LINKING AND ANALYZING DATA SOURCES
FOR KILN-DRIED LUMBER

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Problem Statement

There is a lack of integration and communication between key equipment in the kiln drying application.
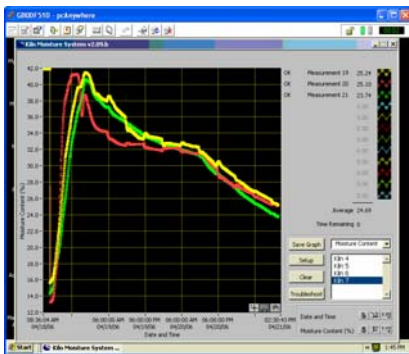

Key data sources that could and should be linked:
- kiln controller
- in-kiln moisture meter
- sawmill moisture meter
- planer mill moisture meter
- automatic grading equipment

Working towards implementing solutions that link all these sources together:
- DryTrend
- Pro-Trac

Signature and NMI Strategic Partnership

Signature Controls has produced in-kiln moisture meters since October 2005. They are widely in use: the installed base is approximately 100 kilns and growing rapidly.

NMI produces saw-mill and planer mill moisture meters noted for superior accuracy. Temperature compensated for improved performance in all types of weather.

Other Signature-NMI Business Relationships are COE, NEWNES, MCGEHEE and Forintek Canada Corporation.

Forintek: What is DryTrend?

Originally developed by Forintek (with manual data entry) and currently used by 11 Canadian mills.

Signature version provides automated data entry and simplified analysis of kiln performance.

Data automatically enter from kiln controller
Data automatically entered from in-kiln moisture meter
Potential automatic entry from planer meter
DryTrend can be used with or without an NMI meter.

Software that helps optimize kiln drying.

What Can You Do With DryTrend?

Helps you answer critical drying questions. Examples:
- Should I adjust my drying targets seasonally?
- How much should my drying targets change by dimension?
- How much should my drying targets change by species?
- Do I have kilns that are underperforming?
- Are there zone in a kiln that aren't providing uniform drying?
- What is my standard deviation?
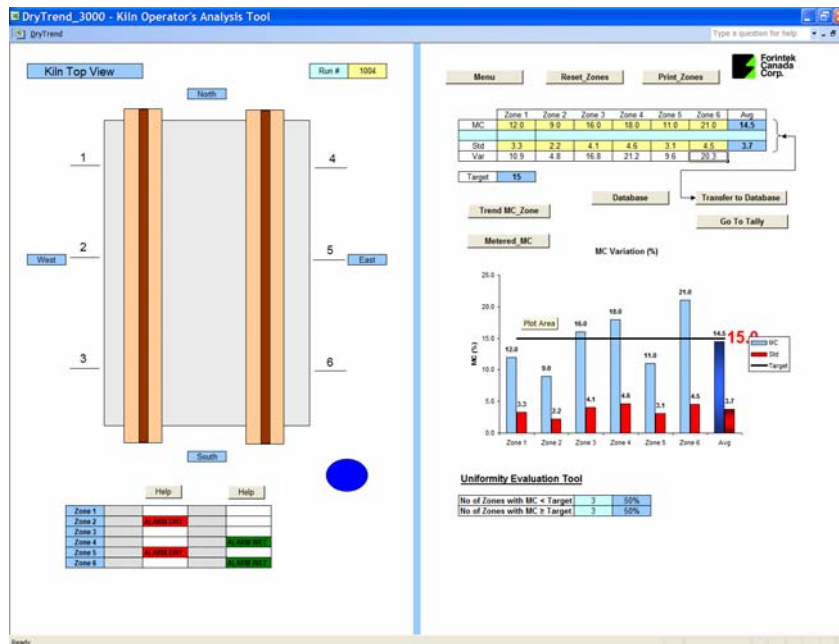- Am I getting optimal yield?

