Power Plant

The XN3N-1 is equipped with an engine which can be operated satisfactorily on standard aviation gasoline of 73 octane value. No defects appeared in the power plant installation, which is shown in the photographs on pages 45-46 and 52-53.

Fixed Equipment

The air speed indicator calibration is shown in Figure VI, page 36. Readings of the compasses before and after compensation are given in Table V.

TABLE V

COMPASS READINGS — XN3N-1

A — Landplane

Magnetic Heading	Uncompensated		Compensated	
	Front	Rear	Front	Rear
0	359	4	0	0
30	35	30	30	30
60	53	56	60	60
90	82	83	90	89
120	113	110	120	119
150	146	140	149	149
180	180	173	179	179
210	214	208	209	210
240	246	244	240	240
270	277	277	270	270
300	305	308	300	300
330	332	337	329	330

B — Seaplane

Magnetic Heading	Uncompensated		Compensated	
	Front	Rear	Front	Rear
0	359	4	0	0
30	25	31	30	31
60	53	57	61	61
90	84	84	91	91
120	115	111	121	121
150	148	140	150	150
180	181	173	179	180
210	214	208	209	210
240	245	243	239	239
270	275	276	269	269
300	301	307	300	299
330	331	337	330	229

Table VI shows the venturi suction obtained during trials at speeds of 60 knots to 100 knots indicated, inclusive, with and without power.

TABLE VI

VENTURI SUCTION — XN3N-1

Indicated Airspeed	With Power (Hg.)	Without Power (Hg.)
60	0.5	0.37
65	0.7	0.5
70	0.87	0.75
80	1.0	0.87
100	1.25	1.12

Table VII shows the results obtained from a measured calibration of the fuel guages, with the XN3N-1 seaplane resting on the handling truck, in approximately flying position, as compared with the readings specified for this position by the calibration plates installed in the cockpits.

TABLE VII

FUEL GUAGE CALIBRATION — XN3N-1

Amount Fuel Measured In (Gals.)	Plate Reading (Gals.)	Actual Reading (Gals.) Front	Rear
0	0	1	1.5
5	5	3.5	4
10	10	8.5	9
15	15	14	15
20	20	19	21
25	25	24	26
30	30	28	30
35	35	33.5	35
40	40	37.5	39
45	45	42.5	44

Total measured capacity of fuel tank 46 gallons.

Carbon Monoxide Test

Two (2) trial flights were made for the purpose of determining concentrations of carbon monoxide gas present in the cockpits during ground and flight operations. Readings were obtained from five (5) positions in each cockpit during ground warm up of the engine, climb at full throttle with spark retarded, and level flight at cruising RPM. The highest reading obtained was .005 of 1 per cent, at the lower right hand side of the forward cockpit, during a climb at full throttle with retarded spark.

Photographs on pages 48 to 51, inclusive, show the arrangement of the cockpits.

KEUFFEL & ESSER CO., N. Y. NO. 359-11
30 × 20 to the inch.

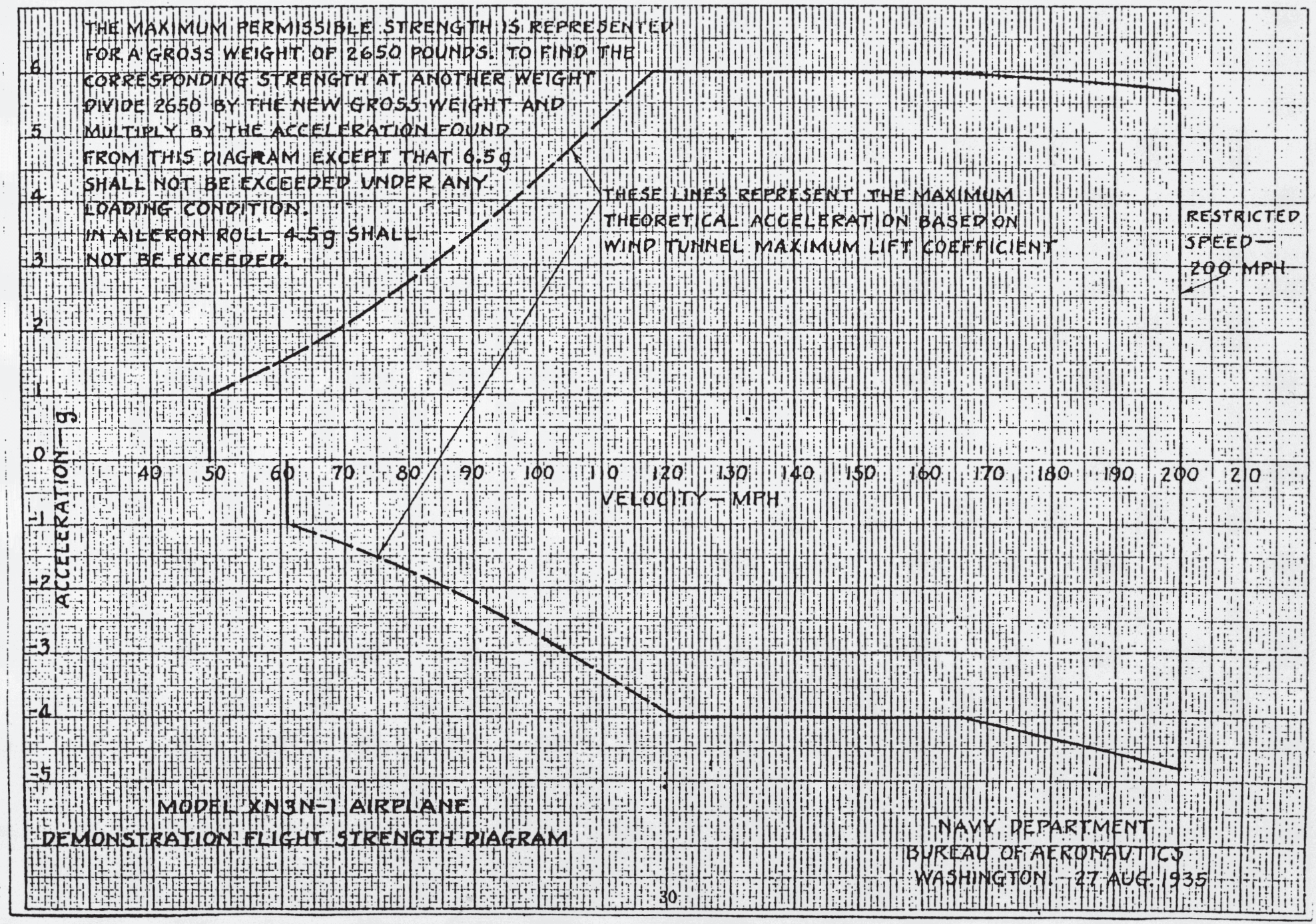


FIGURE I.

