

CURVE SAWING

Larry Guenther
Plum Creek Timber Company
Colville, WA

Curve sawing is not a new technology. There are, and have been numerous systems developed to saw on the contour or sweep of the log. Sawing on the curve dates back to the early 1900's when it was developed to make chair and wheel parts.

There have been a number of patents issued for curve sawing. Generally these were based on the premise of a curve linebar, roll system, or a combination of rolls and linebars.

The system Plum Creek's Arden operation is using was developed by U.S.N.R. and uses both rolls and a linebar on a linear positioner. The U.S.N.R. System has a scanner, a canter and two gang saws, an 8" and a 12" double arbor. This does two things, it scans the log to recover the most wood fiber and determines the best continuous arc for that log. The system cants, or opens the log on a continuous (tangent) arc to minimize bending the saw while in the cut. The scanner also determines which gang to route the cant to and positions the positioning pins at the infeed of the gangs.

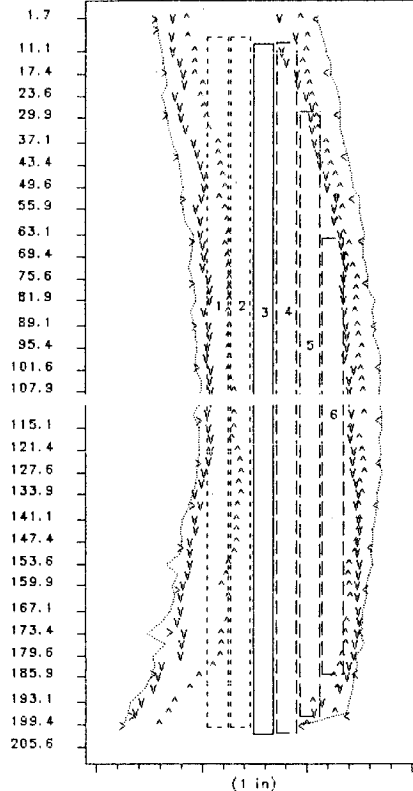
Why go to Curve Sawing? What are the advantages and disadvantages?

With the available log supply decreasing and the logs that are available becoming smaller, it is necessary to manufacture the log so as to recover all available fiber. Being able to saw logs on the curve allows recovering more of the log into longer useable lengths. It also allows for sawing more closely to the grain of the log which reduces warpage when drying plus the moisture content is more consistent the full length of the board. Without curve sawing, the log needed to be bucked in shorter pieces to reduce the sweep, or the log had to be squared up by sawing off the "horns" on one side and the "belly" on the other side to be able to get a piece of lumber with enough length. Once the log was squared up, the board now had heartwood on both ends if sawn from the "belly" side (Figure 1). By following the contour or closely to the contour of the log, the moisture content is more consistent the length of the board.

By sawing the same log as in Figure 1, on the curve or arc of the log, we not only get longer and more lumber, but we get lumber that is cut more consistently along the same moisture content of the log. There will still be some difference in moisture between the edge and middle of the piece (Figure 2).

You will notice on Figure 1, when the log was straight sawn, the volume of lumber recovered was 41.3 board feet, but when the log was sawed on the curve (Figure 2) the volume of lumber increased to 46.5 board feet; a 12.6% (text continued on page 28)

V = Top Face, ^ = Bot. Face, > = Left Side < = RightSide | = SubSet LenCells
 Plot Size = 3.9 by 8.9 (in), Width = 1 / 4, Length = 1 / 24.



Piece Nb: B

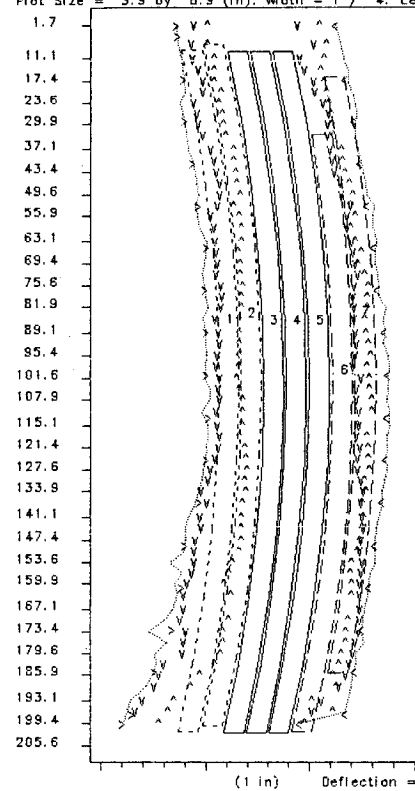
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Nb	Description	Length
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3	4/4x6 8.0	16'
4	4/4x6 8.0	16'
5	4/4x6 7.0	14'
6	4/4x6 5.0	10'

41.33 BF

FIGURE 1. Log sawed conventionally. 41.3 board feet of lumber were recovered.

