

Effective Days Of Traditional Fishing Boat Engines

Kaminton Tambunan¹⁾, Wasum¹⁾, Muklis Ali²⁾

¹⁾Ocean and Fisheries Polytechnic, Bitung

²⁾Ocean and Fisheries Polytechnic, Kupang

Email: kamintonsisingamangaraja@gmail.com

Abstract

Ship engines are machines that play an important role in the dynamics of the fishing business. Unfortunately, traditional fishing boat engines in Indonesia are neglected in maintenance and repair, so that apart from affordable areas, efforts in unreached areas are very important. In this research, damaged machines are maintained and repaired, working hours are monitored, with the main aim of evaluating continued seaworthiness compared to machines that work continuously. Machine operation, machine working hours, assessed for one year in Tablolong village, East Nusa Tenggara, Indonesia. The effective day rate of operation ranges from 268±97 to 275±90 idle time in machine operation and from 190±175 to 200±165 idle time in continuous machine operation. Machines that are maintained every month have higher levels of operation and movement compared to machines that are maintained for three and five months. However, the seaworthiness of the engines is very low, mostly due to lack of understanding, unavailability of engine maintenance facilities. Effective days in machine operation were observed, during the period (January-November). Machine maintenance is very useful for traditional fishermen who lack skills. Nevertheless, ongoing long-term and systematic monitoring is necessary to have a greater understanding of maintenance and repair.

Keywords: Traditional fishing engines, seaworthiness, operating time, maintenance.

INTRODUCTION

Fishing boat engines are the main propulsion of fishing vessels, are highly valuable, and are well known for their reliability in fishing operations. These engines play an important role in maneuvering and fishing operations, and are also important in maintenance and repair for the livelihood of fishers in the coastal community of Tablolong village (Yahya et al., 2021). Unfortunately, the maintenance and repair of engines in unreached villages in Indonesia has declined rapidly.

This decline is caused by a combination of human resources and fisheries workshop factors, and the distance of maintenance facilities (P. Kusuma, "Perencanaan Jadwal Perawatan Sistem Pendukung Mesin Induk Kapal dengan Menggunakan Sistem Dinamis," ITS, 2009). (G. Nusantara, "Pengaruh Efek Perawatan Terhadap Jadwal Perawatan Sistem Pendukung Mesin Induk Pada Kapal Dengan Menggunakan Pemodelan Dinamika Sistem," ITS, 2015), (D. W. Handani and M. Uchida, "Modeling Optimum Operation of Ship Machinery by Using System Dynamics," J. Japan Inst. Mar. Eng. Vol 49 No.1, 132-141., 2014). (K. B. Artana and K. Ishida, "Optimum Replacement and Maintenance Scheduling Process for Marine Machinery in Wear Out Phase: A Case Study on Main Engine Cooling Pumps," Kansai Soc. Nav. Archit. Japan (KSNAJ), 2002). The decline in the maintenance of fishing vessel engines has prompted several studies to determine appropriate maintenance. Therefore, a good understanding of the maintenance and repair of traditional fishing boat engines, technological advances, and the education and training of fishers' human resources is very important to achieve an effective blue economy (D. W. Handani and M. Uchida, "Modeling Optimum Operation of Ship Machinery by Using System Dynamics," J. Japan Inst. Mar. Eng. Vol 49 No.1, 132-141., 2014) (K. B. Artana and K. Ishida, "Optimum Replacement and Maintenance Scheduling Process for Marine Machinery in Wear Out Phase: A Case Study on Main Engine Cooling Pumps," Kansai Soc. Nav. Archit. Japan (KSNAJ), 2002). Recently, a maintenance and repair program for idle, non-operational ship engines has been carried out in Tablolong village, East Nusa Tenggara, Indonesia, utilizing idle engines that were maintained and repaired (RCM 2012). In this study, damaged ship engines were maintained and repaired to be seaworthy and were monitored, with the main objective of evaluating the operational continuity of the engines and the effective days of the engines, compared with engines without maintenance at the site of the traditional fishing village. Because this is a maintenance and repair management program, the results of this study are very important for future programs in Indonesian coastal waters, as well as in other parts of the region.



RESEARCH METHODOLOGY

This research was conducted in the partner village of Tablolong, East Nusa Tenggara, Indonesia, about 50 km from Kupang City.

