ECONOMIC ASPECTS OF FLIGHT PERSONNEL TRAINING ACCORDING TO EASA REQUIREMENTS

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The aim of this contribution is to enclose some economic aspects of the PPL(A) training according to EASA regulations for the reader. Firstly this article deals with the operational costs of some aircrafts used mainly for pilot training. It deals with the expenses of the continuous airworthiness of the aircraft, the insurance costs and the operational cost connected to fuel and oil consumption of each aircraft. The aim of the article is to present the specified aircrafts and to choose the best one for the PPL(A) training.

K e y w o r d s. **:** Private pilot training, operational cost, flight training programme, financial aspects of the flight training

1 INTRODUCTION

This article is unique among others concerning aviation, because it compares aircrafts not only according to their flight performance, but also according to their operational costs and expenses. This comparison also takes in count the appropriateness of these aircraft for the flight training program according to EASA regulations. So this article gives an objective picture about suitability of these aircrafts to concerning usage in a Private Pilot training programme. This article is actual because of the effects of the financial crisis , as it helps the reader to chose an efficient way of getting a Private Pilot License. The information appearing in this article is extracted from the JAR-FCL regulations, and the operation manuals of each aircraft, as well as the operational prices were collected from aircraft operating companies and technicians.

2 COMPARISON OF THE AIRCRAFTS USED FOR PILOT TRAINING

The basic data for the comparison of the aircrafts will be their instrumentation, flight performances, operational cost and fuel and oil consumption. It is very important to take all of these features in count, because otherwise the comparison wouldn`t be objective. As the aim of this article is to chose the best aircraft for the training we need an appropriate comparison of these types taking in count as many features as possible.

Comparison of aircrafts according to operational cost

Item	Zlin Z-142	Cessna C-152	Pipistrel Virus SW 100
Aircraft price	30000 EUR	30000 EUR	96552 EUR
TBO-engine	1500 hours	2400 hours	1000 hours
Price of engine overhaul	22000 EUR	13793 EUR	13793 EUR
TBO- propeller	2000 hours	13793 EUR	13793 EUR
Price of propeler overhaul	8000 EUR	800 EUR	1550 EUR
TBO- Airframe	15 years	12 years	Lifetime warranty
Price of airframe overhaul	20000 EUR	13793 EUR	Not needed
100 h check ZLIN 50 h check CESSNA	880 EUR	413,8 EUR	103,5 EUR
200 h checkZLIN 100 h checkCESSNA	1080 EUR	506,9 EUR	103,5 EUR
500 h checkZLIN 200 h checkCESSNA	3400 EUR	724 EUR	Not needed
Aircraft liability insurance	269 EUR/year	579,3 EUR/year	192 EUR/year
Insurance of the aircrew	138 EUR/year	138 EUR/year	
Aircraft hull insurance	1476 EUR/year	1241 EUR/year	
Hangar parking fee	105 EUR / month	96,5 EUR / month	58 EUR / month
Average fuel consumption	42 litres / flight hour	25 litres / flight hour	12 litres / flight hour
Fuel cost	2,2 EUR / litre	2,2 EUR / litre	1,6 EUR / litre
Average oil consumption	Max 6l / 100 flight hours	Max 10 l / 100 flight hours	Max 6l / 100 flight hours
Price of oil used	3,6 EUR / litre	8,6 EUR / litre	5 EUR / litre
Other expenses (random failures)	15 % of operational cost	15 % of operational cost	15 % of operational cost

Figure 1

According to this table the Pipistrel Virus SW 100 has the most cost efficient operation expenses. Although its price is three times as much as of the other two aircrafts, but the low operational costs will make it the best solution in a short period of time. On the other hand we must realize the service expenses of the Zlin which are extremely high. The cause of this fact is that the Zlin Aircraft company has revoked all repair rights of operating companies to the base factory, and so it became a monopole. This monopole situation allows it to raise the prices without market competitors.

Comparison according to cost of a flight hour by each aircraft

Expenses:	Zlin Z-142	Cessna C-152	Pipistrel Virus SW 100
buying a new aircraft	7,5 EUR/hour	7,5 EUR / hour	24,1 EUR/ hour
engine overhaul	14,6 EUR / hour	12,1 EUR / hour	13,8 EUR/ hour
propeler overhaul	4 EUR / hour	0,5 EUR / hour	3,1 EUR/ hour
airframe overhaul	3,5 EUR / hour	3,5 EUR / hour	
timely service checkups	21 EUR/ hour	8,3 EUR / hour	2,1 EUR/ hour
Hangar paking	3,15 EUR/ hour	2,9 EUR / hour	1,8 EUR/ hour
Insurance	4,8 EUR/ hour	4,9 EUR / hour	0,5 EUR/ hour
Oil cost	0,8 EUR/ hour	0,9 EUR / hour	1 EUR/ hour
Fuel cost	92 EUR/ hour	55 EUR / hour	19,2 EUR/ hour
random failures	22,5 EUR/ hour	14,3 EUR / hour	9,9 EUR/ hour
Dry operation cost / year	32359 EUR	21600 EUR	32472 EUR
Operation cost per year	69479 EUR	43960 EUR	40552 EUR
Flight hour cost without yield	173,85 EUR/ hour	109,9 EUR / hour	75,5 EUR/ hour

