Help for CFI Tools Weight & Balance

PURPOSE: The Weight & Balance App is used to perform weight & balance calculations in a flexible format that is easy to use and customize.

There is no limit on the number of airplanes that can be created in this W&B App.
There is no limit on the number of Stations defined for each airplane.
There is no limit on the number of Envelopes defined for each airplane.

CAUTION! Please consult your Pilot's Operating Handbook or Approved Flight Manual for complete, accurate Weight & Balance Information for your airplane.
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When to Use the Weight & Balance App

To calculate the Weight and Balance for your airplane
It's a lot easier than doing it by hand. And once you have it setup for your airplane it is easy to make copies so you can save different configurations such as different fuel or passenger loads.

To calculate the Weight and Balance for many configurations of your airplane
Since there is no limit on the number of airplanes or stations you can make many copies of your airplane. You might have one with full fuel and 2 people and another with half fuel and 4 four people or any other configuration that you want to save.

To email your Weight and Balance straight from the App using standard iPad/iPhone email
Just press the Email button and the W&B report email comes up ready to send as an email attachment.

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Main Screen

Airplane
Touch the gray button at the top of the screen to select an airplane. The App comes with a number of sample template airplanes. It is unlikely that any of these will match your airplane. Your airplane is unique! You must enter the numbers from your AFM/POH in order to get an accurate calculation. These templates are really fairly simple and even if you can't find one that matches your airplane almost any of them can be quickly customized to match your numbers.

Stations
- Here is a list of the Stations defined for this airplane. Touch a Station on this list to go to the Station update screen for the selected station.
Touch the first blank line to create a new Station.

The Envelope Drawing
- This graph shows the answer. The center of gravity (CG) is plotted along with the weight. If this point is outside any of the defined envelopes this will be noted on the graph.

VSpeeds

- This is really just a simple scratchpad. I added it here and called it VSpeeds because I just wanted a place to keep track of VSpeeds for a number of different airplanes. You can write whatever you want on these lines it is not used for any calculations.
Touch the first blank line to create a new VSpeed.

Summary
- The first fields here, Max Gross, is only used to calculate the Excess Capacity, it is not used for the CG calculation. Enter the Max Gross for the airplane in this field. The other fields under the Summary are output from the calculation.
Total Weight is the sum of the weights entered for the Stations.
Excess Cap. is the difference between Max Gross and Total Weight. This is a nice number to know it is basically how much more weight you can put in the plane without going over Max Gross.
No Fuel Weight is the Total Weight minus the sum of the Stations identified as fuel.
CG is the calculated Center of Gravity.
No Fuel CG is the calculated Center of Gravity with all the fuel stations weight set to zero.

Envelopes
- These are the Envelopes for the airplane. There is no limit on the number of envelopes for an airplane. Most of these planes have a normal and utility envelope defined. You may also see a third envelope defined for airplanes that have a Max Landing Weight. Any other envelope that makes sense for you airplane can be defined.
Touch the first blank line to create a new Envelope.

Share
- The Weight & Balance definitions for any or all of your airplanes can be **shared** with other General Aviations App users.

Touch the **Share** button on the Main Screen.

On the **Share** screen select the airplanes you would like to share and touch the Share button.

The next screen you see will be the standard Apple **sharing** screen and the options presented may vary depending on the configuration of your device. Every option will not work on every device, but Email is one option that should be standard on most devices and works well as a method to share the definitions.

To import a shared definition file using Email. Open the message with the General Aviation App W&B shared file attached. Touch the file to select it and on the popup select the **Open in GenAviation** option. The App will open and automatically import the W&B definitions.

To use **Air Drop** to share the definitions select the Air Drop option and follow the instructions. The sender will choose a recipient who is in the vicinity. Then the recipient will decide whether to allow the import. If allowed the App will be started and the definitions will be automatically imported.

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How to Use the Weight & Balance App

View W&B Information
- Touch the grey Aircraft button at the top of the screen to select an aircraft
- View the W&B information

CG Calculation Method

- Select the Distance or Weight-Moment method, see below for details

View & Update W&B Stations
- View the Aircraft
- Touch the Station that you would like to change
  This will bring up the individual Station update screen

View and update the Station
Station Fields:

Station: This is the name of the Station

Weight: The weight at this station

MmT/CG Loc: This is the Moment or CG location.
If the airplane used the Distance method this is the CG Loc usually measured in inches or millimeters.
If the Weight-Moment method is used this is the Moment found on the POH graph, this is usually expressed in Inch-Pounds or Kg-m.

