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Status Quo, Development, Tendency, and to be Solved Problems of Pilot Boat in China

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Abstract

Pilot boat is the main means and essential equipment of transport during ships transferring pilot. Ensuring pilot embarking or disembarking the ship on time is important for regulating port operation and ship's safety. However, the pilot boat is a very small number of ship's type whether domestic or abroad. This paper discusses the issues of pilot boat to be drawn attentions and solved, and proposes some recommendations for solving the pilot boat issues.

Keywords: Pilot Boat; Status Quo; Development; Tendency; High-speed Boat; Minimum Safety Manning

1 INTRODUCTION

Ship piloting is an integral and key process in port operation. The pilot shall board the vessel for piloting by pilot boat or helicopter and pilot will leave the ship after finish pilot work. However, due to high cost of the helicopter transferring and other certain conditions (like ship's crane restriction, visibility, etc.) to be met, transferring pilot by helicopter usually is not the first choice. At present, above mentioned are two main kinds of tools used to transfer the pilot and pilot boat is mainly used at the large or very large harbor.

2 STATUS QUO OF PILOT BOAT IN CHINA

In China, the piloting body is a section in harbor supervision division in early days, thus most pilot boats were modified from a patrol boat and joint inspection boat or a boat rebuilt on them. In 1980s, Maritime Safety Administration was independent and founded from Port Authority after the reform of port system. In 1990s, with rapid development of economy in China and the continuous expansion of port, the increasing of inbound and outbound vessels, continuous enlarging of pilotage waters, while the piloting body remains in the harbor authority. Gradually, with outwards moving of embarking & disembarking points, some piloting bodies have found that the existing pilot boats or commuter boats cannot meet production demands and begin to build new pilot boats those are suitable for new water environment. However, some pilot boats are almost identical to previous commuter boats, patrol boats and joint inspection boats, etc. At the dawn of the 21st century, as the Dalian Port, Tianjin Port and Qingdao Port tug & barge corporation imported pilot boats from Damen Heeslinger Shipyards, Wales Company and Norway, then our piloting bodies have our own professional pilot boats. With the deepening of piloting system reform and separation of government functions from those of enterprises, the piloting bodies, as a sector providing public service for all ports and shipping enterprises, begin to consider to have their own pilot boats. Due to various reasons, understanding on the pilot boat is limited and few knowing for foreign ports using pilot boats, as well as on which functions are required for the pilot boat is few, as above mentioned are the status quo of pilot boat in China.

3 DEVELOPMENT OF PILOT BOAT IN CHINA

In the early 21st century, in addition to the direct import of aluminum alloy pilot boats by Dalian Port, Tianjin Port and Qingdao Port tug & barge corporation, the Sunbird, Baoda, Jianglong and other enterprises manufactured FRP pilot boats, which once dominated the pilot boat market because of low price, short production cycle, high speed, good comfort, etc. However, these FRP pilot boats have some obvious disadvantages, such as low resistance to collision,

gradual increase of dead weight, water leakage, short life, failure to sail in ice zone, etc., but still have certain market share. They also manufacture aluminum alloy pilot boats to meet market demands. Subsequently, the Aurora introduces technology from New Zealand and manufactures aluminum alloy. Today, they have great improvement regarding the material, process, etc., new FRP pilot boats, which now dominate the domestic aluminum alloy pilot boat market due to the price half of that of imported pilot boat, mature ship type, high speed, good comfort, wide applicable waters, certain difference from the commuter boat, etc. The Conglin Group and Hubei Zhongjiao Group introduced pilot boat technology from Finland and Britain several years ago, which subjects the aluminum alloy pilot boat market to more fierce competition.

