

# **Hardwood Lumber Quality Control Plan**

Designed by Ken Lucas, NHLA hardwood lumber grader

[www.tsiwood.com](http://www.tsiwood.com)

This plan was developed to provide lumber buyers, or sellers, with a statistically backed formal protocol to use to check the quality and quantity of large numbers of hardwood lumber packs. Determining the presence and extent of problems with processed lumber, in a timely manner, is important in order to allow lumber buyers, or sellers, an opportunity to resolve the problems before there is a loss of business credibility. Utilizing this quality control protocol could provide the buyer/seller two benefits:

1. A consistent quality control program that would demonstrate fairness to the other party. Using a statistically backed, consistent protocol is important in the event that it becomes necessary to reject a lumber shipment or assess a dollar penalty. Maintaining a formal quality control program reduces the likelihood of irresolvable conflicts between buyers and sellers.
2. I have based this quality control plan on the use of a weighted random selection process, known as 3-P, to determine which lumber packs get checked. Since 3-P is a weighted random selection process, more of the quality control effort will be spent sampling the higher value lumber products. 3-P allows a much more efficient use of a limited sampling budget, while still **maintaining an unbiased, statistically-supported selection process.**

## **Potential lumber problems:**

1. Lumber packs do not contain the stated board foot (BF) quantity of wood, as indicated on the packs by paper tags or barcodes.
2. Lumber packs contain more than the minimum acceptable amounts of lower grade boards.
3. Lumber packs that contain significant numbers of mis-cut boards, or boards with mechanical damage incurred during transport.
4. Boards within lumber packs exceeding the maximum allowable moisture content.

## **Quality control procedure.**

1. My 3-P computer sampling program must be set up with the following information-

- 1) The best estimate of the total amount of lumber packs produced or received in a specified “quality control period”. The length of the quality control period can vary from a day to a month, depending on the amount of packs produced or received in that period of time and the amount of money budgeted to sample some of the lumber packs for problems.
- 2) The make-up of each lumber pack (this information is generally noted on paper tags attached to the ends of each pack). The information about each lumber pack must include the total board footage of the pack, the wood species, and the lumber grade.
- 3) The dollar value that the buyer or seller specifies for each lumber species, grade, and product.

My 3-P sampling program calculates an approximate dollar value for each of the entered lumber packs and makes a random selection, weighting the higher dollar value packs more for selection. All of the lumber packs selected in this first selection process are designated for “A”-level checks. Each of the previously selected lumber packs is then entered into the 3-P program a second time. All of the lumber packs selected during this second selection process are designated for the more expensive “B”-level quality control checks. The specific checks made on the lumber for the two levels of quality control samples are:

- 1) “A”- Each board in the pack should be quickly scaled, using a lumber scale stick, to determine its volume (BF). All of the board volume figures should then be summed to calculate an actual total volume for the pack. The skills necessary to make this level of checks is minimal, requiring only training in the use of a lumber scale stick.
2. “B”- Each board should be scaled for volume and graded. An estimate should then be made of what percent of the boards in the pack have some form of mechanical damage, such as gouges from fork lift mishandling, etc... Finally, one board each, from the top layer, middle layer, and bottom layer should be checked for percent moisture content with an electronic moisture meter. The moisture content check may require trimming each board into two shorter boards. The skills necessary to collect the information in this level require a formally trained hardwood lumber grader.

2. All of the lumber packs selected for sampling should be stored in a temporary location, separated from other lumber, until enough packs accumulate to justify an efficient quality control effort.
3. The collected data from both levels of sampling checks should then be tabulated to determine the percent of problems. Since these problems will be detected on lumber randomly selected through an unbiased process, all of the other, unsampled lumber packs can be expected to have the same percentage of problems. A quality control report can then be prepared to allow managers to resolve the problems in some appropriate manner.

### **An example of how this program might work.**

A lumber distributor receives 4 truckloads of lumber per month from a sawmill supplier of various lumber products, ranging in value from \$1,000 to \$3,000 for each lumber pack. The distributor would like to make level "A" samples on 12% and level "B" samples on 3% of all of incoming lumber products. Since the distributor is really concerned about the packs worth \$3,000 each, he would prefer that more of his quality control budget be spent checking those high value packs, but the selection method still needs to be unbiased.

Assumptions:

- One truckload = 30 packs of lumber, with each pack containing approximately 1,000 BF of lumber products. 4 truckloads \* 30 packs per load = 120 packs of lumber arriving at the distributor's lumber yard each month. My 3-P program could be expected to select approximately 12 lumber packs for level "A" and 4 additional packs for level "B" sample checks on each month.
- One sawmill worker would require 2 hours to break down a lumber pack, scale all of the boards, and re-assemble the pack. The sawmill worker cost is \$30 per hour (inc benefits). 2.5 man-hours \* \$30 \* 8 lumber packs = \$600.
- Assisted by a sawmill worker, I would require approximately 1.5 hours to Break-down a lumber pack, scale, grade and make moisture checks on 3 boards in each pack. My cost is \$50 per hour.

$[(2 \text{ hours of my time} * \$50) + (2 \text{ hours of sawmill worker time})] * 4 \text{ lumber packs} = \$720$

I would require 2.5 hours of office time to generate the quality control report.

Possible travel charges for my time not included in this example.

**The total (approx.) cost of this quality control program =  
\$1,500 per month.**