V = Top Face, ^ = Bot. Face, > = Left Side < = RightSide | = SubSet LenCells
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Nb	Description	Length
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3	4/4x6 8.0	16'
4	4/4x6 8.0	16'
5	4/4x6 8.0	16'
6	4/4x6 7.0	14'
7	4/4x3 3.5	14'

46.5 Bd F

FIGURE 2. Same log sawed on the curve. 46.5 board feet of lumber were recovered, a 12.6% increase from Figure 1.

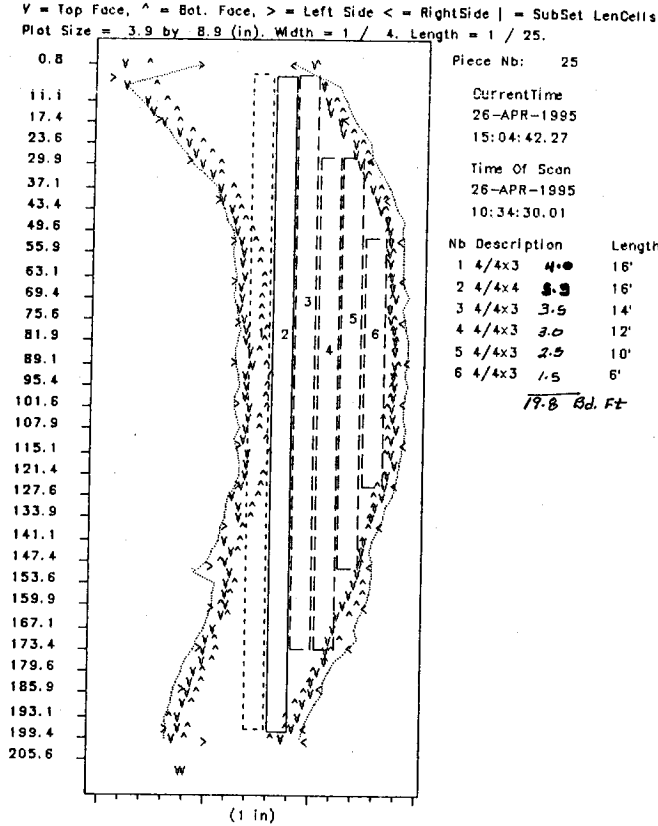


FIGURE 3. Smaller log sawed conventionally. 19.7 board feet of lumber were recovered.

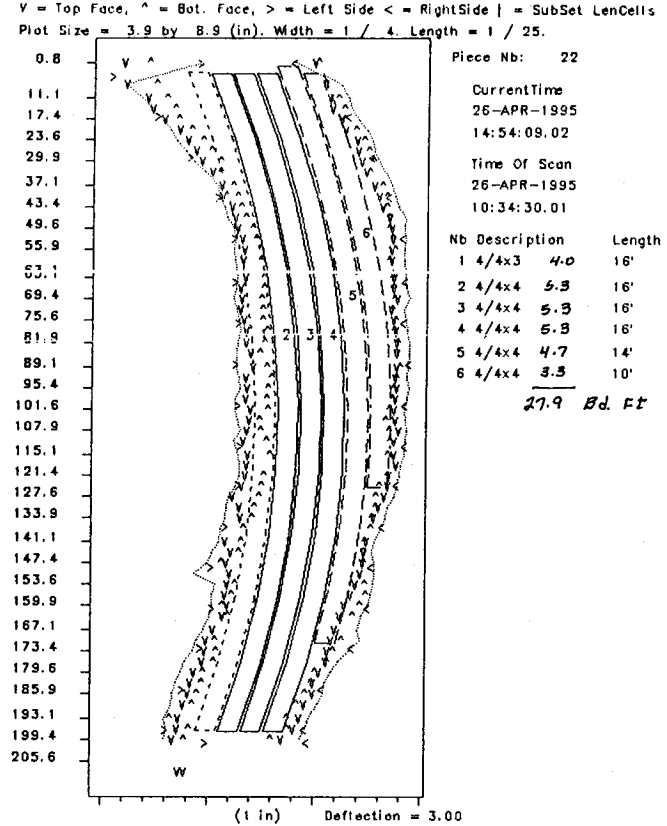
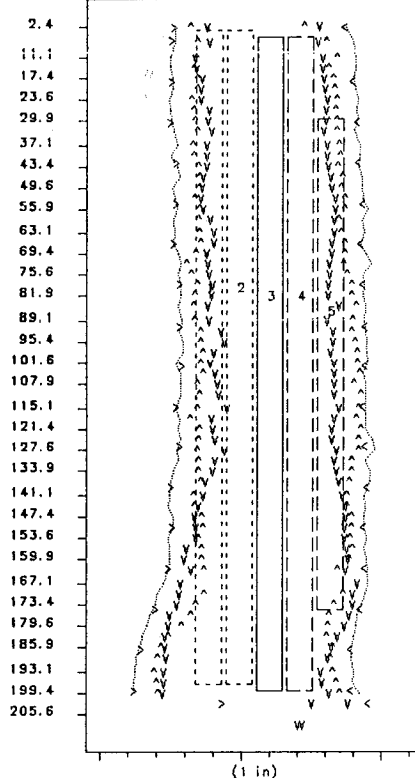


FIGURE 4. Same log sawed on the curve. 27.9 board feet of lumber were recovered, a 41.6% increase from Figure 3.

