ABSTRACT

Material distribution in the supply chain plays a very important role, especially in road construction. One of the main materials distributed in road construction is hot mix asphalt (hotmix), which is produced in a facility known as an Asphalt Mixing Plant (AMP). The distribution process from AMP to the roadwork site must be done quickly and efficiently because hot mixes are highly temperature sensitive. A drop in temperature during transportation can reduce the quality of the asphalt potentially causing problems in road construction or maintenance. Therefore, determining the strategic location of AMP is the key to ensuring that the hot mix distribution runs smoothly and on time.

In West Java Province, the distribution of hotmix from AMP is often hampered by the long distance from the AMP location to the service points. This causes delays in material distribution, which in turn can reduce the quality of road infrastructure projects. As an effort to overcome this problem, this research aims to determine the optimal location of AMPs in West Java using the Maximal Covering Location Problem (MCLP) method. MCLP is an optimization method used to maximize demand coverage in an area by placing a number of facilities in certain locations.

This research is focused on the Regional Technical Implementation Unit (UPTD) III West Java, which covers important areas such as Bandung City, Cimahi City, Bandung Regency, West Bandung Regency, Subang Regency, Karawang Regency, and Purwakarta Regency. This region has an extensive road network and high demand for hotmix. There are currently 20 AMPs in the UPTD III area, but only 7 AMPs are considered capable of effectively serving demand within a maximum distribution travel time of 90 minutes.

The determination of the optimal location of AMP in this study was carried out using a modified MCLP model. The modification involved the addition of important parameters such as road density, Human Development Index (HDI), and Indonesian Disaster Risk Index (IRBI). Road density was used to evaluate the accessibility of the areas to hotmix distribution, while HDI was used to assess the quality of social infrastructure in the selected areas. The IRBI is used to identify the disaster risk in the region, so that AMP is not placed in disaster- prone areas.

The results showed that by reducing the number of AMPs from 20 to 7 locations, the service area coverage could be significantly improved. The seven selected AMPs are located in Bandung City (Gedebage), Cimahi City (Cimahi Utara), Bandung Regency (Margaasih), Subang Regency (Pegaden), Karawang Regency (West Karawang and Jatisari), and Purwakarta Regency (Wanayasa). These locations were chosen because they meet the technical criteria set out in the Minister of Industry Regulation No. 30/2020. These criteria include transportation accessibility, availability of qualified human resources, and minimized disaster risks.

The service area coverage generated by the MCLP model is able to cover 58.63% of the total UPTD III area in a hotmix distribution travel time that does not exceed 90 minutes. This increase in service coverage indicates that the modified MCLP model can be effectively used to determine the optimal location of AMP. In addition, this model

It can also be used in other contexts, such as the siting of other industrial facilities that require efficient material distribution.

This research provides important recommendations for the West Java Provincial Bina Marga and Spatial Planning Office regarding the determination of the optimal location of AMP. The implementation of this model can assist the government in planning more efficient and sustainable road infrastructure development. By maximizing AMP service coverage, hotmix distribution can be done faster, reducing the potential for material quality degradation and saving distribution costs. In addition, the resulting improvement in road quality can also support regional development and improve community welfare.

Keywords: Asphalt hotmix, AMP, Distribution, MCLP