XN3N-1

CLIMB CHARACTERISTICS

SEAPLANE

W = 2845#

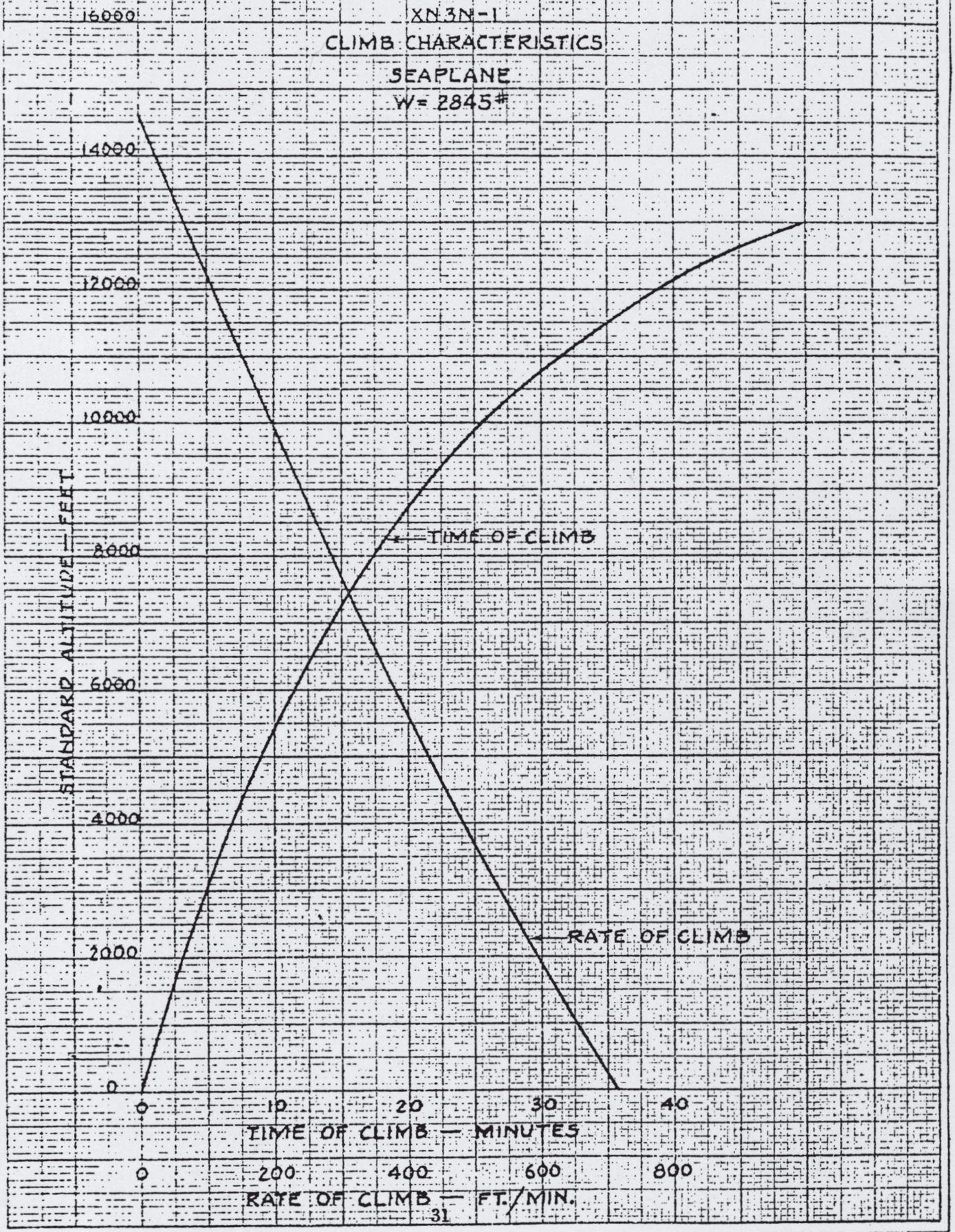


FIGURE II

XN3N-1

SPEEDS AND RPM'S AT ALTITUDE

SEAPLANE

W = 2840#

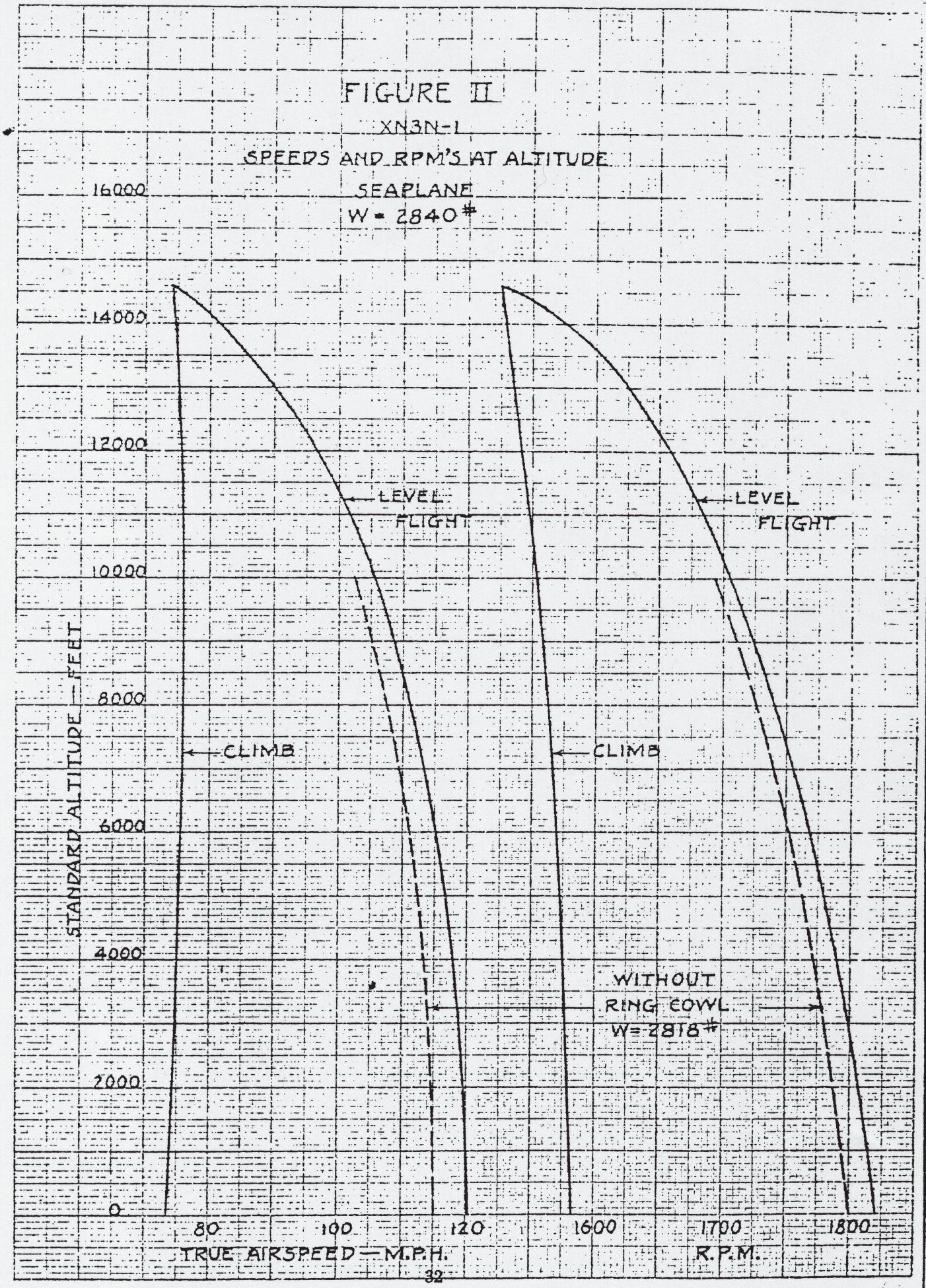


FIGURE III

XN3N-1

CLIMB CHARACTERISTICS

LANDPLANE

W = 2702#

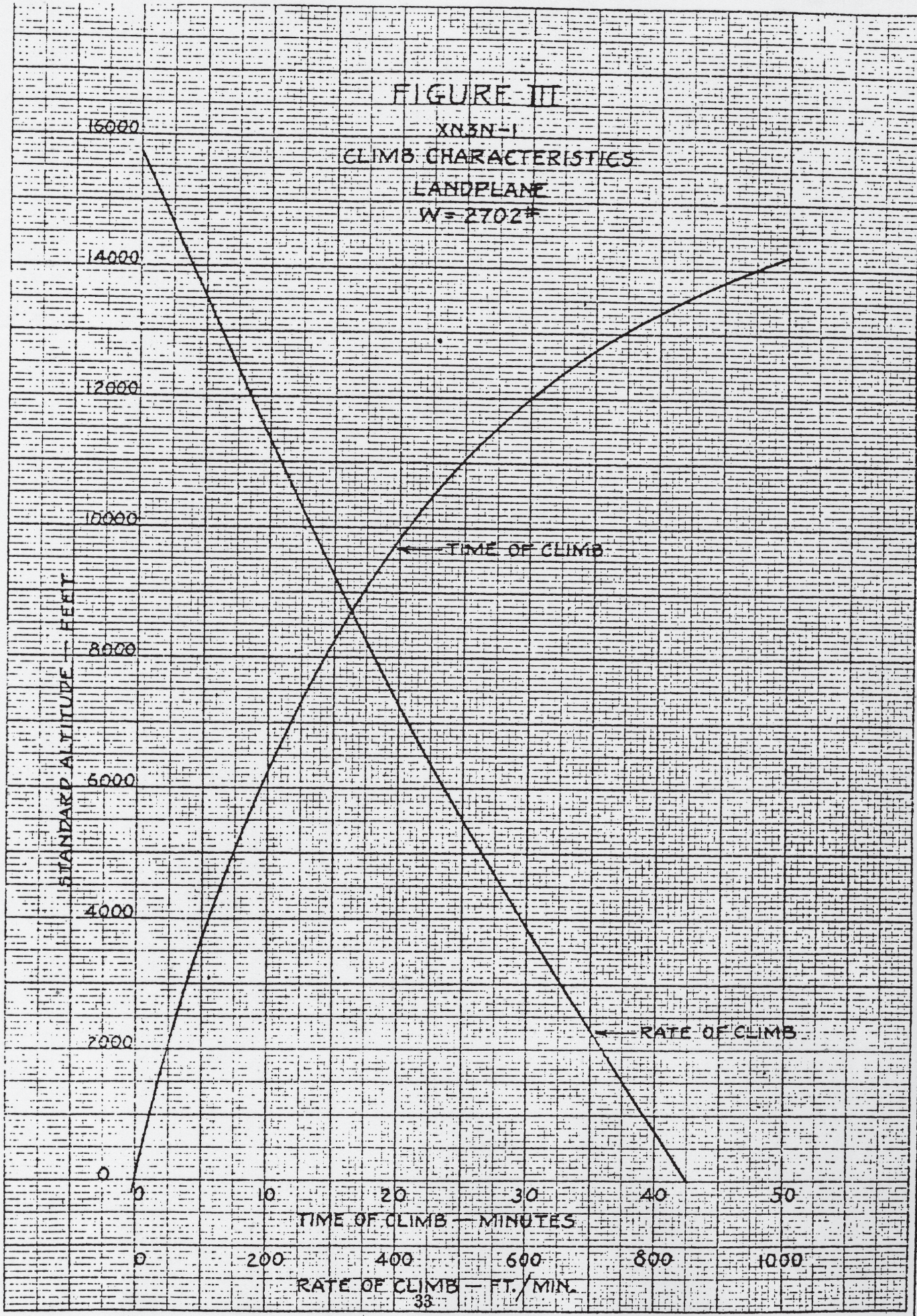


FIGURE IV

XN3N-1

SPEEDS AND RPM'S. AT ALTITUDE

LANDPLANE

W= 2702#

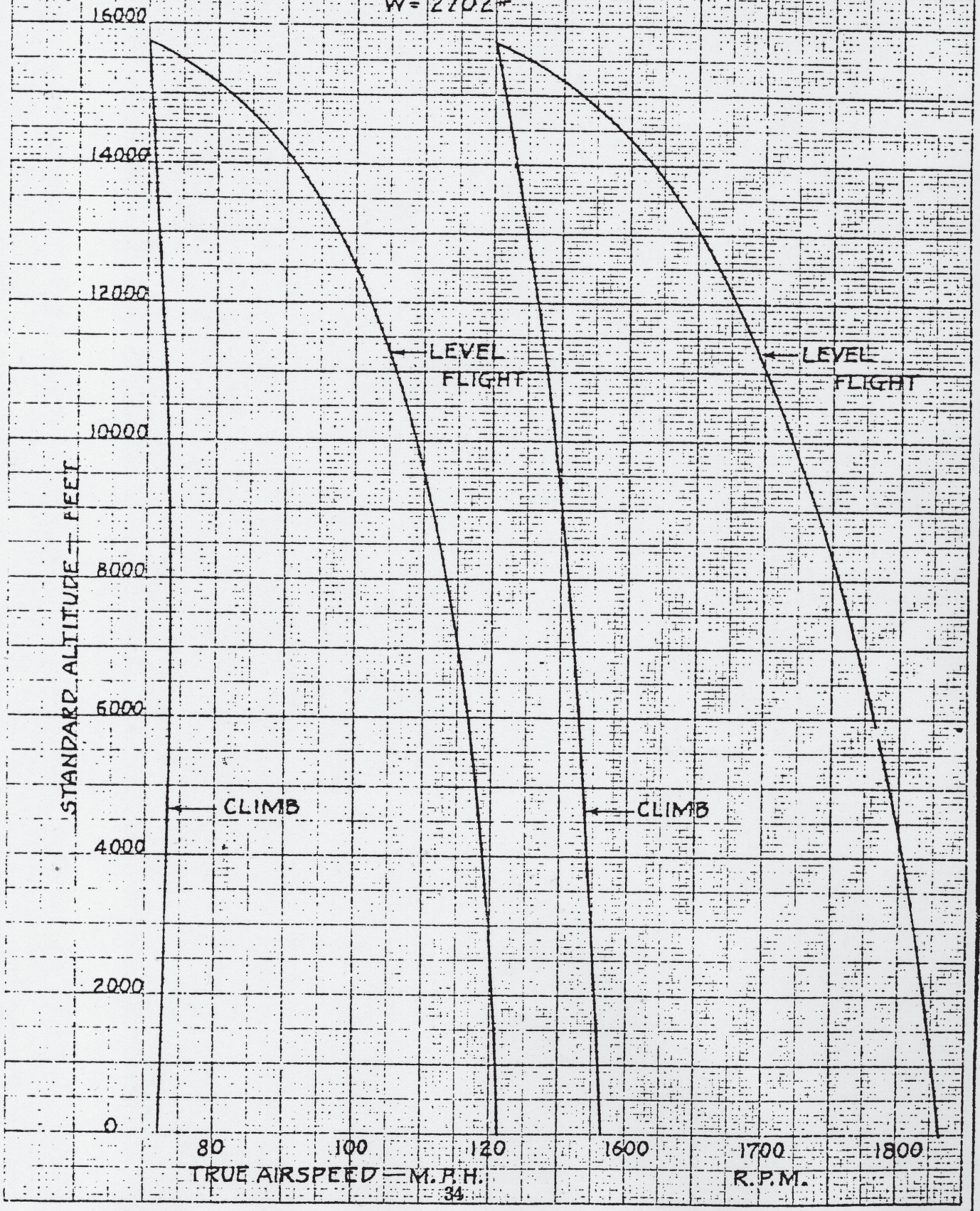


FIGURE V

XN3N-1

FUEL CONSUMPTION DATA

ALTITUDE 2000 FEET

SEAPLANE

W = 2845#

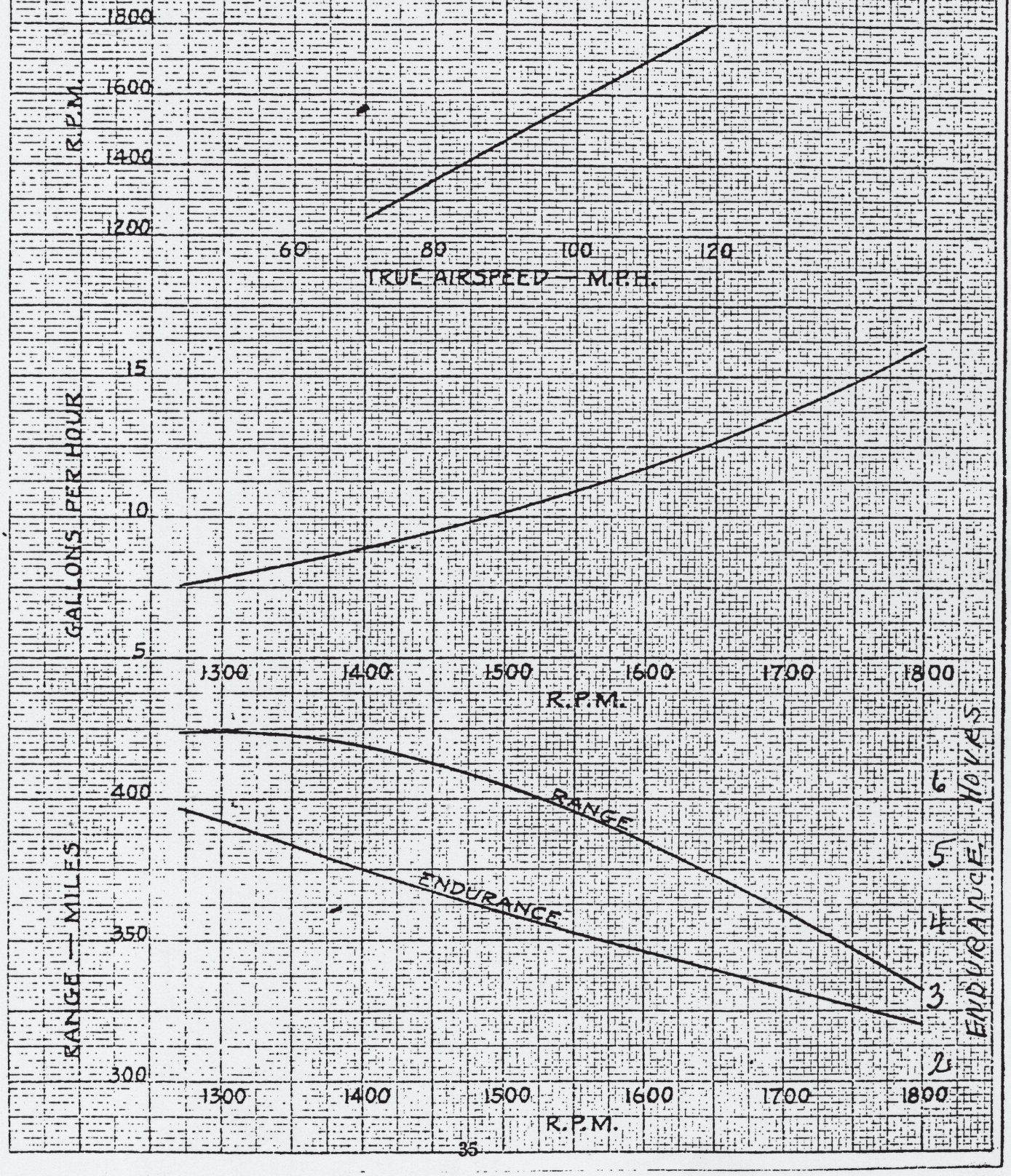
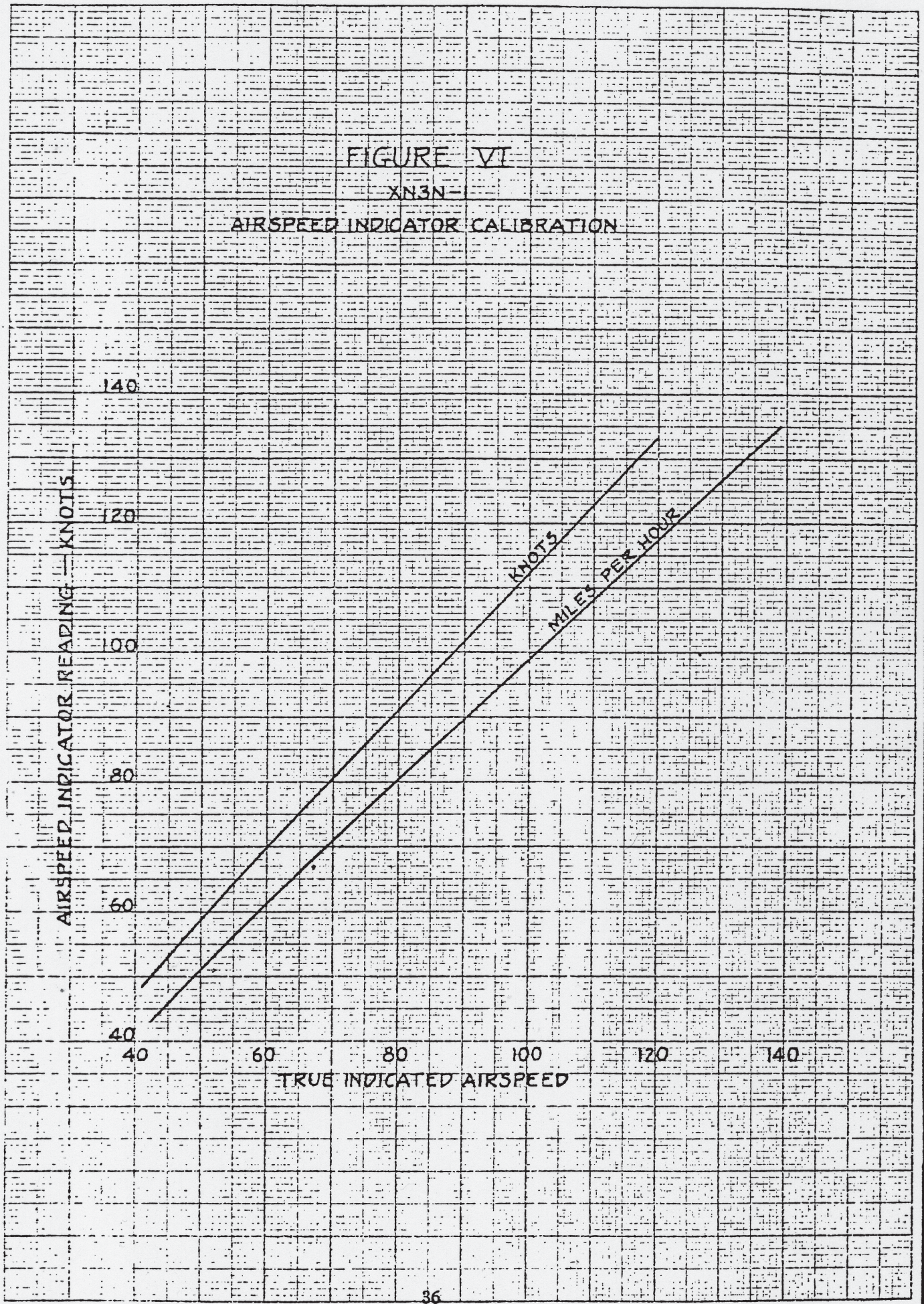


FIGURE VI

XN3N-1

AIRSPEED INDICATOR CALIBRATION



RECOMMENDATIONS

SECTION I — XN3N-1 SEAPLANE

A — NECESSARY CHANGES

1 — General

None

2 — Structure

Strength — None.

Wing Group — Strengthen stiffening ribs beneath lower wing leading edge walkways, and eliminate projecting rivet heads beneath fabric. Provide improved drainage for trailing edge of wings and control surfaces. Eliminate side play in inter-aileron strut hinge bearings.

Tail Group — Alter position of rudder control cable horns, for proper alignment with cable pull.

Body Group — Redesign engine mount ring, with reverse curvature in ring between the two (2) lower engine bed bolts, to provide access to the rear center stud nuts of the engine intake manifold. Provide rear windshield affording good protection and vision during landings for student pilots, with rear cockpit seat raised to maximum height. Provide quick detachable fasteners for all fuselage cowling forward of cockpits, and for inspection plate on left side of monocoque tail. Provide more positive quick detachable fasteners for detachable fairing at left side of fuselage. Provide substantial detachable wooden keel strips for main and auxiliary floats. Provide stronger longitudinal brace wires for main float and strengthen adjoining fittings at float and fuselage.

Eliminate present interference of forward transverse brace wires for main float. Relocate rear footrails for main float, about twelve (12) inches aft of present position. Relocate rear handholes for main float to position over deepest part of rear compartments. Provide plates closing openings in fuselage cowling and stub wing covering, around main float struts, front and rear, and where wheel type landing gear and tail wheel unit have been removed.

3 — Power Plant — Relocate throttle control in forward cockpit, about three (3) inches forward of present position.

4 — Fixed Equipment — Lengthen both control sticks two (2) inches. Relocate elevator flap control, below and aft of throttle control. Eliminate present lost motion in elevator flap. Provide more positive cement joint of rubber crash pads to instrument panel cover plate. Stiffen airspeed indicator pitot tube by means of brace to forward interplane strut. Lower rudder pedals one (1) inch. Provide anti-vibration bracing for inter-cockpit extension rods for main fuel valve, ignition switch, and spark advance control. Improve leading of rudder control cables to eliminate chafing and chafing pads. Provide quick detachable boots for base of control sticks. Install larger venturi tube or improve location of present tube, to provide improved venturi suction at low speeds.

