

Research on the Problems and Countermeasures of Ship Domestic Sewage Management

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Abstract: Currently, environmental protection and sustainable development are receiving increasing attention and importance from the Chinese government. During the process of shipping, a large amount of sewage is often generated, and there is a phenomenon of indiscriminate discharge of sewage. It is easy to cause pollution to water resources and threaten ecological environment security. It is necessary to strengthen the management of ship domestic sewage and reduce water resource pollution. This article provides a brief analysis of the problems and countermeasures in the management of ship domestic sewage, hoping to provide valuable reference and guidance for readers.

Keywords: Ships; Domestic sewage; Regarding this

Introduction

Water transportation is one of the important modes of transportation in China, known as “green transportation”. It has the characteristics of low cost, high safety, low pollution, and low energy consumption, but it does not mean that water transportation is completely “green” and has no impact on the water environment. During the process of ship transportation, a large amount of domestic sewage will be generated. If it cannot be scientifically and effectively treated, it is very easy to cause water resource pollution.

I. Analysis of the current situation and existing problems of ship domestic sewage treatment

1. Weak awareness among crew members

Currently, the awareness and concepts of some crew members in China are relatively outdated, and their awareness of preventing and controlling domestic sewage pollution is generally lacking. The main reasons for this situation are: firstly, some crew members lack awareness and understanding of the hazards of domestic sewage, and do not follow proper discharge procedures, resulting in pollution of ecological resources caused by domestic sewage. Secondly, the publicity and regulatory work of relevant regulatory departments are not in place. The relevant departments have not strengthened the publicity work on the hazards of ship domestic sewage and prevention knowledge, resulting in the lack of timely innovation in the ideological concepts and cognition of crew members. And there is no effective system and measures for regulating domestic sewage in ports, docks, and other places, resulting in few crew members actively completing onshore domestic sewage reception. Although some ships are equipped with advanced sewage treatment equipment, there is a lack of effective supervision, and crew members often shut down the equipment, resulting in direct discharge of domestic sewage into the water and causing water pollution.

2. Low efficiency of storage and processing equipment

Through my practical investigation, I have found that the efficiency of ship domestic sewage storage and treatment facilities is relatively low. The main reason is that: firstly, some ports, docks, waiting areas and other areas in China have not established and improved sewage reception and storage facilities, which affects the effective treatment of ship domestic sewage. Even though some areas have established and improved relevant sewage reception and storage facilities, their capacity is limited and cannot meet the current sewage treatment needs. Secondly, the current main sewage treatment equipment mainly uses the method of biochemical microbial community treatment to treat ship domestic sewage. However, this method has certain drawbacks and requires high power supply. If the power supply is unstable, the treatment equipment will not operate normally and the microbial community will die. However, the operation time of ships is not fixed. When the cargo load is low, some crew members stop the ship at the dock or water service area to reduce expenses and stop power supply, resulting in the death of biochemical bacteria and ineffective treatment of domestic sewage.

3. Insufficient capacity of processing facilities

Due to the significant difference in composition between domestic sewage and residual oil substances from ships, it does not have economic value. However, treating domestic sewage requires a significant amount of manpower and material resources, incurs substantial costs, but cannot yield substantial benefits. Therefore, few companies actively participate in this work or provide this service. In addition, there is a lack of service items. Currently, even if there are relevant units that can provide sewage reception and treatment project services, there is no unified price standard, which leads to the inability to carry out ship domestic sewage reception projects normally. At the same time, it will also lead to the development of the ship cleaning industry.

4. Huge expenditure of funds

Currently, the cost of treating domestic sewage on ships is relatively high, and some ship owners have limited economic skills and are unwilling to pay for domestic sewage treatment fees. At the same time, the receiving sewage units are not willing to treat it for free, resulting in a “dilemma” situation. At present, China has a large number of small ships, small inland ports, a large number of enterprises, and

relatively wide navigable water areas. Therefore, in terms of investing in infrastructure construction, enterprises will face problems such as high investment, high cost, and difficult construction, leading to problems such as inadequate sewage treatment facilities.

5. High regulatory difficulty

The supervision of ship domestic sewage treatment by maritime departments is difficult and the effect is not ideal. On the one hand, the maritime department lacks detection methods and has certain deficiencies in sampling and online detection technology for domestic sewage, as well as significant difficulties in collecting and verifying evidence of illegal discharge. In addition, there is no specialized record of ship domestic sewage treatment, which makes it difficult for maritime departments to effectively grasp the process of ship sewage discharge, thereby increasing the difficulty of supervision.

II. Innovative strategies for ship domestic sewage management

1. Trial free acceptance on shore

From a practical perspective, transporting domestic sewage to shore and treating it through sewage treatment equipment incurs high costs. Due to the unstable economic income of the shipping industry, many ship owners are unable to pay for sewage treatment fees due to financial constraints, resulting in illegal discharge of domestic sewage and water resource pollution. In response to this situation, first of all, local governments can coordinate resources according to the actual situation, bear most of the cost of receiving sewage from local finances, or provide free sewage reception and treatment services for relevant ships, in order to alleviate the pollution of water resources by ship sewage. At the same time, relevant government departments should establish and improve a ship domestic sewage service system, gradually achieve standardized treatment of ship sewage, and reduce illegal discharge of ship domestic sewage. Secondly, efforts should be made to strengthen the publicity of ship domestic sewage discharge and prevention knowledge. Relevant departments can use WeChat official account, microblog, short video and other ways to publicize the harm of ship sewage to water resources to the public, and timely publicize the compliant and legal domestic sewage treatment methods, so as to strengthen the awareness and awareness of crew members and strengthen ship sewage treatment. Again, local governments should provide relevant support in terms of policies. For enterprises related to the reception and treatment of domestic sewage from ships, tax and loan reductions can be granted to promote the sustainable development of sewage treatment enterprises. Finally, government departments should establish and regulate the charging standards for sewage reception and treatment, not only to solve the problem of low charges leading to no enterprise receiving and treating ship sewage, but also to comprehensively consider the economic income situation of ship owners, minimize their economic pressure, and stimulate their enthusiasm for sewage treatment.

