**Answers to Traffic Flow Example: Using Linear Regression**

a) Use linear regression to find V as a function of k. Assume the traffic flow follows the Greenshields (linear) model.

V = 69.7 – 0.49k

b) What is the free flow speed (mi/hr)?

$$v\_{f}=69.7 mi/hr$$

c) What is the jam density (veh/mi)?

$k\_{j}=\frac{69.7}{0.49}=142 veh/mi$

d) What is the road’s capacity (veh/hr)?

$$q\_{max}=\frac{(69.7)(142)}{4}=2474 veh/hr$$

**Answers to Traffic Flow Example Using Speed Study Data**

a) Use the speed study data (“Speed Study North Montana. pdf”) to estimate V as a function of k for North Montana Avenue. Assume the traffic flow follows the Greenshields (linear) model.

We can use the speed study data (“Speed Study North Montana. pdf”) to estimate hourly traffic flow rates. According to the study the observed daily traffic was 4600 vehicles in 2013 and 4900 vehicles in 2015. Assuming the daily traffic occurred during an 18 hour period, the hourly flow rates are approximately 255.6 veh/hr and 272.2 veh/hr respectively. The average speeds are 55.5 mph and 55.0 mph.

Using the relationship q = kv the 2013 vehicle density is k = 255.6/55.5 = 4.61 veh/mi and the 2015 density is k = 272.2/55.0 = 4.95 veh/mi.

We now have two data points (k,v) so we can determine the line’s equation, v = f(k). The data points are (4.61, 55.5) and (4.95, 55.0). The line’s equation is:

v = 62.3 – 1.47k

b) What is the free flow speed on North Montana Avenue (mi/hr)?

$$v\_{f}=62.3 mi/hr$$

c) What is the jam density on North Montana Avenue (veh/mi)?

$$k\_{j}=42.4 veh/mi$$

d) What is North Montana’s capacity (veh/hr)?

$$q\_{max}=660 veh/hr$$