

**\*\* 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 AIRPLANES TOTAL MOMENT (ABOUT DATUM -0-). NEXT THE TOTAL MOMENT IS DIVIDED BY THE AIRCRAFTS 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. – 200 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)  
72.00" (FORWARD) TO 81.00" (AFT)

(B)

**SAMPLE CALCULATIONS (TWO PLACE)**

	WEIGHT	X	ARM	=	MOMENT
TAIL WHEEL	35	X	197.25	=	6,903.75
RIGHT MAIN	584	X	70.08	=	40,926.72
LEFT MAIN	584	X	70.08	=	40,926.72
PILOT	200	X	88.00	=	17,600.00
PASSENGER	0	X	113.00	=	0
FUEL	100	X	94.00	=	9,400.00
FWD BAGGAGE	35	X	34.00	=	1,190.00
AFT BAGGAGE	0	X	131.00	=	0
TOTAL = 1538		TOTAL = 117,988.20			

C.G. LOCATION =  $\frac{\text{MOMENT}}{\text{WEIGHT}} = \frac{116,947.19}{1538} = 76.04" \text{ C.G.}$

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

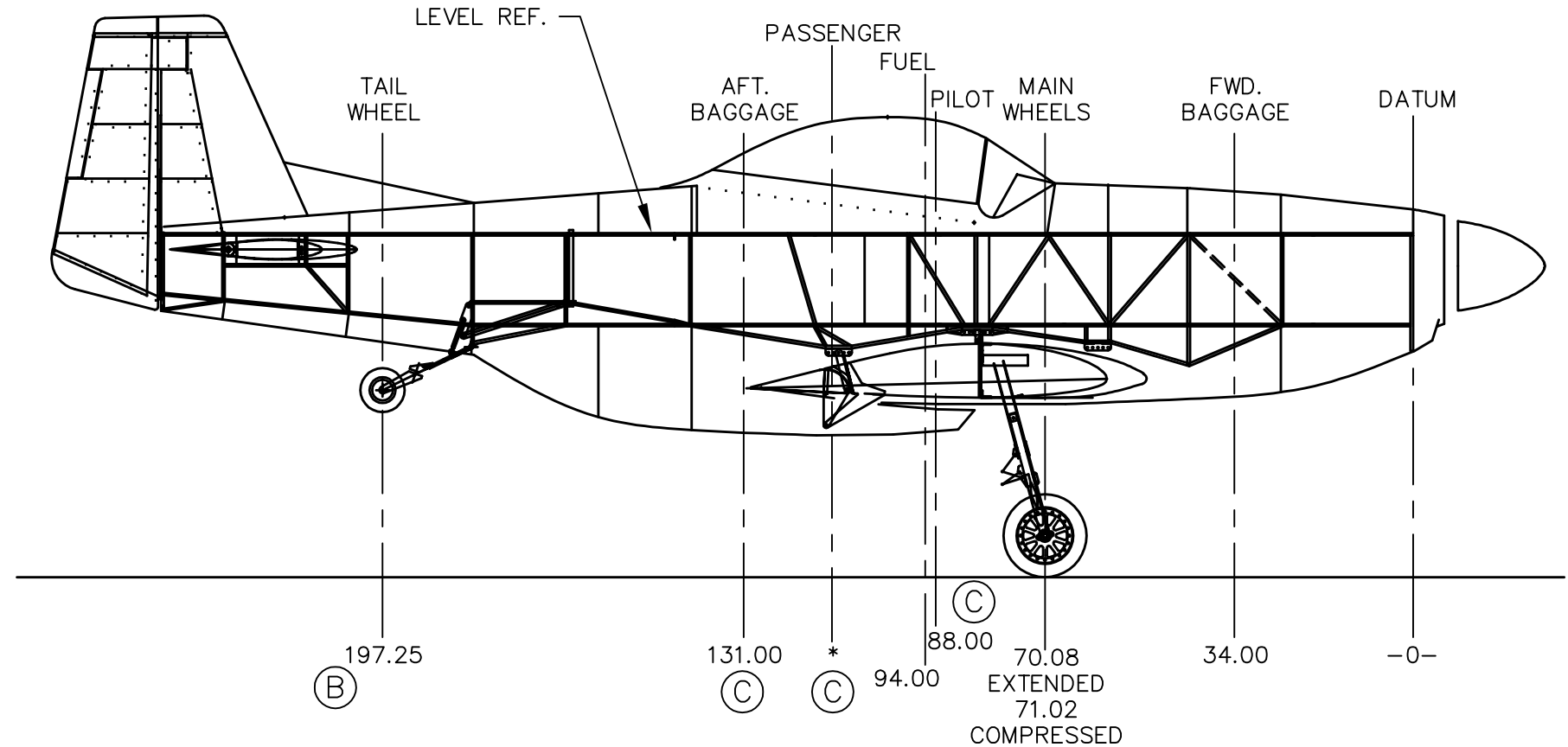
**YOUR CALCULATIONS**

	WEIGHT	X	ARM	=	MOMENT
TAIL WHEEL	X			=	
RIGHT MAIN	X			=	
LEFT MAIN	X			=	
PILOT	X			=	
PASSENGER	X			=	
FUEL	X			=	
FWD BAGGAGE	X			=	
AFT BAGGAGE	X			=	
TOTAL =		TOTAL =			

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

DRAWN K. LIPLIN	DATE 5/6/03
CHECKED B. KOLENO	DATE 12/2/09
APPROVED J. WILLIAMS	DATE 12/8/09

REVISIONS				
E.C. NO.	REV.	DESCRIPTION	BY	DATE
	A	DRAWING RELEASED	KL	5/03
0067	B	CHANGED DATUM MEASUREMENTS	CE	2/04
0984	C	CHANGED DATUM MEASUREMENTS	BH	12/09



\* 109.00 NORMAL  
113.00 FOR SEAT MOD

(C)

**TITAN AIRCRAFT SUPPLY**  
1419 STATE ROUTE 45 SOUTH  
AUSTINBURG, OHIO 44010

DETAIL NAME		WEIGHT AND BALANCE	
SCALE 1/32"=1"	PART NO.		
ASSEMBLY NAME		T-51 MUSTANG	
PART NO.	DRAWING NO. PF1		
DRAWING NO.		B T51-03-INS-0676-C	

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