SAWTech 2005
Sawing Technologies to Improve Mill Performance

Sawing Machine Centre Evaluation

Louw van Wyk, Sawmill Productivity Solutions

Productivity ratios:
Quantity or value of output for a given quantity of input

- Labour Productivity:
  - sawn production per man-hour
- Raw-material Productivity:
  - sawn production per ton of log
- Capital Productivity:
  - sawn production per $ invested
SAWMILL PRODUCTIVITY TOOLS

• Random Activity Sampling
• Digital Video Time Studies
• Sawlog Simulation and Saw Pattern Evaluation
• Sawmill Optimisation
• Mill Flow Dynamics
• Other Monitoring Tools
• Calibration and Correction Factors

Random Activity Sampling
### Random Activity Sampling

**Date:** Location: Observer:  
Number of machine centres: 6  
Time between observations: 3 Minutes  
Start time: 8.0 Hours  
Finish time: 16.0 Hours  
Duration: 480.0 Minutes

#### Work

<table>
<thead>
<tr>
<th>Time</th>
<th>Machine Working</th>
<th>Normal</th>
<th>Not Scheduled</th>
<th>Waiting for Input</th>
<th>Outfeed blocked</th>
<th>Machine Adjustment</th>
<th>Active Maintenance</th>
<th>Break</th>
<th>Scheduled Break</th>
<th>Accident</th>
<th>No operator</th>
<th>Manual Interruption</th>
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<td>8:00 a.m.</td>
<td>3</td>
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#### Random Activity Sampling

**Minutes per Shift:**
- Working Normal
- Not Scheduled
- Waiting for Input
- Outfeed blocked
- Machine Adjustment
- Active Maintenance
- Broken/Walked
- Scheduled Break
- Accident
- No operator
- Manual Interruption

**Activities**
Random Activity Sampling.

Lost Time Analysis

- Waiting for Input: 8%
- Outfeed blocked: 2%
- Working Normal: 90%

Digital Video Time Studies

- Break-points must be defined
- Easy to do
- Accurate
- Video can be played back frame by frame
- All frames are numbered to give accurate cycle times
Sawlog Simulation and Saw Pattern Evaluation

Have standards for:
- Processing time
- Conversion %
- Machine demands
- Value recovery
  for each log type and each sawpattern

Simulated Volume Recovery using Actual Log Shapes
(SED, LED, Length & Sweep)
**Sawmill Optimisation**

Use SOLVER in Excel Spreadsheet

Remember the ABC’c of Optimisation:
- **A** Adjustable cells.
- **B** Best cell.
- **C** Constraints.
- **D** Data block.

## SPREADSHEET SOLUTION USING SOLVER

<table>
<thead>
<tr>
<th>RESOURCES</th>
<th>TOTAL</th>
<th>TOTAL</th>
<th>SCALED</th>
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<tr>
<td>TYPE</td>
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<td>UNITS</td>
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<tr>
<td>LOGS</td>
<td>CONSTRAINTS</td>
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<tr>
<td>P1 450-mm</td>
<td>($200)</td>
<td>($17,841)</td>
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<tr>
<td>P2 350-mm</td>
<td>($150)</td>
<td>($15,000)</td>
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<td><strong>SUM</strong></td>
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<td>189</td>
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<tr>
<td>TIMBER</td>
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<tr>
<td>CLEAR 1&amp;2</td>
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<td>FACT &amp; SHOP</td>
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<td>NO 1&amp;2FRAMING</td>
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<tr>
<td>MACHINES</td>
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<tr>
<td>SORTER PIECES</td>
<td>($10,000)</td>
<td>($10,000)</td>
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<td><strong>MAXIMISED OBJECTIVE:</strong></td>
<td>$22,164</td>
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<td>Conversion %</td>
<td>58.4%</td>
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SawTech 2005
Mill Flow Dynamics

• Draw mill flow in terms of:
  – Process
  – Merge
  – Sort

• Watch out for Merge nodes as they can cause re-occurring delays
**Other Monitoring Tools**

- Statistical Quality Control
- Use Simple rules.
- Instead of Complicated Mathematics use the out of control rule of 7:
  - Seven readings above the line
  - Seven readings in a row going down (or up)
  - Seven readings below the line

Thickness Board #13a23
45mm Gauged Nominal, 51.5mm Target

Thickness (mm)

Savings Potential by Reducing Sawkerf

Savings $ per Year

Machine Centre

Machine Centre

SLABBER  HEADRIG  HORI  GANG  EDGER

$300,000  $250,000  $200,000  $150,000  $100,000  $50,000  $0  ($50,000)
**Calibration and Correction Factors**

- Measuring equipment must be calibrated from time to time.
  - Check electronic calipers every 3 months
  - Check digital multimeters every year. Replace battery when warning sign shows.
- Correction factors may have to be applied to compensate for season or log resource.
Take Home Message

- Keep studies simple
- Involve staff at all levels
- Use the studies as an opportunity to identify literacy and numeracy training needs
- Help staff to improve skills