



Alternate Scaling and Scanner Scaling Implementation

By Bruce Moran, Interfor BC

Introduction

- Today, the need to reduce costs in all aspects of our business is more critical than ever.
- The timber profile of the West Coast of BC has been transitioning from a dynamic old growth type to a homogenous second growth type of stand.



Introduction

- Interfor realizes that the status quo is not an option if we intend on being a viable industry in the years to come.
- Innovative and out of the box thinking, is what we believe, will help us transition successfully into a future of second growth timber.
- Second growth timber provides many different opportunities for cost efficient processes to sorting logs to mill specifications and scaling to determine volume.

- I am going to talk to you today about some of these scaling methods we have tried in the past.
- I am going to talk about some processes that we are currently utilizing.
- I am going to talk about our process of implementing the use of log scanner technology to determine volume for Ministry submission.

Past alternate scaling methods

Top Scaling

- This method was used a few years ago.
- The process was as follows:
 1. Presort loads to mill specification.
 2. Construct booms with the bundles of presorted logs.
 3. Have scaler scale all logs that are visible in each bundle.
 4. Have scaler estimate the percent of logs that were scaled in each bundle.
 5. Prorate the volume scaled to the entire bundle based on the estimate scaled.

Past alternate scaling methods

Top Scaling

- Scaler measures 10 logs at 8.123m³.
- Scaler estimates he measured 20% of the entire bundle.
- Volume for this one bundle would be 40.615m³.
- Each bundle in the boom would be scaled using this method.
- This method did help reduce the cost of scaling.....however, as you can imagine this method did not produce consistent or very accurate results.



Past alternate scaling methods

Piece Averaging

- This method was used a few years ago.
- The process was as follows:
 1. Presort loads to mill specification.
 2. Scaler count pieces as truck is being loaded.
 3. Randomly select 1:7 loads to be scaled.
 4. Scale selected sample load in order to establish an average volume per log.
 5. Determine log volume average for all samples collectively.
 6. Multiply the established average log volume by total number of logs cut off in the boom.

Past alternate scaling methods

Piece Averaging

1. Log average in all samples.
 - Total pieces scaled = 174
 - Total volume scaled = 178.369m³
 - Average volume per piece.
 - $178.369 / 174 = 0.976\text{m}^3$
2. Volume in boom.
 - Total pieces in boom = 1475
 - $1475 \times 0.976\text{m}^3 = 1439.600\text{m}^3$



Past alternate scaling methods

Weigh Scaling

- Weigh Scaling is a widely utilized method of determining volume.
- The volume is determined by converting the weight of the log to volume.
- The common process is as follows:
 1. All trucks stop at a weigh station.
 2. Weigh master enters information about the load into the weigh scaling system. E.g. Population, stratum, year, timber mark, block and other info pertaining to the load hauled.
 3. Gross weight is recorded.
 4. System determines if load is a sample load or not.
 5. Load is scaled if it is a sample or added to inventory if it is not a sample.
 6. Truck is weighed again empty to determine net weight of the logs.
 7. Volume is calculated by multiplying the weight of the wood by the weight to volume ratio determined by the samples.

Past alternate scaling methods

Weigh Scaling

- This process of determining volume works very well.
- It is a cost effective method of scaling in many situations.
- Most efficient with large populations and stratum.

Interior operations

- This process works well for our BC interior operations.
 - Loads are hauled direct to the mill.
 - The mill is established as a the weigh station.
 - Large population and stratum volumes allow a sampling ratio that promotes efficient scaling.

Past alternate scaling methods

Weigh Scaling

Coastal operations

- Coastal operations present some challenges that greatly reduce the efficiency of weigh scaling.
- Remoteness of operations.



Past alternate scaling methods

Weigh Scaling

Coastal operations

- Challenge of multiple weigh stations.
- Requires weigh master at each site.
- Cost of installing weigh scales at multiple sites.



Past alternate scaling methods

Weigh Scaling

Coastal operations

- Mode of transportation.
- All loads are transported by water in booms to various mills.



Past alternate scaling methods

Weigh Scaling

Coastal operations

We established a central weigh scaling station in order to address these issues.



Past alternate scaling methods

Weigh Scaling

Coastal operations

We installed a weigh bunk at this central dry land sort.



