



CANADIAN OWNERS AND PILOTS ASSOCIATION

COPA Guide to Estimating Aircraft Operating Costs



Photo courtesy of Adam Hunt



Introduction

This is a program for estimating aircraft operating costs was developed by Adam Hunt. It is a small 22-kb program that uses Microsoft Excel and which can be downloaded. It will allow you to quickly figure out the costs of owning any particular type of airplane. Microsoft Excel is a requirement to run the program.

Open the [Excel file](#) for the program and enter values into the yellow spaces. It will run calculations and give you operating costs at the bottom, along with two graphs that plot costs versus hours per year.

The Excel Spreadsheet for the aircraft operating cost estimation program can be downloaded [here](#).

How to complete the Excel Spreadsheet

Enter data in the yellow spaces, the program will calculate the rest.

Here are some specific points on each space:

- **Aircraft type** – This does not figure in the calculations. It is just so you will remember later what type you did the calculations for.
- **Number of Owners** – Enter the number of partners who own the aircraft. If the aircraft is owned by one person then leave the number as “1”. The program will calculate the cost per year and the cost per hour at the bottom of the page per owner.
- **Hull Insurance** – Get this figure from an insurance company based on your type and individual pilot details (accident record, total flying time, etc). For a rough number use 3.5% of the hull value (purchase or replacement cost).
- **Liability Insurance** – Get this figure from an insurance company.
- **Passenger Insurance** – Get this figure from an insurance company.
- **NOTE** – If your insurance company quotes you one package price for all, don't bother trying to break it down – you can just enter it on the Total Insurance Cost line.
- **Monthly Storage Cost** – Cost of hangarage or tie-down per month. This is just the monthly fee, not the cost of buying a hangar (that comes later). These costs vary greatly so ask at the airport that you will be based at. If it is zero, then enter 0!
- **Hangar Insurance** – Enter the annual cost.
- **Maintenance** – This is always an estimate. For owner maintenance aircraft (including amateur-built, ultralights) enter the forecast cost of parts per year, for a non-owner maintained airplane don't forget to add in AME labour! Wild guess numbers
 - Ultralight, owner maintained - \$500, Cessna 182 - \$7,500, if it is in good shape and needs very little major work each year!
- **Appreciation/Depreciation** – Enter the average amount that the aircraft is increasing or decreasing in value per year, assuming a constant engine time (that is added in later on). New aircraft depreciate for about 20 years and then start appreciating again. If the aircraft is appreciating in value use a negative number in this space. If it is depreciating use a positive number. These values vary greatly from aircraft to aircraft and year to year. Some ballpark numbers – 1975 Cessna 172 – appreciating \$1,000 per year average, 1999 Diamond Katana depreciating \$7,500 per year average, 2002 Cirrus SR-22 depreciating \$10,000 per year! Check the [VREF Evaluation Guide](#), available on the COPA website, for current figures.
- **Nav Can Service Charges** – Ultralights, gliders, airplanes under 1362 lbs gross weight and balloons are free; enter \$0. Aircraft weighing 0.617 to 2.0 metric tonnes pay \$67.40 / year, 2.0 to 3.0 metric tonnes pay \$225.12 / year.



