

WHAT STATURE PILOTS ARE ALLOWED TO FLY SAILPLANES

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Summary

The maximum control input forces for pilots required JAR-22 or OSTIVAS are in some cases exceeding the physical possibilities of the pilots and therefore operation of sailplanes may be difficult or even impossible for some pilots. Some examples are given but also strategies to overcome the problems.

Historic Review

The problem of pilot sizes and actuation forces of important controls in sailplanes was frequently discussed in OSTIV-SDP (Sailplane Development Panel) in the past.

Also mutual contacts between OSTIV-SDP and OSTIV-TSP (Training and Safety Panel) begin to show fruitful effects. This was intended when both panels were coordinated by OSTIV.

In the past it was necessary to lower the maximum control forces of some control levers as they are vital for safe operation of sailplanes.

Tow release forces under high tow cable loads as well as airbrake opening and closing forces and airbrake locking/unlocking forces in particular were regarded and limited.

Future Developments

The desire to let younger male and female pilots fly sailplanes is also vital for the future of our sport but leads into a dilemma which cannot be solved in an easy manner as explained in the following chapters.

Problem Areas

Whereas the tall pilots get taller on average worldwide (Scandinavians and Dutch in particular but also Germans) some small and lightweight Asian female pilots are attracted by our sport.

There is a movement in the SDP to write down some minimum requirements for pilot sizes into the OSTIVAS for which the cockpit must be fitted by adjustable seats and backrests and adjustable pedals or an equivalent means of adaptation to different pilot sizes. It is most likely that a certain (high) percentile European male and a rather low percentile Asian female is selected and introduced into OSTIVAS and other modern Airworthiness Requirements.

Regarding control forces, the small pilots are the critical ones. The possible arm (and leg) forces for small pilots are low and at the same time the possible travel of levers

(and pedals) is reduced compared to the possibilities of a big (or tall) pilot. The conventional engineering way to reduce forces by allowing more leverage with inherent longer travel is limited by the nature of the small pilots.

The modern sailplanes however get heavier and faster. Both tendencies lead to higher control forces if other parameters are kept constant. It is helpful that the aerodynamically clean surfaces of modern sailplanes allow reduced control surface areas compared to older design sailplanes which in consequence leads to reasonably comfortable control forces of modern sailplanes. This is however not necessarily so for all future development.

It is not so long time ago when driving a heavy lorry was hard work and nearly no women were lorry drivers because of that fact. Servo (power) steering etc. solved this problem. Before servos were introduced into aviation the Flettner tabs helped to reduce control loads of big bomber aircraft. This was associated with a high control flutter risk and almost no natural feedback of control forces was possible.

Ways out of these dilemma:

- 1) As a first step it must be decided, which percentile pilot sizes must be able to fly a given category of sailplanes. These must be minimum requirements, which may be exceeded.
- 2) Larger or heavier pilots normally cause no control force problem, but optimum ergonomics may be failed to be achieved. All control actuation forces have to be revised, that such strong pilots may not over-stress control circuits in a panic.
- 3) Small pilots must not be at the same time weak ones. The Aviation Medicine must be made alert, that a problem may arise, when a pilot is too lightweight to get the c.g. right or when he is too small, that the restraint system is not tightening him down properly or he is too weak to operate the controls properly. I know a very nice lady pilot who confessed to me, that she had problems to actuate the rudder during spin recovery. This was not in a big and heavy sailplane!

Conclusions

OSTIV-SDP and OSTIV TSP have the competence to find minimum requirements and also desirable limits for pilot percentile. Also the Aviation Medicine who checks the "Airworthiness" of the pilots must get knowledge of the requirements and check the aircrew accordingly.

Having modified some sailplanes for handicapped pilots successfully, I am confident that the problems can be solved. Because I have picked up so much weight, I cannot fly some fragile old-timers because of low allowable cockpit load. Also some tiny lady pilots must not fly a huge Lastensegler comfortably. Hanna Reitsch did this, but at the cost of permanent physical power exercise.