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From Shipyards to High Seas: China's Shipbuilding Dominance

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Maritime transport is a critical component of international trade, connecting countries and supporting the global economy. Ninety per cent of the world's goods are transported by sea, contributing significantly to the movement of raw materials, finished products, and energy resources. Globalization has enhanced trade and the movement of goods, making shipbuilding an important strategic industry.

2. China, South Korea, and Japan dominate shipbuilding -- China and South Korea together accounted for over 85% of global shipbuilding orders in 2024.[1] The shipbuilding industry often referred to as the "crown jewel of integrated industries", involves a multitude of components, a lengthy supply chain and high levels of industrial interconnectivity, encompassing over 50 different sectors. It is supported by thousands of auxiliary industries and is a massive generator of employment. China has a long 14,500km coastline dotted with 175 shipyards.[2]

3. China has emerged as the world's largest builder of ships and has invested heavily in modern shipbuilding facilities and technology. Its shipyards produce a wide variety of vessels, ranging from cargo ships to advanced naval warships. China surpassed South Korea to become the world's largest shipbuilding nation in 2021.[3] The latest data in the Clarkson Research 2024, shows that China has secured 71% of global shipbuilding orders.[4]

4. Recent industry data highlights that China leads in all the three key-indicators of shipbuilding viz. completed tonnage, new orders, and the volume

[1] *New Times Shipbuilding takes the helm as China commands 70% of global ship orders-Jiemian Global. (n.d.). https://en.jiemian.com/article/12243065.html*
[2] *China's shipbuilding industry in 2024*. (n.d.). BRS Shipbrokers. https://brsshipbrokers.com/news/title-china-s-shipbuilding-industry-in-2024
[3] Times, G. (n.d.-c). *China surpasses South Korea as world's No. 1 shipbuilder in 2021*. Copyright 2021 by the Global Times. https://www.globaltimes.cn/page/202201/1243973.shtml
[4] *China dominates global shipbuilding in 2024, capturing 71% of the orders*. (2025, January 28). Hellenicshippingnews. https://www.hellenicshippingnews.com/china-dominates-global-shipbuilding-in-2024-capturing-71-of-orders/

of orders on hand. In 2024, of the total 2,412 orders for new ships globally, China alone received orders for 1,689 ships, a staggering 71% share. The second largest number of orders of 12% of the total went to South Korea for 289 new ships. [5] China is also the world leader in building naval ships. According to data compiled by the US's Office of Naval Intelligence, the construction capacity of the Chinese shipyard for surface ships and submarines is 232 times more than the US shipbuilding prowess.[6] This implies that China will be able to sustain a longer-term conflict, with a higher probability of replacing damaged vessels and repairing and maintaining warships over a longer period.

5. The People's Liberation Army Navy (PLAN) boasts the world's largest fleet of ships by hull count, comprising 370 platforms, including major surface combatants, submarines, ocean-going amphibious ships, mine warfare ships, aircraft carriers, and fleet auxiliaries.[7] According to a slide 'leaked' from the US Office of Naval Intelligence, the PLAN's overall battle force is expected to grow to 395 ships by 2025, 435 ships by 2030 and 475 ships by 2035.[8] China owns the largest fleet of oceangoing commercial ships including vessels registered in third countries[9]. In addition, a handful of Chinese firms have seized considerable market share as international terminal operators and in 2024 had ownership or management control of at least 110 commercial ports.[10] This has obvious implications.

6. China's shipbuilding capabilities have significantly increased over the last two decades, driven by various government policies including subsidies for shipyards and related industries, provision of low-interest loans to ship buyers, establishment of secure in-house supply chains, development of shipyards with

[5] *New Times Shipbuilding takes the helm as China commands 70% of global ship orders-Jiemian Global. (n.d.). https://en.jiemian.com/article/12243065.html*

[6] Trevithick, J. (2023, July 11). Alarming Navy Intel Slide Warns of China's 200 Times Greater Shipbuilding Capacity. *The War Zone*. https://www.thedrive.com/the-war-zone/alarming-navy-intel-slide-warns-of-chinas-200-times-greater-shipbuilding-capacity

[7] US Department of Defense. (2023). Military and Security Developments Involving the People's Republic of China. In *https://media.defense.gov/*. https://media.defense.gov/2023/Oct/19/2003323409/-1/-1/1/2023-MILITARY-AND-SECURITY-DEVELOPMENTS-INVOLVING-THE-PEOPLES-REPUBLIC-OF-CHINA.PDF

[8]Trevithick, J. (2023, July 11). Alarming Navy Intel Slide Warns of China's 200 Times Greater Shipbuilding Capacity. *The War Zone*. https://www.thedrive.com/the-war-zone/alarming-navy-intel-slide-warns-of-chinas-200-times-greater-shipbuilding-capacity

[9] Blachier, S. (n.d.). *Merchant fleet – UNCTAD Handbook of Statistics 2023*. https://hbs.unctad.org/merchant-fleet/

[10] *Mapping China's global port network: on the backfoot in 2024, but still well entrenched*. (2024, November 7). Merics. https://merics.org/en/comment/mapping-chinas-global-port-network-backfoot-2024-still-well-entrenched

modern infrastructure and technologies, and investments in creating a highly skilled workforce. Workers are provided with complimentary accommodation and meals, along with performance-based bonuses, further enhancing productivity.

7. The simultaneous development of naval and commercial vessels in the same shipyard allows for the application of dual-use technologies across both, civil and military projects. Constructing naval vessels in multiple shipyards simultaneously has streamlined production lines for specific classes of ships. PLAN's focus on the induction of only few classes of military vessels enhances the advancements in shipbuilding, knowledge and skills. Chinese shipyards also host their own Research and Development (R&D) Institutes, ensuring seamless integration of design and production. PLAN personnel are permanently stationed in these institutes to provide specifications for the development of surface and sub-surface combatants, enabling the testing and refinement of ships before moving to mass production.

8. Chinese shipbuilders have also signed technical agreements and established joint ventures with firms in Japan, South Korea, and other Western nations to gain access to advanced ship designs and manufacturing technologies. These innovations are applied to the production of military and civilian vessels. In addition, the adoption of smart manufacturing techniques, including automation and digitisation, has significantly boosted shipbuilding capacity.

