



# **NATIONAL TRANSPORTATION SAFETY BOARD**

**Office of Aviation Safety  
Western Pacific Region**

## **WEIGHT & BALANCE**

**NTSB Accident: WPR17FA041  
Accident Date: December 26, 2016**

This document contains 6 embedded images

## A. ACCIDENT

Location: Fresno, California  
Date: December 26, 2016  
Aircraft: Petrus Express S90, N176PA, Serial # 80842  
NTSB IIC: Michael Huhn

## B. MAINTENANCE RECORD WEIGHT & BALANCE

PESTRUS DAVID WAYNE S-90 (EXPRESS S-90)  
N176PA  
Weight & Balance information  
DATE: 3/13/15 TACH TIME: 464.1  
CG RANGE 74.7" TO 85"  
MAX TAKEOFF WEIGHT: 3300 LBS  
MAX LANDING WEIGHT: 3200  
DATUM: FORWARD FACE OF FIREWALL IS FS34

| ITEM            | WEIGHT<br>LBS | ARM<br>IN | MOMENT<br>LBS.IN | GALLONS |
|-----------------|---------------|-----------|------------------|---------|
| LEFT MAIN GEAR  | 868           | 90.75     | 78771.00         |         |
| RIGHT MAIN GEAR | 870           | 90.75     | 78952.50         |         |
| NOSE WHEEL      | 425           | 18.75     | 7968.75          |         |
| EMPTY WEIGHT    | 2163          | 76.60     | 165692.25        |         |

Empty Weight 2163  
Empty Weight C.G.: 76.60  
Gross Weight: 3300  
Useful Load: 1137

NOTE: Empty weight includes 9 qts of oil

Figure 1 - Most Recent Weight & Balance

## C. POH DOCUMENTS

*Express*

resulting total moment, when divided by the empty weight, results in the dimension, in inches, from the datum to the center of gravity.

The example above shows an alternate method of finding your empty c.g. from your weighing. The numbers used are only approximate, and relate to the measurements made as shown on page 4.

Weight & Balance

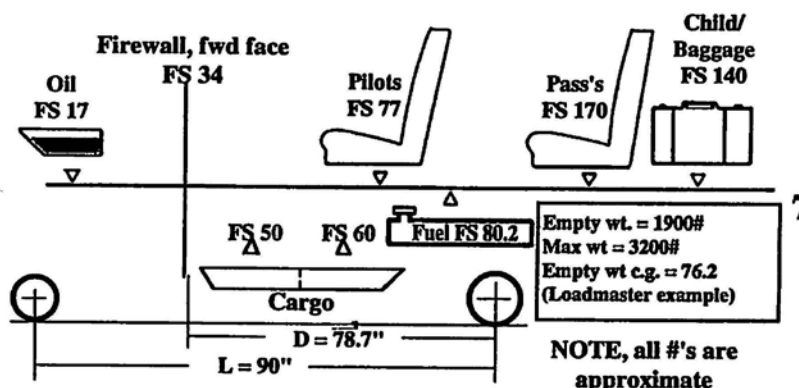


Diagram of Typical Arms for the Aircraft

### FINDING YOUR USEFUL LOAD

With these data in hand we can now compare the weight of the empty aircraft with the maximum allowable gross weight for your model, the difference being your useful load! The cg position can be compared to the allowable range (76.00 to 84.00) and you now know where your empty cg is located. It is generally desirable to have the empty cg near the forward limit as most of the additional weight to be added will drive the cg aft.

