

WRI Design Procedure Memo

Original 1981 Methodology

(Kept in here because the design example uses this methodology)

- 1) Calculate the Equivalent PI, which is basically a weighted average. Soil conditions in the first 5ft of depth are weighted heavier than the 5 to 10 foot range. Soil deeper than 10 foot is weighted even less.
- 2) Adjust the Equivalent PI to the Effective PI using the Slope Correction Coefficient (C_s) and the Over-consolidation Coefficient (C_o). You need the Un-confined compressive strength (q_u in TSF) from the geotech report.
- 3) Look up the climate rating (C_w) for your project using old fig 14 or '96 fig 4. The map is blurry, but it looks to me that Port Arthur is rated as 30 and just west of that is Houston. The '25' line goes right through Houston I think.
- 4) Using the Climate Rating (C_w) and the Effective PI, look up the Climate Support Index (1-C) on fig 15.
- 5) Using the Climate Support Index (1-C), look up the following:
 - a. Beam Spacing (S) on fig 17
 - a. Cantilever Length (l_c) on fig 12
- 6) Then, based upon your rectangular slab dimensions, look up the cantilever length modification factors on fig 13.
- 7) Now you are ready to do Moment calculations. Skip to Step 8

Revised 1996 Methodology

In the 1996 Update, the Climate Support Index (1-C) parameter was eliminated, and also several tables were combined.

Same as
'81

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NEW for
'96

- 4) Using the Climate Rating (C_w) and the Effective PI, look up the following (all on '96 fig 5):

- a. Beam Spacing (S)
- b. Cantilever Length (l_c)

Same as
'81

- 5) Then, based upon your rectangular slab dimensions, look up the cantilever length modification factors on fig 13 or '96 fig 6.

- 6) Now you are ready to do Moment calculations.

- 7) Skip to Step 8

Calculate Moments

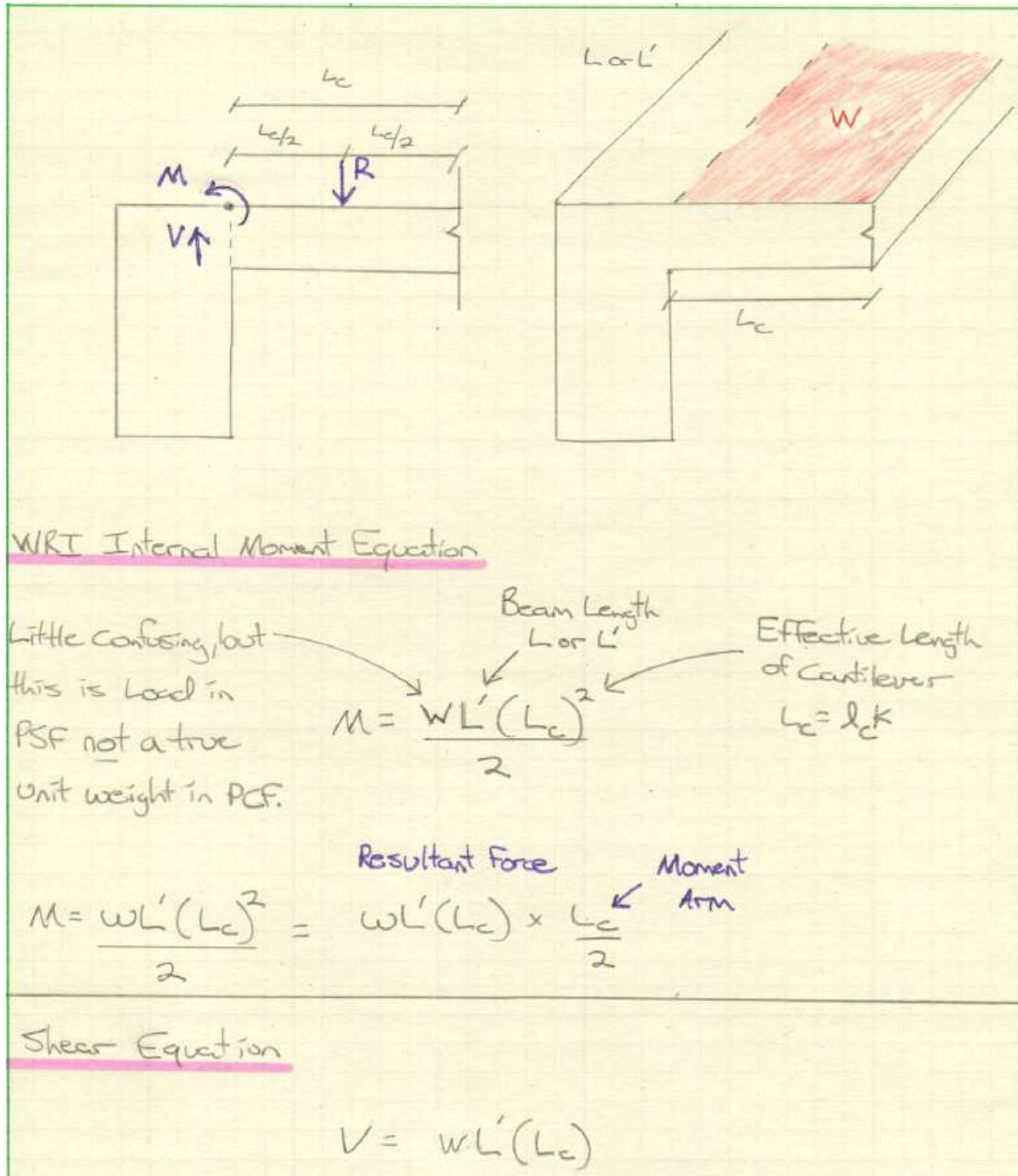
- 8) Calculate the number of beams on the short side and the long side.

- 9) Find the beam widths for the total cross section. For example, 4 beams 12 inches wide would have a total beam width of 48 inches.

- 10) Solve for the long side and short side moments.

- 11) Solve for depths.

Helpful Diagrams



I cannot follow the deflection equation (Δ). I believe they are using hooke's law ($\sigma = E\epsilon$) and general flexure ($\sigma = \frac{My}{I}$).

Where is the point of interest for deflection formula?

- Is it same location as moment and shear?

$$\Delta = \frac{w(L_c)^4 L'}{4 E_c I} = \overbrace{w L_c L'}^{\text{Moment}} \cdot \overbrace{\frac{L_c}{2}}^{\text{Dist.}} \cdot \frac{L_c^2}{2 E_c I}$$

$$\sigma = \sigma$$

$$E\epsilon = \frac{My}{I}$$

$$E \frac{L - L_0}{L_0} = \frac{My}{I}$$

$$E \frac{\Delta}{L_0} = \frac{My}{I}$$

$$\Delta = \frac{My L_0}{EI}$$

They are doing
something like this
but I can't follow

