Structural Bolt Properties

$$BType := \begin{bmatrix} 1 & \text{"A325"} \\ 2 & \text{"A490"} \end{bmatrix}$$

$NDX_{btype} := 1$

$BType_{NDX_{btype},2} = \text{"A325"}$

$$BProp := \begin{bmatrix} 1 & 0.5\ in \\ 2 & 0.625\ in \\ 3 & 0.75\ in \\ 4 & 0.875\ in \\ 5 & 1.00\ in \\ 6 & 1.125\ in \\ 7 & 1.25\ in \\ 8 & 1.375\ in \\ 9 & 1.50\ in \end{bmatrix}$$

Array

Col 1 - Index

Col 2 - Bolt Diameter (in)

Col 3 - Bolt Area (in^2)

Col 4 - AISC Minimum Bolt Pretension (K)

Col 5 - AISC Modified Bolt Pretension (Tb) (K)

$PT1 := [12\ K\ 19\ K\ 28\ K\ 39\ K\ 51\ K\ 56\ K\ 71\ K\ 85\ K\ 103\ K]$

$PT2 := [15\ K\ 24\ K\ 35\ K\ 49\ K\ 64\ K\ 80\ K\ 102\ K\ 121\ K\ 148\ K]$

AISC Design Guide 16 Table 2.1

for $i \in [1..9]$

$BProp_{i,3} := \frac{(BProp_{i,2})^2 \cdot \pi}{4}$

if $NDX_{btype} = 1$

$BProp_{i,4} := PT1_i$

else

$BProp_{i,4} := PT2_i$

if $BProp_{i,2} \le 0.625\ in$

$BProp_{i,5} := BProp_{i,4} \cdot 0.75$

else

if $BProp_{i,2} = 0.75\ in$

$BProp_{i,5} := BProp_{i,4} \cdot 0.50$

else

if $BProp_{i,2} = 0.875\ in$

$BProp_{i,5} := BProp_{i,4} \cdot 0.375$

else

$BProp_{i,5} := BProp_{i,4} \cdot 0.25$

Col 1 - NDX

Col 2 - Bolt Diameter

Col 3 - Bolt Area

Col 4 - AISC Min Bolt Pretension

Col 5 - AISC Mod Bolt Pretension (Tb)

$c := 5$

$BProp_{c,1} = 5$

$BProp_{c,2} = 1\ in$

$BProp_{c,3} = 0.7854\ in^2$

$BProp_{c,4} = 51\ K$

$BProp_{c,5} = 12.75\ K$