# Miss assignment

It Is important to ensure that the model network closely resembles what Is observed on site in terms of road widths, lane configuration and location of stop lines. Model Calibration The assignment guidelines provide the following observed speed data to calibrate the model: “ The average free flow speed was found to be km,’her” The idea of calibration is to adjust the model to achieve similar modeled speed results as observed within the field.

Free flow speed is the average speed a road user would travel if there were no congestion in normal conditions. The free flow speed occurs when density and flow are equal to zero. Calibration Methodology: Reduce the inflows too handful of vehicles (say 5 to 10 from each approach) use the ink evaluation tool to measure the speed of these vehicles as they travel through the roundabout. Determine the average speed across five different seed runs of the model with the above parameters.

Adjust the speed distribution, gap acceptance, and driving behavior characteristics to obtain the km/her average free flow speed. Model Validation The assignment guidelines provide the following observed flow data to validate the model: “ The Maximum Average Circulating Flow was found to be 950 eve/her/lane with a standard deviation of 50 eve/her/lane. ” The idea of validation is to adjust the model o achieve similar modeled flow results as observed within the field. What is the Maximum Average Circulating Flow?

If we consider a roundabout which Is separated Into sections as shown below, the section I] represents the part of the roundabout which Is between the entry zone “ I” and the exit of zone “ J” The average flow, , around a roundabout Is defined as the weighted average of the flow on each section of the roundabout. So considering section I], the flow is weighted by the length of the section; The average velocity, , on a roundabout section Is is defined as the sum of all elicits of all vehicles In section ' J divided by the number of vehicles, , In section I].

For the section ; J, the fundamental flow, density and speed relationship will hold: Substituting (3) Into (1) and then multiplying by the sum of all vehicles on section we get the following expression Where, is the average density of the roundabout (total number of vehicles/total lane tofu assume that the relationship between speed and density decreases monotonically then the relationship between flow and density follows the same shape as the macroscopic fundamental diagram. Flow/Density Curve as shown below). This means that the Maximum Average Circulating Flow will be the highest point on the curve and the goal is make sure that this value is equal to 950 vehicles/her/lane with a standard deviation of 50 vehicles/her/lane.

Validation Methodology: Initially set up the flows within the model to be gradually increasing on a minute by minute basis across the minute data collection period (so that means the volumes need to be redistributed across the minute period for example the first row of the screenings below, the volume still maintains an average of 1000 vehicles/her across he mini period) In addition you could increase the average inflow volumes by a factor of 2 across successive simulation runs and use this data in conjunction with the other data to force a congested scenario (say run 3 flow scenarios) and get data points that are in the congested part of the MFC curve Set up the link evaluation for the roundabout and activate the flow and density parameters using second increments.

From this calculate average circulating flow (remember that the roundabout contains a number of links, so to figure out the average circulating flow you have to do the weighted average for each set of inundation data points related to a particular time step, so for example your roundabout may consist of 3 links resulting in 3 flow values -apply the equation to these 3 values for each time step) and density (again weighted based on link length) data points for that particular demand value. Collect this data. Do this for 5 different seeds and plot the average circulating flow versus density curves for each seed. The peaks of each of these curves will be the maximum average circulating flow for the respective seed. The average value across all the seeds will be the Maximum Average Circulating Flow for the entire model. Ensure that you maintain internal consistency (ensure enough data is collected for validation purposes) and external validity (conduct a z-test to make sure that you are 95% confident that your result is similar to the observed).

To determine internal consistency and define the number of simulation runs which are necessary , once you have validated your model using a minimum of 5 runs, calculate the required number of runs using: (defined in tutorial 3) The standard deviation referred to in the equation is the standard deviation across he 5 maximum average circulating flows determined in the validation process. The other values are constant for a specific level of acceptable error (5% is good for this assignment) If N is less than or equal to 5, then the calibration and validation process can be conducted using the minimum of 5 seeds. If N is greater than 5, then the calibration and validation process must be conducted with at least N number of seeds External Validity can be determined by carrying out a Z test: With this function we are comparing observed values (bal and SEE) with modeled values (be and SEE )