5 — Electrical Equipment—Provide thumb screws or other quick detachable means of securing battery box. Enlarge upper wing inspection plate around left rear cabane strut fitting, to provide improved access to electrical connections. Provide anchor light on upper wing or fuselage aft of cockpits, with separate control switch. Enclose lighting switches and rheostats, for reduction of fire hazard. Provide stowage for spare lamp bulbs.

B — DESIRABLE CHANGES

1 — General

None.

2 — Structure

Strength — None.

Wing Group — Provide adjustable inter-plane struts for correction of basic rigging. Provide drainage for wing rib bottom channels. Insert bushings in laminated attachment lugs for cabane and inter-plane struts. Provide separate right and left upper wing panels.

Tail Group — Provide improved drainage for structure and covering of monocoque tail. Provide drainage for rudder bearing brackets.

Body Group — Provide improved drainage for fairing strips at under side of fuselage. Eliminate lifting bar tunnel. Provide drainage plugs for all main float compartments. Provide welded bosses on engine mount ring. Enlarge engine mount attachment bearings to fuselage. Eliminate engine anti-drag ring cowling.

3 — Power Plant — Decrease propeller pitch by approximately one (1) degree, to improve takeoff and climb performance. Bolt engine starter crank to engine starter crank extension. Redesign exhaust collector outlet stacks to eliminate excessive drag in flight.

4 — Fixed Equipment — Provide baggage compartment. Enlarge size of words "On" and "Off" on main fuel valve direction plate.

SECTION II — XN3N-1 — LANDPLANE

A — NECESSARY CHANGES

1 — General

None.

2 — Structure

Strength — None.

Wing Group — Eliminate side play in inter-aileron strut hinge bearings. Shift inspection plates for aileron control mechanism to upper surface of lower wings. Replace single-piece anti-vibration stiffener for drift, flying, and landing wires.

Tail Group — Provide additional inspection plate at right side of monocoque tail, opposite and similar to present plate. Alter position of rudder control horns for proper alignment with cable pull.

Body Group — Redesign engine mount ring, with reverse curvature in ring between the two (2) lower engine bed bolts, to provide access to the rear center stud nuts of the engine intake manifold. Provide rear windshield affording good protection and vision during landings for student pilots, with rear seat raised to maximum height. Provide quick detachable fasteners for all fuselage cowling forward of cockpits, and inspection plates on monocoque tail.

