ADVANCED ADHESIVES REPORT

APRIL 2002

Your corrugating adhesives newsletter from Harper/Love Adhesives Corporation

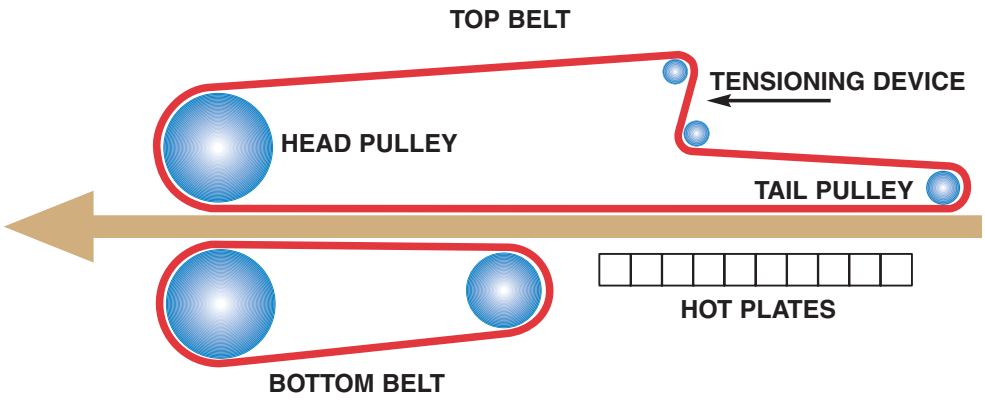
Top corrugator belt tension: Too tight? Too bad!

Excessive tension is the enemy of glue-line consistency

by Wayne Porell

To achieve a consistent glue line across the web on the double face side, you need to have good pressure and solid contact across the web.

Whether you use ballast rolls or a version of shoes to apply pressure, you need to make sure the top belt is not under too much tension. When it is too tight, the belt can't relax and conform to the plates as deflection increases with speed. The belt will actually hold up the ballast rolls or shoes, causing an air gap between the plates and the bottom liner–creating an inconsistent glue line.



Trials performed with a tight belt showed glue lines that varied as much as .070" from the center of the web to the edges. We also observed a temperature variation of as much as 60° F from the center to the edges. By loosening the belt, we picked up an additional 20° F to 50° F at the glue line, and more consistent glue line measurements.

There is no magic number for belt tension; each machine is different.* To determine the right setting for your machine, measure glue line width in the center and the edges, and check the glue line with temperature strips. When you get consistent results across the web, your tension is correct. Make your adjustments in small steps and let the belt run for 2 to 4 hours to settle in before taking new measurements.

Another benefit of running the belt under less tension is reduced strain and wear on the bearings. Worn bearings will give you tracking problems. As you make your tension adjustments, take time to check for bearings that are already worn. A belt under proper tension, running on good bearings, will track better.

**I've found that with hydraulic tension adjusters, 600 to 700 psi works well on some machines.*

Rick Bird and Duane Van Witzenberg Join HARPER/LOVE

Rick Bird recently joined Harper/Love as process improvement engineer based in Charlotte. Rick has a Bachelor of Science degree in chemical engineering from West Virginia Institute of Technology. He has experience in both liquid and powder blending as well as supervisory and laboratory experience.

Duane Van Witzenberg has joined our team as a technical service representative. Duane has over 17 years of hands-on experience as corrugator operator and corrugator supervisor. He has worked with several large integrateds and has developed considerable experience on a vast array of equipment. Duane will be responsible for Technical Service to customers in the Midwestern U.S. and will be located in the Kansas City area.

ADHESIVE TECHNOLOGY ALLIANCE

Partnership achieves bonding breakthrough for wax replacement coatings

The partnership between Harper/Love and Corn Products is paying unique dividends to those plants running wax replacement coated substrates.

A joint research project undertaken by the Harper/Love Laboratory in Charlotte's Advanced Adhesive Bonding Center as well as the fully equipped TAPPI certified Lab in Argo, Illinois, have yielded a major breakthrough in bonding these problematic papers.