Past alternate scaling methods

Weigh Scaling

Coastal operations

- This process did provide some cost saving.
- However the costs of dewatering every load and re-booming was significant.



Current alternate scaling methods

Volume Sampling

- We looked at the information gathered from the weigh scaling efforts.
- We thought..... What if we sampled the booms just as we did in a weigh scaling program but didn't weigh them at all?

- We tested this theory based on the data collected.
 - We took all the samples produced for a single stratum.
 - Calculated an average volume per sample.
 - Multiplied the average by the total number of weighed loads.
 - We found that the volume calculated using this method was within 1.5% of the volume calculated using the weigh scaling method.

Current alternate scaling methods

Volume Sampling

- We established a procedure for this method and proposed it to the MOFR.

Points that are critical to the success of Volume Sampling

1. Presorting must meet mill specifications.

- Chip and saw – 6” to 8” top diameter.
- Gang – 8” to 12” top diameter.
- Standard – 12”+ top diameter.

2. Loads must be consistent in volume.

- Weigh scales on trucks.
- Painted line on truck bunks.
- Logs bucked to consistent lengths

3. Samples must be selected randomly.

4. Samples must be scaled accurately.

Current alternate scaling methods

Volume Sampling

- The MOFR has accepted our proposal and has developed procedures that we follow today.
- The MOFR procedures mimic the weigh scale procedures with the exception of the weighing event.
 - All loads are entered into an approved weigh scale program.
 - This program allows us to submit load information to the MOFR just as we do in a weigh scale operation.
 - The weight of each load is predetermined.
 - Sample selection is done by the weigh scale software.
 - The standard deviation is now the variation of volume of the samples not the variation in weight to volume.

Current alternate scaling methods

Volume Sampling

Benefits to this method

- We do not have to place a scaler or weigh master in each operation.
- We do not have to install scales in each operation.
- We do not have to dewater the entire boom at a central scaling site.
 - We only dewater the samples at the central scaling site.
- Sample ratios are currently about 1:11.

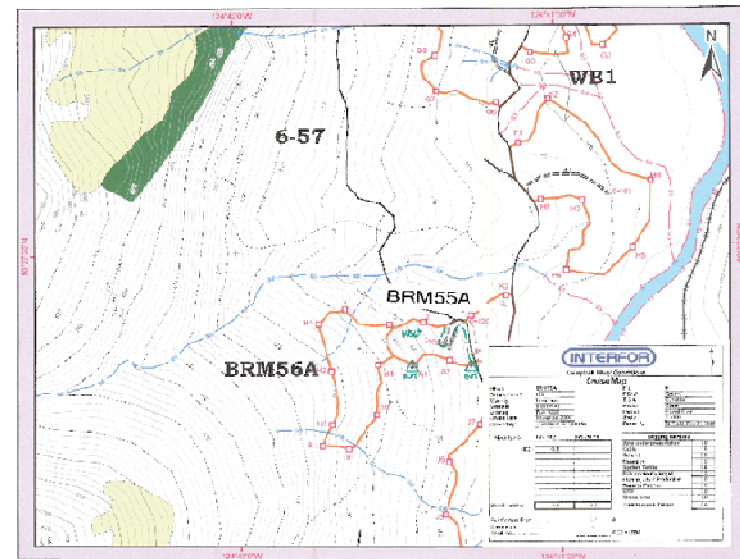
Current alternate scaling methods

Cruise Based Scaling

Timber Cruising

- All areas of operation are timber cruised.
- Location of plots are pre-established within a cutting permit area.
- Collected data is used for internal proformas.
- MOFR uses this information as one factor for determining stumpage rate.

- From this data collected summary information about species, MOFR grades, stem height and stem diameter is compiled.
- The information compiled is adequate for this purpose.

