Abstract

Traffic congestion has become an increasingly severe problem in many major cities around the world, including in the city of Bandung. Population growth and increased vehicle use exacerbate congestion. Jalan Buah Batu, one of the main roads in the city of Bandung, often experiences congestion due to high density. This study explains the traffic flow simulation using the Lighthill-Whitham-Richards (LWR) model with a speed-density function obtained from observation data on Jalan Buah Batu, Bandung. The data included the relationship between vehicle density and speed which was then analyzed using the linear regression method. The approximation of the velocity-density function obtained from linear regression is v(ρ)= -6.904+4.302. Traffic flow simulations were carried out with a road length of 60 meters, a total time of 5 minutes, and high resolution with 300 grid points. At the beginning of the simulation, a peak density of 0.70 occurred in a 15-25 meter road segment. Over time, the peak density shifted and decreased: 0.65 at 20-30 meters at 1.25 minutes, 0.60 at 25-35 meters at 2.5 minutes, and 0.50 at 30-50 meters at the end of the simulation (5 minutes). These results show the movement of vehicles that reduce congestion and improve the smooth flow of traffic. In conclusion, linear regression is effective in determining the velocity-density function.

Keywords: *Linear Regression, Traffic Flow, Velocity-Density Function, Simulation*