Safe flight – innovative idea for a wing modification

Author: Bartosz Piechocki
Supervisor: Urszula Woźnikowska-Bezak
IV Liceum Ogólnokształcące im. Komisji Edukacji Narodowej, Poznań, Poland
Creative Group QUARK, The Youth Palace in Katowice, Poland; email: bzpiechocki@gmail.com

1. Introduction

Nowadays the aviation industry is developing quickly. Constructors need better technologies to make their planes better and safer. As a pilot I have noticed that sharp transitions between an aileron and a wing might be the cause of a lot of accidents. That's why I have decided to investigate solution for this problem. One of the best is flexible material to make smooth transition between the aileron or a flap and the wing.

2. Method of the investigation

To create smooth transition between the flap and the wing I used flexible piece of rubber. My research was based on measuring increase of lift on the modified and the standard wing. I measured it also for wing with flap up and flap down and for different angles of attack. To do it I have constructed my own wind tunnel. Results from scale, which I used to measure lift, I converted from grams to newtons and I calculated the lift coefficient, which is the best parameter to compare results.

Fig. 1 My idea for a wing modification

Fig. 2 My wind tunnel

In the second experiment I wanted to show how smooth transition between the flap and the wing influences airflow. In this case I used 100 threads with 2 cm in between them to see if with the modified wing there is laminar flow on the wing for higher angles of attack.

3. Results of the experiment

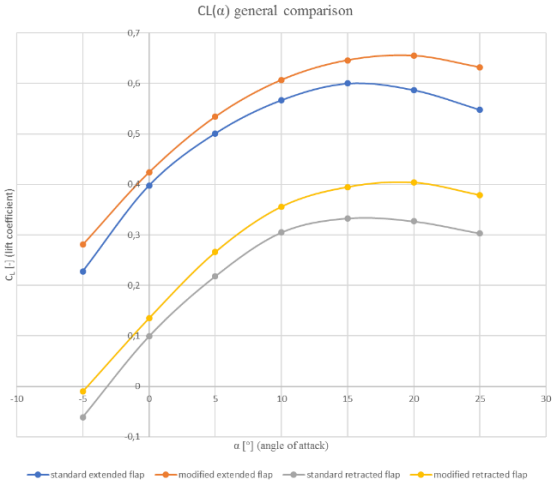

Fig. 3 Comparison of modified and standard wing with flap up and flap down

4. Conclusion

[1] The wing with smooth transition between the aileron and the wing increased lift force
[2] There was a laminar flow on the modified wing for greater angles of attack
[3] This solution increases critical angle of attack
[4] This is a cheap and easy solution for a big problem in general aviation

5. References

[1] https://www.nasa.gov/
[2] https://goo.gl/ctemLo