Standard Class Sailplane Evaluation

at Leszno, Poland, June 1958

During the World Gliding Championships at Leszno eighteen Standard Class sailplanes entered the competition. This was a great success, adding a new and perhaps more interesting form of competition to the Internationals. The performances achieved were surprisingly good and in many cases equalled the Open Class performances.

To encourage design for the new Standard Class, OSTIV announced in 1957 the award of a cup donated by the Royal Aero Club of Great Britain for the best Standard Class design at the 1958 World Gliding Championships.

In order to determine the winner, a jury of five persons were chosen by OSTIV, who were: Paul A. Schweizer of U.S.A. (Chairman); Julian Bojanowski of Poland; Boris Cijan of Yugoslavia; Georges Abrial of France; Lorne Welch of Great Britain.

The following Standard Class sailplanes were evaluated: Breguet 905 (France); PIK-3c (Finland); Ka-6BR (Germany); Zugvogel IV (Germany); EON Olympia (Great Britain); Olympia 415 (Great Britain); Skylark 2 (Great Britain); Standard Futar (Hungary); Mucha Standart I (Poland); Ilindenka-IT (Yugoslavia).

The jury kept in mind the over-riding idea of the Standard Class, that is that the sailplane be simple and cheap with as much performance as possible. In order to review the sailplanes systematically, the following tally sheet was used for the first analysis:

Weight;
Span;
Costs in relation to Olympia (Meise);
Undercarriage;

Method of construction:

Wing,
Fuselage,
Tail;
Finish;
Control;
Comfort of cockpit and equipment;
Rigging and de-rigging;
General conception.

The procedure used was as follows:

1. The sailplane was assembled by crew to permit the jury to inspect the method of assembly. The complete sailplane was then carefully inspected, cockpit was tried out and controls checked, and the sailplane was weighed and then de-rigged by four men against a stop watch.
2. When each sailplane inspection was completed the judges filled out their factor sheets which were then combined to get the consolidated view of the whole jury. In order to take into account the variation in the manner in which each judge scored, a correction factor was introduced.
3. From this report, the four highest rated sailplanes were picked and the features of each were again carefully reviewed and new factors were brought into the picture as follows: Price (manhours for production); Weight; Aspect Ratio; Wing Loading; Classification of Wing Section; Gliding Angle; Cheapness; Efficiency; Utilization; Ease of Repair; Pilot Protection.

As a result of this review one of the four was eliminated and the remaining three sailplanes readied for flight test.

Each of these sailplanes were flight tested by the jury (except Julian Bojanowski of Poland who withdrew, because the Polish entrant was one of the three being tested). In the limited time available to flight test the sailplanes the following items were checked: The stability, the general handling, control response, effectiveness of dive brakes and general evaluation of the flight characteristics of the sailplane. The final result of all these considerations was the choice of the Ka-6BR as the winner of the award. The Royal Aero Club of Great Britain Cup was presented to the designer Rudolf Kaiser on March 22, 1959.

Without reflecting on the Ka-6BR, but in fairness to the other sailplanes entered, it must be mentioned that in making this decision, the jury did so with the realization that there were other worthy designs and that, if complete data and sufficient time had been available to test all the sailplanes thoroughly, a different winner might have resulted. It also should be mentioned that several of the new designs were brought to Leszno before they were fully developed. However, their sponsors should be congratulated for bringing them, because they certainly added interest and helped to make the Standard Class competition a success.

No doubt in future World Championships these sailplanes will be more fully developed and become more highly competitive.

At Leszno judging of the design was made more difficult by such limitations as the lack of technical and design data, difficulties in timing of inspections to avoid interference with competition flying and the necessity to wait until after the competition flying before the jury flew the sailplanes, at which period there was only one day available for the flying.

Some critical observations on the Standard Class sailplanes inspected may be of value to designers.

