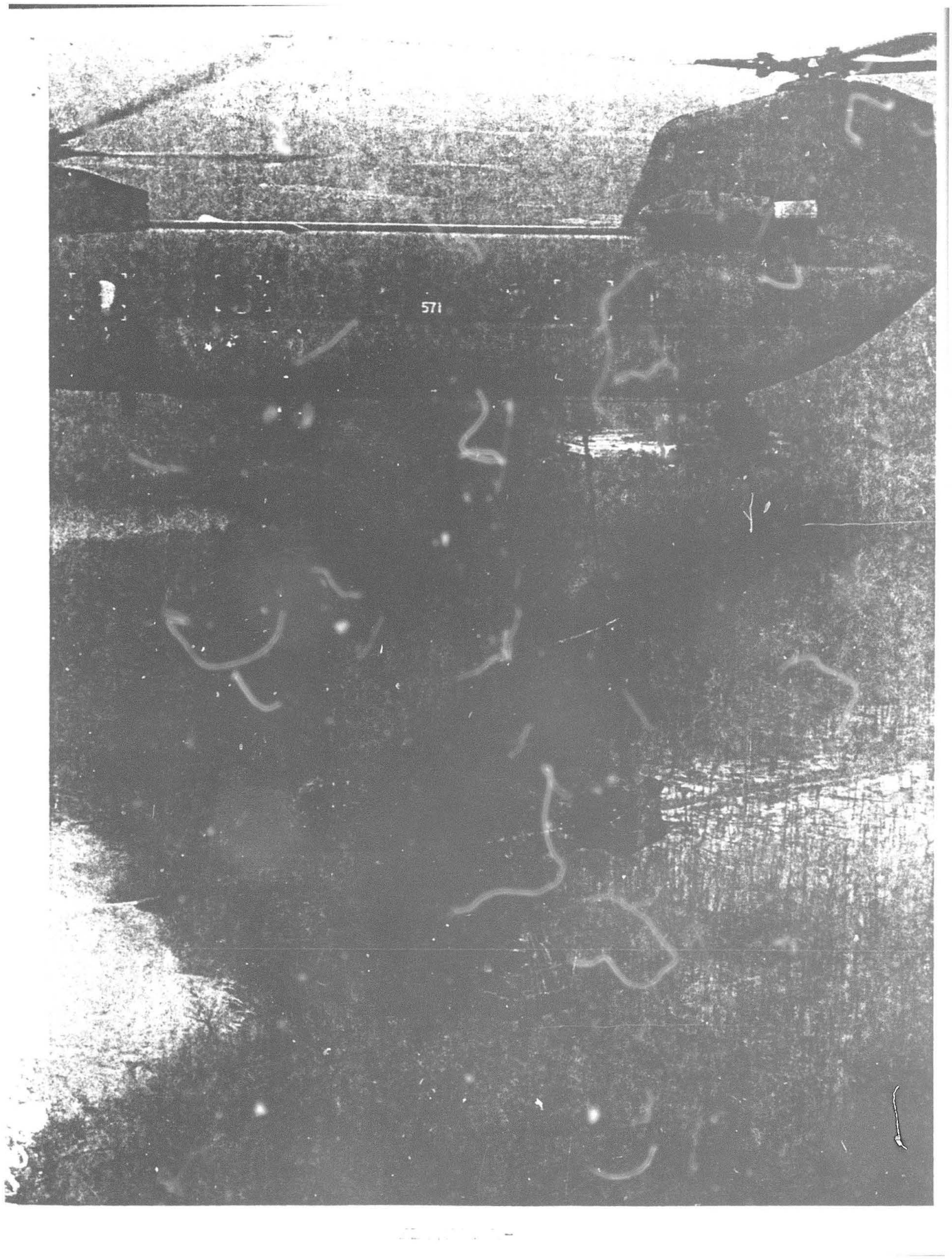
PHOTOGRAPHS OF

TRIPLE HOOK FLIGHT TEST

