Deflection of Short Cantilever equation revised to raise Length (L) to the third power.

Hand Calculations

Deflection of Short Cantilever

$$\text{Curl} = \underset{(A)}{\frac{-P_V L^3}{3EI}} \pm \underset{(B)}{\frac{P_H e L^2}{2EI}} + \underset{(C)}{\frac{wL^4}{8EI}} + \underset{(D)}{\frac{PL^3}{3EI}} \qquad (1)$$

Positive indicates a downward deflection

Deflection Components

(A) = Prestress vertical component
(B) = Prestress horizontal component
(C) = Distributed dead load of structure without barrier, future overlay, etc.
(D) = Concentrated load from hinge diaphragm or other miscellaneous.

Downward Deflection of Short Cantilever

$$\text{Deflection due to long span reaction} = \frac{TL^3}{3EI} \qquad (2)$$

Modify deflections for the long term effects. The Time vs. Deflection graph shown below is used to derive the long term camber equations.

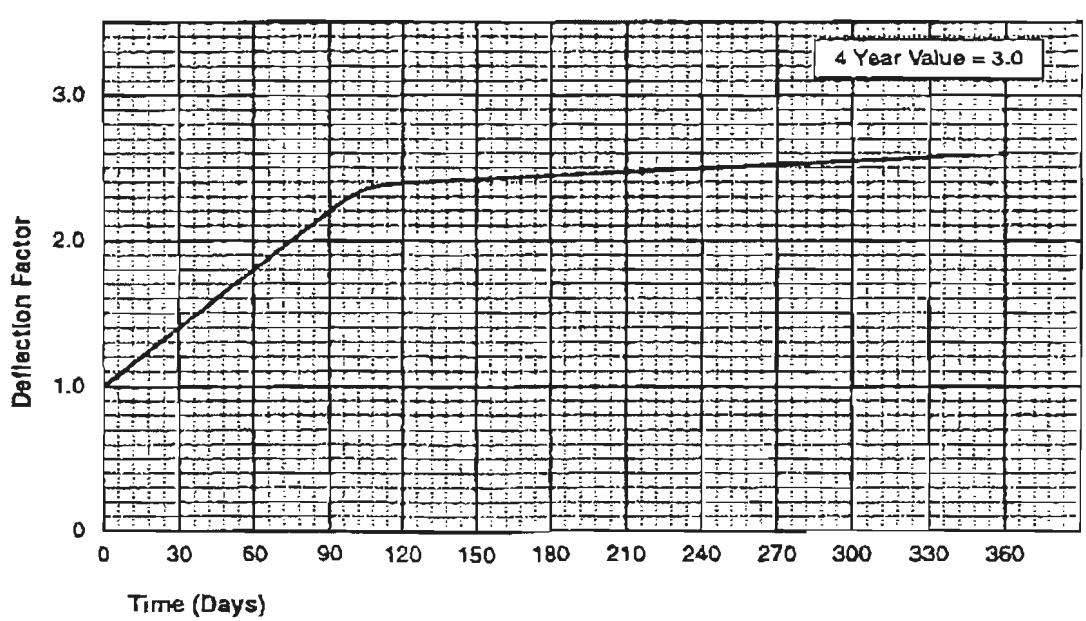

Figure 4: Long Term Deflection vs. Time