REVIEW TOPICS CEEN 2320 TEST 2

Be able to draw a simple, clear, meaningful figure to explain concepts (for example the Safe Stopping Distance).

3.3 HORIZONTAL ALNIGNMENT

"The design of roadway curves should be based on an appropriate relationship between…" (Provide which highway design elements and how they relate to each-other.)

Know how to use the equations relating e_{max}, $f_{s\ max}$, R_{min}, $V_{design.}$ Know the ranges of each of these variables in highway design.

Know the difference between f_f and $f_{s\ max}$.

What considerations limit the values of superelevation (explain in full sentences). Be able to provide a full explanation for each consideration.

What is the concern about superelevation when there is snow or ice on the pavement?

What concern about superelevation exists in relation to heavy vehicles?

What is the designer's goal when deciding the magnitude (value) of the radius of a horizontal curve? What motivates the designer to strive for this goal?

Know the typical ways that tangents connect to horizontal curves. Be able to demonstrate with a clear figure.

Know the terms for all elements of horizontal curves, their symbols and /or abbreviations (for example, PC, PI, PT, T, E, M, LC, L R) and know how to use the equations involving those curve elements.

Know the definition of Degree of curve; be able to say it in a full sentence; know its units; be able to apply it in a simple problem.

Know how to use the Degree of curve-Radius formula.

Be able to explain and use a figure to describe at least three of the general controls for horizontal alignment (paragraph 3.3.13)

3.4. VERTICAL ALIGNMENT

Know the three AASHTO terrain classifications

Grades: typical max grades that have no effect on passenger car speeds; what two grade characteristics affect truck speeds on grades; be able to identify truck crawl speed on figure 3-24; know how to used figures 3-24 and 3-25.

Typical max grades for a design speed of 70 mph, 30 mph.

Typical minimum grade-numeric value and purpose—why is it needed (for what purpose) what highway element makes them necessary.

Vertical curves: be able to recognize and draw the three types of crests and sags of Figure 3-41.

What type of curve (geometric shape) is used for vertical curves?

Be able to show the curve length. Know the property that makes a vertical curve symmetric in relation to its length.

The major design control for a crest vertical curve is… (be able to explain with a paragraph and a figure).

Know all the terms shown on Figure 2.4.11

Know the terms and the corresponding symbols for: A, G1, G2, L, E, y, X. Be able to draw a vertical curve and correctly identify these elements on your drawing. Know the term and meaning of the K value (be able to explain the meaning in a full sentence).

Know how to apply the equations (they will be provided) for the elements listed above.

Know how to find the elevation of a point P on a vertical curve (use equation 2.4.14)

Review the example problem on pp 39-41

Be able to use the equations on page 44.

Be able to draw and interpret (explain in full sentences) the purpose and the relationship between the elements of the figure on page 44 —know the eye height and object height.

Be able to draw and interpret (explain in full sentences) the purpose and the relationship between the elements of the figure on page 47—know the eye height and object height.

Be able to interpret (explain in full sentences) the purpose and the relationship between the elements of the figure on page 48.

Know how to use the equations on page 49.

Know at least two of the general controls for vertical alignment on page 54.

Plan and Profile sheets

Plan: Be able to identify the PC, PT and PI stations; know how to find length of a horizontal curve; know how to find the length of a tangent. Be able to measure lengths along the centerline.

Profile: Know how to identify the existing ground profile and the roadway centerline profile; know how to identify areas of cut and fill. Be able to identify the type (crest or sag) and length of a vertical curve. Be able to identify the PVC, PVT, PVI and their stations and elevations.

Be able to provide the azimuth of a given angle.

Be able to provide the bearing of a given angle.

Contours: be able to identify the contour interval; be able to calculate the grade of a line drawn on top of contours; be able to draw contours when given point elevations; be able to identify the presence and direction of a stream; be able to draw the ground profile along an alignment when given a contour; be able to identify steep and smooth slopes on a contour map;

Cross sections: Be able to identify a cut and a fill cross section; be able to use the Volume formula on page 70.