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Conor M. Kennedy

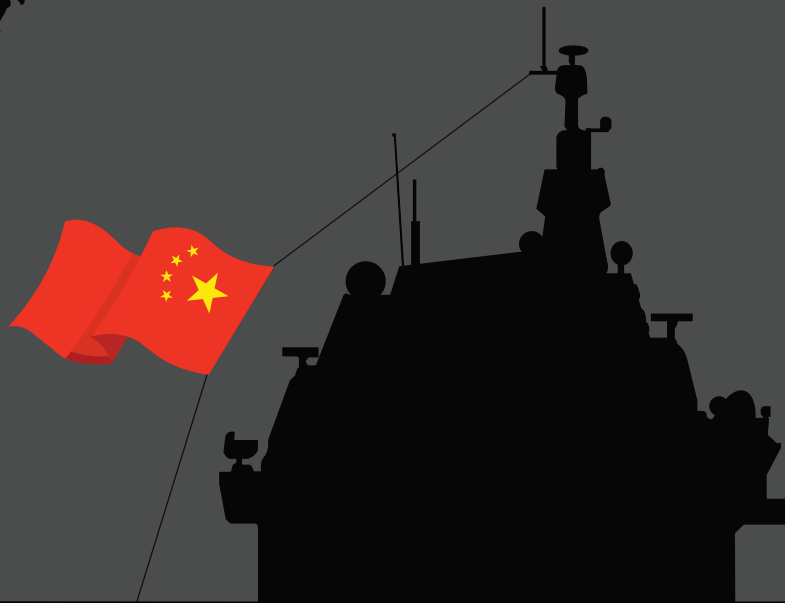
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中国海事研究所  
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# NOTES: 4



**Deck Cargo Ships:**  
Another Option for a Cross-Strait Invasion



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## CMSI Note #4 /// 8 February 2024

### Deck Cargo Ships: Another Option for a Cross-Strait Invasion

Conor M. Kennedy<sup>1</sup>

The People's Liberation Army (PLA) has in recent years increased its use of civilian shipping to augment its sea lift capacity. The incorporation of commercial roll-on/roll-off (RO-RO) ferries into the amphibious lift equation, has likely altered assumptions on the PLA's total amphibious lift.<sup>2</sup> The PLA intends to use RO-RO vessels to deliver PLA amphibious and non-amphibious wheeled and tracked vehicles into target port facilities or across landing area beaches, further enabled by lighterage and floating causeway systems.<sup>3</sup> Ensuring an accurate assessment of all components of lift is vital to determining the PLA's ability to launch and succeed in a cross-strait invasion. The inclusion of the major RO-RO ferries in these assessments has been key to assessing lift. However, the PLA also employs another important, but largely ignored type of RO-RO vessel, the deck cargo ship.<sup>4</sup>



Figure 1. A deck cargo ship carrying units of the 72<sup>nd</sup> Group Army (August 2023).<sup>5</sup>

#### CMSI Perspectives and Key Take-Aways:

- In addition to RO-RO ferries, the PLA also uses another class of RO-RO ship, the deck cargo ship, in sea transport training exercises.
- Deck cargo ships are widely used in China's ocean engineering and construction industry, constituting an existing and large-scale volume of lift capacity.
- The simple design and relative ease of construction of deck cargo ships means they can quickly be built in large numbers.
- These vessels may be tasked to bring in large columns of logistics and follow-on forces to consolidate landing areas, possibly in waves not far behind landing assault forces.

- Deck cargo ships can distribute the risk for many units making transits and force an adversary to find suitable kill solutions to strike numerous lower value targets.

