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WHAT DOES IT COST TO OWN A 310?
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WHAT DOES IT COST TO OWN A 310?

by Bob Thomason, TTCF Editor

The most common question I get from prospective Twin Cessna owners is, “How much does it cost to own and operate a ____ [insert Twin Cessna model]?” If it’s a T310R, 421C or T303 I can answer from personal experience, having owned all three. For other models, I’ve been relying on data from a member survey we conducted in 2015. Since that data was aging, and since our membership has grown quite a bit since 2015, we decided to conduct the survey again. We did so in July, and now have up-to-date data. This is the first of a series of articles focused on ownership costs based on this new data.

First, a few notes about the survey. Those members who responded to an emailed invitation were directed to the following short, 12-question survey:

1. What year and model Twin Cessna do you own or operate?
2. How many years have you owned your Twin Cessna?
3. How many hours per year do you typically fly your Twin Cessna? (Not including flight time for other airplanes.)
4. Do you typically run your engines lean-of-peak (LOP) or rich-of-peak (ROP) in cruise flight?
5. What is the typical fuel burn of your Twin Cessna in GPH during cruise flight?
6. Do you perform any of your own maintenance? If yes, what percentage?
7. What is the cost of an Annual Inspection on your airplane in an average year? (Not including upgrades.)
8. Not counting the Annual Inspection or upgrades, how much do you



The cost to operate a 310 varies by model, but not as much as differences in purchase prices might indicate. All 310s have complex systems to maintain.



A well-maintained 310 can be a cost-effective form of transportation. Staying on top of maintenance is the key.

9. How much is your annual insurance premium?
10. How much is your monthly hangar rent or tiedown fee?
11. Did you spend a significant amount on aircraft upgrades in the past year?
12. Is there anything else you want to tell us about the ownership costs of your Twin Cessna?

In this survey, we looked at two main variables that impact operating costs: 1) How owners operate their airplane and 2) How they maintain it. Running lean-of-peak (LOP) vs. rich-of-peak (ROP) can lower fuel burn per hour by as much as 20 percent. Additionally, most of our survey respondents perform at least some of their own maintenance.

Although we note in the chart on page 22 what percentage of respondents run LOP and what percent do some of their own maintenance, the fuel burns and maintenance costs reported are an average of all respondents. Of course fuel costs will be less for those who run LOP, and maintenance costs will be less for those who do some of their own

maintenance. Keep this in mind as you apply the results to your own situation. Here are the key findings that you can apply to the average numbers in the summary table:

Notes on Fuel Burn

Twenty five (25) percent of 310 owners
(continued on page 22)



Many owners reduce their maintenance costs by performing some of their own maintenance. Regardless, every 310 should be inspected periodically by a Twin Cessna specialist.