9. The 2003 "National Marine Economic Development Plan" proposed constructing three shipbuilding bases centred at the Bohai Sea area (Liaoning, Shandong, and Hebei), the East Sea area (Shanghai, Jiangsu, and Zhejiang), and the South Sea area (Guangdong). The 11th (2006-2010) and 12th (2011-2015) National Five-Year Plans, designated shipbuilding a "pillar industry" in need of special oversight. The Chinese government at the central and local levels encouraged development of the shipbuilding industry. Within a few years, China overtook Japan and South Korea to become the world's leading ship builder in terms of output. China's shipbuilding industry builds a range of advanced vessels like the technologically highly advanced aircraft carriers, LNG carriers, large cruise ships, and other sophisticated vessels. In 2023, China constructed the largest container ship by capacity, '*MSC Tessa*', which can carry up to 24,000

twenty-foot equivalent units (TEUs).[11] Additionally, China is set to build 18 of the largest LNG carriers for Qatar Energy, each with a capacity of 271,000 cubic meters.[12]

10. China's commercial shipping industry offers comprehensive shipping solutions, including container manufacturing, shipping logistics software, cargo cranes, and related infrastructure. The Shanghai Zhenhua Heavy Industries Company (ZPMC), a state-owned enterprise, supplies approximately 70 percent of the world's cargo cranes. A large number of US ports, including those used by the military, use Chinese made cargo cranes.[13] A congressional investigation into Chinese-manufactured cargo cranes installed at U.S. ports has recently raised concerns about potential national security risks due to non-standard communication equipment.[14] Logink, a logistics management platform backed by the Chinese government, provides users with a centralized hub for logistics data management, shipment tracking, and information exchange between enterprises and government entities. This State controlled platform potentially grants China access to data collected and stored on Logink, and gain insights into shipping information, cargo valuations, and routing details of the ships. This could give China an advantage in commerce and commercial shipping.

11. **China Shipbuilding Industry**

The "Made in China 2025" designated maritime equipment and high-tech vessel manufacturing as one of ten priority sectors. The "14th Five-Year Plan" (2021-2025) outlined new requirements for the shipbuilding industry, offering new development opportunities for certain niche vessels and indicating a diversified development pattern for the overall shipbuilding market.[15] Military-Civil Fusion (MCF) gave a further boost to shipbuilding and sought to combine the expertise available in the military and civil sectors. China's now well-publicised and explicit policy of MCF, provides that state-owned enterprises (SOEs) and private

[11] Blain, L. (2023, March 14). China delivers world's largest container ship. *New Atlas*. https://newatlas.com/marine/msc-tessa-worlds-largest-container-ship/

[12] *QatarEnergy to build 18 of largest LNG vessels ever built in China's CSSC at cost of $6 billion*. (n.d.). https://www.qna.org.qa/en/newsbulletins/2024-04/29/0037-qatarenergy-to-build-18-of-largest-lng-vessels-ever-built-in-china's-cssc-at-cost-of-$6-billion

[13] Wynnyk, L. (2024, February 13). *Chinese technology influence in U.S. seaports*. MITRE. https://www.mitre.org/news-insights/publication/chinese-technology-influence-us-seaports

[14] Viswanatha, A., Lubold, G., and O'Keeffe, K. (2023, March 5). Pentagon Sees Giant Cargo Cranes as Possible Chinese Spying Tools. *The Wall Street Journal*. https://www.wsj.com/politics/national-security/pentagon-sees-giant-cargo-cranes-as-possible-chinese-spying-tools-887c4ade

[15] *百度安全验证*. (n.d.). https://baijiahao.baidu.com/s?id=1781355286271971935andwfr=spiderandfor=pc

enterprises are required by law to “provide necessary support and assistance to national security bodies, public security bodies, and relevant military bodies”.

The leading Chinese shipbuilding companies include China State Shipbuilding Corporation (CSSC), COSCO Shipping Heavy Industry, Yangzijiang Shipbuilding (the largest privately-owned shipbuilder), New Times Shipbuilding, Nantong Xiangyu Shipbuilding and Offshore Engineering Ltd, CIMC Raffles Offshore Ltd, among others. The shipyards operated by CSSC are involved in constructing warships for the PLAN. CSSC is one of the linchpins of this policy. CSSC operates under the oversight of the State-owned Assets Supervision and Administration Commission (SASAC) and provides strategic guidance to CSSC to align with China’s national goals. [16] CSSC is a global shipbuilding company and a SOE. In 2019, it merged with the China Shipbuilding Industry Corporation (CSIC) and now owns 96 subsidiaries.[17] The CSSC conglomerate comprises shipyards, equipment manufacturers, research institutes and shipbuilding-related companies that build civilian and military ships. Leaders of SOEs in China are often members of the Central Committee (CC) of the Chinese Communist Party (CCP). These individuals are closely monitored by state security agencies and the Central Commission for Discipline Inspection (CCDI). In June 2018, Sun Bo, the former general manager of CSIC, was arrested for allegedly leaking secrets about the *Liaoning*, China’s first aircraft carrier, to foreign intelligence agents.[18] Similarly, in September 2018, Jin Tao, the former research head of the 712 Research Institute, was detained for "serious violations of party discipline" and being "suspected of a crime of duty that caused significant losses to the national interest."[19] The 712 Research Institute, based in Wuhan, is a leading research centre specializing in marine electric propulsion and advanced battery technologies. It is instrumental in developing the country’s Integrated Electrical Propulsion System, which supports the deployment of high-tech weapon systems and advanced aircraft launch systems.

[16] *SASAC*. (n.d.). http://en.sasac.gov.cn/

[17] *网站群_中国船舶集团有限公司*. (n.d.). http://www.cssc.net.cn/n11/index.html

[18] Jeong-Ho, L., & Jeong-Ho, L. (2018, December 19). Workers at scandal-hit Chinese shipbuilder CSIC given lessons in keeping state secrets. *South China Morning Post*. https://www.scmp.com/news/china/military/article/2178764/workers-scandal-hit-chinese-shipbuilder-csic-given-lessons

[19] Chan, M., & Chan, M. (2019, February 1). Sun Bo, who led project to build China’s own aircraft carrier, will face court on corruption indictment. *South China Morning Post*. https://www.scmp.com/news/china/military/article/2184729/sun-bo-who-led-project-build-chinas-own-aircraft-carrier-will

The Chairman and Party Secretary of CSSC in February 2023, Wen Gang (温刚) reflected the close coordination envisaged by MCF. [20] He is also an alternate member of the 20th CC. Prior to this appointment, he spent most of his career in various positions in the People's Liberation Army (PLA)'s leading defence contractor China North Industries Corporation (NORINCO), one of the China's largest weapons producers and exporter. [21] CSSC employs 205,000 people. The total assets of CSSC are 1,006.616 billion yuan (approximately US $ 144 billion). According to the SIPRI "Top 100 arms-producing and military services companies in the world 2022", CSSC ranked 16th in the list[22]. Its revenue from military sale was 20% of the total revenue earned in 2022.

In 2023, China's shipbuilding industry experienced significant growth, with a remarkable 131.7 percent year-on-year surge in profits, reaching 25.9 billion yuan (approximately US $ 3.57 billion). The total business revenue recorded a robust 20 percent increase, totalling 623.7 billion yuan (approximately US $ 86.06 billion), as reported by the China Association of the National Shipbuilding Industry.[23] China's shipbuilding industry is regarded as having reached the highest pinnacle in the global shipbuilding industry enabling indigenous construction of the three "crown jewels" in shipbuilding viz. Aircraft Carrier, Liquified Natural Gas Tankers and Cruise Ships, each requiring cutting-edge technology and sophisticated expertise.

