

PITTS AVIATION ENTERPRISES, INC.
 AIRPLANE FLIGHT MANUAL
 MODEL S-2A AIRPLANE

SECTION I OPERATING LIMITATIONS

C. Weights

Maximum gross weight (Acrobatic category)		1500 LBS.
Maximum gross weight (Normal category)		1575 LBS.
Design empty weight, dry, no fuel, no oil		1007 LBS.
Design empty weight dry center of gravity is at fuselage station:	FS	87.89

NOTE: Reference station, FS 0.00 is located 97.81 inches forward of leading edge of lower wing.

Maximum oil	2 U.S. gals.	15 LBS.
Fuel tank capacity	24 U.S. gals.	144 LBS.
Crew of two plus parachutes		(ACTUAL WT.)
Baggage, maximum		20 LBS.
Design useful load (Acrobatic category)		493 LBS.
Design useful load (Normal category)		568 LBS.

NOTE: NO ACROBATIC MANEUVERS WITH BAGGAGE.

Usable fuel, normal flight	23 U.S. gals.	138 LBS.
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(See Section V, "Weight and Balance", Model S-2A Airplane, for allowable weight and center of gravity combinations and detail loading instructions.)

Weight and Center of Gravity Limits: (Acrobatic category)

Most forward limit:

FS 92.35 (16.3% mac) at 1350 lbs. or less;

Most forward at maximum gross weight:

FS 95.58 (24.7% mac) at 1500 lbs.;

Most rearward at maximum gross weight:

FS 96.50 (27.0% mac) at 1500 lbs.;

Most rearward limit:

FS 97.12 (28.7%) at 1440 lbs. or less; with straight line variation between points given.

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SECTION I OPERATING LIMITATIONS

C. Weights (cont'd)

Weight and Center of Gravity Limits: (Normal category)

Most forward limit:

FS 92.35 (16.3% mac) at 1350 lbs. or less;

Most forward at maximum gross weight:

FS 94.5 (21.8% mac) at 1575 lbs.;

Most rearward at maximum gross weight:

FS 96.13 (24.4% mac) at 1575 lbs.;

Most rearward:

FS 97.50 (29.6% mac) at 1472 lbs. or less; with straight line variation between points given.

D. Flight Load Factors: (Acrobatic category)

Positive flight, limit

+ 6.0 G.

Negative flight, limit

— 3.0 G.

Maneuvers and entry speeds:

See Section IV, "Placards".

E. Flight Load Factors: (Normal category)

Positive flight, limit

+ 3.80 G.

Negative flight, limit

— 1.52 G.

F. Flight Limitations:

This airplane must be operated as a day VFR airplane only. Flight into known icing conditions is prohibited.

G. Usable Fuel:

Of the 24 U.S. gallon fuel tank capacity, 23 gallons are usable during all normal flight conditions. Unusable fuel, normal flight: 1 U.S. Gal.

NOTE: Do not perform low altitude acrobatics with less than 1/4 tank of fuel on board.

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SECTION II OPERATING PROCEDURES

A. NORMAL PROCEDURES (cont'd)

c. Take-Off: (cont'd)

9. Switch magnetos from both to one and note drop-off, return to both until engine regains speed and switch to other magneto and note drop-off, then return to both.

Normal drop-off is:	100 RPM
Maximum drop-off is:	175 RPM
Difference in drop-off between Magnetos is:	50 RPM

10. Throttle:	FULL OPEN
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d. Landing:

- | | |
|-----------------------|-----------|
| 1. Mixture control: | FULL RICH |
| 2. Propeller control: | HIGH RPM |

e. Engine Shut-Down:

- | | |
|---------------------|--------------|
| 1. Throttle: | CLOSED |
| 2. Mixture control: | IDLE CUT-OFF |
| 3. Master switch: | OFF |
| 4. Ignition switch: | OFF |

B. EMERGENCY PROCEDURES

a. In-Flight Engine Restart:

- | | |
|---|---------------|
| 1. Pull mixture control to: | IDLE CUT-OFF |
| 2. Establish glide at: | 100 MPH IAS |
| 3. Fuel selector: | ON |
| 4. Master switch: | ON |
| 5. Throttle: | OPEN 1/4 FULL |
| 6. Engage starter to start propeller windmilling, if it is not turning. | |
| 7. Advance mixture control to: | FULL RICH |

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SECTION II OPERATING PROCEDURES

B. EMERGENCY PROCEDURES (cont'd)

b. Freezing of Pitot-Static Head:

In the event of icing of the static orifices on the pitot-static head, an alternate source of static pressure is provided.