PROGRAM



PLT. NO. X-20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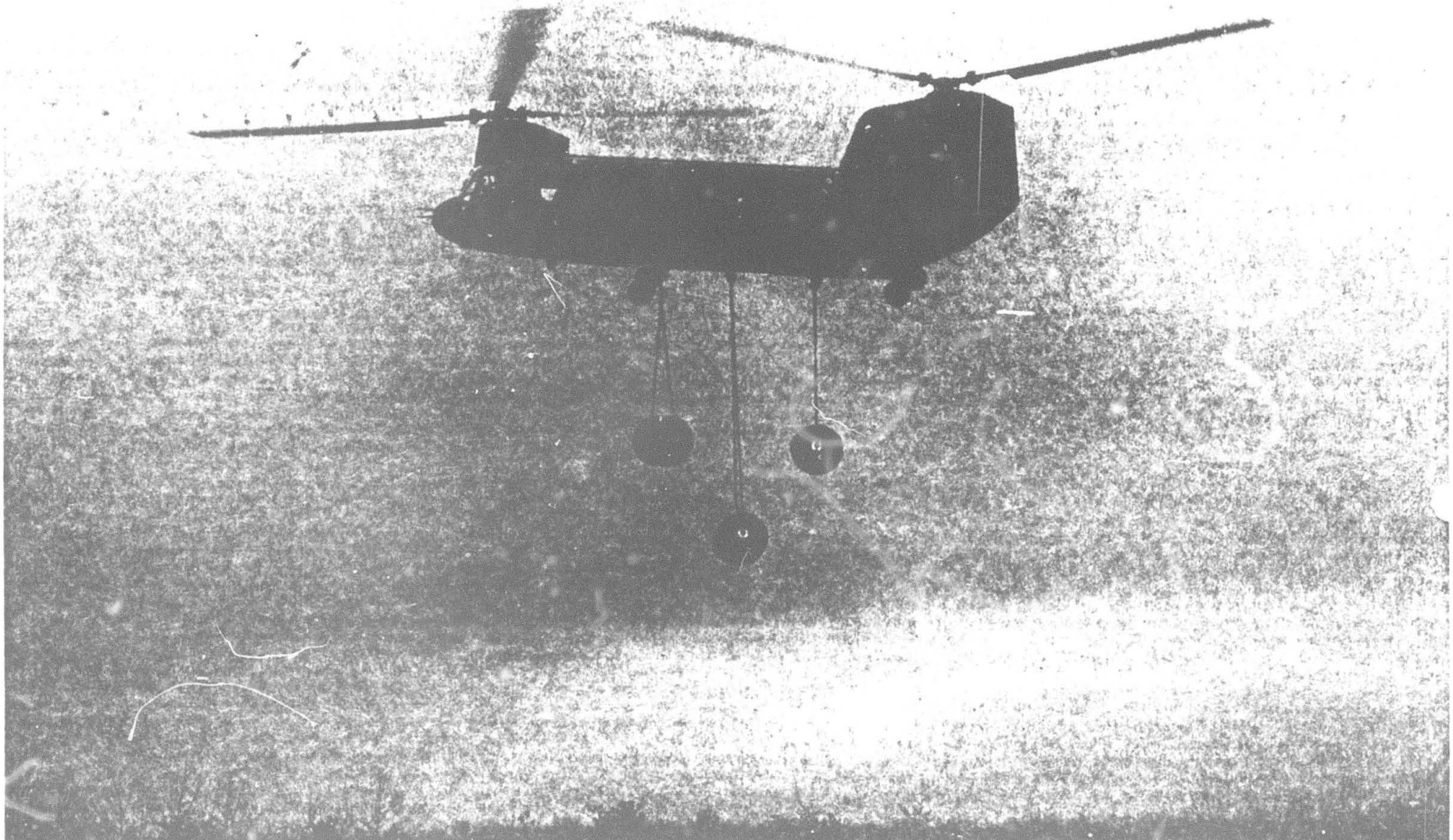
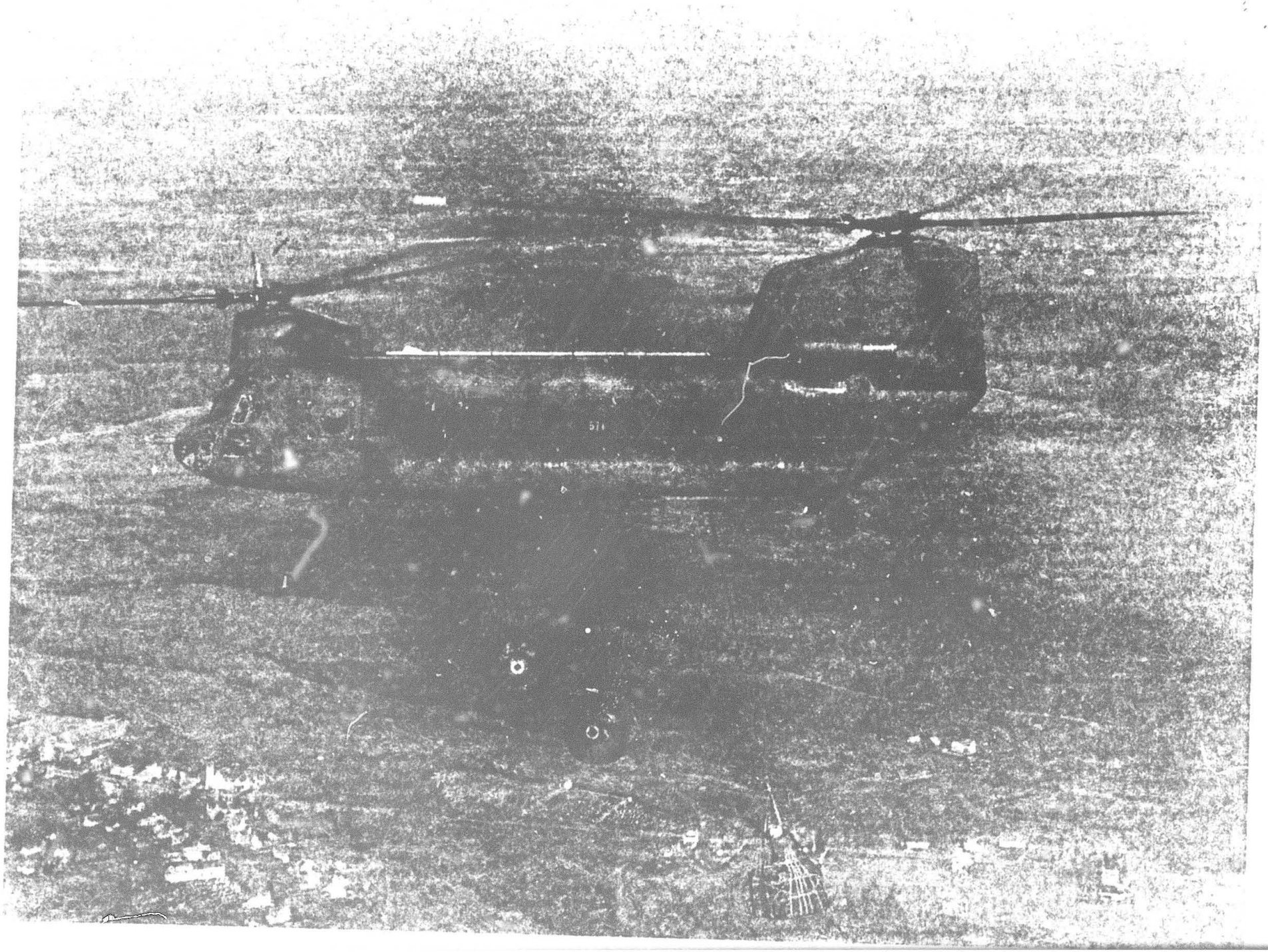