1. Workmanship was of a very high standard.
2. Rigging and de-rigging was not good, as none of the sailplanes approached the standard set twenty years ago with the Weihe. Some of the sailplanes had too many loose items and in some cases there was inadequate accessibility.
3. Accessibility for inspection and maintenance varied widely. Some sailplanes had very few inspection holes and these were often too small. In several cases the plywood or fabric would have to be cut to replace control circuit parts, or even to inspect them. Some turnbuckles were fitted in very inaccessible positions.
4. Control circuit static friction and stiffness varied widely. It was noticeable that those sailplanes equipped with push-pull rods were much the better in these respects. On a few sailplanes the static friction had been reduced to a very low value indeed which must contribute to sensitive controls and improved stability. In one or two cases inadequate control stops were fitted.

5. Airbrakes required to limit the speed in a vertical dive varied considerably in size and some were too small. In several sailplanes having brakes of the DFS type there were large flanges on the outer surface of the brakes which results in the brakes tending to ride open violently when unlocked at high speed. Because of this and also because in several cases the stops were inadequate, it is considered that the brakes could not be operated safely at anywhere near the maximum permissible speeds.

6. Tail trimmers should be fitted to sailplanes of this class and should cover the range of speed from slow circling to at least the maximum aerotowing speed over the whole c. g. range. The trimmer should be capable of being operated quickly in flight.

7. Undercarriages fitted were of three types (main and tail skids; wheel plus nose and tail skids; wheel well forward and tail skid). The last one listed is cheapest and lightest, but it is not yet certain if it is really suitable for landing in rough fields and for ordinary club flying.

   With one or two exceptions the sailplanes had tail skids with very little springing, a feature which must impose severe loads on the rear fuselage.

8. Ground handling was in some cases paid too little attention. There was either nothing by which to lift the rear fuselage, or if a handle were fitted, it was much too low.

9. Cockpit layouts were in some cases very good indeed, with a neat layout, accessible controls, good instrument panel, comfortable seating position and a good view. There were examples of cheap and effective methods for adjusting rudder pedals on the ground. Comfort for pilots of different sizes was also obtained by making the back rest quickly adjustable. It was noticeable that having the transparent cockpit cover extending to the full width of the fuselage gave an impression of space in the cockpit as well as giving more light to instruments and a much better view outside. This is an important feature for a competition sailplane where it is desirable to look steeply downwards at the starting line and turning points. Some bad cockpit features noticed were:

   Lack of a gaiter around the base of the control column resulting in a grave risk of a loose object in the cockpit jamming the controls.
   Flimsy cockpit cover clips.
   No identification of cockpit controls. One sailplane had seven, almost identical, red knobs. One on the left operated the front cable release, while one on the floor worked the rear cable release.
   A lack of placards giving the maximum and minimum permissible pilot weights or instructions for the carriage of ballast. Similarly, some sailplanes did not have a placard giving the flight limitations, speeds, etc., in view of the pilot.
   Inadequate clear vision panels or openings.

OSTIV feels that the Standard Class is a definite benefit to the progress of soaring and that everything should be done to encourage it by continuing the Standard Class flight competition as well as the Design Competition in future World Championships. OSTIV is now planning to make the Design Competition in 1960 a great improvement over that of 1958. In due course details of interest to designers will be published by OSTIV in Aero-Revue. Such information will in no way alter the FAI Standard Class Sailplane Specification dated July 10, 1958 which is effective for the 1960 competitions.

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OSTIV Standard Class Sailplane Committee Conference in Vienna

20 to January 22, 1959

List of attendants

B. S. Shenstone, M. A. Sc. – Chairman (England)
Dr. H. Sigmund, Austria
Ing. R. Kunz, Austria
Dipl.-Ing. M. R. Jovanovitch, Yugoslavia
Dipl.-Ing. T. Tervo, Finland
Dipl.-Ing. A. Peyer, Switzerland
Dipl.-Ing. H. Zacher, Germany
Dipl.-Ing. H. Plasa, Germany
Dipl.-Ing. W. Nowakowski, Poland
Dipl.-Ing. J. Sandauer, Poland
Dipl.-Ing. J. Bojanowski, Poland
P. Bonneau, France
Ing. M. Doutreloux, Belgium
Col. F. J. Sweet, U.S.A.
L. A. de Lange, President, OSTIV
Dipl.-Ing. B. J. Cijan, Chairman Technical Section, OSTIV

In his opening speech on January 20, 1959, in connection with the OSTIV Standard Class Sailplane Committee Conference, the President of OSTIV, Mr. L. A. de Lange, made special reference to the following points.

