**BLAST DESIGN RULES OF THUMB**

(Given: Hole depth, Rock type, and Distance to structure)

**HOLE DIAMETER (d)** = hole depth (H) divided by 5 to 10.

\[ d(\text{in}) = \frac{H(\text{ft})}{(5 \text{ to } 10)} \]  
(Typically 7)

**BURDEN (B)** = 2 to 3 times the diameter.

\[ B(\text{ft}) = (2 \text{ to } 3) \times d \]  
(Typically 2.5 X d)

**SPACING (S)** = 1 to 2 times the burden.

\[ S(\text{ft}) = (1 \text{ to } 2) \times B \]  
(Typically 1.5 X B)

**STEMMING (T)** = 0.5 to 1.0 times the burden.

\[ T(\text{ft}) = (0.5 \text{ to } 1.0) \times B \]  
(Typically 0.7 X B)

**POWDER COLUMN (PC)** = hole depth minus stemming (T), backfill (F) and decking (T_d).

\[ PC(\text{ft}) = H - T - F(\text{ft}) - T_d(\text{ft}) \]

**LOADING DENSITY (LD)** = 0.3405 times the explosive density (\( \rho \)) times the hole diameter squared.

\[ LD(\text{lb/ft}) = 0.3405 \times \rho \text{ (g/cc)} \times d^2 \]  
(or Mfg design guide)

**CHARGE WEIGHT (CW)** = powder column times the loading density.

\[ CW(\text{lb}) = PC \times LD \]

**POWDER FACTOR (PF)** = powder per hole divided by rock volume per hole.

\[ PF(\text{lb/yd}^3) = CW / (B \times S \times H / 27) \]

**SCALED DISTANCE (SD)** = Distance to structure divided by square root of the charge weight.

\[ SD(\text{ft/lb}^{1/2}) = \frac{\text{Distance(\text{ft})}}{CW^{1/2}} \]  
(Greater than 55)

**PEAK PARTICLE VELOCITY (PPV)** = 438 times scaled distance to the -1.52 power.

\[ PPV(\text{in/s}) = 438 \times (SD)^{-1.52} \]  
(Maximum expected)