Harvest Optimisation – A case study of HFM NZ Northland

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Catalyst for Change

- HVP presentation on the value recovery work that included the introduction of optimisation software in processing machines.
- Difficult environmental conditions, small skid size, lack of available labour for expanding harvest and terrain.
- Already had the basics in place for mechanical log making to use the optimisation software
  - Already had the machines and some already had the software
  - Could get going with little cost involved by upgrading
- Making sure that operators have the best tools to maximise value.
- Ability to capture real time data on actual production by grade and reconcile against Pre Harvest Inventory.
Software Options

- The software has been available for some time in the form of John Deere/Waratah’s TimberRite system.
- Optimisation software hasn’t been used to full potential in New Zealand as it has in Scandinavia where Harvest Optimisation was developed and implemented over 25 years ago.
- Optimisation software is not confined to John Deere/Waratah.
- Komatsu Forest (Valmet), Ponsse and Southstar have developed their own harvester optimisation systems using the Dasa software.

General Setup of Optimisation system

- The Forest Owner/Manager needs to work out the number of grades (assortments) being cut.
- These need to be divided into groups defined by specific log characteristics:
  - Knot size
  - Sweep, Wobble
  - Spike knots, Nodal swelling
  - Ovality etc
- This creates the 8 quality groups (A to H) to associate all the log grades (assortments) to.
- Create an APT file (cut plan) with grades (assortments) ranked to reflect priority/value.
Quality Characteristcs

SOFTWOOD OPTIMISER LOG QUALITY CODE

<table>
<thead>
<tr>
<th>DEFECT</th>
<th>1 QUALITY</th>
<th>2 QUALITY</th>
<th>3 QUALITY</th>
<th>4 QUALITY</th>
<th>5 QUALITY</th>
<th>6 QUALITY</th>
<th>7 QUALITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knots</td>
<td>No Knots</td>
<td>5 cm</td>
<td>7 cm</td>
<td>10 cm</td>
<td>12 cm</td>
<td>20 cm</td>
<td>Unlimited</td>
</tr>
<tr>
<td>Wobble</td>
<td>SED/6</td>
<td>SED/1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multiple Sweep</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sweep</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spike Knot</td>
<td>X</td>
<td>14 cm</td>
<td>20 cm</td>
<td>No Restriction</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quality</td>
<td>10 cm</td>
<td>SED/10</td>
<td>10 cm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nodal Swelling</td>
<td>X</td>
<td>5 cm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

There are 8 quality groups available,
This example just uses 7.

Quality and Grades (Assortments)
The operator uses the quality buttons like a simple MARVL description of the log they are cutting.

This is not a TimberTech/AVIS approach to log making.

The stem is NOT described before the log making begins.

The process is a partnership between the operator and the computer.

Operator judges sweep, branches and other defects and selects the relevant quality button.

The operator has over ride options to change length/grade of each log.

More variation in the stem means more work for the operator.
Advantage to the Forest Owner/Manager

- Grades produced are those that are on the current cut plan for any given period of time.
- Increased production – for the duration of the trial, average production was 108% across 3 crews.
- Log Value Recovery (LVR) is comparable to manual log making.
- Mechanised log making will consistently produce accurate results over a full day.
- More logs produced to specification, more quickly with an improvement in value recovery.
- Improved LVR due to machine cutting to minimum Small End Diameter (SED).
- Optimiser function works on value as opposed to the operator who works on length and volume.

Advantage to the Forest Owner/Manager

- Optimiser is continually learning from previous stems processed and predicts the best grade and length mix based on taper information, but recalculates if taper differs.
- Less rejects identified.
- More production information is available on a daily basis
  - Detailed information on grades (SED, length and grade mix)
  - Creation of information about the forests in real time which aides reconciliation
- If you have new equipment the chances are the system is already on board.
- All manufacturers use same data standard – StanForD
- One piece of software will create cut plans and read production files.
Example of Data – Grade Distribution

Example of Data – Length Distribution
Example of Data – SED Distribution

Advantage to the Operator/Contractor

- Reduced operator fatigue
  - Physical - less wrist/hand strain. Less button pushing.
  - Mental – operators not having to constantly think about log making options.
- Improved production.
- Improved operator quality scores during audits.
- Given the choice, operators would not change back to the manual system they had come from.
Can processors produce accurately?

- Machines can cut to length and SED provided all the settings are correct.
- There are 3 settings that need to be correctly set up and maintained
  - Overall calibration – Length and SED
  - Butt log factor
  - Topping saw factor
- Bi-annual Warrant of Fitness checks to check the settings above, various other settings and check the operators knowledge of the machine functions.

Summary

- The software has been available for 25 years and was developed and implemented in Scandinavia.
- If you have new machines operating, chances are they already have this system.
- Going forward, this system is likely to be more common on new equipment.
- There are benefits for both the forest owner/manager and the operator/contractor.
- Increased production and value recovery.
- Given the choice no operators would change back to the manual system they came from.