Module 3-3 tutorial
Questions

Austroads

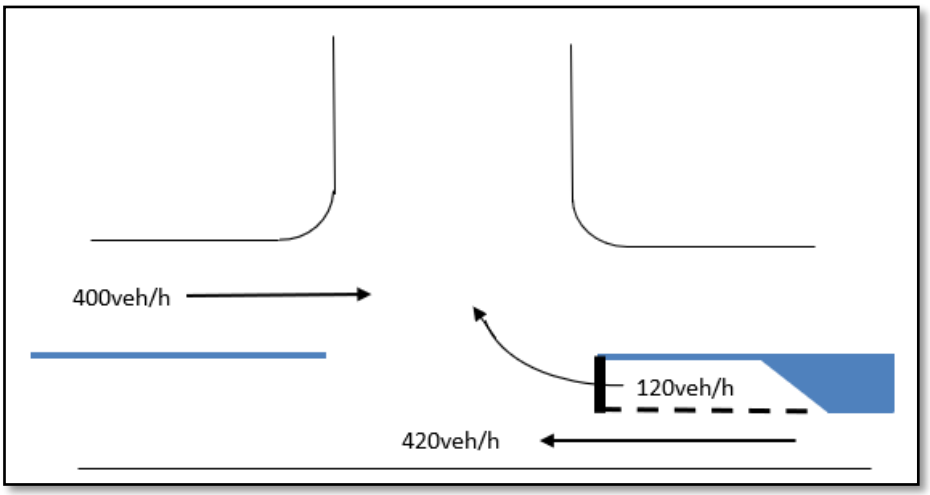
Capacity analysis

Question 1. The capacity of a motorway section in Sydney is to be determined as part of a project. The project involves collecting video-tape data of traffic movement on the motorway section. Upon processing the data, the traffic engineer observes a density of 50 veh/km and 33 veh/km at prevailing stream speeds of 45 km/h and 60 km/h respectively. Determine the capacity of the section using Geenshield's model.

Question 2. A ramp meter on the Monash Freeway (M1) in Melbourne dispatches vehicles at an average rate of 60 vehicles every 5-minutes during afternoon. The average rate of arriving vehicles during afternoon at this location is 80 vehicles every 5-minutes. Answer the following questions:

a) Determine the utilisation factor. Comment on the calculated value
b) Keeping the arrival rate as the same, what should be the service rate in order to achieve a utilisation factor of 0.8
c) Compute the mean queue length, standard deviation of the queue length and the mean delay for this system (i.e. ramp meter)

Question 3. For the unsignalised T-intersection given below, determine the length and storage required for the right-turning traffic stream that is not exceeded 95% of the time by the traffic queue. Assume the average vehicle length as 6m. Assume the saturation flow for the right-turning movement is 185 veh/h.



Question 4. Calculate the capacity of the left-most approach for the single lane roundabout shown below. Assume $t_a = 4$, $t_f = 2$ and $\tau = 2$. Similarly, identify the capacities of the remaining approaches. Identify the critical capacity for this roundabout.