### **Discussion:**

Deck cargo ships are generally self-propelled open-deck cargo barges of varying sizes and configurations that feature a bow ramp enabling the delivery of construction equipment or bulk material onto coastal shoreline locations. They can be found in many harbors and rivers across China's coastal provinces and are typically utilized in various ocean engineering and construction projects, a steadily growing industry in China's marine economy. Deck cargo ships were notably employed alongside dredging vessels in China's massive reclamation efforts in the Spratly Islands since 2013. Construction equipment and materials had to be transported and delivered to reclaimed features by many deck cargo ships to enable construction of military stations. This was a sustained operation across vast maritime distances.<sup>6</sup>

The PLA uses deck cargo ships to augment the sea transport capacity of forces. China's defense-focused television programming has over the past few years publicized PLA exercises that explored civil-military delivery methods involving a number of civilian and military vessels, including deck cargo ships. During the summer of 2021, footage of 72<sup>nd</sup> Group Army elements were shown conducting civilian vessel loading training and "cross-sea long-distance delivery exercises" (跨海远程投送演练) using multiple deck cargo ships, alongside other civilian cargo vessels and PLA Ground Force Coastal Defense Brigade watercraft units.<sup>7</sup> In the Summer of 2023, the 72<sup>nd</sup> Group Army again utilized deck cargo ships in its cross-sea long-distance delivery exercises, in addition to RO-RO ferries and cargo vessels.<sup>8</sup>

Non-amphibious units in other theaters are using different types of deck cargo ships in conjunction with RO-RO ferries to serve as lighterage solutions for amphibious landing operations. According to information contained in a government procurement contract announced on 21 July 2022, the 81<sup>st</sup> Group Army's 194<sup>th</sup> Combined Arms Brigade (CAB) sought to rent for a period of 32 days a "self-propelled deck transport ship" (自航甲板运输船) and a "shallow-draft self-propelled deck ferry" (浅吃水平甲板自航渡船) to enable lighterage operations from RO-RO ferries to shore. The "deck ferry" would be capable of ferrying vehicles onto beaches itself.<sup>9</sup> This indicates ways in which various types of deck cargo ships can be used for lighterage, specifically the ability of large deck barges to receive and transfer vehicles onto smaller deck barges with hull forms designed for work in shallow coastal waters. This diversity can provide a degree of resilience for ensuring ground forces from other Theater Commands can continue to land, despite potential attrition to the PLA's organic amphibious lift in a conflict.

Deck cargo ships are likely in regular use by the PLA. The general utility of these vessels in supporting logistics and their cheaper hiring costs relative to larger commercial operations such as the national RO-RO ferry operators make them an attractive option for moving equipment. The previously mentioned contract for the 194<sup>th</sup> CAB was worth a budget of up to 3.7 million RMB for 32 days of use.<sup>10</sup> The larger RO-RO ships may require significantly higher payments for diversion from regular commercial operating routes and their larger crews.



Figure 3. A deck cargo ship is shown alongside landing craft of the PLAGF watercraft forces in Tiegang Harbor, Zhejiang Province loading a unit of the 72<sup>nd</sup> Group Army (August 2021).<sup>11</sup>



Figure 4. Bow ramps on deck cargo ships allow for easy loading and unloading as shown here in the 2021 training exercises.<sup>12</sup>

### Analysis:

Deck cargo ships are present in large numbers across most of maritime China and do not themselves represent any particularly special capability for the PLA. It is the sheer quantity, variety, and availability of these vessels that make them a significant pool of lift for a potential cross-strait invasion of Taiwan. While a specific breakdown of deck cargo ship types and numbers is not available, there are a reported 7,361 “barges” nationwide according to the 2023 *China Statistical Yearbook*’s section on civil transport vessels.<sup>13</sup> This figure provides little

insight into the vessels themselves, giving no information on propulsion status, size, equipped ramps, or seaworthiness. The actual figure of the type of cargo deck barges concerned here would be far fewer, but still numerically significant.



Figure 5. An advertisement from the Taizhou, Zhejiang Province-based company Yunhong Shipping featuring a large number of its deck cargo ships.<sup>14</sup>

The simple design and relative ease of construction of deck cargo ships means they can quickly be built in large numbers. Therefore, the PLA itself may not need to build and maintain a massive armada of different L-class ships and craft. To assemble the scale of a fleet of landing ships, ship-to-shore connectors, and lighterage sufficient to invade Taiwan would require enormous quantities of resources that could not be sustained for long. This resource drain is not palatable for a peacetime military that may not have explicit orders for such a buildup yet. Built in numerous smaller shipyards, deck cargo ships can be easily surged and completed within months. Their unitary purpose and design for moving heavy materials and construction equipment may require relatively little additional modification for PLA use. Some shipyards market the “short building cycle” of these vessels. See figure 6 below.

