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

BURDEN (B) = 2 to 3 times the diameter.
\[ B(\text{ft}) = 2 \times d(\text{in}) \text{ to } 3 \times d(\text{in}) \] (Typically 2.5 X d)

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

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

POWDER COLUMN (PC) = hole depth minus stemming (T), backfill (F) and decking (Td)
\[ PC(\text{ft}) = H(\text{ft}) - T(\text{ft}) - F(\text{ft}) - Td(\text{ft}) \]

LOADING DENSITY (LD) = 0.3405 times the explosive density times the hole diameter squared.
\[ LD(\text{lb/ft}) = 0.3405 \times \text{density(gm/cc)} \times d^2(\text{in}) \] (or Mfg design guide)

CHARGE WEIGHT (CW) = powder column times the loading density.
\[ CW(\text{lb}) = PC(\text{ft}) \times LD(\text{lb/ft}) \]

POWDER FACTOR (PF) = powder per hole divided by rock volume per hole.
\[ PF(\text{lb/yd}^3) = \frac{CW(\text{lb})}{(B(\text{ft}) \times S(\text{ft}) \times H(\text{ft}) / 27)} \]

SCALED DISTANCE (SD\textsubscript{2}) = Distance to structure divided by square root of the charge weight.
\[ SD_2(\text{ft}/\text{lb}^{1/2}) = \frac{\text{distance}(\text{ft})}{CW^{1/2}(\text{lb}^{1/2})} \] (Greater than 55)

PEAK PARTICLE VELOCITY (PPV) = 119 or 438 times scaled distance to the -1.52 power.
\[ PPV(\text{in/s}) = 438 \times (SD_2)^{-1.52} \] (Compliance)
\[ PPV(\text{in/s}) = 119 \times (SD_2)^{-1.52} \] (Expected)