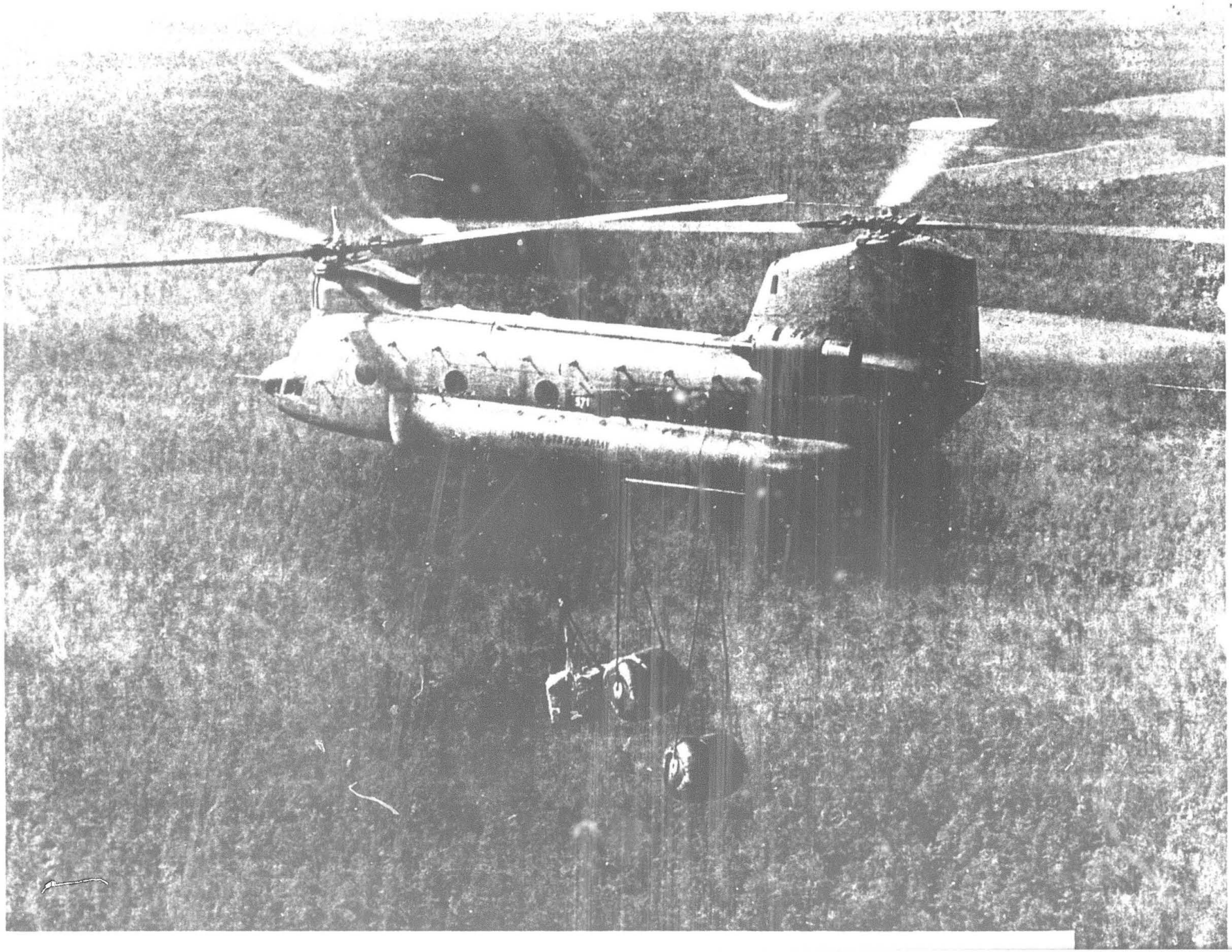
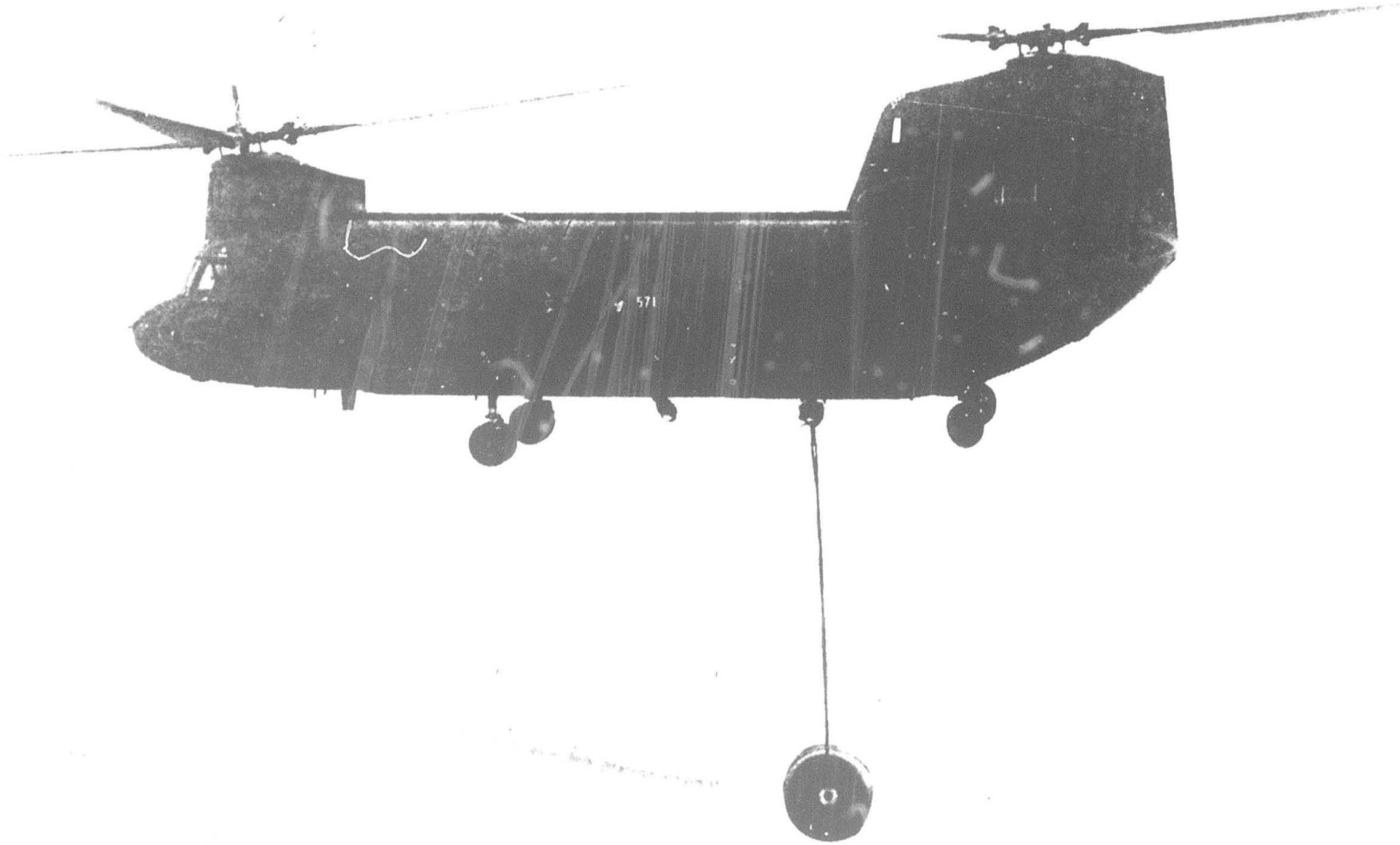