Cessna 310 Operating Costs					
	310 - 310B	310C - 310Q	310R	All Non-Turbo	T310 (P,Q,R)
	(240 HP)	(260 HP)	(285 HP)	310s (Col. 1-3)	(285 HP)
Survey Data:					
Hrs/Year	59	76	101	79	88
Fuel Burn (GPH)	22	24	29	25	30
% LOP	20%	11%	29%	20%	35%
Annual Inspection Cost	\$4,300	\$5,529	\$6,010	\$5,280	\$6,982
% Who Do Own Maintenance / percent preformed	80% / 57%	72% / 48%	50% / 52%	67% / 52%	56% / 26%
Maintenance Cost Other than Annual	\$4,282	\$3,770	\$4,468	\$4,173	\$6,140
Annual Insurance Premium	\$2,027	\$2,813	\$3,578	\$2,806	\$3,743
Monthly Hanger or Tiedown Fee	\$224	\$362	\$575	\$387	\$401
Cost to Fly 100 Hrs per Year	Not including taxes, training, or financing costs				
Variable Costs:					
Fuel:	\$10,824	\$11,808	\$14,268	\$12,300	\$14,760
Non-Annual Maintenance	\$4,282	\$3,770	\$4,468	\$4,173	\$5,760
Total Variable Costs:	\$15,106	\$15,578	\$18,736	\$16,473	\$20,520
Fixed Costs:					
Annual Inspection	\$4,300	\$5,529	\$6,010	\$5,280	\$6,982
Insurance	\$2,027	\$2,813	\$3,578	\$2,806	\$3,743
Hanger/Tie Down	\$2,688	\$4,344	\$6,900	\$4,644	\$4,812
Total Fixed Costs	\$9,015	\$12,686	\$16,488	\$12,730	\$15,537
Total Cost to Fly 100 Hrs. w/o OH Reserves	\$24,121	\$28,264	\$35,224	\$29,203	\$36,057
Total Cost per Hour w/o OH Reserves	\$241	\$283	\$352	\$292	\$361
Typical Engine & Prop OH Cost	\$35,163	\$38,055	\$38,055	\$37,091	\$53,361
TBO	1500	1500	1700	1600	1400
OH Cost Per Hour for both Engines	\$47	\$51	\$45	\$46	\$76
Total Cost to Fly 100 Hrs/Yr Including Overhaul Reserves	\$28,809	\$33,338	\$39,701	\$33,839	\$43,680
Total Cost per Hour including OH Reserves	\$288	\$333	\$397	\$338	\$437

report running their engines LOP. The rest run ROP.

Non-turbo owners running LOP report an average fuel burn of 23 GPH while those running ROP burn 26 GPH. Turbo owners report fuel burns of 27 GPH LOP and 33 GPH ROP. In summary, 310 owners who run LOP burn about 15% less fuel per hour than those running ROP.

Notes on Maintenance

Sixty percent of respondents report doing at least some of their own maintenance. Some do only the owner-performed maintenance allowed by the FARs (oil changes, spark plug cleaning, etc.). Others are A&Ps and A&Is who do most or even all of their own maintenance. Of those who report doing some of their own maintenance, the average amount of total maintenance they perform themselves is about 50%. This means that quite a few of the respondents are A&Ps or AIs.

Since the maintenance costs in the Summary Table are an average of these two groups, the costs for those owners who don't do any of their own maintenance are likely to be higher than shown, and vice versa for those who do some of their own maintenance.

And remember, even if you do all your own maintenance you should take your airplane to a Twin Cessna specialist at least periodically. We've run several articles in this magazine by owners who didn't follow this advice, and after a nasty maintenance surprise, wished they had.

Finally, there are significant operating costs we chose not to include in the survey. Among them are taxes, training, and financing costs. Taxes vary considerably depending on location, and the other costs are easily obtainable with a little research by a prospective owner. We do provide our own estimates of prop and overhaul reserves in the accompanying chart. They are based on actual quotes, including removal and installation, from a respected specialty engine overhauler. If you prefer RAM or factory remains at overhaul time, your costs will be higher.

Survey Results

We had over 250 responses to our survey - a very good response rate. On the facing page is the summary data for 310s. Note that we subdivided the data by 310 model and present it here based on engine size - 240 HP, 260 HP, 285 HP, and turbocharged 310s.

Notes:

- We had a very good sample size of respondents this year for each category of 310.
- The T310 column consists of 75% 310Rs and 25% Ps and Qs.
- Colemill and other modified 310s are not included in this survey.

In the “Cost to Fly 100 Hours per Year” section:

- An average cost per gallon of 100LL of \$4.92 is used versus \$5.12 in 2015. This four percent reduction in fuel costs had a positive effect on total operating costs.
- Engine and prop overhaul costs are based on actual quotes. They include removal and installation cost, and for the turbo models, typical compliance cost for AD 2000-01-16 (exhaust).
- Costs omitted include: taxes, financing costs, and extraordinary maintenance events.

The Early 310s

Not shown here, the biggest cost for an early 310 buyer will probably be the dollars it takes to get it in shape. Many of these airplanes have been sitting and corrosion can be a big, expensive problem. And even once up to spec, these classics are not much less expensive to own than the other normally aspirated 310s. In their survey, they show the lowest per hour operating cost, but this may be impacted by the fact that 80% of owners perform almost 60% of their own maintenance - the highest percentage of any of the groups. Plus, reported hangar/tie-down costs were lower.

