

A CRITIQUE OF "Nomad"

by Robert Stanley

It was once my ambition to design and build a refined sailplane to surpass anything hitherto seen in America. For the better part of two years, my entire life centered itself around the attainment of that difficult goal. With a zeal worthy of perhaps a better cause, I subordinated recreation, friendships, every waking hour to the insatiable gods of design and production. From these solitary labors gradually emerged that plane in which, though hardly half completed, I received, at the 1938 National Contest, my first taste of motorless flight. Final completion a year later, after some 12,000 miles of travels, suggested its title, as a member of a wandering tribe, of "Nomad."

How nearly my ambition has been realized every man must judge for himself. I did not expect perfection. I did not attain perfection. If experience teaches us to profit from our mistakes, we emerge the richer. If we are enabled to profit by another's experience, we reap double reward. To those of you who aspire to the design of a championship sailplane, I offer the following critique. In it are expressed my most sincere and carefully considered evaluation of those features which were Nomad's. That these data might shed some glimmer of light upon that tortuous path of sailplane design is my modest hope.

Let us face first the faults. Nomad's were comparatively few, but important. Her most glaring fault led to her eventual destruction, and hence merits comment.

Flaps vs. Spoilers:

Nomad had drag flaps—large ones. They were utterly useless for landing purposes, the purpose for which they were designed (Nomad crashed following the loss of 17 feet of left wing during test and stunt flight). A bad, crosswind landing in a dense wheat field had seriously damaged the wing, on which hasty and inadequate repairs had been made. This landing was necessitated by choice of a large field, though a bad one, because of the impossibility, due to absolute lack of all glide path control by the inadequate flaps provided, of landing in an adjacent, smaller, but smoother field. Every landing in Nomad was a nerve-wracking ordeal; I never knew just where it would eventually set down. Spoilers as effective as Minimoa's or even Ibis' would have made landing a simple operation. Above 70 m.p.h., the flaps were fine, quite valuable for the rapid loss of altitude coming down from great height. An excellent arrangement seems to be flaps and spoilers, former for high speeds, the latter for landing approaches. The former is, however, a luxury—the latter an absolute necessity.

Landing Gear:

Nomad had retractible landing gear, but no brake. Much better that it were the reverse. Like spoilers, a wheel brake is a necessity, a retractible landing gear an unimportant luxury. Wheel location, which is important, should be well aft of the C.G. Nomad's was directly beneath the C.G., resulting very erratic takeoff characteristics



After the crash

and a moderate tendency to ground loop on landing. Wheel location on Wolf and Minimoa are ideal, both as to takeoff and landing.

Ailerons:

Nomad's aileron control was best of any sailplane I've ever flown. Full aileron at stalling speed was still effective, and did not cause tip stall. The aileron chord tapers down with wing chord, rather than skewing across the tip, as is the case of many designs. Its effectiveness and freedom from tip stall contributed much to the ease of flying blind in turbulent clouds. Its defect was manifested only during prolonged, tight turns, where the continual application of reverse aileron which inevitably accompany all tight turns must have created appreciable wing drag. A Friese aileron, its merit was that it gave favorable yawing moments for maneuvering and adverse yawing moment in steady turns. A plain aileron of similar planform would offer better streamlining, without much reduction of effectiveness.

Wing Area:

I hesitate to reduce Nomad's wing area to help cruising speed at expense of impairment of her phenomenal ease of climb. All future contest flying is going to place continually heavier emphasis on speed, and lightly-loaded, thick wings cannot give it. Hence I would favor a thinner section, say 23012, for the outer 75% of span; the weight increase would not be objectionable.

Cockpit Room:

Nomad was tailored to my lanky frame. A large man, like Parker Leonard, makes the whole fuselage bulge; all of which would make it hard to sell to a bulky customer if and when I wish to part with it.

The above represents the sum of my adverse criticism of the Nomad design. Now, by way of dessert, a few bouquets.

Aerodynamic Design of Wing:

Despite a geometric washout of only 1°, and a sharp-peaked lift curve, the Nomad's stall characteristics were