Weight per Unit: If Enter Units? is selected (see below) this field should contain the weight of a single unit, for example if this is fuel the weight of one pound of fuel (6 Lbs.) may be entered here

Units: If "Enter Units?" is selected (see below) this field should contain the number of units for example 53 gallons of fuel.

Fuel?: This switch is used to indicate that this station is for fuel. This is used to calculate the second CG which is for zero fuel. Any station that has a Station name that contains the word "Fuel" will also be counted as fuel for this zero-fuel calculation.

Enter Units?: This switch is used to indicate how the weight for this station is calculated. If this switch is set to "No" then the weight is simply entered in the Weight field. If this switch is set to "Yes" the weight is calculated by multiplying "Weight per Unit" by "Units". This switch was created to make it easier to enter the weight for fuel. Many people like to deal with Gallons or Liters rather than Pounds or Kilograms. This switch allows you to do that.

- Touch the Back button at the top to finish the Station update.

View & Update W&B Envelope
- View the Aircraft
- Touch the Envelope that you would like to change
- View and update Envelope
The table on the left side of this screen shows the definitions for each point in the envelope.
There are two numbers to define each point. The first number is a weight, the second depends on the Compute Method chosen for the airplane.
If you choose the Distance method the second column will contain the distance for that point in the envelope usually defined in inches or millimeters. If you choose the Weight-Moment method this number will be the Weight-Moment usually defined in inch-pounds or Kg-m.
- Touch the Back button at the top to finish

A note about the unit of measurement
This W&B App does not use any particular unit of measurement. There is no need to specify this unit as long as the user in consistent in entering data. For example if you decide to use pounds rather than kilograms for weight measurement this OK as long as all the weights entered are expressed in pounds.

This consistency only has to be maintained within a specific airplane. That means you can have one airplane that records weight in pounds and another that records weight in kilograms.

Delete or Add a Station, Envelope or V-Speed Measurement
- Touch the Edit button
- To Delete Touch the minus (-) button and touch Delete
- To Add Touch the plus (+) button to create a new entry
- Use the Update function (above) to update the new entry

Move a Station, Envelope or V-Speed:
- Touch the Edit button
- Touch the right side of the entry to be moved and drag it to its new position

These Add, Delete and Move functions are standard iPhone table functions and are the same for any table that has a grey Edit button.

Delete an Airplane:
- Touch the Delete button
- Confirm the Delete

Add an Airplane:
- Touch the New Airplane Button
- Select a template to pre-fill with generic information. If you don't see your airplane on this list just choose one that is similar and the data can be updated to match your airplane.
You probably won't find your exact airplane on this list. Each airplane is unique and must be customized.
- Update the information provided in the template to match your airplane

The calculated **CG** is plotted on the graph as a Red Dot. A **second CG** that represents the zero fuel CG is also plotted as a Red Dot.

The two Red Dots represent the starting and ending CG's and the difference between them is the weight of the used fuel.

The weight of the fuel is identified as the weight of the Station whose name contains the word "fuel". And any Station that has the "Fuel ?" switch set to the "Yes" position.

V-Speeds

The V-Speeds page allows entry of V-Speeds, or any other data, for each Airplane.
The data entered here is **not validated in any way**. So you can enter whatever you like.

This could be V-Speeds or any other information you would like to have at your fingertips.

It might be oil capacity, or tip-tank size or power settings for cruise and descent.

Email

The Email function allows you to email the W&B report. This function is useful for dispatchers who have to collect W&B information for a fleet.

Just touch the Email button and fill in the destination. It's ready to go.

This uses the standard Email screen so you can use any standard iOS email functions.

Please Note!

There are 2 types of Calculation/Plotting Methods Supported:

Distance and Weight-Moment

The method you choose depends largely on the Center of Gravity limits table that you have in your POH. Different manufacturers supply these numbers in different formats.

Choose the Distance method if your graph has a distance along the bottom or top of the graph usually expressed as inches or millimeters.

Choose the Weight-Moment method if your graph has a weight-moment along the bottom or top of the graph usually expressed as inch-pounds of Kilogram-millimeters.

Distance Method
This method uses the CG envelope that shows a distance along the bottom of the graph. For this type aircraft "Plot Type" should be set to Distance. The Stations should be entered with Weight and Location/Distance from the datum.