The background

Starting a little over a 10 years ago, the corrugating industry was hit with the economic energy crunch that sent wax prices sky-rocketing. Plants were scurrying to eliminate cascading and curtain coating with a more efficient and cost effective material that could be recycled.

Over time, as petroleum costs went back down, the push went to the back shelf. However, there is still a need for a wax replacement that will provide superior wet strength performance, increase edge-crush values and increase corrugator production speeds at a reasonable cost.

Over the last decade, a lot of coatings have been developed in order to produce a wax alternative. As the coating became more sophisticated, the adhesive bond became harder to make at higher speeds.

The breakthrough

Harper/Love and Corn Products researchers have found that a combination of a high solids Corn Products specialty carrier (Fiberbond) and two liquids from Harper/Love have succeeded to provide a solid well-bonded sheet with a very high level of wet strength.

The Harper/Love liquids include both a recently developed performance-bonding agent (XW-200) and a high solids wet strength resin (Aquaseal W-150).

The resultant adhesive produces excellent bond and wet strength at a full range of corrugator speeds.

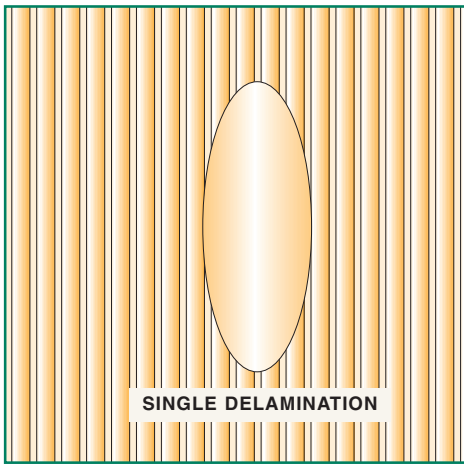
For detailed information on this needed technology, please contact your Harper/Love or Corn Products representative.

Clues to cold spots

A little detective work reveals the cause–and the cure

These football-shaped delaminations occur in the center of the single face web and work their way out to the edges. They can come in a series of one, repeating after so many lineal feet, or in a series of interconnected delaminations.

A rule of thumb (there are exceptions): If delamination is in the middle of the web, it is a heat problem. If delamination is on the edges of the web, look for a mechanical or procedural solution.



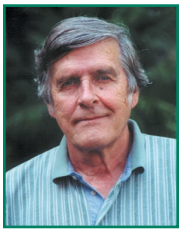
Cold spots often occur when a single facer is restarted after a shutdown. When the machine is not running, condensate collects in the bottom of both corrugating rolls, causing a temperature differential between the upper and lower portions of the rolls. This causes the rolls to bow and become slightly out of round, which creates localized loss of pressure roll loading. The problem goes away as the rolls return to uniform shape.

If the machine runs well at speed, but the cold spots persist longer than they should, it is possible a siphon pipe is turned up on the side of the vessel. This will cause extra condensation to accumulate when the machine is shut down. Then, when the machine is restarted, it takes a longer time than it should to remove this increased volume of condensation.

If cold spots appear when higher machine speeds are

Ron and Katherine Harper celebrate 50 years of personal and professional partnership

February 12, 1952

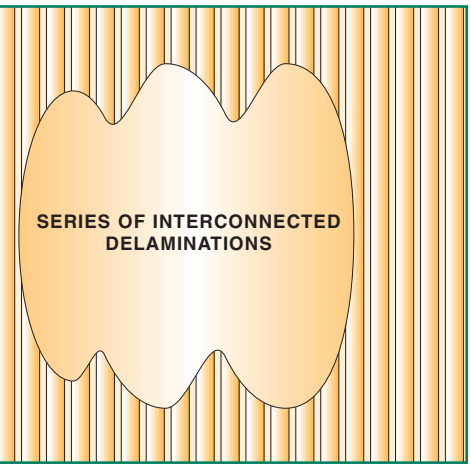


by Chris Polster (I) and Bill Nikkel

attempted after the machine has been running awhile, the problem may be with the return side of the steam system—or the boiler itself.