To open the alternate static air pressure source, turn the indicated valve on the left-hand side of the rear instrument panel counter-clockwise to full open.

c. Best Glide Speed, Engine-out, is: 97 MPH IAS

d. NOTE: Stall warning inoperative with master switch off.

SECTION III PERFORMANCE INFORMATION

A. Altitude loss during power-off stalls: 200 FT.

B. Power-off stalling speed versus bank-angle, at 1575 lbs. gross weight and forward gross C.G.:
Normal Category.

<u>BANK ANGLE</u>	<u>STALLING SPEED</u>
0°	61 MPH CAS
30°	66 MPH CAS
45°	73 MPH CAS
60°	86 MPH CAS

Power-off stalling speed versus bank-angle, at 1500 lbs. gross weight and forward gross C.G.:

Acrobatic Category.

<u>BANK ANGLE</u>	<u>STALLING SPEED</u>
0°	58 MPH CAS
30°	62 MPH CAS
45°	69 MPH CAS
60°	82 MPH CAS

C. Demonstrated flight-time, inverted is: 3 minutes

D. Demonstrated cross-wind velocity is: 20 MPH

FAA APPROVED: 11 June, 1971

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MODEL S-2A AIRPLANE

SECTION V WEIGHT AND BALANCE

The following section of this manual has been provided for your convenience in determining the weight and center of gravity of the airplane for various loading configurations.

CAUTION

1. The envelope of Page 17 has been thoroughly investigated by Pitts Aviation, and by the Federal Aviation Agency, and the S-2A airplane has been found to comply with all flight and structural requirements of FAR 23, Acrobatic Category, within this envelope. Operation at weights or centers of gravity not within the envelope is legally prohibited, and may be dangerous.
2. Do not perform acrobatics with baggage.
3. Do not perform acrobatics with less than 1/4 tank of fuel on board.

For your convenience, several loading points for various configurations have been computed and plotted on the envelope of Page 17. These points are for example, and are based on an airplane dry empty weight of 1007 pounds, and a moment of 88505 in.-lb. which is typical; however, THE OWNER IS CAUTIONED TO BASE ACTUAL WEIGHT/C.G. CALCULATIONS FOR HIS AIRPLANE ON THE EQUIPPED WEIGHT EMPTY SHOWN AT THE BOTTOM OF PAGE 5.

TO DETERMINE YOUR WEIGHT AND C.G.:

1. Begin with the equipped weight empty of your airplane, shown at the bottom of Page 5. Record the weight and the moment.
2. From the plot on Page 16, (weight and moment due to pilots), locate the weights and moments corresponding to the actual weights of the pilots on board, including parachutes, if they are worn.
3. From the plot on Page 16, (weight and moment due to baggage), locate the weight and moment corresponding to the weight of baggage in the baggage compartment aft of the rear cockpit.

NOTE: No acrobatics with baggage.

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SECTION V WEIGHT AND BALANCE

TO DETERMINE YOUR WEIGHT AND C.G.: (cont'd)

4. Add these weight and moments as shown:

	WEIGHT, LB.	MOMENT, IN-LB.
Equipped Weight Empty		
Forward Pilot		
Aft Pilot		
Baggage		
Total		

5. Locate the total weight and moment point found in step 4. on the plot of Page 17. This point on the weight/C.G. envelope represents the airplane and its contents with zero usable fuel. Note that this point must not lie aft of the rear C.G. limit of the envelope of Page 17 .
6. To the weight obtained in step 4. above, (zero usable fuel), add the weight of the maximum usable fuel: 23 gals. times 6 lb/gal., or 138 pounds. Draw a line through the zero usable fuel point of step 5. above, parallel to the fuel-burnoff lines of the weight/C.G. envelope, extending the line upward to the left, to the weight corresponding to airplane and contents plus maximum usable fuel. This point must also be within the design weight and C.G. envelope of Page 17 . The two points obtained in steps 5. and 6. above, represent the configuration of the airplane at take-off with full fuel and at landing with zero usable fuel.

The above procedure is illustrated by the examples shown here:

Example #1.

CONFIGURATION:

140 lb. pilot + 20 lb. parachute in aft seat; no baggage.

Step 1: From bottom of Page 5 of 17 , equipped weight empty = 1028 lbs., and the corresponding moment is 89812 in-lb.