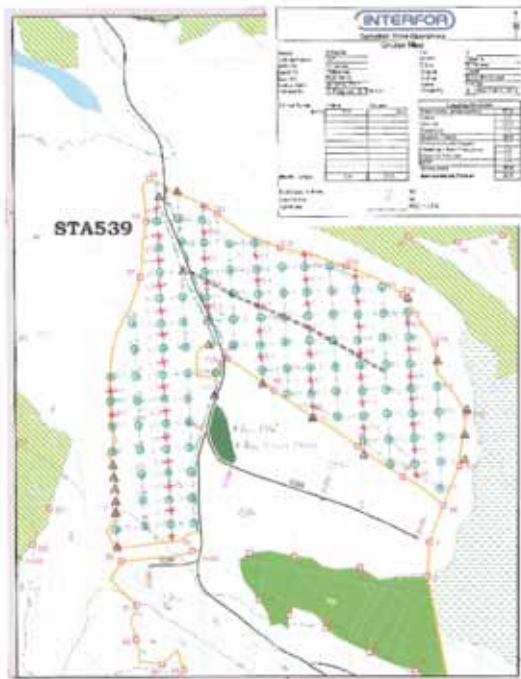


Current alternate scaling methods

Cruise Based Scaling

Timber Cruising

- If we increase the number of plots the information becomes more accurate and reliable.



- We have been able to submit this more accurate information to the MOFR in order to determine total stumpage due.
- Stumpage is paid before a single tree is felled.

Current alternate scaling methods

Scanner Scaling

A few year ago.....

- I had a conversation with one of our logging engineers.



Current alternate scaling methods

Scanner Scaling

- Over the years the mills had often reported fluctuating LRF.
- I started to look at what was going on with the reported scale volume.
- There were some occasions where booms were not cut off accurately.
- I then looked at the scaling practices. In particular the increments in which BC Metric scale is based on.

Current alternate scaling methods

Scanner Scaling

BC Metric Scale

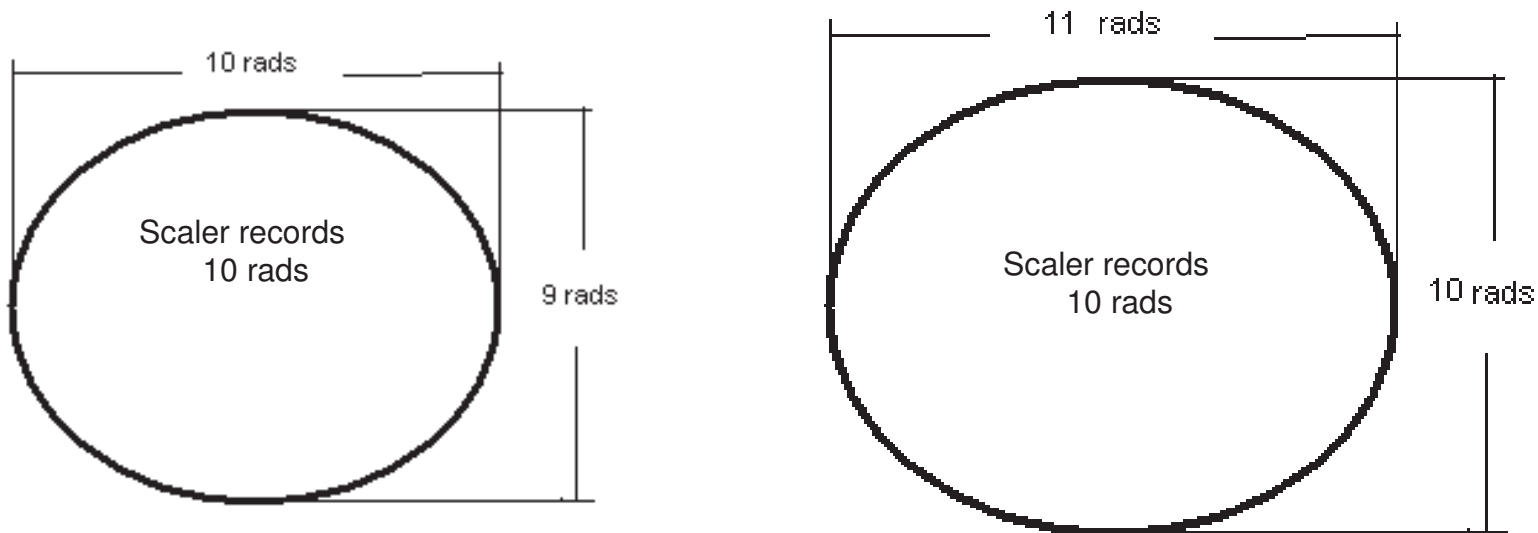
- This scale is a volume scale.
 - No consideration for sweep, checks etc.
- Scalers measure the top and butt diameter.
 - The units of measurement are called rads (2cm).
- Scalers measure the length.
 - The units are decimeters.