- **Publications Costs** – These costs can vary a lot depending on what publications you fly with and how often you update them. Currently VNC maps are \$16.50, a CFS is \$29.00, CWAS is \$45.00 and CAP volumes are \$20.00 each. Make sure that shipping and taxes are included in your estimate.
- **GPS Databases** – These can also vary a lot and could be “not applicable” if you fly without GPS or don’t update it.
 - Typically these run \$25-\$1,500 per year, but have a look at www.jeppesen.com or your GPS manufacturer for more details for your actual contemplated GPS set.
- **Lifed Items** – These are all items that have a fixed service life. These will also vary greatly depending on the type of aircraft and how it is stored. Some guidance estimates are given below.
- **Exterior/paint** – Enter the cost of fixing the outside of the aircraft here. For metal painted aircraft this will be the cost of painting it and the frequency that it needs painting. For a metal aircraft stored outdoors figure on every 15 years. If stored indoors it may go a lot longer, perhaps 25 years. Average costs of repainting a Cessna 150 \$12,000, Cessna 182 (and similar sized four seaters) \$15,000. For fabric aircraft enter the cost of recovering the aircraft. For Dacron-covered ultralights and Powered Parachutes/Powered Paragliders add the wing cover or canopy cost and a reasonable life span.
- **Interior/seats** – Enter the cost of refurbishing the interior and the projected period between refurbishing. This will also vary greatly. For an aircraft stored outdoors and with cloth seats figure on every 10 years. For a leather interior stored indoors perhaps 20 years! Figure on a cost of \$5,000 for a cloth interior or \$12,000 for leather! For ultralights add in the cost of new seats and interior items here.
- **Prop overhaul** – Variable pitch props must be overhauled no less than every ten years (CAR 625 Appendix “C”). Budget up to \$4,000 every ten years, ask your AME for an estimate. Fixed pitch props can vary greatly, depending on factors such as corrosion and wear, usually they just require removing, inspecting and re-installing every five years.
- **Other Lifed Items** – Add in any other items that have a specified fixed life, like hydraulic actuators, rotor blades, balloon envelopes, BRS parachutes, etc
- **Financing costs** – This new section works out the cost of borrowing the money to buy the aircraft and hangar, using compound interest calculations. This does not include the actual purchase price, just the cost of borrowing the money. If you are not borrowing any money to buy the aircraft then enter \$0!
- **Aircraft and Hangar Purchase Cost** – Enter the total cost of the aircraft and hangar including taxes to be paid.
- **Less down payment** – enter the amount of the down payment (amount that you provide, that is not borrowed)
- **Fuel** – Enter your fuel flow in US gal per hour and the cost per litre. The program will calculate the rest. Good numbers for engines: Cessna 150 – 6 US GPH, Cessna 172, Piper Cherokee 160 hp – 8 US GPH, Cessna 182 13 US GPH, Cirrus SR-22 15 US GPH, Ultralights – Rotax 503 4 US GPH, Rotax 582 6 US GPH, Rotax 912UL – 3.5 US GPH.
- **Avgas** currently ranges from about \$1.30 to \$2.50 per litre, for auto fuel use your local cost for premium gas or regular as applicable.
- **Oil** – Enter the number of litres per oil change (normal capacity). For two stroke engines enter 0, as they don’t get oil changes!
- **Enter the normal oil consumption per hour.** If you don’t know, then use 0.1 for all four strokes (that’s one litre in ten hours) and 0.3 for all two strokes, otherwise figure out the oil ratio for two strokes (A 50:1 ratio will use 1/50th as much oil per hour as fuel).



- **Cost per litre** – use actual figures where possible, current rates are \$6.50 for four strokes and \$9.00 for premium super two - stroke oil.
- **Oil change periodicity** is how many hours between oil changes. For two-stroke engines and other engines that do not have oil changes enter 1, not zero. If you enter zero then the calculation won't work out!
- **TBO** – Enter the Time Between Overhauls (TBO) – some recent numbers can be found in table 1.
- **Cost of overhaul** – This cost can vary a lot, so you should contact an overhaul shop for a current number. The estimates in table 1 were provided by [Aerotec Engines](#) (prices in CAD, August 2020):

Table 1

Aircraft/ Engine Model	TBO in HRS/ HP	Factory Overhaul	Aerotec Overhaul	Engine Kitty / per hour
Cessna 150 ,TCM O-200-A	2,000 / 100	\$26,000	\$21,500	\$10.75
Cessna 152, LYC O-250-L2C	2400/ 118	\$27,800	\$23,000	\$9.58
Cessna 172, LYC O-320-E2D	2,000 / 150 or 160	\$29,500	\$24,000	\$12.00
Cessna 172 R/S, LYC IO-360-L2A	2,000 / 180	\$37,000	\$33,000	\$22.50
Cessna 182, TCM O-470-R	1,700, 230	\$42,000	\$38,000	\$22.35
Piper Aztec, LYC IO-540-C4B5	2,000 / 250	\$49,000	\$45,000	\$22.50
Cessna T206, LYC TIO-540-AJ1A	2,000, 310	\$97,000	\$80,000	\$40.00
Cirrus SR22 , TCM IO-550-N	2,200, 310	\$54,000	\$48,500	\$22.00

To complete the Calculation in the Excel sheet:

- Enter the number of engines the plane has.
- Hit return and the rest should happen automatically.
- Check the graphs at the bottom for a look at the costs per year and per hour.
- The program will calculate the cost per year and the cost per hour at the bottom of the page **per owner**, as indicated at the top of the page.

Any questions can be sent to:

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