DryTrend Moisture Tracking

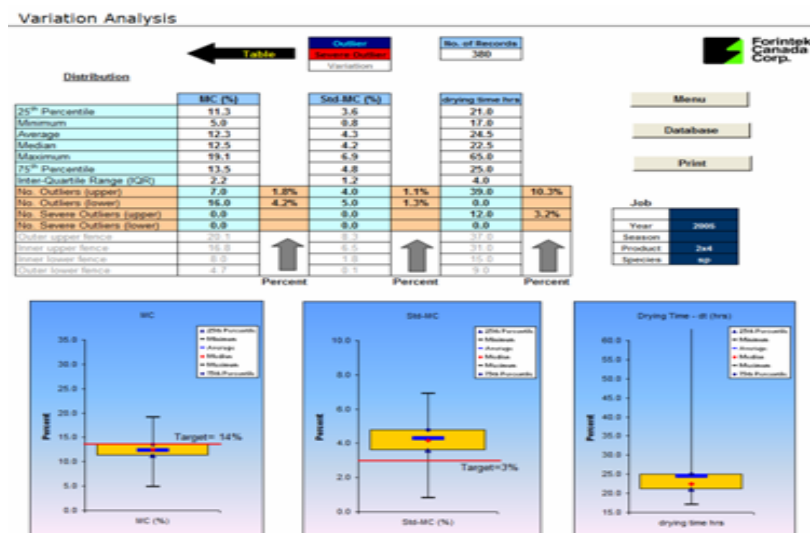Kiln 1, Pine, 2x4: Feb 10 through Mar 27, 2007
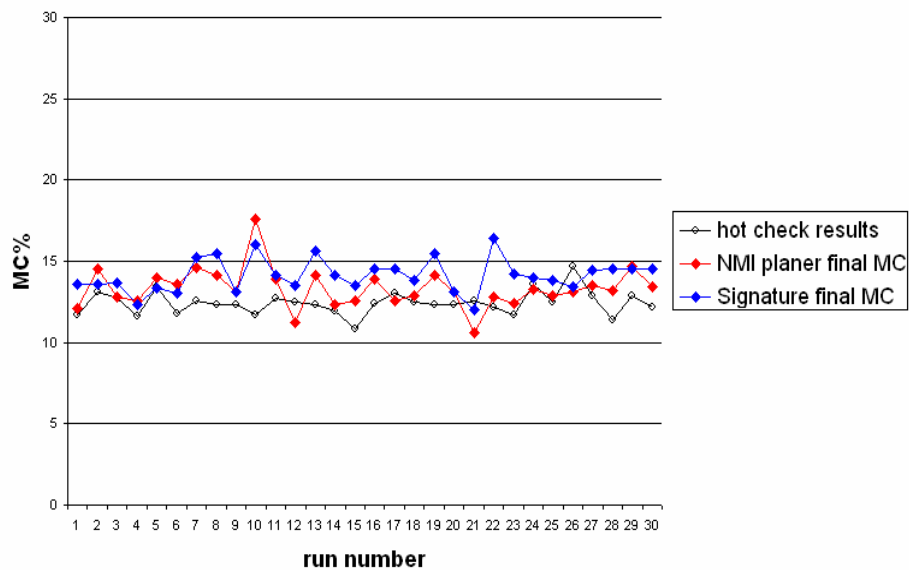
DryTrend Zone Analysis

DryTrend Variation Analysis

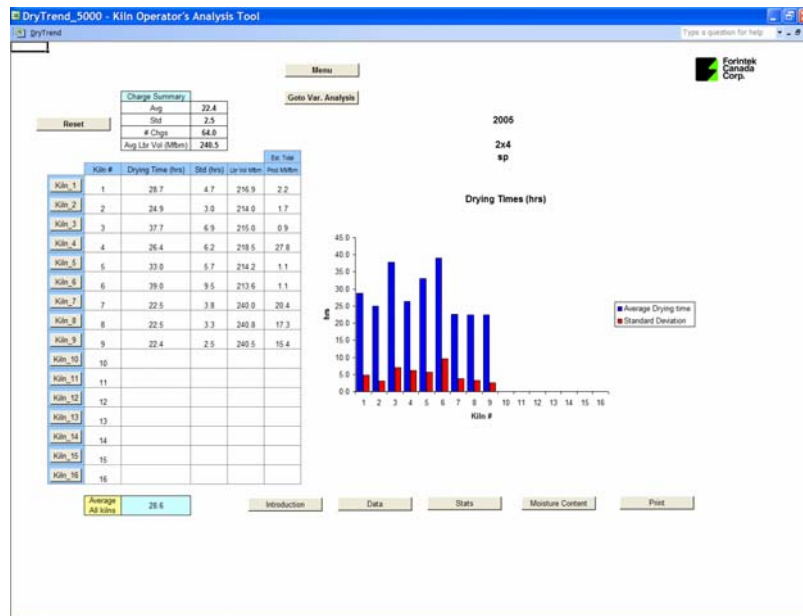Uses box and whisker charts to show typical performance and variability in performance.

Allows you to set goals and manage towards achieving them.

Focus on ave MC, Std deviation, and the variability in both.