Step 2: From plot of Page 16 of 17 , for pilot plus chute of 160 lbs. in aft seat, read moment = 21850 in-lb.

Step 3: Weight and moment from baggage: NONE.

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SECTION V WEIGHT AND BALANCE

TO DETERMINE YOUR WEIGHT AND C.G.: (cont'd)

Example # 1. (cont'd)

Step 4: Add the results of steps 1 thru 3:

	WEIGHT	MOMENT
Equipped, Empty	1028	89812
Pilot, Aft	160	21850
Baggage	0	0

Airplane and contents, zero usable fuel:	1188	111662
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Step 5: Locate the point of step 4, (1188 lb. and 111662 in-lb.), on the chart of Page 17 of 17. Note that it is within the design envelope at Fuselage Station 93.99. (this point is labeled 1-E.)

Step 6: Weight and moment from fuel: (from plot, Page 15 of 17 :

	WEIGHT	MOMENT
Fuel (23 gal)	138	11152
Plus (step 5)	1188	111662
Total, with full fuel:	1326	122814

Locate this point on the chart of Page 17 of 17, and label it 1-F. Since this point, (at fuselage station 92.62), is within the design envelope, the airplane is satisfactorily loaded for this example.

Example #2.

CONFIGURATION:

220 lb. aft pilot + 20 lb. parachute in aft seat; no baggage.

Step 1. From bottom of Page 5 of 17, equipped weight empty equal 1028 lb. and the corresponding moment is 89812 in-lb.

Step 2. From plot of Page 16 of 17, for pilot plus chute of 240 lb. in aft seat, read moment equals 32780 in-lb.

Step 3. Weight and moment from baggage: NONE

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SECTION V WEIGHT AND BALANCE

TO DETERMINE YOUR WEIGHT AND C.G.: (cont'd)

Example #2. (cont'd)

Step 4. Add the results of steps 1 thru 3:

	WEIGHT	MOMENT
Equipped, Empty	1028	89812
Pilot, Aft	240	32780
Baggage	<u>0</u>	<u>0</u>
Airplane and contents, zero usable fuel:	1268	122592

Step 5. Locate the point of step 4, (1268 lb. and 122592 in-lb), on the chart of Page 17 of 17 . (This point is labeled 2-E. Note that it is inside the design envelope at FS 96.68)

Step 6. Weight and moment from fuel: (from plot, Page 15 of 17).

	WEIGHT	MOMENT
Fuel (23 gal)	138	11152
Plus (step 5)	1268	122592
Total, with full fuel:	<u>1406</u>	<u>133744</u>

Locate this point on the chart of Page 17 of 17 , and label it 2-F. Note that it is within the design envelope.

Example #3.

CONFIGURATION:

180 lb. pilot plus 20 lb. parachute in aft seat; 140 lb. pilot plus 20 lb. parachute in front seat, no baggage.

Step 1. From bottom of Page 5 of 17 , equipped weight empty equals 1028 lb., and the corresponding moment is 89812 in-lb.

Step 2. From plot of Page 16 of 17 , for pilot plus chute of 200 lb. in aft seat read moment equals 17380 in-lb.

Step 3. Weight and moment from baggage: NONE

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SECTION V WEIGHT AND BALANCE

TO DETERMINE YOUR WEIGHT AND C.G.: (cont'd)

Example #3. (cont'd)

Step 4. Add the results of steps 1 thru 3:

	WEIGHT	MOMENT
Equipped, Empty	1028	89812
Fwd. Pilot	160	17380
Aft Pilot	200	27320
Baggage	<u>0</u>	<u>0</u>
Airplane and contents, zero usable fuel:	1388	134512

Step 5. Locate the point of step 4, (1388 lb and 134512 in-lb), on the chart of Page 17 of 17. This point is labeled 3-E. Note that it is inside the design envelope.

