

**ALLOWABLE STRESS DESIGN FLOWCHART**

**FOR**

**AISC MANUAL OF STEEL CONSTRUCTION, NINTH EDITION**

**APPENDIX C**

**BEARING PLATE DESIGN**

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S-Y. Chen, December 1997, *Using Genetic Algorithms for the Optimal Design of Structural Systems*, Dissertation for Doctor of Philosophy, Department of Civil Engineering, Arizona State University.

## BEARING PLATE

### Situations When Bearing Plates Are Necessary

Bearing plates are mostly used to transfer the load between end of steel structures member into its ground support. For example, foundation of the column or beam, or even the connection between column and beam.

### Design Requirement

1. Normal Stress on the Supporting Ground : the maximum stress on the supporting structure should not exceed its allowable value.

1.1 Type 1, beam sitting on ground (Figure ASD06.emf)

$$f_p = \frac{R}{B \cdot N}$$

1.2 Type 2, column sitting on ground (Figure ASD07.emf)

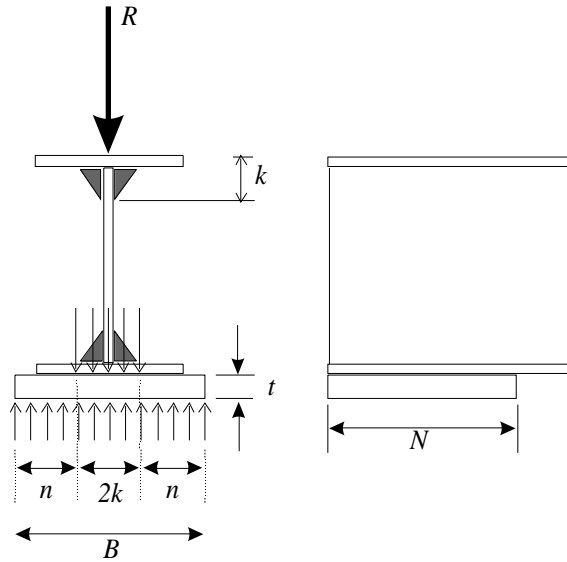
$f_p$  is calculated based on the strength, geometry and mechanics of the material, such that

$$B \cdot \int f_p \cdot dx = P \text{ and } B \cdot \int f_p \cdot x \cdot dx = M$$

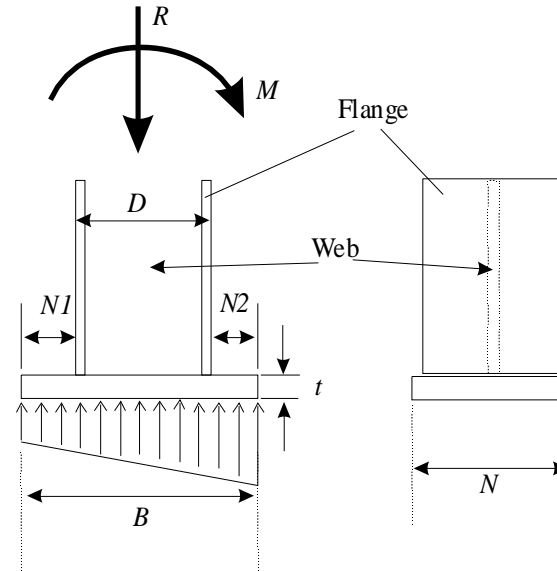
2. Bending Stress of the Bearing Plate

Bearing plate must be checked as a cantilever beam of length  $n$  in Type 1, and  $N1$ ,  $N2$  in Type2, with cross-section depth  $t$  and width  $N$ , so that the maximum bending stress of the bearing plate does not exceed its allowable value. (See Figure ASD06.emf and ASD07.emf).

$$\text{Where } n = \frac{B - 2k}{2} \text{ and } N1 + N2 = B - D$$



Beam Sitting on Supporting Ground  
Figure ASD06.emf



Column Sitting on Supporting Ground  
Figure ASD07.emf