

ABSTRACT

Roads as one of the transportation infrastructures are an important element in efforts to facilitate the mobility of goods or services in order to improve the national economy. To realize these objectives, the provision of land transportation infrastructure cannot be separated from the availability of materials that make up the road construction itself. Sand is a natural material that is abundantly available in Indonesia. Until now, sand has only been utilized as a building material, although sand contains valuable minerals such as iron, titanium, and other elements that can be used for industrial purposes. Aceh is known as a province rich in mining commodities, including gold, silver, copper, and nickel. The Aceh government has issued data on mining business permits (IUP) for mineral and coal commodities, including permits for iron sand (Aceh Energy and Mineral Resources Office). In the area of Central Aceh Regency, Atulintang Subdistrict, Merah Mulyang Village, there is a sand factory (crusher) where iron sand is found but its utilization has not been fully optimized. This study aims to investigate the effect of iron sand as fine aggregate in hot mix asphalt (AC-WC), to determine the stability value and Marshall characteristics of the pavement mixture (AC-WC) using iron sand, and to obtain results from using iron sand in the asphalt mixture (AC-WC) through the Marshall test. This research uses an experimental method in accordance with the 2018 General Specifications of Bina Marga. The testing in this study uses variations of iron sand mixture at 0%, 40%, 50%, 60%, and 70%. From this study, the Marshall characteristic values obtained include Stability, Flow, Voids In Mix (VIM), Voids In Mineral Aggregate (VMA), Voids Filled Bitumen (VFB), Marshall Quotient (MQ), and Bulk Density. After obtaining the parameter values using the Marshall Test equipment in the highway laboratory, for the asphalt mixture (AC-WC) with penetration asphalt 60/70, the Marshall Quotient values for iron sand mixture variations were: 0% 1035.22 kg/mm, 40% 1134.26 kg/mm, 50% 1094 kg/mm, 60% 1339 kg/mm, and 70% 1633 kg/mm. Based on the research data obtained, the Marshall Quotient values meet the 2018 Bina Marga General Specifications. It is recommended to conduct further research on the use of iron sand as an alternative material for other types of pavement, by analyzing other characteristics that have not been observed in this study

Keywords: iron sand, research method , Marshall characteristics.