12. **Chinese Shipyards**

Chinese shipyards churn out commercial and the naval vessels utilizing the same technology, infrastructure and resources of the yards. Analysis of the satellite imageries of the various Chinese shipyards, shows that commercial and naval vessels under construction or maintenance are co-located in the same shipyard.[24] Chinese military shipbuilding programs, which are often co-located at shipyards engaged in mostly commercial activities, are able to leverage the considerable infrastructure and technology improvements for design,

[20] *董事会_中国船舶集团有限公司*. (n.d.). http://www.cssc.net.cn/n4/n1047/index.html

[21] *集团领导_中国船舶集团有限公司*. (n.d.). http://www.cssc.net.cn/n4/n13/c26815/content.html

[22] *The SIPRI Top 100 arms-producing and military services companies in the world, 2022*. (n.d.). SIPRI. https://www.sipri.org/visualizations/2023/sipri-top-100-arms-producing-and-military-services-companies-world-2022

[23] *China's shipbuilding industry reports surging profits in 2023*. (n.d.). https://english.news.cn/20240214/813b79edde794837bdbfee14929b2176/c.html

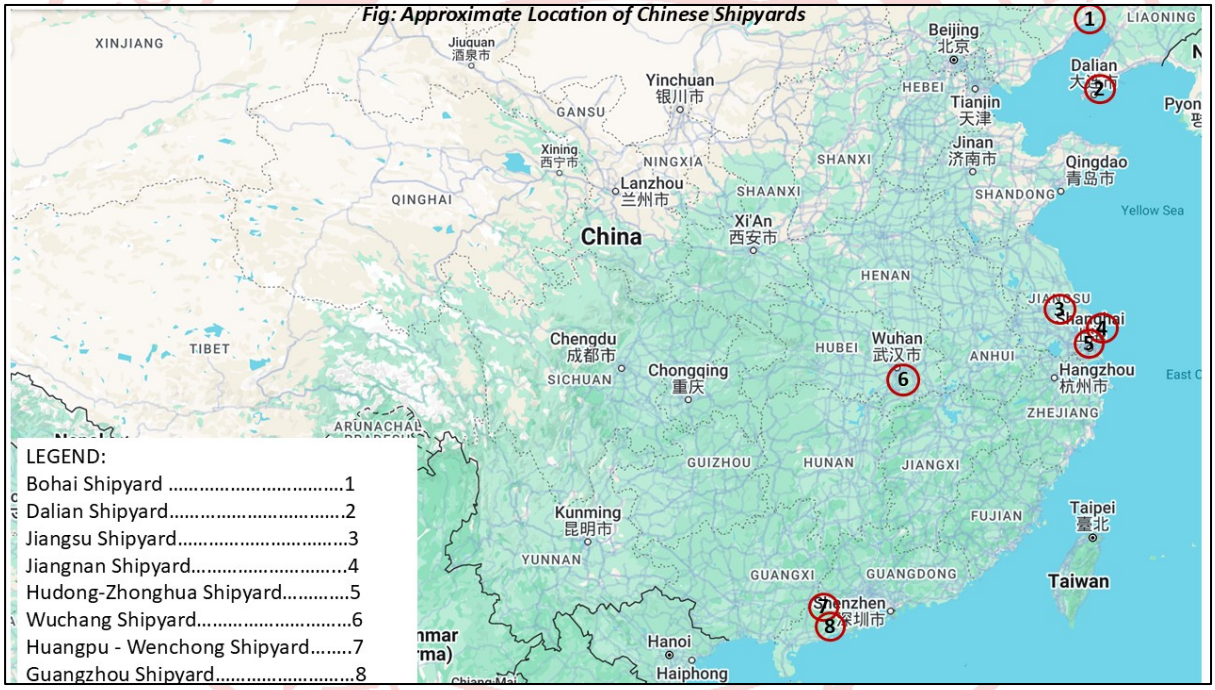
[24] Bermudez, M. P. F. B. H. J. (n.d.). *In the Shadow of Warships*. https://features.csis.org/china-shadow-warships/#article

development, and construction. One outcome of these efforts is the comparatively higher quality and capacity of warships being delivered to the PLAN.

As China strives to modernise its navy, its shipyards play a key role. These shipyards get orders and technology transfers from commercial shipping companies, amounting to billions of dollars. According to a report by the Center for Strategic and International Studies (CSIS) this could inadvertently help China's military modernisation.[25]

13. Eight shipyards are responsible for most of the production and maintenance of PLAN's major naval vessels. The details of various shipyards involved in PLAN vessels are as follows:

Fig: Approximate Location of Chinese Shipyards



a) Bohai Shipbuilding Heavy Industry (BSHIC)

Bohai Shipyard is located at 40.7150°N, 121.0109°E in the Huludao Port, southwestern Liaoning Province, on the northern coast of the Bohai Sea. The current Chairman and Party Secretary of BSHIC is Li Tianbao (李天宝)[26] and it employs approximately 10,000 people[27]. Before assuming the role of Chairman, Li Tianbao served in various capacities within the BSHIC,

[25] Bermudez, M. P. F. B. H. J. (n.d.). *In the Shadow of Warships*. https://features.csis.org/china-shadow-warships/#article

[26] *李天宝*. (n.d.). 百度百科. https://baike.baidu.com/item/%E6%9D%8E%E5%A4%A9%E5%AE%9D/3513989

[27] Dun and Bradstreet. (n.d.). *Bohai Shipbuilding Heavy Industry Co.,Ltd.* https://www.dnb.com/. https://www.dnb.com/business-directory/company-profiles.bohai_shipbuilding_heavy_industry_coltd.895b9e89d12087861dc682ad9a09b00e.html

including Deputy Factory Director, Assistant General Manager, Deputy General Manager, and Executive Deputy General Manager. Li Tianbao is an alumnus of the Dalian University of Technology. BSHIC builds various types of ships up to a tonnage of 400,000 deadweight tons (DWT). Aside from performing the full spectrum of naval and commercial shipbuilding, BSHIC also engages in ship repair; steel structure processing; construction of metallurgic and hydropower equipment; and nuclear power equipment fabrication. The major expansion of this shipyard started between 2015 and 2022, but work is still going on.

Fig: Bohai Shipyard at 40.7150°N, 121.0109°E
DoI: 26 Mar 2024 Image: Google Earth

BSHIC is currently the only shipyard in China for the assembly of nuclear submarines. The shipyard has built five Type 091 Han-Class nuclear-powered attack submarines (SSNs), of which three are currently in service.[28] It has constructed one Type 092 Xia-Class nuclear-powered ballistic missile submarine (SSBN)[29] and six Type 093 Shang-Class SSNs, including four improved variants classified as Type 093A. [30] Additionally,

[28] Wikipedia contributors. (2024, August 27). *Type 091 submarine*. Wikipedia. https://en.wikipedia.org/wiki/Type_091_submarine
[29] Wikipedia contributors. (2024a, January 2). *Type 092 submarine*. Wikipedia. https://en.wikipedia.org/wiki/Type_092_submarine
[30] Wikipedia contributors. (2005, August 9). *Type 093 submarine*. Wikipedia. https://en.wikipedia.org/wiki/Type_093_submarine

two further improved variants classified as Type 093B were launched in May 2022 and January 2023.[31] The shipyard has also produced six Type 094 Jin-Class SSBNs, including two improved variants classified as Type 094A.[32] Submarines of the Type 095 Class (SSN) and Type 096 Class (SSBN) are possibly under development.

