Correct Saw Selection and Operation

Warren Bird

Balancing Cutting Power and Saw Blade Stiffness to Improve Sawing Accuracy
Direct Measurement

- Wedging (Single Arbor)
- Offset (Double Arbor)

Indirect Measurement

- Percentage of Boards Downgraded Due to Sawing Inaccuracy
- Number of Unscheduled Saw Changes
Factors Which Influence Cutting Power

**FUNDAMENTAL FACTORS**
- Wood Properties—Specific Gravity
- Cutting Direction versus Fibre Direction

Factors Which Influence Cutting Power

**ADJUSTABLE FACTORS**
- Chip Thickness—Specific cutting energy increases with decreasing chip thickness
- Rake Angle—Power decreases with increasing rake angle
- Gullet Loading—Power increases if sawdust load is large relative to gullet area
- Tooth Dulling—Power increases with time
Factors Which Influence Saw Blade Stiffness

- Thickness
- Thermal Stress and Tensioning Stress
- Band Saw Strain

CASE HISTORY:
Increase Chip Thickness to Decrease Power

Green Triangle—Dartmoor, Victoria

**Machine:** 8-inch Vertical Single Arbor Gang

**Problem:** Excessive Wedging in 8-inch Boards

**Solution:** Number of Teeth Reduced from 30 to 22
- Sawing Power Lowered by 13 Percent
CASE HISTORY: 
Increase Plate Thickness to Compensate for Increased Number of Teeth 

Douglas Fir Mill—Oregon

Machine: Board Edger

Problem: Number of Teeth Increased from 52 to 62 for Improved Surface Finish; Saw Deflection After 2 to 3 Hours

Solution: Calculated Power Increase was 7.0 Percent
>
To Compensate, Saw Plate Thickness was Increased from .067 inch to .069 inch

CASE HISTORY: 
Material Selection for Higher Strain Load 

Douglas Fir Mills—Oregon

Machine: Twin Horizontal Band Saw

Problem: Increase Feed Rate by 25 to 30 Percent, without Increase of Kerf or Target
>
Strain Load was Increased, but Stresses Exceeded Fatigue Limit of Steel

Solution: Sandvik Multishift Steel
CASE HISTORY: Retaining Tooth Durability with Increased Hook Angle

Georgia-Pacific—Coos Bay, Oregon

**Machine:** Twelve-inch Double Arbor Gang Edger

**Problem:** Reduce Cutting Forces to Sustain Reduced Target Size for 4 Hours

- Hook Angle Increased to 34° from 30°, but Tooth Corner Wear is Rapid with 8° Top Clearance

**Solution:** Calculation Found Required Clearance to be 4°; The 4° Removed from Tooth Face was Added Back to Tooth Top

- 4 Hour Run Time is Achieved