Current alternate scaling methods

Scanner Scaling

BC Metric Scale

- We do not have the option for recording half rad measurements.
- Scalers round half rad measurements to the nearest even rad.

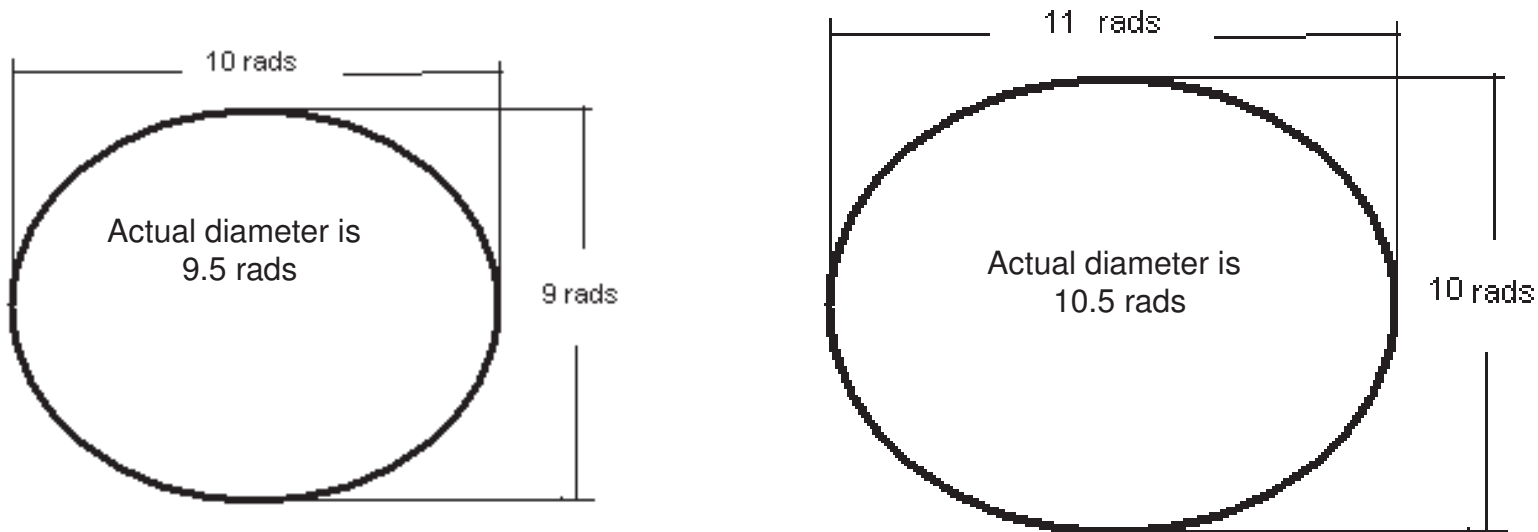


Current alternate scaling methods

Scanner Scaling

BC Metric Scale

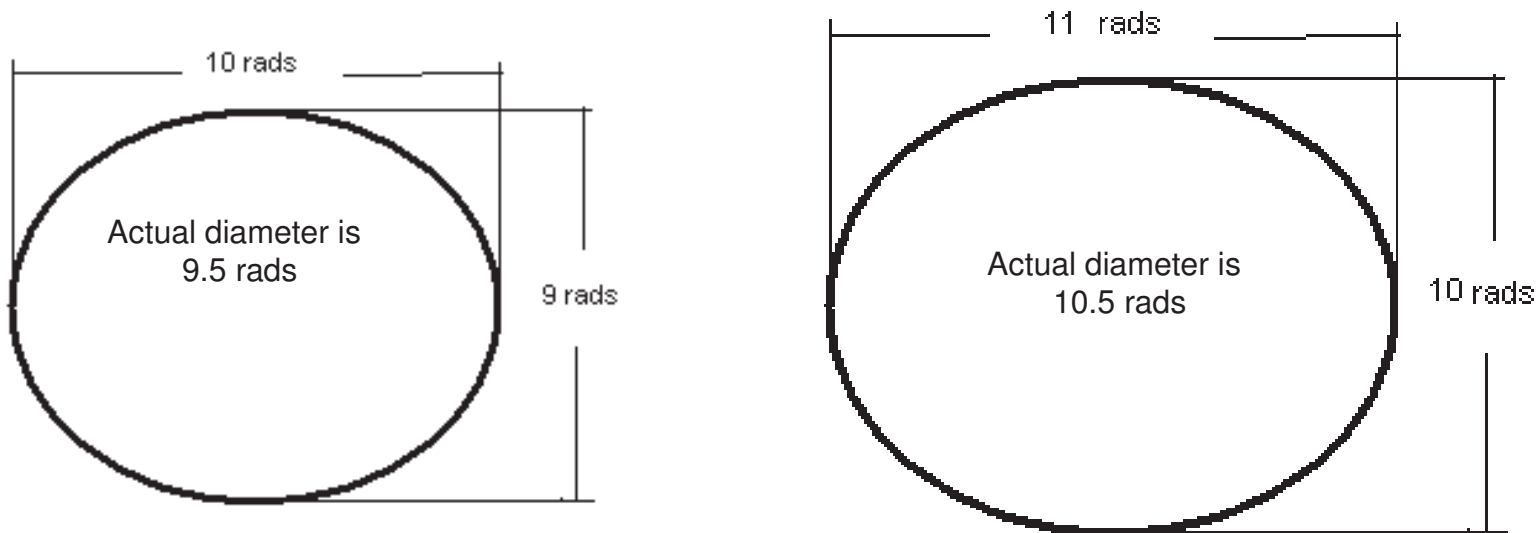
- The actual volume in these two examples is very different.