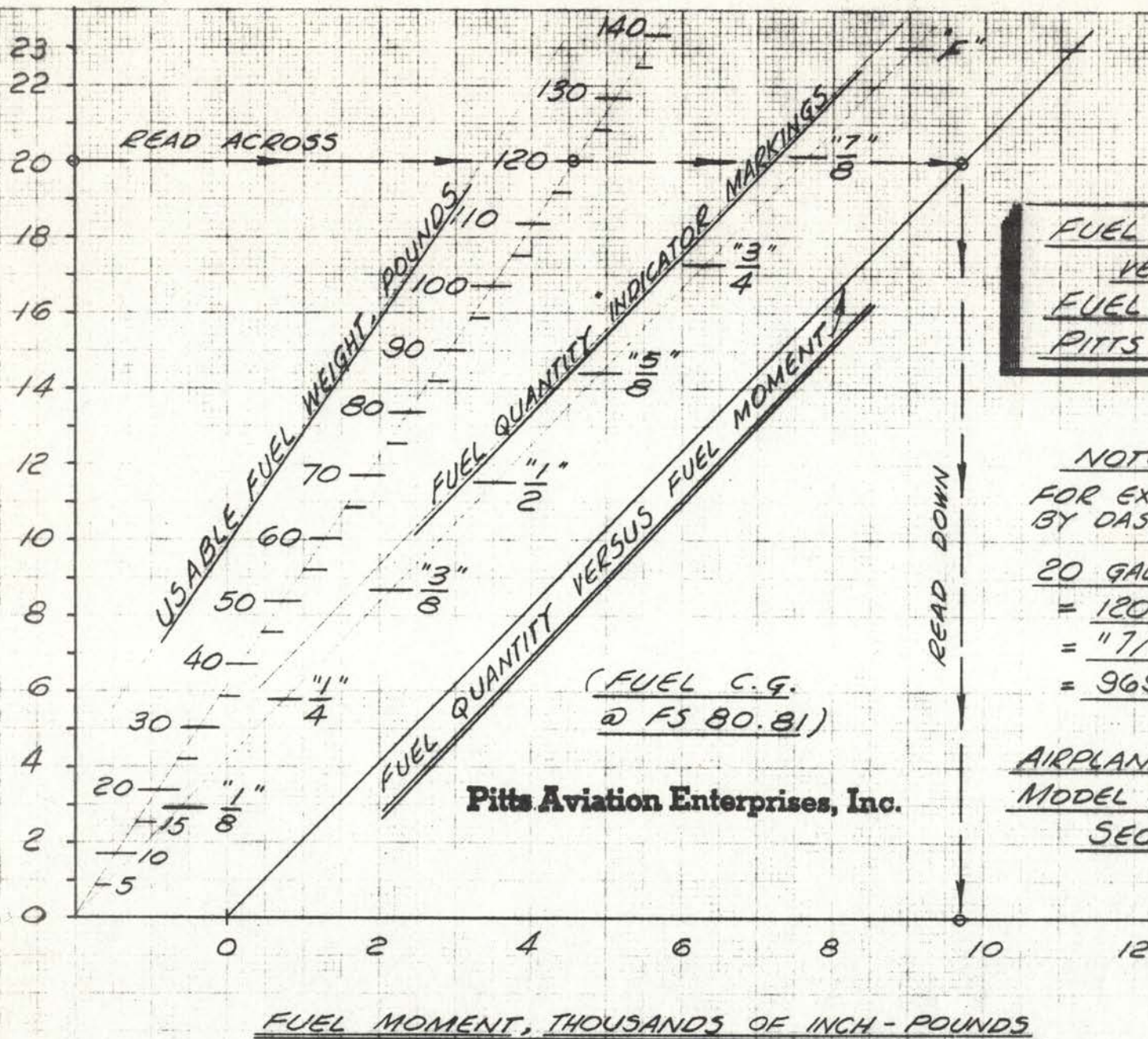
Step 6. Weight and Moment from Fuel: (from plot, page 15 of 17).

	WEIGHT	MOMENT
Fuel (23 gal)	138	11152
Plus (step 5)	<u>1388</u>	<u>134512</u>
Total, with full fuel:	<u>1526</u>	<u>145664</u>

Locate this point on the chart of Page 17 of 17, and label it 3-F. Note that it is outside the acrobatic design envelope.

Step 7. This step is necessary because if the airplane were loaded to maximum usable fuel it would be outside the acrobatic design envelope, at point 3-F. Locate point 3-N along the fuel burnoff line where it crosses the acrobatic forward C.G. limit. Note the total weight at 3-F is 1526 lbs., or 26 lbs. heavier than at 3-N, 1500 lbs. From the plot of Page 15, read 26 lbs. of fuel equals 4.4 gallons, or 3/16 tank. You must therefore plan your flight so as to fly in Normal Category (no acrobatic maneuvers) until you have between 7/8 and 3/4 tank of fuel on board, after which you may operate in Acrobatic Category.

