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Efficiency Analysis of Sea and Rail Intermodal in Merak - Tanjung Priok Freight Forwarding

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Abstract: In the era of globalization and increasing national logistics needs, the efficiency of the transportation system is the main key in supporting the smooth distribution of goods. The Merak-Tanjung Priok route as one of Indonesia's strategic logistics corridors plays a vital role in connectivity between the islands of Java and Sumatra. This study aims to analyze the level of efficiency of the use of intermodal transportation systems, especially the combination of sea and rail modes in the distribution of goods across Merak-Tanjung Priok. Using a qualitative approach through literature study and secondary data, this study examines operational aspects, infrastructure, policies, and the contribution of logistics actors such as PT KAI Logistics (KALOG) and PT PELINDO. The results show that intermodality between sea and rail modes can improve shipping efficiency, reduce road congestion, and support sustainable logistics policies. The role of the government through regulations and incentives such as PP No. 8 of 2011 and PM No. 117 of 2016 also encourages more optimal modal integration. In conclusion, strengthening intermodal transportation based on sea and rail is an important strategy in reducing national logistics costs and increasing the competitiveness of Indonesia's distribution system.

Keyword: intermodal transportation, logistics efficiency, freight rail, transportation policy

INTRODUCTION

In the era of globalization and rapid economic growth, logistics and transportation systems play a central role in supporting the smooth flow of goods. Indonesia as an archipelago with high trade activity relies heavily on the efficiency of an integrated supply chain, especially in key logistics corridors such as the Merak - Tanjung Priok route. This route is a vital link between Java and Sumatra, where Merak port serves as the main gate from the west and Tanjung Priok as the busiest port in Indonesia.

To answer the challenges of fast, safe, and economical distribution of goods, the use of intermodal transportation systems, namely the combination of two or more modes of transportation in one shipping process, is increasingly relied upon. In the context of Merak - Tanjung Priok, the combination of sea crossing and rail transportation is an important

alternative to increase shipping efficiency, reduce travel time, reduce logistics costs, and reduce the burden of road congestion.

However, the level of efficiency of intermodal use is not only measured by the speed of delivery or cost savings, but also includes factors of infrastructure integration, schedule reliability, availability of supporting facilities, and the lack of administrative and technical barriers at each mode node. Gaps in intermodal coordination, delays in loading and unloading, or less than optimal integration of information systems can lead to wasted time and costs, which ultimately reduce the competitiveness of national logistics.

This study aims to analyze the level of efficiency of intermodal use in shipping goods on the Merak - Tanjung Priok route by considering various aspects of operations, infrastructure, and influencing policies. The results of this study are expected to contribute to efforts to improve the intermodal transportation system in Indonesia, especially on strategic cross-island routes that have a crucial role in national logistics mobility.

METHODS

This research method uses a literature study approach and secondary data to obtain information relevant to the topic under study. Literature study is a data collection technique that involves reading books, journals, or references on research topics (Lidya et al., 2022). Meanwhile, secondary data is obtained from sources that have been previously collected and published by other institutions or individuals. This type of research is qualitative which aims to understand certain concepts or phenomena. Meanwhile, for data analysis techniques, this writing uses descriptive analysis techniques which are the result of describing the information found in various literature sources. It can be concluded that this research method allows researchers to understand a phenomenon based on information that is already available without having to collect primary data. With this approach, research can be done more efficiently and still produce valid and relevant analysis.

RESULTS AND DISCUSSION

Transportation services are required because of the many activities and patterns of social and economic interaction that are spread across land uses. As transportation of people and goods is usually undertaken to achieve a variety of destinations, a number of issues relating to transportation and its movement patterns must be considered. Integration with other modes of transportation (rail, truck, and sea). Considering the bus accidents, which caused the demand for rail transportation to increase. However, this increase inevitably cannot be fully met, which will ultimately impact the quality of rail services. Railways are more environmentally friendly and more efficient for large volume and long-distance shipments.