Current alternate scaling methods

Scanner Scaling BC Metric Scale

- Theoretical logs
 - $125 \times 9.5 \times 13.5 = 0.535\text{m}^3$
 - $125 \times 10.5 \times 14.5 = 0.628\text{m}^3$
 - Difference of 0.094m^3 (18%)
 - The recorded volume would be 0.581m^3



Current alternate scaling methods

Scanner Scaling

- The volume reported was correct using the BC Metric Scale.
- The increments upon which it was based caused some fluctuations in volume and therefore LRF.

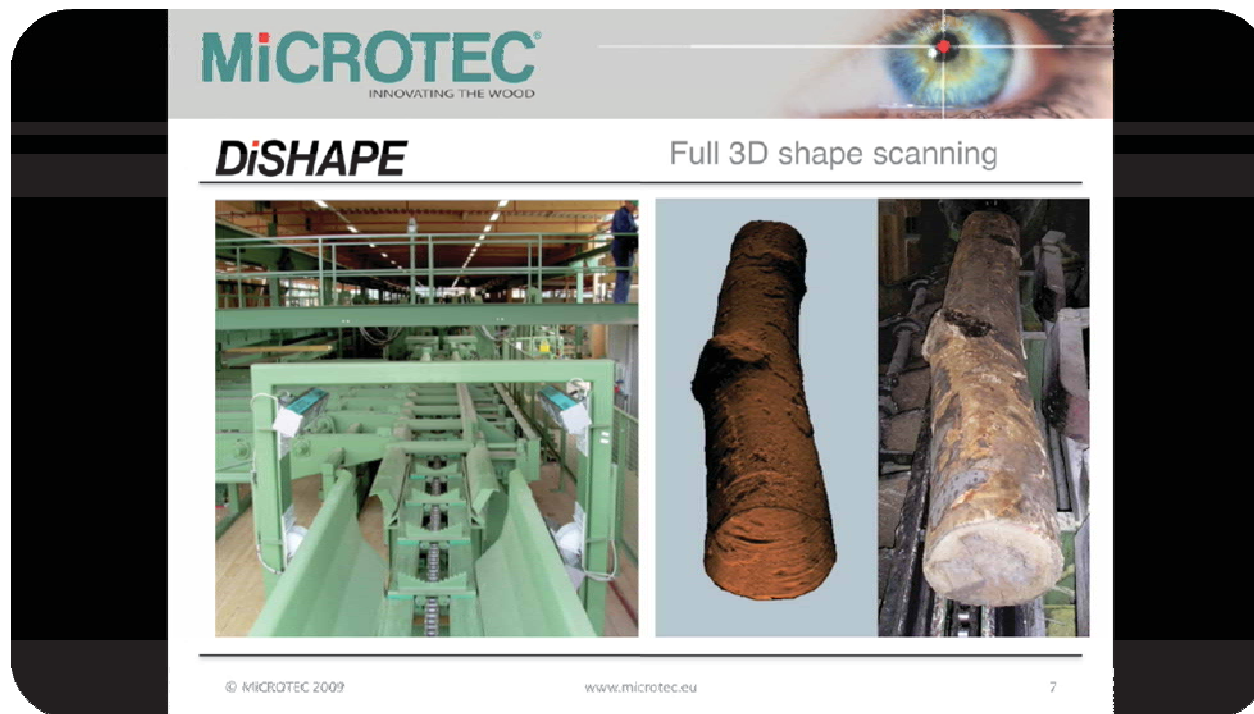
Scanner Advantage

- Measuring in smaller increments would give a more accurate volume calculation.
- Less handling of logs and booms is more cost efficient.
- We approached the MOFR with the concept of scaling by scanner and they embraced the concept.

Current alternate scaling methods

Scanner Scaling

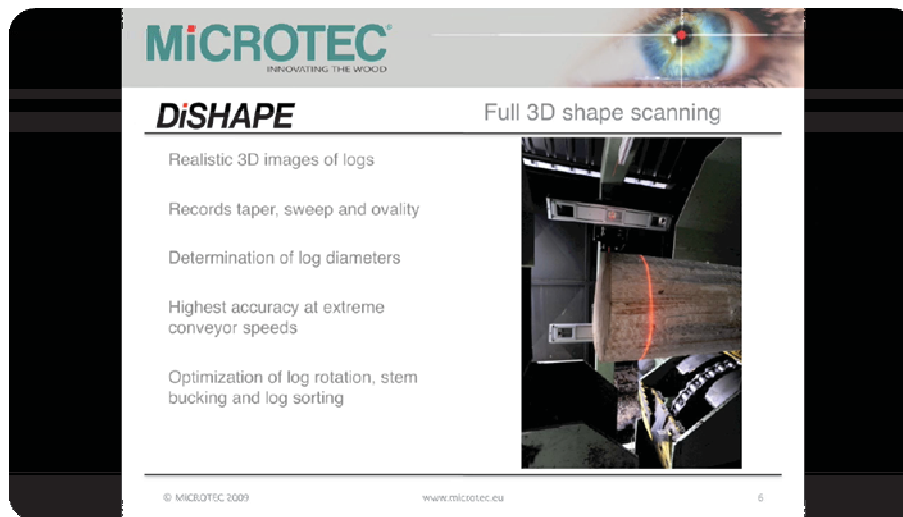
- The scanner system that was utilized at Acorn mill, was not adequate for the task of scaling logs for MOFR submission.
- On the scene appeared our friends from Microtec.



Current alternate scaling methods

Scanner Scaling

- Based out of Italy, Microtec has become experts in the electronic evaluation of logs to lumber.



MICROTEC
INNOVATING THE WOOD

DiSHAPE Full 3D shape scanning

- Realistic 3D images of logs
- Records taper, sweep and ovality
- Determination of log diameters