Provide more positive quick detachable fasteners for detachable fairing at left side of fuselage. Extend Zerk fittings at landing gear strut hinge bearings and tail wheel unit, permitting ready servicing with standard Zerk guns. Provide quick detachable boot for tail wheel unit. Provide hole with spring cover in fairing of tail wheel, for ready inflation of tires.

3 — Power Plant — Relocate throttle control in forward cockpit, about three (3) inches forward of present position.

4 — Fixed Equipment — Lengthen both control sticks two (2) inches. Relocate elevator flap control, below and aft of throttle control. Eliminate present lost motion in elevator flap. Provide more positive cement joint of rubber crash pads to instrument panel cover plates. Lower rudder pedals one (1) inch. Provide anti-vibration bracing for inter-cockpit extension rods for main fuel valve, ignition switch, and spark advance control. Improve leading of rudder control cables and tail wheel locking device control cable, to eliminate chafing and chafing pads. Install lever on tail wheel locking device control rod in forward cockpit, the same as in rear cockpit. Install larger venturi tube or improve location of present tube, to provide improved venturi suction at low speeds. Provide more positive and dependable brake system. Strengthen brake control rods and fittings throughout. Improve fairing of brake system leads aft of landing gear struts. Install brake parking lock and control lock.

5 — Electrical Equipment— Provide thumb screws or other quick detachable means of securing battery box. Enlarge upper wing inspection plate around left rear cabane strut fitting to provide improved access to electrical connections. Provide white light on upper wing or fuselage aft of cockpits, with separate control switch. Enclose lighting switches and rheostats for reduction of fire hazard. Provide stowage for spare lamp bulbs.

B — DESIRABLE CHANGES

1 — General

None.

2 — Structure

Strength — None.

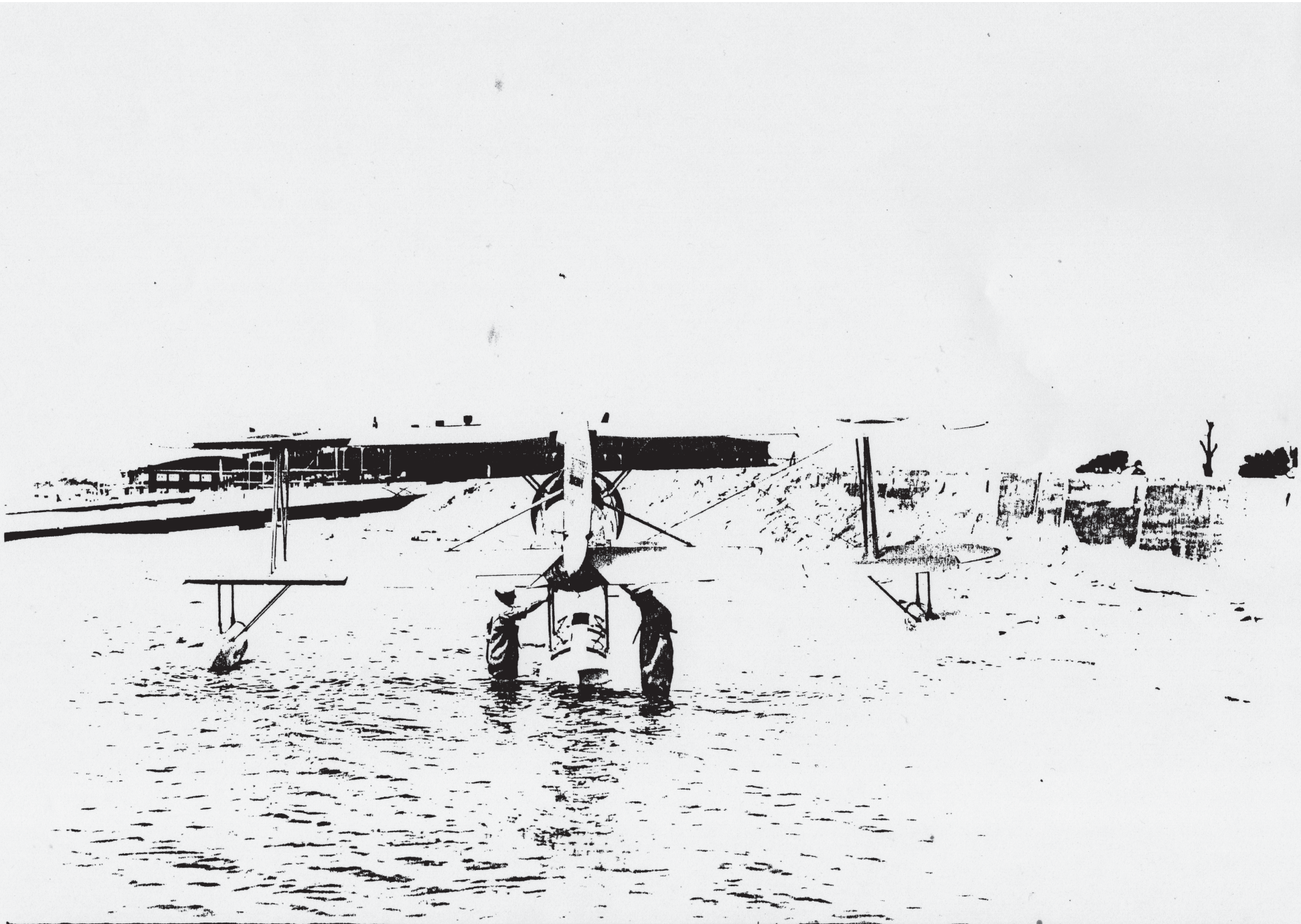
Wing Group — Provide adjustable inter-plane struts for correction of basic rigging. Insert bushings in laminated attachment lugs for cabane and inter-plane struts. Provide separate right and left upper wing panels.

Tail Group — None.

Body Group — Eliminate lifting bar tunnel. Provide welded bosses on engine mount ring. Enlarge engine mount attachment bearings to fuselage. Eliminate engine anti-drag ring cowling. Eliminate locking tail wheel and install steerable tail wheel.

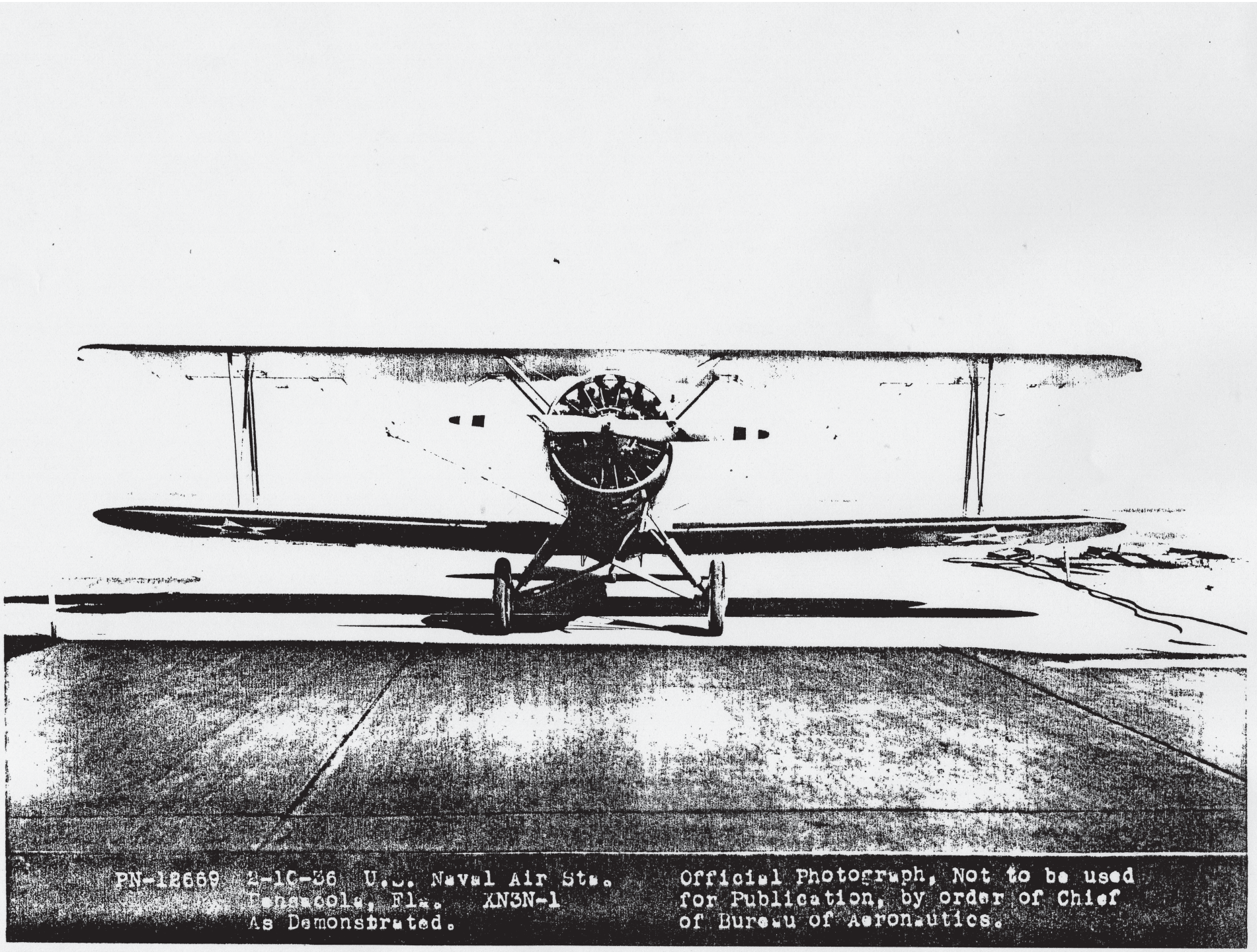
3 — Power Plant — Decrease propeller pitch by approximately one (1) degree, to improve takeoff and climb performance. Move engine starter crank stowage to engine compartment. Redesign exhaust collector outlet stacks to eliminate excessive drag in flight.

4 — Fixed Equipment — Provide baggage compartment. Enlarge size of words "On" and "Off" on main fuel valve direction plate. Eliminate hydraulic brakes and install mechanical brakes.



PN-12673 2-14-36 U.S.Naval Air Station, Pensacola, Fla., XN3N-1 As Demonstrated.

Official Photograph, Not to be used for Publication, by order of Chief of Bureau of Aeronautics.



PN-18669 2-1C-36 U.S. Naval Air Sta. Pensacola, Fla. XN3N-1 As Demonstrated.

