Tension Issues in Corrugated Board

Most of us are well aware of the causes of tension issues in corrugated and what we mean when talking about tension warp, but let's make sure for those that may have less experience in this area.

Tension warp is a machine direction warp in either an "End to End Up" or "End to End Down" direction. This can be easily observed by visually looking along the slit edge of a stack of sheets on the conveyor. Look for the leading and trailing edge to be either up or down. On a shorter length cut off, it will look like a total curve and on a longer cut length, it will appear flat in the middle with the end either up or down simply due to the length and weight of the sheet.

While the "End to End" Tension issues are the most common, there are also diagonal tension issues which occur resulting in twist warp scenarios. These typically stretch the paper fiber in a diagonal direction on the machine and can be identified by observing combined boards where diagonally opposite corners of the board are either up or down in the stack.

The most common cause occurs when you have too much tension on either the top web or the bottom liner as they enter the hot plate section in relation to the other. In other words, the tension is "out of balance" between the two. It is necessary to maintain some tension on the web and liner in order to hold them firmly against the respective preheater in order to achieve consistent heat transfer across the width of the paper. However, too much tension can actually stretch the paper fibers in the web or liner and the more tension applied, the more the fiber stretches. In the corrugator process, you hold that tension through the hot plate section, traction section, and slitter. The tension is released when the sheets are cut to length at the cut-off knife. Once the tension is released, the paper fiber springs back like a rubber band and attempts to return to its original length. Since the web and liner are already glued together, and either the bottom liner or the web has been stretched more than the other, one will shrink back more than the other resulting in tension warp.

In addition to tension applied by the machine adjustments on the web tension control devices and the roll stand, splicer and brake controls, there are other items which can cause tension issues in the paper. These are less common, and harder to identify, but can also stretch the paper fiber. Mechanical conditions like bearing issues, out of parallel wrap and idler rollers, incorrect preheater to paper speed ratios throughout the speed curve, hot plate level and housekeeping issues, top to bottom belt speed issues are some of the other causes. You can even have tension issues built into the paper from the mill/paper making process.

New equipment to assist with heat transfer are Tension and Brake Rolls. These greatly improve the contact and consistent tension around Preheaters and Single Facer. These minimize the temperature variation during splices, slow downs and speed ups of the machine.

Your Corrugated Chemicals Technical Specialist can help coach in this area. You can contact them at 800-669-7589 or email: solutions@corrugatedchemicals.com for assistance.

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