It is a prudent thing to measure the arms of all the seats in the plane

July, 1994

VI-7

Figure 2 - Stations from POH

*Express*

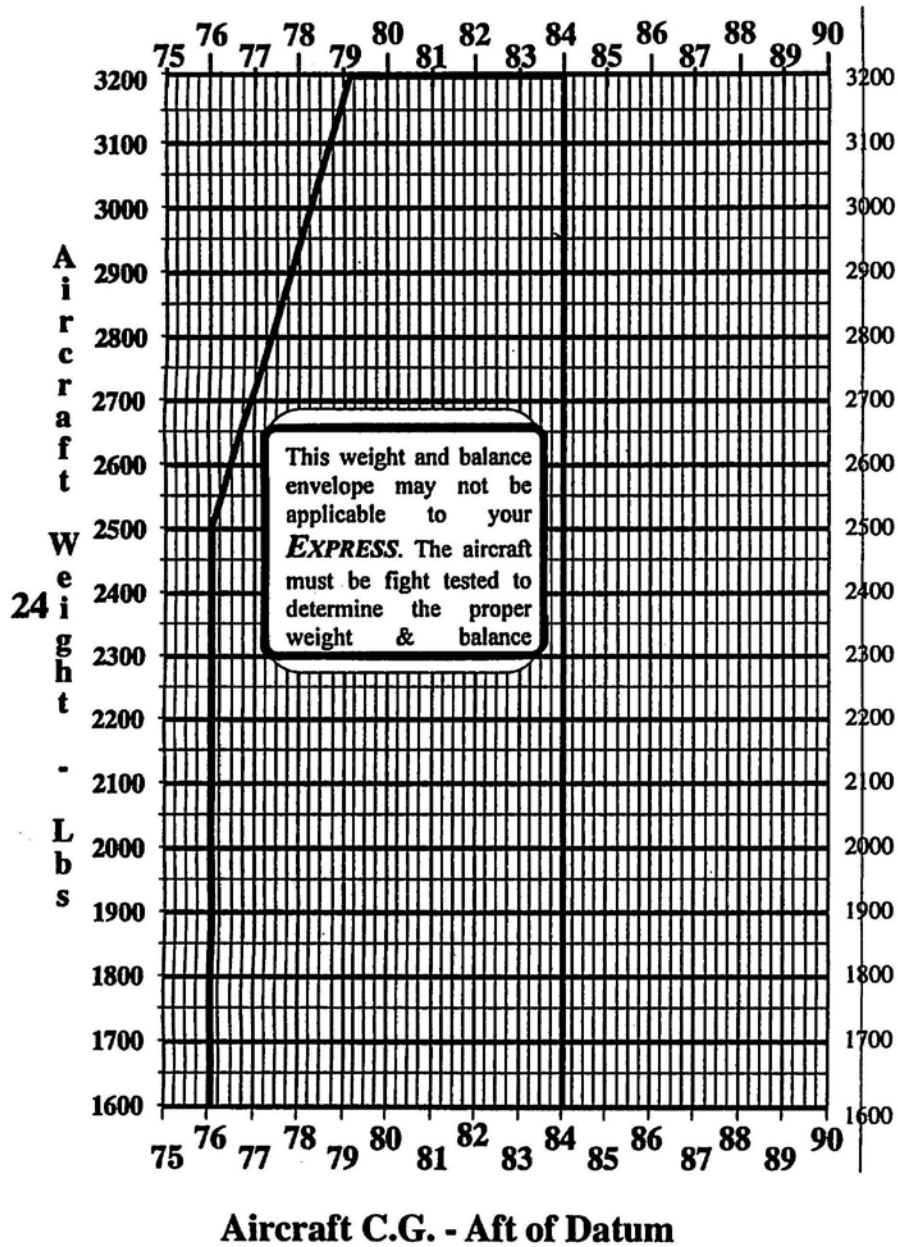


Figure 3 - W&B Envelope from POH

## D. CALCULATIONS

| TAKEOFF Wt & CG           |              |             |             |  |                 |
|---------------------------|--------------|-------------|-------------|--|-----------------|
| Inboards & Outboards Full |              |             |             |  |                 |
| Item                      | Station      | Weight      | Max Wt      |  | Moment          |
| EW                        | 76.6         | 2163        |             |  | 165685.8        |
| Ft Seat Pilot             | 77           | 215         |             |  | 16555           |
| Ft Seat Pax               | 77           | 200         |             |  | 15400           |
| Baggage (rear seat)       | 170          | 20          |             |  | 3400            |
| Wing Inboard Fuel         | 80.2         | 360         | 60g         |  | 28872           |
| Wing Outboard Fuel        | 80.2         | 180         | 30g         |  | 14436           |
|                           |              |             |             |  |                 |
| <b>TOTAL</b>              | <b>77.87</b> | <b>3138</b> | <b>3300</b> |  | <b>244348.8</b> |

Figure 4 - W&B with Full Fuel

| TAKEOFF Wt & CG                 |              |             |             |  |                 |
|---------------------------------|--------------|-------------|-------------|--|-----------------|
| Inboards Full & Outboards empty |              |             |             |  |                 |
| Item                            | Station      | Weight      | Max Wt      |  | Moment          |
| EW                              | 76.6         | 2163        |             |  | 165685.8        |
| Ft Seat Pilot                   | 77           | 215         |             |  | 16555           |
| Ft Seat Pax                     | 77           | 200         |             |  | 15400           |
| Baggage (rear seat)             | 170          | 20          |             |  | 3400            |
| Wing Inboard Fuel               | 80.2         | 360         | 60g         |  | 28872           |
| Wing Outboard Fuel              | 80.2         | 0           | 30g         |  | 0               |
|                                 |              |             |             |  |                 |
| <b>TOTAL</b>                    | <b>77.73</b> | <b>2958</b> | <b>3300</b> |  | <b>229912.8</b> |

