AASHTO 14.6.6.3.3 Compressive Deflection

Find Compressive Strain From AASHTO Fig. 14.6.5.3.3-1 or Bridge Manual Figure 12A.1:

$ORIGIN := 1$

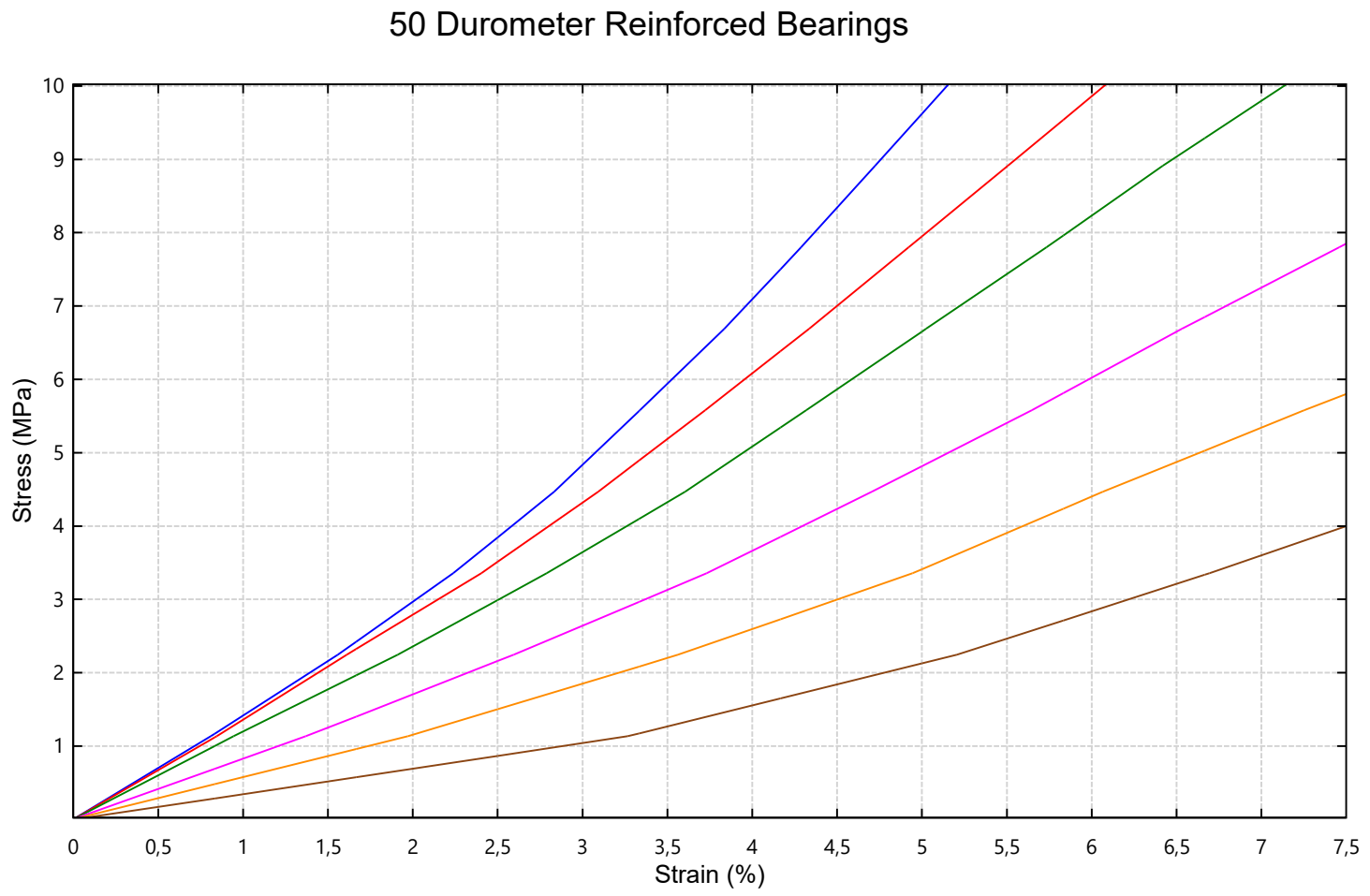
$$\sigma_{data} := \begin{bmatrix} 0.00 & 0.70 & 1.40 & 2.15 & 2.95 & 3.80 & 4.80 & 5.95 & 7.05 & 8.35 & 9.60 & 10.95 & 12.55 & 14.15 & 15.75 \\ 0.00 & 0.65 & 1.35 & 2.10 & 2.75 & 3.50 & 4.30 & 5.20 & 6.05 & 7.00 & 7.95 & 8.90 & 9.85 & 10.85 & 11.85 \\ 0.00 & 0.60 & 1.20 & 1.75 & 2.35 & 2.95 & 3.65 & 4.30 & 5.10 & 5.85 & 6.65 & 7.45 & 8.20 & 9.05 & 9.80 \\ 0.00 & 0.45 & 0.80 & 1.25 & 1.70 & 2.15 & 2.65 & 3.10 & 3.65 & 4.20 & 4.85 & 5.40 & 6.00 & 6.65 & 7.25 \\ 0.00 & 0.30 & 0.55 & 0.85 & 1.15 & 1.50 & 1.85 & 2.20 & 2.55 & 3.00 & 3.40 & 3.90 & 4.40 & 4.90 & 5.35 \\ 0.00 & 0.15 & 0.25 & 0.40 & 0.60 & 0.75 & 1.00 & 1.25 & 1.50 & 1.80 & 2.10 & 2.45 & 2.80 & 3.20 & 3.60 \end{bmatrix}^{T} \text{ МПа}$$

Strain as a function of stress and shape factor

$$\varepsilon_{comp}(\sigma_x, S) := \begin{bmatrix} \text{for } j \in [1..15] \\ \quad \varepsilon_{data_{j,1}} := (j-1)\cdot 0.5\,\% \\ \text{for } j \in [1..6] \\ \quad A_j := \text{linterp}\left(\text{col}\left(\sigma_{data}, (7-j)\right), \varepsilon_{data}, \sigma_x\right) \\ \text{linterp}\left(([3\ 4\ 5\ 6\ 9\ 12])^{T}, A, S\right) \end{bmatrix}$$

$M := 10^6$

$$durometer_{plot} := \begin{cases} x\,\% - \varepsilon_{comp}(y, M, 12) \\ x\,\% - \varepsilon_{comp}(y, M, 9) \\ x\,\% - \varepsilon_{comp}(y, M, 6) \\ x\,\% - \varepsilon_{comp}(y, M, 5) \\ x\,\% - \varepsilon_{comp}(y, M, 4) \\ x\,\% - \varepsilon_{comp}(y, M, 3) \end{cases}$$



$durometer_{plot}$

$$\sigma_{TL} := \frac{TL}{L_{brg} \cdot W_{brg}} \quad \text{==>} \quad \sigma_{TL} = 77.6145 \frac{\text{kip}}{\text{фут}^2} \quad \text{==>} \quad \varepsilon_{TL} := \varepsilon_{comp}\left(\frac{\sigma_{TL}}{\text{UnitsOf}\left(\sigma_{TL}\right)}, S\right) \quad \varepsilon_{TL} = 0.0297$$