technology TODAY

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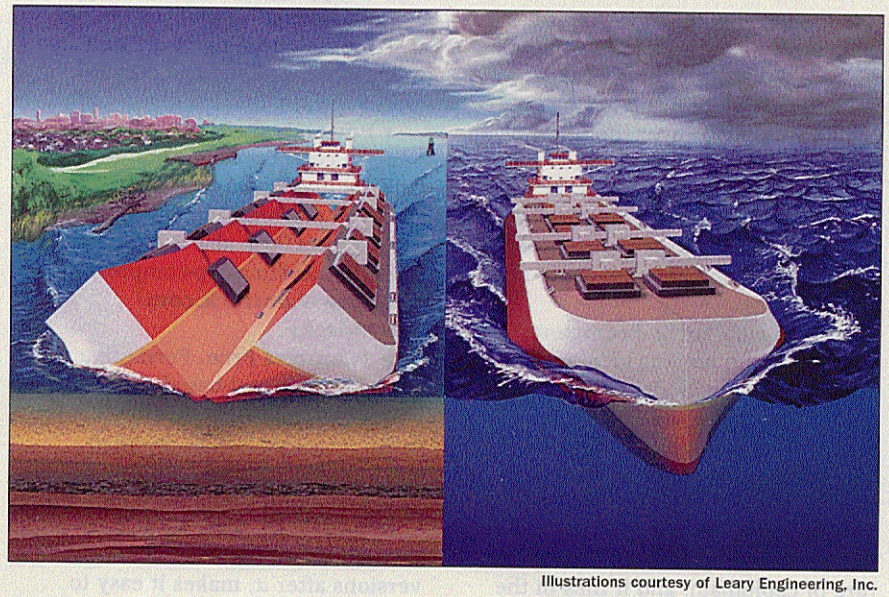
A Metamorphosing Ship



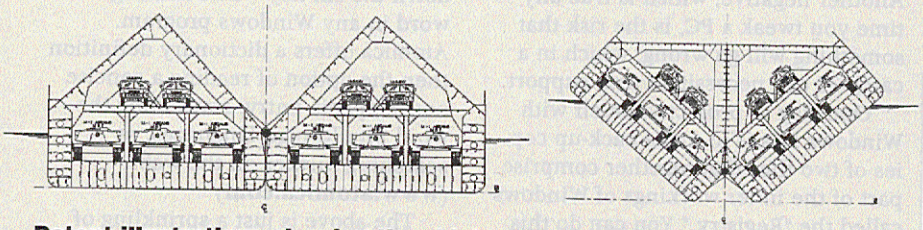
Illustrations courtesy of Leary Engineering, Inc.

YOUR mission is to design a ship that can travel both on inland waterways and through ocean sealanes. Your inland and trans-ocean vessel must be able to carry massive quantities of dry and liquid bulk cargo, shipping containers, or military and civilian vehicles through both types of waterways. The vessel's hulls, draft, beam, and displacement configurations must physically change so the ship can become an intermodel transportation system that operates in deep and shallow water.

This statement above describes the engineering challenge recently met by Leary Engineering, Inc. of New Orleans. The firm has just patented a Hinge-Ship design that meets all of the design constraints listed above. The illustrations at the top of the page show their ship morphed into its two configurations. When the ship is in its inland transportation mode (left illustration), it has a shallow draft and very wide beam that conforms to a barge design. When metamorphosed into its ocean transportation mode (right illustration), the ship has a deep-draft planing-hull design common to seagoing vessels.

This ship can go down a river to load its cargo at a shallow inland port. Once loaded and back in deep water, the ship transforms itself into its ocean configuration to deliver its cargo to deep or shallow ports oceans apart.

The initial patent designs were developed around the nautical requirements for operating on the Mississippi River. The vessel measures 595' long and can operate in any river system that can handle nine standard barges being pushed by a towboat. Its speed and power depend upon the propulsion system installed. To see the relationship between its configuration and its attainable speed, the following figures are given. With a 12,000-hp engine it will do 9.4 knots in its shallow-water configuration or 12.7 knots in its deep-water configuration.



Patent illustrations showing the ship's cargo arrangement.

The ship hulls are rotated through the combined efforts of two systems. The beam and gear system can be seen in the illustration. The second system, a water-ballast system, is positioned under the cargo compartments.

There is no doubt in my mind that a vessel of this type will soon appear in a James Bond-type movie thriller. The movie's special effects that show the ship opening and closing would knock an audience's socks off. I expect many readers will want to use this month's column as a Design Brief for sea transportation. If you should develop the hinge-ship into an activity, please send photos of your students' best designs to *Tech Directions*. We will try to publish some of them during our next publishing year.

I want to take this opportunity to wish you a fantastic summer. I look forward to our once again meeting between the pages of *Tech Directions* in August. This coming year I also hope to get the opportunity to personally address some groups. My visit to your group might just be an email away.

Recalling the Facts

1. Describe how the hinge-ship changes its configuration to travel in a river and in the ocean.
2. Why do you need different hull designs for ships that travel inland waterways and ships that travel in the ocean?