Figure 5 - W&B with Empty Outboards

*Express*

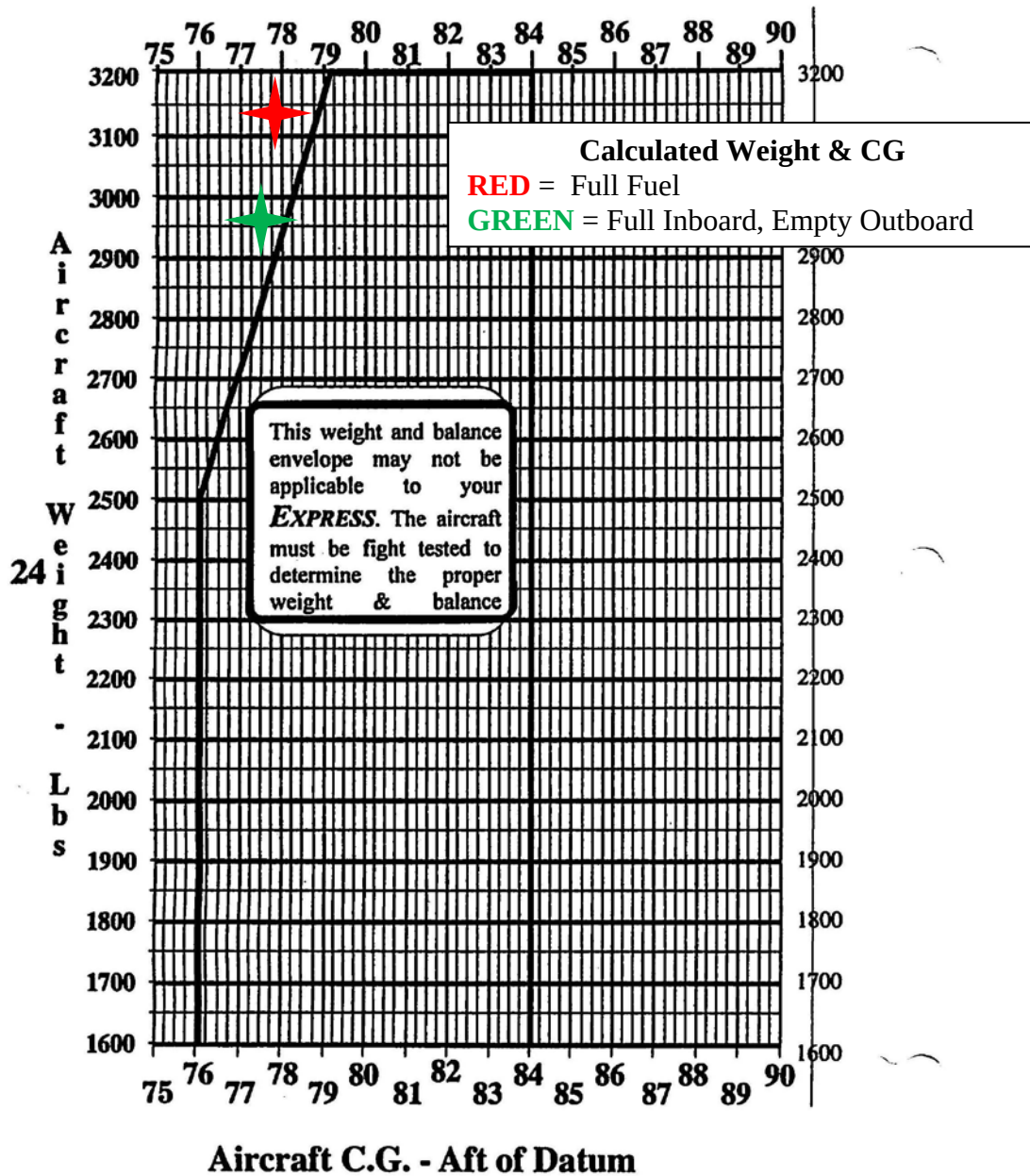


Figure 6 - Calculated Values on Envelope