At the beginning of his speech he remarked that this was the first time in the history of OSTIV, and even of ISTUS, that a special working conference had been organized between the generally known and periodically fixed congresses. This was a conference of experts who were to consider an important and practical problem. This problem had emerged from the inauguration of the Standard Class sailplane. During the evaluation of the Standard Class sailplanes, which took place for the first time in Leszno during the 1958 World Championships, the wish was expressed that it would be a good thing if in the future such sailplanes could be built to internationally agreed airworthiness requirements. The basic assumption must be that in scheming the desired minimum requirements for strength and flying qualities, it must be possible to apply them to sailplanes built anywhere. After all, a sailplane which is absolutely safe in one country should be equally safe in any other country.

Mr. de Lange realized that we do not live in an ideal world and that conservatism and chauvinism have some influence and that the goal of generally recognized and applied airworthiness requirements could only be achieved gradually and above all would require a great deal of time.

Even so, it is important for OSTIV to grasp this problem and approach step by step a unified airworthiness requirement. If OSTIV were successful in setting up airworthiness requirements of such quality that everybody would agree that a sailplane fulfilling them would be quite safe, the following advantages would accrue:

In the future certain embarrassments hitherto experienced would no longer occur; such as the requirement by one country to thoroughly check and test a sailplane from some other country before certification, at the cost of considerable time and money.

On the other hand, the existence of OSTIV airworthiness requirements (initially for the Standard Class) would have the advantage that countries having no requirements or obsolescent ones could make use of them.

Mr. de Lange made it clear that OSTIV had never intended to force the F.A.I., the national Aero Clubs or authorities to accept any OSTIV requirements, nor would they ever consider doing so in the future. These requirements must be so clearly and obviously worked out by the experts that their acceptance by all interested parties will occur automatically and in their own interest.

In case it might be thought that such OSTIV requirements might contain only the most severe conditions of the several national requirements (which is feared by the British Gliding Association), the president of OSTIV wished to make it clear that this must not occur, as it would be inconsistent with the aim of providing minimum requirements. Following detailed study of the various national loading assumptions by OSTIV, the lowest in value would be chosen which would still result in a completely safe sailplane.

Turning to the problems of the Standard Class Sailplane Committee, Mr. de Lange made the following suggestions for the step-by-step solution of the problem:

1. Comparison of existing requirements. For this, one requires a basis of comparison. This has already been provided by the Committee chairman, Mr. B. S. Shenstone, and has been made available to the Committee members.

2. Discussion of the differences between the loading assumptions and flying qualities requirements on the basis of international experience and considering the reasons for the various differences.

3. On the basis of the results worked out in (2) above, the determination of the desired minimum requirements would follow automatically.

A very important matter which must be studied by this committee is the standardization of methods for measuring the performance and flying qualities. By this, Mr. de Lange had in mind standardized measuring techniques and equipment. The president of OSTIV saw the possibility of OSTIV obtaining suitable equipment for such standard measurements and which could then be made available to national authorities and Aero Clubs. By this means, precise international comparative data could be measured and the various countries could easily make their own measurements. Finally, the committee would have the opportunity, in view of the reports of the Standard Class Jury in Leszno (Paul A. Schweizer, U.S.A.; Lorne Welch, U.K.; J. Abrial, France; B. J. Cijan, Yugoslavia; J. Bojanowski, Poland) of studying the results of the Leszno comparisons and finally to make suggestions on improvements to be made in the future.

At the end of his speech, the president of OSTIV thanked the President of the Austrian Aero-Club, Mr. F. Polcar, for the hospitality of the Austrian Aero Club in providing conference rooms and looking after the delegates. Only thereby had it been possible for this study of these important problems to take place.

Mr. de Lange then expressed the hope that the example of Austria would be an encouragement for other OSTIV members to be of similar assistance to OSTIV when the necessity arises. In any case, one could be certain that this first step would become known as the "Congress of Vienna".

The background of this meeting, its purposes and its results may be of interest not only to OSTIV members but to other readers of Swiss Aero-Revue and for this reason the following résumé is given.

