SEAPLANE TOWING CHANNEL
-1931, 1936-

A seaplane must operate in both water and air. Fuselage and float hydrodynamics investigations were not part of the original National Advisory Committee for Aeronautics (NACA) research program. However, flight experience revealed that seaplanes had unique design problems. In particular, water resistance during take-off had to be minimized without seriously compromising aerodynamic performance efficiency.

In 1929 NACA decided to pursue research in seaplane hydrodynamics. Naval architect Starr Truscott assumed the task of designing a facility for developing and testing seaplane float and hull designs. Truscott’s original plans specified a tank 1980 feet long with a maximum tow carriage speed of 50 knots.

The original equipment included a wave-generator for simulating rough-water conditions. In 1937 the tank was lengthened to 2880 feet and carriage speed increased to 60 knots. Engineers obtained hull performance data by towing models along the tank channel and recording drag and other performance characteristics. Test results allowed designers to develop airworthy hull shapes having low water resistance.

The flying boat was considered obsolete in 1959. However, the facility continued to be used for research on surface and underwater craft until 1977. It was reopened in 1983 and is used for investigation of laminar flow phenomena on underwater vehicles and torpedoes.

Based on data from: Design and Deletion’s Interpretation/integration of field work, historic photographs, and National Advisory Committee for Aeronautics as-built drawings D-367 and D-2477 (primary reference).

SITE PLAN

STATE MAP

1" = 600’-0"

17200

OFFICE AREA

SHOP AREA

PUMP PIT

MOTOR GENERATOR ROOM

Overhead Craneway

Sump

LAUNDRY
Aeronautical research requires analysis of both aircraft and the medium in which they operate. Seaplanes are a compromise design that operate in the air and on water. The complexity of these specialized aircraft required unique facilities for their development and testing. A towing tank may be compared to a wind tunnel. Instead of showing the effects of airflow, it illustrates the principles of water flow. The tow tank lets engineers determine how a specific shape will perform when moving through the water. As a hull moves through the water, resistance increases to a peak soon after the seaplane begins to move. By comparison, aerodynamic drag is slight at take-off and only increases gradually. Early seaplane model testing took place in tanks designed for testing ship models, but these had slow towing devices and were too short for practical tests on flying boats.

A tank to test seaplane hulls needed to be about 2900 feet long and capable of reaching towing speeds of 60 knots. By eliminating guesswork, the Langley tow tank enabled engineers and designers to test theoretical improvements based on previously successful results. Scale models of developmental seaplane hulls, towed at measured speeds and with specific loads, yielded critical design data.