ABSTRACT

Road infrastructure development in West Java Province has driven an increase in demand for hot mix asphalt, which is produced through Asphalt Mixing Plant (AMP) facilities. Although it plays an important role in supporting mobility and economic growth, AMP operations have a significant environmental impact, namely carbon emissions caused by road heating, asphalt production, and asphalt road maintenance. In this context, Green Supply Chain Management is considered an appropriate approach as it integrates environmental aspects throughout the supply chain, has the potential to reduce environmental impacts, improve operational efficiency, and comply with applicable regulations.

This study aims to design a system for measuring the level of implementation of Green Supply Chain practices at AMP in West Java using the Multi-Criteria Decision Analysis (MCDA) approach, employing the Best Worst Method (BWM) to determine the priority weights of each criterion and sub-criterion. The techniques used in this study were designed through four stages: introduction, data collection, data processing, and data analysis, considering the credibility, reliability, and validity of the research to produce high-quality outputs.

The criteria and sub-criteria were determined through a literature review of international scientific journals, Indonesian government regulations, and international standards such as ISO 14001, which focuses on environmental management systems. Based on the results of combining literature and regulations, four main criteria were established for measuring GSC: Green Supplier, Green Transportation, Green Production, and Waste Management Recycling. Each criterion has sub-criteria that explain the sustainability criteria in more detail. Data collection was conducted through the distribution of questionnaires to expert respondents selected based on their professional backgrounds in the construction and AMP industries. Respondents were asked to determine the best and worst criteria and provide preference comparisons using a 1–9 scale according to the BWM method.

The data processing results show that the Green Production criterion has the highest weight of 0.372, followed by Waste Management Recycling at 0.261, Green Supplier at 0.183, and Green Transportation at 0.184. This indicates that respondents consider production efficiency and waste management as the primary factors in implementing GSC in AMP. The sub-criteria with the highest global weights High fuel efficient Machiner (0,142), Recycling of production Waste (0,126), dan Sustainable RAP application in hot recycling (0,167). *However, criteria such as Use of Alternative Fuels (Biogas) and Utilization of Energy Efficient have the lowest weights. The average consistency score of respondents was 0.075, indicating that the assessment results are sufficiently valid and can serve as a basis for decision-making.*

From the results of this study, it is concluded that the implementation of Green Supply Chain in AMP should first focus on Green Production and Waste Management Recycling practices. These two criteria reflect the importance of

material efficiency, recycling, and waste reduction to support environmentally friendly supply chain practices. Therefore, awareness of production and waste management is already quite good, but the sustainability aspect at the initial stage of the supply chain still needs to be improved. The results of this study are expected to contribute in the form of an evaluative measurement tool that can be used by local governments and industry players as a guide for decision-making and improving sustainability at AMPs. By starting with these high-priority aspects, it is hoped that implementation can proceed more effectively and have a significant environmental impact in the short and long term.

Keywords: *Green Supply Chain, Asphalt Mixing Plant (AMP), Best Worst Method (BWM), Multi-Criteria Decision Analysis (MCDA), Supply Chain*