SENSITIVITY OF THINNING COSTS TO
EQUIPMENT, SITE & STAND CONDITIONS

by

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o Good Morning!

o Stuart & I would like to thank you for asking us to participate in this
timely & interesting meeting.

o One of the inherent dangers of being at the end of a program is, of
course, that what we have to say has already been said - but worse than
that - said better!

o However - We will give you our thoughts on the sensitivity of thinning
costs to equipment, site & stand conditions and let the chips fall where
they may - sorry, no pun intended!

o In a word - The sensitivity is fantastic!

o The question becomes - Why?

o Sensitivity to thinning costs can be attributed to the method of
thinning employed, the system used & most importantly to the size of the
trees harvested.

o Let's look at these.

METHOD OF THINNING

o The method of thinning employed will, to a large extent, determine the
size of the trees which will be harvested & the difficulty of their re-
moval.
For example - Let's look at true selective thinning or thinning from below:

- Here our objective is to improve the quality of the residual stand - The situation can best be described by quoting Howard Hanna of Container Corporation of America who once said - "Selective Thinning is like giving a hungry man a plate of English peas and a dull fork - and asking him to eat every other pea on the plate and not disturb the others"

- Selective Thinning requires the very careful removal of a relatively large number of extremely small trees with a minimum of disturbance to the residual stand.

- On the other hand, if we mechanically thin by removing entire rows in plantations, or cut corridors through natural stands to reduce basal area and enhance growth, we will remove a certain percentage of the dominant and co-dominant trees and make the job somewhat less difficult.

- In either case, we are talking about harvesting trees which will probably average less than 6" DBH, and will more likely average 5" DBH or less, and this is our basic problem!

Let's look at what this means in terms of trees per unit of production:

- Trees 4" DBH contain 1.12 cu.ft/tree and run 80 trees/cord.
- 5" DBH trees contain 2.31 cu.ft/tree and run 39 trees/cord.
- 6" DBH trees contain 3.91 cu.ft/tree and run 23 trees/cord.
If we carry this one step further, we can state that:

- 70 good 4" trees are equal to 10 average 8" trees.
- 102 poor 4" trees are equal to 10 average 8" trees.
- And, if we assume that poor 4" trees have a merchantable height of 12 feet, then one quarter of a mile of stems must be handled to harvest a cord of wood!

I suggest again that our basic problem in thinning is to harvest small trees in a confined area. Now let's look at harvesting systems.

**HARVESTING SYSTEMS USED**

- Our system alternatives appear to be an either or situation.
- They can be manual or mechanical.
- Each system has its advantages and disadvantages.
- I would like to illustrate these with some slides.
- Lights please

**SLIDE BOB-TAIL SYSTEM**

- The bob-tail truck system for the production of pulpwood from clearcuts and thinnings served us well when
  - There was an oversupply of good labor at minimum wage.
  - Minimum equipment was chainsaws, igloo coolers and Pepsi-cola trucks.
  - Good weather and favorable terrain.
- It is a viable method and can be used today.
  - If the terrain permits.
  - If you can find a willing producer
And if the price is right.

And there are good reasons.

**SLIDE FELLING RATES**

Chainsaw felling rates in terms of trees/hour in the smaller diameters are high.

- The time to cut a 4\" tree is considerably less than for an eight inch tree.

- No undercut is needed.

- There is little need for brushing out, or planning

- And because of their weight little felling damage.

**SLIDE - Fig. 3**

This pattern of felling rates results in production rates which varies linearly with diameter.

- The result is that the impact of volume per tree is lessened.

- Similar relationships occur in limbing, bucking and hand loading.

**SLIDE: Busch combine**

- Now: Let's look at mechanical systems.

- First attempts were to replace the bob-tail truck and produce shortwood at the stump. The bush combine worked best in clearcuts and could row thin

**SLIDE - TH 100**

The TH-100 and TH-105 could row thin and thin adjacent rows.

**SLIDE - TH 210**
The TH-210, a marriage of front half of the TH 105 and rear of the combine could row thin and thin adjacent rows

PROPST

Then along came the PROPST - up to 3 trees/min.

- Each of these machines had one common characteristic - have you picked it up?
- All trees were processed in a linear fashion!
- Were they sensitive to diameter? You better believe it!
- Remember the quarter of a mile of 4" trees to get a cord?

VFB -

First attempts to produce tree lengths carried trees on their back - like the VFB.

ROW 30

The RW 30 - felled and limbed and carried

BOB-CAT

Then we discovered we could carry trees vertically.

Joe Blonsky at-HRP developed the first S.A. Allen shear and the concept of felling and bunching and we were off like a herd of turtles.

- The early feller bunchers sheared and carried one tree at a time.
  We dubbed them tree-to-tree feller bunchers. We could selectively thin now.

- Now, the first tree to tree machines all had commonality - the best they could do was about two trees/minute.
Were they sensitive to diameter?

Yes sir - in 4" trees production was about 1 1/2 cords/worked
hour in 8" trees production was about 12 cords/worked hour.

As Sam Coughren of Rome Industries said - What a difference a tree
makes! Obviously - something had to be done.

JOHN DEERE

The next step of course was accumulative shears.

Rates jumped from 120 trees/worked hour up to 200-240 trees/worked
hour which helped.

TJ 30

The latest idea took a leaf from Canada's book and we have the
prototype TJ 30 - a feller-forwarder - a very fast row thinner -
one pass

WESTVACO

And then, as John Allen said, we can go full circle and combine
the best of the manual system - highly skilled workmen and cable
yarding to reduce the damage to the stand.

Lights please.

In summary, ladies and gentlemen - If you want to thin, it can physically
be done with either manual or mechanical systems.

The impact of diameter is not as great with manual systems.

The impact of diameter and height on mechanical systems is horrendous.

So what of the future?
Continuous feller-bunchers or continuous feller-forwarders which only pause to dump their loads are next.

So what are our conclusions?

1. There is no mechanical equivalent to the bob-tail truck.
2. Save your paint - marked thinnings are out.
3. Row, swath and corridor thinnings are in.

**UNFORTUNATELY THERE IS NO FREE LUNCH.**

One word on that - Personally, I think thinning is TSI and should not be classed as a harvesting cost.

If you accept this idea, then thinning costs may be acceptable.

It is difficult to justify thinning costs if you are not in a wood tight - Open market wood is cheaper.

Thank you!

Any questions?