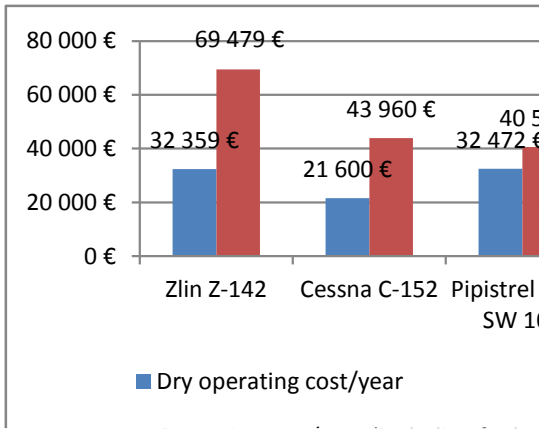

Figure 2

This table shows us how much is the operation cost influenced by the fuel and oil consumption of the aircraft. As we can clearly see the Pipistrel Virus SW 100 has the highest dry operating cost, but if we calculate the fuel consumption it becomes the cheapest one. The expensiveness of the dry operation of this aircraft is connected to its purchase price which is three times higher than the price of the other ones. By the dry operational cost the most efficient aircraft is the Cessna C-152. Although it was only second by the wet operational cost there is a little difference between the 2 aircrafts. As we see the most expensive aircraft is the Zlin and the reason for this is that the aircraft is from the mid 60`s of the 20th century when fuel consumption wasn't a big concern.

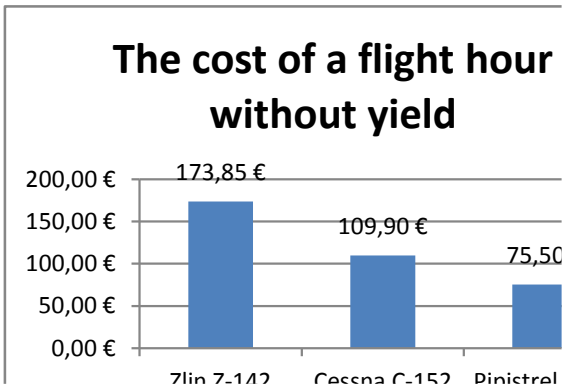

Figure 3

This table shows us the hourly costs of each aircraft. This time the best solution is the Virus, which has the half of the price of the Zlin. It is important to understand that these prices are without the yield of the FTO and without the instructor fee.

Comparison of the aircraft according to flight performance

	Zlin Z-142	Cessna C-152	Pipistrel Virus SW 100
Cruising speed	226 km/h	204 km/h, 110 kts	273 km/h (147 kts)
Climbing performance	7 m/s	715 FPM , (3.63 m/s)	8.4 m/s (1680 fpm)
Service ceiling	5 000 m	4480 m, (14 700 ft)	8100 m (22500 ft)
Take off run	240 m	221 m, (725 ft)	95 m (310 ft)
Landing distance	180 m	145 m, (475 ft)	125 m (410 feet)
Stall speed (no flaps)	110 km/h	89 km/h, (48 kts)	79 km/h (42.6 kts)
Stall speed (with flaps)	96 km/h	80 km/h, (43 kts)	64 km/h (34.5 kts)
MTOW	1090 kg	757,5 kg	472,5 kg
Useful load	355 kg	257 kg	259 kg
Fuel tank volume	220 l	96 l	100 l
Oil capacity	12 l	5,6 l	4,5 l
Powerplant:	M 337 AK - 210 hp max 2750 rpm	Avco Lycoming 0-235-L2C 110 HP – 2550rpm	ROTAX 912ULS 100 HP
Propeler diameter	2000 mm	1753 mm	1620mm
Fuel	Avgas 100 LL	Avgas 100 LL	Shell 95 UL

Power	210 HP (154 kW)	110 HP	100 HP
G load factor	+ 6 g , - 3,5 g	+4.4 g , - 1.76 g	+4 g , - 2 g
Range normal / (long range)	650 km/(1200 km)	585 km/(1000 km)	1450 km

Figure 5

From this table the reader can find out important information about the flight performance of these aircraft. As we can see the Zlin has the largest engine with most horse powers but it is the heaviest aircraft as well. The fastest aircraft is the Virus, and this can be well used for cross country flights, but that aircraft has the less of useful load.