If you are experiencing problems with all steam vessels, the problem is with the return side of the steam system as a whole–usually supply-side versus return-side pressure.

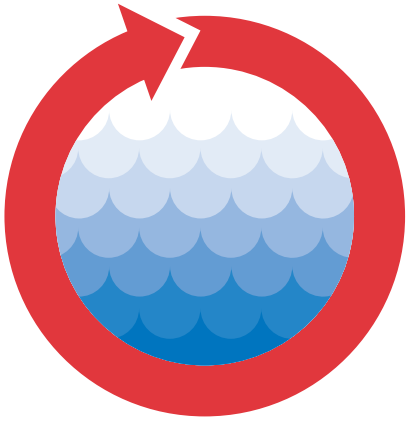
The most common problem with the boiler, as it relates to cold spots, is carryover. When the machine is running at high speed, or running heavy test, the boiler will most often be running at high fire to satisfy the energy demands of the corrugator. If the machine is shut down for any reason, the boiler will shut off or go to low fire. Then, when the machine is restarted, crews often return to high speeds before the boiler can return to high fire to answer the demand. This can cause water to be pulled out of the boiler and into the steam system.



If the problem is limited to a single vessel, it is probably the trap. You can solve the problem temporarily by opening slightly the bleeder that is positioned between the vessel and the trap. This allows the condensate to be released until the trap can be repaired or replaced.

Other issues, such as problems with noncondensable gases, can also affect the performance of a steam system. Call your steam system technician to help solve the problem.

February 12, 2002, marked the 50th anniversary of Ron and Katherine Harper's wedding. The couple founded Harper Corporation of America in 1972 and formed Harper/Love Adhesives in 1978 as a joint venture with N. B. Love of Australia. Today, Ron is chairman of Harper Corporation of America and president of Harper/Love Adhesives. Katherine serves as president of Harper Corporation of America.



Zero water discharge: What's involved. How to get started.

Recycling wash-up and other waste water for adhesive formulation makes sense environmentally and economically. Because each plant is different, there is no off-the-shelf program but we can help you sort things out.

- In general, we'll start by looking for ways to reduce your water consumption so you have less waste water to deal with.
- Then we'll recommend any changes needed to make your waste water more adhesive friendly. Usually, this involves controlling pH, hardness, solids, temperature, and microbal growth.
- We'll also look at any engineering changes the program would require.
- And, of course, we'll make sure your adhesive formula can accommodate the change without compromising your productivity or board quality.
- Finally, if there's no way to avoid discharging water, we'll show you how to process it at the lowest possible cost.

There's more. To explore your Zero Water Discharge opportunities, contact your Harper/Love representative or call us toll free at 800-438-3066.

IN THIS ISSUE

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Use Calciban™ to keep your glue rolls clean and efficient.

Calciban prevents calcium build-up that can cause adhesive transfer problems.

Inorganic compounds in your adhesive water can cause calcium build-up on your glue rolls. These deposits, which appear as a milky-white haze on the roll surface, clog cells and reduce the amount of adhesive the cells can carry. This creates a risk of bonding problems and increased waste.

In also means lost productivity when you need to shut down for time-consuming cleaning operations.

Just 3 to 6 ounces of Calciban in a 700-gallon batch of adhesive can prevent this build-up and the problems it creates. It can be post-added to the batch, or to starch in a storage tank.

At just $3.95 per pound, Calciban is low-cost insurance against the problems of calcium build-up.

The problem: *Inorganic compounds in adhesive mix water can clog cells in your glue transfer rolls.*

The solution: *Used regularly, Calciban keeps glue-roll cells clean and efficient, for proper adhesive transfer.*

Other uses for Calciban:

- **Add to cooling water in closed-loop systems**
- **Add to flexo wash water**
- **Add to boiler feed water**

To order, contact your local Harper/Love representative or call us toll free at 800-438-3066.