

**** VERY IMPORTANT – FIGURE WEIGHT AND BALANCE BEFORE FLIGHT. ****

CENTER OF GRAVITY (C.G.) CALCULATION METHOD

THE MOMENT IS MEASURED IN INCH POUNDS, WHERE THE INCH DIMENSION IS THE ARM LENGTH AND POUNDS ARE THE FORCE (WEIGHT) APPLIED AT THE ARM LOCATION. THE DATUM -0- IS THE POINT FROM WHICH ALL ARM LENGTHS ARE MEASURED.

FOR THE AIRPLANE, THE INDIVIDUAL MOMENTS FOR EACH ITEM ARE ADDED TO GIVE THE AIRPLANE'S TOTAL MOMENT (ABOUT DATUM -0-). NEXT THE TOTAL MOMENT IS DIVIDED BY THE AIRCRAFT'S FLYING WEIGHT, GIVING YOU THE C.G. LOCATION. THE FLYING WEIGHT WILL CHANGE FOR VARIOUS PILOT WEIGHTS, PASSENGER WEIGHTS, AND/OR FUEL AMOUNT.

SAMPLE CALCULATION:

1) PERFORM WEIGHT & BALANCE IN NO WIND CONDITIONS WITH AIRPLANE LEVELED USING FUSELAGE TUBE SHOWN AS A LEVEL REFERENCE.

2) MEASURE AND RECORD THE WEIGHTS OF ALL THREE WHEELS. (NOTE: AIRCRAFT SHOULD BE IN EMPTY CONFIGURATION AND SHOULD BE RESTING ON THE TWO MAIN WHEELS AND TAIL WHEEL IN LEVEL POSITION AT ALL TIMES DURING THE MEASURING PROCESS.)

3) NOW EXPERIMENT WITH DIFFERENT LOADING CONDITIONS, FOR EXAMPLE:
AFT C.G. – 130 LBS PILOT, FULL FUEL, NO BAGGAGE OR PASSENGER.
FORWARD C.G. – HEAVY PILOT, NO FUEL, HEAVY PASSENGER OR BAGGAGE.

- A) FILL IN WEIGHT OF AIRCRAFT, PILOT, PASSENGER, BAGGAGE AND FUEL.
- B) MULTIPLY WEIGHT TIMES ARM TO GET THE INDIVIDUAL MOMENTS.
- C) ADD UP TOTAL FLYING WEIGHT.
- D) ADD UP TOTAL MOMENT.
- E) DIVIDE MOMENT BY WEIGHT TO GET C.G. LOCATION.
- F) RECALCULATE TAKING INTO ACCOUNT FUEL CONSUMPTION.

ACCEPTABLE C.G. RANGE: (LEVELED AIRPLANE)

SINGLE PLACE: 69.50" (FORWARD) TO 75.50" (AFT)

TWO PLACE: 73.00" (FORWARD) TO 79.00" (AFT)

SAMPLE CALCULATIONS (TWO PLACE)

	WEIGHT	X	ARM	=	MOMENT
TAIL WHEEL	22	X	192.00	=	4,224.00
RIGHT MAIN	277	X	82.50	=	22,644.75
LEFT MAIN	281	X	82.50	=	22,971.75
PILOT	140	X	47.68	=	6,675.20
PASSENGER	0	X		=	0
FUEL	30	X	91.39	=	2,741.70
OTHER ITEMS	0	X		=	0
OTHER ITEMS	0	X		=	0
TOTAL = 750			TOTAL = 59,257.40		

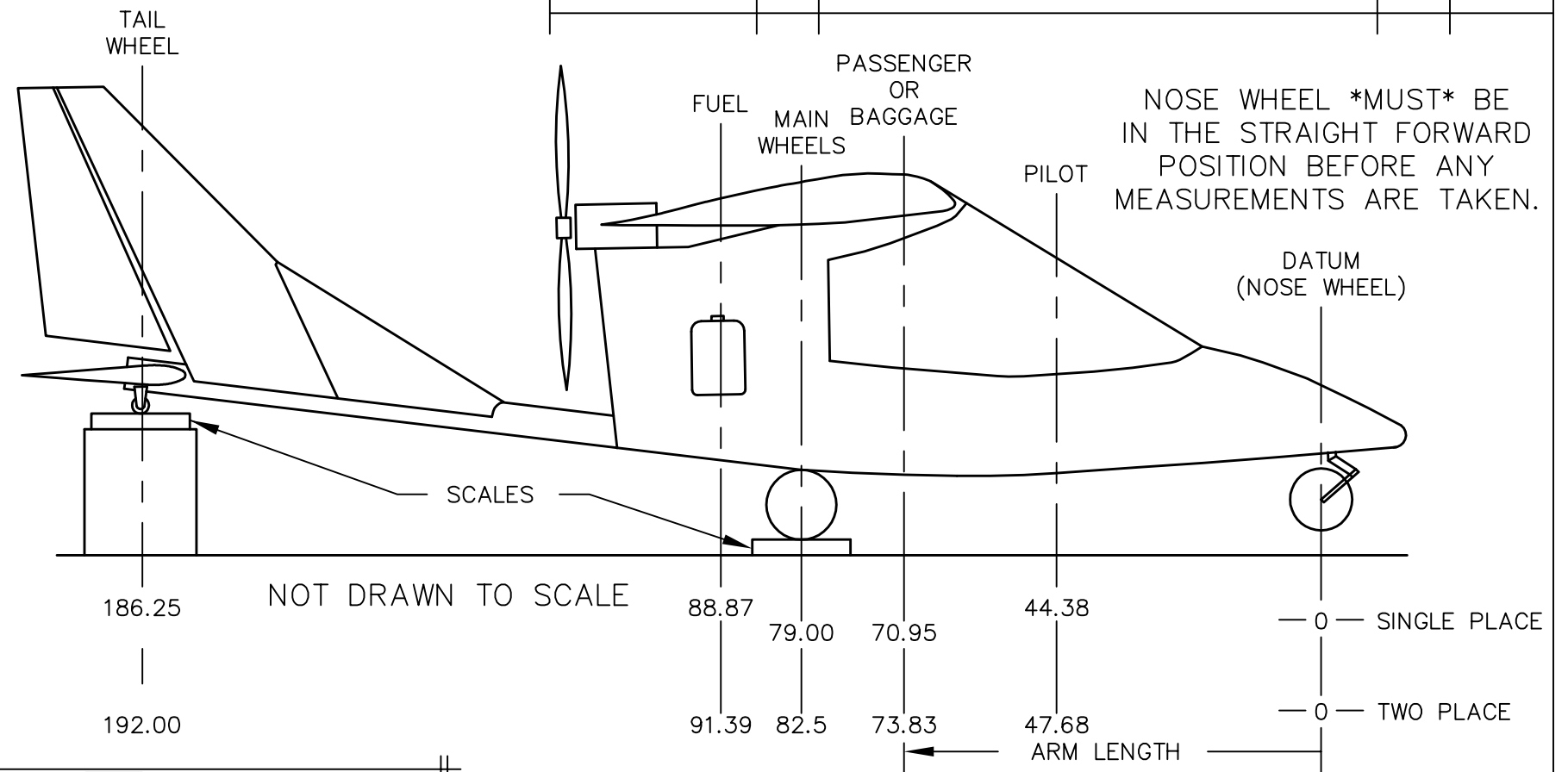
C.G. LOCATION = $\frac{\text{MOMENT}}{\text{WEIGHT}} = \frac{59,257.40}{750} = 79.01"$ C.G.