The Moment is calculated for each Station like this:
Moment = Weight x Location

The CG for the airplane is calculated like this:
CG = Total Moment / Total Weight (expressed in Inches or Millimeters)

Weight-Moment Method
This method uses the CG envelope that shows a weight-moment along the bottom of the graph. The Stations should be entered with Weight and Location/Distance from the datum.
The Moment is calculated for each Station

The Moment is calculated for each Station like this:
Moment = Weight x Location

The CG for the airplane is calculated like this:
CG = Total Moment (expressed in Kg-m or In-Lbs)

Although they both do the same thing, there are two key differences in these methods.
The unit of measurement for the CG is different. The difference is simply that in the Weight-Moment method the CG is not divided by the weight.

And using the Weight-Moment method the answer is usually expressed as a number in the thousands as opposed to the Distance method where the CG answer is usually expressed as dozens when using inches. This can lead to some confusion if the W-L chart in your POH displays the scale along the bottom row as In-Lbs / 1,000. It is easy to forget to divide or multiply by 1,000 depending on which way you are reading the chart.

Carrier 📶 9:54 AM 100% 🔋

WEIGHT & BALANCE

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N3504L Cessna 172-S

Registration **N3504L** Make **Cessna** Model **172-S**

Edit **Stations**

Basic Empty	1714.2	40.757
Front Left	180	37
Front Right	200	37
Rear Seat	5	73
Baggage 1	6	95
Baggage 2	0	123
Fuel	210	48

Outside the Envelope Utility

Outside! Utility

Edit **VSpeeds/Notes**

VX	62
VY	74
VS0	40
VS1	48
VNO	129
VFE	110/85
VNE	163
Max Glide	68
Max Demo XWind	15

Summary

Max Gross	2550
Total Weight	2315
Excess Cap.	235
No Fuel Wgt	2105
CG.	41.0
No Fuel CG.	40.3

Envelopes **Edit**

Normal
Utility

New Airplane **Delete**

Copy **Email**

Share

Method Distance Weight-Moment

CFI Tools

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N172P Cessna 172-P Envelope

Env. Name　Utility

Envelope Line Drawing Color　**Red**

Edit

Weight	Moment or CG Loc.
1500	35
1950	35
2100	36.5
2100	40.5
1500	40.5

Outside the Envelope Utility

Outsid
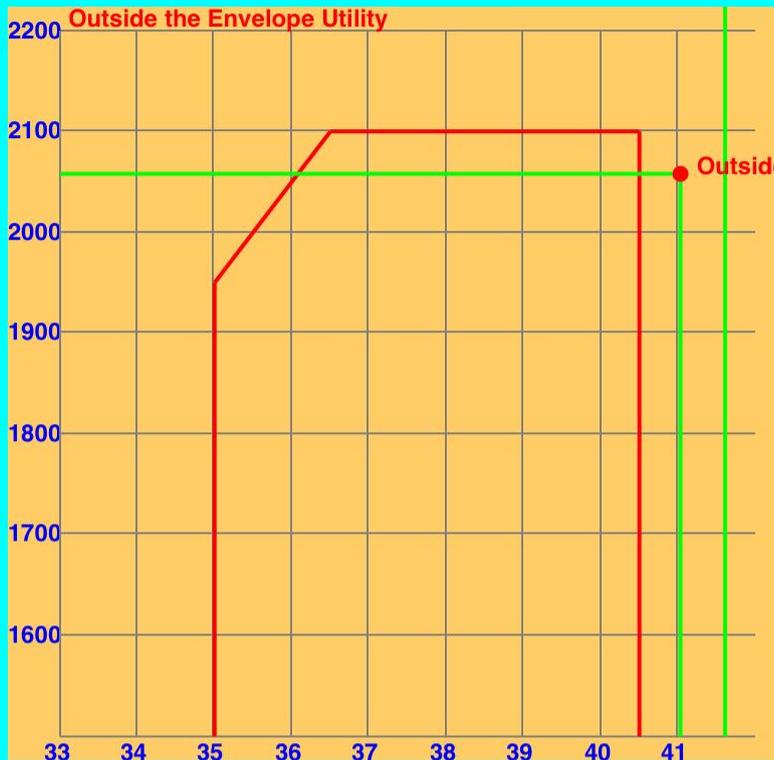
Weight & Balance Sharing Screenshots