Fuel burn is a couple of GPH lower due to the lower HP engine, but this is partially offset by the fact that some parts for these airplanes have become



Turbochargers live in a harsh environment, adding to operating costs through fuel burn, maintenance, and overhaul.

scarce and expensive. And while the landing gear on all 310s needs TLC, this is especially true of the early 310s. On the other hand, anyone who thinks these airplanes are just museum pieces should talk to our members who fly them extensively for both business and pleasure.

A classic 310 is not necessarily a bargain, but it's a practical airplane. And, as an added bonus, no other 310 will turn heads on a ramp like one of these beauties.

310C through 310Q

This group of airplanes, powered by 260 HP IO-470s, had the largest number of responses. These models represent the longest production run of the group, from 1959 to 1974, so there are many variations. For example, overwing exhaust was standard until the 1964 I model, and maximum gross weight increased from 4,830 lbs. to 5,300 lbs. during the period.

One thing these airplanes have going for them is the tried-and-true IO-470 engine which has a good reputation for making TBO.

Interestingly, the 11% of owners who report running LOP is the smallest of any of the 310 groups and well below the 25% average.

310R

As expected, the R models are more expensive to own due to their larger, 285 HP engines. Count on at least 5 GPH more in fuel burn over the C through

Q models. This translates into another \$25 per hour at today's fuel prices. Maintenance and insurance costs are also higher. Interestingly, the R models are flown the most hours per year of any of the groups, according to the survey data. While not verifiable from the survey, perhaps more are flown on business or even charter operations.

Turbo 310s

While turbocharging was introduced with the 1969 T310P and continued through the '81 T310R, all of these airplanes featured some variation of the 285 HP TSIO-520 engine. Fuel burn on a turbo model is about 5 GPH higher than the non-turbo models, yet the Summary Table shows only a one GPH bump from the normally aspirated R model. This is because 35% of the turbo owners that responded run LOP vs. only 20% for all 310s. Perhaps with fuel burns topping 30 GPH, the incentive to save via LOP operations increases.

It's clear that total maintenance costs (annual inspection plus non-annual related expense) are higher than non-turbo TSIO-520 powered airplanes. This is consistent with what Tony sees in his shop. He reports that turbocharged airplanes consistently have more exhaust-related issues, including engine compartment corrosion, than non-turbo versions. Prospective owners should

(continued on next page)



To preserve the value of their aircraft, owners need to set aside reserves for upgrades.



A 310, if built today, would cost well over \$1 million. In other words, 310s may be very affordable to buy, but we must remember we are maintaining "million dollar airplanes." Pictured above: John and Cynthia Bowman's magnificent 310R.

count on this.

One area in which the turbocharged 310s are undeniably more expensive is the engine overhaul. These engines cost

about \$16,000 more each to overhaul (including typical AD 2000-01-16 expenses), and they have a shorter TBO than their non-turbocharged counterparts (1,400 hours vs. 1,700).

This results in at least a \$30 per hour difference in overhaul reserves. Thus, increased fuel burn and higher overhaul reserves add roughly \$55 per hour to operating costs, and as mentioned earlier, maintenance costs are likely to be higher as well.

Comparison to 2015 and 2011 Data

Comparing the latest survey data to the 2015 data reveals a surprising conclusion: the cost to own and operate a 310 has remained virtually unchanged over the last five years. Going back even further, it has changed little since we did our first survey in 2011! This is due to two reasons: 1) Lower fuel prices and 2) More owner-performed maintenance.

Average Price of 100LL

2011: \$5.60/gallon
2015: \$5.12/gallon
2020: \$4.92/gallon

The price of avgas has fallen 12 percent in the last nine years.