At Leszno during the World Championships last year, some of those who were making a close study of the Standard Class sailplanes in the competitions considered that it might be worth while to consider the possibility of special airworthiness requirements for this class. The matter was brought up to OSTIV by Boris Cijan, the Chairman of the Technical Section of OSTIV, at a meeting in Osieczna.

The plan was to have a short technical meeting to consider this possibility. It was decided to have a tentative draft of such a requirement prepared as a basic document on which to base the discussions. On Boris Cijan's suggestion, the British sailplane requirements were chosen as this instrument. C. O. Vernon and the present writer undertook to take the British requirements and make them applicable solely to the Standard Class. This draft was distributed to attendants for study shortly before the meeting which was made possible by the hospitality of the Austrian Aero Club, and was attended by engineers from ten nations.

The idea was (as stated by Mr. de Lange) to see whether a minimum requirement was a possibility as opposed to an envelope requirement embracing all the most severe cases of all nations. Such an envelope requirement, although easy to devise, would be doomed to failure by its unacceptability. A minimum requirement would be difficult because nations having more severe cases might consider it as a downgrading and therefore unacceptable.

The Polish representatives at the meeting provided another document which was the counterpart of the British-based document based on the latest Polish requirements. This was of great assistance. Four additional papers giving views and information on the subject were delivered or made available, but space limitations unfortunately prevent their publication in Swiss Aero-Revue. Two basic expressions of technical viewpoints were the papers by Boris Cijan and Justyn Sandauer. Although differing in their approach to the problem and in their analyses of the data available, both writers considered that the existence of Standard Class Airworthiness Requirements would be advantageous.

The other two papers, by Pierre Bonneau and J. Bojanowsky, dealt with flying qualities and testing methods, and were used as working papers during the meeting.

The meeting used the British-based requirement as a beginning with these objectives:

(*a*) To what extent the proposed draft might be generally acceptable.

(*b*) Whether there was a chance that any draft might gain enough agreement to be generally acceptable.

A detailed study of the requirement resulted in many changes being made which resulted in a second draft requirement. A number of the changes were increases in severity over the first draft. This means that the second draft deviates from a minimum requirement and at the OSTIV Board meeting in April 1959 it was decided that it required further study, and a meeting for September 1959 was suggested.

There is no intention of publishing either the first or second draft requirements. They are not official OSTIV documents and are not at this stage acceptable by all interested parties. Publication would therefore be misleading to those who are unacquainted with the background and the present position.

It is worth repeating here that OSTIV has stated that it does not intend to propose through the F.A.I. that any agreed Standard Class Airworthiness Requirements should be mandatory for such sailplanes. They could be used by any person or nation wishing to use them, and nations without their own requirements might find them useful. However, no proposals in any form have been made to the F.A.I. and it is not yet clear whether any form of requirement will be sufficiently widely acceptable for adoption even on a permissive basis.

A great deal of work is still to be done if this object is to be achieved. Apart from an initially acceptable requirement, a scheme for amending it as knowledge grows and ideas change would have to be devised which in itself would be very difficult if other international endeavours on technical matters are any guide.

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Standard Class Sailplane Meeting in Paris

Airworthiness Requirements

The second draft has now been re-worked into a third draft at a meeting in Paris, at the Aero Club de France, on September 21st, 22nd, and 23rd, at which the following were present:

L. A. de Lange, President of OSTIV
B. S. Shenstone, Chairman (England)
Dipl.-Ing. Boris Cijan (Jugoslavia)
Dipl.-Ing. J. Bojanowski, Dipl.-Ing. J. Sandauer (Poland)
P. Bonneau (France)
Ing. M. Doutreloux (Belgium)
Dipl.-Ing. H. Plasa (Germany)
Col. Floyd Sweet, Chairman, Technical Section OSTIV (U.S.A.)
Ing. R. Kunz (Austria)
Dipl.-Ing. T. Tervo (Finland)

Also the following were present as observers:

G. Abrial (France)
L. Pituch (Poland)
Messrs. Cayla and Schneider (of Breguet)

This third draft is based on British requirements with modifications emanating mainly from the Polish and French requirements and from the results of much argument and compromise. It has also been considerably shortened and, it is hoped, simplified.