4 TENDENCY OF PILOT BOAT IN CHINA

With the opening to the outside, more and more piloting bodies go abroad to investigate the pilot boat, a large number of advanced pilot boats are exhibited on the International Maritime Pilots' Association Congress held once every two years. Pilot boats can be searched through the internet, which broaden our horizon, we found some disadvantages during actual use of pilot boat, which raise stricter requirements on new pilot boats to be built. Apart from conventional high speed and flexible control, these new pilot boats to be built are required to be suitable for rapid and safe embarking & disembarking, those are also required to meet such demands as rapid rescue in case the pilot falls into water, different embarking & disembarking points, no squeeze to the pilot ladder, good horizon for the pilot boat' driver, etc [1]. Meanwhile, the shipyards also continuously explore and study new facilities, conduct continuous improvement on original basis, so as to further satisfy user's demands and enhance market competitiveness. Because of the minimum safe manning requirement for pilot boat, the propelling unit in other modes may be used by piloting bodies. For example, the newly-build aluminum alloy pilot boat at Shanghai Maritime Pilots' Association adopts the mode in which a jet pump is employed to make propelling, which is the first pilot boat propelled with a jet pump boat in China. Figure 1 shows the pilot boat HUGANG YIN 17 propelled by jet pumps.

FIG. 1 PILOT BOAT HUGANG YIN 17 PROPELLED BY JET PUMPS

5 PROBLEMS TO BE SOLVED IN CHINA

For the steel pilot boats we used before, as limited by the volume, few problems are encountered due to relative low power and speed since the domestically-made main machine is used. While for the aluminum alloy pilot boat manufactured today, problems are serious due to low dead weight and high speed since the imported main engine is employed.

5.1 Problems brought forward as the manufactured aluminum alloy pilot boat becomes a high-speed vessel

The Rules for Construction and Classification of Sea-going High-speed Craft (2012) issued by the China Classification Society defines the high-speed vessel as a ship whose max. sailing speed meets Formula (1) :

$$V \geq 3.7 \nabla 0.1667 \quad (1)$$

Wherein: ∇ is the displacement volume corresponding to the designed waterline, m3;

V is the sailing speed that can be reached in the still water at the verified max. continuous propelling power when the ship is provided with the max. operating load, m/s.

The Technical Rule for Legal Inspection of Maritime Small Vessels issued (2007) by the Maritime Safety Administration of the People's Republic of China specially defines the high-speed vessel with length less than 20m as a boat whose maximum sailing speed at the fully loaded displacement satisfies both Formula (1) and V≥10 kn. In this case, in Formula (1): ∇ is the displacement volume corresponding to the designed waterline, m3; the fully loaded displacement refers to the mass of displaced water when ship's crew, equipment, goods, spare parts, accessories, cables are completely arranges as per regulations, fuel, lubricating oil, fresh water, food and supplies are provided, allowable passengers aboard the ship, and the ship is ready for sailing, t; V is the sailing speed that can be reached in the still water at the verified maximum continuous propelling power in case of fully loaded displacement, m/s.

If the fully loaded displacement of a pilot boat is 50t, then the pilot boat will be deemed as a high-speed vessel in case its speed reaches 14 kn; although the speed is directly proportional to the fully loaded displacement, the pilot boat will also be deemed as a high-speed vessel in case its speed reaches 16 kn even if the fully loaded displacement is 100t

Many requirements concerning sailing, collision prevention, etc. are made for the high-speed vessel. Although the International Regulations for Preventing Collision at Seat of 1972 does not provide an independent definition to the high-speed vessel, and deems it as a general power-driven vessel, the Article 18 "Responsibility between Vessels "of the Regulations specifies the responsibility of collision avoidance between Vessels of different categories: the power-driven vessel underway shall keep out of the way of a vessel not under command, a vessel restricted in her ability to maneuver, a vessel engaged in fishing and a sailing vessel ; A seaplane on the water shall, in general, keep well clear of all vessels and avoid impeding their navigation. From this article, it can be seen that one basis for differentiating rights and responsibilities of underway ships is the control performance of ship. It is generally believed that the high-speed vessel has a low tonnage, small stroke and diameter of turning circle, good control performance and the condition for giving way to general ships, thus the high-speed vessel should take actions actively before collision risk occurs.