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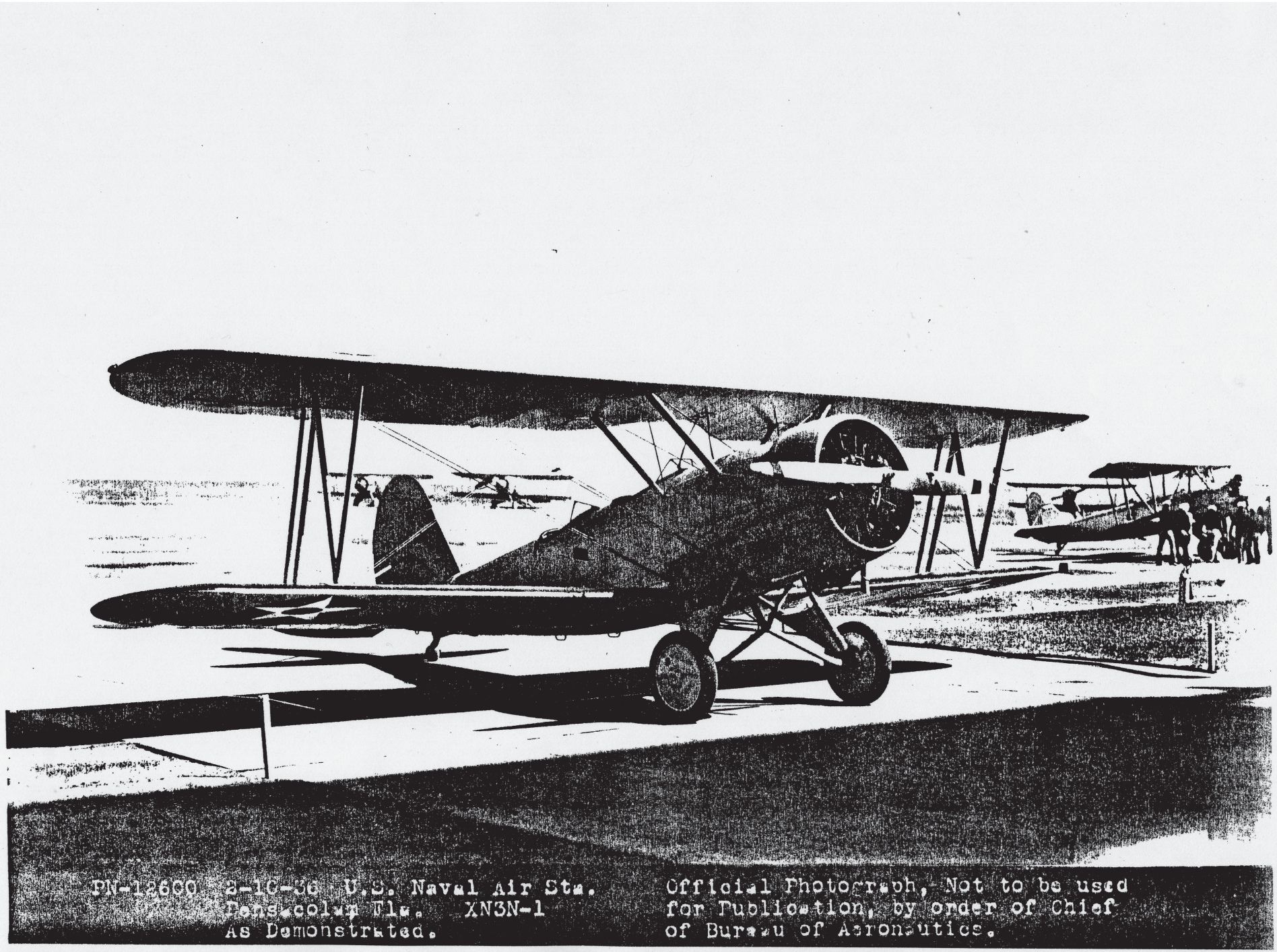

PN-12600 8-10-36 U.S. Naval Air Sta.
Pensacola, Fla. XN3N-1
As Demonstrated.

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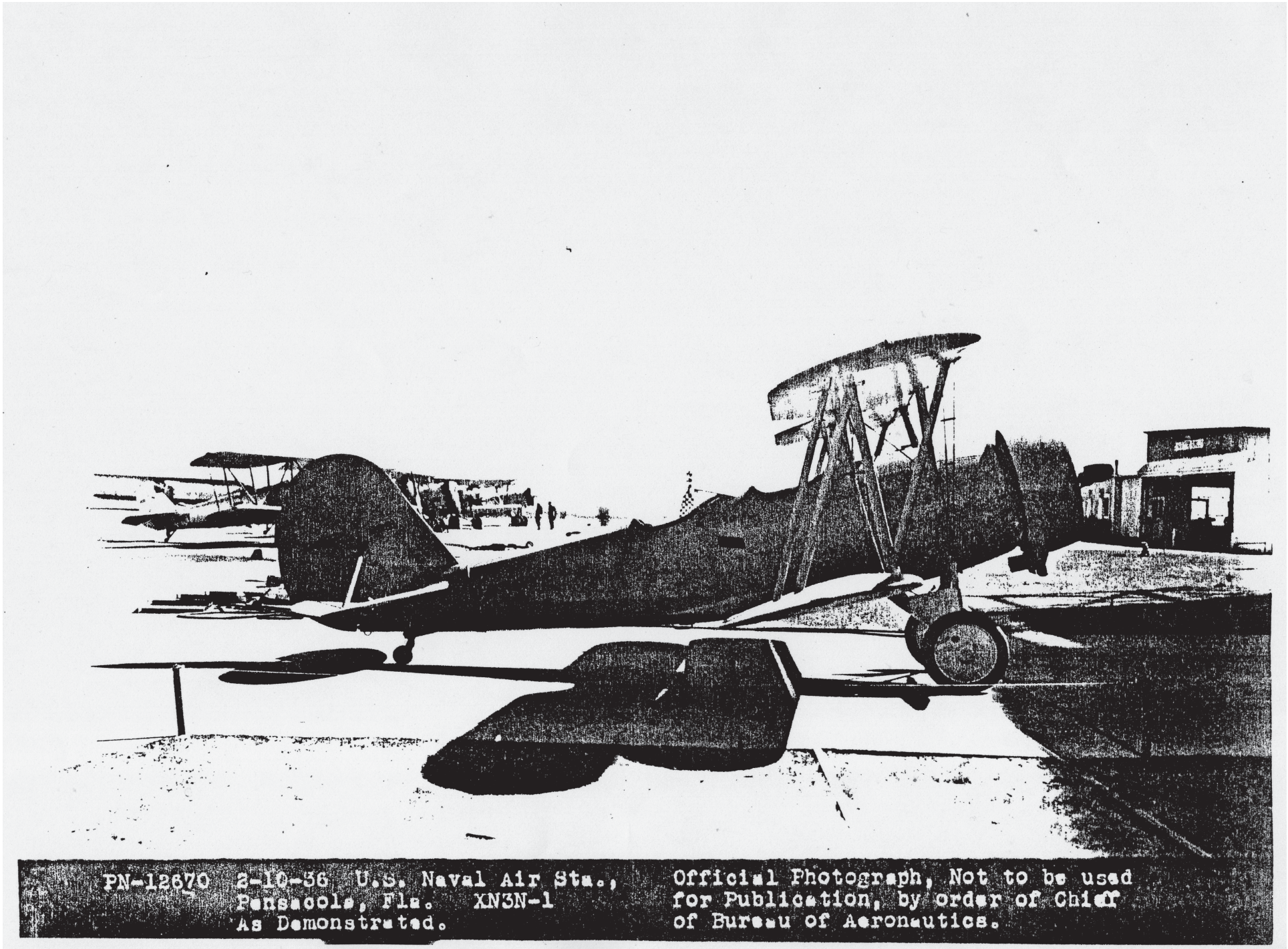

PN-12670 2-10-56 U.S. Naval Air Sta., Pensacola, Fla. XN3N-1 As Demonstrated.

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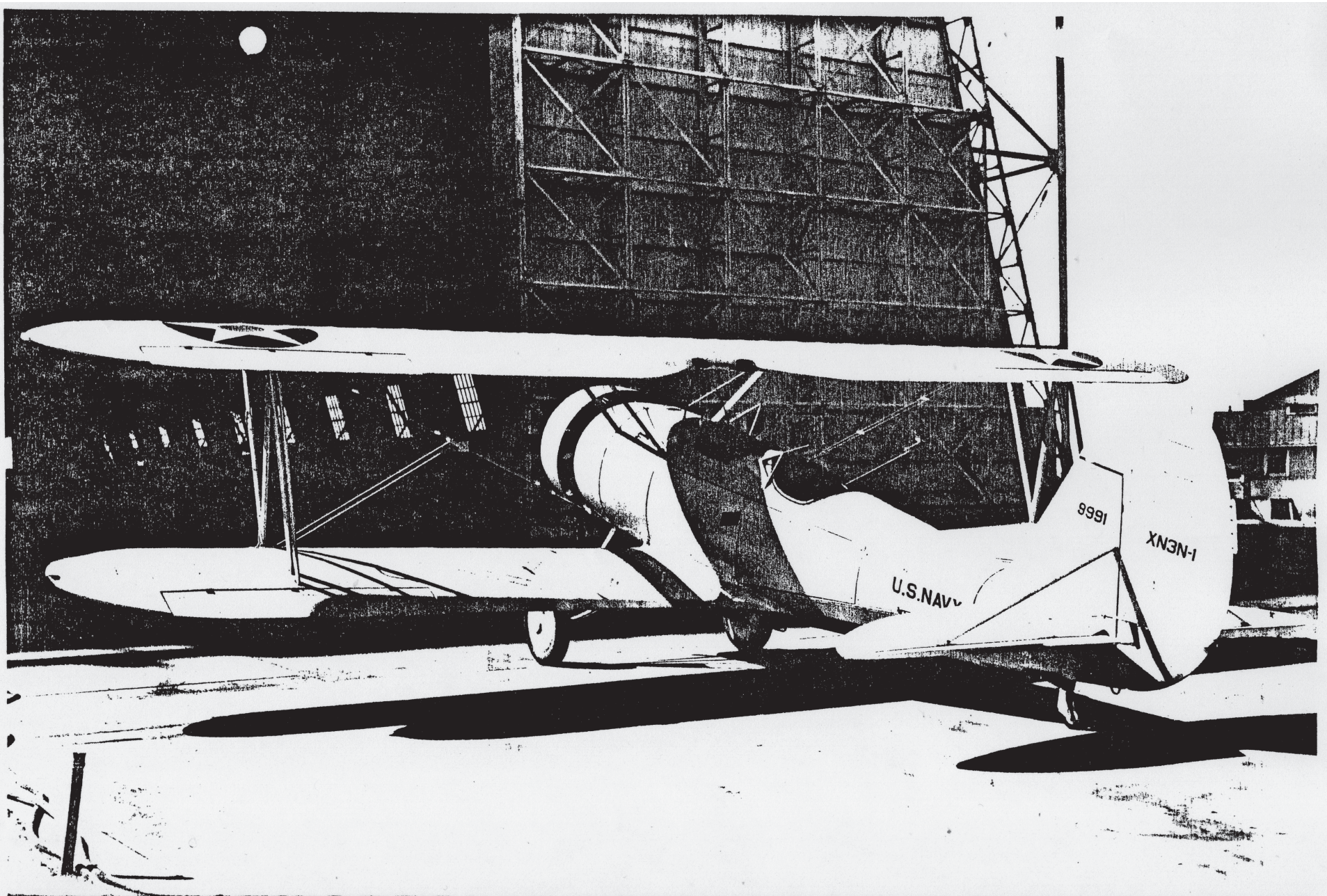

PN-12601 8-10-36 U.S. Naval Air Sta., Pensacola, Fla. XN3N-1 As Demonstrated.

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PN-12695 2-11-36 U.S.Naval Air Sta.
Pensacola, Fla. XN3N-1
As demonstrated.

