Kobukson or "Turtle Ship"

Clad with iron, the "Turtle Ship" won many sea battles against large numbers of enemy ships by means of superior fire-power and structural design. The roof was covered with iron spikes to prevent the enemy from boarding. Cannons were placed at every angle on the ship, and the "dragon's head" emitted smoke to provide cover and distraction. The ship was well-suited for ramming, as it was sturdier than the enemy ships thanks to the red pine timber and the use of wooden nails which expanded as they absorbed seawater. The enhanced structural integrity also enabled it to carry heavier cannons than the enemy, with greater range. As with other Korean traditions, innovation on the sea has carried through to the modern age, with Korean shipbuilders currently leading the world market, both in construction of vessels and also naval constructions such as floating and "on ground" dock.

The Kobukson, or Turtle Ship, was the world's first iron-armored warship. It was completed and used for the first time by Admiral Yi Sun-sin in the 16th century. With its exceptional capabilities and fire power, it played an active role in almost all the sea battles of the Imjin War (1592~1598). Able to charge and break up the enemy fleet's formation, sinking ships within minutes, the Kobukson was effectively a sea tank.

The bow of the Kobukson was shaped like the head of a dragon, and the stern was like a turtle's tail. The interior of the ship consisted of three floors: the lower floor was used to store cargo, the middle floor kept the rowers, and the top floor was the gun deck. The ship was designed so that the crew were able to see outside whilst being invisible to the enemy.

Iron armor plating covered the wooden boards which roofed over the Kobukson. Steel spikes were then fixed in the roof, and straw laid over the top. When the enemy tried to board the ship, they were impaled on the hidden spikes.

Unlike other warships, the Kobukson had guns stationed not only along its sides, but also in the bow and in the stern, allowing it unprecedented flexibility of range and accuracy. The dragon's head was designed to "exhale" flaming arrows and cannon balls, and also sulfurous fumes and clouds of smoke, which provided the Korean Navy with cover for tactical maneuvers.

A little below the bow protruded the head of a gargoyle, which served as a charging device, and was used in conjunction with the dragon head in the Kobukson's special ramming technique. When the gargoyle's head breached an enemy hull, the dragon's head would fire cannon balls into the breach as the ship withdrew. The gargoyle had the further effect of improving the ship's hydrodynamic performance by cutting the waves as the ship sped along, thus increasing its ramming speed.[26]

Two further features of the Kobukson made it particularly serviceable for the execution of this tactic. First, it was built with red pine timbers, which have a relative density of 0.73, much higher than that of average timber (0.41-0.47). Second, wooden nails were used in the construction of the Kobukson. Unlike metal nails, which are quick to rust, the wooden nails expanded as they absorbed water, and the joints became more secure over time. The Kobukson as a whole was constructed on this principle of strengthening by expansion: support beams were fitted to the roof by means of a system of matching indentations and interlocking teeth, thus making the entire structure of the vessel stronger and more resilient.

Replica of the Kobukson The War Memorial of Korea

Korea's small territory, with limited natural resources, spurs on the creative spirit of its people. Korean shipbuilding companies can build ships on the water, without the need for dry docks. At one point, under pressure from excessive demand, Samsung Heavy Industries ran out of dock space. After careful planning, it developed the world's first large-scale "floating dock." The huge

26. Tae-hoon Kim, The Two Faces of Yi Sun-sin (Seoul: Changhae, 2004), 117-118.

building blocks of the ship were assembled on the surface of a special barge, and when the ship was completely built, the barge was sunk so that the ship was left floating. The "floating dock" method enabled Samsung to overcome the problems of side-to-side motion that normally inhibit the process of welding at sea.

Hyundai Heavy Industries, the world's largest shipbuilder was the first to build a vessel on land, which it claimed was a breakthrough. This "on ground building" method frees ships from the tight constraints of a dry dock, allowing them to be built in bigger sections at a time. After the ship is completed it is transported by rail and put out to sea on a barge. If development of innovative technologies such as this continues, the Korean shipbuilding industry is likely to keep its lead in the world.

Replica of the Kobukson The War Memorial of Korea

* Replicas of Kobukson are on display at various national museums, such as the War Memorial of Korea, as well as other museums throughout the world, such as the Washington D.C. War Memorial Museum in North America, and in many other countries including China, Japan, Germany, France, and Canada.

Source: Excerpt from "Fifty Wonders of Korea" Vol. 2 Science and Technology, Korean Spirit & Culture Promotion Project