ADVANTAGES OF AN IN-KILN
MOISTURE MEASUREMENT

Trevor Yasbek and Dave Haney
Accudry
Anapolis, Maryland

A new generation of In-Kiln moisture measurement systems has been available for dry kilns for three to four years now. During this time a significant number of systems have been installed and the actual benefits of the system have become obvious to the operators. The emphasis has moved from "Does the system work?" and "How accurate is it?" to "What benefit will be achieved from using such a system?". The object of this paper is to show how different locations and kiln configurations have benefitted from using In-Kiln moisture measurement. Each location has experienced different benefits, some expected and some unexpected.

SITE A:

This site has a number of single track kilns drying at high temperature and short cycles. The end result was a high percentage of over dried lumber. This lumber caused a number of delays in the planer mill due to stoppages caused by feed jams. Once the In-Kiln system was installed the kilns were shut down at a preset moisture content to eliminate over drying. This not only improved the grade recovery but one of the main benefits was that the available planer mill run time was increased to such an extent that additional shifts were no longer required to keep up with the dry kilns.

SITE B:

This site has a large number of double track dry kilns. Each charge was checked using a "hot" checker before pulling the charge. This was often done two to three times per individual charge. Once an In-Kiln moisture system was installed the need for hot checks was eliminated. The benefit was that the kiln throughput was increased from 85-90 charges per month to over 110 charges per month. This represents an increase of 20% in capacity, equivalent to having an additional dry kiln available.

SITE C:

A lack of experienced drying personnel was causing a lot of drying issues on this site. An In-Kiln moisture system was installed together with a computerized kiln controller. This allowed a high level of automation and minimal staff input. The system was fine tuned to shut off at a preset moisture content and all the schedules were preset for size and type of lumber. This allowed the kiln operators to run the kiln relying solely on the kiln controller and the In-Kiln moisture system. Not only did this eliminate the drying issues it enabled the mill to dry shop lumber using the same resources. This resulted in a significant increase in revenue for the mill and solved the problem of skilled drying personnel at the same time.
SITE D:

A number of different kilns of different age and different manufacturer type are installed on this site. The different drying characteristics of these kilns was such that the planer operators were able to tell exactly which kiln had dried a particular charge from the way it ran through the planer. After an In-Kiln moisture measurement system was installed the planer operators were no longer able to tell in which kiln the charge had been dried. The dried lumber was uniform and consistent with the added benefit of improved grade recovery.

SITE E:

One of the main benefits of an In-Kiln moisture system is the improved grade recovery that can be achieved with such a system. On average most mill sites achieve an average increase of 2% by installing an In-Kiln system with some reporting as much as 5-6% increases in grade recovery. The financial benefits of improved grade recovery is significant to the extent that in time of low lumber prices it can mean the difference between maintaining profitability or closing down. This was the case two and a half years ago when many mills in the South East claim it is unlikely they would still be in business today, if it were not for the improved grade recovery achieved using an In-Kiln moisture measurement system.

These are just some examples of the benefits experienced by different sites. Each site will have a number of benefits from In-Kiln moisture measurement systems. This will range from improved grade recovery, shorter drying times with increased kiln throughput to improved safety conditions by eliminating the “hot” checks.

How to maximize the benefit of your In-Kiln moisture measurement system.

From the above examples different sites experience different advantages. Each site is different and often has its own unique arrangements. To maximize the benefit from your In-Kiln system the first step would be to have the system tied into the kiln controller. A computerized kiln control system is almost essential at this stage.

The condition of the kiln is also important. Often the In-Kiln system will indicate that some maintenance of the kiln is required. Bad baffling, leaky door seals, incomplete loads and the rest of the usual suspects need to be eliminated.

Once all of these have been addressed fine tune the drying schedules in conjunction with the moisture system to achieve consistent results at the end feed moisture meter.

Once enough experience has been gained it should be possible to drive the drying schedule based on moisture content rather than time. A good control system will allow this. A moisture driven schedule is far preferable to a time driven schedule particularly after fiber saturation has been reached.

Integrate the system with the rest of the drying process. The In-Kiln system is a useful tool only if it is used and the more it is used and integrated into your drying process the better it will work for you.

The availability of reliable in-kiln systems coupled to effective kiln control systems removes a lot of the guess work from the drying process. In particular it will enable high quality lumber to be produced on a far more consistent scale than before. The proof of this
is that no dry kiln operation that has successfully integrated an In-Kiln system into their operation would like to work without it.

What has become clear is that the future of kiln dried lumber will be dependent on an effective In-Kiln moisture measurement system. Evaluate the available systems, speak to existing owners of In-Kiln systems and choose wisely.

A note on Kiln Controls and suitability for In-Kiln moisture systems. At present there are two main types of kiln controls in operation.

A) Pneumatic Recorder Controller.

These have no computer to interface with and require a stand alone In-Kiln moisture system. The main benefits will be that the kiln can be shut off when the desired moisture content is reached and improved grade recovery. The general trend is to change these controls for a computerized type controller. With adequate care and attention good quality lumber can be produced with these controls and a stand alone In-Kiln moisture measurement system. In the long term these systems will be replaced by PC/PLC type controls.

B) Computerized Kiln Controllers.

These controllers normally consist of a PC interface and PLC to control the kiln. This system is ideal for In-Kiln moisture systems that can interface with the PC/PLC system. This allows automated kiln shut off and moisture driven schedules to be run by using the data fed from the In-Kiln moisture system. Combining this with a paging or equivalent communications system allows a high level of flexibility in the entire kiln operation by maximizing grade recovery and optimizing kiln running operations.

Benefits

Improved grade recovery
Reduced drying cycle times
Consistent moisture contents
Improved kiln utilization
Easier kiln operation
Reduced lumber degrade

How to maximize the benefit of an In-Kiln moisture system

1. Use a computerized controller.
2. Keep the kilns in good condition.
3. Fine tune the drying process.
4. Integrate with the drying process.

Quality

The system will allow consistent quality lumber. Remember: there is always room for improvement, even with an In-Kiln system.