Assignment #0 – CE 367G

Due MONDAY, Jan 22, 2024, before Midnight (as always 😊)

10 points total

This is an ungraded assignment to help you and the instructor assess your background roadway-design knowledge. It is to be reviewed by the instructor to simply recognize to what extent students have been exposed to certain topics and techniques.

Please give yourself no more than two hours and access to only a couple textbooks (e.g., your CE321 and CE311S texts, for example). Do NOT GOOGLE/search for information online or ask others questions. Please provide your answers very clearly in separate boxes.

Do not worry if you have never seen some of these questions before. This is simply an opportunity for you and me to ascertain your background knowledge base.

1. If a simple/circular arc has a radius of 50 meters and an internal angle of 30 degrees, what is the length of the chord between the start and end of this arc?

2. If the runoff (i.e., superelevation development) length for a simple circular curve is 100 meters, what is the most amount of this length that one should consider putting on the road’s tangent section? And what is the least amount?

3. If the normal crown slope for a road’s tangent is –2% and a curve’s full superelevation is 6%, how much runout (on the tangents) should one have? Assume 100 m of runoff length, as in Question 1.

4. What is helpful about spiral curves? In other words, why might one choose to use these?

5. What is the general equation for directly computing stopping sight distances (SSD)?

6. What does “HCM” stand for?

7. What is the standard lane width for design (such that a roadway’s capacity is not really constrained)?

8. What amount of lateral clearance (LC) is sufficient so that a roadway’s capacity is not affected (according to the HCM)?

9. What is the net present value of a stream of $1 million benefits starting at the end of this year, each year, for 10 years, at an annual discount rate of 8%, after accounting for a cost of $4 million that occurs at the end of the second year?

10. If vehicles arrive at an intersection at a rate of 1 per second and according to a Poisson distribution, what is the probability that at least 60 arrive over the course of a minute? Please write the equation for this computation. (You do not need to provide the value, unless you wish to use Excel or approximate the solution.)

Final Question: If you are an undergraduate student, please note who your CE321 professor was and the semester (and year) in which you took CE321.

Hook ‘em!