2. Choose the appropriate sewage treatment plant

The advantages and disadvantages of ship domestic sewage treatment equipment are very obvious. In terms of advantages, the sewage treatment device occupies a small area of the ground and is very suitable for use in ships. After treatment, the sewage can be directly discharged. In terms of disadvantages, the sewage treatment equipment cannot be effectively tested by ship surveyors, and the sewage treatment effect is not obvious, making it impossible to determine whether the sewage treated by the equipment meets the relevant national discharge standards. At present, China's ship sewage treatment equipment mainly uses biochemical microbial communities for treatment. Once the power supply is lost, it will lead to the death of microbial communities, making it impossible to complete sewage treatment. In the new era, with the continuous development and innovation of science and technology, an innovative sewage treatment device has emerged: the point connected sewage device. The advantage of this device lies in its sterile cultivation, which does not affect the treatment efficiency of wastewater even in the event of a power outage. But the disadvantage is that the cost of its core components is relatively high, and due to the unstable voltage of the ship, the service life of the device cannot be guaranteed. At the same time, the cost of replacing core components in the later stage is relatively high. In order to improve the effectiveness of ship sewage treatment, it is necessary to scientifically select sewage treatment equipment based on the actual situation of the ship, in order to achieve effective treatment of ship sewage.

3. Enhance the supervision of ship domestic sewage

In order to effectively avoid the illegal discharge of ship domestic sewage, it is necessary for relevant departments to increase the supervision of ship domestic sewage. In the actual regulatory process, it is difficult to obtain effective evidence of illegal discharge of domestic wastewater by ships, and the relevant legal literature and administrative regulations are not sound, which makes it impossible to effectively supervise the illegal discharge of ship sewage. Moreover, the cost of illegal discharge is relatively low, resulting in numerous incidents of illegal discharge of ship sewage, causing serious pollution to water resources. In response to this situation, relevant departments should first establish and improve laws and regulations on ship sewage discharge, laying the foundation for regulatory work. Secondly, relevant departments should formulate relevant punishment measures to penalize vessels that violate emission regulations. The punishment measures should have a certain intensity to increase the cost of illegal emissions and form a deterrent effect. Finally, advanced detection technology and equipment will be introduced to regularly monitor the domestic sewage situation of ships and enhance regulatory efforts.

4. Upgrade sewage reception technology

In the new era, in order to reduce the discharge of domestic sewage from ships, it is necessary to continuously upgrade and optimize sewage reception technology and equipment to improve the effectiveness of sewage treatment. In this regard, advanced sewage treatment technologies at home and abroad should be fully borrowed, and on this basis, China's sewage receiving technology and equipment should be upgraded. There are multiple options in the process of receiving ship sewage. For example, a large number of pipelines can be laid to receive

sewage, and professional “sewage suction trucks” can also be used to receive sewage. The most suitable method of receiving sewage can be adopted according to the actual situation. Meanwhile, when choosing these methods, it is also necessary to consider issues such as cost and loss. Using a “suction truck” to extract ship sewage can directly transport it to a sewage treatment plant for treatment. This method not only saves more costs, but also avoids the significant energy consumption of sewage discharge pumps. For this, a treatment mode of “onshore reception as the main approach, supplemented by sewage suction vehicles” can be adopted. In addition, sewage treatment equipment and various processes can be upgraded to continuously improve and perfect related technologies and procedures, thereby ensuring more efficient treatment of ship domestic sewage and reducing environmental pollution.

5. Improve the construction of institutional system

In order to further strengthen the prevention and control of ship sewage, relevant regulations and systems should be continuously established and improved. For example, specialized rules and regulations can be formulated: a set of targeted sewage treatment and prevention methods can be developed for inland vessels under 400 tons. By doing so, the effectiveness of sewage prevention and control can be improved. In addition, in order to improve the discharge and prevention level of domestic sewage from inland vessels, various management measures should be clearly defined and strictly implemented. And refine the ship management work to ensure that all tasks are implemented effectively. Specifically, for docked vessels, after entering the dock, they must report to relevant departments and submit detailed reports on sewage treatment, storage, and other related situations, accompanied by relevant supporting materials. In this way, it ensures that relevant departments can timely grasp the domestic sewage discharge, storage, and prevention work of relevant ships, while ensuring that ships comply with relevant national standards in pollution prevention and control. This move is of great significance for maintaining the environment of China’s inland waters, and must be highly valued and effectively implemented.

Conclusion

In short, in the new era, the problem of traditional domestic sewage discharge has seriously affected China’s water resource security. In this regard, relevant departments should strengthen supervision and develop effective regulatory measures to effectively reduce the discharge of domestic sewage from ships through various means and methods, thereby laying a solid foundation for creating a good ecological environment.

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