

The Shipbuilding and navigation in China from the early modern period to the modern era

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Abstract

The development of Chinese ships in early modern times went through numerous changes and challenges. At the beginning of the Ming Dynasty, although the number and size of ships increased, the navy adopted a defensive stance due to a broader defensive foreign policy. Understanding the historical development of ships is crucial to understanding Chinese history. This paper examines the evolution of Chinese ships from early modern times to the present in a chronological framework. It focuses on how China navigated from decline to revival through the lens of maritime development. The narrative spans from the prosperity of the Ming Dynasty to the decline of the Qing Dynasty, and from the chaos of the Republic of China to the emergence of modern China as a global power. This paper emphasizes that ships symbolize these societal shifts, reflecting China's transformation from a weak global power to a formidable one within just a few decades.

Keywords

Shipbuilding; Navigation; Modern China; Chinese History; Ming Dynasty; Qing Dynasty; Western Impact

1. Introduction

The historical development of ships is an outstanding characteristic for understanding Chinese history. In this paper, I'll research the development of ships in chronological order from Early Modern China to Modern China, using ships as a focal point to research how China transitioned from decline to revival.

2. Shipbuilding and Navigation during the Ming and Qing Dynasties

The development of Chinese ships experienced many ups and downs in Early Modern China. In the Early Ming Dynasty, Zhu Yuanzhang, the first emperor of the Ming Dynasty, inherited the strong maritime power of the Yuan Dynasty after the unification of China in 1368. The number and size of ships continued to increase during Zhu Yuanzhang's reign, but the navy was transformed into a defensive role as part of

an overall defensive foreign policy [1]. Regarding overseas trade, Zhu Yuanzhang implemented a maritime prohibition policy due to concerns over the outflow of silver and rampant piracy. However, this eventually backfired as the number of pirates increased, and close interest groups were formed with some officials.

In 1405-1433, Emperor Zhu Di began to break the former policy, advocating Zheng He to embark on voyages to the Western seas and engage in trade with various foreign countries. This made China the world's leading shipbuilding and naval power at the time [2]. After Zhu Di's death, the maritime policy of the Ming Dynasty that followed continued Zhu Yuanzhang's sea ban and imposed even stricter restrictions on private maritime trade. For example, during the Jingtai period (1450-1456), the strategy of banning the sea in Zhangzhou, Fujian Province stated that:

All those nearshore vessels that violate regulations must be dismantled, cutting them down to about five or six feet in length. The authorities will issue certification to the dismantled vessels, allowing them to continue their transportation business. Each ship should go out to sea in the morning and return in the evening; if it does not come back by evening, the person in charge of the fleet must report to the government office. If there is a failure to report, and this is discovered, both the person in charge and those responsible will be held accountable together"

“其近海违式船只，皆令拆卸，以五六尺为度，官为印照，听其生理。每船朝出暮归，或暮不归，即令甲总赴府呈告，有不告者，事发连坐 [3]。”

By the Jiajing period (1522-1566), the maritime prohibition policy reached its peak of severity. Subsequently, China's shipbuilding industry declined from its developmental zenith.

In the Early Qing Dynasty, the maritime prohibition remained stringent as the Qing government sought to isolate the anti-Qing forces stationed in Taiwan. It was not until 1683 that the Qing forces completely reclaimed Taiwan. Emperor Kangxi, recognizing the numerous benefits of maritime trade from the Zheng family, abolished the "Order to Evacuate the Coast" and issued the "Order to Expand Maritime Trade," permitting Chinese citizens to engage in overseas commerce [4]. However, the 40-year maritime prohibition stifled technological advancements in shipbuilding. The intense shipbuilding competition between the Qing government and the Zheng family led to the excessive consumption of large timber along the coastal and riverine areas, resulting in severe shortages of shipbuilding materials after the expansion of maritime trade. Consequently, ships became prohibitively expensive, hindering the normal development of the shipbuilding industry during the Qing dynasty [5]. In 1747, the shortage of shipbuilding materials started to alleviate. The Qing government formally authorized merchants to construct ships abroad, which partially revitalized the declining domestic shipbuilding industry and facilitated the growth of overseas trade during the Qing dynasty.