Prevention to form collision risk is a reflection of seamanship. This means that the high-speed vessel will bear more responsibilities in case it collides with a general ship.

Article 17 of the Rules for Safety Management of High-speed Passenger Ship of the People's Republic of China provides that the high-speed vessel shall actively keep clear of all non-high speed ships during sailing at the port and navigable internal waterway. Although the high-speed vessel is different from the high-speed passenger ship, the maritime sector may also treat accidents in accordance with above regulation in case a high-speed vessel collides with a general ship, thus the high-speed vessel shall also actively keep clear of all non-high speed ships.

Article 26 of the Rules for Safety Management of High-speed Passenger Ship of the People's Republic of China provides that the high-speed passenger ship shall not sail at night. However, if night sailing is really needed for the high-speed passenger ship which sails over special water, it may sail at night after permission application for entering or leaving the port is filed to and approved by the local maritime authority. Though above requirement is only made against the high-speed passenger ship and no requirement concerning night sailing of high-speed vessel is raised, in fact, the regulations made by the maritime sector for night sailing of high-speed vessel is generally stricter than that for general ships. Pilot boats of some piloting bodies are not allowed to sail at night because they are high-speed vessels.

5.2 Minimum safe manning requirements for pilot boat

There is no special requirement for the minimum safe manning of pilot boat in China, thus the Rules for Minimum Safe Manning of Ships of the People's Republic of China can be implemented by deeming the pilot boat as a general ship so long as the designed number of passengers does not exceed 12 (it will be deemed as a passenger ship in case of exceeding 12).

(1) As for the general ship less than 100 gross tons, the deck department is required to be provided with1 officer and 1 on-duty sailor. If the continuous sailing time exceeds 8h, an additional 1 driver shall be provided; in case the continuous sailing time does not exceed 4h, 1 on-duty sailor can be reduced. Therefore, the deck department of a ship

less than 100 gross ton shall be provided with at least 1 officer.

(2) In case of 220 kW ≤the main engine power ＜750 kW, the engine department shall be provided with 1 chief engineer, 1 fourth engineer and 2 on-duty Motor Men. If the continuous sailing time does not exceed 8h, 1 on-duty Motor Man can be reduced; in case the continuous sailing time does not exceed 4h, additional 1 fourth engineer can be reduced. Hence, the engine department shall be provided with at least 1 chief engineer and 1 on-duty Motor Man.

(3) In case of 750 kW ≤the main engine power＜3 000 kW, the engine department shall be provided with 1 chief engineer, 1 second engineer and 2 on-duty Motor Men.

It can be seen that in case of the main engine power ＜750 kW, one pilot boat shall be provided with at least 3 persons; in case of the main engine power ≥750 kW, one pilot boat shall be provided with at least 5 persons. Most of aluminum alloy pilot boats manufactured today have a main engine power greater than 750 kW, and the pilot boat is required to work all day, considering work and rest of sailors, the piloting body may be overwhelmed in case such manning mode is adopted.

5.3 Special requirements for sailors on a high-speed vessel

According to the Sub-clause 17 of Clause 7 of the Administrative Measures for Issuance of Seafarer Training Certificate of the People's Republic of China, the captain, driver, chief engineer and engineers shall have a special training certificate for high-speed vessel seafarers. Clause 9 provides that the seafarer applying a special training certificate for high-speed vessel seafarers shall not be older than 45. Clause 10 specifies that the one applying for a special training certificate for high-speed vessel seafarers shall work as a captain, officer, chief engineer and engineer for no less than 12 months or have the experience of providing service at a high-speed vessel for no less than 12 months before receiving training. Sub-clause 3 of Clause 13 provides that the one applying for a special training certificate for high-speed vessel seafarers shall complete the on-board internship of no less than 1 month or 50 single trips as required for the captain, officer, chief engineer and engineer of the high-speed vessel. Sub-clause 4 of Clause 22 specifies that the one applying for remaining the special training certificate for high-speed vessel seafarers in force shall have the experience of providing service at a high-speed vessel for no less than 12 months and qualified performance within 5 years before the validity expiration date of certificate, or complete specified knowledge renewal and pass relevant examination, etc.