b) Dalian Shipbuilding Industry Company (DSIC)

Located at Dalian, in Liaoning province the DSIC is China's largest shipyard and had 15,000 employees in 2020.[33] The current Chairman and Party Secretary of Dalian Shipyard is Yang Zhizhong (杨志忠).[34] Prior to being appointed Chairman, Yang Zhizhong held several key positions in BSHIC, including Director of Civil Production, Assistant General Manager, Deputy General Manager, and General Manager and in DSIC as General manager and Deputy Party Secretary.[35]

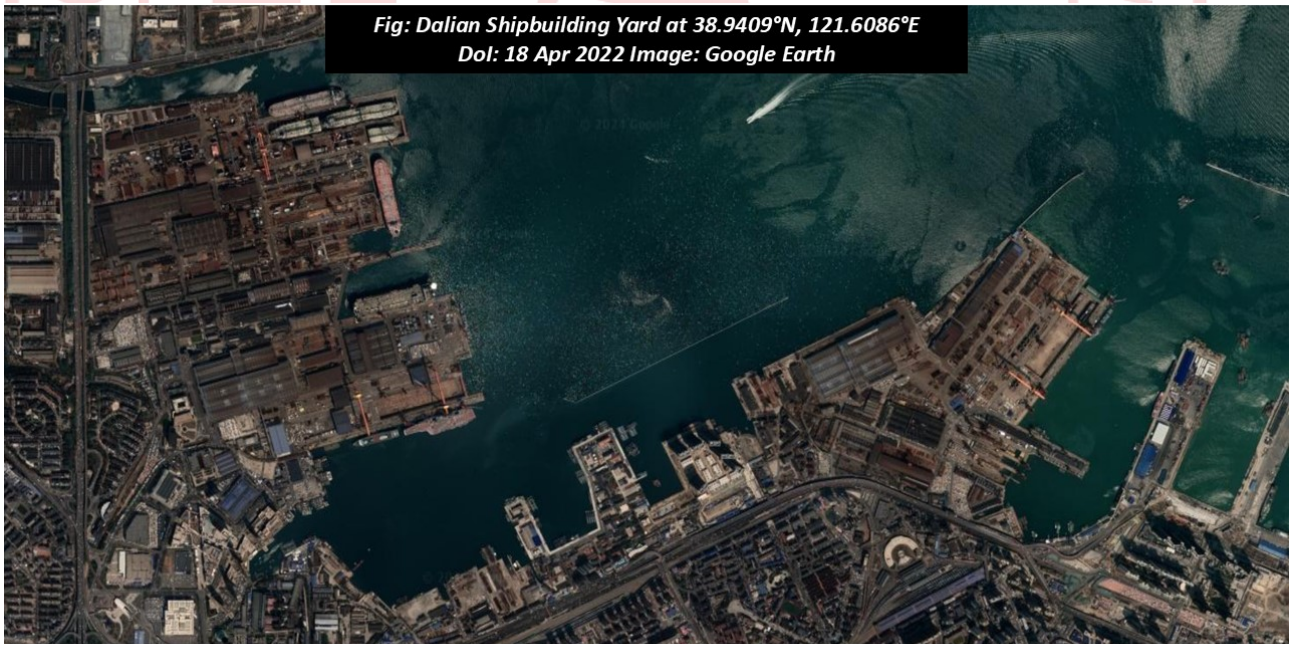


Fig: Dalian Shipbuilding Yard at 38.9409°N, 121.6086°E
DoI: 18 Apr 2022 Image: Google Earth

DSIC operates primarily from three main facilities: the original Dalian Shipbuilding Yard (38.9409°N, 121.6086°E), the Dagushan Yard (38.9685°N,

[31] US Department of Defense. (2023). Military and Security Developments Involving the People's Republic of China. In *https://media.defense.gov/*. https://media.defense.gov/2023/Oct/19/2003323409/-1/-1/1/2023-MILITARY-AND-SECURITY-DEVELOPMENTS-INVOLVING-THE-PEOPLES-REPUBLIC-OF-CHINA.PDF

[32] Wikipedia contributors. (2024c, October 13). *Type 094 submarine*. Wikipedia. https://en.wikipedia.org/wiki/Type_094_submarine

[33] *大连船舶重工集团有限公司*. (n.d.). http://www.dsic.cn/

[34] *百度安全验证*. (n.d.-b). https://baijiahao.baidu.com/s?id=1685070912174913192andwfr=spiderandfor=pc

[35] *杨志忠*. (n.d.). 百度百科. https://baike.baidu.com/item/%E6%9D%A8%E5%BF%97%E5%BF%A0/24622530

121.8340°E), and the Dalian Liaoning South Shipyard (38.8015°N, 121.2632°E). The Dagushan Yard is situated towards the east of the Dalian Shipbuilding Yard across Dalian Bay. The Liaonan, also known as Dalian Liaoning South Shipyard, is located adjacent to the Lushun Naval Base of the PLAN.

Dalian Shipbuilding Yard played a crucial role in assembling and launching China's Type 001 (Liaoning) and Type 002 (Shandong) aircraft carriers. It also constructs the Type 055 Renhai class (built:04)[36], Type 052D Luyang III class (built:07)[37], and Type 051C Luzhou class (built:02)[38] destroyers, and Type 072 Landing Ship Tank. Of the eight Chinese navy Type 055 destroyers launched between 2017 and 2023, and presently in service, four each were built at the Dalian Shipbuilding Yard and Jiangnan Shipyards. The average time required to complete a Type 055 destroyer, from hull to launching to commissioning, is around 3 years. The PLA Navy warship *Nanchang* (Type 055) was honoured by the China Communist Party (CCP) Central Committee (CC) Publicity (Propaganda) Department with the title of "role model of the times" on Jan 07, 2024. [39]

[36] Wikipedia contributors. (2024k, October 9). *Type 055 destroyer*. Wikipedia. https://en.wikipedia.org/wiki/Type_055_destroyer

[37] Wikipedia contributors. (2024n, October 28). *Type 052D destroyer*. Wikipedia. https://en.wikipedia.org/wiki/Type_052D_destroyer

[38] Wikipedia contributors. (2024b, January 15). *Type 051C destroyer*. Wikipedia. https://en.wikipedia.org/wiki/Type_051C_destroyer

[39] Times, G. (n.d.). *PLA Navy's large destroyer honored after fending off foreign military provocation during drills*. Copyright 2021 by the Global Times. https://www.globaltimes.cn/page/202401/1304924.shtml

Fig: Dagushan Yard at 38.9685°N, 121.8340°E
DoI: 20 Apr 2024 Image: Google Earth

The Dagushan Yard is engaged in the construction of Type 055 and Type 052 destroyers.

