EMBRACING DEVELOPING TECHNOLOGIES

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Introductions

From the onset of the startup of the Cowlitz operations we have seen a tremendous amount of ownership and team spirit in our operations. This has led to safety, quality and production in every facet of our manufacturing process. Productivity went beyond forecasted predictions and drove the division toward new possibilities. It also created some challenges from a drying standpoint, to support the team's innovational process and address immediate production demands. We had to explore projects that would enhance our ability to keep up with the accelerated pace of production. From a drying standpoint we have 22 double track kilns and five boilers located at four facilities. Two are on site drying facilities and two are off site drying facilities. The offsite facilities support the excess product that cannot be dried at the onsite facilities. We knew that all of our boilers were producing at their peak. We were limited on steaming capacity. This then, meant we had to explore a means to maximize our conventional drying. So, we needed a plan of action that would enhance our current kiln and boiler resources. We knew increasing boiler capacity would involve tremendous cost, an extensive permitting process and thus too much time to meet the immediate demands of the division.

Our goals were to find ways to increase our current drying capacity. We considered the cost associated with increasing our boiler capacity. New capital investment to replace our existing boilers would require an extensive engineering and permitting process, not to mention some huge capital. With the inception of retooled sawmills already utilizing capital resources, our current commitments needed time to prove themselves. With these boundaries established in our conventional process we needed to consider an alternative solution. We chose to find solutions, by looking at new technologies. The RF kiln was the solution to our needs.

We then considered the opportunities that this technology would bring into the drying arena. We found it very viable to increase our conventional kiln throughput. The process we embraced would be to pull our conventional kilns at higher moisture content targets, produce a targeted percentage of wets that would be dropped out at the planer in-feed and repackaged in a solid pack for drying, using the RF kiln. This process would increase our conventional kiln throughput, better balance the kiln production with the sawmills production, and eliminate kiln wets with the RF drying process. The result would be to produce a more uniform product recovery with a higher market value.

The next phase of the process involved product capitalization realities. With this RF kiln process we had a huge grade recovery opportunity. Much of our product that we would have lost in the conventional drying process we now had the opportunity to recover as premium product. In preliminary studies we found that a large percentage of our wet product was premium grade! We just needed a process to capture that product. The other opportunity we realized in this process was the reduction of target sizes in the mill. Because we could pull the kilns at a higher moisture contents meant less shrinkage and more uniformity. Which, opened up more recovery options in the sawmill.

Our research and development process involved three key components. 1. A wet analysis of the product for potential grade recovery maximization. 2. The identification of an optimum conventional kiln recovery point m/c target. 3. The ability to utilize Heatwave's demonstration kiln to prove out our ideas. We broke down wet bundles to explore the grade recovery opportunities prior to the drying process. This helped us to establish a baseline for recovery and let us know our full recovery potential. We identified manufacturing defect, as well as biological and physical defect. We were then able to track this wood through the kilns to break it down and correctly identify all the fall down caused by the drying process. We were also able to see the influence of different moisture content targets on our grade recovery. We were then able to identify what has become the optimum kiln recovery point or optimum kiln m/c target. We then solid packed some of our wet product and sent it to Heatwave's demonstration kiln in Crescent Valley B.C. to see the effect and results of our own wood in this process. This helped us to establish an acceptable "wet target", so we could then forecast our wet production and begin the logistical process of handling that product for the RF kiln.

Based on this information we were able to identify the needed capacity of the RF kiln and establish the processing requirements of this product. The first thing we needed to do was to establish an inline wet board drop out system. We needed something that would handle the forecasted amount of wets efficiently in a production environment. We installed a tipple-gate right after the breakdown hoist at the planer so we could capture the product rough and solid pack it for the RF kiln. Prior to the tipple-gate is an inline moisture meter to identify the wets and drop them out. We tied this into a PLC to control the tipple-gate drop out system. We also installed a un-scrambler and a stacker to produce loads for the RF kiln.

These "solid packs" are then brought to the RF kiln to be loaded in the chamber. The RF kiln has an in-feed and out-feed system capable of holding the capacity of a full kiln charge. So while we are drying a charge we can be building a charge on the in-feed and unloading a charge on the out-feed. The RF kiln is a vacuum chamber that utilizes radio frequency waves to cause friction in the water molecules. Which in turn creates heat and causes the wood to dry.

Under vacuum we can reduce the boiling point of water to 85 degrees Fahrenheit. This in turn causes vapor pressure in the wood and the release of the water from the wood. The vacuum then pulls this water vapor through a condenser and the water drops out at that point. That water is then pumped to our wet scrubber pond at the boiler. We have a kiln capacity of 40MFBM per charge in our RF kiln with cycle times averaging 11 hours per charge. The dry RF product is then reintroduced at the planer in-feed along with the rough on sticks as part of our normal production process. By controlling the "mix" of solid packs into the planer we can also optimize our wood flow to achieve a higher level of efficiency through the planer. This has been a huge success for us and a great enhancement to our conventional drying process.