Formula Sheet

Saw and Tooth Shape

\[ d \] Circular saw diameter or bandmill wheel dia. (inch)

\[ P \] Tooth pitch (inch)

\[ n \] Number of teeth

\[ k \] Kerf

\[ h \] Thickness of saw plate

\[ s \] Side clearance (inch)

\[ s_{MIN} \] Minimum recommended side clearance (inch)

\[ a \] Gullet area (square inch)

Operating Conditions

\[ N \] Shaft speed (rpm)

\[ c \] Blade (or rim) speed (sfpm)

\[ b \] Bite per tooth (inch)

\[ D \] Depth of cut (inch)

\[ f \] Feed speed (fpm)

\[ f_{MAX} \] Maximum recommended feed speed (fpm)

\[ f_{MIN} \] Minimum recommended feed speed (fpm)

Performance Prediction

\[ GFI \] Gullet Feed Index

\[ GFI_{MAX} \] Maximum allowable Gullet Feed Index

0.3 for circular saws

0.7 for bandsaws

Power Consumption

\[ E \] Estimated power required (hp)

\[ C \] Energy factor depending on wood properties

\[ C = 35 \] for North American softwoods

40 for dry fir

70 for hardwoods

Evidence from the Wood

\[ X \] Distance taken by ‘m’ bites on the board

\[ m \] The number of bites in distance X
\[ c = \frac{3.14 \times d \times N}{12} \quad \text{or} \quad N = \frac{12 \times c}{3.14 \times d} \]

\[ b = \frac{X}{m} \quad \text{or} \quad X = m \times b \]

\[ f = \frac{b \times c}{p} \quad \text{or} \quad b = \frac{f \times p}{c} \]

\[ GFI = \frac{b \times D}{a} \quad \text{or} \quad b = \frac{GFI \times a}{D} \]

\[ f_{\text{MAX}} = \frac{GFI \max \times a \times c}{D \times P} \]

\[ f_{\text{MIN}} = \frac{s \times c}{P} \]

\[ s = \frac{k - h}{2} \quad \text{or} \quad k = h + 2 \times s \]

\[ E = \frac{C \times k \times f \times D}{144} \]

**For Circular Saws Only**

\[ P = \frac{3.14 \times d}{P} \quad \text{or} \quad n = \frac{3.14 \times d}{P} \]

\[ b = \frac{12 \times f}{N \times n} \quad \text{or} \quad f = \frac{b \times n \times N}{12} \]