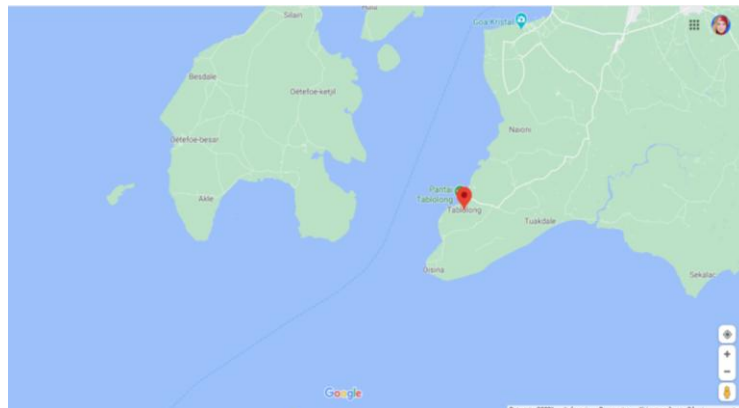


Figure 1 Map of Tablolong village

Tablolong Village was designated a fishing village in 2018 under the coordination of Lantamal VII of the Central Indonesia region. The village can be easily accessed by land. The coast is strongly influenced by the Northeast Monsoon from November to February, which brings the fishing season (Widodo et al., 2001, in DKP 2009). Ekawati et al. (2015). With the increasing number of traditional fishers and fishing engines, and many ship engines standing idle, a fishing boat engine maintenance and repair program was initiated by PT Persero Pertamina, Lantamal VII, and the Ocean and Fisheries Polytechnic, Kupang. The ship engines were maintained and repaired.



Figure 2 Idle ship engine

Maintenance and Repair of Fishing Boat Engines

Four sampling locations in the coastal community of Tablolong village were selected randomly and were marked as Jaga 1, Jaga 2, Jaga 3, and Jaga 4. The ship engines were then selected based on damage and marked.



Figure 3 Ship engine maintenance

(F. Kusniawati, 2020). A total of four ship engines at four locations were marked, and their operation, effective days, and maneuverability were monitored during this study. Maintenance and repair data were collected in a record for each engine. Damaged and replaced components were recorded. Components that were completely damaged were replaced with new ones.

Table 1. Maintenance activities and schedule for each engine

No	Engine	Maintenance	Month
1	Jaga 1	Valve clearance	Jan – Nov
2	Jaga 2	Fuel filter	
3	Jaga 3	Injector pressure	March, June, September
4	Jaga 4		May, October

Ten components were successfully replaced Engine monitoring and observation. During the monitoring period, engine working hours, effective engine days, and engine maintenance were recorded at each location during each visit. In addition, engine maintenance was recorded (restoring valve clearance, injector pressure, and cleaning the fuel filter). Four aspects of ship engine monitoring were recorded in three categories (every month, every three months, and every five months).

RESULTS AND DISCUSSION.

Maintenance was performed after fishing trips were completed so that the engines could be used again as soon as possible in the afternoon. Maintenance was performed to restore the compression, power, and maneuverability of the engines optimally, thereby increasing the effective days and seaworthiness of the ship engines.

Table 2 Operating time results

Seaworthy		Operating	Idle
Effecti	Idle	engine	engine
ve days	time	hours	hours
240	125	1920	1000
275	90	2200	720
190	175	1520	1400
200	165	1600	1320

Based on Table 2, the comparison of effective days and idle time can be seen in Figure 4 below.



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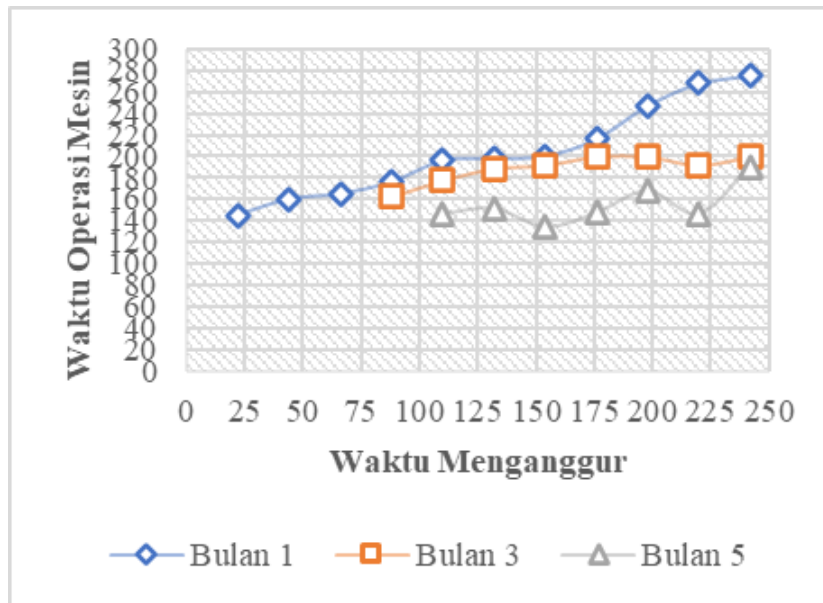


Figure 4 Graph of the relationship between engine operating time and maintenance days

The graph shows that the highest engine operating time occurred under monthly maintenance, at 265 and 275 days.