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PN-12698 2-11-36 U.S.Naval Air Sta.
Pensacola, Fla. XN3N-1
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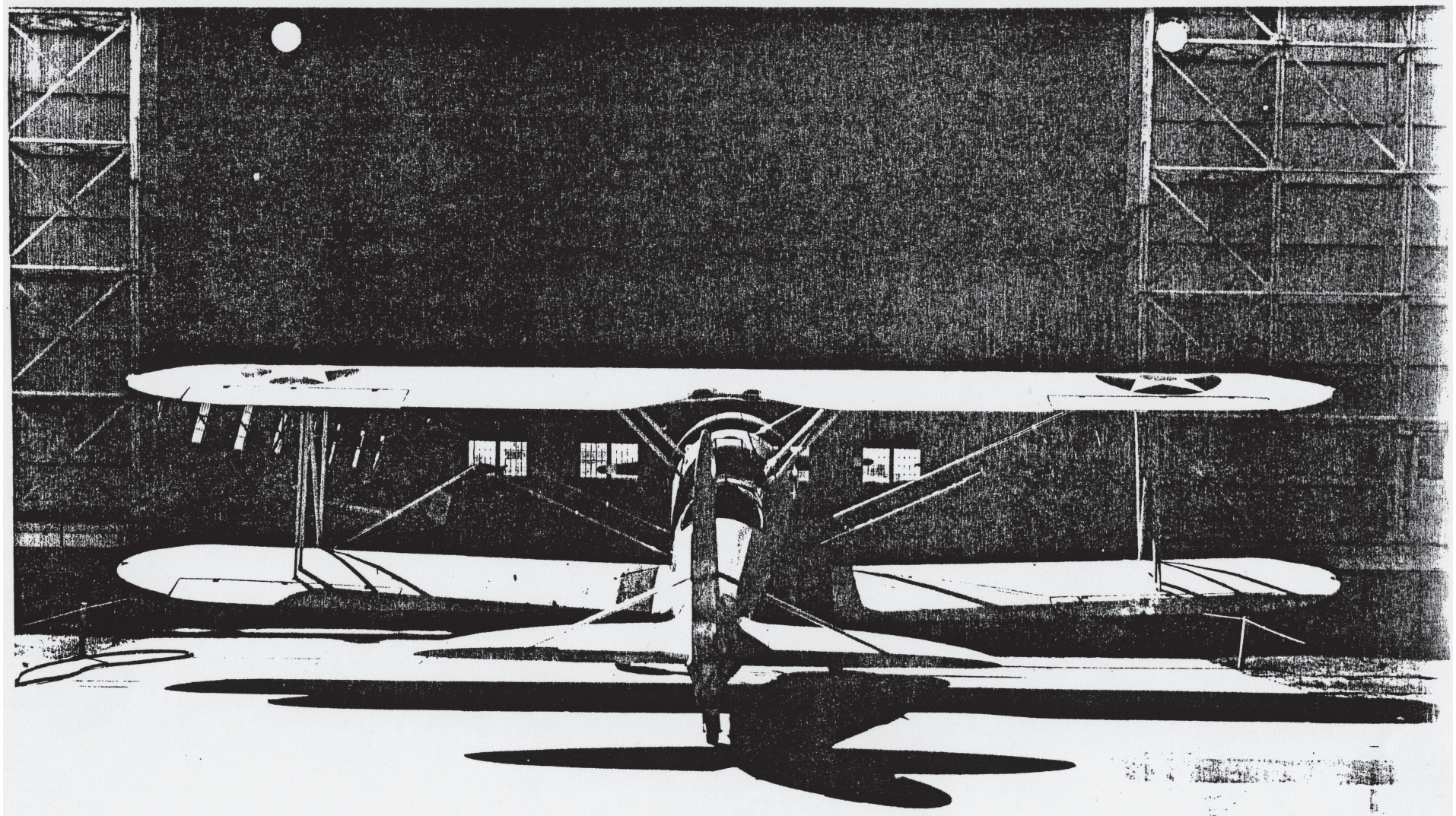
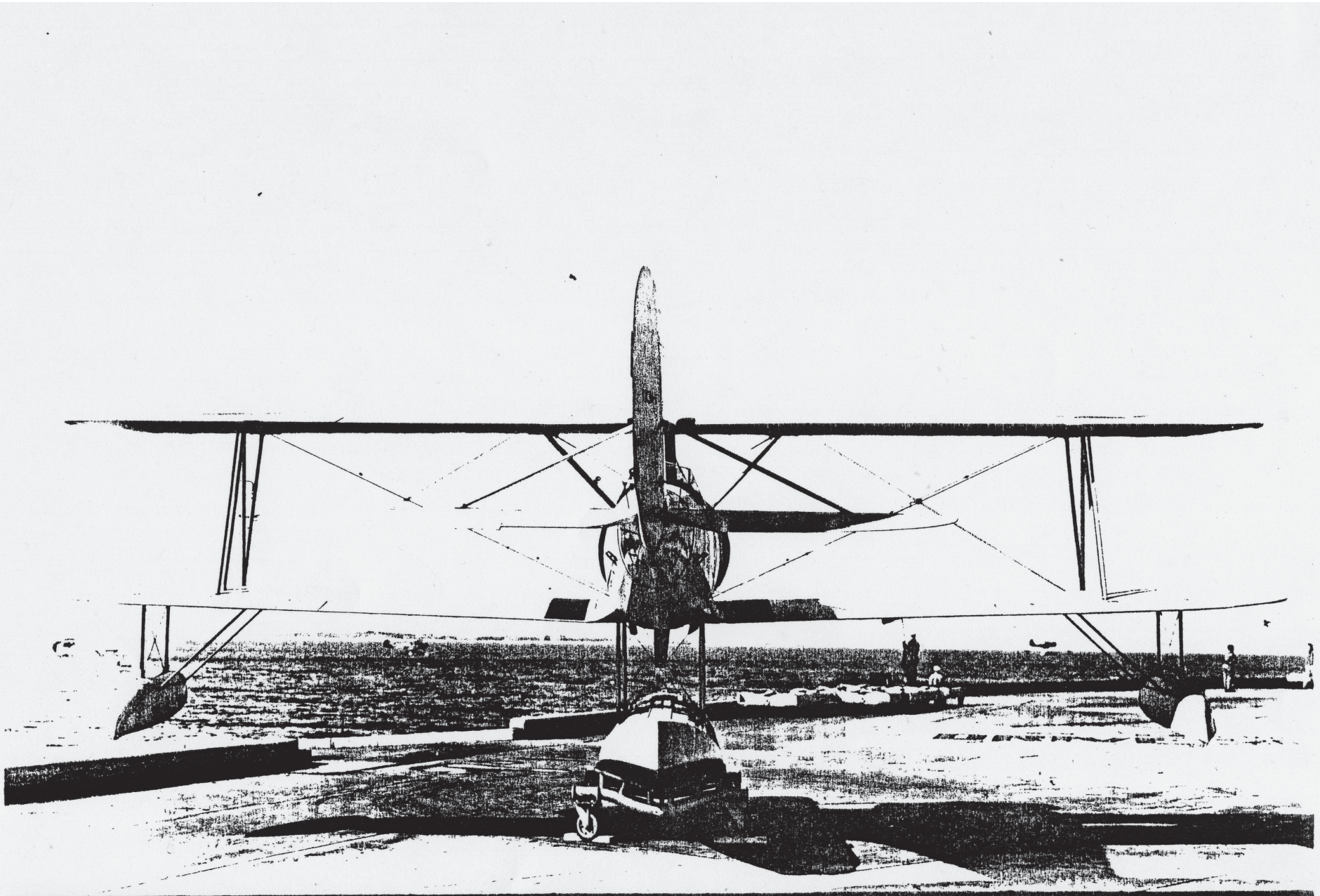


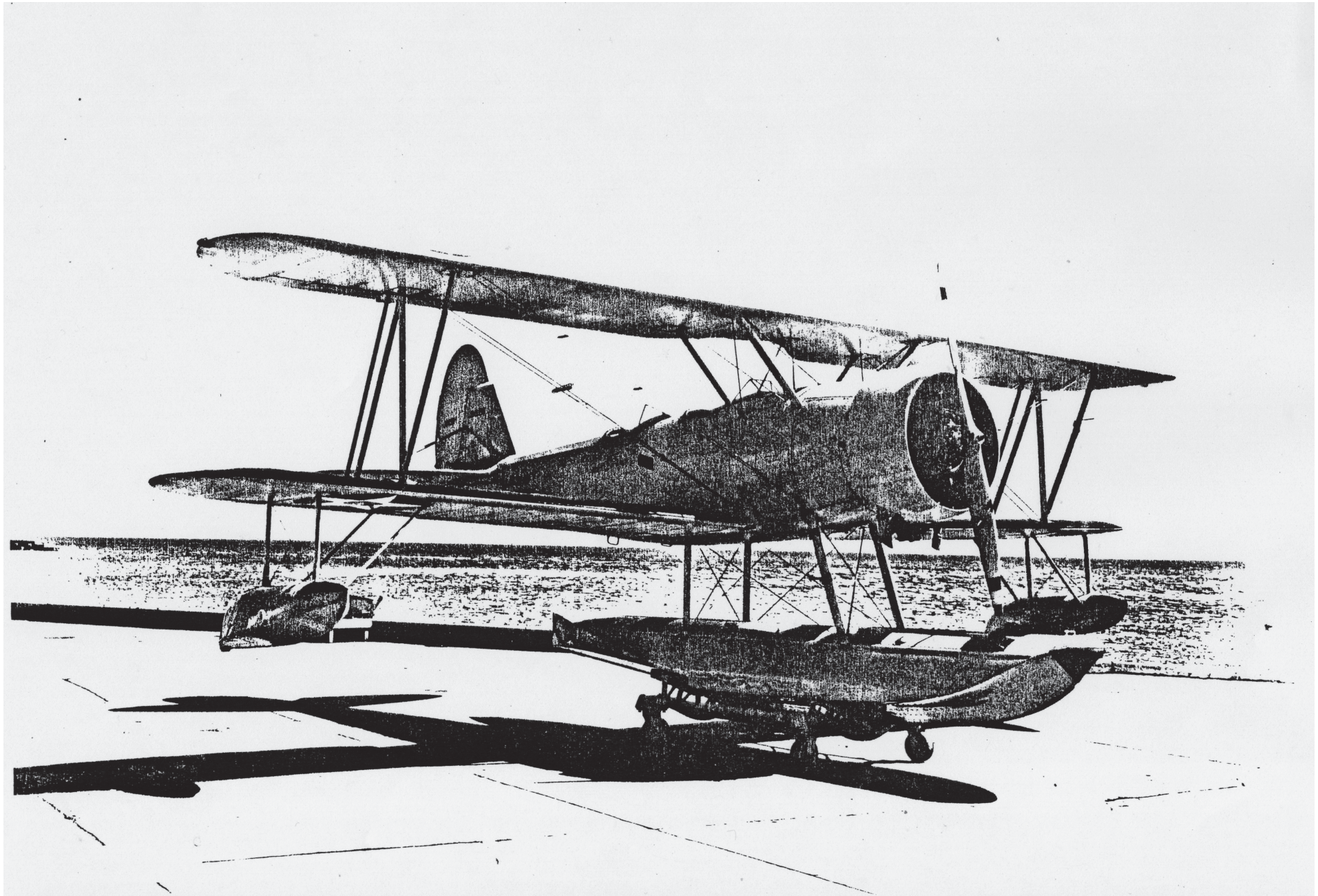
XN-12671 2-10-36 U.S. Naval Air Sta., Official Photograph, Not to be used
[illegible]sacola, Fla. XN3N-1 for Publication, by order of Chief
As Demonstrated. of Bureau of Aeronautics.



PN-12894 2-12-38 U.S. Naval Air Sta. Pensacola, Fla. XN3N-1

Official Photograph, Not to be used for publication, by order of Chief

P.-1380 [illegible] Naval Air Sta. Official Photograph, not to be used
[illegible] XS3H-1 for publication, except on order of Chief
[illegible] of Bureau of Aeronautics.



