

REBUILDING A KILN

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Introduction

Simpson Timber Company in Shelton, Washington is the largest softwood lumber producing sawmill in North America, with an annual production over 350,000,000 bd/ft of dimension lumber. Simpson dries about 75% of the lumber on an annual basis, (262,000,000 bd/ft). The 75% represents kiln capacity limitations not market opportunities.

The dry kiln department consists of 6 double track kilns; 2-Hemco 108' double tracks, 2- Ronan 104' double tracks and 2 Hildibrand 64' double tracks. In 1995, due to increasing market opportunities in kiln dried lumber, Simpson started looking at what opportunities were available for additional drying capacity. The baseline that was used for desired production results was performance results from our two Hemco 108' double tracks. The Hemco kilns dry hemlock in the 35 hour range.

Our preliminary studies indicated that two of the four kilns would require major modifications to achieve an annual drying time average of 35 hours, but a 10% reduction in drying times was achievable through a less expensive and complicated project. The other two kilns were cost prohibitive to invest into due to the design and capacity of the kilns. Simpson made the decision to proceed with a project on Kiln #3 (104' Ronan) based on a 10% reduction in drying times.

Step one: the problems are identified

Historical data indicated drying performance was negatively impacted with higher green moisture content type lumber (hemlock) and increasing wet weather conditions. Increased drying time trends were noted starting in late October through the middle of April.

Air circulation system was determined as being inadequate for drying higher green moisture content lumber. Average air velocity studies indicated air velocities in the 400 to 500 fpm range. This was due to several design and mechanical problems identified during the study.

- a. Fan motors were undersized -- 7 ½ hp.
- b. Fan blades were an older four blade design type.
- c. Fan shrouds were a straight lip ring type.
- d. Fan tip to shroud clearance averaged 1 ¼".

The venting system was not an efficient system. The system was a butterfly type design and calibration of vents was very difficult. Vent lids were a single plate design, not designed for proper sealing required for high production drying.

Historically Kiln #3 had averaged 52 hours on hemlock at 95% uptime during the time between October through April. The data also indicated that only hemlock wifes could be dried in this kiln. With a 10% decrease in hemlock drying times and uptime static we could dry 2.5 additional charges of lumber per week. Referring the Hemco kilns and fan curve charts we were able to determine how much air flow was required and what types of improvements were needed on the venting system to achieve this task.

Step two: determining a cost effective solution

It was determined that an air velocity of 800 plus was required to do the job. We determined that 10 hp motors with a 6 blade adjustable pitch fan and a new bell fan shroud/motor base assembly would allow us to achieve the desired air velocity and rectify the fan tip to shroud clearance problems. A larger than 10 hp motor would indeed do the trick but with using the 10 hp motors we could use the existing electrical system, which was a substantial savings in project cost and kiln downtime.

A conventional 21x21 vent opening setup on a linear linkage system would work the best for our requirements. The 21x21 vent lid assembly would fit into the existing vent openings. This would allow us to not disturb the roof panels, basically simplifying the installation process on the new vent system.

Bids were sent out to selected vendors and contractors. The project was scheduled as a 72 hour turn around from shut down to start up. With vendors and contractors selected, we proceeded with project.

Step three: the installation

The project went as scheduled; Crews were working around the clock and no major problems with installation were experienced. As all projects seem to go, we were ahead of schedule half way through the project and ended up about 5 hours late on start up due to some small unforeseen issues. Overall, the installation went very well; no one was injured, all of the parts were shipped and they fit with only minimum modifications. Kiln 3 was loaded with lumber and fans tuned. Initial velocity readings indicated air velocities in the 850 -900 fpm range.

Step four: does it work as well as planned?

As with any capital project the success of the project comes with the bottom line results..... does it meet the benefits as indicated in the project scope. Kiln 3 has been drying all widths of hemlock at an average time of 43 hours since the project in September of 1996. Payback on project cost was realized in less than 6 months. Kiln 6 is currently being reviewed for a similar project.