- Highest accuracy at extreme conveyor speeds
- Optimization of log rotation, stem bucking and log sorting

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Current alternate scaling methods

Scanner Scaling

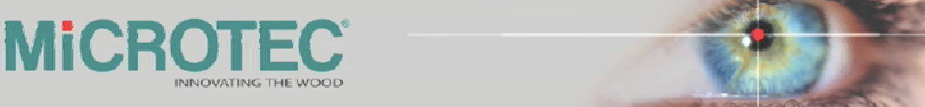
- We now have installed at Acorn Sawmill, a Microtec six head true shape scanner



Current alternate scaling methods


Scanner Scaling

- This unit measures the diameter every 1cm along its length in increments of 1mm.
- Length is measured in increments of 1cm.



DiSHAPE Full 3D shape scanning

- Realistic 3D images of logs
- Records taper, sweep and ovality
- Determination of log diameters
- Highest accuracy at extreme conveyor speeds
- Optimization of log rotation, stem bucking and log sorting



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Current alternate scaling methods

Scanner Scaling Implementation

- Difficult concept for many of us to wrap our heads around.
 - Scanner is simply an electronic scaler.
 - Take out the human eye, scale stick and handheld computer.
 - The scanner does all of these actions simultaneously.

Current alternate scaling methods

Scanner Scaling Implementation

- There are 6 groups involved to integrate the scanner technology.
 1. Coastal Woodlands of Interfor.
 2. Acorn Sawmill.
 3. Microtec.
 4. Interfor IT.
 5. Interfor log supply.
 6. Ministry of Forest and Range.