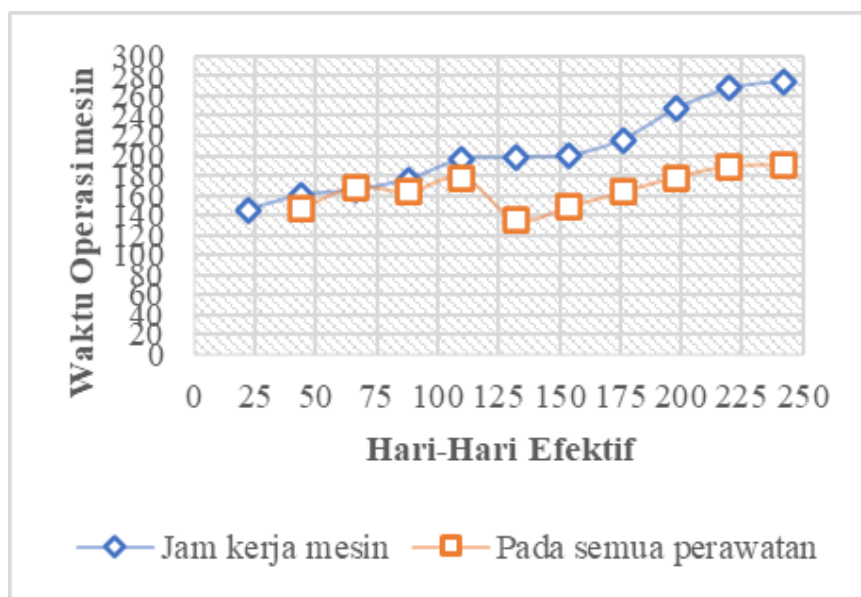


Figure 5 Graph of the relationship between engine operating time and effective days

The graph compares engine working hours under all maintenance treatments with effective working hours. The figure above shows that effective working hours are influenced by maintenance.

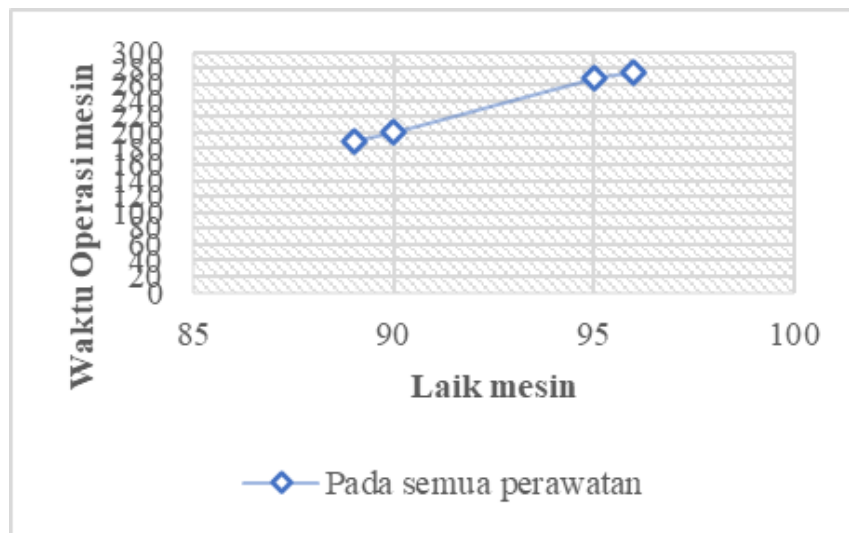


Figure 6 Graph of the relationship between engine operation and engine seaworthiness

Referring to availability, the working capability of the engines (effective engines above 90% of the value) under all maintenance treatments, seaworthiness was 95–96% at 268–275 effective operating days

CONCLUSION

This study has successfully documented baseline data for the maintenance and repair of ship engines, which can yield effective days for traditional fishing boat engines of 265 days and 275 days.

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