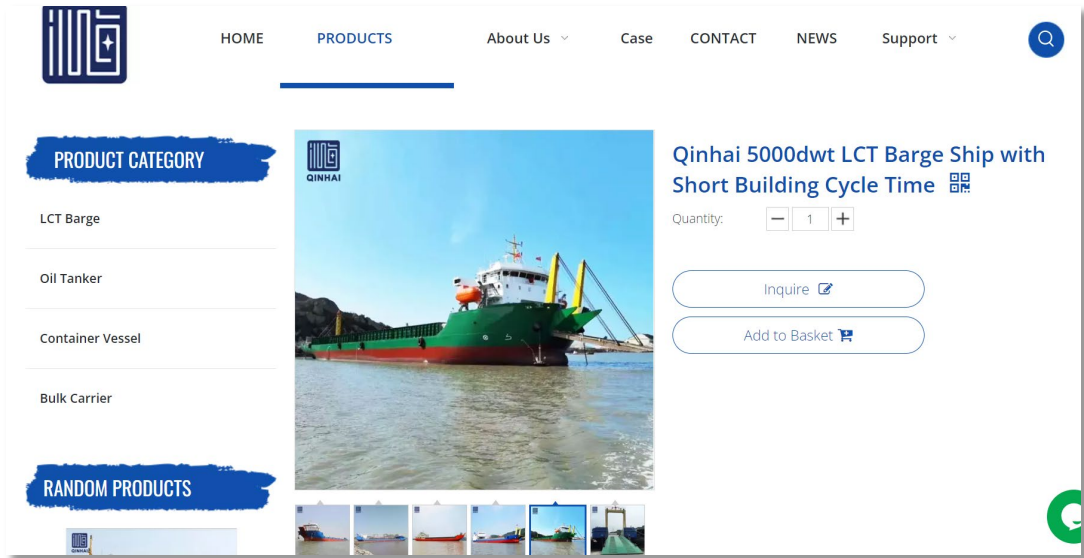


Figure 6. Taizhou Qin Hai Shipping Science and Technology Co., LTD. advertises one of its “LCT Barge” product lines as a quickly delivered capability.<sup>15</sup>

Large numbers of cheap, perhaps even disposable, transport vessels such as deck cargo ships present two main challenges for defenders. First, the potential volume of lift they can contribute is significant. These vessels may be tasked to bring in large columns of logistics and follow-on forces to consolidate landing areas, possibly in waves not far behind landing assault forces. Second, the large number and easy availability of these vessels enable a degree of dispersion for embarked forces. As large slow-moving targets, many amphibious landing ships and large RO-ROs are inherently vulnerable. Deck cargo ships can distribute the risk for many units making transits and force an adversary to find the right kill solutions and maintain sufficient magazine depth to strike many lower value targets.

Despite some initial experimentation, the PLA’s large-scale use of deck cargo ships is currently only hypothetical. Mobilizing, crewing, and integrating these vessels in sufficient coordination to actually deliver large-scale forces is likely an enormous problem requiring years to develop. However, if the inclusion of RO-RO ferries into PLA transportation and landing exercises is any guide, the addition of deck cargo ships into the equation will likely be similarly gradual and imperfect. Nevertheless, deck cargo ships are well within China’s capability to produce rapidly and mobilize into a makeshift force structure, and therefore bear watching closely.

This CMSI Note has provided a brief introduction to these civilian vessels. Michael J. Dahm has added extensive and critical real examples of PLA use of deck cargo ships in China Maritime Report No. 35, “Beyond Chinese Ferry Tales: The Rise of Deck Cargo Ships in China’s Military Activities, 2023.”

<sup>1</sup> Conor Kennedy is an assistant professor at the China Maritime Studies Institute. The views expressed here are the author’s alone and do not necessarily represent the views, policies, or positions of the U.S. Department of Defense or its components, to include the Department of the Navy or the U.S. Naval War College.