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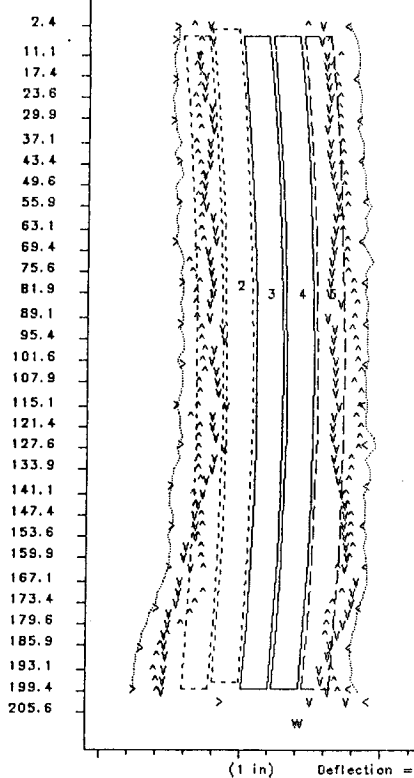


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Nb	Description	Length
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3	4/4x4	16'
4	4/4x4	16'
5	4/4x3	12'

Bd Ftge 23.0

v = top face, ^ = bot. face, > = Left Side < = RightSide | = SubSet LenCells
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Nb	Description	Length
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3	4/4x4	16'
4	4/4x4	16'
5	4/4x3	16'

Bd Ftge 24.0

FIGURE 5. Log with only 0.5" of curve, sawed conventionally.

FIGURE 6. Same log sawed on the curve. There was only a 4.4% increase from Figure 5 due to the small amount of sweep.

V = Top Face, ^ = Bot. Face, > = Left Side < = RightSide | = SubSet LenCells
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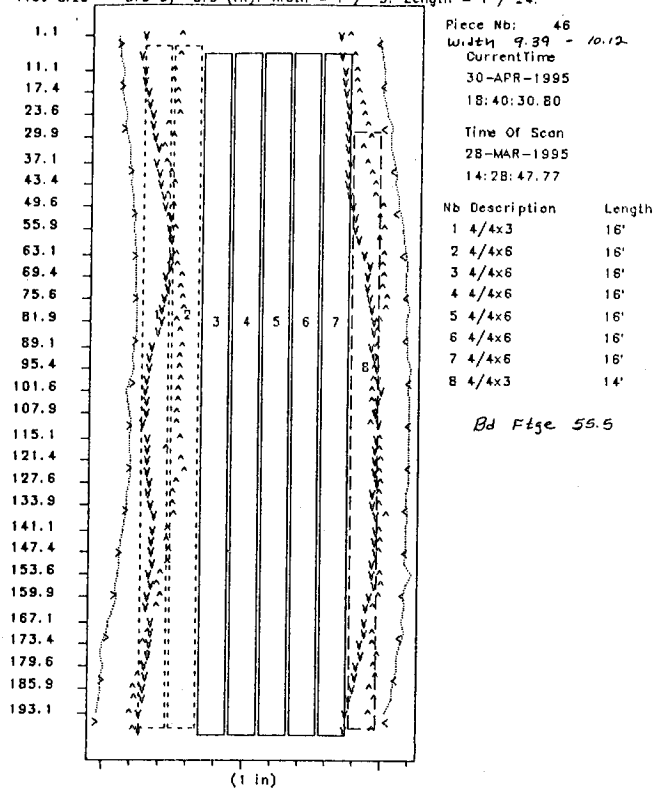


FIGURE 7. Log with only 0.37" of curve, sawed conventionally.