Fig: Liaoning Shipyard at 38.8015°N, 121.2632°E
DoI: 31 Aug 2024 Image: Google Earth

The Liaonan Shipyard built the Type 056/A Jiangdao-class (built:13)[40] for PLAN. The shipyard also launched a new corvette, as a "comprehensive test platform", spotted for the first time in a satellite imagery in August 2023.[41]

c) Jiangsu Dayang Marine Shipyard

The Jiangsu Dayang Marine Shipyard, also known as the New Dayang Shipyard, is located at 32.0080°N, 119.9941°E in Yangzhou, Jiangsu Province. It is strategically positioned along the Yangtze River. The shipyard builds Naval and Commercial Ships. The shipyard has constructed the world's first dedicated drone carrier in May 2021. Additionally, it manufactures simulated enemy vessels for the Chinese Navy, advanced target barges, and large drone motherships.[42]

d) Jiangnan Shipyard

Jiangnan Shipyard is located at 31.3447°N, 121.7556°E in Changxing Island to the North of Shanghai. The shipyard builds both naval and commercial vessels. The current Chairman, Party Secretary and General Manager of Jiangnan Shipyard is Lin Ou (林鸥)[43], who also serves as a delegate to the 15th Shanghai Municipal People's Congress. Lin Ou held various positions including Deputy Section Chief and later Director in the 708 Institute, Deputy Director of the Institute and Director of the Naval Ship Design Center. He has served as Vice President and General Manager of Jiangnan Shipbuilding (Group) Co., Ltd. The shipyard employs 20,000 people and has 1,785 party members.[44]

[40] Wikipedia contributors. (2024i, September 9). *Type 056 corvette*. Wikipedia. https://en.wikipedia.org/wiki/Type_056_corvette

[41] Luck, A. (2023, December 3). *Stealthy new warship design emerging at shipyard in China*. Naval News. https://www.navalnews.com/naval-news/2023/11/stealthy-new-warship-design-emerging-at-shipyard-in-china/

[42] Sutton, H. I. (2024, May 15). *China Builds World's First Dedicated Drone Carrier*. Naval News. https://www.navalnews.com/naval-news/2024/05/china-builds-worlds-first-dedicated-drone-carrier/

[43] *林鸥*. (n.d.). 百度百科. https://baike.baidu.com/item/%E6%9E%97%E9%B8%A5/22304549

[44] *企业概况 - 江南造船(集团)有限责任公司*. (n.d.). https://www.jnshipyard.com.cn/cms/document/show/8.html

Fig: Jiangnan Shipyard at 31.3447°N, 121.7556°E
DoI: 10 Feb 2024 Image: Google Earth

The commercial yard has remained relatively the same size since 2008, however, work on expansion of the naval yard started in 2016 and construction is still in progress. It has produced major military vessels such as the Type 003 (Fujian) aircraft carrier the first Chinese carrier equipped with electromagnetic catapults (EMALS), Type 055 Renhai-class destroyer (built:04)[45], Type 052D destroyer (built:18)[46], Yuan Wang-class of tracking ships, Type 726 air cushioned landing craft, and other naval vessels. The shipyard also builds LNG carriers, LPG carriers, Ro-Ro ships, ultra large container ships and other commercial ships.

[45] Wikipedia contributors. (2024k, October 9). *Type 055 destroyer*. Wikipedia. https://en.wikipedia.org/wiki/Type_055_destroyer
[46] Wikipedia contributors. (2024n, October 28). *Type 052D destroyer*. Wikipedia. https://en.wikipedia.org/wiki/Type_052D_destroyer

e) Hudong-Zhonghua Shipbuilder

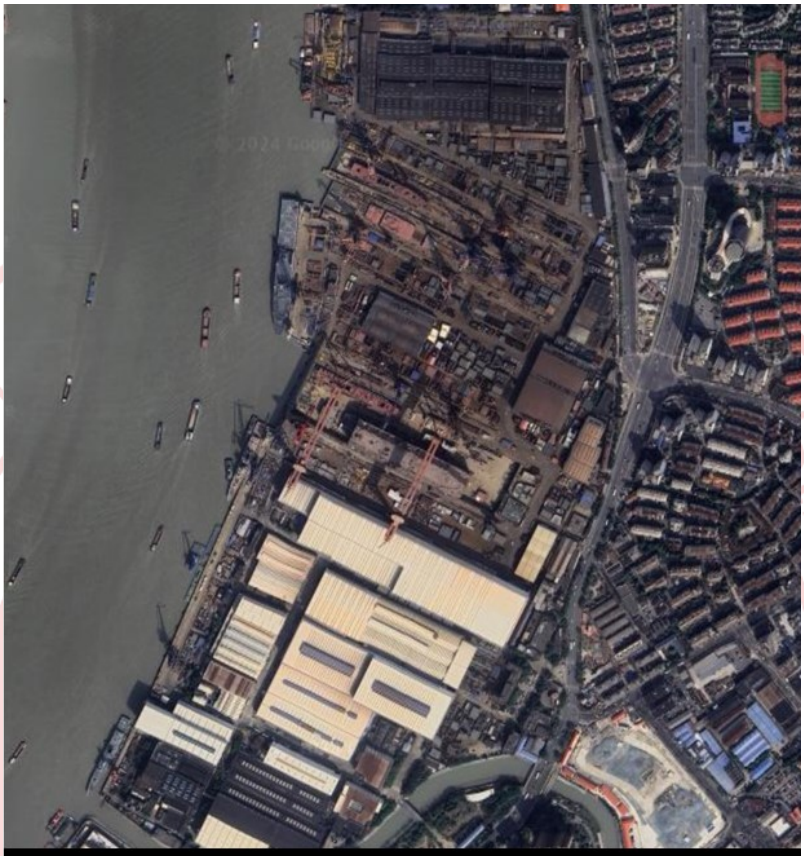


Fig: Hudong-Zhonghua Shipyard at 31.2761°N, 121.5679°E
DoI: 30 Jun 2024 Image: Google Earth

The Hudong-Zhonghua Shipyard is located at 31.2761°N, 121.5679°E in Shanghai along the Huangpu River. In the near future the shipyard will be shifted adjacent to Jiangnan Shipyard in Changxing Island at 31.3251°N, 121.7629°E. It builds both military and civilian vessels, as well as high-powered marine diesel engines. The current Chairman, Party Secretary, and General Manager of Hudong-Zhonghua Shipyard is Chen Jianliang (陈建良) [47], who also serves as a delegate to the 15th Shanghai Municipal People's Congress. He graduated from Shanghai University of Technology and has held the position of Party Secretary at the shipyard since 2015. [48] The shipyard employs over 10,000 people.[49] The shipyard is the key production house for amphibious ships for PLAN. The shipyard has built

[47] *陈建良*. (n.d.). **百度百科**. https://baike.baidu.com/item/%E9%99%88%E5%BB%BA%E8%89%AF/22300220

[48] *陈建良-**抖音百科***. (n.d.). **抖音百科**. https://www.baike.com/wikiid/7311302327377723444