USABLE FUEL QUANTITY, GALLONS



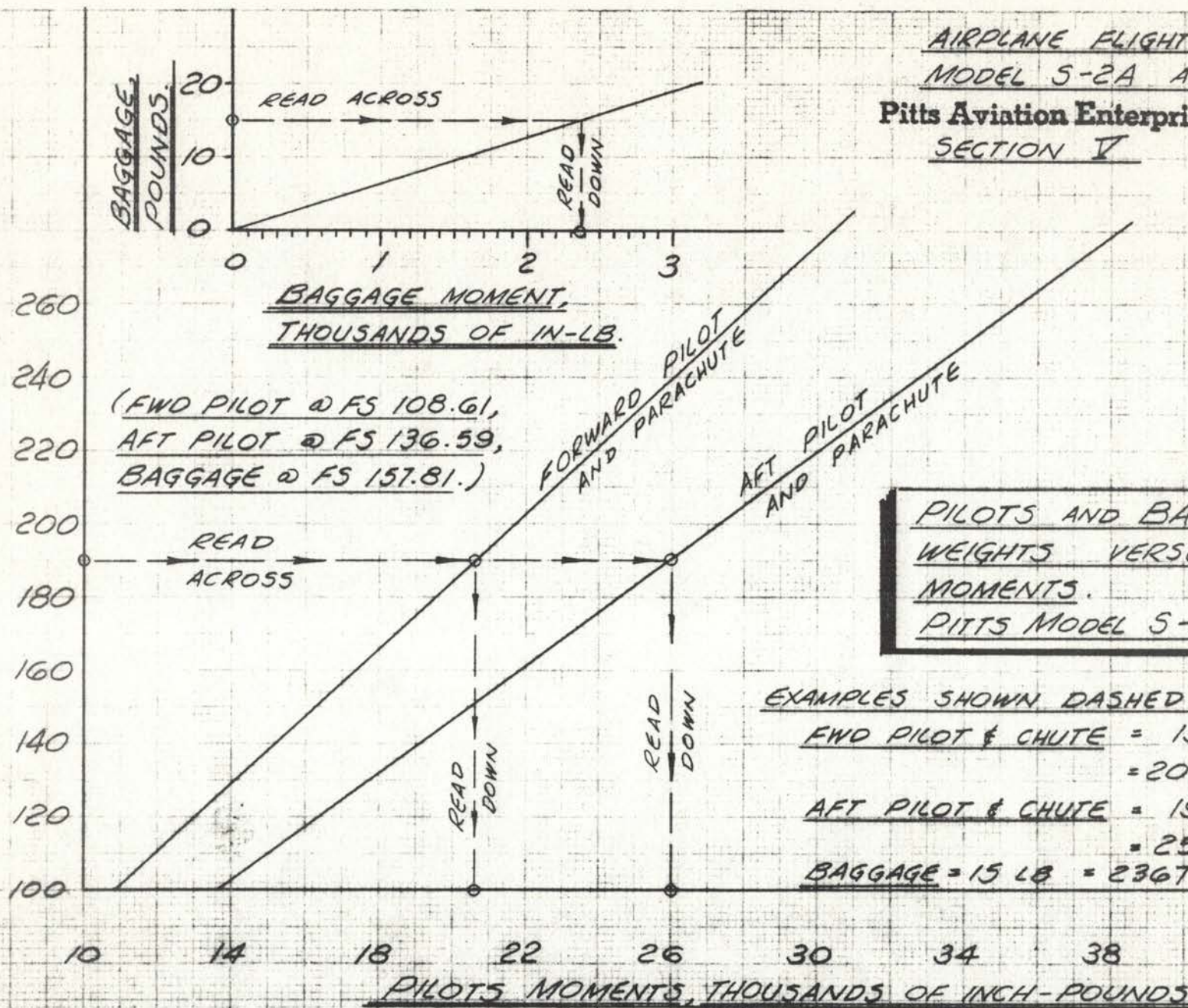
**FUEL QUANTITY
VERSUS
FUEL MOMENT
PITTS MODEL 5-2A**

NOTE:
FOR EXAMPLE SHOWN
BY DASHED LINE:

20 GALLONS
= **120 LB**
= **"7/8" TANK**
= **9697 IN-LB.**

**AIRPLANE FLIGHT MANUAL
MODEL 5-2A AIRPLANE
SECTION V.**

REV. A



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SECTION V

REV. A