Lumber Target Sizing
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Key Points

- Oversizing results in poor lumber recovery
- Undersizing leads to grade downfall
- What’s more important—preventing grade downfall or preventing poor recovery?
- Using a calculated target size results in good recovery with out loss of grade
Lumber Target Sizing

Calculated Target Size
Lumber Target Sizing

Target Size (TS) Model

\[ TS = \frac{FS + PA}{1 - SH} + (s_t \times z_p) \]

**FS** = Final Dry Dressed Size (in.)

**PA** = Planer Allowance (in.)

**SH** = Drying Shrinkage (decimal fraction)

**s_t** = Total Sawing Variation (in.)

**z_p** = Undersize factor (exclusion limit)
Lumber Target Sizing

Target Size (TS) Model

$TS = CMS + SA$

CMS = Critical Minimum Size (in.)

SA = Sawing Allowance (in.)
Components of Lumber Target Size

- Sawing Allowance
- Critical Minimum Size
Lumber Target Size

Critical Minimum Size (CMS)

$$CMS = \frac{FS + PA}{1 - SH}$$

FS = Final Dry Dressed Size (1.500 in.)
PA = Planer Allowance (0.063 in.)
SH = Shrinkage (5% or 0.05)
Lumber Target Size

Critical Minimum Size (CMS)

CMS = \frac{1.500 \text{ in.} + 0.063 \text{ in.}}{1 - 0.05}

FS = \text{Final Dry Dressed Size (1.500 in.)}

PA = \text{Planer Allowance (0.063 in.)}

SH = \text{Shrinkage (0.05 in.)}
Lumber Target Size

Critical Minimum Size (CMS)

\[ CMS = \frac{1.563 \text{ in.}}{0.95} \]

\[ CMS = 1.645 \text{ in.} \]
Components of Lumber Target Size

Sawing Allowance

- Oversizing
- Shrinking Variation
- Planing Allowance
- Finished Size
Lumber Target Size

Sawing Allowance (SA)

\[ SA = S_t \times Z_p \]

\( S_t \) = Total Sawing Variation (std. deviation)
\( Z_p \) = Undersize factor (exclusion limit)
5% Undersize

-1.65s_t
Lumber Target Size
Sawing Allowance (SA)

Why use 5% undersize?

To take advantage of lumber grading rules (5% off grade)
Lumber Target Size

Sawing Allowance (SA)

\[ SA = s_t \times z_p \]

\[ = 0.031 \text{ in.} \times 1.65 \]

\[ = 0.051 \text{ in.} \]
Lumber Target Sizing

Target Size (TS) Model

\[ \text{TS} = \text{CMS} + \text{SA} \]

\[ \text{CMS} = \text{Critical Minimum Size (in.)} \]

\[ \text{SA} = \text{Sawing Allowance (in.)} \]
Lumber Target Size

Calculated Target Size (TS)

$$TS = 1.645 \text{ in.} + 0.051 \text{ in.}$$

$$TS = 1.696 \text{ in.}$$
Target Set Reduction
Target Set Reduction Example

What is the Improvement

- Original target set = 1.750 in. (2 inch dimension)
- New target size = 1.696 in.
- % improvement = \((\frac{1.750 \text{ in.} - 1.696 \text{ in.}}{1.750 \text{ in.}}) \times 100\)
  = \(0.054 \text{ in.} \div 1.750 \text{ in.} \times 100\)
  = 3 % increased recovery