3. Western Impact and Modernization Attempts in the Late Qing Dynasty

In the 1760s, Britain took the lead in undergoing the Industrial Revolution, which led to unprecedented advancements in science, technology, and social productivity. Through practical experience, Europeans gained a profound understanding of the navigational performance of ships, and European vessels saw significant improvements. With the eastward expansion of Western clipper ships in trade, traditional Chinese sailing ships faced severe challenges in Southeast Asian maritime commerce.

Between 1784 and 1811, among the foreign ships exporting goods from the Guangzhou port, there were 762 British ships, 378 American ships, and 166 ships from various European countries. British and American merchant ships accounted for 87% of the total [6]. By the early 19th century, fast sailing ships, known as clipper ships due to their sleek, scissor-like design, were being constructed in the shipbuilding hub of Baltimore on the U.S. East Coast. These clipper ships were remarkably fast—while traditional ships could make one round trip between China and Southeast Asia per year, American ships could complete three voyages on the same route in a single year [7]. Chinese merchant ships subsequently lost their competitive edge in long-distance maritime trade and quickly saw a decline in their share of Southeast Asian trade routes.

In addition, Britain resorted to large-scale smuggling of opium to balance its trade deficit with China, leading to a significant outflow of silver from China. This exacerbated tensions between the two countries, culminating in the Opium War of 1840-1842. This conflict starkly revealed the vast disparity between China's naval capabilities and those of the Western powers. The British invasion force deployed 32 warships and 25 transport ships, including 3 steam-powered vessels used for communication. The largest British warships measured over 32 zhang 丈 in length (approximately 107 meters) and over 6 zhang 丈 in width (around 20 meters), carrying more than 70 cannons with a firing range of up to 20 li 里 (about 10 kilometers). In contrast, the Qing government's largest warships were only about 11.2 zhang 丈 long (37 meters) and 2 zhang 丈 wide (6.6 meters), with fewer than 10 cannons [8]. This vast disparity in naval power led to the Qing government's swift defeat in the war and gradually made the Chinese realize the significant gap between China and the Western powers.

After the Qing government suffered another crushing defeat in the Second Opium War (1856-1860), leading officials initiated the "Self-Strengthening" movement. This effort aimed to address the military weaknesses of the Qing regime through a series of reforms, often involving the adoption of foreign technology and methods. For instance, in December 1861, Zeng Guofan established the Anqing Arsenal, where the production of domestic firearms and steamships began. In April 1865, China completed its first domestically designed steam-powered ship, the "Huanghu" 黄鹄, though it lagged far behind British steamships of the same period.

That same year, Zeng Guofan and Li Hongzhang founded the Jiangnan Arsenal in

Shanghai. Between 1865 and 1885, the arsenal built seven small vessels and 15 warships, with a total displacement of 10,490 tons, and repaired 11 ships [9]. However, shipbuilding was not initially intended as a major focus of the Jiangnan Arsenal, and its workers lacked technical expertise in ship construction. As a result, shipbuilding never became a core activity. After 1885, the Qing government ordered the arsenal to cease shipbuilding altogether, leading to a decline in China's shipbuilding industry, which remained stagnant for two to three decades.

4. Development of Modern China's Shipbuilding Industry

During the Republic of China period (1912-1949), although there were some attempts and developments in China's shipbuilding industry, the entire industry faced significant setbacks due to various wars that led to the destruction or occupation of shipyards. As a result, the shipbuilding industry stagnated during this period. It was not until 1949 when China ended its external and internal conflicts and the Communist Party came to power, that China's modern shipbuilding industry began to develop rapidly.

The development of modern Chinese shipbuilding can be divided into two phases based on the Reform and Opening-Up period. Before the Reform and Opening-Up (1949-1979), the Chinese government laid the foundation for the shipbuilding industry by introducing foreign technology. In June 1953, the Chinese government signed a naval procurement agreement with the Soviet government (also known as the June 4 Agreement), which involved the transfer of Soviet naval shipbuilding technology through a "transfer of manufacturing" approach. This led to a technological upgrade of most Chinese shipyards [10]. For example, during this "transfer of manufacturing" process, China upgraded several shipyards, including Jiangnan, Hudong, Qiuxin, Wuhu, Wuchang, and Guangzhou. Key supporting facilities were established, including high-speed diesel engines for ships, instruments and meters, auxiliary machinery, underwater acoustic equipment, and underwater weapons.

