



Artist's impression of typical Hydrokeel craft

Boating on a Bubble

By Perry J. Eli

The accompanying article is reprinted verbatim by courtesy of Bell Aerosystems Co.

AS OMAHA BEACH, Tarawa and Bougainville proved during World War II, amphibious invasions are a costly means of establishing beachheads in modern warfare.

The problem has been to get the invading troops to the beach faster with the least exposure to the murderous gunfire of shore-based batteries. Recent technological developments, however, are wreaking quite a change in this field which eventually should improve the chances of the amphibious invader.

"One of the big advances in amphibious operations of the future will be in the ship-to-shore movement," wrote Rear Admiral John S. McCain in a recent issue of the US Naval Institute Proceedings. "... the trip to the beach will take only about one-third of the time required today. Hydrofoils, hydrokeels, or hydroskimmers will transport the Marine to the beach at speeds in excess of 30 knots."

Of the three means for transporting men to the beach suggested by Admiral McCain, the Hydrokeel is the most recent. It is a radically new principle of boat hull design developed by Robert W. Priest, a young naval architect formerly with the Navy's Bureau of Ships. He is president of Anti-Friction Hull Corporation of Severna Park, Maryland, manufacturers of Hydrokeel boats.

The Hydrokeel principle involves a system of "lubricating" the bottom of a hull with a thick curtain of air to reduce water drag and attain high speeds over the water. Air is forced downward by forward mounted blowers between side keels to form an air pocket beneath the hull bottom and above the water surface. The hull is basically a rectangular, flat-bottomed box to which a curved bow has been added. Across the bow are flexible flaps that extend to the lower part of the hull and cover the front of the bow down toward the

water. When the boat is in motion the flaps may, when in contact with strong waves, swing back to reduce the shock of contact, tending to compress the air layer and soften the slam or pounding. The craft is propelled and controlled in the conventional manner.

In addition to high speeds, other advantages of the Hydrokeel concept, in comparison with conventional craft, include greater economy and increased load-carrying capacity at these high speeds, simplified hull form and greatly reduced slam.

Textron's Bell Aerosystems Company has a licensing agreement with the Anti-Friction Hull Corporation to use, manufacture, sell and sub-license vessels employing the Hydrokeel principle. This agreement combines the engineering and sales capabilities of the two companies to develop the full potential of the Hydrokeel boat for military, governmental and commercial applications throughout the world.

Bell now has access to a broad range of technology in all facets of air cushion vehicle engineering. This technology includes such vehicles as its own 22½ ton Hydroskimmer built for the Navy, the 1½ ton "Carabao" ACV, patented air cushion inventions held by Westland Aircraft Limited, Hovercraft Development Ltd of England and several Hydrokeel boats.

Recognizing the many benefits of the Hydrokeel principle, the Navy and Marines currently are investigating its application. The Bureau of Ships has long been searching for unusual hull forms which increase speed and improve seakeeping qualities. These qualities are necessary in modern sea warfare, especially with the advent of high performance submarines, high-speed aircraft and nuclear devices.

In July 1961, just two years after the Hydrokeel concept was developed by Priest, the Navy purchased an LCVP(K) (Landing Craft Vehicle and Personnel Hydrokeel) to study its application to modern amphibious warfare. This

36-foot craft can carry 6,000 pounds at 35 miles per hour, nearly four times faster than present-day operating landing craft.

It seems, at this time, more probable that Hydrokeels, rather than hydrofoils, will be better suited as the craft delivering personnel and supplies to the beach because of their greater load-carrying capability. Hydrofoils are also restricted by their long foils which have to be retracted before hitting the beach, an action which slows up the landing.

The Marine Corps has exhibited interest in the Hydrokeel for much the same reason as the Navy. They are presently awaiting delivery from Anti-Friction Hull Corporation (AFHC) of an ARC(K) (Amphibious Research Craft Hydrokeel) which they will use to investigate its handling characteristics, power to speed relationship, and general application to their needs. The ARC is scheduled for delivery to the Marines in June.

Another craft, called a Landing Craft Swimmer Recovery (LCSR), is being designed by AFHC for the Navy, using the Hydrokeel concept. Missions for LCSRs include frogman operations, aiding demolition teams in mining and securing beaches, and demolition work ashore. The need for speed in this type of operation is always necessary, especially in picking up frogmen and getting out of hostile areas.

The LCSR being designed is 56-feet long. It will have a range of approximately 1,000 miles and will be capable of speeds in excess of 50 miles per hour. It will also have greater seakeeping ability over craft now in use.

Wide Application

Military applications of the Hydrokeel concept are by no means limited to landing craft and recovery craft. Among the other craft that may employ this concept and benefit from increased speed, range and seaworthiness are: PT boats, patrol craft, anti-submarine warfare craft, mine sweeping launches, rescue boats, personnel boats, motor launches and many others currently in use by the military.

"There appears to be no limitation to the size of boat or ship that could use the Hydrokeel concept," Priest declared. However, he pointed out, the Navy is presently investigating its potential, using models at the David Taylor Model Basin at Carderock, Maryland, one of the world's most extensive testing facilities.

Besides the military applications there are many commercial and pleasure areas where the Hydrokeel principle can be applied such as ferries, metropolitan commuter service, coastal and inland