Industrial Sensors Technologies
On-Line Wood Chip Colour Analyzer

Innovative On-line Vision-Based Measurement

The Chip Line Quality System (CLIQS) Colour Analyzer is an on-line vision analysis system that quantifies visible properties including bark, bluestain, char, decay, brightness and species. The CLIQS Wood Chip Colour Analyzer is an overhead mount camera-based vision system that provides reliable and accurate real time chip colour analysis using advanced wood chip colour image processing algorithms. The analyzer interface allows the end user to define the wood chip descriptors based on predefined colour parameters. For example, the end user could define bark as their primary interest and the system will output bark area percentage (and other chip descriptors at the same time if more chip descriptors are defined). The Wood Chip Colour Analyzer is designed to be integrated on a chip line and to make non-contact wood chip colour measurements on moving wood chip stream as shown in Figure 1.

The image analysis methodology of this system provides improved quantitative measures over signal averaging systems or manual counting methods. The pixel-by-pixel analysis allows for measurement of small components, such as bark, that may have a negligible effect on an average measure. The analysis gives an area averaged measure of a property that corresponds much better to a weight fraction than piece counting methods.

The major benefits to pulp producer include:
- Valuable input signal to pulp mill for wood chip brightness and colour parameters monitoring.
- Pulp mill bleaching control.
- Valuable addition to a pulp quality database.

Key Features
Enhanced Runnablility Design – Low Maintenance and Service Requirements

The Wood Chip Colour Analyzer is equipped with self-cleaning and self-calibration systems that minimize runnability issues related to environmental dust and optical signal drift. Three years of mill trial results demonstrate that analyzer could run smoothly for twelve months without major services. The self-calibration system is capable of minimizing the signal drift within predefined time period between routine wood chip component scaling calibrations.

Advanced 3D Spatial Colour Correction Algorithm Minimized Chip Height Effect

Chip height variation is a common factor that can influence the colour analysis if corrections for spatial variation of the illumination are not used. The analyzer uses an advanced 3D spatial colour correction algorithm to minimize this effect and improved the system output stability and accuracy performance. Figure 2 provides comparison graphics to demonstrate the wood chip image before and after 3D spatial colour correction. After spatial colour correction, a colour component analysis yields output data as shown in Figure 3.

Figure 1 Chip analyzer installed on a chip belt

Figure 2 Spatial colour correction

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Measurement Accuracy and Repeatability

For a typical TMP process, the correlation between on-line blue stain area percent was compared with lab scanner routine test results. Figure 4 is a one year period comparison chart to demonstrate the trend. Some on-line data were reading zero due to system service/test for that period. Please note the results from lab scanner system were not affected by chip moisture and temperature since the lab samples were dried first and stabilized at room temperature. The CLIQS on-line results were from chip line chip samples that have a moisture variation range from 20% to 50% and temperature variation range from -50ºC to 40ºC. Overall the CLIQS algorithm works well within normal chip moisture and temperature range in Western Canada.

CLIQS Wood Chip Colour Analyzer

Product Specifications

CLIQS Wood Chip Colour Analyzer provides reliable measures of wood chip descriptors including blue stain, bark, decayed chips, species, and brightness.

Inputs
- 110V power supply
- Pressed air at 30 psi (optional)
- Analog phone for remote connection (optional)
- Environmental temperature -50ºC to 50ºC

Outputs
- Analog output (4-20 mA) or digital output.
- Blue stain chips (0 – 100%)
- Bark (0 – 100%)
- Red chips (0 – 100%)
- Chip brightness (optional)
- Chip height (optional)
- Digital output
- User selectable alarms and warnings
- Ethernet based chip quality output to process (Modbus TCP/IP interface is optional).

User and Computer Interface
- System Control Access
- Power switch
- RS232 modem or TCP/IP interfaces for remote system access.
- A software interface on host PC will be provided for system operation control and chip quality analysis.
- Chip quality result is displayed on software interface and saved in results file.
- Calibration software tools.

Physical Features
- CLIQS unit: 30” x 24” x 20”
- CLIQS unit will be custom designed to fit the chip line in pulp mill. A support frame is normally required.

System Control
- Industrial PC with embedded Windows XP operating system for high level control and data communication.
- CLIQS unit temperature control system.
- CLIQS self-cleaning system.
- CLIQS self-calibration system.

Documentation
- User manual with sections describe installation, maintenance and routine operation.
- Recommended spare parts list.

Put our expertise to work for you:

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