# AN INTRODUCTION TO THE PRINCETON SAILWING WINDMILL

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Generally discussed is the Princeton University interest in a wide range of wind machines. Specifically discussed is one example of the work - the Sailwing windmill. The aerodynamic characteristics of the Sailwing itself are presented in condensed form and its natural application to the wind machine is discussed. Past and present Sailwing windmill configurations are shown and their relative merits are compared. A section on a future promising configuration is presented and its compatibility to advanced technology electrical machinery is briefly discussed. Also included is a short bibliography.

## BIBLIOGRAPHY

Sweeney, T. E.: Exploratory Sailwing Research at Princeton University. Princeton Aero. Report No. 578, Dec. 1961.

Ormiston, R. A.: Theoretical and Experimental Aerodynamics of the Sailwing. J. Aircraft, vol. 8, no. 2, Feb. 1971, pp. 77-84.

## DISCUSSION

Q: What is a reasonable size for one of these sails? Could you get up to 100 feet or so?

A: Possibly, but there is a crossover point. We had studied it in reference to the entry body back when we were talking about Skylab: fixed wing versus something you could fold up. If you send up heavy big loads, the structure get so heavy, that you lose your whole weight advantage. So we're pretty sure we're good at 25, and I would bet 50. When you get to 100 I'm going to leave.

Q: What sort of loadings do you use in a sail application?

A: For the airplane type of application, 10, 12, up to 15 pounds per square foot, rather light.

Q: On the aerodynamic comparison between the solid and the sailcloth type of configuration, the difference there is that you built the solid rotor the same as the sail one. If you did, it should have the same characteristics.

A: Yes, the characteristics would be the same if a conventional metal wing could crinkle and bend the way a sailwing does. The advantage of the sailwing is its flexibility.