[49] ***沪东中华造船(集团)有限公司**---查看*. (n.d.). https://jobcareer.sdu.edu.cn/eweb/jygl/zpfw.so?entityId=SCFW_JYGL_DWXXandsubsyscode=zpfwandmodcode=jygl_scfwyrdwandtype=viewDwxxandid=V9y3sfcYfU9K7mTVUeQ1f1

more than 3,000 ships, including LNG carriers, LPG carriers, medium and large-sized container vessels, chemical tankers, Ro/Ro ships and other commercial vessels. It has recently built four Type 075 Yushen class Landing Helicopter Docks (LHDs), it began construction of the first LHD in 2019. [50] The fourth Type 075 fitting out is taking place in the new facility of the shipyard at Changxing Island.[51] Notable military vessels built by the shipyard include amphibious warships Type 071 Yuzhao class Landing Platform Dock (LPD) (built:09 one with Thai Navy, construction started in 2006) [52], Type 072/I/II/III/A Landing Ship Tank (LST) (built: at least 20)[53], Type 054/A Jiangkai class frigate (built: at least 21 [includes 04 for Pakistan]) [54], Type 053 frigate (built for Thailand, Bangladesh, Myanmar and Egypt navy)[55] and Type F-22P frigate (built:03 for Pakistan Navy and 01 built at Karachi, Pakistan)[56], corvettes Type 056/A Jiangdao class (built:23 [includes 01 for Algeria]) [57], surveillance ship Type 815 (built:09), and replenishment ship Type 903. The new-class amphibious assault carrier, known as Type 076, was constructed at the shipyard's new facility on Changxing Island and launched on December 27, 2024.[58] This carrier is likely to be equipped with an electromagnetic catapult system to assist fixed-wing aircraft during take-off.

[50] Kennedy, C. M., & Caldwell, D. (2022). China Maritime Report No. 23: The Type 075 LHD: Development, Missions, and Capabilities. In *https://digital-commons.usnwc.edu/cmsi-maritime-reports/*. https://digital-commons.usnwc.edu/cgi/viewcontent.cgi?article=1022&context=cmsi-maritime-reports

[51] Luck, A. (2024, June 18). *Chinese Type 076 amphibious carrier takes shape in Shanghai, drone capabilities emerge*. Naval News. https://www.navalnews.com/naval-news/2024/06/type-076-amphibious-carrier-takes-shape-drone-airwing-emerges/

[52] Kennedy, C. M., & Caldwell, D. (2022). China Maritime Report No. 23: The Type 075 LHD: Development, Missions, and Capabilities. In *https://digital-commons.usnwc.edu/cmsi-maritime-reports/*. https://digital-commons.usnwc.edu/cgi/viewcontent.cgi?article=1022&context=cmsi-maritime-reports

[53] Wikipedia contributors. (2024d, October 1). *Type 072 landing ship*. Wikipedia. https://en.wikipedia.org/wiki/Type_072_landing_ship

[54] Wikipedia contributors. (2024d, September 15). *Type 054A frigate*. Wikipedia. https://en.wikipedia.org/wiki/Type_054A_frigate

[55] Wikipedia contributors. (2024b, May 28). *Type 053 frigate*. Wikipedia. https://en.wikipedia.org/wiki/Type_053_frigate

[56] Wikipedia contributors. (2024h, October 26). *Zulfiquar-class frigate*. Wikipedia. https://en.wikipedia.org/wiki/Zulfiquar-class_frigate

[57] Wikipedia contributors. (2024e, September 9). *Type 056 corvette*. Wikipedia. https://en.wikipedia.org/wiki/Type_056_corvette

[58] *中国海军076两栖攻击舰首舰下水命名-新华网*. (n.d.). http://www.news.cn/politics/20241227/5ca3c39f6bb24aa8a9271824f558bf33/c.html#:~:text=%E7%BB%8F%E4%B8%AD%E5%A4%AE%E5%86%9B%E5%A7%94%E6%89%B9%E5%87%86%EF%BC%8C076,%E4%BD%9C%E6%88%98%E8%83%BD%E5%8A%9B%E7%9A%84%E5%85%B3%E9%94%AE%E8%A3%85%E5%A4%87%E3%80%82

f) Wuchang Shipbuilding Industry Group

The Wuchang Shipbuilding Industry Group, commonly known as Wuchang Shipyard or Wuhan Shipyard, has undergone significant expansion and modernization since it was built in 2012. The original shipyard, located in the centre of Wuhan, has been moved to a much larger site further down the Yangtze River.

Fig: Wuchang Shipyard at 30.5851°N, 114.6829°E
DoI: 12 Sep 2022 Image: Google Earth

The new site is approximately ten times the area of the older one and is located at 30.5851°N, 114.6829°E on the banks of the Yangtze River. Wuchang Shipbuilding Group has more than 13,000 employees.[59] Jiang Tao (姜涛) is the Party Secretary and Chairman of Wuchang Shipbuilding[60]. He has held several significant positions at the CSSC Huangpu-Wenchong Shipbuilding Co., Ltd. and other subsidiaries of the China State Shipbuilding Corporation (CSSC). The roles include Director of the Information Management Department of the Technology Centre, Secretary, Deputy Director, and Director of the Party Branch of the Technology Centre, Deputy Chief Information Engineer, and Secretary and Deputy Director of the Party Branch. He also served as General Manager and Deputy Secretary of the Party Committee of CSSC Chengxi Ship Repair Co., Ltd.

[59] *武昌船舶重工集团有限公司2021年校园招聘简章*. (2021, March 23). https://job.lzu.edu.cn/html/22/article/2021/25011.html

[60] *李天宝*. (n.d.-b). 百度百科. https://baike.baidu.com/item/%E6%9D%8E%E5%A4%A9%E5%AE%9D/3513989

Wuchang Shipbuilding is responsible for the construction of conventional submarines for PLAN, including air-independent propulsion (AIP) submarines, Type 39 Song Class diesel electric attack submarines (SSK) (non-AIP, Active: 13)[61], Type 039A/B/C Yuan Class SSK (AIP, Active:21) [62], and Type 035 Ming Class SSK (non-AIP, Active:15)[63] and builds light naval vessels such as the Type 056 corvettes. *Washington Times* reported an incident at a shipyard in May 2024 involving a newly constructed Zhou-class attack submarine, notable for its hybrid propulsion system utilizing both conventional and nuclear power. During construction at the pier, the submarine reportedly sank, with satellite images from May and June showing unusual crane barge activity around the pier where the partially submerged vessel was located.[64]

g) Huangpu - Wenchong (Guangzhou) Shipbuilding

Huangpu - Wenchong Shipyard is located at 23.0833°N, 113.4064°E in Guangzhou, Guangdong Province. Luo Bing (罗兵) [65], is the Deputy Party Secretary and General Manager of Huangpu - Wenchong Shipyard.