FL[illegible]. X-23

No. X-2

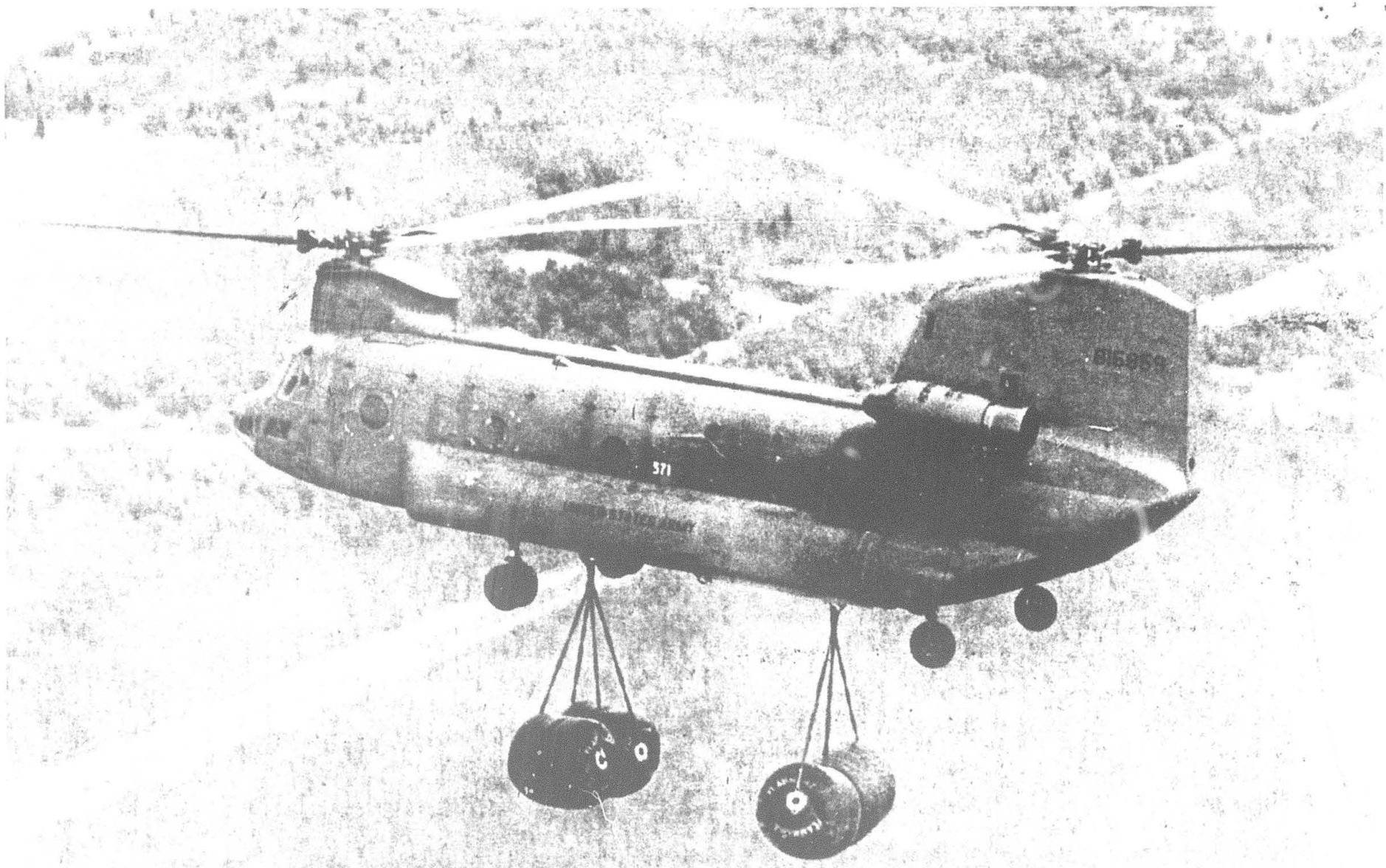


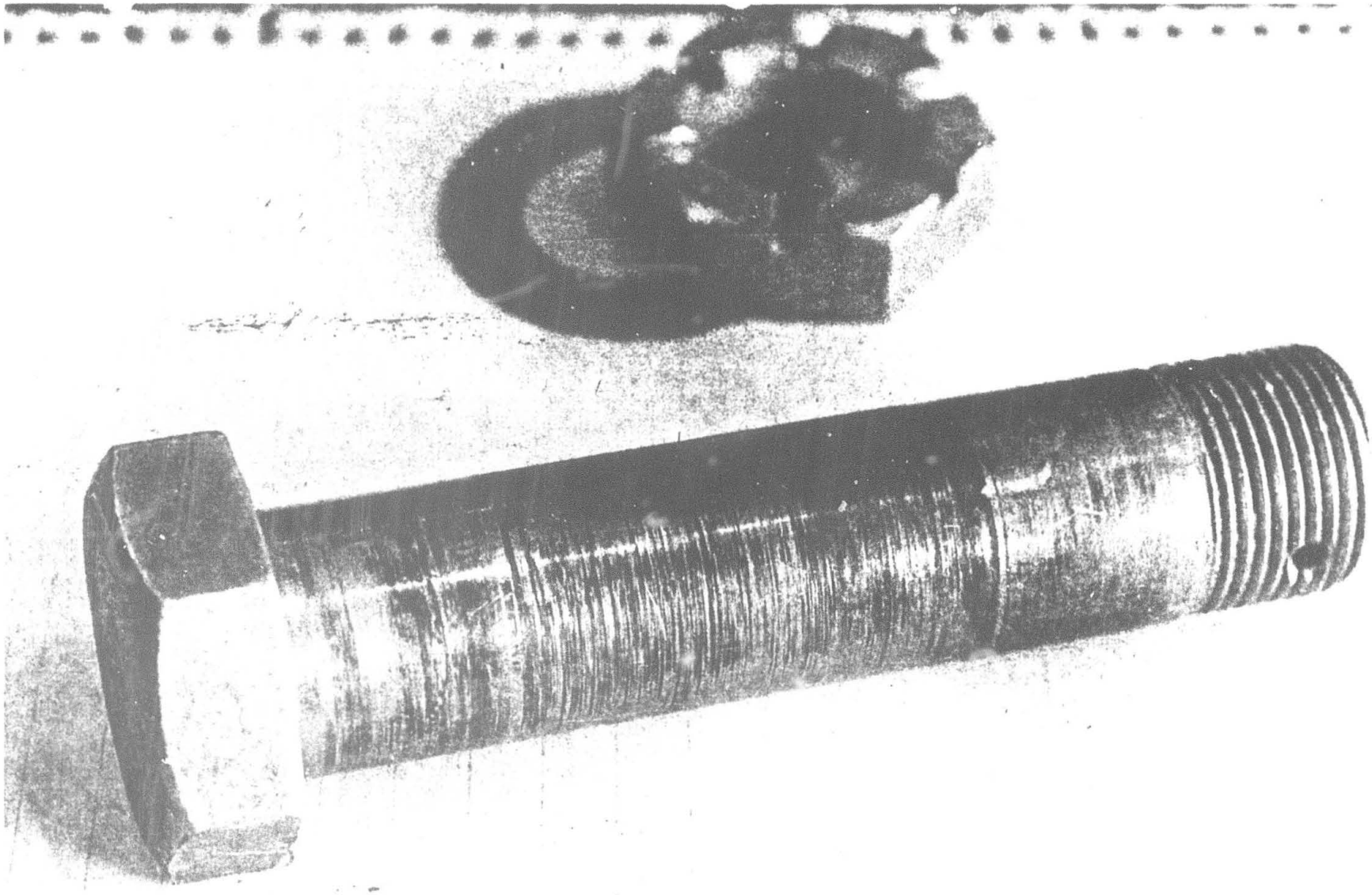




