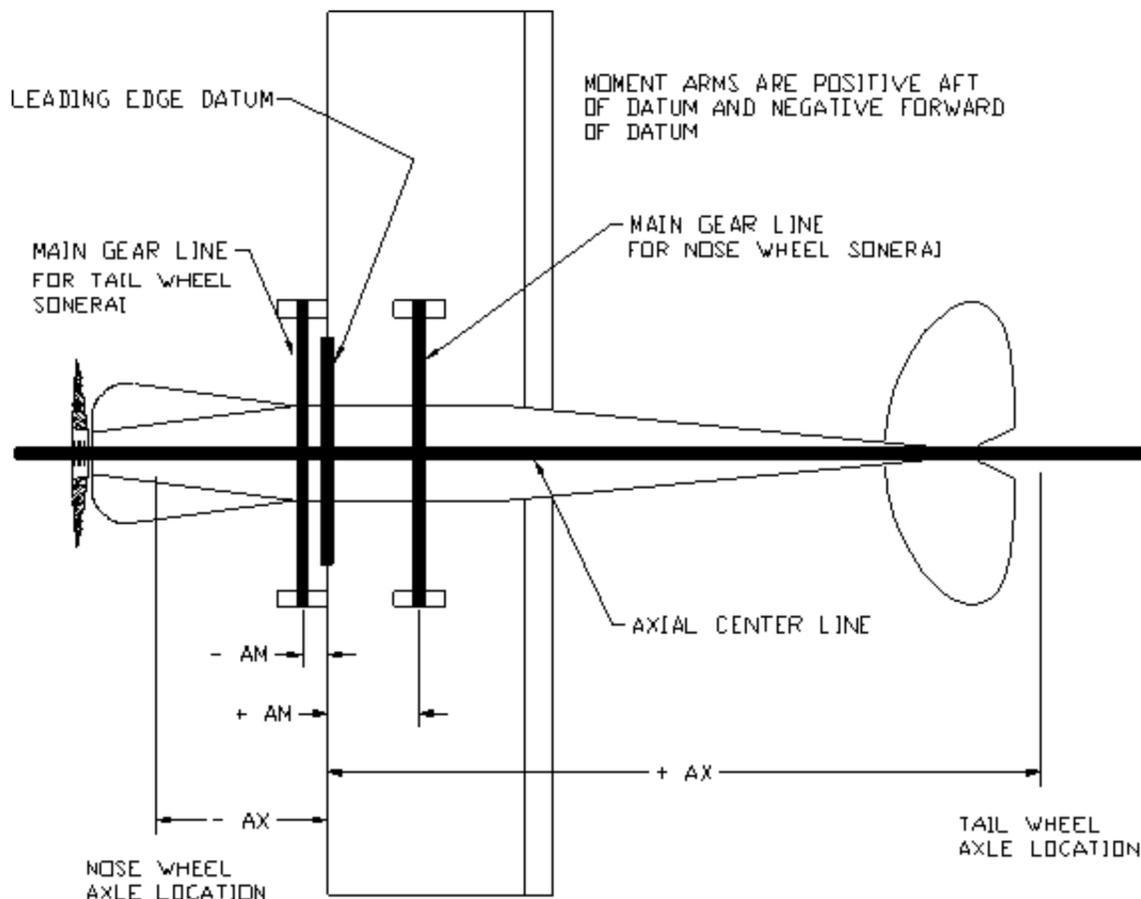
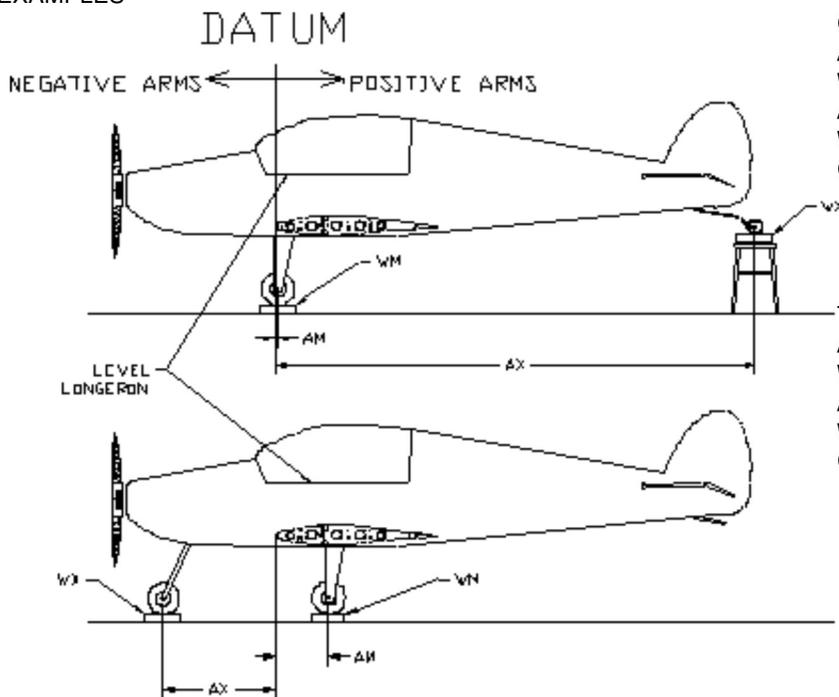


