How Chinese Junks Changed Trade in the Song Dynasty

Although Chinese junks were built for both fresh- and saltwater travel, many were constructed as war-vessels, like the “armed junks” of the Qing Dynasty that fought in battles against British, American, and French forces during the Opium Wars. Other junks were specifically constructed for expeditions: they tended to be very large, like the ones built during the Ming Dynasty intended for Zheng He’s expeditions in the Indian Ocean. Though basic structure of Chinese junk ships gave them the flexibility to travel in different depths of water, the construction of the ship model here—entitled “Country Passage Boat”—through its hull shape and fasteners, rudder, bulkheads, and sail structure, provides significant evidence that it is a Chinese Junk Passage Boat originating from the Song Dynasty. Lasting between 960 and 1279, the Song Dynasty increased the importance of overseas trade when the loss of the northern empire occurred. The construction of this boat made it an ideal craft for both the South China seas and the inland rivers.

George Worcester (1966;55) noted that the Chinese ‘Passage Boats’ were crafted in such a way that they served as the Chinese equivalent to stage coaches which maintained a regular cargo and passenger voyage to Hong Kong and Macao while holding the capacity to also travel inland via rivers. Junks have a flat and curved bottom with curved sides and a bow and stern that are wide and square-shaped. It has no keel, sternpost or stempost, but it does have a large rudder that can be easily raised or lowered into the water (Perkins 2013;250). This description describes the ship model almost perfectly as the model too lacks a keel, sternpost, and stempost and has a flat, curved, shallow drafted bottom. This allows for the boat to travel in many different depths without fear of running aground in shallow areas. While looking at the shape of the hull, you may notice small niches carved in the wood. This gives evidence that the junk used a method of
fastening in which Kugi (long, flat, slightly curved) metal nails are hammered into chiseled holes, “edge fastening” two planks. This makes the hull appear to have a carvel structure, meaning the planks are laid flush on one another rather than overlapping as seen in clinker models. The tops of these fasteners are not seen because the Chinese may have used similar construction techniques as the Japanese, who used “wooden plugs” to cover these holes (Damian 2010;109).

To return to the conversation about the hull shape, the lack of a deep draft keel makes the ship ill equipped to sail an effective straight course. To compensate for this, the Chinese added a large, fenestrated rudder (rudder with holes) to the stern of the ship during the Song Dynasty so that it could travel longer distances in deeper waters. The fenestrated rudder was invented to “ease the steering by reducing the pressure against which the tiller has to act, and minimize the drag on the ship caused by turbulence in hydrodynamic flow of the rudder” (Needham 1970; 656). The fenestrated rudder fulfills the function both of keel and steering aid. The rudder model in figure 1, as well as a picture of the model’s rudder, illustrates Figure 1 (photo by Smith 2015) the mechanism of this part of the vessel.
Apart from this, the lack of a stern- and stempost gives the boat yet another tool of flexibility. The square shape of both the bow and stem of the ship, though unequal in size, allows for the Chinese junk ship to travel either direction easily without the need to turn around. These innovations enabled efficiency for the trading junks of the Song Dynasty.

The bulkheads, or compartments, of the Chinese passage junks also point to the Song Dynasty. These boats would contain a house “fitted with sliding hatches [that would be] built on the main deck” (Worcester 1948;274). They would be divided into three compartments: one for living, one for passage, and one for storage. (Yu 1119) The model, too, has these three compartments that would aid in the storage of large cargo. However, these bulkheads were not solely meant for storage and living. In a region that suffered regular typhoons, a strong hull was needed. The Chinese had these bulkheads built to be watertight. This not only strengthened the
ship, but slowed flooding in case of holding.

Figure 3 (photo by author)

Junks also had unique sails. If you picture an ancient Chinese boat, an image of a squared sail broken up into several parts probably comes to mind. These sails are referred to as lugsails,
four sided sails. In the figure 4 below, you can see that there are four main sections of the sail, the head, the foot, the leech and the luff, giving it its rectangular shape.

Figure 4 (photo by Smith, 2015)

The cloth that makes up the sail itself is made of woven mats that are attached to multiple horizontal bamboo poles known as battens and are mounted onto one of five masts (Perkins 2013;250). These battens provide shape and strength to the sails as well as create resistance to tears on as a tear is typically limited to a single panel between battens and not subject to the entire sail. The benefit of using these lugsails was that it could easily be reefed and adjusted to accommodate different wind directions and strengths, useful for traveling in various mediums of water. The post in the model, although laying down in the model, is rather large and is accompanied with a single sail made of a cloth mentioned above sewn together into five battens. Because there is only one sail, it can be inferred that this vessel traveled in less windy places, like rivers, at a slower pace.

Though the Chinese junk was used for many different voyages, I believe that this particular model was a passage junk used specifically in the Song Dynasty where inland trade experienced an exponential increase. Its single sail, three bulkheads, and adjustable rudder made it a perfect vessel for traveling both inland and on the open sea.
Bibliography


Yu, Zhu, 1119, Pingzhou Ketan (Pingzhou Table Talk). publisher unknown.