Standard Class Sailplane

Airworthiness Requirements

By Dipl.-Ing. B. J. CIJAN (Jugoslavia)

I. Introduction

The development of sailplanes and the performance achieved are closely bound up with atmospheric energy sources. In spite of this, designers have, during the past few years, made great efforts to improve the performance of sailplanes so that pilots might be able to perform better. Apart from the economic and financial standpoint, it is necessary to ask oneself whether this great effort has been worth while. At this juncture we note that OSTIV and the CVSM of the FAI have drawn up some characteristics for competition sailplanes and created the Standard Class. This is intended to be a simple, cheap and able sailplane. Its performance should not be greatly inferior to the super-sailplanes in the open class. The world championships in Leszno in 1958 showed that the standard class sailplanes under sporting competition conditions lagged only 8 % behind the super-sailplanes on the average. The quality of the sailplanes in the two classes was practically at the same level.

The successful fulfilment of the Standard Class requirements and the performances attained during the last World Championships have encouraged many experts from various countries to organise further developments of these sailplanes, so that future sailplanes will have better performance and handling qualities and will at the same time be cheap.

One must not forget to allow free rein for the imaginative designer in his creation of new developments. The suggestion has been made that the mandatory requirements should be more closely studied in order to assist the designers regarding a certain lack of clarity in present day airworthiness requirements. In this connection a great deal of consideration has been given to deciding to what extent OSTIV should take part in the standardization of airworthiness requirements.

As early as 1937 during the ISTUS Congress, Mr. Wanner [1] stated: "... the international importance of soaring flight makes it desirable and necessary to unify the attitudes taken when determining the loading assumptions". Mr. L. L. Th. Huls from Holland [2] made valuable suggestions during the OSTIV Congresses in Sweden and Spain about

the international standardization of sailplane airworthiness requirements. During the OSTIV Congress in England in 1954, Mr. Zacher [3] in his paper: "Some Remarks on the International Integration of Airworthiness Requirements" made some valuable recommendations on the broadening of the sport of soaring and on the exchange of sailplanes with international contests in mind. All these recommendations should, it was suggested, be agreed internationally. During the OSTIV Congress in Osieczna in 1958, Mr. Pierre Bonneau [4] suggested an international Certificate of Airworthiness to be issued by OSTIV. Irena Kaniewska [5] in her paper "Comparison between Polish and Foreign Requirements for Strength and Construction of Sailplanes" at the VII OSTIV Congress pleaded for co-operation in the working out of international standards.

If we look back to the times of ISTUS, particularly to the Congress in Berne in 1938, I remember that at that time ISTUS laid down the loading assumptions for the well-known Olympic Sailplane. At that time the following nations co-operated in forming these loading assumptions: England, Germany, Poland, France, Holland, Italy, and Jugoslavia. The brief ISTUS Requirement went some way in helping to standardize the sailplanes of the Olympic Class. How important such a standard requirement was, even twenty years ago, can be realised clearly today after the creation of the Standard Class.

Stimulated by suggestions by experts from many lands, the problem of the existence of an international airworthiness requirement for sailplanes of the Standard Class emerged. Following the OSTIV Congress in Saint Yan in France, a working group of OSTIV experts from various countries drew up a Requirement for the Standard Class. As a result of this work, the FAI drew up a minimum requirement for such aircraft. As for airworthiness, any national requirement was accepted with the recommendation that where such requirement was non-existent, the English or German requirement should be used. At the OSTIV Congress in Poland we discovered from C. O. Vernon's paper that the English design requirements for sailplanes had been improved. The German design requirements, dated 1939, are already obsolescent in several respects. The question arises: Under what requirement should Standard Class sailplanes be built in countries which have no requirements of their own? OSTIV should assist in getting agreement to a standard expression of the minimum requirements for airworthiness of these sailplanes by an exchange of experience between various countries. The conference in Vienna was called in order to study the most important aspects of existing national requirements, to compare and to analyse and to make useful suggestions for recommendations so that the future development of these sailplanes could be assisted. OSTIV is not a National Authority which can lay down the law, but OSTIV must keep a sharp eye on developments and the opinions of scientists, engineers, and sailplane pilots from all over the world. We ought to study the difficulties and obstacles in the path of development and improvement of soaring flight and try to overcome them scientifically and technically. New work for the next OSTIV Congress should result from this conference, and a number of topical problems should be studied carefully and in good time.

