

Strategi Pengembangan Green Ship Recycling Facility di Indonesia Menggunakan Metode Analytical Network Process = Development Strategy of Green Ship Recycling Facility in Indonesia using Analytical Network Process

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Abstrak

Sebagai negara maritim, Indonesia memiliki total keseluruhan kapal mencapai 63.000 kapal dengan 60 persen diantaranya berusia lebih dari 20 tahun, hal ini membuat besarnya potensi jumlah keberadaan kapal tua yang sudah tidak layak beroperasi dan harus di daur ulang. Selain itu, terlepas dari besarnya prospek pasar internasional green ship recycling yang terus meningkat khususnya berhubungan dengan European Union Ship Recycling Facility (EUSRF), Indonesia masih kalah bersaing di pasar internasional dalam industri green ship recycling, dibuktikan dengan adanya 23 kapal berbendera Indonesia dari 630 kapal komersial dan unit lepas pantai yang terjual untuk ditutuh di luar Indonesia menurut NGO Shipbreaking Platform 2020, serta ditambah masih terdapatnya kebutuhan baja dalam negeri yang terus meningkat. Hal tersebut terjadi karena kondisi industri green ship recycling Indonesia yang masih jauh dari kondisi ideal yang mendesak untuk diwujudkan menjelang akan berlakunya Hongkong Convention pada 26 Juni 2025. Kondisi Ship Recycling Facility di Indonesia masih banyak menggunakan metode beaching yang merusak lingkungan dan tidak memperhatikan aspek keselamatan, keamanan, dan kesehatan pekerja akibat dari minimnya pengaturan mengenai aspek teknis, prosedur, dan fasilitas. Maka dari itu dilakukan penelitian ini dengan tujuan menghasilkan strategi pengembangan Green Ship Recycling Facility sesuai keadaan di Indonesia serta memenuhi ketentuan internasional dan mencapai kepentingan ekonomis. Dalam penelitian ini dihasilkan rekomendasi kombinasi alternatif sistem dan teknologi yang optimal untuk digunakan di ship recycling facility melalui metode Analytical Network Process (ANP) dan in-depth interview terhadap stakeholders (praktisi, regulator, dan pakar) di industri ship recycling Indonesia dengan hasil yaitu: LPG/oxy-acetylene sebagai cutting technology, sandblasting sebagai decoating technology, landing/wet-basin sebagai docking system, mobile crane sebagai material handling technology, dan randomized storage system sebagai storage system. Lalu dilakukan pula kajian untuk menghasilkan rancangan prosedur dan tata letak area beserta fasilitas, rancangan pemilahan limbah per kategori material berbahaya (HAZMAT), rancangan prosedur identifikasi material selama proses ship recycling, rancangan ketentuan fasilitas penanganan dan penyimpanan material berbahaya (HAZMAT), serta studi kasus pengembangan fasilitas yang dilakukan terhadap salah satu ship recycling facility semi modern di Cilegon, Indonesia, mencakup gap analysis, rekomendasi pengembangan, dan design layout berdasarkan kajian rancangan yang telah dilakukan.

.....As a maritime country, Indonesia has a total of 63,000 ships, with 60 percent of them being over 20 years old. This creates a significant potential for the existence of old ships that are no longer operational and need to be recycled. Additionally, despite the growing prospects of the international green ship recycling market, particularly in relation to the European Union Ship Recycling Facility (EUSRF), Indonesia still places behind in the international market in the green ship recycling industry. This is evidenced by 23 Indonesian-flagged ships out of 630 commercial ships and offshore units being sold for dismantling outside

of Indonesia, according to the NGO Shipbreaking Platform 2020. Moreover, there is a continuous increase in domestic steel demand. This happened because the condition of the green ship recycling industry in Indonesia is still far from the ideal conditions that are urgently needed to be realized, especially with the upcoming implementation of Hong Kong Convention on 26 June 2025. Ship Recycling Facilities in Indonesia still extensively use beaching methods that damage the environment and disregard safety, security, and workers' health aspects, primarily due to the lack of regulations concerning technical aspects, procedures, and facilities. Hence, this research aims to develop a strategy for Green Ship Recycling Facility based on the Indonesia's condition, while complying with international regulations and achieving economic interests. The study resulted in recommendations for an optimal combination of alternative systems and technologies to be used in ship recycling facilities, using the Analytical Network Process (ANP) method and in-depth interviews with stakeholders (practitioners, regulators, and experts) in the Indonesian ship recycling industry. The recommendations include LPG/oxy-acetylene as cutting technology, sandblasting as decoating technology, landing/wet-basin as the docking system, mobile crane as material handling technology, and randomized storage system as the storage system. Furthermore, the study also conducted an assessment to generate designs for procedures, layout areas, and facilities, waste categorization procedures for hazardous materials (HAZMAT), material identification procedures during the ship recycling process, requirements for handling and storing hazardous materials (HAZMAT), and a case study on the development of a facility in one of the semi-modern ship recycling facilities in Cilegon, Indonesia. This case study covers gap analysis, development recommendations, and design layout based on the conducted design assessment.