DESIGN COMPARISON OF TEAL AND LAKE AMPHIBIANS

From the time the Lake Amphibian was originally designed as the SKIMMER Amphibian in 1947, operating experience with this configuration, plus seven years of continuing Navy hydro research using a Lake LA-4A as a test bed, amply demonstrated basic design problems associated with the raised nacelle pusher installation. To eliminate these problems the TEAL Amphibian was developed in 1968, incorporating the benefit of 21 years - a generation - of improvement in small amphibian design.

As designer of both the Lake and Teal, in my opinion the following review presents the major improvements designed into the TEAL some twenty years after the Lake Amphibian configuration was established:

1. APPROACH HANDLING -

The tractor propeller installation of the TEAL provides a minimum flying speed at gross weight and full power. Since increases in power produce additional center section lift, the TEAL will not stall and "fall through" due to sudden application of power during an approach correction.

When full power is applied to the Lake Amphibian at low airspeed, the pusher propeller installation scavenges the wing root area airflow. This inherent design problem results in loss of lift, loss of thrust, and increased drag at a time when maximum lift, maximum thrust, and minimum drag are essential - such as power corrections during an approach over tree-lined shores or embankments. Further, sudden application of power to the LAKE results in severe nose up pitch, and if power is cut the plane will stall. This situation can be so critical for the Lake that recovery may be impossible between 15 to 80 feet altitude; below 15 feet, ground effect tends to lessen the destabilizing influence of sudden power application. As a result, power should not be applied to the Lake during the terminal phase of final approach.

As an additional consideration, the TEAL propeller operates in unrestricted airflow while the Lake is partially blocked by the cowling; another reason the TEAL configuration provides more thrust per horsepower.

2. TRIM CHANGES -

Trim changes are minimum for the TEAL due to the "T-tail" configuration. Located in the propeller slipstream, the horizontal tail experiences increased airflow with increased power - providing required balancing loads with power changes. However, the Lake experiences rather large trim changes with power, tending to amplify the approach correction problem previously noted. This condition is minimized by not applying large power corrections during the approach.

3. WATER OPERATION -

Water operation and handling characteristics of the TEAL are more gentle and less demanding than those of the Lake. While this is partially due to the power trim characteristics of the two aircraft, improved water operation of the TEAL is mainly due to a deep step hull design. This configuration virtually eliminates porpoising at either end of the trim range as well as the accompanying skipping and pitch-out tendencies of the Lake hull. As a result, the TEAL hull is FAA certified for operation in twice the wave height permitted for the Lake - 12 inch waves for the TEAL vs six inch chop for the Lake.

4. STRUCTURE AND EQUIPMENT -

The TEAL has approximately one-half the number of detail parts required to assemble the Lake. This means lower first cost, lower spare parts prices, and reduced maintenance for the TEAL. For example, the TEAL has a maintenance-free leaf spring landing gear vs the Lake oleo struts which require constant service during salt water operation, and the TEAL carburetor can be reached for adjustment in five minutes.

The complex hydraulic system in the Lake requires constant attention, while the TEAL has a manually retractable landing gear and flaps, requiring no hydraulic system.

5. The operational features and performance capability of the TEAL II have been set forth as prepared by TEAL (Canada) in the accompanying brochure and comparison study.

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October 23, 1976