The requirements set by the FAI at the suggestion of OSTIV are a first approximation which in no way limited the effectiveness of the designers. Various loading assumptions from various countries ought to be compared in order to bring out only those aspects which would have a positive influence on bringing closer together the various national requirements. We wish to examine the present-day design requirements by getting down to actual cases in order to make recommendations which will ease the difficulties experienced with National Authorities. The initiative of individuals and of the gliding movement in new developments must be encouraged, and advances and development must not be held back. Rigid assumptions which have been dragged along for decades must be replaced by clear rational cases. Loading assumptions are not the only things affecting safety in flight, particularly in the present state of development. In many design requirements, still in force, there is no mention of flying qualities. All these things indicate problems to be worked on so that recommendations for design requirements can be made.

II. Statistical Considerations

From a survey of present-day sailplanes of the Standard Class from various countries, based on different loading assumptions and design requirements, it is seen for example that there is no effect caused by the loading assumptions on performance or on basic weight. The present-day technical possibilities are so many-sided that two different sailplanes built to the same requirements may differ in weight as much as 80 kg. (176 lb.) which is as if the heavier of the two were flying as a two-seater. The statistical data show that the empty weights of individual sailplanes do not affect their aerodynamic qualities. For instance, an aerodynamically well-developed wing with a low drag section using the latest manufacturing techniques would have no important effect on the empty weight even if built of wood. One is rather striving to reduce the weight and not to increase the strength unnecessarily. The direction that sailplane development is taking is towards weight reduction without sacrificing optimum cruising speed and gliding angle.

III. Recommendations for the Airworthiness of Standard Class Sailplanes

For the Olympia sailplane of twenty years ago, the maximum weight was limited as well as the 15-metres-span limitation. New knowledge about new structural materials for aircraft indicates that there is no need to limit the empty weight. OSTIV should collect indispensable data on new materials which would form an important background for calculations and workshop practice. In order to improve the structural and economic qualities at an acceptable level of airworthiness, one should encourage the tendency towards weight decrease and study these parts of airworthiness requirements which lead in this direction and recommend them. As example, I should like to mention the gust loading, for our Standard Class sailplanes must be safely outside the danger zone in cloud and wave soaring. Different requirements for sailplanes use different methods for dealing with gusts. This means that this problem is not yet physically clarified. A contribution towards the clarification of this problem was made by Miha Mazovec [6] on the occasion of the OSTIV Congress in Madrid. In the work of Paul B. MacCready, Jr. [7] there is a report on research into atmospheric turbulence. C. O. Vernon [8], on the occasion of the OSTIV Congress

in Osieczna, gave a contribution on the gust case. For future OSTIV recommendations for gust loading we still require data on gust strengths and gust structure, so that with better information on gust gradients more precise calculations can be made on the maximum loadings to be experienced under gusty conditions.

In the same way, the stiffness requirements should be studied more closely in the more important aspects. For example, the aileron reversal speed as a function of the permissible never-exceed speed, and also the required lateral controllability. These are some of our recommendations for this conference.

IV. Summary

OSTIV's job is to keep a watchful eye on the development and advance of sailplane design and to make available in a practical form the latest knowledge in science and technology. OSTIV Congresses have always resulted in new contributions and valuable suggestions from scientists and engineers from all over the world, upon which the development of new recommendations could be based. The conference has been called for the purpose of furthering the development of the Standard Class sailplane, so that we can plan better and indicate in which direction research for the immediate future should progress. The experience and results stemming therefrom will be made known to our members.

In any case, it is recommended that collaboration with our meteorologists on the latest information about sources of energy in the atmosphere and particularly on the subject of gusts should take place as soon as possible.

The development of Standard Class sailplanes is already in the direction of simplicity and cheapness, and the airworthiness requirements should also fit in with these trends. The recommendations resulting from the deliberations of the working conference should, however, in no way tend to damage the various valid national requirements. It depends, rather, on whether the separate national authorities, after careful consideration wish to adopt them. Standard Class sailplanes are being built now and will be built in the immediate future to the various national airworthiness requirements. However, our new recommendations after final drafting should be of assistance to nations which have as yet no requirements of their own. In every case these efforts of OSTIV are in the direction of easing the difficulties of international co-operation in soaring flight.