NOTE: AFT C.G. LOCATION IN THIS EXAMPLE.

NOTE: ALL DIMENSIONS ARE AS FOLLOWS,
WEIGHTS ARE POUNDS,
ARMS ARE INCHES,
MOMENTS ARE INCH POUNDS.

REVISIONS

E.C. NO.	REV.	DESCRIPTION	BY	DATE
1178	B	CALCULATIONS UPDATED FOR '98	K.B.	1/98

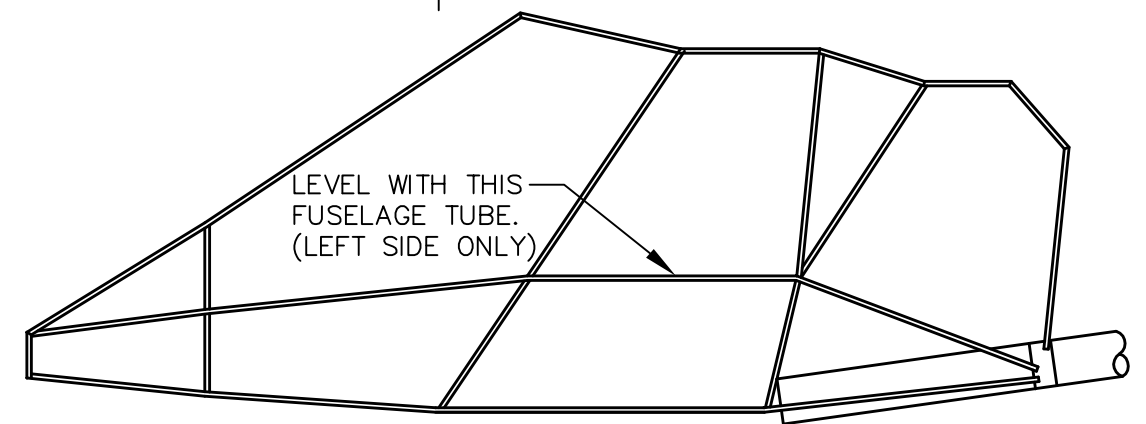


USE THESE ARM LENGTHS FOR THE FOLLOWING SERIAL NUMBERS ONLY:
- SINGLE PLACE "T" SERIAL NUMBERS.
- SINGLE PLACE "Q" SERIAL NUMBERS.
- TWO PLACE "D" SERIAL NUMBERS, 0034 AND HIGHER.

YOUR CALCULATIONS

	WEIGHT	X	ARM	=	MOMENT
TAIL WHEEL		X		=	
RIGHT MAIN		X		=	
LEFT MAIN		X		=	
PILOT		X		=	
PASSENGER		X		=	
FUEL		X		=	
OTHER ITEMS		X		=	
OTHER ITEMS		X		=	
TOTAL =			TOTAL =		

C.G. LOCATION = $\frac{\text{MOMENT}}{\text{WEIGHT}} = \text{---} = \text{---}$ C.G.



TITAN AIRCRAFT SUPPLY

1419 STATE ROUTE 45 SOUTH
AUSTINBURG, OHIO 44010

DETAIL NAME		WEIGHT AND BALANCE	
SCALE	N/A	PART NO.	
ASSEMBLY NAME SINGLE PLACE AND TWO PLACE TORNADO			
PART NO.		DRAWING NO.	
DRAWING NO.		B 93-INS-0339-B	

DRAWN J. PRESTON	DATE 2/23/93
CHECKED R. INGLE	DATE 1/10/01
APPROVED J. WILLIAMS	DATE 1/17/01

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