By 1959, 116 military vessels were completed, with combat capabilities comparable to those of international ships from the late 1940s and early 1950s. Alongside these military ships, China's shipbuilding industry produced a total of 484 vessels over the decade [11]. During this period, shipbuilding research institutions and schools such as the Shipbuilding Research Institute, Shanghai Shipbuilding Industry School, and the Shipbuilding College were established. Several universities also introduced shipbuilding disciplines. Additionally, the Soviet Union sent numerous experts to China to provide guidance and support for the development of the shipbuilding industry, while China sent nearly 100 officials and workers to the Soviet Union for training. Through this cooperation and learning from the Soviets, China's shipbuilding technology and management teams were gradually strengthened, laying a solid foundation for the modern Chinese shipbuilding industry.

During the period of Reform and Opening-Up(1978-1998), the Chinese government

began implementing Deng Xiaoping's 1977 strategic decision to "introduce advanced foreign technology and penetrate international markets with ship exports." This marked the beginning of China's transition from a closed to an open shipbuilding industry. China not only continued to import technology from the Soviet Union but also began introducing advanced technology and management expertise from countries such as Japan and those in Europe, while placing greater emphasis on market cooperation with foreign enterprises. The focus shifted from predominantly military products to a mix of military and civilian products. Concurrently, the industry actively imported advanced foreign technology, establishing an "export-import-enhance-re-export" outward-oriented economic development model [12].

Specifically, the shipbuilding industry introduced foreign advanced technology at a high starting point, imported cutting-edge key production equipment, and undertook large-scale technological upgrades at major shipyards. This rapidly enabled the industry to construct ships that met international norms and standards, leading to successful ship exports. Building on this foundation, the shipbuilding industry continuously advanced in technology, standards, facilities, management, and trade, aligning comprehensively with international practices. Furthermore, by assimilating and absorbing imported technologies, China gradually developed its own design and development capabilities, significantly improving shipbuilding efficiency, standards, and quality.

Through this period of development, China quickly acquired the capability to build ships that meet international standards and norms and gradually achieved the ability to independently design and develop shipbuilding technologies. This success enabled China to establish a significant presence in the international market. In 1994, China surpassed Germany to become the world's third-largest shipbuilding nation. By 2008, China's shipbuilding industry overtook Japan in three major indicators—shipbuilding completions, new orders, and order backlog—becoming the world's second-largest shipbuilding country. Today, China's shipbuilding industry stands at the pinnacle. According to Chinese government statistics, in 2023, China's shipbuilding completions, new orders, and order backlog accounted for 50.2%, 66.6%, and 55.0% of the global total by deadweight tonnage, respectively, maintaining the world's leading position in all three major indicators, with each showing a growth trend [13].

In addition, modern China's naval power is also growing increasingly formidable. Since the early to mid-1990s, China has been engaged in about 30 years of naval modernization efforts. Today, the People's Liberation Army Navy (PLAN) is a significant military force in China's near seas and is expanding its activities into the broader waters of the Western Pacific, Indian Ocean, and around Europe. According to the U.S. Department of Defence, the Chinese navy is "the largest in the world, with over 370 combat platforms, including major surface combatants, submarines,

long-range amphibious ships, mine warfare ships, aircraft carriers, and fleet auxiliaries [14]". Furthermore, China possesses the financial and technological resources needed to sustain its long-term naval development plans. If this trend continues for the next ten to twenty years, China could likely achieve a naval capability comparable to that of the U.S. Navy [15].

5. Conclusion: The Symbolic Significance of Ships in Witnessing China's Social Changes

In the historical context of China's shipbuilding development, ships have witnessed various stages of China's societal evolution. From the splendour of the Ming Dynasty to the decline of the Qing Dynasty; from the chaos of the Republican era to the strength of modern China, ships have symbolized these shifts in societal progress. Therefore, studying the development of Chinese shipbuilding is of great importance to the research of modern Chinese history. Moreover, examining the history of China's shipbuilding industry can reflect how modern China transformed from a weak global power to a strong one in just a few decades.

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