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<sup>2</sup> See section titled “Civilian Roll-On/Roll-Off (RORO) Ships and Their Potential Use in a Taiwan Scenario” within the US Department of Defense 2023 annual report “Military and Security Developments Involving the People’s Republic of China,” pp. 142-144.

<sup>3</sup> Henley, Lonnie D., "China Maritime Report No. 21: Civilian Shipping and Maritime Militia: The Logistics Backbone of a Taiwan Invasion" (2022). CMSI China Maritime Reports. 21.  
<https://digital-commons.usnwc.edu/cmsi-maritime-reports/21>.

<sup>4</sup> These vessels are referred to by many names, including self-propelled deck barges, deck transport vessels, deck barges, etc. Companies and shipyards advertise these vessels on their English-language websites, often using the term “LCT Barge,” a nod to their core function. For one example, see 泰州沁海船舶科技有限公司 [Taizhou Qin Hai Shipping Science and Technology Co., LTD.], accessible at <https://www.qh-shipping.com/Qinhai-5000dwt-LCT-Barge-Ship-with-Short-Building-Cycle-Time-pd723752588.html>.

<sup>5</sup> 第 72 集团军某旅组织海上装卸载训练 [“A Brigade of the 72<sup>nd</sup> Group Army Organizes Maritime Loading and Unloading Training”], CCTV - 正午国防军事 [CCTV - *Noon National Defense Military*], 18 August 2023, <https://tv.cctv.com/2023/08/18/VIDE77BW6qxQb0dr2o4stNU0230818.shtml>.

<sup>6</sup> Visit “China Island Tracker” by the Asia Maritime Transparency Initiative (Center for Strategic & International Studies) for an extensive collection of imagery of the Spratly Island reclamation work. Accessible here: <https://amti.csis.org/island-tracker/china/>.

<sup>7</sup> Video footage describe a distance covered of up to 1,000 nautical miles during the movement of the units involved. See: 第 72 集团军某旅组织民船装卸载训练 [“A Brigade of the 72<sup>nd</sup> Group Army Organizes Civilian Ships for Embarkation Training”], CCTV - 正午国防军事 [CCTV - *Noon National Defense Military*], 24 July 2021, <https://tv.cctv.com/2021/07/24/VIDE0P1QokXW4AiAQ0KekvyF210724.shtml>; 东南沿海, 陆军登陆演练! [“An Army Landing Exercise Along the Southeastern Coast!”], 央视军事 [CCTV *Military*], 25 August 2021, <https://china.huanqiu.com/article/44Vb0jX2UjP>.

<sup>8</sup> “A Brigade of the 72<sup>nd</sup> Group Army Organizes Maritime Loading and Unloading Training.”

<sup>9</sup> 能够滚装过驳车辆、抵滩卸载? 这支部队招标租用甲板运输船和渡船 [“Can Vehicles be Lightered with RO-Ros and Offloaded at the Beach? This Unit Invites Tenders to Charter Deck Transport Vessels and Ferries”], 搜狐 [Sohu], 22 July 2022, [https://www.sohu.com/a/570291142\\_155167](https://www.sohu.com/a/570291142_155167).

<sup>10</sup> Ibid.

<sup>11</sup> “An Army Landing Exercise Along the Southeastern Coast!”

<sup>12</sup> Ibid.

<sup>13</sup> See section 16-24 民用运输船舶拥有量 [“Possession of Civil Transport Vessels”] in 中国统计年鉴 2023 [China Statistical Yearbook], 国家统计局 [National Bureau of Statistics of China], 中国统计出版社 [China Statistics Press], <https://www.stats.gov.cn/sj/ndsj/2023/indexch.htm>.

<sup>14</sup> Yunhong Shipping is one example of a smaller shipyard focused on building, brokering, and exporting deck cargo ships/LCT barges. Many examples of barge construction can be found on the “Yunhong Shipping” Facebook page here: <https://www.facebook.com/yunhongshipping/>.

<sup>15</sup> 泰州沁海船舶科技有限公司 [Taizhou Qin Hai Shipping Science and Technology Co., LTD.], accessible at <https://www.qh-shipping.com/Qinhai-5000dwt-LCT-Barge-Ship-with-Short-Building-Cycle-Time-pd723752588.html>.