CFI Tools

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N35B Beechcraft Bonanza V35B

N172P Cessna 172-P

N172R Cessna 172-R

N3504L Cessna 172-S

N182T Cessna 182-T

N162 Cessna 162

N20M Mooney M20M Bravo

N28161 Piper PA28-161 Warrior II

N28181 Piper PA28-181 Archer II

N28R201 Piper PA28-181 Arrow III

N32301 Piper PA32-301 Saratoga

N20C1 Diamond DA20-C1

N5B Grumman Tiger AA5B

N20CD Cirrus SR20

NX Generic Model

Select All

Select None

Share

Back   **SHARE**

N35B Beechcraft Bonanza V35B

N172P Cessna 172-P

N5294W Cessna 172-R

N3504L Cessna 172-S

N182T Cessna 182-T

N162 Cessna 162

N20M Mooney M20M Bravo

AirDrop

Share instantly with people nearby. If they do not appear automatically, ask them to open Control Center and turn on AirDrop.

Message   Mail   Twitter   Facebook

Cancel

Weight & Balance Station Update Screenshot

Back

N172P CESSNA 172-P STATION

Station: **Basic Empty**

Weight: **1533**

Mmt/CG Loc: **38.7**

Weight per Unit: **0**   eg. 6 Lbs per Gal. or .72 Kg per Litre

Units: **0**   eg. # Gallons or Litres

Fuel? [Yes | **No**]

Enter Units? [Yes | **No**]

Enter Units = No - Just enter the weight
Enter Units = Yes - Enter Weight Per Unit & Units
   - eg. 6 Pounds per Gallon and 35 Gallons
   - The Weight will be calculated

CFI Tools

Weight & Balance Create Airplane Screenshot

Carrier 10:56 AM 100%

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WEIGHT & BALANCE ADD AIRPLANE

N35B Beechcraft Bonanza V35B

N172P Cessna 172-P

N172R Cessna 172-R

N172S Cessna 172-S

N182T Cessna 182-T

N162 Cessna 162

N20M Mooney M20M Bravo

N28161 Piper PA28-161 Warrior II

N28181 Piper PA28-181 Archer II

N28R201 Piper PA28-181 Arrow III

N32301 Piper PA32-301 Saratoga

N20C1 Diamond DA20-C1

N5B Grumman Tiger AA5B

N20CD Cirrus SR20

NX Generic Model

Select a template to be used for the new airplane.

These templates are supplied to help with the setup. These samples should NOT be used to perform actual W&B calculations. The actual numbers from your POH/AFM should be used.

These samples do not imply any limits. There is no limit on the number or type of airplanes that can be entered. There is no limit on the number of Stations or Envelopes for any airplane entered.

CFI Tools

Weight & Balance VSpeed Update Screenshot

CFI Tools

Back   Vspeed Update   Edit

VX	60
VY	76
VS0	33
VS1	44
VNO	127
VFE	110/85
VNE	158
Best Glide	65

Weight & Balance Create Email Screenshot

Cancel   **Weight and Balance Report**   **Send**

To:

Cc/Bcc:

Subject: Weight and Balance Report

Weight and Balance Report Wed 2013-01-16 17:28 EST

Registration: N172P
    Make: Cessna
Model: 172-P

Station	Weight	Loc	Moment
Basic Empty	1533	38.7	59327.1
Front Left	170	37	6290.0
Front Right	200	37	7400.0
Rear Seat	150	73	10950.0
Baggage 1	5	95	475.0
Baggage 2	0	123	0.0
Fuel	186	48	8928.0
Total	2244		93370

Max Gross: 2400
Excess Capacity: 156.0

CG: 41.6
CG No Fuel: 41.0

📄
WandBReport.txt

Sent from my iPhone Simulator

Weight & Balance Email Attachment Sample

Weight and Balance Report Sat 2011-01-29 11:16 EST

Registration: N3504L
        Make: Cessna
       Model: 172-S

Station	Weight	Loc	Moment
Basic Empty	1714.2	40.757	69865.6
Front Left	180	37	6660.0
Front Right	200	37	7400.0
Rear Seat	5	73	365.0
Baggage 1	5	95	475.0
Baggage 2	0	123	0.0
Fuel	210	48	10080.0
Total	2314		94846

       Max Gross: 2550
Excess Capacity: 235

            CG: 41.0
   CG No Fuel: 40.3