Because of its important role in public transportation, mode selection is one of the most important models in transportation planning (Rifni & Prasetya, 2016). In the selection of transportation modes, several criteria are usually considered, namely delivery time, frequency of delivery according to the schedule, obstacles or obstacles that will likely arise, the ability to handle various goods, handling loading and unloading and cost. With various factors that influence the selection of modes, including road characteristics, movement and transport capacity. In research, freight transportation or logistics in Indonesia is still dominated by road transportation. This condition results in frequent accidents and damaged road conditions. In addition, the result of the dominance of road transportation is congestion, which is not friendly to the environment and can increase exhaust emissions. For various reasons, such as transportation, schedule, and accessibility. The road load can be shifted and balanced by alternative transportation methods such as rail. The use of these rail-based modes can reduce the load, congestion on roads and exhaust emissions in the air. The services provided by this freight rail transportation company also provide satisfactory services because they are

supported by pre and onward transportation and supporting services which include management at the Container Terminal (TPK). PT KAI Logistik, a business-oriented logistics rail transportation company, offers "End-to-End Services" as a complete logistics distribution service provider.

Therefore, along with the development of the economy PT KALOG collaborates with PT PELINDO as one of the pioneers of Container Terminals in Indonesia, especially on the island of Java. Exporters from Sumatra Island send cargo to be exported and then sent using containers using PT. ASDP Roro Ferry to Merak Port and then will be distributed to the Container Terminal in the Tanjung Priok area using PT. KALOG's freight train. By using existing railway lines, container transportation can be used to transport goods and logistics from ports to major ports in Java and Sumatra. Therefore, railcar providers and the logistics industry must work together and improve their supply and performance systems. Railway is one of the transportation that requires its own road space, with large carrying capacity and lower cost. Efforts to use this rail mode must be balanced with the development of adequate supporting infrastructure, such as places for loading and unloading. In addition, train operations in the transportation of goods must be carried out professionally and in collaboration with the private sector.

The role of the government cannot be separated in encouraging the efficiency of transportation of goods from Sumatra Island to Java Island. The government is responsible for several things, namely:

1. Encouraging the development of multimodal transportation according to Government Regulation (PP) No. 8 of 2011 concerning multimodal transportation. The government regulates and encourages the use of integrated transportation modes (sea + rail) to reduce national logistics costs and improve competitiveness.
2. Subsidies and incentives for efficient and environmentally friendly modes according to PM No. 117/2016 on the implementation of freight transport by rail. The government subsidizes freight train fares and encourages the use of sea toll vessels to reduce distribution costs.

Therefore, the transportation of these goods will be more efficient using the sea mode and continued by rail mode than continued by land mode due to subsidies or incentives provided by the government to the transportation company. Another reason is because ships have a large cargo capacity and low cost per ton-kilometer. Once at the port, trains also offer cheaper rates
than trucks for bulk transportation. Furthermore, road congestion can be avoided, it supports government policies (green logistics and emission reduction) and there is already an available and integrated infrastructure.

Regarding the operational transportation of goods using PT KALOG's freight train from Merak Port (Banten) - Tanjung Priok Port (Jakarta) which is an important part of the Sumatra - Java inter-island logistics chain, starting with the receipt and handling of goods at Merak. KALOG receives goods from feeder trucks or Roro Ferry Ships in the form of containers or general cargo and conducts a logistics document check-in process and then identifies the type and destination of the goods. After handling, loading into the train and departure, this freight train is usually run at night or during off peak hours so as not to interfere with the Green line KRL operating time with a train speed of 60-70km / hour and the route traveled is Merak - Rangkasbitung - Tanah Abang - Tanjung Priok via the KRL line. When it arrives in Tanjung Priok, acceptance with the KALOG arrangement unloads the goods at the Tanjung Priok KAI Logistics terminal or dry port and performs unloading or final distribution using a truck to the warehouse or will be reloaded to the ship to be sent abroad according to the destination.

CONCLUSION

Integrated transportation services are essential to support the mobility of goods and people, especially in the context of growing social and economic activities. The use of railbased transportation modes such as trains has proven to be more efficient, environmentally friendly, and able to handle large volumes and long distances compared to road modes that often cause congestion, accidents, and infrastructure damage.

In the context of transporting goods from Sumatra to Java, the combination of sea and rail modes (intermodal) is a strategic solution to improve national logistics efficiency. PT KAI Logistik (KALOG) and PT PELINDO play an important role in this system by providing end-to-end logistics services, from ports to land terminals.

The Government plays an active role through regulations and subsidies to encourage the use of efficient and environmentally friendly modes, as stipulated in PP No. 8 of 2011 and PM No. 117 of 2016. The Merak-Tanjung Priok freight train operation has been designed so as not to interfere with KRL operations, and is equipped with professional logistics handling facilities,at both ports.

With the support of regulations, infrastructure, and collaboration between parties, integration between sea and rail modes can reduce the burden on roads, lower logistics costs, and encourage the creation of a more sustainable national distribution system.

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