5.4 Permission for pilot boat broadcasting English name on AIS device

Working as a pilot boat shall be easy and early identified by assigned ships. However, most of our domestic pilot boats are only named the boat on the boat body side as "PILOT", pilot flag displayed on the top of the mast during daytime and white on red lights exhibited in night time for the purpose of working as pilot boat, but all these flag and light signal will be vulnerable to visibility. In China, most of the pilot boats have equipped with AIS device and named ships' name with Chinese Phonetic name, as we all known Chinese Phonetic is so hard to identify for foreigners. Thence, name the pilot boats with easy identified English name as the format "PILOT + Port name + No." is a better way for assigned ships fast identifying [2].

6 SUGGESTIONS ON PROMOTING THE DEVELOPMENT OF PILOT BOAT

Actually, plenty problems will be encountered once the manufactured pilot boat becomes a high-speed vessel. For example, special requirements are made for high-speed seafarers in China at present, while there are few institutions capable of providing special training for them, plenty limitation concerning sailing of high-speed vessel, the high-speed vessel will generally bear more responsibilities when an accident occurs, the high-speed vessel is not allowed to sail at night at some ports. In order to promote the development of pilot boat, following suggestion proposed for reference:

6.1 Re-define the high-speed vessel

According to above calculation, the formula $V \geq 3.7 \nabla 0.1667$ is not reasonable, and re-study is required. It is more practicable to calculate with a formula by setting a unified speed ratio. For example, it may be set that a ship will be

deemed as a high-speed vessel in case the maximum ship's speed reaches 25kn, because the corresponding speed does not change greatly in case of calculation with a formula for different fully loaded displacement. With the ship automatic identification system (AIS) widely used today, an unified ship's speed is conducive for the Vessel Traffic Service （VTS）to monitor. In addition, the V in formula should be the ship's speed instead of the sailing speed.

6.2 Appropriately adjust the minimum safe manning of pilot boat

According to the Rules for Minimum Safe Manning of Ships of the People's Republic of China, the pilot boat with the main engine power≥750 kW shall be provided with at least 5 persons, which is not suitable in pilot transferring practice, thus proper adjustment is required, such as increasing the main engine power to be≥1000kW.

6.3 Relax limitations on night sailing of the pilot boat as a high-speed vessel

If the pilot boat deemed as a high-speed vessel is not allowed to sail at night, which means that a high-speed pilot boat can be used at daytime, while other ship must be used at night, then additional manpower and materials resources must be required at the piloting body.

6.4 Classify the pilot boat into public service vessel category

The pilot boat is designed to transfer pilots and help the pilot to climb the pilot ladder. Meanwhile the pilot boat shall need help from the sailor when maneuvering in rough weather condition. If the pilot boat is classified into public service vessel category, then manning will be determined by the piloting body, which will ensure safe embarking and disembarking of the pilot. The pilot is usually transferred at the port entrance or exit with complex navigation environment, so special care shall be taken when maneuvering the pilot boat, and an extra qualified sailor proper lookout is necessary and needed by the pilot boat officer.

7 CONCLUSION

Nowadays, pilot boat is the main way for transferring pilot. However, some fatal cases happened on pilot transferring due to the wrong operation and negligent protective measures.

With the tendency of ships becoming larger and larger, the ships freeboard will be much more higher, the pilot ladder and other boarding arrangements will be much more higher. On the other hand, with deeper draft and the outer moving pilot boarding point, the risk on pilot boarding is becoming more and more high. Thence, pilot boat is the essential link to the safety for pilot and traffic flow, which shall be drawn more attentions.

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