Current alternate scaling methods

Scanner Scaling Implementation

➤ Coastal Woodlands of Interfor

- Must deliver logs to the mill that are on spec.
- Selecting the right contractors, operations and cut blocks are critical to the success.



Current alternate scaling methods

Scanner Scaling Implementation

➤ Acorn Sawmill

- The mill now becomes an official log scaling station.
- An audible log handling process must be developed and maintained.
 - Accurate boom cut offs.
 - Boom information entered without errors or omissions.



Current alternate scaling methods

Scanner Scaling Implementation

➤ Acorn Sawmill

Boom Boat Operator Responsibilities

- Call cypress operator and inform him when starting a new boom
- Give the cypress operator the new boom number.
- It is very important to get a clean cut off.
- Ensure all logs from previous booms have been processed before starting new boom

Cypress Operator Responsibilities

- Inform Barker operator last log on the deck.
- Inform Barker operator and cut-off saw operator with radio.
- Give both operators new boom number

Barker Operator Responsibilities

- Run all logs out from previous boom on log deck.
- Inform cut-off saw operator when last log is in loaders to cut-off.
- Barker operator must wait until cut-off operator has entered all the new boom information.

Cut-off Saw Operator Responsibilities

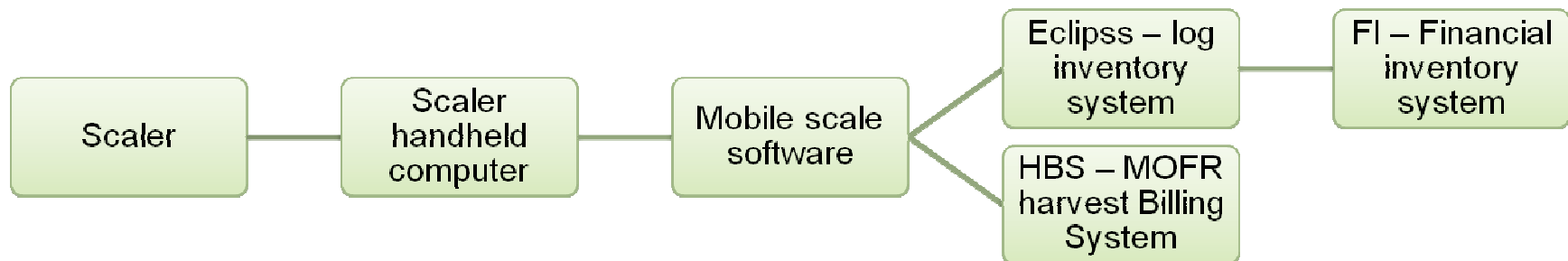
- Enter all new boom information into computer from cut sheet.
- Boom Number, type of boom, Cubic meters, and operator's name.
- If for some reason the boom number is not on the cut sheet he must notify the shift Supervisor or the Chargehand.
- Inform Barker operator he can now run logs thru the barker.

Current alternate scaling methods

Scanner Scaling Implementation

➤ Microtec and Interfor IT

Current scale data handling process



Current alternate scaling methods

Scanner Scaling Implementation

➤ Microtec and Interfor IT

- Multiple different data modules to each computing system.

Microtec

- Data collection module
- Optimizing module

Interfor

- Acorn optimization
- Eclipss log inventory
- Financial Inventory

MOFR

- HBS- Harvest Billing System

Current alternate scaling methods

Scanner Scaling

➤ Current status of implementation

- We are able to produce booms to mill specs.
- We have procedures in place to perform auditable cut offs at the mill.
- We have a scanning device in place and operating.
- We have contractor support.
- We have MOFR support.

Still many things to do.....

- Data flow needs to be worked out.
- Data formats and increments are different. Decisions need to be made on this.
- Canada Weights and measures approval.
- Ultimately MOFR approval.

Conclusion

- Top scaling
- Piece average scaling
- Weigh scaling
- Volume sampling
- Scanner scaling
- All of these methods employ the idea of presorting logs to mill specification.
- By utilizing the capabilities of our contractors and equipment we are able to significantly reduce sorting and scaling costs.

Conclusion

Future

We envision scanner technology will become widely utilized as the primary method of determining volume for many operations on the BC Coast and beyond.....

Conclusion