DryTrend Drying Time Analysis

Benefits of DryTrend

One centralized data base for storing kiln operations data
Automated data entry
Simplified displays and analysis
Don't need to be a statistics major to use it!
Training and technical support
Easier and more powerful method to track many of the parameters you need to track
as a kiln operator

What is Pro-Trac?

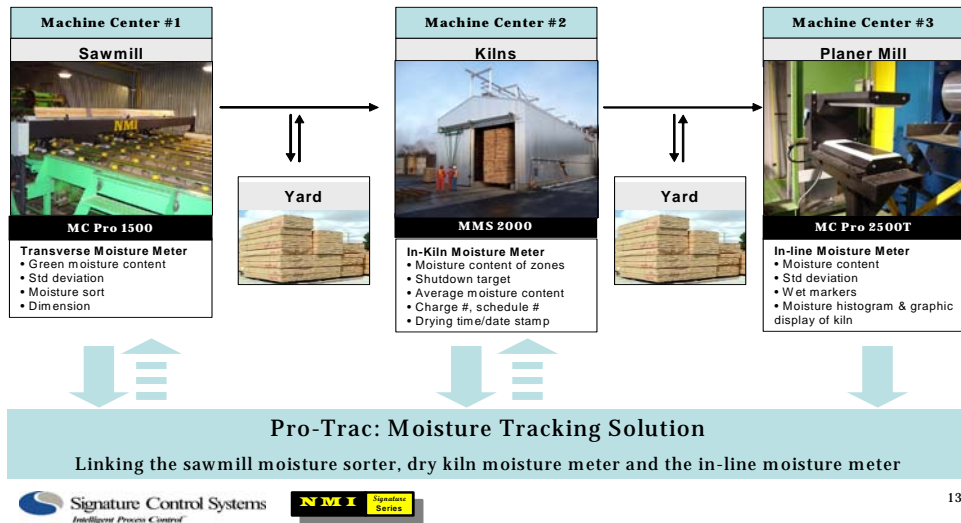Integration and software solution that leverages the linkage between NMI meters and
Signature In-Kiln Meter

- May include both sawmill and planer mill meter if desired
- Tracking capability via barcoded packages
- Tracks time between sawmill to kiln and kiln to planer.
- Analyzes moisture content data and synchronizes moisture readings between
  meters Facilitates three dimensional and zone analysis of moisture content.

How Does Pro-Trac Work?

Machine Center #1	Machine Center #2	Machine Center #3
Sawmill	**Kilns**	**Planer Mill**
MC Pro 1500	**MMS 2000**	**MC Pro 2500T**
Transverse Moisture Meter • Green moisture content • Std deviation • Moisture sort • Dimension	**In-Kiln Moisture Meter** • Moisture content of zones • Shutdown target • Average moisture content • Charge #, schedule # • Drying time/date stamp	**In-line Moisture Meter** • Moisture content • Std deviation • Wet markers • Moisture histogram & graphic display of kiln

Yard   Yard

Pro-Trac: Moisture Tracking Solution

Linking the sawmill moisture sorter, dry kiln moisture meter and the in-line moisture meter

Signature Control Systems
Intelligent Process Control

NMI Signature Series

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Sawmill Stacker: Barcode labels are affixed to each package.

Sawmill Out-Feed: Scanned at the sawmill out-feed and moisture related data is passed to database.

Dry Kiln In-Feed: Scanned on the kiln carts and data is appended to database. Key information: Lag time from sawmill to kiln and kiln charge pre-sorted MC (from NMI sawmill meter).

Planer Mill In-Feed: Scanned at the planer mill in-feed and data is appended to data base. Key information:
> lag time from kiln to planer mill final average moisture content (from Signature) and
> final moisture content by zone (from Signature).

Planer Mill Moisture Meter

Data is appended to database completes full set of data on that kiln charge, including
> Ave MC and Std Dev of the charge (from NMI meter)
> Ave MC and Std Dev of each package (from NMI meter)

Facilitates
> Three-dimensional moisture mapping of kiln charge
> Zone analysis
> Correlation between planer meter and in-kiln meter

Benefits of Pro-Trac

Data collection and storage
    Centralized location to store moisture related data
    Data may be stored to meet CFIA/Export requirements

Tracking and Trending Reports
    Identify opportunities for improvement (i.e., "long lag times form kiln to planer mill")
    Increase efficiency and decrease operating costs (i.e., identify zones that are underdrying)
Optimization Software
    Synchronize planer meter and in-kiln moisture meter readings.

3D Kiln Moisture Mapping