



Engineering Equations for Evaluating Point Load Applications

The following equations are to be used in lieu of the Combine Load Tables provided for each size of engineering steel header. The equations are derived from testing and analytical calculations in accordance with AISI 2012 and IBC 2015 codes. They are intended to be used for non-uniform vertical load applications such as point loads or other non-uniform load configurations. All loads in the provided equations are absolute values. It is the designer's responsibility to evaluate the member for all applicable load combinations per the IBC 2015 and to evaluate the demands at all locations along the length of the member.

Definitions:

M_x – Moment due to vertical loading (IE Gravity or Uplift) at a given point along the length of a member.

M_y – Moment due to horizontal loading (IE Wind or Seismic) at a given point along the length of a member.

V_y – Shear due to vertical loading (IE Gravity or Uplift) at a given point along the length of a member.

P_{max} – Maximum point load at any location along member

$P_{up,max}$ – Maximum uplift point load at any location along member without engineered load path to apply load uplift load directly to the bottom chord of the header.

$R_{up,max}$ – Maximum uplift reaction at either end of member

Non-Uniform Load Equations

(SH3 and SH4 equations available December 2018)

SH5:

$$1. \frac{M_x}{3,735 \text{ FT} \cdot \text{LBS}} + \frac{M_y}{607.5 \text{ FT} \cdot \text{LBS}} \leq 1.0$$

$$2. \sqrt{\frac{M_x}{3,735 \text{ FT} \cdot \text{LBS}} + \frac{V_y}{3,600 \text{ LBS}}} \leq 1.0$$

$$3. P_{max} \leq 5,400 \text{ LBS}$$

$$4. V_{y,max} \leq 3,600 \text{ LBS}$$

$$5. P_{up,max} \leq 1,050 \text{ LBS}$$

$$6. R_{up,max} \leq 1,700 \text{ LBS}$$

SH6-SH10:

$$1. \frac{M_x}{6,010 \text{ FT} \cdot \text{LBS}} + \frac{M_y}{918 \text{ FT} \cdot \text{LBS}} \leq 1.0$$

$$2. \sqrt{\frac{M_x}{6,010 \text{ FT} \cdot \text{LBS}} + \frac{V_y}{4,645 \text{ LBS}}} \leq 1.0$$

$$3. P_{max} \leq 5,100 \text{ LBS}$$

$$4. V_{y,max} \leq 4,645 \text{ LBS}$$

$$5. P_{up,max} \leq 1,050 \text{ LBS}$$

$$6. R_{up,max} \leq 1,700 \text{ LBS}$$