



CROSS DIRECTION (CD) BASIS WEIGHT PROFILE CONTROL SYSTEM

The Cross Direction Basis Weight Profile Control System provides a cost effective solution to upgrade scanner measurement systems to closed loop cross direction (CD) profile control using stepper slice screws or dilution valve actuators. The system works with the basis weight profile obtained from the scanning sensor system, generates the actuator profile and sends control outputs through a PLC-based control module. Control outputs are specified to match actuator requirements or can also be supplied to a distributed control system (DCS) for actuator control by the DCS. The control strategy uses the CD profile control software to calculate actuator action for each headbox position. The number of data boxes in the CD basis weight profile is mapped to the number of positions in the headbox. Full colour video displays provide an interactive and friendly operator interface.

FEATURES

- Standard operating system
- Modular software
- Standard hardware
- Scanner/Sensor interface
- Selectable outputs

BENEFITS

- Unlimited connectivity to external systems
- Can be applied to slice screw or dilution valve actuators
- Low capital and maintenance costs
- Can be retrofitted to legacy scanner systems
- Digital, analog, serial and Industrial Ethernet outputs

Scanner and Sensor Interface

The scanner and sensor interface collects analog sensor and scanner data from the basis weight measurement system and builds the basis weight profile to suit the papermachine and actuator requirements. The interface is driven by an industry standard PLC and provides the programming flexibility to adapt to most measurement systems. Transmission of profiles to the operator station is done through industrial Ethernet communication. The PLC and supporting electronics form a compact unit for ease of installation and maintenance.

SCADA Operator Station

The operator station performs the cross direction supervisory control and operator communications functions. Operator displays are built on a windows-based environment and feature optional touchscreen facility. Typical video displays include basis weight and actuator profile in one page. Operators can select manual or automatic control for any or all of the actuator positions. The station consists of a standard PC, colour video and network card for communications with the scanner/sensor interface and cross direction control module. The application program runs under Microsoft Windows XP™, a multitasking and network operating system.

CD Basis Weight Profile Control Software

The CD basis weight profile control software consists of four main functions including reception of measurement profiles, profile filtering, profile mapping and profile control. Other machine data, grade setup guidance, performance evaluation and control tuning are also used to support the main functions. High-resolution measurements of basis weight and moisture are received and filtered at the end of each scan. A “controlled” CD profile is calculated by “mapping” the filtered profile to match the actuator array. For slice screw control, the CD model computes the optimal adjustment of the basis weight actuators. This is accomplished by estimating the controllable portion of the current basis weight profile and reducing this to a minimum. The slice screw model checks the limitations of the actuators and ensures that no excessive mechanical stress is induced in the slice lip. Actuator set point changes are implemented based on the transport delay of the sheet and the variability of the error profile.

Specifications

Input:

- Basis weight measurement profiles
- Slice opening/valve position feedback
- Automatic sheet edge position measurement
- Slice/valve actuator position

Output:

OPC network communication to DCS

Industrial Ethernet to PLC, Ethernet/IP, ModBus Ethernet

Dry contact closure to individual stepper slice actuator or dilution valve

Analog output to individual dilution valve

Number of positions: customizable to match number of actuator positions and machine trim.

Profile resolution: up to 256 points.



Basis Weight Profile display