Weight and Balance Calculation for the Sonerai Aircraft.

1. Drain all oil and fuel. Remove all items that are not part of the aircraft. Undrainable fuel and oil are normally part of empty weight, therefore a dry engine sump, oil cooler, or fuel tank should be filled and then drained using normal maintenance procedures.
2. Position the aircraft on three scales.
3. Level the aircraft by adding shims under the scales. Tail wheel aircraft will require a stool to raise the scale for the tail wheel. Place the level on the upper fuselage longeron.
4. Using a plumb-bob and a piece of chalk, transfer engine centerline and tail centerline locations to the floor.
5. Use a carpenter's chalk line to connect the engine and tail points creating an AXIAL CENTER LINE on the floor.
6. Transfer the right and left wing leading edges to the floor using the plumb-bob and chalk.
7. Snap a chalk line through the leading edge points on the floor and label it DATUM. Write the word POSITIVE on the axial center line between DATUM and the tail of the aircraft. Write the word NEGATIVE on the axial centerline between DATUM and the engine.
8. Transfer the main gear axle locations to the floor.
9. Snap a chalk line through the axle points and label it MAINS. If you have a tail wheel Sonerai, the MAINS line will be forward of the leading edge by about one inch. If you have a nose wheel Sonerai, the MAINS will be aft of the DATUM by about 19 inches.
10. Measure the distance between the intersections of the DATUM line and the MAINS line. This is dimension AM, (arm main).
11. If the MAINS line is aft (toward the tail) of the DATUM line, AM is positive. If the MAINS line is forward of the datum line AM is negative. Record AM on the work sheet.
12. Transfer the tail wheel or nose wheel axle point to the AXIAL CENTER LINE on the floor using a plumb-bob.
13. Measure the distance from the DATUM to the tail or nose wheel position as applicable. This is dimension AX, (arm, tail or nose X). AX will always be positive for a conventional gear aircraft and AX will always be negative for a tricycle gear aircraft.
14. Perform the calculations in the examples to assure you arrive at the same empty weight CG (rounded) before calculating your own numbers.



EXAMPLES



CONVENTIONAL GEAR
 AM = ARM MAIN = -.9
 WM = WEIGHT MAIN = 530
 AX = TAIL ARM = 168
 WX = WEIGHT TAIL = 30
 CGE = 8.15

TRICYCLE GEAR
 AM = ARM MAIN = 19
 WM = WEIGHT MAIN = 477
 AX = ARM NOSE = -32
 WX = WEIGHT NOSE = 137
 CGE = 7.62

15. Record weights of the two main scales. Add together and record as WM, (weight mains).
16. Record weight on tail or nose wheel scale. Record as WX, (weight nose or tail).
17. Double check that all arms forward of the leading edge are recorded as negative and all arms aft of the leading edge are recorded as positive. Remember that when a positive number is multiplied by a negative number the resulting product is negative.
18. Multiply AM by WM and record moments as MM, (moments mains).
19. Multiply AX by WX and record moments as MX, (moments nose or tail).
20. Add WM and WX to get WE, (weight empty).
21. Add MM and MX to get ME, (moments empty). Remember to subtract if moments are negative.
22. Divide ME by WE to get CGE, (empty center of gravity).

SONERAI W&B WORKSHEET

N# _____ **DATE** _____

empty center of gravity (CGE) =
$$\frac{\text{total moments (MT)}}{\text{total weight (WT)}}$$

arm main (AM) _____
weight main (WM) _____
moments main (MM = AM x WM) _____

arm tail or nose (AX) _____
weight tail or nose (WX) _____
moments tail or nose (MX = AX x WX) _____

total weight (WT = WM + WX) _____
total moments (MT = MM + MX) _____

empty center of gravity (CGE = MT / WT) _____