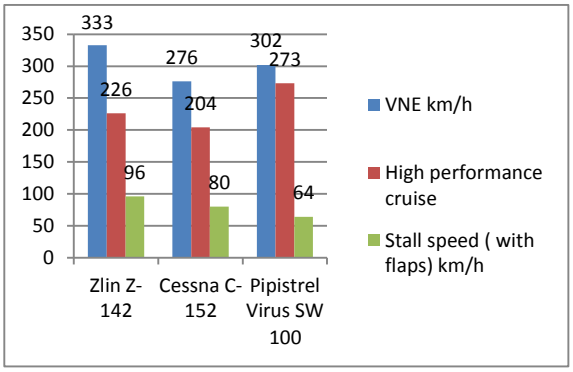

Figure 6

This table shows us the speed restrictions of the aircrafts. We can also deduce aerodynamic characteristics of the airframes and wing profile. We can see that Zlin flies on higher speeds what means that this aircraft also has a higher approach speed. This can make it harder for a beginner pilot to land safely this aircraft than to do so with the slower ones.

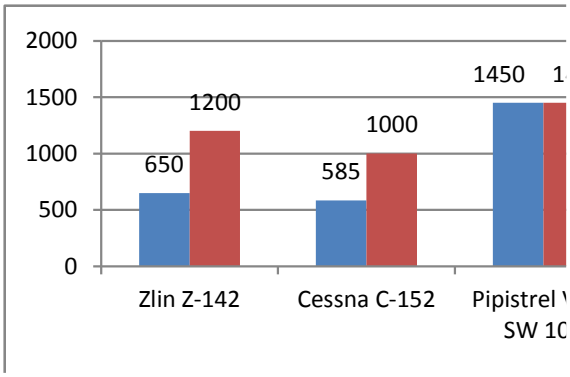

Figure 7

This table is interesting at the final part of the PPL(A) training and afterward at the later modules of the pilot training. For example to complete a CPL(A) training you must make a cross country flight of 540 km distance. This task excludes the Cessna C-152 from this type of training because you can not make such a long flight with the basic fuel tanks.

Overall comparison of the aircrafts

I have personally flown with all these three aircrafts so I can compare them from the view of the pilot as well as from the aspect of flight handling.

What concerns the easiness of the flight handling, the best is the Cessna. This airplane has the less operations on checklists and is a very stable aircraft. The Cessna has a fixed pitch propeller and the fuel system uses both tank at once, and it has a comfortable and easily usable mixture lever. There is a very small chance for this airplane for developing a spin and quite slow stall speed with the flaps extended. Cessna uses for controlling the attitude control yokes instead of a center stick as the other airplanes use. It is more comfortable for the longer cross country flights. This system is used in most of the American aircrafts. Although this system is comfortable it is unfavourable for controlling the plane in higher techniques of flying such as steep turns or chandellees. It is also harder to develop controlling sensitivity for a beginner pilot as most of the time he controls the plane with two hands and only during difficult maneuvers when he needs to do other things with his second hand. From the aspect of comfort the cabin of Cessna is the smallest and the least comfortable. My global opinion about this airplane is very positive, and if I take in count the economical aspect I must say: This aircraft is the best solution for a Private Pilot Training according to EASA regulations.

Picture 1.

Zlin compared to Cessna is more difficult. It has more system which need to be served through the flight. Piloting this aircraft needs deeper theoretical knowledge. This airplane has meny operations on the checklist, which need to be done, and without completing them the flight can become dangerous. The saying is true : this airplane doesn`t forgive the pilot`s mistakes. This aircraft has a constant speed propeller which is more difficult to use for a beginner pilot. This aircraft is very good by comfort and flight performance but nowadays when the student has to pay the whole training fee it became a very expensive and inefficient airplane.

Picture 2.

The Pipistrel Virus is the most cost efficient from the three compared aircrafts. This airplane has vary good flight performance, high cruising speed and a long range. It has a very comfortable and ergonomic cabin. The only problem is that the EASA doesn`t recognize this type as a proper aircraft for the PPL(A) training. It is a very safe aircraft. I think in the close future it will became a fully recognized aircraft by the EASA and than it will be the best solution for PPL(A) training.

Picture 3.

3 CONCLUSION

We compared these 3 aircrafts by many aspects and at the and we can see their positive and negative features. After reading this article the reader gets quite important information about these aircrafts to be able to chose the one which suits him best. I personally prefer the Cessna 152 by the actual regulations, by I also look forward to the time when the Virus will be fully recognized. The future of the general aviation is in the Ultralight aircrafts, for sure.

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