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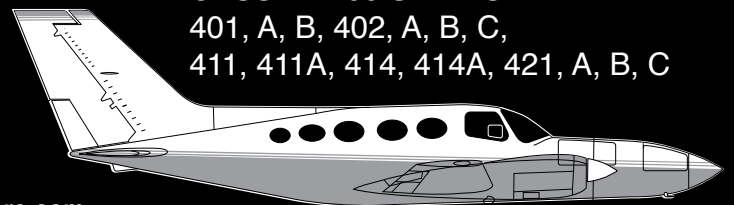
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310G, H, I, J, K, L, N, P, Q, 310R, T310R, 320B, C, D, E, F, 336, 337, 335, 340, 340A



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Percent of Owners Doing Part or All of their Own Maintenance

2011: 43%
2015: 60%
2020: 67%

Owner-performed maintenance means lower maintenance costs than would otherwise be the case. 310 maintenance costs have risen only 13 percent since 2011, while overhaul costs have risen 21 percent. Parts prices, particularly from Cessna, have risen even more - some by triple digits. The net result is our 310s are not costing us much more in 2020 than they did in 2011.

“The (cost) numbers presented...are averages. As all longtime aircraft owners know...there are good years, bad years and sometimes, very bad years.”

There is one final important observation: The amount of annual flying for all 310s has been declining since 2011. Nine years ago, average annual flight time was about 100 hours. In this latest survey, it is about 80 hours. Since we adjust the cost numbers for hours flown (assuming 100 hours/year), fewer actual hours flown doesn't affect the data, but less flying is disturbing nonetheless.

One possible explanation is that the average age of our group has been slowly increasing and older pilots might not fly as much. We are watching this trend closely. My anecdotal observation is that we are getting more and more younger members as some of us older folks sell them our great airplanes!

Summary

The numbers presented in this survey summary are averages. All longtime aircraft owners know that from a financial standpoint there are good years, bad years and sometimes, very bad years. The first few years of aircraft ownership are often “catch-up” maintenance years and costs are likely to be much higher than our survey numbers. Prepare to pay considerably more.

Additionally, the survey results do not reflect upgrades. In order to preserve the value of your aircraft, every so often it has to have paint and interior work. Also, these days it's getting difficult to sell an airplane without at least some glass in the panel. And avionics are advancing at such a rapid rate that panel upgrades are required with more and more frequency.

And don't forget about inflation. Engine overhaul prices are rising faster than the general rate of inflation. Your overhaul may cost you 20 to 25% more in ten years. If you are accumulating funds in an overhaul account as many owners do, you'll need to factor this into account.

And finally note that the operating costs for, say, a \$30,000 310D are not proportionally lower than those of a \$175,000 310R. An inexpensive airplane does not necessarily mean low operating costs. All 310s have two engines and fairly similar systems that must be maintained.

With these caveats, our survey data should be useful to anyone who wants to know the longterm cost of owning a 310.

I spent part of my career in sales. We had a saying, “until value is established, any price is too high.” What value does one get from flying a 310 at an all-in hourly cost of anywhere from \$288 to \$437 per hour? What is it worth to create incredible family memories by flying to places others can only

dream about seeing? What's the value of calling on three major clients in a day vs. one? How valuable is the satisfaction of being able to safely operate a machine that allows you to fly! (Something that less than .002% of all Americans are able to do.)

I've owned Twin Cessnas for 21 years now. I consider the money I've spent on my T310R, 421C, and my two 303s during that time to be a bargain.



If you use these numbers for cost estimates and do not plan to perform any of your own maintenance, adjust them upward accordingly.

DOUBLE M AVIATION

I have never had a better, more honest, and more capable maintenance go to source in all my aviation career. Mike Naab (Owner of Double M Aviation) is especially well versed in the twin Cessna series, and 400 series pressurized aircraft specifically. We literally ended up with the proverbial “squawk-free” aircraft!

We get an amazing sense of security not only flying a super well maintained airplane, but also knowing that if a problem comes up on the road, we have a great go-to guy in Mike that can help bail us out.

-Kevin Jordan, Business Jet Enterprises, Texas

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