[61] NTI. (2024, August 13). *China submarine capabilities*. https://www.nti.org/analysis/articles/china-submarine-capabilities/

[62] NTI. (2024, August 13). *China submarine capabilities*. https://www.nti.org/analysis/articles/china-submarine-capabilities/

[63] *Chinese navy – submarines*. (2022, September 6). The Searchers. https://warsearcher.com/shipsearcher/chinese-navy-current-and-retired/chinese-navy-submarines/

[64] Gertz, B. (2024, September 30). Sunken Chinese submarine was a new hybrid nuclear-conventional attack boat, U.S. says. *The Washington Times*. https://www.washingtontimes.com/news/2024/sep/30/sunken-chinese-submarine-was-new-hybrid-nuclear-co/

[65] ***中国船舶黄埔文冲****举行公司领导与****2024****届大学生****见面会暨扬帆计划开班仪式*. (2024, October 18). **中国船舶集**团有限公司电子政务网站群. Retrieved January 20, 2025, from http://www.csschpws.com/component_news/news_display.php?id=2067

Fig: Huangpu - Wenchong Shipyard at 23.0833°N, 113.4064°E
DoI: 07 Jan 2023 Image: Google Earth

The shipyard currently employs approximately 17,000 people.[66] It is one of the largest shipyards building military and commercial cargo ships and is a major production base for navy vessels including warships, auxiliary ships, cargo ships, and workboats, special engineering ships and offshore engineering projects in South China. It leads the country in the production of dredging vessels and feeder container ships. The shipyard builds Type 054 A/B Jiangkai class frigate (built: at least 20 at this shipyard)[67], Type 053 frigate (built:06) [68], Type 056/A Jiangdao class corvette (built: at least 18 at this shipyard)[69], and Type 818 petrol vessels. On January 12, 2023, the *Zhu Hai Yun*, the first seaborne unmanned ship that can function independently, was delivered by this shipyard to the Southern Marine Science and Engineering Guangdong Laboratory (Zhuhai). Delivery was almost eight months after the vessel was launched in May 2022[70]. It is a

[66] *China Shipbuilding*. (n.d.). http://www.chinashipbuilding.cn/shipyard.aspx?pklujyukkpp4csbganmkhTk8Pl4ENaORDERBOOK4c
[67] Wikipedia contributors. (2024g, September 15). *Type 054A frigate*. Wikipedia. https://en.wikipedia.org/wiki/Type_054A_frigate
[68] Wikipedia contributors. (2024c, May 28). *Type 053 frigate*. Wikipedia. https://en.wikipedia.org/wiki/Type_053_frigate
[69] Wikipedia contributors. (2024g, September 9). *Type 056 corvette*. Wikipedia. https://en.wikipedia.org/wiki/Type_056_corvette
[70] Times, G. (n.d.-a). *China builds world's first autonomous seaborne drone-carrier*. Copyright 2021 by the Global Times. https://www.globaltimes.cn/page/202301/1283744.shtml

'mothership'—a hub for launching and recovering unmanned air, surface, and undersea vehicles directly from its deck.[71]

h) Guangzhou Shipyard International (GSI)

The Guangzhou Shipyard International (GSI), part of the CSSC Offshore and Marine Engineering (Group) Company Limited (COMEC), is a major shipbuilding company, located at 22.7034°N, 113.6411°E in Nansha, Guangdong Province. The shipyard specialises in building PLAN's replenishment vessels, which help supply naval ships with oil, ammunition, food and water, and ice-breaking ships. The shipyard has designed and constructed various types of liquid cargo vessels, specifically the Type 901, 903, and 904 series replenishment ships. In May 2024, the GSI completed the construction of a new-generation icebreaker '*Ji Di*'. Earlier, in April, it launched the larger polar research vessel, '*Tan Suo San Hao*', further bolstering China's polar exploration capabilities.[72] GSI also builds Very Large Crude Carriers (VLCCs), LNG Carriers, Bulk and Ore Carriers, Ro/Ro Ships, Hospital Ships and other commercial ships. The company currently employs 10,695 people. [73]

In China, for the production of modern PLAN vessels at least two shipyards were involved simultaneously. For example, in the development of Aircraft Carriers and Type 055 and Type 052D destroyers, the Jiangnan and Dalian shipyards were involved, while the Type 054B frigate was developed by the Hudong-Zhonghua and Huangpu-Wenchong shipyards. The first Type 054B frigate, built by Hudong-Zhonghua Shipyard, the keel of which was laid around December 2022, was commissioned on January 22, 2025. The hull was launched in August 2023, and the ship began sea trials in January 2024, approximately a year before commissioning.[74] In just 25 months, a brand-new class of frigate entered service!

This process enabled the transfer of lessons learned and best practices acquired from one shipyard to another, reducing the time for the 'learning curve'. This

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[71] 姚敏. (2023, January 13). *全球首艘智能型无人系统科考母船"珠海云"交付使用*. 全球首艘智能型无人系统科考母船"珠海云"交付使用.
https://ocean.cctv.com/2023/01/13/ARTImGURU4hHruwlzW5X2BBR230113.shtml

[72] Times, G. (n.d.-b). *Is global ice-breaker race imminent?* Copyright 2021 by the Global Times. https://www.globaltimes.cn/page/202407/1316818.shtml

[73] *Guangzhou Shipyard International Co. Ltd*. (n.d.). ZoomInfo. https://www.zoominfo.com/c/guangzhou-shipyard-international-company-ltd/350678845

[74] Luck, A. (2025b, January 22). *Chinese Navy Commissions First Type 054B next gen Frigate*. Naval News. https://www.navalnews.com/naval-news/2025/01/chinese-navy-commissions-first-type-054b-next-gen-frigate/

also serves as a backup for maintenance and production of naval vessels during times of conflict in case one shipyard comes under attack.

China has been conducting escort task force operations in the Gulf of Aden for the last fifteen years. These operations have provided naval training and catalysed the development of naval skills for long-distance operations for PLAN. Since 2008, the PLA Navy has dispatched forty-seven escort task forces to the Gulf of Aden with each task force comprising a three-four ship configuration of two warships and one underway replenishment ship. The escort task force safeguards China's economic interests and military diplomacy. These task forces have visited over 60 countries thus far. [75]

14. **Understanding China's Ascendancy in Shipbuilding: Policies Implemented**

China has implemented many policies for the growth of the shipbuilding industry. These include:

- The policies of the Chinese government have played an important role in transformation and upgrading of the shipbuilding industry. Equally important are the subsidies provided by the government at entry and production level for shipyards and cheap loans to ship buyers and related industries for shipbuilding.[76] A Foreign Policy article disclosed that the Chinese government pays 13 to 20 percent of the construction costs of a typical cargo vessel as a subsidy.[77]
- Forward and backward linkage industries of shipbuilding in China are vast. Approximately 90-95% shipbuilding materials are manufactured inside China. Most of the world-renowned manufacturers, firms and industries have set up their factories in China and are giving uninterrupted production, resulting in the ready, uninterrupted supply of shipbuilding materials and lower overall cost.
- China is home to some of the largest and most advanced shipyards in the world. The country's shipyards are equipped with modern infrastructure and the latest technologies, making them highly efficient in the production and

[75] *Chinese naval fleets escort 3,400 foreign ships over past 10 years - Xinhua | English.news.cn*. (n.d.). http://www.xinhuanet.com/english/2019-01/01/c_137712892_2.htm

[76] Bown, C. (2023). Industrial Policy Detectives: China's subsidies for shipbuilding. In *https://tradetalkspodcast.com/wp-content/uploads/2023/11/Episode-194-Transcript-Complete.pdf*.

[77] Demarais, A. (2024, April 21). Forget about Chips—China is coming for ships. *Foreign Policy*. https://foreignpolicy.com/2024/04/19/china-ships-shipbuilding-shipping-shipyards-unfair-competition

maintenance of various types of vessels, including container ships, oil tankers, bulk carriers, and military vessels.