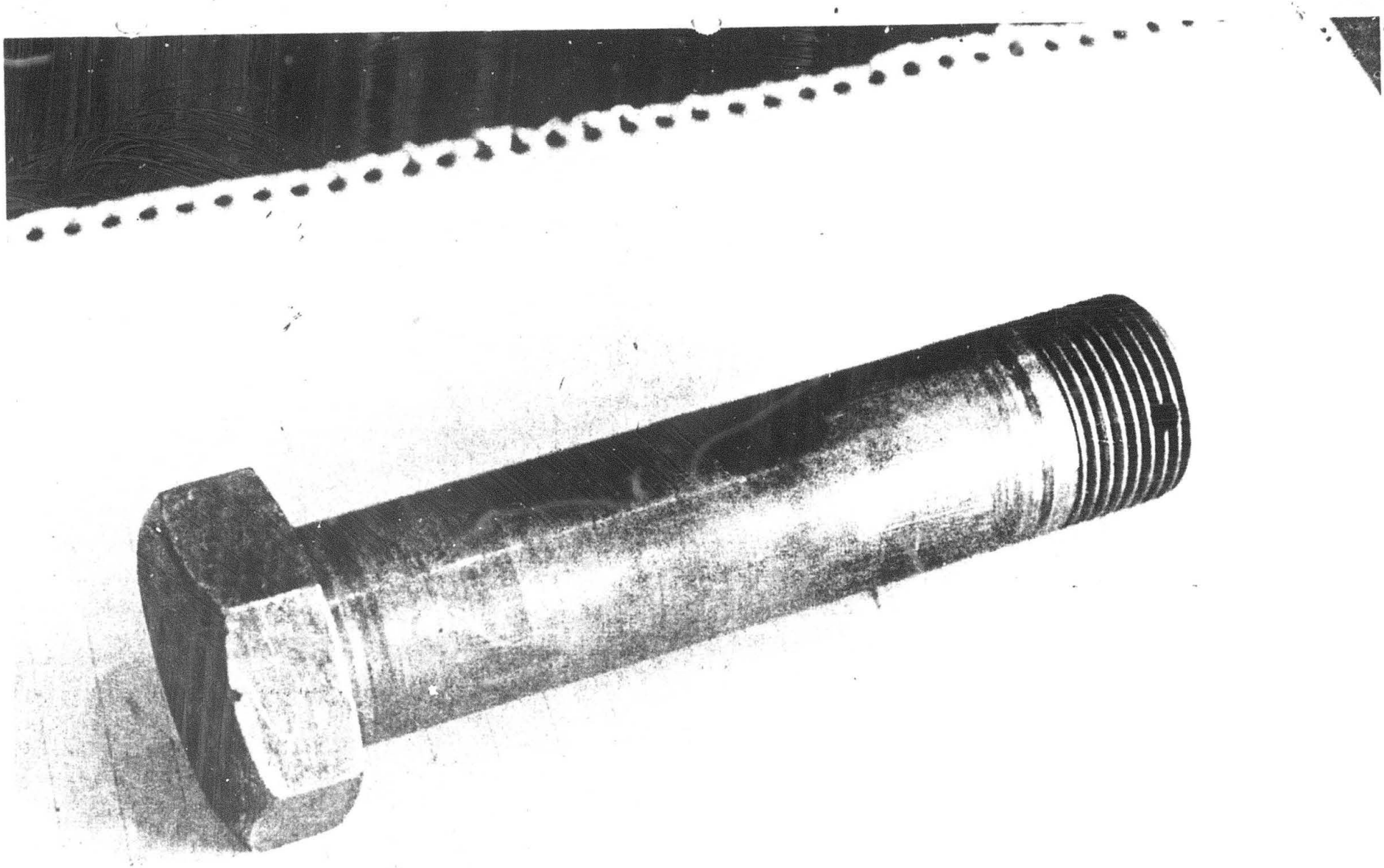
X-21

FIG. NO. X-30

