

FIBERGLAS REINFORCED PLASTIC —AN IDEAL SAILPLANE MATERIAL?

by J. H. GRAY

Many will recognize Fiberglas as it is used in the manufacture of cloth for draperies and clothing. Others are more familiar with fishing poles, boats, skis, bows for archery and other sport equipment made from Fiberglas reinforced material. Still others have made use of this material because of its excellent insulating properties. There are some people however, who may not have considered the possibility of using Fiberglas for the construction of aircraft, motorless or otherwise. At least one manufacturer* has recognized some of the material's latent possibilities and has produced an all Fiberglas aircraft which has enjoyed a good measure of success since its introduction nearly a year ago.

First of all, to avoid confusion, it might be well to define just what we mean by Fiberglas reinforced material. To those who wonder, let us begin by saying that glass fibers, which can be drawn to almost unbelievable fineness, have tremendous strength in proportion to their small size. These fibers can be spun into thread and in turn be woven into cloth of extreme durability and luster. On the other hand, the fibers can be loosely bunched and scrambled together and used for insulation from heat, sound and electricity. However, the use which will interest most of the soaring fraternity is the one whereby the glass fibers are imbedded in a plastic (usually a phenolic resin) and thereafter formed under heat and pressure into objects ranging from thin wafer-like sheets to solid objects with compound curves and a variety of sizes. In turn, thin sheets can be again subjected to heat and pressure and caused to assume shapes almost as desired. These unusual features lend almost infinite utility to the material. Considering that we wish to use Fiberglas to its fullest advantage in our proposed sailplane, let's list a few of its desirable attributes:

1. Fiberglas possesses great tensile strength and resists torsion, shear and compression loads to a fantastic degree.
2. Fiberglas reinforced material has great impact strength and resili-

ence. It is not brittle and has a high yield strength.

3. It is impervious to moisture and heat as we commonly think of these terms.
4. The strength to weight ratio is superior to almost any other known material.
5. It can be molded under heat and pressure, yet lends itself to rapid field repair with common tools.
6. Its surface can be painted and polished to almost any desired degree of smoothness and billiance, although it need not be, to render long and useful service. The original finish can be very attractive and will be as smooth as the mold allows.
7. Fiberglas can be drilled, sawed, sanded and otherwise worked as necessary to join separate pieces together. However, another simpler method can also be used if desired.
8. From the manufacturers standpoint, a rapid and complete interchangeability is readily achieved because all parts from the same mold will, of necessity, be the same within extremely close tolerances.
9. As used in structural work and as an engineering material it can afford a sailplane of extreme strength, great beauty, smoothness and best of all, safety through structural integrity.

Should this description paint a picture of unblemished beauty and joy forever, let it be said that Fiberglas reinforced material is slightly more expensive in comparison to more commonly used substances in aircraft manufacture. Should this be considered a major drawback, it may be possible to show how its use need not create a more expensive craft, but one which could be less expensive and far more useful and rugged.

Can you pilots, engineers and manufacturers visualize a sailplane with monocoque fuselage, cantilever wings and tail structure, the whole being constructed of Fiberglas reinforced plastic? Internal spars, stiffeners, formers and ribs could be made from aluminum or wood, but also Fiberglas. Instrument panel, seat shell,

cockpit interior—all would or could be made from Fiberglas.

Of what value to the manufacturer a ship that need not be riveted or welded? Of what value to the pilot the machine of unmarred external contour and smoothness? Is it possible that savings realized from lack of riveting, lack of fabric and dope, lack of other normal expensive fabrication methods might enable one to buy a sailplane of real performance for the amount now spent on a trainer? If the demand were great enough, volume manufacture could decrease costs still further.

After mold costs are amortized, the savings in production man hours and material would seem to dictate a less expensive ship.

Many pilots today assemble their own sailplanes from kits. How much easier to build a Fiberglas ship of fewer total parts, no rivets and no fabric to sew and finish.

Coloring material of almost any desired hue can be added to the plastic bonding agent to produce a ship that would never fade or need recover or refinishing—right from the factory.

Are there any potential soaring pilots who would like to have their own sailplane but can't afford a complete ship, nor have they time to assemble a kit? Fiberglas may provide the answer.

What of the possibilities of manufacturing a ship for "class" contests. Each sailplane would be identical to its mate and soaring skill would decide the winner to a greater extent than now possible. If this is not enough, then what about a two-place ship whose performance could be equal or surpass that of present single place craft?

Pulling our heads from the sand for a moment and behaving more like an albatross than an ostrich, how can we bring about these desired things? First of all, let us interest more newcomers in the grand sport of sailplane flying.

Encouraging interest in the art and science of motorless flight does not detract from one's own accomplishments and does not demean his prestige. Only through a strong soaring movement can we have the inexpensive craft we desire without sacrificing performance to the Gooney Bird level. Stimulate the novices and fledglings to demand this new ship. If their cries are loud enough the manufacturers cannot help but hear.

What of yourselves, the accomplished and skillful in the art? Class