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Corrugated Board

Quality

The quality of a box, be it a regular brown box or a highly printed box, is determined by the quality of the corrugated sheet produced at the corrugator. Characteristics that determine board quality are:

- The flatness of the sheet in both directions
- The strength of the sheet
- The surface smoothness of the sheet
- The final moisture of the sheet

Flatness of the sheet and the strength (ECT) are requirements for any board grade. The flatter the sheet the easier it is to run through the converting processes. The optimal final moisture of the sheet is important to avoid post-machine warp, cracked scores and for easy converting. The surface smoothness of the sheet is an important characteristic for direct printing.

In addition to providing a competitive edge because of high customer satisfaction, quality board also provides the benefits of reduced waste and higher corrugator and converting speeds.

Production Speed

The speed of the corrugator is a metric that is used for rating most corrugators. Management has a focus on machine speed or the square (feet/meters) of board produced per hour. There is a balance between board quality and machine speed. The quality of the sheet is dependent on the speed of the corrugator and the speed variations due to order changes and wet end changes. Similarly, the speed of the machine is dependent on the quality of the board. Flatter, well-bonded board will tend to run smoother with less downtime due to tear outs, stacker jams, etc.

Controlling Board Quality

The quality of corrugated board is affected by many factors – the equipment, raw materials (paper and starch) and process conditions.

Equipment and raw materials are best handled by plant management and are considered to be uncontrolled variables. These process conditions are controllable with a quality control system.

The quality control system will preset the corrugator – heat (preheater wraps doublefacer loading), starch application gaps, auxiliary moisturizers, bridge accumulation – for the grade of board to be produced when a paper change takes place. It will then adjust the settings as the speed of the machine changes to ensure that the appropriate amounts of heat and starch are being applied at all speeds and conditions. Measurements of paper temperature and moisture are used as a feedback mechanism for finer continuous adjustments. This will ensure the production of quality board at all times.

Controlling Corrugator Speed

The speed of the corrugator is also a function of several factors:

Dry End Factors – order length, cut length, cycle time of the dry end between orders.
Wet End Factors – whether a partially consumed roll is being run, time for the wet end crew to get ready for a paper change, splicing while keeping the doublebacker speed constant.

Quality factors – board grade, lower temperature limits for bonding (adequate heat).

A process control system monitors all the above constraints and optimizes the speed of the corrugator to push it closer to the limiting constraint. The result is a corrugator running at the maximum possible speed for a particular order while producing quality board.

The Qualitek Quality Control System (QCS) provides the tools to ensure consistent, high-quality board – it controls preheater wraps, doublefacer loading, starch application, auxiliary moisturizers and machine speed.

The Qualitek Production Control System (PCS) provides controls such as bridge speed controls, synchronized splicing, minimizing partially consumed rolls, and maximizing the speed of the machine to a wet end or dry end limitation.

The integrated Qualitek Control System provides the tools for producing high-quality board consistently at the highest production speeds. Fastest paper change is achieved through the QCS system to get immediate return of investment for the complete corrugation line.