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AEROPLANE STRENGTH ANALYSIS IN FOREIGN REGULATIONS. THE GERMAN PROPOSALS

BY G. ALBENGA

After having summarized the essential characteristics of the new proposals, which in some points stand out remarkably from the usual ones, it is pointed out that the chief importance is given to the conventional elastic limit, as regards admissible tension and the relatively small factor of security of the airplane, with regard to stresses possible however rare, is put in evidence.

Afterwards the load factors and the positions of the various forces acting on the aeroplane for the five fundamental flight hypotheses and for landing in various conditions are indicated.

THE RAISONDI PHENOMENON
(a New Phenomenon in Hydrodynamics)

BY E. PISTOLESI

The Author deals with certain experiments of Col. Prof. E. Raimondi which showed that a plate or a cylinder (rotor) rotating within a fluid, near to a flat wall, are submitted, on account of the
fluid, to a force which has a tendency to urge them to the wall, while the latter is urged with an equal force toward the rotor. The phenomenon can be explained by Bernoulli's law as an effect of the circulatory stream, which, by adherency and viscosity, takes place within the fluid around the rotor, owing to the rotation of it. An analogous phenomenon takes place when a cylinder rotates into another hollow cylinder, the axes of both the cylinders not coinciding.

The experiments have been carried out by Col. Raimondi in the air, utilizing as a flat surface a small wooden board 100 × 60 cm. and a rotor driven by an electrical small engine, consisting, according to the cases, in a small wooden board 100 × 22.5 cm., with increasing thickness from 8 cm. (at the edges) to 18 cm. (at the centre) or in a wooden cylinder 100 cm. in length and 28 cm. in diameter.

The case of the full cylinder rotating within the hollow cylinder is realized with the same rotor of the previous case and with a hollow wooden cylinder having the interior diameter of 34 cm.

The maximum forces obtained in the various cases were:
\[ F = 5 \text{ kg. for the plate plane unity, velocity of rotation 1900 R. P. M., } d (\text{distance of the rotation axis from the plane}) = 15 \text{ cm.} \]
\[ F = 4 \text{ kg. for the cylinder plane unity R. P. M. 2500, } d = 15 \text{ cm.} \]
\[ F = \text{about 1 kg. for the two cylinder unity.} \]

The relations among this new hydrodynamical phenomenon and some theoretical researches of Prof. Cisotti and of Col. Raimondi Rimself are discussed, which relate to the forces arising on a cylinder or on a plate near to an indefinite plane when there is a circulatory stream along either the cylinder or the plate. Such researches are developing in the domain of perfect fluid equations, therefore they differentiate from the phenomenon as appearing experimentally, the cause of which is to be found only in the viscosity. It is believed however, according to what takes place in other aerodynamical phenomena, that the theoretical formula offer a sufficient approximation to the reality and it is hoped that further experiments will be able to clear up completely the relation existing between theory and experience.

At last the analogies and the differences between the Raimondi phenomenon and that of Magnus are put in evidence, while the possibility of practical applications is indicated.
THE GUGGENHEIM FUND FOR THE PROMOTION OF AERONAUTICS CONSIDERING ITS MISSION AS ACCOMPLISHED TERMINATES ITS EXISTENCE

BY R. GIACOMELLI

The "Daniel Guggenheim Fund for the Promotion of Aeronautics" was founded in January 1926 by the American Mæcenas Mr. Daniel Guggenheim with a gift of 2,500,000 dollars and entrusted to a Board of Trustees of 12 members, among whom Colonel Lindbergh and Orville Wright, putting it under the Presidency of his son Harry, pilot in the world war, during which he took the "Brevetto Superiore Italiano".

In the previous year, Mr. Daniel Guggenheim had already made a grant of 500,000 dollars for endowing the New York University with an Aeronautical School; thus 3 millions of dollars have been in total destined by Mr. Daniel Guggenheim to the promotion of aeronautics.

The aim of the Fund, arising in a critical epoch of the aviation development in the U. S., was to assist in making air transportation safe, popular and regularly available, with the expressed condition of its founder that when this purpose is accomplished, the Fund will terminate its existence.

From this temporary character of the Fund it followed that both interest and principal must be expended, carrying forward a large scale operation to launch civil aviation in the U. S., where in that moment it was as yet uncertain, unpopular and technically inadequate.