L.E. = Leading edge
T.E. = Trailing edge

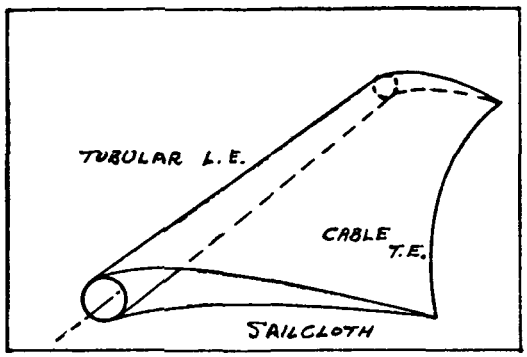


Fig. 1

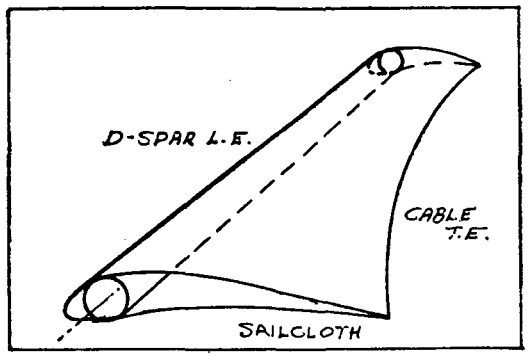


Fig. 2

Sail wing types of blade

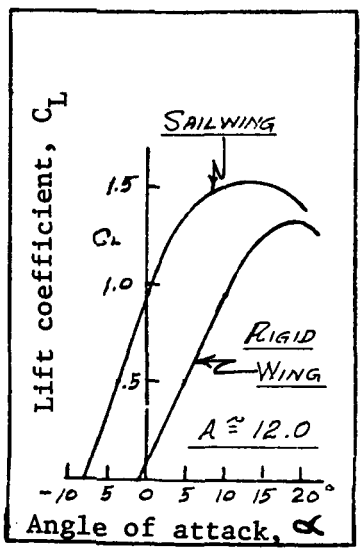


Fig. 3a

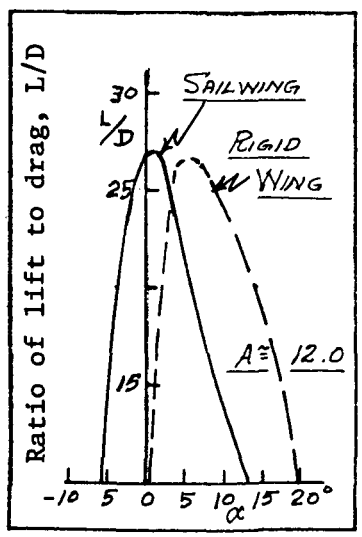


Fig. 3b

Aerodynamic characteristics of sail-wing airfoil

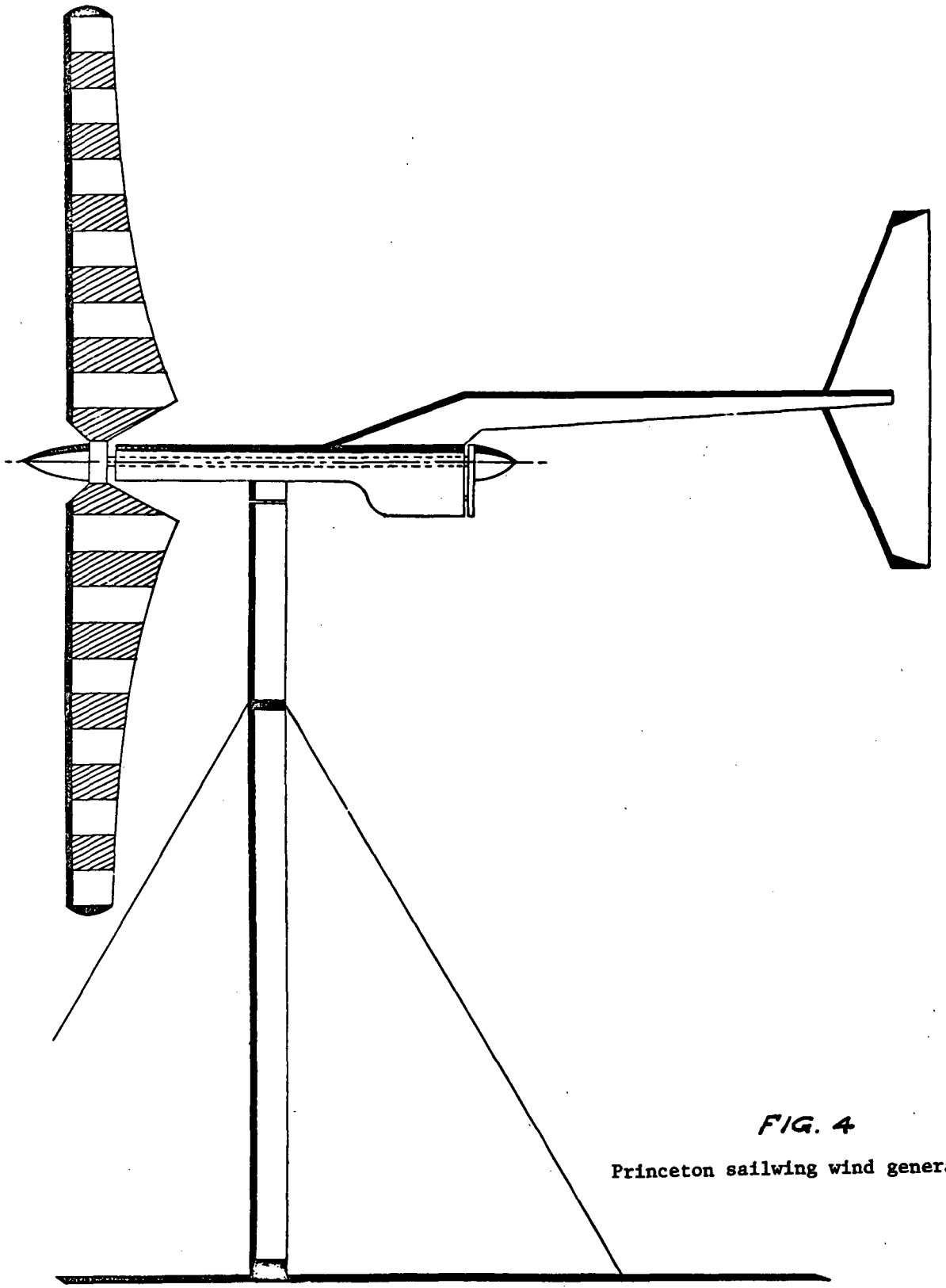

FIG. 4

Princeton sailwing wind generator