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Theoretical Breaking Load Caused by Shear

PC2-18 and PC2-24 Inch 2 Bolt Cleats

Assumptions:
- Forces are perpendicular to bolt direction
- Bolts are installed properly
- Thank you to Portland Bolt technical information and accuracy (links below)
- Each site is different. Consult a licensed engineer for your project.

1. What bolt will you use:
   Diameter
   Grade
   Tensile Strength of Grade (TSG)
   Thread: Nominal Size and Threads Per Inch (example: 1-8)
   Thread: Coarse / Fine / 8UN

2. To calculate Tensile Strength of Bolt (TSB), look up the Tensile Strength of Bolt Grade (TSG) and then multiply by the Tensile Strength Area (TSA) for given thread (size and threads per inch and coarse or fine or 8un thread)

   TSB = TSG x TSA

3. Bolt Shear (SB) = Tensile Strength Bolt (TSB) x Shear Factor (SF) = .60

   SB = TSB x .6

4. Breaking Strength of Cleat (BSC) = Bolt Shear (SB) x Number of Bolts (BN)

   BSC = SB x BN

5. Safe Working Load (SWL) = Breaking Strength of Cleat (BSC) / Safety Factor (X)

   SWL = BSC / SF

Cleat:	TSG	TSA	SF	Bolts	Breaking Load	Breaking Load
					Pounds	Metric Tons
PC2-18 Cleat						
Grade 8: 7/8-9 Coarse Bolt	150,000 psi	.462	.6	2	83,160 lbs.	37.8 mt
Grade 5: 7/8-9 Coarse Bolt	120,000 psi	.462	.6	2	66,528 lbs.	20.24 mt
Grade 1: 7/8-9 Coarse Bolt	60,000 psi	.462	.6	2	33,264 lbs.	15.2 mt
PC2-24 Cleat						
Grade 8: 1-8 Coarse Bolt	150,000 psi	.606	.6	2	109,080 lbs.	49.58 mt
Grade 5: 1-8 Coarse Bolt	120,000 psi	.606	.6	2	87,264 lbs.	39.66 mt
Grade 1: 1-8 Coarse Bolt	60,000 psi	.606	.6	2	43,632 lbs.	19.83 mt