The principal features of the work carried out by the Fund, in its four years of life, have been the following:

Creation of schools, laboratories and scholarships in American Universities; financial assistance to technical organizations both in America and in Europe (Associazione Italiana di Aerotecnica, Rome, R. Aeronautical Society, London, Aero Club de France, Paris, Aero Club von Deutschland, Berlin); grant of an equipment loan for the first passenger transportation air line in the U. S.; organization of aeronautical propaganda by intensive methods, with the collaboration of Colonel Lindbergh charged by the Fund...
with an aerial three-months' tour covering the 48 States of the Union and stopping in 82 cities; creation of a large Committee of those engaged in education work, putting at their disposal suitable means for carrying out aeronautical education in elementary and secondary schools; institution of the great Safe Aircraft Competition; compilation of an Aerodynamical Encyclopædia with the contribution of scientists all over the world; assistance to the first adequate and complete meteorological service in the U. S.; organization of the first National Aeronautical Safety Conference, in 1928; organization of the Roof-marking Campaign for identification from the air of all towns with a population from 1000 to 50,000 inhabitants; organization of the Full Flight Laboratory at Mitchel Field, with consequent solution of the problem of flying and landing safely in fog; finally a very enormous series of scientific and financial supports to individuals and organisations working in all branches of aeronautical science, both in America and in Europe.

But the chief problems for the definite conquest of the air attacked by the Fund are those of safe aircraft and of flying and landing in foggy weather, on which the Fund engaged itself with the greatest lavishness of means.

The results of the safe aircraft competition will be known before long and they will show the amount of contribution which has been brought by the competition to the improvement of safety in flying, urging designers and constructors along the line of the inherent safe flying machine.

As regards the results obtained in the Full Flight Laboratory they were at first communicated to the Italian public through a telegram sent by Mr. Harry Guggenheim to me, on the same day (September 24th) on which the successful Lieut. Doolittle's experiments took place, and then through a more detailed communication of Mr. Harry Guggenheim, sent by mail on the same date and published in the October issue of this Magazine.

But now full information on these experiments and on all the preliminary studies and researches which led to them has appeared in a Report of very deep importance, published by the Guggenheim Fund, which has been at once translated under my direction into Italian and circulated in the circles interested, but a most accurate version of it will appear in a coming issue of the "Notiziario Tecnico di Aeronautica" of the Air Ministry.
The fact is that by means of these experiments the Daniel Guggenheim Fund succeeded in establishing the necessary fundamental principles for solving the double problem of flying and landing in fog. It remains now to develop these principles practically, making them suitably applicable to commercial air transportation. But the Fund considers this further development of its work outside its mission and leaves it to the great aeronautical movement, which in these last few years has magnificently arisen in America, so as to surpass the most optimistic expectations which could be held at the beginning of 1926, when the Fund was established.

In consideration of such progress made by the aeronautical idea, in the U. S., so that industry, finance, science and private citizens are to-day all desirous to dedicate energy and capital to transport by air, which in proper conditions has become safe, popular and regularly available, the Fund already some months ago set itself the question if its mission could be considered as achieved and if consequently it must direct its activities towards the end.

And now, after the conclusion of its main works—the Safe Aircraft Competition and the Fog Flying Problem Solution—the Board of the Trustees of the Fund, at a meeting held in last October, in which a number of important grants were authorized, decided to close its activities by January 1st 1930, at which time the “Daniel Guggenheim Fund for the Promotion of Aeronautics” will belong to history.

The Government of the U. S., in public recognition of the merits shown by the Fund in promoting American and world-wide aviation and in consideration of the high qualities revealed by Mr. Harry F. Guggenheim during his Presidency of the Fund, has appointed him Ambassador of the U. S. to Cuba.

To Mr. Harry F. Guggenheim and to all the Trustees of the Fund we all send, in the moment of its dissolution, the appreciation and the grateful salutation of the “Associazione Italiana di Aerotecnica” with a high encomium for the great work carried out in promoting universal Aviation and a warm acknowledgment of the assistance given to the development of our Association.

At the same time we are glad to announce to our Fellowes that General A. Crocco, availing himself of his powers as Extraordinary Commissary, and interpreting the feelings of all of us, has now appointed Mr. Harry F. Guggenheim Honorary Fellow of the A. I. D. A.
THE NEW ITALIAN COMMERCIAL AEROPLANES

BY C. DE RYSKY

To the Italian aeroplanes which are yet in service in our airlines -- Cant. 10, Cant. 22, Savoia S 55, and Caproni Ca 97 -- a new aeroplane has to-day been added: the Caproni Ca 101 monoplane, which derives with some ameliorations from the Caproni Ca 97. It is of cantilever thick wing type, of high tensile stress steel tube construction, except wooden wing ribs, with the result of a higher lightness and elasticity, the resistance being the same. The fuselage is of quadrangular section, very large in size, with facilities both for passenger accomodation and for bomb and troop carrying. Facilities are also provided for a safe and smooth landing.

The machine is fitted with a two-bladed Caproni-Red screw of Alferium and can be fitted with one or two or three engines. In the last version there are three Lynx aircooled engines 600 h. p. total power.

The main characteristics are as follows:

Span 19.30 m.
Length 13.75 m.
Height 3.75 m.
Wing area 55 m².
Fuel 830 kg. or 1150 litres.
Oil 125 kg.
Maximum speed 220 km/h.
Minimum speed 90 km/h.
Endurance and range 8 hours or 1200 km.
Total weight 4000 kg.
Useful load 1500 kg.

R. G.