V = Top Face, ^ = Bot. Face, > = Left Side < = RightSide | = SubSet LenCells
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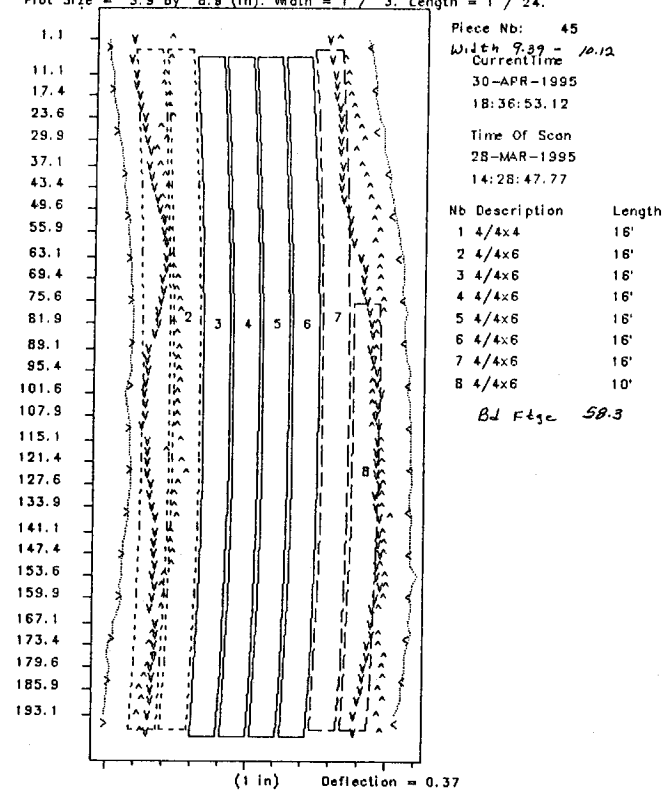


FIGURE 8. Same log sawed on the curve. There was only a 4.4% increase from Figure 7 due to the small amount of sweep.

increase. This log had a curve or deflection of 1.84 inches over 16 feet. Figures 3 and 4 show a smaller diameter log with a curve of 3 inches over 16 feet. The board footage on the straight sawn log was 19.7 versus 27.9 board feet when sawed on the curve. An increase of 41.6%. Keep in mind that not every log has this much sweep in it. Figures 5 and 6 are a 4" cant, 6.5" wide with a .5 curve and the increase is 4.4%. Likewise, figures 7 and 8 are a 6" cant, 10" wide with .37 inches of curve and the increase is 5%. Of the logs we process, 54% have no sweep; 26% less than 1 inch; 13% from 1 inch to 2 inches and 7% over 2 inches (Figure 9).

As far as disadvantages, there have been very few. The life of the saws are shortened some because of some bending. There can be problems with the boards loading on lugs downstream if there is much curve. This has been a very minor problem. Even though the log is sawn on the curve, the lumber has a tendency to lay flat. By the time the lumber is dried and surfaced, there is no indication that it was sawn on the curve.

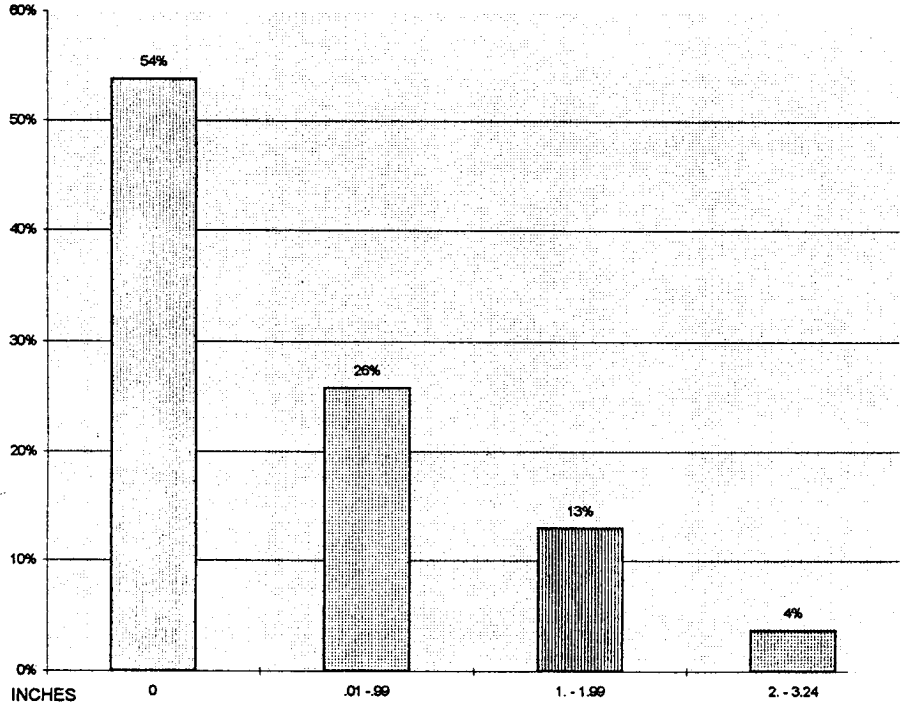


FIGURE 9. Percent of logs in mix (vertical axis) having sweep a given amount of sweep (horizontal axis).