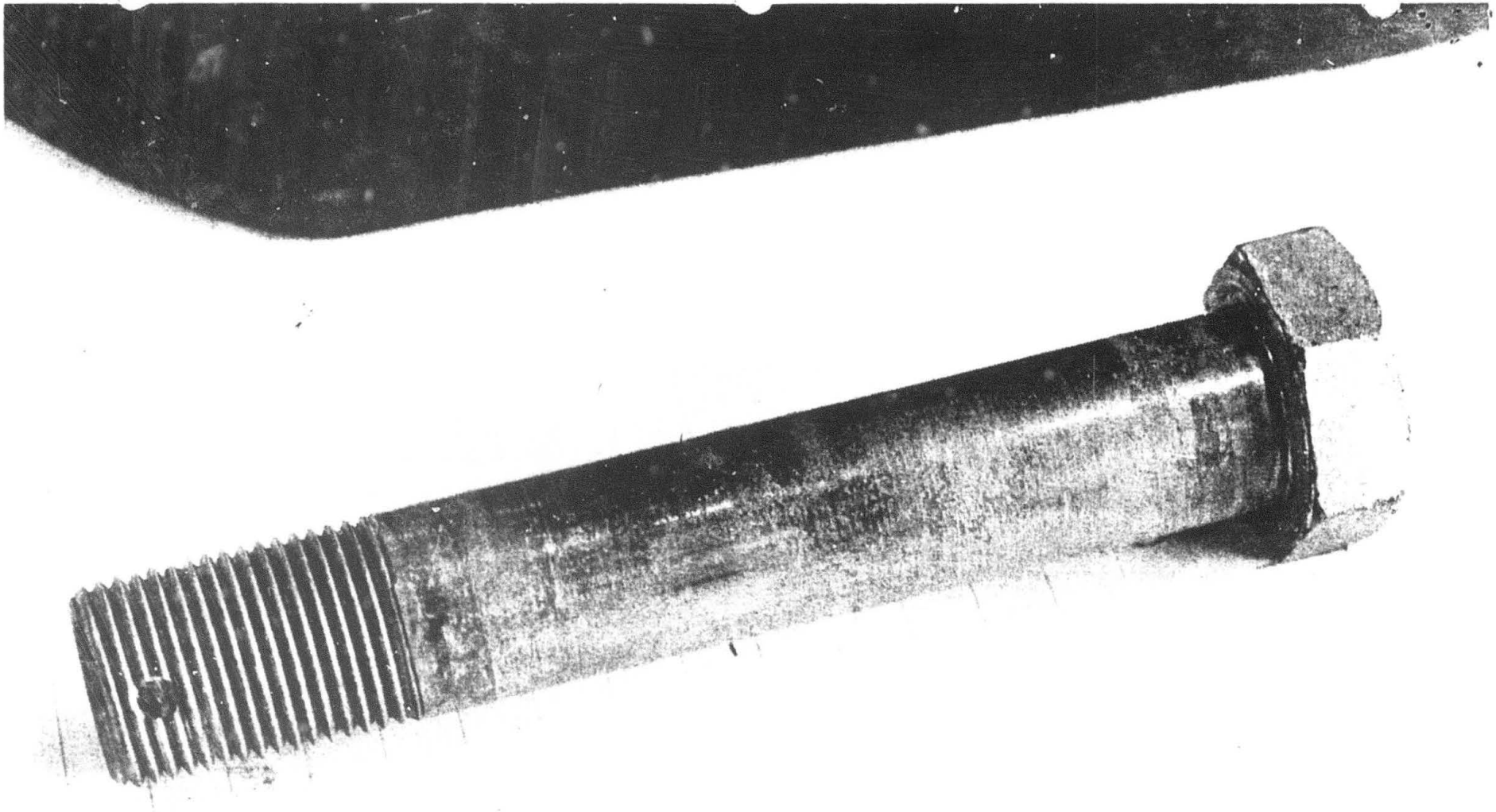

571



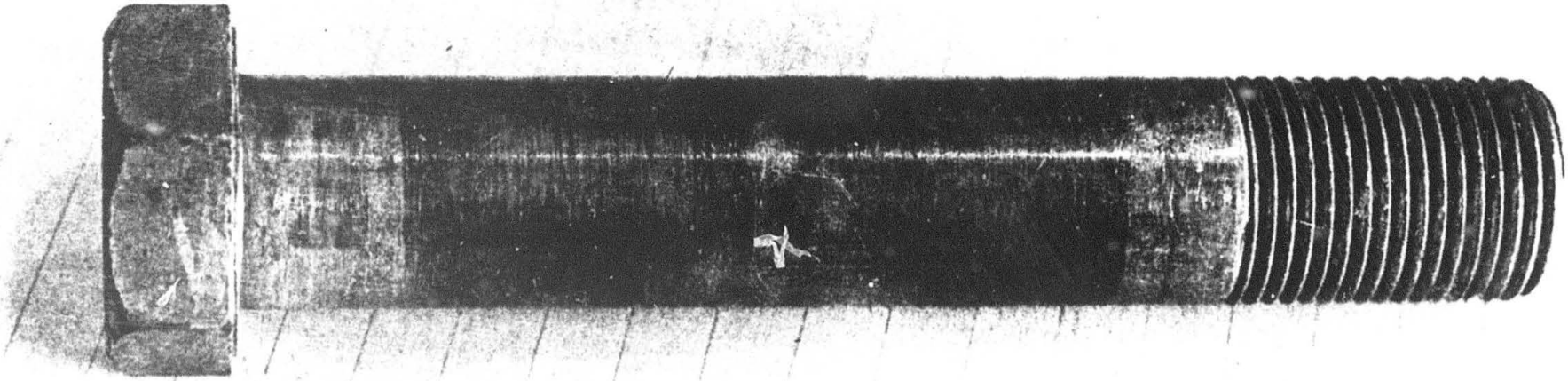
AF LATERAL BOLT



FORWARD LATERAL BOLT



AF[illegible] [illegible]D [illegible] BOLT



FORWARD LOWER MEDIAL BOLT