I have attempted to give you an insight into the work and research necessary for the further development of the Standard Class sailplane.

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Standard Class Sailplane

Airworthiness Requirements

By Dipl.-Ing. J. SANDAUER (Poland)

I should like to indicate in a few words our point of view on the general problem of strength and design requirements for the Standard Class. The committee can be relied upon to deal with our suggestions thoroughly and in detail on the basis of our scheme.

The undoubted success of the Standard Class during the 7th World Championships in Leszno in 1958 clearly showed the correctness of the idea of introducing a class for relatively cheap and simple sailplanes, which also have a good and not widely differing performance. As was clearly realized, the first step in this direction, the OSTIV Specification for the Standard Class, could not be considered as the last step. One of the weaknesses of this specification is that it does not exclude the possibility of there being large differences in weight between one design and another. These differences originate mainly from the values of the assumed loadings, or in other words, the strength. As an example, one can quote the differences which have already occurred in Leszno, which are: the safe load factor for the Ka-6B was 4, for the Breguet 905 was 4.5, for the PIK-3C was 5 and for the Mucha-Standard was 6. It is obvious that the differences in the safe loadings, as also in the safety factors, permissible diving speeds and other assumptions affect the structure weight and hence the performance of the sailplanes. The connection between weight and performance in the Standard Class can be easily recognized because with constant wing loading the limitation in span results in an inverse proportionality between weight and aspect ratio.

In order to summarize the above, we feel that the development of strength and design requirements for the Standard Class Sailplanes is consistent with the idea behind it and is a further step forward.

When devising strength and design requirements, it is necessary to define their region of applicability. If strength requirements are concerned, we are of the opinion that they must determine the type of operation of the sailplane and the resulting permissible loads in the air and on the ground. Determination of the safe loading and the required safety factors forms for the designer the basis for the calculation of sufficient strength of all structural elements of the sailplane. The certification on the basis of such strength requirements by the State Authority concerned is another question and has to be done according to rules which may vary from country to country. Such an assumption, that is the determi-

nation of the safe loadings and safety factors and at the same time allowing the State in which the sailplane is built or used to certificate it, removes any possible conflict between OSTIV and State Authorities. It is thus logical to ask that a basic condition for the certification of a sailplane of the Standard Class for a national certificate should be the fulfilment of the OSTIV requirements.

If we pass on to design requirements, we can see quite clearly that their essential content is aimed towards guaranteeing safe operation. But limiting the design requirements to safety aspects is to the advantage of the development of the Standard Class according to OSTIV ideas. At this juncture I should like to stress that the present OSTIV requirements have not been so designed that they will stop undesirable tendencies towards the building of little "Hot-House Plants". The present requirements, although limiting the basic wing dimension, leave the designer completely free in designing the fuselage. At present nothing prevents the designer from decreasing the height of the fuselage as much as he likes, to the extent of requiring a pilot to lie at full length on his back, and to reduce the beam so that it is barely wide enough for shoulders and hips. The pilot, inserted into the cockpit with the help of a shoe-horn, could certainly withstand a competition flight of a few hours' duration, but this is hardly what we had in mind for the Standard Class, which was: a sailplane suitable not only for competitions but also for general club flying activities. The design requirements should therefore also contain conditions which would ensure a satisfactory minimum standard of comfort for the pilots and for ground handling.

As opposed to the strength requirements, the fulfilment of design requirements does not necessarily involve State certification. They can be checked by an OSTIV committee before competitions. The same thing goes for the flying qualities requirements. Taking into consideration the above-mentioned fundamental points, we have worked out a draft for the strength and design requirements which we have tabled before the conference. On the basis of the above discussion we also make the suggestion that there should be limits set on the layout of the fuselage for Standard Class Sailplanes. In our opinion, these limits should define the minimum cross section of the fuselage from the point of view of pilot comfort. We have not included this limitation in our draft requirements because some sort of qualitative agreement must be reached before it can be defined. In any event this limitation could only come into force after 1960.

(Swiss Aero Review 1959/4, 7, 8, 12)