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PE Civil Exam Review Guide: Transportation Depth
Preview Edition

Errata

(updated 4/8/2021)

This document will be updated regularly.

Chapter 1: Traffic Engineering

(1) p. 1-48: In Equation 1-34, add 1.47 before *V*. In addition, T_p should instead read t_p.

interval also gives motorists approaching the intersection the option to stop safely or proceed through the intersection without accelerating.

$$Y = t_p + \frac{1.47V}{2a + 2gG}$$ **Equation 1-34** [12]

Where:
Y = yellow time (usually rounded up to the nearest 0.5 second)
t_p = driver perception/reaction time (usually taken as 1.0 second)
V = speed of approaching traffic (mph)
a = deceleration rate for the vehicle (usually taken as 10.0 ft/s^2)
g = acceleration due to gravity (32.2 ft/s^2)
G = percent grade divided by 100

(2) p. 1-48: In Example 1.5, t_r should read t_p.

$$Y = t_p + \frac{1.47V}{2a + 2gG} = 1.0 + \frac{1.47(55)}{2(10) + (2)(32.2)\frac{4.25}{100}} = 1.0 + \frac{80.85}{20 + 2.737} = 4.56 \text{ s}$$

(3) p. 1-93: In Equation 1-93, the second instance of v_F should be v_R.

$$v_{12} = v_R + (v_F - v_R) \times P_{FD}$$ **Equation 1-93** (*HCM* Eqn. 14-8)

(4) p. 1-93: Three equations are listed but not labeled in the text. These three equations should be labeled in Table 1.24 as follows:

Table 1.24: Models for Predicting P_{FD} at Off-Ramps or Diverge Areas

NUMBER OF FREEWAY LANES[a]	MODEL(S) FOR DETERMINING P_{FD}
4	$P_{FD} = 1.000$
6	$P_{FD} = 0.760 - 0.000025v_F - 0.000046v_R$ **Equation 1-94** (*HCM* Eqn. 14-9)
	$P_{FD} = 0.717 - 0.000039v_F + 0.604(v_U/L_{UP})$ when $v_U/L_{UP} \leq 0.2$[b] **Equation 1-95** (*HCM* Eqn. 14-10)
	$P_{FD} = 0.616 - 0.000021v_F + 0.124(v_D/L_{DOWN})$ **Equation 1-96** (*HCM* Eqn. 14-11)
8	$P_{FD} = 0.436$
Selecting Equations for P_{FD} for Six-Lane Freeways	
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(5) p. 1-153: There is a typographical error in the problem statement for Example 1.29: 190 should be 200. The solution is correct as is.

(6) p. 1-164: There is a typographical error in Rating 6, bullet point 4: 2 ms should be 2 m.

Chapter 2: Horizontal Design

(1) p. 2-32: Equation 2-33 is misnumbered and should be listed as Equation 2-34.

Chapter 3: Vertical Design

(1) p. 3-8: There are typographical errors in the solution to Example 3.1 (corrections shown below).

Solution

Draw a rough sketch.

Find R. (Grades are in percent, L is in stations)

$$R = \frac{G_2 - G_1}{L} = \frac{-2 - 3}{1.8} = -2.778$$

Find the VPC station.

$$sta_{VPC} = sta_{VPI} - \frac{L}{2} = 3{,}020 - \frac{180}{2} = 2{,}930 = 29 + 30$$

Find VPT station.

$$sta_{VPT} = sta_{VPI} + \frac{L}{2} = 3{,}020 + \frac{180}{2} = 3{,}110 = 31 + 10$$

Find the VPC elevation.

$$ele_{VPC} = ele_{VPI} - G_1\left(\frac{L}{2}\right) = 600.40 - (3)\left(\frac{1.8}{2}\right) = 597.70 \text{ ft}$$

Find VPT elevation.

$$ele_{PVI} = ele_{VPI} + G_2\left(\frac{L}{2}\right) = 600.40 + (-2)\left(\frac{1.8}{2}\right) = 598.60 \text{ ft}$$

Find x distance of interest for the turning point (high point).

$$x_{\text{turning point}} = \frac{-G_1}{R} = \frac{-3}{-2.778} = 1.0799 \approx 1.08 \text{ stations}$$

The turning point occurs at station:

$2{,}930 + 108 = 3{,}038 = 30{+}38$

See the following chart for 25-ft stations and elevations along the curve.

STATION	x (STATIONS FROM VPC)	ELEVATION $\left(ele_x = \frac{Rx^2}{2} + G_1x + ele_{VPC}\right)$
29+30 (VPC)	0.00	597.70
29+55	0.25	598.36
29+80	0.50	598.85
30+05	0.75	599.17
30+30	1.00	599.31
30+38	1.08	599.32
30+55	1.25	599.28
30+80	1.50	599.07

Calculate elevation at point of interest.

$$ele_x = \frac{Rx^2}{2} + G_1x + ele_{VPC} = \frac{(-0.2778)(1.08)^2}{2} + (3)(1.08) + 597.70 \text{ ft} = 599.32 \text{ ft}$$

(2) p. 3-10: Equation 3-15 is incorrect as written. It should be:

$L = 2S - \frac{2{,}158}{A}$ for $S > L$ **Equation 3-15**

Chapter 6: Signal Design

(1) p. 6-32: The title of Figure 6.13 is incorrect. It should be **Figure 6.13: Warrant 4, Pedestrian Peak Hour**.

Chapter 9: Drainage

(1) p. 9-55: The title of Example 9.12 should be changed to Bernoulli Energy Balance.

(2) p. 9-70: The following text should be added at the end of the problem statement for Example 9.16:
Assume a Manning's coefficient of 0.05.

(3) p. 9-71: In the first sentence of Example 9.17, m/s^3 should be changed to m^3/s.