PN-12699 2-11-36 U.S.Naval Air Sta. Pensacola, Fla. XN3N-1 As demonstrated.

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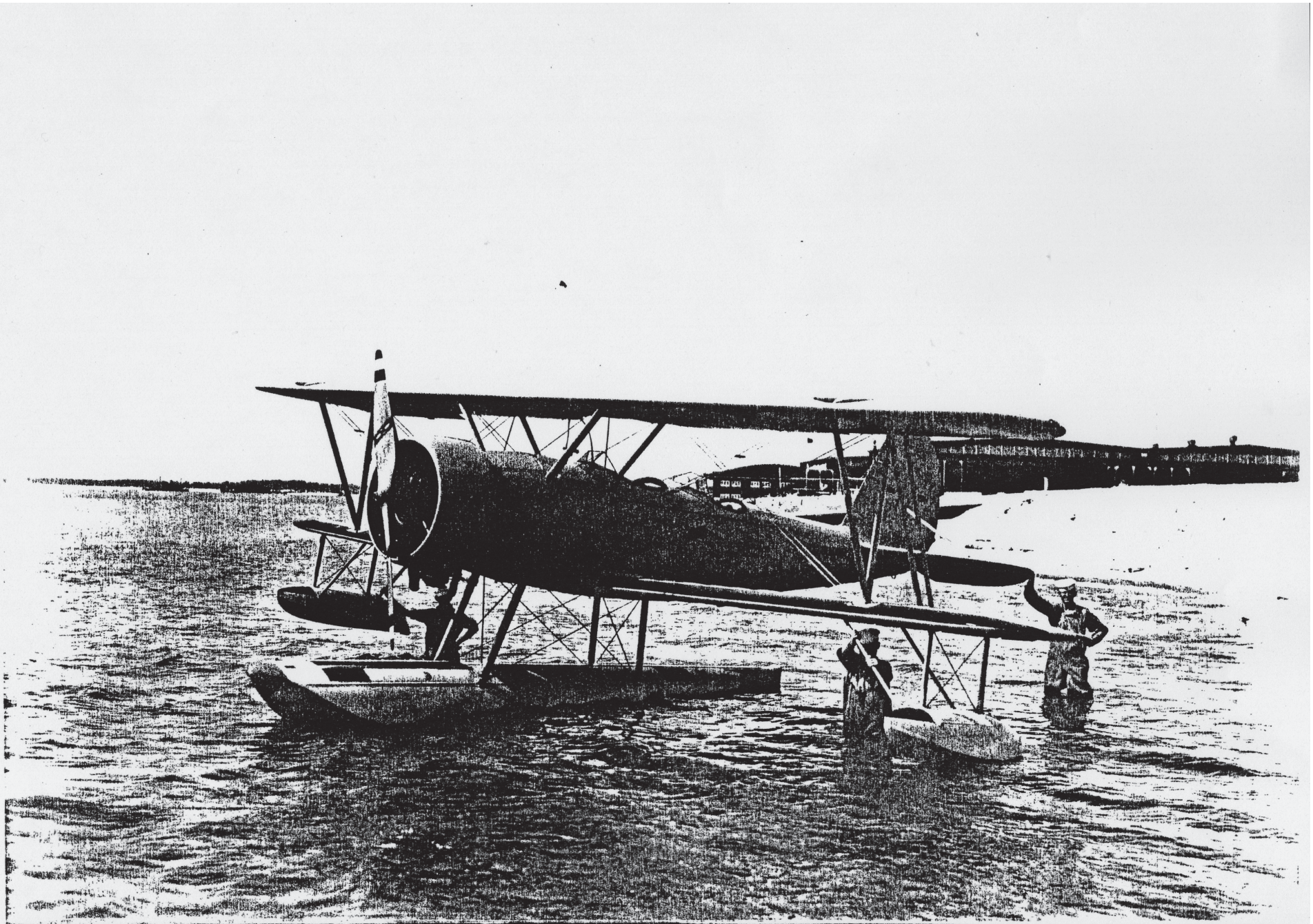

PN-12602 8-10-36 U.S. Naval Air Sta., Pensacola, Fla. XN3N-1 As Demonstrated.

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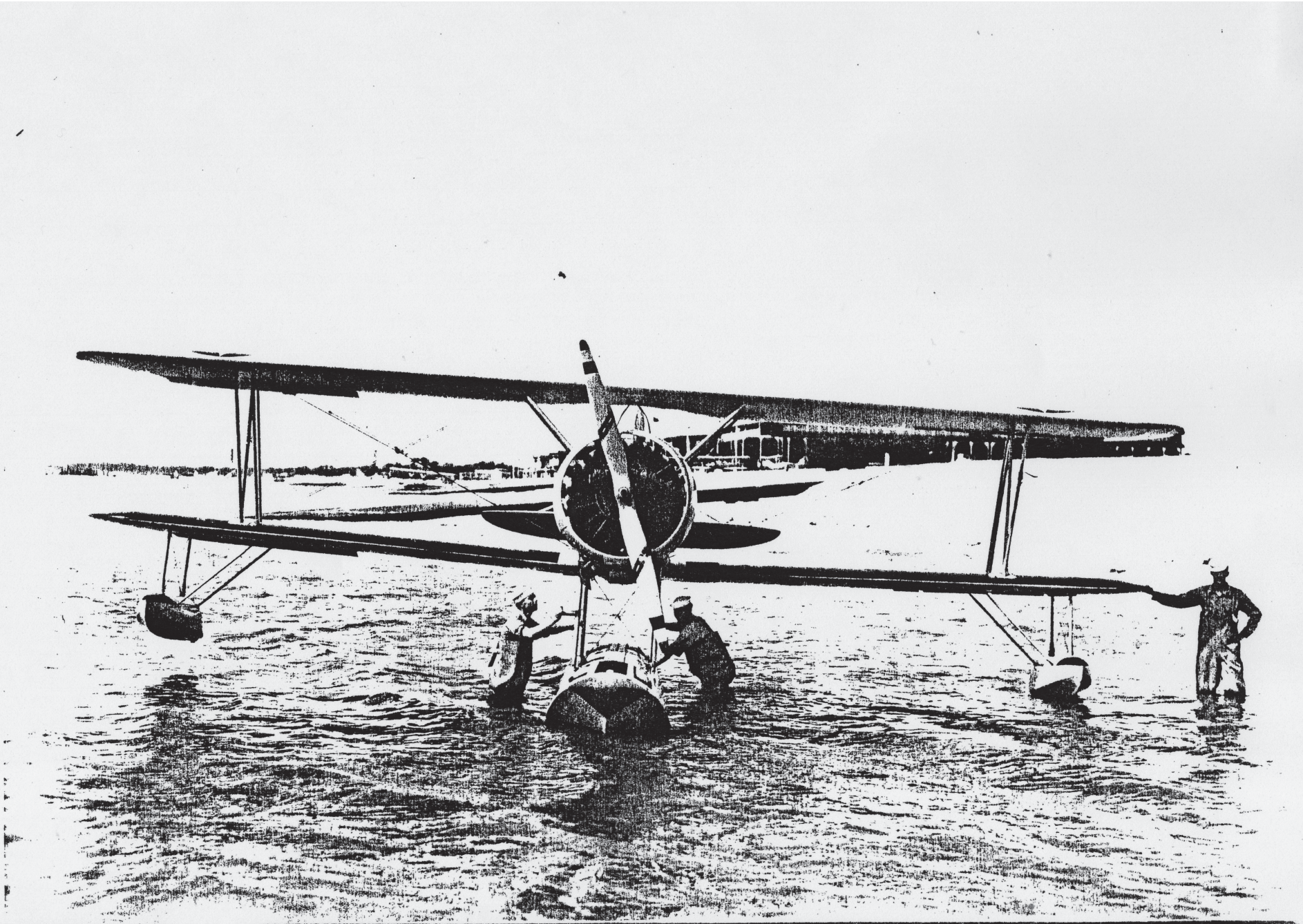

PN-12672 2-10-36 U.S. Naval Air Sta., Pensacola, Fla. XN3N-1 As Demonstrated.

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DESCRIPTION

A — General

The XN3N-1 was constructed by the Naval Aircraft Factory, Philadelphia, Pa. It is a single engine two seat primary training plane, convertible for use as a landplane and as a seaplane. It is not designed for catapulting nor for use aboard an aircraft carrier.

The airplane is a tractor biplane with the following general characteristics:

Full load weight (landplane)	2702 lbs.
Empty weight (landplane)	1991 lbs.
Full load weight (seaplane)	2845 lbs.
Empty weight (seaplane)	2132 lbs.
Maximum Span	34′0″
Overall length, Seaplane (approx.)	29′0″
Overall length, Landplane (approx.)	25′6⅛″
Total wing area	305 sq. ft.

A hoisting sling, wheel type landing gear, tail wheel unit, main float, auxiliary floats, and handling truck are provided.

B — Structure

Strength — The structure is not designed for arresting or catapulting. The wheel type landing gear and the tail wheel unit are designed to withstand a 36″ drop. The design loads on the ailerons are 40 lbs. per square foot. The flight strength diagram is shown on page 30.

Wing Group — The wing group consists of one upper wing of one panel and one lower wing of two panels attached to a wing stub integral with the fuselage, ailerons on both upper and lower wings, and necessary struts and wires. The wings are not designed for folding. The wings are of conventional metal two spar and metal rib construction, with fabric covering. Walkways are provided on each lower wing panel, next to the wing stubs, and along the entire leading edge of the lower wings.

Dimensions and characteristics of the wing group are as follows:

Span, upper wing	34′0″
Span, lower wing	34′0″
Chord, upper wing	57″
Chord, lower wing	57″
M. A. C.	54.03″
Gap, mean	5′3.42″
Stagger	28.5″
Incidence, upper wing	0
Incidence, lower wing	0
Dihedral, upper wing	0
Dihedral, lower wing	2°
Aileron area	26.5 sq. ft.

Tail Group — The rear fuselage and vertical fin are of aluminum alloy monocoque construction, included in one unit. The horizontal stabilizer and movable tail surfaces are of metal construction, fabric covered. The stabilizer is not adjustable in flight, longitudinal trim being obtained by means of an adjustable trailing edge flap on the left hand side of the elevator, which is controllable in flight from each cockpit. The entire tail group is removable as a unit, similar to the engine mount, by removal of four (4) bolts forward of the monocoque structure. Dimensions and areas of the tail group are as follows:

Span	12′2″
Normal incidence	0
Adjustment of stabilizer	0
Stabilizer area	23.5 sq. ft.
Elevator area	15.0 sq. ft.
Fin area	5.66 sq. ft.
Rudder area	13.66 sq. ft.

Body Group — The body group includes a detachable welded tubular engine mount of chrome-molybdenum steel, a fuselage, wheel type landing gear, tail wheel, and complete float type landing gear. Construction of the fuselage is of extruded "T" and angle sections of aluminum alloy, with a detachable monocoque after section. The engine mount and detachable after fuselage section are each secured to the main fuselage section by means of four (4) tension bolts. An aluminum alloy fire wall is provided. The wheel type landing gear is of the split axle type, of chrome-molybdenum steel construction, with oleo shock absorbers and hydraulic brakes.

The brake controls are operable from both cockpits, and the rear brake controls may be disengaged by adjustment on the ground. The tail wheel unit is of the free swiveling type, not steerable with the rudder controls, and is provided with a locking device, and oleo shock absorber. The main float and auxiliary floats are of all metal construction with removable metal keel strips.

C — Power Plant

Engine — A Wright Model R-790-8 direct drive engine is provided, rated at 220 BHP at 1800 RPM at sea level. Ignition circuits are not shielded.