- For production of a specific vessel, achieving a doubling of labour efficiency typically requires between ten to twenty iterations. The PLA Navy is focused on longer production runs of fewer series, which enhances advancements in shipbuilding, knowledge, and skills.
- China has invested in creating a highly skilled workforce for shipbuilding. The engineering and technology universities and technical colleges of China provide thousands of shipbuilding and engineering students as a workforce for the industry every year. Collaborations have been established between shipyards and 'feeder' technical schools and universities to improve the quality of the workforce.
- The Chinese shipyard offers its blue-collar workers complimentary accommodation and meals, along with overtime pay and year-end bonuses based on performance.[78] This incentive structure boosts employee efficiency and productivity.
- Chinese shipbuilders entered into a number of technical cooperation agreements and joint ventures with shipbuilding firms in Japan, South Korea, Germany, and other countries, which gave them access to advanced ship designs and manufacturing technologies along with transfer of technology, engineering skills and production know-how to China. Military shipbuilding programs, often located within Chinese shipyards that primarily focus on commercial activities, have successfully utilized significant advancements in civilian shipbuilding infrastructure and software for design, development, and construction. This is reflected in the notably higher quality and capacity of warships being delivered to the PLAN.
- Chinese shipyards are using the hull-block method for shipbuilding reducing the time for the production of vessels.[79] The hull-block method in shipbuilding significantly accelerates vessel production by using smaller, manageable sections called "blocks." This technique allows multiple teams to work simultaneously on different blocks, improving efficiency compared to traditional sequential methods. Additionally, blocks can be pre-outfitted

[78] *中国船舶集团最新招聘公告|2024沪东中华造船(集团)有限公司社会招聘1200人公告 - 高顿央国企招聘*. (n.d.). https://www.gwy.com/gqzp/349344.html

[79] *South Korea's Samsung Heavy enlists China's reborn Hengli for Evergreen newbuildings*. (2023, May 17). TradeWinds | Latest Shipping and Maritime News. https://www.tradewindsnews.com/shipyards/south-korea-s-samsung-heavy-enlists-china-s-reborn-hengli-for-evergreen-newbuildings/2-1-1452665

with systems and equipment, simplifying subsequent assembly and reducing installation complexity.

- The level of automation and digitization in the shipbuilding industry's manufacturing process has significantly increased, with a sharing rate of three-dimensional models exceeding 80%[80].
- The shipbuilding industry has taken intelligent transformation of key links as a starting point and has made positive progress in intelligent shipbuilding: backbone shipbuilding enterprises have basically applied three-dimensional digital process models in the entire design and construction process; a batch of intelligent manufacturing production lines and equipment, such as profile cutting, small group standing welding, medium group standing welding, flat section manufacturing, and pipe processing, have been successively developed; solutions for intelligent workshops in shipbuilding, including section manufacturing, pipe processing, and section painting, have become more mature[81].
- Chinese shipyards implement smart manufacturing in shipbuilding, using robots for welding the steel plates based on the three-dimensional segment model generated[82].
- All Chinese shipyards build naval and commercial vessels simultaneously, which enables them to easily apply dual use technology from civil to naval projects. This further improves their infrastructure utilization and lowers their overhead costs.
- China has a distinctive model; the production conglomerates have their own Research and Development Institutes (R&D). The CSSC is associated with 36 research institutes[83] and this alliance ensures effective integration between the design and production agency. These institutes conduct R&D on nuclear-powered ships and submarines (719th Institute, Wuhan Second Ship Design and Research Institute), design and development of naval vessels (701 Institute of Ship Design, Wuhan), gas turbines (703rd Institute, Harbin,

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[80] ***造船大国***迈向造船强国. (2023, November 11). https://www.cnii.com.cn/jxzb/202310/t20231011_511343.html

[81] ibid

[82] *EconomyandLife | Intelligent manufacturing benefits shipping industry in central China's Hubei*. (n.d.). https://english.news.cn/20240517/e490c09020db45b5a6fe2e28843c0c78/c.html

[83] ***中国船舶集***团公司及研究所. (2023, April 10). https://zhuanlan.zhihu.com/. https://zhuanlan.zhihu.com/p/336674778 and ***网站群_中国船舶集***团有限公司. (n.d.-b). http://www.cssc.net.cn/n11/index.html

Harbin Ship Boiler Turbine Research Institute), diesel engines and air-independent propulsions (711th Institute, Shanghai, Shanghai Marine Diesel Engine Research Institute), electric propulsion system (712th Institute, Wuhan, Wuhan Ship Electric Propulsion Device Research Institute) and other cutting-edge technologies. Institutes have signed MoUs with leading scientific and engineering institutes to leverage their resources. This approach allows them to test and refine both surface and sub-surface combatants, enabling the development and field testing of new ship classes every few years before advancing to mass production.

15. Conclusion

A number of China's developmental initiatives have been prompted, or accelerated by the CCP leadership's fears of attempts by the major powers to retard its progress in the time of crisis or an adverse international environment. China's maritime power is a key component of its expansionist dream and is also vulnerable.

China has built the largest shipbuilding industry, producing more than half of all new tonnage, and which is actively expanding and modernizing its naval fleet with the clear aim of transforming the PLAN into a blue water navy capable of global operations. China's shipbuilding capacity serves as a critical component for its broader strategic objectives, which includes territorial expansion, economic dominance, and expansion or geopolitical influence. It has, therefore, encouraged and supported its companies to either build, upgrade or manage ports around the world. Correct estimates are that Chinese companies 'manage' or own at least 110 commercial ports in 67 countries.[84] Many are chosen for their strategic significance, for example Djibouti, Piraeus, Gwadar, Hambantota etc. China's control over critical ports and its manufacturing prowess in shipping equipment raise concerns about disruptions to the global supply chain for essential goods.

An additional consideration for China post February 2018, is insulating its commercial and shipbuilding supply chains from Western sanctions, as highlighted by the Chinese Academy of Engineering in February.[85] With a

[84] *Mapping China's global port network: on the backfoot in 2024, but still well entrenched*. (2024, November 7). Merics. https://merics.org/en/comment/mapping-chinas-global-port-network-backfoot-2024-still-well-entrenched

[85] Chen, S., and Chen, S. (2024, February 28). China's shipbuilding industry 'edge' helps it thrive under US sanctions: study. *South China Morning Post*.

warship inventory of 370 estimated to exceed 435 ships by 2030,[86] the PLAN is already a formidable force and with a navy of this size and which is largest in the world and Asia, the PLAN will be a potent instrument in Beijing's effort to recover so called 'lost territories' and expand economic depredations.

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https://www.scmp.com/news/china/science/article/3253413/chinas-shipbuilding-industry-edge-helps-it-thrive-under-us-sanctions-study

[86] US Department of Defense. (2023). Military and Security Developments Involving the People's Republic of China. In *https://media.defense.gov/*. https://media.defense.gov/2023/Oct/19/2003323409/-1/-1/1/2023-MILITARY-AND-SECURITY-DEVELOPMENTS-INVOLVING-THE-PEOPLES-REPUBLIC-OF-CHINA.PDF