Engine Accessories — An exhaust collector of corrosion resistant steel is installed. No flame is visible from the cockpits and no fumes are noticeable in pilot operation. The engine operates at moderate temperatures with full throttle, intake air heater cut in, and lagging installed on oil tank and oil lines.

Engine Controls — Standard engine control units are provided in both cockpits. Separate spark advance controls are installed.

Propeller — The propeller is of one piece, two blade, fixed pitch metal construction, Design No. 55501-72, diameter 9 feet, pitch at the 42-inch station 16.5 degrees.

Starting System — The starting system consists of a Series VI hand operated inertia starter, integral booster magnets, and engine primer assembly. The starter trip is located near the starter crank extension. A shut-off valve is provided in the primer line at the forward cockpit. The starter crank is stowed at the left hand side of the forward cockpit.

Lubricating System — The lubricating system consists of a 5-gallon oil tank with a maximum oil filling capaciy of 3.75 gallons, and is equipped with a graduated sounding rod and ½″ diameter vent line from the engine.

Felt lagging was installed for cold weather operations at the Naval Aircraft Factory, and was left in place during trials. Oil temperature thermometers indicate the engine inlet oil temperature.

Fuel System — The fuel system is of the pressure feed type with engine driven fuel pump. A wobble type emergency fuel pump is installed, and may be operated by hand from both cockpits. The fuel tank, of welded aluminum alloy construction, has a filling capacity of 46 gallons and is located in the fuselage aft of the fire wall. The fuel tank is removable by removing cowling and brace wires located above the tank. Hydrostatic fuel guages and calibration plates are installed in both cockpits. The main shut-off valve position is correctly indicated by the indicator dials in both cockpits.

D — FIXED EQUIPMENT

Instruments — The following instruments are provided:

Forward Cockpit	Rear Cockpit
Airspeed Indicator	Airspeed Indicator
Altimeter	Altimeter
Clock	Clock
Compass, Mk. VIII	Compass, Mk. VIII
Fuel Quantity Guage	Fuel Quantity Guage
Engine Guage Unit	Engine Guage Unit
Tachometer	Tachometer
Turn and Bank Indicator	Turn and bank Indicator
Thermometer, outlet oil, first airplane only.	

Surface Controls — Surface controls are of the stick and rudder pedal type. Rudder pedals are interconnected to insure positive movement, are readily adjustable in flight, and so designed that pilots' feet are prevented from slipping off. Brakes are operated by means of brake pedals mounted on the rudder pedals. Aileron controls are of the push-pull rod type, supported by roller bearings, providing positive independent control of the ailerons on each side of the airplane.

An elevator adjustable flap control is provided in both cockpits, having an adjustable friction locking device in the rear cockpit. Indicators are provided showing the flap position.

Furnishings — The cockpit seats are identical and have an adjustable vertical travel of four (4) inches. Standard pilot type safety belts are installed. Crash pads are installed over both instrument panels, and do not obscure the pilots' view of instruments. No baggage compartment is furnished. Engine and cockpit covers are provided with suitable stowage space at the right hand side of the fuel tank. Map cases are installed at the right hand side of both cockpits. A carbon dioxide fixed pressure fire extinguisher is installed at the left hand side of the fuel tank, and a carbon tetra-chloride hand fire extinguisher is provided at the right hand side of the rear cockpit.

Electrical Equipment — A removable battery box is installed at the right hand side of the engine compartment, but no battery was furnished. Running lights and instrument panel lights are installed, with control switches and rheostats in each cockpits. No anchor light or white light visible through 360 degrees in flight is furnished. Light switches and rheostats are not enclosed. No stowage is provided for spare lamp bulbs. No provision is made for battery charging, landing lights, or wing tip flares. The ignition switch is installed in the engine compartment, remotely controlled from both cockpits.

Miscellaneous Equipment — A hoisting sling and towing fittings are provided. No provision is made for arresting, catapulting, gunnery, bombing, communications, oxygen equipment, or pyrotechnics.

E — USEFUL LOAD

The XN3N-1 provides for only one condition of loading. The disposable items are listed in Appendix I.

APPENDIX I

DETERMINATION OF WEIGHT AND LOCATION OF CENTER OF GRAVITY OF XN3N-1 NO. 9991

The XN3N-1 was weighed to determine the empty and full load weights as a landplane and as a seaplane, and the locations of the center of gravity under these conditions.

LANDPLANE

As prepared to determine the empty weight the landplane weighed 1998 pounds. Test instruments installed in the airplane weighed 7 pounds, making the net empty weight 1991 pounds. This empty weight included the battery container and the lagging on the oil tank and lines.

Carrying the useful load specified in paragraph 104a of SD-227, Detail Specification for Model XN3N-1 Airplane, dated 3 October, 1935, the landplane weighed 2702 pounds, including 711 pounds of useful load.

The center of gravity of the landplane as weighed light was found to be 4.6 inches forward of the leading edge of the lower wing, and with full load, 2.3 inches aft of the L. E. L. W. This is at 18.7 and 31.5 per cent of the main aerodynamic chord for the empty and full load conditions, respectively.

The vertical location of the center of gravity of the landplane with full load was found to be 1.3 inches above the thrust line. The reference point used for the weighings in making this determination was a point on the thrust line and 82.8 inches forward of the L. E. L. W.

A mean aerodynamic chord as calculated according to SR-7A for 1.2 x Vs is 54.03 inches in length and its leading edge is 14.7 inches forward of the L. E. L. W.

SEAPLANE

As prepared to determine the empty weight the seaplane weighed 2144 pounds. Deducting 7 pounds for test instruments installed and 5 pounds for the sling, the net empty weight is 2123 pounds. This net empty weight includes the battery container, lagging on oil lines and tank, and certain landplane parts and fittings not readily removable.

SEAPLANE

Carrying the useful load specified in paragraph 104b of SD-227, the seaplane weighed 2845 pounds, including 713 pounds of useful load.

The center of gravity of the seaplane as weighed light was found to be 2.6 inches forward of the L. E. L. W.; and with full load, 3.1 inches aft of the L. E. L. W. This is at 22.4 and 32.9 per cent of the M. A. C. for the light and full load conditions, respectively.

Details of the weighings are given below:

Landplane — As Weighed Light

Level Position

Net Weight on front scale	1865 lbs.
Net Weight on rear scale	133 lbs.
Total	1998 lbs.

Horizontal distance,

L. E. L. W. to front supports	18.9″ forward
L. E. L. W. to rear supports	195.2″ aft

Location of center of gravity, taking moments about the L. E. L. W.,

$$1998X = (133 \times 195.2) - (1865 \times 18.9)$$

$X = 4.6$ inches aft of L. E. L. W.

$$\frac{14. - 4.6}{54.03} = 18.7\% \text{ of the M. A. C.}$$

Landplane — As Weighed with Full Load

The following items of useful load were installed during the weighing:

Crew (2) (Ballast in seats)	400.0 lbs.
Gasoline (45 gallons)	271.0 lbs.
Oil (3 3/4 gallons)	28.0 lbs.
Navigating charts	1.0 lbs.
First Aid Kit	4.0 lbs.
Test instruments	7.0 lbs.
Total	711.0 lbs.

Landplane — As Weighed with Full Load

	Level Position	Tail Down 14°
Net Weight on front scale	2435 lbs.	2273 lbs.
Net Weight on rear scale	267 lbs.	429 lbs.
Total Weight	2702 lbs.	2702 lbs.

Horizontal distance,—

Reference point to front supports	63.9″ aft	49.5″ aft
Reference point to rear supports	278.0″ aft	255.7″ aft

Location of center of gravity, taking moments about the reference point,—

Level Position

$2702X=(267x278.0)+(2435x63.9)$
$X=$(85.1 inches aft of reference point
85.1 − 82.8 = 2.3 inches aft of L. E. L. W.
14.7 + 2.3 = 31.5% of the M. A. C.
54.03

Tail Down 14°

$2702X=(42.8x255.7)+(2273x49.5)$
$X=$ 82.2 inches aft of reference point

From the above weighings the vertical location of the center of gravity of the landplane with full load was determined as 1.3 inches above the thrust line.

Seaplane — As Weighed Light

Level Position

Net Weight on front scale	1357 lbs.
Net Weight on rear scale	787 lbs.
Total	2144 lbs.

Horizontal distance,—

L. E. L. W. to front supports	30.0″ forward
L. E. L. W. to rear supports	44.6″ aft

Location of center of gravity, taking moments about the L. E. L. W. —

$2144X=(787x44.6)-(1357x30.0)$
$X=$ 2.6 inches forward of the L. E. L. W.
14.7 − 2.6 = 22.4% of theM. A. C.
54.03

Seaplane — As Weighed with Full Load

Level Position

Net Weight on front scale		1500 lbs.
Net Weight on rear scale		1345 lbs.
	Total	2845 lbs.

Horizontal distance,—

L. E. L. W. to front supports	32.3″ forward
L. E. L. W. to rear supports	42.6″ aft

Location of center of gravity, taking moments about the L. E. L. W. —

$$2845X=(1345\times42.6)-(1500\times32.3)$$

$X=$ 3.1 inches aft of the L. E. L. W.

14.7+ 3.1=32.9% of the M. A. C.

54.03

All weighings were made with the engine ring cowl installed. Removing the ring reduces the weight 27 pounds and gives a center of gravity location of 32.7 and 34.1 per cent of the M. A. C. for the landplane and seaplane respectively.

For other conditions of loading the weights, in pounds, and the center of gravity locations, in per cent of M. A. C. were calculated to be as follows:

	Landplane				Seaplane			
	Ring Installed		Ring Removed		Ring Installed		Ring Removed	
Load Condition	WT.	C.G.	WT.	C.G.	WT.	C.G.	WT.	C.G.
Full Load, except,—								
Front seat empty	2502	28.2	2475	29.4	2645	30.0	2618	31.2
Rear seat empty	2502	21.6	2475	22.6	2645	23.6	2618	24.7
Less 25 gals. gas.	2552	32.9	2525	34.1	2695	34.4	2668	35.6

APPENDIX II

LOG OF DEMONSTRATIONS AND TRIALS

OF XN3N-1 No. 9991

2-7-36 — Received XN3N-1 as landplane, via air from Naval Aircraft Factory, Philadelphia, Pa.

2-10-36 — Landplane weighed and photographed.
Completed landplane demonstration.

2-11/12-36 — Completed 20-hour check on plane and engine. Removed carburetor and checked specifications.
Weighed landplane empty and loaded for center of gravity determinations. Photographed cockpits. Familarization flights in landplane by Trial Board members.

2-13-36 — Converted to seaplane. Installed manifold pressure guage, calibrated tachometer.

2-14-36 — Completed seaplane demonstration. Familiarization flights by Trial Board members.

2-17/18-36 — Familiarization flights and climb trials.

2-19/20-36 — Stability and balance trials.

2-21-36 — Installed anti-spin chute. Maneuverability and spin trials.

2-24-36 — Speed calibration trials and additional climb.

2-25-36 — Installed drop head airspeed indicator and venturi suction guage. Stalling speed and venturi suction trials. Trial dual instruction flight with student. Weighed seaplane empty and fully loaded for center of gravity determinations.

2-26-36 — Fuel consumption trials Photographed seaplane.
Converted seaplane to landplane.

2-27-36 — Venturi suction, stability and balance trials as landplane.

2-28-36 — High speed low speed, and climb trials.

3-2-36 — High speed and fuel consumption trials. Repairs to hydraulic brakes.

3-3-36 — High speed and fuel consumption trials. Plane grounded with broken brake pedal fittings.